PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

EDITED BY

THE HONORARY SECRETARIES,

JANUARY TO DECEMBER,

1887.

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PROCEEDINGS

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FOR JANUARY, 1887.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 5th January, 1887, at 9 P. M.

E. T. ATKINSON, ESQ., C. S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Thirty-two presentations were announced, as detailed in the appended Library List.

In accordance with Rule 5 of the Society's Bye Laws the Secretary submitted the name of the following gentleman for re-election as an Ordinary Member.

Babu Rákhál Dás Háldár, Ranchi, Chota-Nagpur, proposed by Dr. Rájendralála Mitra, seconded by H. M. Percival, Esq.

The following gentlemen have intimated their wish to withdraw from the Society:

Col. Sir E. B. Sladen.

Hon'ble H. Beverley.

The PHILOLOGICAL SECRETARY exhibited 4 ancient copper coins presented to the Society by Kaviráj Shyámal Dás of Oodeypur.

The PHILOLOGICAL SECRETARY read the following report:—

Report on 67 coins forwarded by the Deputy Commissioner of Ságar with his letter, No. 3408, dated 6th October, 1886.

1. The coins were found in the Ságar district, but no particulars of the find have been given.

2. They are all round silver rupees of the following Moghul Emperors of Delhi.

		No. of specimens.
1, III.	*Jalál-ed-dín Akbar*, A. H. 963—1014 = A. D. 1556—1605. Circular area. *Obv.* name of Emperor and mint. *Rev.* Legend. mint Ahmedábád, year of reign 14	3
2, IV.	*Jehángír*, A. H. 1014—1037 = A. D. 1605—1627. Circular area. *Obv.* name of Emperor and mint. *Rev.* Legend and date: mints Patna, Lahor and Ahmedábád, dates 1014-1024-1026...	8
3, V.	*Sháh Jehán*, A. H. 1037—1068 = A. D. 1627—1658. They are of 3 types, *viz.*:—	
	a. Marsden's No. DCCCLXX, p. 642, mints Lahor, Agra, years of reign 8-9-17-18-21-24-26-29	35
	b. Marsden's No. DCCCLXIV, p. 637, mints Surat, Patna, Ahmedábád, Secundrábád, Agra, years of reign 4-15 ...	11
	c. Marsden's No. DCCCLXVII, p. 639, mint Surat, years of reign 2-4.....	2
4, VI.	*Aurangzíb*, A. H. 1068—1118 = A. D. 1658—1707. Marsden's No. DCCCXC, p. 652, mints Surat, Golkonda	8
	Total ...	67

DR. RÁJENDRALÁLA MITRA, in laying before the meeting a letter from Professor Max Müller on the derivation of the Buddhist term *Ekotibháva*, made the following remarks:—

In April last Dr. Max Müller published in the 'Academy' a note on the etymology of the Buddhist term *Ekotibháva*, which he took to be "an irregular contraction" of *Eka-koṭibháva*, and I had occasion to dissent from this in a note which appeared in our 'Proceedings' for June last. Anent this note I have now received from the learned gentleman a letter, the following extract from which will, I think, interest our members:

"*Oxford, 26th October*, 1886.

"MY DEAR SIR,

"I read with much interest your remarks on my paper on *Ekotibháva*. Of course, I fully agree with all you say about *Ekotibháva*, with dental *t*. That can be derived from *eka* and *úti*. But I had

met with *Ekoṭibhâva*, with lingual *ṭ*, and it was the word which I called possibly a Bhâshâ word, of which afterwards a learned etymology was attempted.

"The question of real interest is, do we find in Sanskrit analogies to the contraction *eka koṭi* into *ekoṭi*. They are frequent in other Aryan languages, in order to avoid the repetition of the same sound in two successive syllables. So we have in English *mineralogy* instead of *mineralology*, *wholly* for *wholely*. In Latin *nutrix* for *nutritrix*, *veneficus* for *venenificus*, *vipera* for *vivipara*, *stipendium* for *stipipendium*, perhaps *fastidium* for *fastitidium*, etc.

"In Sanskrit my memory would not supply me with any really analogous cases. The contracted perfect *lebhe* for *lalâbhe* is not quite analogous, but I should be glad to know whether you have come across any words in Sanskrit or Prakrit where, for the sake of euphony, one of two syllables beginning with the same consonant is dropt.

"You may print this note in the Proceedings of the Asiatic Society."

The question put to me is too general and comprehensive to admit of a categorical reply. Of all ancient languages the Sanskrit is, perhaps, the most complicated in its etymological and euphonic rules. Acutely sensitive to cacophony the Indo-Aryans devised a complicated and very elaborate system of combinations by lengthening, shortening, softening and synizesis, so as to wear, abrade, clip, and elide all asperities, and reduce the elements of their words into what struck their ears as the most harmonious forms. And Sanskrit grammarians revel in framing rules to explain the *rationale* of the changes adopted. Their ingenuity, however, did not suffice to cover the whole ground. Many words were found in the language which would not yield to any general principle, and these had to be classed as irregular. Now the general principles do not apply to the case under notice, and I have no hesitation in saying with the fullest confidence that the changes by which *eka koṭibhâva* can be reduced to *ekoṭibhâva*, cannot be accounted for by any rule, general or special, in the Sanskrit grammar. Of the irregular words which have been classed by Pâṇini in the group *Pṛishodara* &c. the only explanation given is that "the forms in which they have been pronounced by the learned should be accepted as correct" (*sishṭair yaṭhochchâritâni tathaiva sâdhûni syuh*). The group is said to belong to the class *âkṛitigaṇi*, *i. e.*, not only the words included in the group, but others of the same form come under it. *Ekoṭibhâva*, however, does not in form correspond with any of the words given in the gaṇapâṭha; and it is hopeless to find its analogue. Apart from grammar I have ransacked the wide field of Sanskrit vocables, but with no better result. I have not found a single word which is strictly

analogous. At first sight the word *bhaumávásyá** struck me as closely similar to the English *mineralogy*. It is an obscure word, not given in our lexicons, but it is sometimes used by Kaula Tántrics who indulge extensively in obscure, enigmatic and mystified technical terms, often amputating words and syllables to raise them above the comprehension of the common people. At first sight it seems to be a compound of *bhauma* and *amávásyá;* but the two elements compounded according to the ordinary rules of Sanskrit grammar would yield *bhaumámávásyá*, and not *bhaumávásyá*, and the inference is that one of the two *má's* has been elided for the sake of euphony. If so, it would certainly be the same as *mineralogy*, a compound of *mineral* and the Greek *logos*, which should have in ordinary course produced *mineralolology* and not *mineralogy*. But all Tántrics do not accept the derivation above given. While some refer the etymologist to the rule about irregulars (*Preshodara* &c.) to account for the irregularity,† others hold that *bhauma* is a derivative form, and *vásyá* is the same word which we have in *amávásyá* with the intensive particle *a*, meaning 'to abide by,' or 'to exist conjointly with,' the meaning of the compound term being 'that which exists conjointly with *bhauma*' or Tuesday. And if this be the right etymology, and there is no fair reason to reject it, the parallelism is entirely destroyed. It is true that an *amávásyá*, or new moon on a Tuesday, is what is meant by the term, that conjunction being held to be the most auspicious for the performance of certain Kaula rites, but it may be as well indicated by a derivative as by a substantive word, and it would be futile to build any theory on such dubious evidence.

The following papers were read—

1. *Note on the rice-juice sapper of Madras.—By* E. T. Atkinson, Esq., President.

Mr. J. Lee Warner, of Tinnevelly, sent me some specimens in spirits of an insect that attacks rice in the Tinnevelly district, and which, like the green Homopterous insect that came in such numbers in Calcutta in October-November 1886, also appeared in excessive numbers in the Madras Presidency about the same time during that year. I identify this insect with *Leptocorisa acuta*, Thunberg, a wide-spreading species found all over the East on rice. In Assam, it is known as the *gandi*

* The word occurs in the following extract from the 7th book of the Mahánirvána Tantra :—

भौमावास्यानिशाभागे मपञ्चकसमन्वितः । पूजयित्वा महाकालीमाद्यां त्रिभुवनेश्वरीं ।
पठित्वा शतनामानि साक्षात्कालीमयो भवेत् । नासाध्यं विद्यते तस्य त्रिषु लोकेषु किञ्चन ॥

† पृषोदरादित्वाद्भौमावास्येत्यत्र मालोपः ।

or bug that attacks the *ahu* rice, and in Tinnevelly it is called the *munju vandu*, or rice-juice sucker or sapper. There is every reason to believe that the numerous references which I give below all belong to one and the same species or its local varieties. This species is represented in South America by the closely allied *Leptocorisa filiformis*, Fabr.; in Central and North America, by *L. tipuloides*, De Geer; in Africa by *L. apicalis*, Westw.; and in Australia by *Mutusca brevicornis*, Dallas. The general colour of the Indian species varies from virescent (which in old specimens, fades to sordid yellow) to testaceous and even brownish-testaceous: the rings, at the base of 2-4 joints of the antennæ, vary in the space occupied by them; and in colour, from white to fulvous and testaceous, and are sometimes very faint; the first joint of the antennæ is sometimes entirely testaceous: abdomen above reddish orange, beneath entirely flavescent or with a row of four brown spots on each side. Those without spots beneath are smaller, and in my collection are from Assam and Sikkim; the spotted forms are from Calcutta, Behar, Tinnevelly and Ceylon but, in some of these latter specimens, the spots are so nearly obsolete as to be barely traceable.

Leptocorisa acuta, Thunberg.

Cimex acutus, Thunberg, Nov. Ins. Spec. ii, p. 34 (1783). China.

Var. *a.*—*Cimex angustatus*, Fabr., Mant. Ins. ii, p. 308 (1787).

Cimex angustus, Gmelin, ed., Syst. Nat. i, (4), p. 2193 (1788).

Gerris oratorius, Fabr., Ent. Syst. iv, p. 191 (1794); Syst. Rhyng., p. 261 (1803). India.

Gerris angustatus, Fabr., Ent. Syst. iv, p. 191 (1794); Syst. Rhyng., p. 262 (1803); Stål, Hem. Fabr. i, p. 66 (1868); Ofv. K. V.-A., Förh., p. 658 (1870). China, Philippines.

Myodochus trinotatus, Herr. Schäff., Wanz. Ins. viii, p. 95, t. 281, f. 863 (1848). Java.

Leptocorisa angustata, Walker, Cat. Het. iv, p. 173 (1871).

Leptocorisa (*Rhabdocoris*) *acuta*, Stål, En. Hem. iii, p. 86 (1873), China, Java, Australia.

Var. *b.*—*Gerris varicornis*, Fabr., Syst. Rhyng., 260 (1803); Wolff. Ic. Cim. v, p. 202, t. 20, f. 196 (1811); Stål, Hem. Fabr. i, p. 67 (1868) excl. syn. *G. apicalis*; Ofv. K. V.-A., Förh., p. 658 (1870). Tranquebar, Philippines.

Leptocorisa flavida, Guérin, Voy. La Coquille, Zool. ii, p. 178, t. 12, f. 12 (1830).

Coreus (*Stenocephalus*) *varicornis*, Burm. Nov. Act. Ac. Leop. xvi. Sup., p. 298 (1834).

Myodochus varicornis, Burm. Handb. Ent. ii, (i), p. 325 (1835). Sumatra, Philippines.

Leptocorisa bengalensis, Westw., Hope Cat. Hem. ii, p. 18 (1842); Stål, En. Hem. iii, p. 87 (1873). Bengal.

Leptocorisa chinensis, Dallas, List Hem. ii, p. 483 (1852): Walker, Cat. Het. iv, p. 172 (1871). China.

Leptocorisa maculiventris, Dallas, l. c., p. 484 (1852); Walker, l. c., p. 172 (1871).

Leptocorisa varicornis, Dallas, l. c., p. 484 (1852); Walker, l. c., p. 172 (1871); Stål, En. Hem. iii, p. 86 (1873): Distant, A. M. N. H. (5s.) iii, p. 127 (1879). Assam.

Var. *a*.—Above greyish, beneath entirely flavescent: antennæ and feet somewhat testaceous (*G. angustatus*, Fabr.). Virescent; antennæ obscurely flavescent, last joint white at base: beneath flavescent immaculate: abdomen above rufous (*G. oratorius*, Fabr.) Sordid greenish-yellow: 2-4 joints of antennæ yellow at base, black at apex (*M. binotatus*, Herr. Schäff.). Long, 18 mill. Testaceous; thorax greenish, with the lateral margins whitish: membrane with a black spot on the inner basal angle: abdomen beneath yellowish-white: antennæ with basal joint fulvous, black externally and at apex: 2-3 joints black, fulvous at base; last joint brown fulvous at base (*L. chinensis*, Dallas). Long. 16-17 mill.

Var. *b*.—Body linear, above flavescent, margin of thorax and hemelytra whitish: antennæ elongate, filiform, 5-jointed (?), first joint very short, globose, rest cylindrical, equal, inserted between the eyes, as long as the body, joints flavescent at base, black at apex: rostrum porrect, longer than head, inflexed, inserted below the clypeus; sheath 4-jointed, the joints subequal, last a little shorter, somewhat obtuse: labium porrect, elongate, very fine, corneous, subulate, as long as the first joint of the sheath; setæ three, equal, subulate, as long as the sheath: wings hyaline with a small common fuscous spot at the base: beneath flavescent (*G. varicornis*, Fabr.). Above fulvous testaceous: membrane with a brown curved streak on the inner margin, within the basal angle: abdomen above reddish-orange, beneath with a row of four brown spots on each side (*L. maculiventris*, Dallas). Long. 17 mill. Virescent-luteous: antennæ brunneous-fulvous, 2-4 joints paler at the base: a thin arcuate fulvous line at the base of the membrane: median segments of the abdomen furnished beneath on both sides with a fuscous spot: feet fulvous (*L. bengalensis*, Westw.). Long. 16½ mill.

I have specimens from Assam, Sikkim, Behar, Calcutta, Karachi, Tinnevelly and Ceylon. *L. tipuloides* is noticed as occurring on orange-trees in Florida (United States), and is said to do there no harm to the

crops, but preys on the different insects to be found upon the trees (Rep. Agric. Un. States, p. 205, 1880). It remains for observers in this country to ascertain whether the Indian form of this cosmopolitan insect damages the rice-crop and what is its life-history.

2. *On the ancient remains at Nagari, a village in Meywar, with copies of three inscriptions.*—*By* Kaviráj Shyámal Dás.

(Abstract.)

This paper contains an interesting account of the ancient town of Nagari, which seems to have been the capital of Meywár before Chitor was built.

The author describes a curious stone enclosure called Hathion-ka-Bara, or the elephant enclosure, and also the stone pyramid known by the name of Akbar's lamp, and which is described by Tod, I, 325, and II, 756.

He also gives two early inscriptions in Sanscrit, and one composed in 1499 and set up in 1504.

The paper will be published in the Journal Part I, for 1887.

3. *A Brief account of Tibet from "Dsam Ling Gyeshe," the well-known geographical work of Lama Tsanpo Nomankhan of Amdo.*—*By* Babu Sarat Chandra Dás, C. I. E.

(Abstract.)

This paper gives a number of geographical details about Tibet and describes the chief places of pilgrimage and monasteries, and also contains an interesting description of the city of Lhása. The following passage is very curious, if the Chitor referred to be the old capital of Meywár:—"When the Turushka armies under king Boramjee (or Noramjee) captured Chittore, the king and his brother carrying with them the images of Chanrassig Wangchhyug and his wife, retired to Kang Tesi.....

The royal brothers at the end of their pilgrimage in Tibet returned to Nepál, carrying with them the image of Dol-Ma. There, the elder brother happened to obtain the principality of Júmlang, and the younger brother, more fortunate, the kingdom of Nepál. The latter, after reigning several years, abdicated the throne and went to Southern India, where he obtained the chieftainship of a large principality."

The paper will be published in the Journal, Part I for 1887.

The PRESIDENT said:—In the paper by Babu Sarat Chandra Dás that has just been read there is much of interest to those engaged in investigating the history and geography of Tibet, so much indeed that I should not care to detain you even with a part of all that it suggests. With the assistance of the paper, and the notes of General Cunningham, Lieut. J. D. Cunningham, Lieut. H. Strachey, the surveyors of the Great Trigonometrical Survey, Father Desgodins, Captain Giles, and some collected in Kumaon, on the borders of Nari-Khorsum, the *S*tod *M*ngah-ri *s*kor-*g*sum of the paper, we might now be able to give a reasonable account of Tibetan geography did time and opportunity permit. The country to which the name Tibet is now applied appears in the Chinese annals of the Yang dynasty in the seventh century as T'ufan which should be read Tu-po; the character for '*fan*' being phonetic with the two sounds '*fan*' and '*po*.' In the records of the eleventh century, it is known as T'u-pot'é, in which the latter syllable represents 'Po' or 'Bo*d*,' and hence the Indian Bhot. The European name is derived from the Mongol in the form Tbt, or Tibt (Tibet), which occurs in the travels of the merchant Sulaiman so early as 851 A. D., and is evidently derived from the Chinese T'u-pot'é. During the Ming dynasty, the name was changed to Wussŭ-tsang, from the two principal divisions *d*Vus and *g*Tsang, hence the modern name Weitsang by which it is known to the Chinese. The word *h*si or 'western' is also applied to the country; hence *h*Si-tsang and *t*Si-fan, and the people are called Tupote and Tangkute.

The countries bordering on Tibet are *r*Gya-nak, or 'great black' (China), that in which the people are usually clothed in black *(nak)*: *r*Gya-gar or India, where white (*gar*) is the usual clothing: *r*Gya-ser, the great yellow (*ser*) or Russia: *h*Jang or north-western Tibet: Mon,* the entire Indian Himálaya, and the remainder as in the paper. Amongst the lakes mentioned Maphamgyu-*m*tsho is the Mánasarovara lake so well-known in Sanskrit literature, and which lies to the north of Kumaon: it is called also *m*Tsho ma-dro*s*-pa in the Tibetan books. Tibet has three divisions:—(*a*)-*s*Tod-*m*ngah-ri *s*khor-*g*sum or Little Tibet, the Nári-khorsum of our maps: (*b*)-*d*Vu*s* and *g*Tsang or Tibet proper, the U-tsang of our maps: and (*c*)-*m*Do, Kham*s* and *s*Gang or Khamyul, Great Tibet on the east. Nari-khorsum is divided into three Provinces, *s*Tag-mo Ladvag*s* to the west; Guge-buhrang (Purang) in the middle and Mang-yul along the Nepál frontier. According to Strachey, '*nari*' signifies 'clear' or 'pure,' an appellation probably due to the fine air and water of the country, and '*khorsum*' signifies the three countries or tracts into which the province is divided. *s*Tag-mo Ladvag*s* was for-

* A male native of Kumaon is called Mon-pa by the Húniyas, and a female Mon-mo.

merly known as Maryul, and includes Ladák and Balti, in which are *s*Le*s*-*m*khar, the fort (*khar*) of Le, and the forts of *s*Be-thub and Khrise (in Purik), besides others. In Guge-Purang, is the great mountain Kang Tesi, the Kailás of the Indians, and the sacred lake Mánasarovara. Hence also arise the four great rivers so frequently mentioned in Sanskrit and Chinese literature. In the great Chinese map, prepared by order of Khian-loung, the four corners or gates of the Mána lake are called the lion, elephant, horse and ox gates: *Toui-gochal* on the east; *Ghiou-ourgou* on the south; *Arabko* on the west and *Dadza-loung* on the north. The Pandit explorers give the names *Singh-gi-chu* or *Singh-gi-khamba* or *Singh-gi-kha* to the Indus, the *Senge khabab* of this paper: *Langjan-khamba* to the Satlaj: *Tamjan-khamba* to the Brahmaputra, the *Tsang-po* of this paper: and *Mabja-khamba* to the montane waters of the Karnáli or Ghágra, the *Mab-chya khabab* of this paper. Gerard calls the Satlaj, the *Lang-zhing-choo* and J. Cunningham gives the name *Langchin kabab*. '*Sing*' is lion, '*lang*' is bull (not elephant which in Tibetan is called 'great bull'), '*mam*' is peacock and '*ta*' is horse: *ka*' means mouth, and '*bab*' means 'issuing from' so that the names agree with the legend describing these rivers as issuing from the mouths of a lion, bull, peacock, and horse.

The traditional report as to the great size of *m*Tsho Mapham in former times is probably due to the legend that its area formerly included the neighbouring lake *m*Tsho Lagan (or Lagran *m*-tsho as it is called in this paper), the Rákhas Tál of Sanskrit literature. Amongst the affluents of *m*Tsho Lagan is the river La *m*tsho, the *L*ja-chhu of the paper, which rises from the south face of Kailás (Kang Tesi) close above Gángri and soon develops into a considerable stream. The pool on the pilgrim track around Mánasarovara, called Gauri-kund by the Indians, is probably the same as the Tibetan *h*Thúng-grol, the fountain that gives salvation to all who drink thereof. Both the lake and the mountain and their vicinity are sacred to both Buddhists and Hindus. The circuit of the mountain takes a couple of days to perform, and there are four monasteries on the way:—Nindi the residence of the Lhoba Lama, Didiphu, Jungdulphu, and Gyanktang in Gángri. The *parikrama*, or circumambulation, of the lake takes from 4 to 5 days, and is marked by eight monasteries:—Tokar, Gusur, Ju, Jakyab, Langbuna, Bundi, Sárálung and Nunukhar. As observed in the paper, the Hindus worship the places and marks of the presence of a deity as representing Mahádeo, in his various forms, whilst the Buddhists refer these places to their Bodhisattwas.

Guge-Purang is governed by the two Garpuns of upper and lower Gar. These act jointly together and form a board for the administration

of civil affairs called '*Lankya.*' The senior is called *Urku-gang*, abbreviated usually to *U-gang*, and the junior is styled *Urku-wah* or *U-wuh*. Both reside at Gar-toh or Gar-tod (upper Gar), also called Gar-yársa, or the summer abode (*yar*, 'heat' or 'summer') to distinguish it from Gar-gunsa, the winter abode (*gun*, 'cold' or 'winter'). The first is situate on the left bank of the southern branch of the Indus, and the second two or three days' journey down the river further north-west. In Gar-yársa the whole population live in tents and in winter migrate to Gar-gunsa, where there are but three large and eight small houses. Under the Garpuns are the Jangpuns or governors of districts, and the Makhpuns or headmen of circles or groups of villages. In Guge-Purang, or as it is more generally called Nari, there are four Jangpuns:—(1), at Ruduk in charge of the communications with Ladák: (2), at Tsáparang in Guge, in charge of the communications and trade with Bisáhr, Nilang and Mána: (3), at Dába in Guge, in charge of those with Níti and Juhár, and (4), at Taklakhar in Purang, in charge of those with Dárma and Byáns, and with Humla in Nepál. The four districts are:—(1) Ruduk, comprising Ruduk proper on the Ladák frontier; No, to the north of Ruduk, and the salt mines in part; (2), the divisions of Gar, and upper and lower Seng, about the upper waters of the Satlaj, Gar-namru, and Tashikang; (3), Guge has Dába, Tsáparang, Rong-chung and Chumurti; and (4), Purang has Bongba, Hor-ba, Kangri and Purang. Both Garpuns and Jungpuns are appointed from Lhása, and have a tenure of office for three years, after which they are relieved and return to give an account of their stewardship. Besides them, there is a commissioner of revenue in charge of the tea-monopoly called Lung-chung-pun, whose duty it is to assess the amount of tea to be taken by each district at a fixed price; and a contractor for the gold mines called Sarpun who manages those mines. There are also territorial divisions under native chiefs (*Pun*) called Pun-kágs of which Strachey gives a list.

In Nari there are four chief monasteries presided over by abbots of the Gelukpa sect,—in Ruduk, Rabgyaling, Tholing or Thoding of the paper, and Shebiling. The king Srong-tsan Gampo of the paper is also an historical personage who reigned in 630-50 A. D., and was a great conqueror, a religious reformer, and the pioneer of civilisation in Tibet. He is one with the Chitlungstan of the Chinese annals who removed his seat of government to Lhása and married a daughter of the Emperor of China. In the same annals we find an interesting account of the early history of Tibet. Hutipusiyeh was chief of the Fa-chiang, to whose family belonged Fanni or Supuyeh who was a boy in 414 A. D., and succeeded in establishing the nucleus of a State in 425 A. D. Amongst his successors was Chitsunglungtsan or Chitlungstan, also called Chisa-

mung and styled Fuyehshih. He was a minor when he ascended the throne in 630 and died in 650 A. D. I have said enough to show you that the paper is deserving of consideration as its statements are supported by independent testimony, so far as I have been able to examine them, and I only wish that I had time to continue the investigation which I commend to others more qualified for the task, promising that some labour and care will be amply rewarded.

4. *On some new species of* Ficus *from New Guinea.—By* George King, M. B., LL. D., *Superintendent Royal Botanical Gardens, Sibpur.*

(Abstract.)

The first portion of this paper is occupied by an outline of a rearrangement of the species of the large genus *Ficus*. The sections into which it is proposed to arrange the Indo-Malayan species are seven in number, the characters of these sections being founded on the structure and arrangement of the flowers. Two of the sections are proposed for the first time, the characters of the other five sections which are not new are modified so as to fit into the new arrangement. The remaining part of the paper is occupied by descriptions of sixteen new species of *Ficus* collected during recent explorations in New Guinea by Signor Beccari and Mr. H. O. Forbes.

5. *Description of some new Hemipterous insects belonging to the genus* Chrysocoris, *Hahn.—By* E. T. Atkinson, Esq., President.

Chrysocoris atriventris, n. sp.

Closely allied to *C. hypomelæna*, Voll. from Borneo, differs in the markings on the thorax and in the entire venter being almost wholly deep black. Brassy-green, irrorated golden, shining, closely punctured: head beneath and feet lighter brassy-green, very shining: venter deep black, smooth, slightly shining. Head much inclined, obtusely triangular, rounded at the apex; except the tylus, irrorated golden: eyes, ocelli, antennæ and rostrum, black; 3-5 joints of antennæ somewhat flattened; rostrum reaching almost the apex of the second ventral segment, extremity of tip brownish: thorax with three black spots towards the anterior margin, the lateral subovate-oblong, transverse, impressed, smoothish, the median irregularly triangular, smallest; towards the posterior margin three larger spots, of which the lateral oblong, longitudinal, and the median obtusely triangular, smallest; lateral margins reflexed, a very small black spot on the slightly prominulous posterior angles: scutellum with the basal elevation smooth, shining,

and with seven black spots; on each side three lateral, of which the two first are ovate-oblong, transverse, and the third is somewhat rounded posteriorly, also one subbasal median, obtusely-triangular, having its apex pointing hindwards. Head beneath and pectus very bright, shining, brassy-green; antennæ black: entire venter intensely black, smooth, slightly shining; barely traces, under the microscope in the sun, of a slightly purplish limbus and a slightly brassy-green margin to the stigmata: feet blackish, femora tinted brassy-green towards the apex; tibiæ finely ciliated, externally of a blue-steel colour. Long 14; breadth of pronotum, 8 mill.

Example from Dehli.

CHRYSOCORIS ANDAMANENSIS, n. sp.

Above deep blue turning into purplish or into green, or green, shining, deeply and densely punctured: eyes and ocelli brown: antennæ black, basal joint flavescent (except the apex): rostrum flavescent, reaching posterior coxæ: thorax densely punctured, transversely sulcate before the middle, with a broad smooth band close to anterior border, marked by three black, oblong, transverse spots, also between the band and the base, three large, longitudinal, black spots of which the median is triangular with its apex pointing forwards; margins slightly reflexed, posterior angles slightly prominulous and blackish: scutellum with a semicircular basal elevation, smooth, immaculate; three rounded spots on each side, of which the last is the largest, and a linear longitudinal median basal streak, black; broad apical limbus bright orange: body beneath flavescent, sides of pectus, stigmata, and transverse streaks therefrom on anterior margin of each segment on both sides, apex of femora and tibiæ externally, steel-blue; anal segment violet-black. Easily distinguished by its size and the broad, orange, apical limbus of the scutellum. Long, 17; breadth of pronotum, 9 mill.

The Indian Museum possesses a long series from the Andaman Islands.

CHRYSOCORIS VIRIDIS, n. sp.

Allied to *C. purpureus*, Westw. Above light brassy-green, densely punctured: antennæ black, basal joint brown, rostrum almost reaching apex of second ventral segment: head and pronotum irrorated golden, the latter with a smoother transverse band close to, and parallel with anterior margin, and bearing slight traces of three blackish spots, also traces of three median distant spots, lateral margins slightly reflexed, posterior angles slightly prominulous: scutellum with a steel-blue, smooth, semicircular, basal elevation; on each side, three smallish black spots, the basal resting

on the basal elevation, no discoidal or apical mark; beneath very sordid flavescent turning into ferruginous, sides of pectus brassy-green, stigmata black, irrorated green, base of anal segment slightly black, no black spot on basal segment: feet somewhat ferruginous, apex of femora, and tibiæ externally, brassy-green. Differs from *C. purpureus* in colour and markings above, in the less-obtuse apex of scutellum, and absence of purple border and black basal patch on the abdomen. Long, 15-16 mill.

From the Panjab.

CHRYSOCORIS EQUES, Fabr., Var. *nicobaricus*, mihi.

Above shining green; eyes brown; antennæ black: pronotum with the lateral margins much dilated, semicircularly rounded, edged black; anteriorly with a transverse row of three black spots of which the median is largest, triangular, having its apex pointing hindward; three black spots arranged in form of a triangle at the posterior angles, sometimes but two, and then with the basal margin black, on which rests a median triangular spot with its apex turning forwards and meeting the triangular median spot of the anterior row: scutellum without a basal elevation, no discal spot, three black spots on each side and one at the apex: body beneath entirely brassy-green, tinted violet or steel blue, especially on the pectus, a small median transverse patch on the anterior margin of each segment, also the stigmata and base of anal segment, violet black: feet of a steel blue, tibiæ internally sordid ferruginous. Long. 11-12 mill.

The Indian Museum has a long series from the Nicobar islands.

LIBRARY.

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Amsterdam. Revue Coloniale Internationale,—Tome III, No. 6, Decembre, 1886.

Baltimore. Johns Hopkins University,—American Chemical Journal, Vol. VIII, No. 5, October, 1886.

———. ———. American Journal of Mathematics,—Vol. IX, No. 1, October, 1886.

Baltimore. Johns Hopkins University. American Journal of Philology,—Vol. VII, No. 3, October, 1886.

———. ———. Circulars,—Vol. VI, Nos. 52 and 53.

———. ———. Studies from the Biological Laboratory,—Vol. III, No. 8, October, 1886.

Batavia. Bataviaasch Genootschap van Kumsten en Wetenschappen,—Notulen, Deel XXIV, Aflevering 3.

———. ———. Tijdschrift,—Deel XXXI, Aflevering 4.

Birmingham. Birmingham Philosophical Society,—Proceedings, Vol. V, Part 1, Session 1885—1886.

Buenos Aires. La Academia Nacional de Ciencias en Cordoba—Boletin, Tome VIII, Entrega 4ª.

Calcutta. Geological Survey of India, Palæontologia Indica, Memoirs, ser. X, Vol. IV, Part 2; ser. XII, Vol. IV, Part 2; ser. XIII, Vol. I, Part 6; and Title Page and Contents of Vol. I, (ser. VII and XIV).

———. The Indian Antiquary,—Vol. XV, No. 190, December, 1886.

———. The Indian Engineer,—Vol. II, Nos. 6 and 7.

———. Indian Engineering,—Vol. I, No. 1.

———. Original Meteorological Observations,—July and August, 1886.

Chicago. The American Antiquarian and Oriental Journal,—Vol. VIII, No. 6, November, 1886.

Edinburgh. The Scottish Geographical Magazine,—Vol. II, No. II, November, 1886.

Florence. La Societá Africana d' Italia,—Bullettino, Tome II, No. 7.

———. La Società Italiana di Antropologia, Etnologia e Psicologia Comparata,—Archivio per L' Antropologia e la Etnologia, Volume XVI, Fascicolo 20.

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Havre. Société de Géographie Commerciale du Havre,—Bulletin, No. 5, Septembre et Octobre, 1886.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XL, Heft 3.

London. The Academy,—Nos. 758—762.

———. The Athenæum,—Nos. 3081—3085.

———. Nature,—Vol. XXXV, Nos. 889—893, and Index to Vol. XXXIV.

———. Pali Text Society,—Journal, 1885.

———. Royal Asiatic Society of Great Britain and Ireland,—Journal Vol. XVIII (new series), Part 4, October, 1886.

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———. Royal Geographical Society,—Proceedings, Vol. VIII, No. 11, November, 1886.

———. Royal Microscopical Society,—Journal, Vol. VI (ser. 2nd), Part 5, October, 1886.

———. Zoological Society of London,—Proceedings, Part III, 1886.

Paris. La Société D'Anthropologie de Paris,—Bulletins, Tome IX (III^{e} série), 3^{e} Fasciculi, Mai et Juin, 1886.

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Roorkee. The Indian Forester,—Vol. XII, No. 12, December, 1886.

Shanghai. Royal Asiatic Society (China Branch), Journal, Vol. XIX, (new series), Part 2.

Simla. United Service Institution of India,—Journal, Vol. XIV, No. 65.

Toronto. Canadian Institute,—Proceedings, Vol. IV (3rd series), No. 1, November, 1886.

Turin. Osservatorio della Regia Università di Torino,—Bollettino, Anno XIX, 1884.

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Yokohama. Der Deutschen Gesellschaft für Natur-und Völkerkunde Ostasiens,—Mittheilungen, 35 stes Heft, November, 1886.

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Books and Pamphlets,

presented by the Authors, Translators, &c.

Beveridge, H., B. C. S. The Trial of Maharaja Nanda Kumár, a narrative of a judicial murder. 8vo. Calcutta, 1886.

Macdonell, A. A. Anecdota Oxoniensia. Texts, Documents, and Extracts chiefly from Manuscripts in the Bodleian and other Oxford Libraries, Kátyáyana's Sarvánu Kramani, etc. Aryan series, Vol. I, Part IV, demy 4to. Oxford, 1886.

Mandlik. The Honorable Ráo Sáheb Vishnanátha Náráyan, C. S. I. Mánava-Dharma Sástra (Institutes of Manu). With the Commentary of Govindarája. 3 Vols. 4to. Bombay, 1886.

Roy, Protáp Chandra. The Mahabhárata of Krishna-Dwaipayana Vyása, translated into English Prose, Part XXVIII. 8vo. Calcutta, 1886.

MISCELLANEOUS PRESENTATIONS.

L' Ottica di Chandio Tolomes da Eugenio. 8vo. Torino, 1885.

LA R ACCADEMIA DELLE SCIENZE DI TORINO.

Catalogus der Numismatische Verzameling van het Bataviaasch Genootschap van Kunsten en Wetenschappen, door J. A. van der Chijs, Derde Druk. 8vo. Batavia, 1886.

BATAVIAASCH GENOOTSCHAP VAN KUNSTEN EN WETENSCHAPPEN, BATAVIA.

Report on the progress and Condition of the Government Botanical Gardens at Saharanpur and Mussoorie, for the year ending 31st March, 1886. Fcp. Allahabad, 1886.

J. F. DUTHIE, ESQ.

Descriptive Catalogue of a collection of the Economic Minerals of Canada by the Geological Corps (Colonial and Indian Exhibition. London, 1886). 8vo. London, 1886.

THE GEOLOGICAL AND NATURAL HISTORY SURVEY, OTTAWA.

Report on the Lunatic Asylums in the Central Provinces for the year 1885. Fcp. Nagpur, 1886.

Report on the Vaccine Operations in the Central Provinces for the year 1885-'86. Fcp. Nagpur, 1886.

Returns of Railway-borne Traffic of the Central Provinces for the quarter ending June 30, 1886. Fcp. Nagpur, 1886.

CHIEF COMMISSIONER, CENTRAL PROVINCES, NAGPUR.

Annual Report on Emigration from the Port of Calcutta to British and Foreign Colonies during the last nine months of 1885, by J. G. G. Grant, Esq., M. D., Protector of Emigrants. Fcp. Calcutta, 1886.

Report on the Calcutta Medical Institutions for the year 1885, by A. J. Cowie, Esq., M. D., Inspector-General of Civil Hospitals, Bengal. Fcp. Calcutta, 1886.

Report on the Land Revenue Administration of the Lower Provinces for the official year 1885-'86. Fcp. Calcutta, 1886.

Report on the Police of the Lower Provinces of the Bengal Presidency for the year 1885, by J. C. Veasey. Fcp. Calcutta, 1886.

GOVERNMENT OF BENGAL.

Excursions et Reconnaissances. XII, No. 27, Mai—Juin, 1886. 8vo. Saigon, 1886.

GOVERNMENT OF FRENCH COCHIN CHINA, SAIGON.

Army Estimates of Effective and Non-Effective Services, for 1886-'87 (with Index). Fcp. London, 1886.

Despatch from Her Majesty's Minister in China transmitting a Convention between Her Majesty and His Majesty the Emperor of

China relating to Burmah, signed at Peking, July 24, 1886, (China No. 5, 1886). Fcp. London, 1886.

Further Correspondence relating to Burmah (Burmah, No. 3, 1886. Fcp. London, 1886.

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Return showing the Annual Dates, since the transfer of the Government of India to the Crown in 1858, of the migration of the Government of India at Calcutta to Simla, and the dates of its return to Calcutta, and, so far as possible, the extra annual cost upon the Taxpayers of India in consequences of this annual migration of Government (East India, Transfer of Government to Simla). Fcp. London, 1886.

Scientific Results of the Second Yarkand Mission; memoir of the Life and Work of Ferdinand Stoliczka, Ph. D., by V. Ball, M. A., F. R. S., F. G. S. 4to. London, 1886.

Statistical Abstract relating to British India from 1875-'6 to 1884-'5 (Twentieth Number.) 8vo. London, 1885.

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International Meteorological Observations, August, 1885 with Summary and Review. 4to. Washington, 1886.

Monthly Weather Review, August, 1886. 4to. Washington, 1886.

GOVERNMENT OF INDIA, METEOR. REPORTER.

Manual of the Administration of the Madras Presidency, in illustration of the Records of Government and the yearly Administration Reports (Articles on Geography, Ethnology, and History, taken from the first volume). Fcp. Madras, 1886.

GOVERNMENT OF MADRAS.

The Anguthara-Nikâya. Part I, Ekanipâta, Dukanipâta, and Tikanipâta. By the Rev. Richard Morris, M. A., LL. D. 8vo. London, 1885.

The Dhammasangani. By Edward Müller, Ph, D. 8vo. London, 1885.

Udânam. By Paul Seinthal, Ph. D. 8vo. London, 1885.

PALI TEXT SOCIETY, LONDON.

The 'Sacred' Kurral of Tiruvalluva-Nâyanâr. With Introduction, Grammar, Translation, Notes, Lexicon, and Concordance. By the Rev. G. M. Pope, M. A., D. D. 8vo. London, 1886.

SECRETARY OF STATE IN COUNCIL OF INDIA, LONDON.

Map of India shewing Feeders to Railways (Roads and Navigable Canals) 1884-'85 in 6 colored sheets. Calcutta, 1886.

SURVEY OF INDIA DEPARTMENT.

Fifth Annual Report of the United States Geological Survey, Washington, 1883-'84. By J. W. Powell, Director. 4to. Washington, 1885.

Monographs of the United States Geological Survey, Washington, Vol. IX. 4to. Washington, 1885.

UNITED STATES GEOLOGICAL SURVEY, WASHINGTON.

Report of the Board on behalf of the United States Executive Departments at the International Exhibition, held at Philadelphia, P. A., 1876, under the Acts of Congress of March 3, 1875, and May 1, 1876, Vols. I and II, (Vols. X and XI af the series of Reports on the International Exhibition of Washington). 8vo. Washington, 1884.

UNITED STATES GOVERNMENT, WASHINGTON.

Thirty-second annual Report of the Library Syndicate of the University Library, Cambridge. 4to. Cambridge, 1886.

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Allahabad. Indian Notes and Queries,—Vol. IV, No. 38, November, 1886.

Berlin. Deutsche Litteraturzeitung,—VII Jahrgang, Nr. 41—45.

Bombay. The Legends of the Punjab,—Vol. III, No. 32, August, 1886.

Calcutta. The Calcutta Review,—Vol. LXXXIV, No. 167, January, 1887.

————. Indian Medical Gazette,—Vol. XXI, No. 11, November, 1886.

Cassel. Botanisches Centralblatt,—Band XXVIII, Nr. 2—7.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XVI, No. 11.

Giessen. Jahresbericht über die Fortschrette der Chemie und verwandter Theile anderer Wissenschaften,—Heft IV, 1884.

Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Göttingische gelehrte Anzeigen, Nr. 20 und 21, 1886.

Leipzig. Annalen der Physik und Chemie,—Band XXIX, Heft 3.

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———. Hesperos,—Vol. VI, Nos. 130—132.

———. Literarisches Centralblatt,—Nr. 42—46, 1886.

London. The Annals and Magazine of Natural History,—Vol. XVIII (5th series), No. 107, November, 1886.

———. Chemical News,—Vol. LIV, Nos. 1407—1411.

———. The Entomologist,—Vol. XIX, No. 282, November, 1886.

———. The Entomologist's Monthly Magazine,—Vol. XXIII, No. 270, November, 1886.

———. The Ibis,—Vol. IV (5th series), No. 16, October, 1886.

———. The Journal of Botany,—Vol. XXIV, No. 287, November, 1886.

London. The London, Edinburgh, and Dublin Philosophical Magazine,—Vol. XXII (5th series), No. 138, November, 1886.

———. The Messenger of Mathematics,—Vol. XVI (new series), Nos. 6 and 7.

———. The Nineteenth Century,—Vol. XX, No. 118, December, 1886.

———. The Publisher's Circular,—Vol. XLIX, Nos. 1180 and 1181.

———. Society of Arts,—Journal, Vol. XXXIV, Nos. 1773—1777.

New Haven. The American Journal of Science,—Vol. XXXII (3rd series), No. 190, October, 1886.

Paris. L' Académie des Sciences,—Comptes Rendus des Séances, Tome CIII, Nos. 14—18; et Tables, Tome CI.

——. Annales de Chimie et de Physique,—Tome IX (6me série), Octobre, 1886.

——. Journal des Savants,—Octobre, 1886.

——. Revue Critique,—Tome XXII, Nos. 41—45.

——. Revue des Deux Mondes,—Tome LXXVIII, Nos. 2 et 3.

——. Revue de Linguistique,—Tome XIX, No. 4.

——. Revue Scientifique,—Tome XXXVIII, Nos. 15—19.

Books Purchased.

Deva, Dínanátha. Hindustání Grammar. 8vo. Calcutta, 1886.

The Encyclopædia Britannica, a Dictionary of Arts, Sciences, and General Literature. Ninth Edition, Vol. XXI. 4to. Edinburgh, 1886.

Gould, John, F. R. S., &c. The Birds of New Guinea and the adjacent Papuan Islands, including any new species discovered in Australia, Part XXII. Fol. London, 1886.

Hudson, C. T., LL. D., Cantab. The Rotifera; or Wheel-Animalcules, Parts V and VI. 4to. London, 1886.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR FEBRUARY, 1887.

The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday the 2nd February, 1887 at 9 P. M.

E. T. ATKINSON, ESQ., C. S., President, in the Chair.

According to the Bye-Laws of the Society the President ordered the voting papers to be distributed for the election of Officers and Members of Council for 1887; and appointed Messrs. Gay and Wood-Mason, Scrutineers.

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

ANNUAL REPORT FOR 1886.

The Council of the Asiatic Society of Bengal have the honour to submit the following Report on the state and progress of the Society's affairs during the past year.

Member List.

During the year under review 24 gentlemen were elected Ordinary Members of the Society, 17 Members withdrew, 5 died, 10 were removed from the List in accordance with Rule 38, 1 in accordance with Rule 9, and the names of two gentlemen who had ceased to be Members in 1884, but whose names had been continued on the List for 1885, were also removed. The total number of Members, therefore, at the close of 1886 was 319, against 328 at the end of the preceding year. Of these 93 were Resident, 142 Non-Resident, 18 Foreign, 16 Life, 48 Absent from India, and 2 Special Non-Subscribing Members, as will be seen from the following table, which also shows the fluctuations in the number of Ordinary Members for the past 6 years :—

YEAR.	PAYING.				NON-PAYING.				GRAND TOTAL.
	Resident.	Non-Resident.	Foreign.	TOTAL.	Life.	Absent.	Special Non-Subscribing.	TOTAL.	
1881	110	168	17	295	14	40	1	55	356
1882	101	155	18	274	15	47	1	63	337
1883	100	142	18	266	15	47	1	63	323
1884	102	157	12	271	15	39	1	55	326
1885	105	161	13	279	16	34	1	51	330
1886	93	142	18	253	16	48	2	66	319

The 5 Ordinary Members who died during the year were Mr. H. L. St. Barbe, the Hon'ble J. Gibbs, Mr. J. Holdsworth Fisher, Babu Ráj Krishna Mukherji, and Dr. J. E. N. Wise. The 2 Special Non-Subscribing Members are Mr. V. Ball and Lieut.-Col. H. H. Godwin-Austen, in accordance with recommendation of Council, confirmed by the General Meeting.

Among the Honorary Members there were two deaths, namely, of Mr. Edward Thomas, F. R. S., and of Mr. A. Grote. Their number now stands at 27. Notices of the life and labours of Mr. Thomas by the President and by Dr. Mitra were published in the Proceedings for April.

Among the Corresponding Members, intimation of the death of Mr. R. von Schlagintweit of Giessen was received. Their number now stands at 13.

Among the Associate Members there were two deaths,—those of Mr. J. Schaumburgh and of the Rev. C. H. Dall. There was one election—that of Babu Sarat Chandra Dás, C. I. E., in recognition of his attainments as a Tibetan scholar. Their number now stands at 8.

Indian Museum.

Two Copper Sheets received from the Deputy Commissioner of Buldáná were transferred to the Indian Museum.

Two vacancies in the office of Trustee having occurred owing to the resignations of Mr. F. E. Pargiter and of the Hon'ble H. J. Reynolds, Dr. R. Mitra and Mr. E. Gay were appointed to replace them as Trustees on behalf of the Society.

Finance.

The Accounts of the Asiatic Society are shown in the Appendix under the usual heads.

Statement No. 8 contains the Balance Sheet of the Asiatic Society, and of the different Funds administered through it.

The Budget for the year under review was estimated at the following figures:—Receipts Rs. 15,900; Expenditure Rs. 15,575. The Actuals were found to be:—Receipts, Rs. 15,133-11-8; Expenditure, Rs. 17,974-7-7.

The Receipts thus show a decrease of Rs. 766-4-4, and the Expenditure an increase of Rs. 2,399-7-7, on the Budget Estimate.

The falling off in the Receipts is due mainly to the Subscriptions, the amounts realized under that head falling short of the estimate by nearly Rs. 700. This is accounted for partly by the large number of Members absent from India, and paying no subscriptions during absence —the number being 48 against 34 in the preceding year; and partly by the large number of withdrawals of Members that took place in the first quarter of the year,—the number being 8 out of a total of 17 withdrawals during the whole year.

The increase in the Expenditure is entirely due to Extraordinary payments not provided for in the Estimate. These fall under two heads: first, a payment of Rs. 2,293-0-3 made for the publication of Moore's Catalogue of Atkinson's Lepidoptera, Part III, towards meeting which Government Securities to the amount of Rs. 1,500 were sold out; and secondly, the amount of Rs. 403-11-0 classed under the head of "Extraordinary Miscellaneous," consisting of Rs. 150 paid for auditing the Society's Accounts, and of Rs. 253-11-0 written off the accounts of the late Assistant Secretary at his death.

The Actual Ordinary Expenditure has been Rs. 15,277-12-4, showing a saving on the estimated expenditure of about Rs. 300, which sum has gone towards meeting a portion of the extraordinary charges above enumerated. The amount of Ordinary Expenditure above stated also covers a sum of Rs. 393 under the heading "Building" for which the Budget Estimate had provided only Rs. 50. It also covers an excess of actual over estimated expenditure under the heading "Books," amounting to Rs. 682. The estimate under that heading for the ensuing year, has not, however, been increased, owing to a reduction having been effected in the number of publications subscribed for.

The Budget Estimate for 1887 shows few changes. On the *Receipts* side:—the estimate under the heading "Subscriptions" is based upon the actuals of the last year; the amount under the heading "Interest on Investments" has been reduced by Rs. 200, owing to the sale of Government Securities noticed above; and the amount under the heading "Sale of Periodicals" is set down at half that estimated in the last Budget, as the latter had to take into account the sales effected through

Messrs. Trübner and Co. during two years (1884-85). On the *Expenditure* side:—the amount under the heading "Books" is also set down at half that estimated in the preceding year, for the same reason, with regard to purchases of books effected through the same agency. The adjustment of these Accounts was completed in September last, thus leaving only one year's Accounts to be provided for in the present Budget; also, the actual expenditure on the Journal, Part I having been Rs. 1,075-9-0 and on Journal, Part II, Rs. 2,761-10-4, and the experience of the last four years showing that it was difficult to estimate the division of the expenditure on the two Parts, the present estimate provides for both under the same heading, the total of the two amounts remaining unaltered.

The Budget Estimate for 1887 is as follows:—

RECEIPTS.

Subscriptions	Rs.	7,000	0 0
Sale of Periodicals		1,000	0 0
Interest on Investments		6,000	0 0
Miscellaneous		200	0 0
		14,200	0 0

EXPENDITURE.

Salaries	Rs.	4,000	0 0
Commission		400	0 0
Stationery		150	0 0
Lighting		80	0 0
Building		50	0 0
Taxes		816	0 0
Postage		600	0 0
Freight		20	0 0
Meeting		90	0 0
Contingencies		150	0 0
Books		1,500	0 0
Local Periodicals		50	0 0
Binding		500	0 0
Coins		10	0 0
Journal, Part I „ Part II		4,200	0 0
Proceedings		1,100	0 0
Printing Circulars		100	0 0
		13,816	0 0

London Agency.

The statement furnished by Messrs. Trübner and Co. of their account with the Society for 1885, showed a debit Balance of £107-8-8½; towards meeting which a remittance of £100 was made in September last. This unusually large and unfavourable balance was chiefly due to payments made by Messrs. Trübner for Plates for the Journal, Part II, amounting to £91-12-0.

The sales of the Society's Publications effected by them during 1885 amounted to £49-5-9; and of the Bibliotheca Indica to £59-9-3.

The numbers of copies of parts of the Journal, of the Proceedings, and of the Bibliotheca Indica sent to Messrs. Trübner and Co. during 1886 for sale were 481, 300, and 1,659 respectively.

Eleven Invoices of Books purchased and of Publications of various Societies sent in exchange were received during 1886. The value of the Books purchased amounted to £106-19-3.

Library.

The total number of printed volumes or parts of volumes added to the Library, during the year was 2,281, of which 895 were purchased and 1,386 were presented.

A manuscript of the Tárikh-i-Firoz Sháhi was presented to the Society by the Royal Asiatic Society of London on behalf of the late Mr. Edward Thomas.

Four Catalogues of the Sanskrit, the Arabic and Persian, the Tibetan, and the Burmese Manuscripts are in progress.

Publications.

There were published during the year ten Numbers of the Proceedings containing 181 pages of letter-press; three Numbers of the Journal, Part I, containing 203 pages of letter-press and 9 Plates; and three Numbers of the Journal, Part II, containing 298 pages of letter-press and 11 Plates; and a fourth, bringing up the number of pages of matter and of plates for the year to a total of 412 and 19 respectively, is in type and will be issued shortly.

Stock was taken towards the end of the year of the Publications for sale in the Store Room consisting of the Society's Publications and the Bibliotheca Indica.

Building.

The expenditure on the building during the year was Rs. 393; of which Rs. 378 was for renewing beams and burgahs in the roof over the staircase, and Rs. 15 for refixing a lightning conductor.

Coin Cabinet.

During the year under review, 129 Coins were added to the Cabinet, of which all, with the exception of 2 copper coins presented by Rái Shyám Bahádur of Chapra, were acquired under the Treasure Trove Act. Of these 117 were from the Bengal Presidency, and 10 from the Bombay Presidency. No coins were received from Madras, and there were no purchases. Of the 117 coins acquired in the Bengal Presidency, 3 were of gold, 95 of silver, and 19 of copper; detailed descriptions of which are given in the Society's Proceedings for January, February, April, June, July, November and December.

The 10 coins presented by the Government of Bombay consist of 1 gold coin of Aurangzíb, 2 gold Hún coins of Bijápur, and of 2 coins of Aurungzíb, 2 of Sháh Jehán, 1 of Alamgir, 1 of Muhammad Sháh and 1 of Farrokh Sír, all of silver.

Office of the Secretaries.

Mr. J. Wood-Mason continued as Natural History Secretary throughout the year.

Dr. A. F. R. Hoernle left India on leave in June, when the duties of Philological Secretary were divided amongst three gentlemen, Mr. J. Beames, Mr. A. Hogg, and Pandit Haraprasád Sástri, who took charge of the Journal, Part I, the Coins, and the Bibliotheca Indica respectively. Mr. Beames resigned in August when Mr. H. Beveridge took his place, and has since continued in charge of the Journal, Part I.

Mr. F. E. Pargiter resigned the General Secretaryship in February, and Mr. H. M. Percival was appointed to succeed him.

Mr. F. W. Peterson continued as Treasurer till March, when, on his leaving India, his duties were taken up by the General Secretary.

Mr. J. F. Duplessis, the Assistant Secretary, died in February and Mr. H. Ronaldson was appointed in his place in March, the Assistant Librarian carrying on the current duties in the interim.

Mr. J. H. Elliott has continued to hold the post of Assistant Librarian, and Babu Nritya Gopál Bose that of Cashier, throughout the year.

Babu Jogindra Náth Tarkachudámani continued as Pandit of the Oriental Library till October, when his services were dispensed with, and Babu Hari Mohan Mukherji appointed on probation to the vacancy. Babu Amritalál Dás resigned the post of Copyist in September, and was succeeded by Babu Jogesh Chandra Chatterji.

Bibliotheca Indica.

Thirty-eight fasciculi were published during the year, of which eleven were in the Arabic-Persian Series, and twenty-seven in the Sanskrit Series. They belong to nineteen different works, of which four are in the

Arabic-Persian, and fifteen in the Sanskrit Series. There were no new publications in the former Series, whilst in the latter there were two, *viz.*, Aśvavaidyaka and Vṛihannáradiya Puráṇa.

In the annual report of the preceding year (p. 16) it had been estimated that 48 fasciculi would be published in the course of the ensuing year, at a probable cost of Rs. 20,736. The actual out-turn has been 38 fasciculi. The expenditure out of the Oriental Publication Fund during the year (exclusive of a payment of Rs. 1,963-6-1 for Racks) amounted to Rs. 15,870-4-4, which sum includes Printing charges for 43 fasciculi and Editing charges for 34 fasciculi, and gives an average cost of Rs. 401 per fasciculus. For the year 1887 the out-turn may be reckoned at 45 fasciculi. These at the above average rate will cost Rs. 18,045. The average income calculated on the receipts of the last six years is Rs. 13,068, which gives an excess of estimated expenditure over income of Rs. 4,977, towards meeting which there is a Balance of Rs. 16,943.

The Editorship of the Tárikh-i-Budáuni has been transferred from Maulavi Abul Khair Mahomed Siddik to Syed Shamsul Hudá, Professor, Calcutta Madrasa.

Dr. R. Sen has been appointed to take up the translation of the Suśruta in place of the late Dr. U. C. Dutt.

Of the following works of which fasciculi have appeared in previous years no fasciculi were published during the year under review :—

1. Tabaqát-i-Násirí (Index of Persons and places). 2. Prákṛita Lakshaṇa (English translation and notes). 3. Kátantra (Introduction). 4. Kathá Sarit Ságara (Index of subject and names). 5. Suśruta Samhitá (English translation with notes). 6. Mímámsa Darśana (Text). 7. Kála Mádhava (Text). 8. Ápastamba Śrauta Sútra. (Text.)

Of the following works sanctioned in previous years no fasciculi have as yet appeared :—

1. Brihaddevatá (Text). 2. Prákṛitádháya (Text and Translation). 3. Charaka (English translation with notes). 4. Naqáid (Text). 5. Nyáya Vártaka (Text). 6. Vedánta Sutra, Commentaries on (Text). 7. Yoginí Tantra (Text). 8. Karaṇa Grantha (Text). 9. Táríḳh-i-Yámaní (English translation with notes). 10. Ashṭa Sahasriká Prájña Páramitá (Text). 11. Jñátá Dharmakathá and Vipáka Sútra (Text). 12. Saddharma Puṇḍaríka (Text). 13. Sat-Saí (Text). 14. Gadya Kusumánjalí (Text). 15. Varáha Puráṇa (Text). 16. Al Tabrízí (Text). 17. Tuzak-i-Jehángíri (Text).

The following new works have been sanctioned during the year for publication :—

A. *Arabic-Persian Series.*

1. TÁRIKH-I-FIROZ SHÁHI of Shamshi Shirán, to be edited by Maulavi Lutf-ur Rahmán:—

B. *Sanskrit Series.*

2. MÁRKANDEYA PURÁNA, to be translated by Mr. F. E. Pargiter.

3. SWAYAMBHU PURÁNA, to be edited by Babu Haraprashád Sástri.

4. BAUDHÁYANIYA SRAUTA SUTRA and HIRANYAKESIN SRAUTA SUTRA, to be edited by Dr. Hillebrandt.

5. ADVAITA-BRAHMA-SIDDHI by Sadánand Yáti of Kashmir, to be edited by Pandit Váman Islámpurkar of Oodeypur.

6. MADANA PÁRAJITÁ—a standard digest of the Smritis,—to be edited by Professor Madhusudan Tarkaratna.

7. ANIRUDDHA'S COMMENTARY, with extracts form the glosses of Vedánta Mahádeva, to be edited by Dr. R. Garbe.

The following is a detailed list of the publications issued during 1886.

A. *Arabic-Persian Series.*

1. ISÁBAH edited by Maulavi Abdul Hai of the Calcutta Madrasa, Nos. 253, 254, 255, 256 (Old Series) Fasc. XXX, Vol. II, No. 9, and Fasc. XXIX, XXXI, XXXII, Vol. III, Nos. 9, 10, 11, total *four* fasciculi.

2. AKBARNÁMAH, by Abul Fazl-i-Mulárah-i-Allami; edited by Maulavi Abdur Rahím, Professor, Calcutta Madrasa; Nos. 564, 565, 571, 572, Vol. III, Fasc. VIII, IX, total *two* fasciculi.

3. MUNTAKHAB-UT-TAWÁRÍKH, by Abdul Qádir Bin-Malúk Sháh, known as Al-Bádaóní, translated from the original Persian by W. H Lowe, M. A., Hebrew Lecturer, Christ's College, Cambridge, No. 569, Fasc. IV, total *one* fasciculus.

4. THE ẒAFARNÁMAH, by Maulánd Sharfuddin Ali Yazdi, edited by Maulavi Muhammad Ilahidád, late Professor, Calcutta Madrasa, Nos. 563, 570, 576, 581, Fasc. III, IV, V, VI, total *four* fasciculi.

B. *Sanskrit Series.*

5. CHATURVARGA CHINTÁMAṆI, by Hemádri, edited by Pandits Yogesavara Smritiratna and Kámákhyánatha Tarkaratna, Nos 561, 579, 594, Vol. III, Part I, Fasc. XIII, XIV, XV. Total *three* fasciculi. This is an exhaustive work on Hindu ritual, compiled in 1182 Sakábda (1260 A. D.), and containing numerous quotations from earlier works thus affording an important key to the determination of their chronology. The first and second khandas of this work have been already

published, but for want of MSS. from which to edit them, the third and fourth khandas have been passed over, and the fifth has been now taken up for publication.

6. NIRUKTA, with Commentaries, edited by Pandit Satyavrata Sámaśramí, Nos. 568, 580, 583, Vol. III, Fasc. IV, V, VI, Nos. 593, 596, Vol. IV, Fasc. I, II. Total *five* fasciculi, of which three complete the third volume, and two begin the fourth. This work is the highest authority in all philological questions connected with the Vedas. The text is accompanied by the excellent Commentary of Durgácháryya, to which the editor has appended an exhaustive index of all the words found in the text.

7. STHAVIRÁVALÍ-CHARITRA or PARIŚISHṬA PARVA, being an appendix of the Trishasthi Śaláká-Purusha-Charita, by Hemachandra, edited by Dr. Hermann Jacobi, Professor of Sanskrit and Comparative Philology in the University of Riel, No. 591, Fasc. IV. Total *one* fasciculus. This completes the work, which is an appendix to the *Trishaśthisaláká-purusha Charita*, an important Jaina work, throwing considerable light on Jaina religious life in India. The editor is now engaged in giving very valuable information both in Sanskrit and in Prákrit regarding the great teachers of Jainism, in the form of Appendices to this work.

8. PARÁŚARA SMṚITI, edited by Pandit Chandrakánta Tarkálankára, No. 567, Fasc. V, Total *one* fasciculus.

9. TATTVA CHINTÁMAṆI, edited by Pandit Kámákhyánátha Tarkaratna, Nos. 573, 590, Fasc. IV, V. Total *two* fasciculi. This work is generally called the *Múla* or "original work" upon the Nyáya philosophy as taught in the Schools of Mithilá and of Bengal. The text is accompanied by the gloss of Mathurá.

10. KÚRMA PURÁṆA, a system of Hindu Mythology and Tradition, edited by Pandit Nilmani Mukhapádháya, Professor, Presidency College, No. 589, Fasc. II. Total *one* fasciculus. This work, one of a body dealing with the system of Hindu mythology and tradition, represents a later phase of Pauránika development than the Vishnu, Váyu, and Agni Puránas.

11. VIVÁDARATNÁKARA, a digest of Laws relating to jurisprudence; edited by Pandit Dinanáth Vidyálankára, Nos. 588, 592, Fasc. III, IV. Total *two* fasciculi. This is a Digest of Hindu Law, both Civil and Criminal, as taught in the Mithilá School.

12. NÁRADA SMṚITI, one of the standard authorities in Hindu Law, edited by Dr. Julius Jolly, Professor of Sanskrit and Comparative Philology in the University of Wurzburg, Nos. 566, 595, Fasc. II, III, Total *two* fasciculi. This completes the work, which is a high authority on Hindu Law, quoted and explained in almost all the principal digests.

The edition is enriched with extracts from digests bearing on the text.

13. MANU TÍKÁ SANGRAHA or extracts from various Commentaries on Manu's Law Book, edited by Professor Jolly, No. 584, Fasc. II. Total *one* fasciculus. This work consists of extracts from six of the principal commentaries on the text of Manu, designed to explain that text, and accordingly rejecting all controversial matters abounding in the commentaries.

14. SÁNKHÁYANA SRAUTA SUTRA, edited by Dr. Alfred Hillebrandt, Professor of Sanskrit and Comparative Philology in the University of Breslau, No. 585, Vol. I, Fasc. III. Total *one* fasciculus. This is an important work of the Srauta class of ritual of the Sánkháyana School of the Krishna Yajur Veda. The present fasciculus brings the first volume to a close and contains the first instalment of an exhaustive Index of words in that volume compiled by the editor.

15. UVÁSUGADASÁO, the seventh Anga of the Jains, on the rules of conduct of Jain laymen, edited by Dr. A. F. Rudolf Hoernle, No. 578, Fasc. II. Total *one* fasciculus. This has been a most difficult work to edit. The Prákrita text is accompanied by the excellent Sanskrit Commentary of Abhayadeva. The editor has added a careful translation in English, and enriched the edition with notes. The rubric has been printed in red.

16. PRITHIRÁJA RÁSAU, of Chand Bardai in the original old Hindi, rdited by Dr. A. F. Rudolph Hoernle, No. 577, Part II, Fasc. V. Total *one* fasciculus, bringing this famous epic down to the end of the thirty-fifth Prastáva.

17. LALITA-VISTARA, or Memoirs of the early life of Sákya Sinha, translated from the original Sanskrit by Dr. Rájendralála Mitra, C. I. E., No. 575, Fasc. III. Total *one* fasciculus. This edition contains valuable notes by the editor at the end of each chapter.

18. The AŚVA-VAIDYAKA, a treatise on the diseases of the Horse. Compiled by Jayadatta Súri, edited by Kaviráj Umesachandra Gupta Kaviratna, Nos. 574, 582, 587, Fasc. I, II, III. Total *three* fasciculi. This is one of the most important Sanskrit works on Veterinary science known to exist in India. Difficult and techinical terms have been explained by the editor in footnotes. It is expected the work will be completed early this year.

19. The VṚIHANNÁRADÍYA PURÁṆA, edited by Pandit Hríshikeśa Sástri, Professor, Sanskrit College, Calcutta, Nos. 562, 586, Fasc. I and II. Total *two* fasciculi. This work is a Vaishnava Purána in which Vishnu occupies the position of the pantheistic Brahma of the Vedánta philosophy.

List of all Societies, Institutions, &c., to which the Publications of the Asiatic Society have been sent during the year, or from which Publications have been received.

* Societies, &c., which have received the Asiatic Society's publications, and have sent their publications in return.

† Societies, &c., which have received the Asiatic Society's publications, but have sent none in return.

§ Societies, &c., whose publications have been received, but to which nothing has been sent in return.

* Allahabad :—Editor, Pioneer.
§ American Philological Association.
* Amsterdam :—Royal Zoological Society.
* Angers :—Société d' E'tudes Scientifiques d' Angers.
* Baltimore :—Johns Hopkins University.
* Batavia :—Society of Arts and Sciences.
§ ——— :—Magnetic and Meteorological Observatory.
* ——— :—Kon. Natuurkundige Vereeniging in Nederlandsch-Indiö.
* Berlin :—Royal Academy of Sciences.
§ ——— :—Entomologische Zeitschrift.
† Berne :—Société Suisse d' Entomologie.
§ Birmingham :—Birmingham Philosophical Society.
* Bombay :—Anthropological Society of Bombay.
* ——— :—Bombay Branch, Royal Asiatic Society.
* ——— :—Bombay Natural History Society.
* ——— :—Editor, Indian Antiquary.
* ——— :—Editor, Times of India.
* Boston :—Natural History Society.
* Bordeaux :—L' Académie Nationale des Sciences, Belles-Lettres et Arts.
§ ——— :—Société de Géographie Commerciale.
* ——— :—Société Linnéenne.
* Brisbane :—Royal Society of Queensland.
* Brookville :—Society of Natural History.
* Brunswick :—Verein für Naturwissenschaft.
* Brussels :—L' Académie Royale des Sciences.
* ——— :—Musée Royal d' Histoire Naturelle de Belgique.
* ——— :—Société Entomologique de Belgique.
* ——— :—Société Royale Malacologique de Belgique.
* Buda Pest :—Royal Hungarian Academy of Sciences.
* Buenos Aires :—Museo Nacional.
* ——— :—Academia Nacional de Ciencias de la Republica Argentina.
* Calcutta :—Agri-Horticultural Society of India.
* ——— :—Geological Survey of India.

* Calcutta :—Editor, Englishman.
* ——— :—Editor, Hindoo Patriot.
* ——— :—Editor, Indian Daily News.
* ——— :—Indian Mirror.
* ——— :—Indian Museum.
† ——— :—Mahommedan Literary Society.
* ——— :—Public Library.
* ——— :—Survey of India.
* ——— :—Tuttobodhini Shova.
† ——— :—University Library.
† Cambridge :—University Library.
* Cassel :—Der Verein für Naturkunde.
* Cherbourg :—La Société Nationale des Sciences Naturelles.
* Christiania :—University Library.
* Clinton :—Editor, American Antiquarian and Oriental Journal.
* Colombo :—Ceylon Branch, Royal Asiatic Society.
* Copenhagen :—La Société Royale des Antiquaires du Nord.
† Cuttack :—Cuttack Library.
* Danzig :—Naturforschende Gesellschaft.
* Dehra Dun :—Great Trigonometrical Survey.
* Dublin :—Royal Dublin Society.
* ——— :—Royal Irish Society.
§ ——— :—Geological Society of Dublin.
* Edinburgh :—Royal Society.
* ——— :—Scottish Geographical Society.
§ ——— :—Botanical Society.
* Florence :—Società Italiana di Anthropologia e di Etnologia.
* ——— :—Société Africaine d' Italie.
* Frankfurt :—Naturwissenschaftlichen Verein Senckenbergische Naturforschende Gesellschaft.
* Geneva :—Société de Physique et d' Histoire Naturelle.
* Genoa :—Museo Civico di Storia Naturale.
* Giessen :—Oberhessiche Gesellschaft fur Natur und Heilkunde.
* Graz :—Naturwissenschaftlichen Verein für Styria.
* Hague :—Koninklijk Instituut voor de Taal-Land-en Volkenkunde van Nederlansch-Indië.
* Hamburgh :—Naturhistoriches Museum zu Hamburgh.
* Hamiltion :—Hamilton Association of Canada.
* Halle :—Deutsche Morgenländische Gesellschaft.
* ——— :—Die Kais. Leopoldinische-Carolinische Akademie.
* Harrisburgh :—Second Geological Survey of Pennsylvania.
* Havre :—Société de Géographie Commerciale du Havre.

* Helsingfors :—Société des Sciences de Finlande.
* ——— :—Societas pro Flora et Fauna Fennica.
§ Ithaca (U. S. A.) :—Cornell University.
* Königsberg :—Die physikalisch-Oekonomische Gesellschaft.
* Lahore :—Editor, Civil and Military Gazette.
§ Lahore :—Anjuman-i-Panjab.
† ——— :—Agricultural Society.
† Leyden :—Royal Herbarium.
* Liége :—La Société Géologique de Belgique.
* ——— :—La Société des Sciences.
§ Lille :—Société de Géographie.
* Liverpool :—Literary and Philosophical Society.
* London :—Anthropological Institute.
* ——— :—Editor, Academy.
* ——— :—Editor, Athenæum.
* ——— :—British Museum.
* ——— :—Geological Society.
* ——— :—Institute of Civil Engineers.
* ——— :—Institution of Mechanical Engineers.
* ——— :—Editor, Nature.
* ——— :—Linnean Society.
* ——— :—Royal Asiatic Society of Great Britain and Ireland.
* ——— :—Royal Astronomical Society.
* ——— :—Royal Geographical Society.
* ——— :—Royal Institution.
* ——— :—Royal Microscopical Society.
* ——— :—Royal Society.
* ——— :—Society of Telegraph Engineers.
* ——— :—Statistical Society.
* ——— :—Zoological Society.
* Lyons :—La Société d' Agriculture, Histoire Naturelle et Arts Utiles.
* ——— :—Musée Guimet.
* ——— :—Le Muséum d' Histoire Naturelle.
* ——— :—La Société d' Anthropologie.
§ ——— :—La Société de Géographie.
† Madras :—Literary Society.
* Madras :—Government Central Museum.
* Manchester :—Literary and Philosophical Society.
§ Melbourne :—Royal Society of Victoria.
* Moscow :—Société Impériale des Naturalistes.
* ——— :—Imperial Society of Amateurs of Natural Sciences, Anthropology and Ethnology.

* Munich :—K. Bayerische Akademie der Wissenschaften.
* ——— :—Editor, Repertorium der Physik.
† Netherlands :—Royal Society.
* New Haven :—Connecticut Academy of Arts and Sciences.
* ——— :—American Oriental Society.
* Newport :—Natural History Society.
* Ottawa :—Geological and Natural History Survey of the Dominion of Canada.
† Oxford :—Bodleian Library.
† ——— :—Indian Institute.
* Paris :—La Société de Géographie.
* ——— :—Société d' Anthropologie.
* ——— :—Société Asiatique.
† ——— :—Bibliothèque Nationale.
* ——— :—Société Zoologique.
* ——— :—Société Académique Indo-Chinoise.
§ ——— :—Institution Ethnographique.
* Philadelphia :—Academy of Natural Sciences.
§ ——— :—American Philosophical Society.
* Pisa :—Società Toscana de Scienze Naturali.
§ Prague :—K. K. Sternwarte.
§ Rio de Janeiro :—Museo Nacional.
§ Rome ;—Società degli Spettroscopisti Italiani.
§ ——— :—R. Accademia dei Lincei.
* St. Petersburgh :—Comité Géologique.
* ——— :—Imperial Library.
* ——— :—Société Imperiale Russe de Géographie.
* ——— :—Académie Impériale des Sciences.
* ——— :—Hortus Petropolitanus.
* San Franciso :—Californian Academy of Arts and Sciences.
* Schaffhausen :— Société Entomologique Suisse.
* Shanghai :—North China Branch, Royal Asiatic Society.
* Simla :—United Service Institution of India.
* Stettin :—Entomological Society.
* Stockholm :—Royal Swedish Academy of Sciences.
* Sydney :—Royal Society of New South Wales.
* Toronto :—Canadian Institute.
* Trieste :—Società Adriatica di Scienze Naturali.
* Turin :—Reale Accademia delle Scienze.
† Ulwar :—Ulwar Library.
* Vienna :—Anthropologische Gesellschaft.
§ ——— :—K. K. Central-anstalt für Meteorologie und Erdmagnetismus.

* Vienna:—K. K. Akademie der Wessenschaften.
* ———:—K. K. Geologische Reichsanstalt.
* ———:—K. K. Naturhistorischen Hofmuseums.
* ———:—K. K. Zoologisch-Botanische Gesellschaft.
* ———:—Ornithologische Verein.
* Washington:—Commissioners of the Department of Agriculture.
* ————:—Smithsonian Institution.
§ ————:—U. S. Army Signal Service.
* ————:—United States Geological Survey.
§ ————:—U. S. Coast and Geodetic Survey.
* Wellington:—New Zealand Institute.
* Württemberg:—Natural History Society.
* Yokohama:—Asiatic Society of Japan.
* ————:—German Oriental Society.
* Zagreb:—Archæological Society.

Abstract of Proceedings of Council during 1886.

January 28th, Ordinary Meeting.

A reply from the Government of Bengal to the Society's recommendation to appoint Dr. Hoernle as a Government representative at the Congress of Orientalists to be held at Vienna in September next, was recorded.

Maulavi Abul Khair Mahomed Sidik resigned the editorship of the Tárikh-i Budáoni.

A proposal made by Count Angelo de Gubernatis to erect a marble inscription in the rooms of the Society was declined.

A presentation of a MS. of the Tárikh-i-Firoz Sháhi to the Society's Oriental Library by the Royal Asiatic Society, London, on behalf of Mr. Edward Thomas, was acknowledged.

Mr. J. Beames was appointed to the Council.

February 25th, Ordinary Meeting.

Mr. J. A. Anderson having expressed his inability to audit the Society's Annual Accounts for 1885, Mr. J. C. Douglas was asked to undertake the work.

On the recommendation of the Philological Secretary, Maulavi Shamsul Hudá was appointed to the editorship of the Tárikh-i Budáoni resigned by Maulavi Abul Khair Mahomed Sidik.

In connection with the Secretary's report on the death of the Assistant Secretary, it was ordered that all payments by the Post Office

to the Society should be received by cheques in favour of the Treasurer only, and that a set of rules be adopted in connection therewith.

An extract from the Proceedings of the Government of India was read with reference to a suggestion offered by the Society that Coins remaining unsold at the Local Mints should, instead of being melted down, be sent to the India Office for public sale, due notice being given to Institutions and individuals in Europe interested in Numismatics.

The Deputy Commissioner of Buldáná District with reference to his letter reporting the find of some Copper Sheets, was requested to send a few specimens of the sheets for inspection, and to keep the rest of the find intact until the Society should have reported upon the pieces sent.

Mr. J. Beames was appointed Joint-Philological Secretary in consequence of Dr. Hoernle's approaching departure from India.

March 25th, Ordinary Meeting.

Mr. T. H. G. Moncreiffe was appointed to the Council in place of Mr. A. Simson, about to leave India.

Mr. Medlicott was appointed Vice-President in place of Col. J. Waterhouse about to leave India.

Mr. Douglas having expressed his inability to audit the Society's Accounts it was resolved to place Rs. 300 at the President's disposal for securing the services of a professional auditor, and for taking stock.

On the recommendation of the Philological Committee Dr. R. Sen was appointed to edit the "Susruta" in place of the late Dr. U. C. Dutt.

The Sub-Committee's recommendation for the erection of four large Racks for the storage of the increasing numbers of the Bibliotheca Indica was approved.

The Sub-Committee's recommendation regarding the better preservation of the Tibetan Zylographs and Burmese MSS. was approved.

The printing of the Tibetan MSS. was sanctioned on the line proposed by the President that the printed texts should be a strict reproduction of the MSS. without at present any attempt at editing or emending.

April 29th, Ordinary Meeting.

With reference to a letter from the Commissioner, Orissa Division, forwarding a transcript of an inscription found on a stone in the Bankur Pass, the Commissioner was requested to furnish a 'squeeze' of the inscription.

An exchange of publications was sanctioned with the K. K. Naturhistorischen Hof-museum, Vienna, the Naturwissenschaftlichen Verein, Frankfurt, and the Bombay Natural History Society.

On the recommendation of the Philological Committee Mr. F. E. Pargiter was appointed to publish an English translation of either the Márkandeya Purána or the Kurma Purána.

An application from Pandit Chootia Rama Tewary to publish the Hindi text and an English translation of the "Padmavati" was postponed.

A proposal from the Société de Géographie, Tours, for an exchange of publications was declined.

On the recommendation of the Philological Committee Pandit Haraprasád Sástri was appointed to publish the "Svayambhu Purána" an important work from Nepal.

On the recommendation of the Philological Secretary Maulavi Lutf-ur-Rahmán was appointed to edit the Tárikh-i-Firoz Sháhi of Shamsi Shirán.

Dr. Mitra was nominated on behalf of the Society as a Trustee of the Indian Museum in place of Mr. F. E. Pargiter leaving India.

An estimate from Messrs. Jessop and Co. for four wrought-iron racks for the storage of the Bibliotheca Indica, amounting to Rs. 1,800, was sanctioned.

The Secretary reported that Messrs. Browne and Lovelock had completed the audit of the Society's Accounts for 1885.

May 27th, Ordinary Meeting.

The President's proposal for the preparation of (1.) a Catalogue of Persian and Arabic MSS. (2.) a Catalogue of Sanskrit and Hindi MSS. (3.) a Catalogue of Tibetan MSS. and (4.) a Catalogue of Burmese MSS. in the Society's Library was sanctioned.

On the recommendation of the Philological Committee Professor Madhusudan Tarkaratna was appointed to edit the "Madana Párajitá" a standard digest of the Smritis.

A proposal from the Corresponding Secretary of the Rōmaji Kai (Romanization Society) Takyo, Japan for an exchange of publications was declined.

The Philological Secretary submitted a Catalogue of the Coins belonging to the Society.

An invitation to the Society from the Committee of Organization, for the Seventh International Congress of Orientalists at Vienna, was acknowledged by the President in an autograph letter, informing them that Dr. Hoernle had been appointed to represent the Society at the Congress and soliciting their good offices on behalf of Mr. G. A. Grierson, a member of the Society, who would also attend the Congress.

In view of Dr. Hoernle's departure from India the duties of the Philological Secretary were distributed as follows:—Mr. J. Beames to

have charge of the Journal, Part I; Pandit Haraprasád Sástri of the Bibliotheca Indica; and Mr. A. Hogg, of the Coins.

The President's suggestion that some of the daily newspapers received by the Society should be distributed amongst the Calcutta Hospitals was sanctioned.

July 1st, Ordinary Meeting.

Read a letter from Mr. F. E. Pargiter stating that he had undertaken the translation of the Márkandeya Purána.

An exchange of Publications with the Naturforschende Gesellschaft, Danzig, was sanctioned.

On the recommendation of the Philological Committee, Dr. Hillebrandt's offer to publish in the Bibliotheca Indica the Baudháyaniya Srauta Sutra and the Hiranyakesin Srauta Sutra, was accepted, on the condition that the publication be not proceeded with by him unless he had three complete MSS. of each work. Dr. Hoernle was permitted by the Council to take with him to Europe such of the MSS. in the Society's Library as might be useful in editing these works.

An application from Mr. E. C. Oliver for the loan of any Chaghatai coins in the Society's Cabinet, could not be complied with.

In reply to a letter from the Government, North West Provinces and Oudh, asking whether the Society would be willing to publish a report by Mr. W. Hoey, with maps and plans, on the excavations and exhumations at Sahet Mahet in the Gondá District, that Government was asked whether they would publish the Maps and Plans, while the Society undertook to publish the Report.

A reprint of the Library rules, with list of presentations corrected up to date, was sanctioned.

Read a letter from the Superintendent, Baptist Mission Press agreeing to a reduction in the terms for printing the Journals and Proceedings.

July 29th, Ordinary Meeting.

An application from the Secretary, Provincial Museum Committee, Lucknow, for complete sets of the Arabic, Persian and Sanskrit Series of the Bibliotheca Indica to be supplied to the Museum Library gratis was granted as far as the series were available.

Mr. H. Beveridge was appointed to succeed Mr. Beames as Philological Secretary in charge of the Journal, Part I, on the resignation of the latter.

With reference to the recommendation of the Sub-Committee, dated 22nd December 1885 allowing a discount of 25 % in the case of "large

orders" for "Publications" it was decided that "large orders" should mean orders for Rs. 50 and upwards, and "Publications" should mean only the Bibliotheca Indica and not the Proceedings and Journals.

On the recommendation of the Finance Committee the following periodicals were ordered to be discontinued after the end of the period subscribed for:—Publishers' Circular: Revue des deux Mondes: Edinburgh Review: Quarterly Review: Westminster Review: Hesperos.

As members had not taken advantage of the Library being kept open until 10 P. M. on Thursdays during June and July, the arrangement, tried as an experiment, was to cease from August 1st.

It was ordered that Members on election should be in future informed that a copy of the Library Catalogue was at their disposal if they chose to apply for it.

August 26th, Ordinary Meeting.

An offer from Pundit Lal Trelok Nath Sing of a book named "Bhoobnesh Ank Brakar" on the Construction of Magic Squares, for publication by the Society, was declined.

A suggestion from Mr. F. J. Fleet that Major Kittoe's impression of the Gupta Inscription from Aphsar in the Behar District, then in his possession, should be presented by the Society to the India Office in London, was declined.

An application from Mr. H. G. Keene for permission to publish a new edition of Beale's Oriental Biographical Dictionary, which had been brought out by the Society in 1881, was granted on the condition that the publication was to be at Mr. Keene's own expense and sole responsibility.

An examination of the beams over the staircase was ordered.

September 30th, Ordinary Meeting.

Mr. T. G. H. Moncreiffe resigned his seat as Member of the Council.

An application from the Inspector-General of Education, Central Provinces, for the grant of thirteen specified works in the Bibliotheca Indica to the Jubbulpore College was sanctioned.

In accordance with the Minutes of the Members of Council on Mr. A. Grote's letter regarding the publication of Part III of Mr. Moore's papers on the late Mr. Atkinson's Collection of Lepidoptera, the Treasurer stated that in pursuance of instructions, the Bank of Bengal had sold Government Securities of the value of Rs. 1,500 and that the sum £161-6-6 had been remitted to Mr. Grote.

In accordance with the Minutes of the Members of Council regarding a Catalogue of Sanskrit MSS. found in a temple at Pooree, and for-

warded to the Society by the Commissioner of the Orissa Division, it was ordered that as the MSS. themselves were not for sale, the Catalogue be returned to the Commissioner.

In reply to a letter from Mr. M. D. Karan, Government Pleader, Monghyr, forwarding a facsimile copy of an inscription found on a small rock at the Kashtarun ghat, which he thought if deciphered would throw some light on the history of Monghyr, it was ordered that a facsimile impression be asked for.

On the recommendation of the Philological Committee, Pandit Váman Sástri Islámpurkar of Odeypore, was appointed to edit the Advaita Brahma Siddhi by Sadánand Yáti of Kashmir.

An offer from Pandit Harináth Dvivedi to edit either the Vedánta Kalpataru (with a Commentary, the Vedánta Kalpataru Parimálá) or the Sanskhepa Shariraka, was declined.

An estimate of Rs. 461-8-0 by Messrs. Mackintosh, Burn and Co. for putting new beams over the staircase, was referred to Mr. Medlicott.

October 28th, Ordinary Meeting.

With reference to a letter from the Government of Bombay applying for the loan of twelve specified Sanskrit MSS. on behalf of Lt.-Col. G. A. Jacob, who was engaged in preparing a concordance to the Upanishads, it was ordered that the MSS. be sent on loan to be renewed after twelve months.

An exchange of publications with the Anthropological Society of Bombay was sanctioned.

Mr. Medlicott, with reference to Messrs. Mackintosh, Burn &. Co.'s estimate, reported that he had arranged through Mr. W. Girling, for the execution of the repairs at a cost of Rs. 360.

A further examination of the roof of the building was ordered.

November 25th, Ordinary Meeting.

An application from the Kambuliatola Boy's Reading Club to be presented with the Society's Publications, was declined.

The Government, North West Provinces and Oudh, was informed that, according to an estimate furnished from the Surveyor General's office, the total cost of printing the Photographs, Maps and Plans of Mr. Hoey's report at that office would be Rs. 3,264, for 650 copies.

A paper by Pandit M. V. Pandia, Meywár, containing a critical examination of the views of Kaviráj Shyámal Dás on the antiquity, authenticity and genuineness of the epic Prithiráj Rasau commonly ascribed to Chand Bardai, which had been referred to the Philological Committee, was returned to the author.

On the resignation of the Hon. H. J. Reynolds, Mr. D. Waldie was appointed Vice-President, and Mr. E. Gay nominated to a Trusteeship of the Indian Museum, in his place.

On the recommendation of the Finance Committee, a second class passage to China, at a cost not exceeding Rs. 100 was procured for the Lama who had completed the Catalogue of Tibetan MSS., it being contrary to the Lama's principles to accept money payment for the same.

The printing of the Catalogue of Tibetan MSS, and of the Catalogue of Burmese MSS. with romanized titles, was ordered.

The Office-Bearers and other Members of Council for the next year were proposed.

December 30th, Ordinary Meeting.

At the request of the Government of India, the name of Professor J. Darmesteter, Collége de France, Paris, was added to the list of persons in Europe to whom Catalogues of Sanskrit MSS. are sent.

Read a letter from the Government, North West Provinces and Oudh, offering to subscribe Rs. 1,000 towards the publication of Mr. Hoey's Report, on condition of receiving 150 copies of the work. The proposal was referred for further report to Col. Waterhouse.

On the recommendation of the Philological Committee, Dr. Garbe was appointed to edit Aniruddha's Commentary with extracts from the glosses of Vedánta Mahádeva.

The Report having been read the President invited the Meeting to put any questions or offer any remarks which any member might think necessary in connection therewith.

No remarks having been offered the President moved the adoption of the Report. The motion was unanimously carried.

The PRESIDENT then addressed the Meeting as follows:

Address.

The Society.—In the report of our General Secretary will be found all the information necessary regarding the Society's affairs, and it is not my intention now to review them again. I would merely note that our income about equals our ordinary expenditure, that we have Rs. 142,000 invested, of which Rs. 120,000 forms a close reserve fund, and the balance is available for extraordinary expenditure. From this source, your Council have voted a special grant of Rs. 1,000 for binding books and

have under consideration a proposal for a new manuscript room. These are the two next most pressing needs, a large outlay on iron-racks for storage purposes having been met during 1886. We have also at considerable trouble verified our stock of publications, and our accounts are now audited by professional accountants, as it was found that the time and labour demanded were such as could not reasonably be required from any private member. Before reviewing the work done during the year, I must tender my grateful acknowledgments for the services rendered by the office-bearers of the Society during my tenure of office:—to Mr. H. M. Percival who has carried on the duties of General Secretary and Treasurer during the greater part of the year; to Mr. Wood-Mason for his services as Natural History Secretary, and to Dr. Hoernle, Mr. Beames, Mr. Beveridge, Pandit Hara Prasáda Sástri, and Mr. Hogg, who have at different times aided in the discharge of the various duties appertaining to the office of Philological Secretary. I would therefore call upon you for a vote of thanks to those gentlemen for their voluntary services, afforded in addition to arduous official duties, and without which we could not have succeeded in carrying on the work of the Society. (*Carried unanimously.*)

Obituary.—It has ever been the painful duty of your President to bring more prominently before you on these occasions the names of those whom death has removed from us, and who have done good work through, or for, our Society. I have not been spared in this respect, and it is now my duty to announce the deaths of three distinguished members of our Society during the year, Mr. Edward Thomas, Mr. James Gibbs, and Mr. Arthur Grote. Mr. Thomas was a member of the Bengal Covenanted Civil Service, and some account of his life and writings was given at a previous meeting by the President and by Dr. Mitra, and will be found recorded in the Proceedings of the Society. From 1848 to 1884, he contributed numerous papers, on Indian, Indo-Baktrian, Indo-Sassanian, Iranian, and Armenian archæology and numismatics, to the pages of the *Journal of the Royal Asiatic Society* and of this Society, and to the *Numismatic Chronicle*, the *Journal of the Numismatic Society* of London, and the *Journal Asiatique* of Paris. He also edited Prinsep's papers on 'Indian Antiquities,' and took a principal part in the international edition of 'Marsden's Numismata Orientalia', besides giving us, in his 'Revenues of the Moghul Empire in India' and 'Chronicles of the Pathán kings of Dehli,' records which must ever remain standard works of reference for Indian history. Mr. James Gibbs was a member of the Bombay Covenanted Civil Service, and was an active resident member up to a short time ago. It was only late in 1885 that he published a pamphlet 'On some

rare and unpublished coins of the Pathán and Moghul dynasties of Dehli.' Though his contributions to our Proceedings are neither so numerous nor so important as those of Mr. Thomas, Mr. Gibbs's knowledge of the coins of Western India deservedly acquired for him a high reputation as a numismatist, and to this was added a ready disposition to aid others in his favourite pursuit such as is rarely to be met with.

Mr. A. Grote was a member of the Bengal Covenanted Civil Service. Born in 1814, he came to India in 1833 and filled successively the offices of Collector of Midnapur, Secretary of the Board of Revenue, Commissioner of the Nadiya Division, and Member of the Board of Revenue in Calcutta. From the year 1852, to 1855, he was Secretary of this Society, from 1856 to 1858, Vice-President, and from 1859 to 1862, President. Those amongst you who had the privilege of his acquaintance will remember the friendly help that he was ever ready to extend to all who needed counsel or encouragement. Mr. Grote retired in 1868, but did not on that account withdraw his interest from our Society and its affairs; for up to a very recent date he was in constant communication with several of our members, and on various occasions showed that in him we had in England a faithful counsellor and warm friend, ever ready when called upon to represent and protect our interests. Nor must I omit to mention the name of the late Babu Rájkrishna Mukharji though but for a short time connected with this Society. He was favourably known as a Bengáli writer, and in his collection of essays, historical and antiquarian, published under the name *Náná prabandha*, showed considerable learning and industry.

Publications:—Journal.—The publications of the Society, as you are aware, are four in number, the Journal Part I representing philology and literature; the Journal Part II representing science; then come the *Proceedings*, containing records of our meetings and many minor papers; and the *Bibliotheca Indica* devoted to the publication of important unpublished Oriental texts and translations thereof. In the first Part of the Journal for 1886 are papers 'On some copper coins of Akbar found in the Kángra district' by Mr. Oliver, on a collection of South Indian coins by Captain Tufnell, on some symbols on the coins of Kunanda by Mr. Theobald, and a fourth list of coins supplementary to those given in Mr. Thomas' Chronicles of the Pathán kings of Dehli by our Associate member, Mr. C. J. Rodgers; all of which show that materials for original research still exist in this well-cultivated field. Kaviráj Shyámal Dás of Mewár has given us notes on the Prithiráj-rásau commonly ascribed to Chand Bardái, on the actual birth-day of the Emperor Akbar, and on the Míná tribe of Jájpur in Mewár. The migrations of these Mínás or

Meos eastward to the Duáb and sub-Himálayan districts of the N.-W. Provinces should, when fully examined, throw much light on the early mediæval history of Upper India. In Mr. R. S. Whiteway's place-names in Merwára we have a useful contribution to local topography, and in Mr. Pargiter's notes on the dialect of the Chittagong district, an excellent contribution to the survey of the Indian dialects which we hope soon to see placed on a better and more comprehensive footing. Mr. Oliver's paper on the decline of the Sámánis and the rise of the Ghaznavis in Máwará-un-Nahr and part of Khurásán is illustrated by some hitherto unpublished coins which enable us to fill up some gaps in the scanty records of the past of those regions. Babu Sarat Chandra Dás has also contributed a paper on the Buddhist and other legends about Khoten, the Li-yul of the Tibetans, and the Chandana of the early Indian writers.

In Part II of the Journal, we have contributions by Dr. Barclay on the species of uredine affecting the Himálayan spruce-fir (*Abies smithiana*) and the deodár (*Cedrus deodara*), also descriptions of three new Himálayan primulæ and two species of ilex by G. King, M. B., Superintendent of the Royal Botanical Gardens. A very interesting paper by the latter gentleman on some species of *Ficus* from New Guinea gives a new arrangement of the genus and descriptions of seventeen new species. In the domain of Zoology, the invertebrates are, at last, taking the place to which their scientific and economical importance entitle them. We have published during the year, papers on the Rhopalocerous Lepidoptera (butterflies) of Kumaon by an American entomologist, Mr. W. Doherty, and additional notes on new or rare Indian butterflies by the same writer, whilst Mr. de Nicéville also describes and illustrates nine new Indian butterflies chiefly from Sikkim, and, with Mr. Wood-Mason, gives a list of the butterflies of Cachar. Mr. Elwes and Mr. de Nicéville together publish a list of the butterflies of Tavoy, and the latter writer further adds to our knowledge of this popular order of insects by notes on the life-history of some Calcutta species of *Satyrinæ*, in which he explains and proves the occurrence of seasonal dimorphism amongst them. Some species are furnished on the underside of the wings, in the broods that are on the wing during the rainy season, with strongly marked and conspicuous ocellated spots, whilst, in the same species, or other species that take their place, during the cold and dry seasons, those markings are obsolete or entirely wanting, and the general tone of coloration is much paler and more leaf-like. No sufficient explanation of this phenomenon has as yet been arrived at, but the fact has been distinctly proved by actual breeding, with the result that several species hitherto considered distinct must be held to be one and the same. Mr. Moore's paper on the Heterocerous Lepidoptera (moths) of Tavoy and

Siam takes up this neglected, because more difficult, section of the order; and I am glad to be able to state that the third part of the descriptions of 'New Indian Lepidoptera from the collection of the late Mr. W. S. Atkinson' by the same writer is ready for publication.

For the Hymenoptera, we have the second part of a valuable paper by Professor Forel of Zurich on the Indian ants preserved in the Indian Museum, and a paper on the hive-bees indigenous to India and the introduction of the Italian bee by Mr. J. C. Douglas, whose efforts in this direction have been crowned with success. Mr. E T. Atkinson has completed his descriptive catalogue of the Homopterous section of the Indian Rhynchota with an index to the six parts, which for the first time collects in one place, with some additions and omissions, the original descriptions of all the insects of this section hitherto recorded from India; he also describes some new species. In his paper on the family *Coccidæ*, the same writer calls attention to a section of the Rhynchota of much economical and commercial value. To it belong the pests of the coffee, tea, and chinchona and the lac-insect that affords the lac-dye and shell-lac of commerce. But little, however, can be accomplished in this direction until we have the services of an expert to devote himself exclusively to the investigation of the life-history of the local insects and the publication of the results, as is done in America by the entomological section of the Department of Agriculture. Mr. Wood-Mason gives us a paper on the Stomatopod crustaceans preserved in the Indian Museum; Dr. O. von Möllendorff, German Consul at Manilla, one on the land shells of Perák, and Mr. Hill, of the Muir College, a contribution of considerable value on solar observations at Allahabad.

Proceedings.—In our *Proceedings*, we publish the notices of all acquisitions to our coin cabinet and in addition papers of minor importance. Amongst these, is a learned note by Dr. Mitra on the term '*Ekotibháva*' in which he criticises some statements of Professor F. Max Müller. It should be some satisfaction to the learned doctor that Professor Müller has since acknowledged the value of these criticisms by accepting them. We have also a contribution to meteorological literature in the shape of a notice of snow-measurements taken at Kailung in Lahoul, communicated by Mr. H. F. Blanford. Also the substance of a lecture by Mr. C. Stevens of Brisbane on the Veddahs of Ceylon which gives us much information regarding this little known, and, from an Anthropological point of view, highly interesting people. I understand that we may soon expect a complete account of the Veddahs from a forthcoming work by Mr. C. W. Rosset, who has spent eighteen months amongst them. I would submit that this very brief survey of work done by the Society shows

that in its old age it has lost little of the vigour of its youth, and I congratulate you on the result.

Bibliotheca Indica.—The fourth issue of our Society is the '*Bibliotheca Indica*' in which are published texts or translations of hitherto unpublished or untranslated works. The scheme was formulated and accepted many years ago chiefly through the exertions of our late member, Mr. J. W. Laidlay, and we have abundant testimony to the fact that it has well subserved the advancement of Oriental learning throughout the world. Its parts, as published, are sent free not only to nearly all the Oriental Societies and principal Universities in the world, but to many distinguished scholars, who would not otherwise, perhaps, be able to obtain them. Thirty-eight numbers were issued during the year, of which 11 belong to the Persian-Arabic series, and 27 to the Sanskrit series, bringing the total issues to nearly 600. All the parts of the Persian series are continuations of works previously sanctioned, and include Mr. Lowe's welcome translation of Badáoní. The parts of the Sanskrit series are also chiefly continuations, and for them we have, in addition to our able local staff, secured the services of several well-known European scholars, such as Professor Jacobi of Kiel, Professor Julius Jolly of Würzburg, and Professor A. Hillebrandt of Breslau.

In connection with the *Bibliotheca Indica*, I may here mention that amongst the matters that engaged the attention of your Council during the year was the furtherance of a scheme for furnishing aids to the study of Tibetan. The very valuable collection of Tibetan MSS. presented to the Society by Mr. B. H. Hodgson has been rearranged, and the contents collated, by a Buddhist Lama from the Tibetan district of Hor-tol: the catalogue formed is in the press and will be printed under the supervision of Babu Pratápa Chandra Ghosha. Steps have also been taken to publish without, at present, any attempt at editing, selections from these manuscripts and thus open this long-neglected source of knowledge to European students. There are few in Europe and fewer still in India who make Tibetan a special study, and the principal reason is, I believe, the absence of texts. The first difficulty was the want of a good fount of type, for that used by Csoma de Körös for his dictionary and grammar, the only one at present in India, is in some respects defective. Mr. Thomas, our printer, has liberally come forward and relieved us from this difficulty by ordering a special fount from Europe, which is expected to arrive at an early date. Many of these Tibetan texts were translated from the original Sanskrit by Indian pandits in the tenth to the twelfth centuries, and, I am told, appear to possess a purer and more correct version in some cases than can now be found in India, whilst, for others, the Sanskrit original is still unknown.

Babu Sarat Chandra Dás, who has lately been elected an Associate member of this Society on account of his contributions from Tibetan literature, has in hand a list of the philosophical and other technical terms in Tibetan and their equivalents in Sanskrit and in English. For this purpose he has been allowed to make use of the very valuable manuscript* of Csoma de Körös in the possession of the Society, and which contains the Tibetan terms with Sanskrit and English equivalents of a very large vocabulary of such words, all of which is in Csoma's own handwriting. He has also had at his disposal a rare Burmese manuscript on the same subject from our library. The work is a much needed one, for these terms have hitherto proved more or less of a stumbling-block to Tibetan students and a collection like that proposed should be of much service to them.

The Burmese and Siamese manuscripts in the possession of the Society have also been examined, and the former have been catalogued, by a Burmese monk from Upper Burma. The list formed is in the press and will be brought out under the supervision of Moung Hla Oung. Our new Pandit is engaged on the completion of the catalogue of our Sanskrit manuscripts, and a Maulvie from the Madrassah has similarly been employed on the list of our Arabic and Persian manuscripts under an arrangement made by Dr. Hoernle. I had hoped that the same gentleman would have given us his long promised 'Catalogue raisonné' of the coins in our cabinet, but his absence from India has postponed the completion of this very necessary work for the present.

Notices of Sanskrit MSS.—I have to refer to another publication which may be regarded as a fifth part of our issues, and that is the 'Catalogue of Sanskrit manuscripts' in private libraries in Bengal, prepared by Dr. Mitra and published by the Society on behalf of Government. Similar lists have been compiled in almost every Province in India during the last eighteen years, and the time has now come when they should be collated and consolidated. Our local list was commenced in 1870, and, since then, 22 parts have been published, containing 2,975 pages and notices of 2,963 manuscripts, mostly illustrated by extracts from the originals. During 1886, some 74 pages containing 73 notices have been issued.

Work outside the Society.—It would be impossible for me to attempt an adequate description of the progress made outside our Society in the subjects to which the attention of its members is directed. These subjects embrace a wide, and as knowledge progresses, an

* This manuscript is described at some length by Dr. Mitra in the Appendix, p. 207, of Duka's life of Csoma de Körös, which also contains much information regarding that distinguished Tibetan scholar's connection with this Society.

ever increasing field, as the Society still holds to the rule laid down by its founder that "the bounds of its investigation will be the geographical limits of Asia; and, within these limits, its inquiries will be extended to whatever is performed by man or produced by nature." It is also to be remembered that in most cases we have only received the European publications for the first half of the past year, and that the time chosen for the annual address is also the busiest one for almost all of us in our public and private avocations. Personally, I much regret that you have not before you to-day one who could satisfactorily carry out the programme, but, gentlemen, I was elected to the post that I have the honour to hold by your suffrages, and therefore the fault of having such an imperfect representative rests with you. I can only say that, craving your indulgence for its many imperfections and omissions, I will, with the assistance of the many* who have come forward to aid me, endeavour to give you some account of some portions of the work done outside the Society during a part of 1886.

Survey of India.—We can always turn to the records of the Survey of India with the assurance that we shall find there something of novelty and interest. The great feature of the year has been the completion of the work undertaken by the Afghan Frontier-delimitation Commission on which three officers and several native surveyors have been so long employed. It will be some time before the results can be made ready for publication, and we are glad to learn that it is the intention of Government to collect and publish the whole of the reports as a separate volume. We, however, know that an independent traverse without a break was taken from Quettah to Kushán, a distance of 767 miles. Between Nushki and Khwájah Ali the country was triangulated, and a topographical survey was carried on along two separate routes, embracing an area of about 6000 square miles. The Helmand valley was mapped up to the Hamun, and the total area plane-tabled along the route amounted to 15,000 square miles. We have not yet details from which we can apportion to 1886 the work done in that year, but we know that the survey was continued and carried on to Kábul itself on the return journey, and that Captain Gore proceeded from Khamiáb through Herát to Kirmán and thence to Bandar Abbás on the Persian Gulf. The Survey of India was also represented on Colonel Lockhart's Gilgit mission, which traversed much new ground, including parts of Chitrál, Yassin, and the borders of Káfiristán, and should be able to fill up many blank spaces on our maps. In connection with this elevated region reference may

* I would particularly record my obligations to Mr. H. B. Medlicott, Dr. G. King, Dr. D. D. Cunningham, Dr. Burgess, Mr. H. Blanford, Mr. G. A. Grierson, and Mr. H. Risley.

be made to a journey made in Kárateghin and Dárwáz, in 1882, by the Russian traveller Kosiakof, an account of which appears in the *Proceedings of the Royal Geographical Society* for January 1886.

In the Trigonometrical branch of the Survey, there were two parties engaged on electro-telegraphic longitude operations; several arcs were measured between Trigonometrical stations, and a party was employed in fixing by triangulation the positions of prominent land-marks and in erecting beacons along the east coast of Madras for the purposes of the marine survey. The tidal and levelling party continued its usual work of tide-registering and spirit-levelling. The operations of the Topographical branch of the Survey were carried on in the Andaman Islands, Lower Burma, Mysore, Kachh, Gujarát, the Konkan, and the Dekkan in the Bombay Presidency, also in Rájputána, the Mirzápur district of the N.-W. Provinces, and in Baluchistán, in continuation of the work of former years. The surveys of the Andaman Islands, Mysore, and Kachh were completed during the year. The Hill survey party was transferred from the Sikkim station to Kángra and the Hill States around Simla, there to serve as a school for military officers to fit them for reconnoissance in the field. Cadastral surveys for the purposes of the settlement of the land-revenue were carried on in the Biláspur district of the Central Provinces, the Gorakhpur and Basti districts of the N.-W. Provinces, the Kamrúp district in Assam, and the Akyáb district in Burma; the similar survey undertaken in the Muzaffarpur district of Bengal, for the purpose of forming a basis for a record of rights, has been stopped by orders of the Secretary of State.

Geography.—We have some papers bearing on the geography of Afghánistán in the contributions to the *Proceedings of the Royal Geographical Society*. That by Sir Peter Lumsden properly belongs to the history of 1885, as also does that by Major Holdich, R. E., on the measures taken to fix the geographical position of Mashad in north-eastern Persia. Col. C. E. Stewart's paper on 'The Herát valley and the Persian border from the Hari-rud to Seistán' gives an account of an interesting reconnoissance made by him, from Kháf as a centre, to Mashad on the north, Karez on the east, Gazdun and Duruh on the south, and Kundar on the west, through a little-known country. He also discusses the physical and political possibilities of a railway from Quettah to Herát. More connected with purely Indian geography is the discussion, in the same Proceedings, between Mr. Freshfield and a well-known and distinguished member of our Society, General Walker, on the actual position of Mount Everest. We have also a paper 'On the River systems of Southern India' by General Rundall, in which is advocated the formation of storage works for economising the water-supply and the perfecting of

canal and river-navigation in the peninsula as the best means for ameliorating the results of seasons of drought.

Much had been expected from the well-equipped Mission to Tibet under Mr. C. P. Macaulay, and we can only regret that, where all the conditions deserving of success were present, the Mission was not allowed to proceed to Lhása. In the fourth and last journey of the distinguished Russian traveller, General Prejevalsky, we have, however, added considerably to our knowledge of Tibetan geography. He examined the northern border of the great Tibetan plateau, hitherto absolutely unknown, except from the vaguest tradition. In a letter, translated in the *Proceedings of the Royal Geographical Society*, General Prejevalsky describes the northern boundary as formed on the east by a range of mountains, named by him the Kerian (Keriiski), extending for 107 miles, east to west, between the rivers Keria and Yurun-kash, the latter dividing it from the mountains which continue the chain westward to the Kárakorum. The Kerian range appears as a high, steep, disrupted, wall of mountains, surpassing the snow-line throughout its extent, and in places rising in groups to a height of over 20,000 feet. During the whole time of the stay of the traveller in this lofty belt, rain continued to fall, brought there probably by the Indian monsoon and continuing during the three summer months, being heaviest in July. These rains are said to account for the profusion of glaciers and the existence of pasturage between 9000 and 12,000 feet, on which feed numerous flocks of fine-woolled sheep.

Mr. H. E. M. James of the Bombay Covenanted Civil Service, accompanied by Mr. F. E. Younghusband and Mr. H. Fulford, has recently made a journey through the Chang-pei-shan mountains of Manchuria, and has visited the sources of the river Sungari, reaching a part not hitherto visited by Europeans. The party leaving Moukden, the capital of southern Manchuria, reached the *Pei-shan*, or white mountain, the highest of the group, and found it to consist of a recently extinct volcano, with a lovely blue pellucid lake filling the bottom of the crater, and surmounted by a serrated circle of peaks rising far above the surface of the water. This lake is about $1\frac{1}{2}$ miles across and from six to seven miles in circumference. From its northern end issues a small stream forming the eastern branch of the Sungari, whilst the western branch owes its origin to several streams rising on the south-east face of the Pei-shan. The party returned by another route to Kirin, the capital of central Manchuria, and have proceeded thence to northern Manchuria. Mr. Needham's very interesting account of his journey from Sadiya on the Brahmaputra in Upper Assam to Rima on the Zayal-chu, published in the same Proceedings, seems to establish,

on a firm basis, the identity of the Dihong river of Assam with the Sanpo of Tibet, as held by the majority of Indian geographers.

From the same source, we have a paper 'On the exploration survey for a Railway connection between India, Siam and China' by Mr. Holt S. Hallett which gives an interesting account of the country lying between the Lower Iráwadi, Northern Siam, and the Chinese frontier. The line proposed by him would extend from Maulmain to Raheng; the main line passing through 481 towns and villages, with one terminus at the sea-port of Bangkok and another at Kiang Hseu, only 190 miles from China, and situated in a vast, fertile plain now being repeopled by the Sháns of Upper Burma and Siam. We have also an account of a 'journey in South-western China from Ssŭ-chian to Western Yunnan' by Mr. A. Hosie, and by Mr. J. G. Scott a paper 'on the hill-slopes of Tong-king,' both of which add considerably to our knowledge of those little-known regions. In 'Burma, the country and people' by Mr. J. Annan Bryce, we possess an admirable summary of general information founded on many years' residence and personal exploration; a great part of the basin of the Kyendwin described by him had never been previously noticed, and his paper is full of facts of considerable value for ethnological and geographical purposes. Nor must I omit to mention the issue of the second edition of the Imperial Gazetteer of India by the Hon'ble W. W. Hunter, giving the results of the latest census and correcting the few errors which in a work of the kind must occur.

Archæological Survey.—On the retirement of that distinguished and old member of our Society, General Cunningham, from the Archæological Survey, the organization of the Survey in Upper India was remodelled on a plan prepared by the retiring Director-General, and, from October 1885, the provinces previously under his supervision were divided into three circles:—(*a.*) Bengal with Assam and the S. E. districts; (*b.*) N. W. Provinces and Oudh with Central India and the Central Provinces; and (*c.*) the Panjáb and Rájputána. Each circle was to have a Surveyor and an assistant and a head-draftsman; and Dr. Burgess was appointed head of the surveys and adviser to Government, and subsequently was made Director-General with extended powers and the control of all conservation works. It was also arranged that an allotment should be made for the translation of inscriptions by competent Oriental scholars in this country or in Europe.

Panjáb.—During 1883, the Surveyor in the Panjáb, Mr. Rodgers, who is also an Associate Member of our Society and a frequent contributor to its Journal, made a tour to the places of interest in the districts of Gurdáspur and Kángra, and has prepared a number of drawings of in-

teresting old buildings. He has also collected a large number of old coins of various dynasties, which will be described in his Report. It is understood that all coins, sculptures, and other antiquarian objects collected by the staff shall be strictly considered as State property and shall belong to the principal museum of the circle, but arrangements may be made for certain exceptions (including duplicates) in favour of the Imperial and other Museums and also for exchanges and casts. I can only hope that these arrangements may have a liberal tendency in so far as they affect the Indian Museum, which is to all intents and purposes the Museum of our Society and contains the nucleus of a fairly representative study-collection from various parts of India.

N.-W. Provinces.—In the North-Western Provinces and Oudh circle, under Dr. A. Führer, who is an Associate Member of our Society, and Mr. E. Smith, some 64 inscriptions in Arabic, Persian, and Sanskrit were collected and translated, of which 30 were new and some were of considerable historical importance. In Jaunpur, the capital of the local Sharki dynasty in the fifteenth century, careful architectural drawings were made of the Jáma, Atála, and Jhinjari Masjids, chiefly built from materials derived from older Hindu temples, and themselves illustrating a peculiar style of architecture. The Report will also deal with the ancient remains at Zafarábád, Ayodhyá, Sahet-Mahet, and Bhuila-Tál. This last place was identified by Mr. Carlleyle (Arch. Rep. xii, p. 182) with Kapilavastu, but Dr. Führer dissents from this.

Bengal.—In Bengal, the Surveyor, Mr. J. D. Beglar, and his assistant, Mr. Garrick, have examined more or less completely the remains of interest in the Sháhábád, Gayá, Patna, Munger, Bhágalpur, Húgli, and Nadiyá districts and the Santhál Parganahs. The fortress of Shergaṛh has been visited and sections and detailed plans and drawings of the great tombs of Sher Sháh and his father at Sásserám have been prepared. In Gayá, under the guidance and direction of General Cunningham, Mr. Beglar opened trial trenches in a place to the north of the temple within the old '*gaṛh*' or fort, with the result that the remains of a building were discovered that may reasonably be identified with one of the great monasteries mentioned by Fah Hian, the Chinese traveller, in the fifth century. In Patna, an examination of the river-wall of the fort has led Mr. Beglar to the belief that its foundations contain remains of the landward walls of the fortress that existed there in Asoka's time, in the third century before Christ. Sections and plans have also been prepared of the Adina mosque, in the Malda district, the most ancient and the most important of the Muhammadan buildings in Bengal. Steps have been already taken to conserve in a measure the buildings around the site of the famous *bo*-tree at Gayá, and selections from the scattered remains

found there will find a home in the Indian Museum. The suggestion of Mr. E. Arnold that the present occupant of the Hindu temple at Gayá should be induced to give up his acquired right of occupancy, and that the place so sacred in the annals of Buddhism should be handed over to the care of Ceylon Buddhists, will doubtless receive consideration, but we should not forget in this connection that we have in Burma even a greater number of Buddhist fellow-subjects who desire and deserve consideration.

Bombay.—In Western India, H. H. the Gaikwár procured a survey to be made by the Archæological Department of the ancient fort of Dubhoi, the results of which will, it is believed, be published. The early mosque at Bharoch, with its richly carved ceilings, torn from Jaina temples, was also surveyed, and the latter half of the last season was devoted to a careful delineation of the early Chalukyan temples in the Dhárwár district and on the borders of Mysore. These temples appear to represent a distinctly marked architectural style, and in their chronological sequence can be clearly traced the development of that style from the slightly modified Dravidian temples of the seventh and eighth centuries to the fully developed and richly carved Chalukyan works of four centuries later. The drawings prepared by the Survey will illustrate the richness of Hindu art in mediæval times in a manner that has never before been attempted. Numerous old inscriptions in the Káuarese character were also collected and submitted for decipherment. H. H. the Gaikwár has asked for a party to examine the remains of the celebrated city of Anhillawaḍa-Paṭṭan, once the capital of the Solankhis, and also the remains at Sidhapura and Mudhera. The same survey party will visit other remains in Gujarát and the east of Káthiáwár, including the Jaina shrine of Satrunjaya.

Madras.—In Southern India, the Survey, during last season, traversed the country lying along the north-east frontier of Mysore from Pennakonda to the Tungabhadra, delineating numerous remains both of the Chalukyan and Vijayanagar dynasties, and collecting facsimiles of stone and copper-plate inscriptions. A copper-plate grant in old Prákrit, belonging to the Pallava dynasty, and of the fourth or fifth century A. D. was procured in the Belári district, and another very important inscription of the Pallavas found on a large marble pillar at Amarávati has been read by Dr. Hultzsch. During the present season, after completing the examination of Mahávallipuram, the staff will take up the antiquarian remains at Vellúr and other places in the North Arcot district and the vicinity. In March last, Dr. Burgess made a personal visit to the remote shrine of Srí Sáilam in the Nallamallas, or Black mountains, and sees reason to think that it is one with the *Po-lo-mo-lo-ki-li* rock or

mountain, mentioned by Hiuen-Tsiang, the Chinese traveller. It was here that a king in Southern Kosala built for the Bodhisattva Nágárjuna, a *sanghárama*, and here was passed a great portion of the saint's life. Dr. Burgess has in the press a monograph on the Amarávati stúpa, illustrated by about 70 plates, mostly autotypes. It will include new versions of the Asoka edicts at Jaugada and Dhauli by Dr. G. Bühler from fresh impressions taken by Dr. Burgess himself.

An effort which cannot fail to obtain the approval of this Society is now being made to secure complete lists and impressions of all old inscriptions arranged by districts. This is a work in which every member of this Society can, with very little trouble to himself, considerably aid the objects of the Survey, by sending transcripts or impressions of inscriptions to the local Surveyor or lists of places where they are to be found. Attention is also being directed to the more careful preservation of all ancient remains, including the dolmens and stone circles of the south of India and the old village sites and ruined stúpas in the Panjáb and Rájputána. Nor should it be omitted to state that the Maharaja of Jaipur is giving generous encouragement to Colonel S. Jacob to complete and publish his collection of examples of architectural ornament formed from specimens at Amber and other towns within the Maharaja's territories.

Indian Antiquary.—In philology, archæology, and literature relating to India, the *Indian Antiquary* continues to hold its high place, and, to judge from the quantity and variety of its contents, to meet with the liberal support that it certainly deserves. Your attention may be called to the continuation of the Sanskrit and old Kánarese inscriptions by Mr. Fleet, of which eight are given (Nos. 160—167), and Dr. Bühler's Vallabhi inscriptions, of which the eighteenth number appears. Mr. Fleet also has a paper on the Gupta era in which he follows Al Bírúni's statement that the Gupta era began within a year or two on either side of A. D. 319-20, but denies that this was also the date of the extermination of the Guptas, and not of their rise to power. Mr. Fleet also gives grounds for believing that this Gupta era was used in Nepál by the Lichchhavis, whilst at the same time the Sríharsha era, established by Harshavardhana of Kanauj, was used by Ansuvarman and his successors. The same writer also gives a paper on the history and date (515 A. D.) of Mihirakula son of Toramána known from the boar inscription at Eran in the Central Provinces which was originally edited by Dr. Mitra and published in our Journal.* Dr. Kielhorn contributes a paper on the Sásbahu inscription of Mahípála on the Vaishnava temple at Gwalior, correcting a former reading pub-

* See Journal XXX, p. 267; XXXIV, p. 115: Arch. Rep. IV, 96.

lished in our Journal,* and also on two copper-plate grants of Jayachandra of Kanauj, the translation of one of which was previously published in Colebrooke's Essays,† and of the other in our Journal.‡ Dr. E. Hultzsch, now attached to the Archæological Survey of India, revises the transcript and translation of an inscription found in the fort of Gwalior and originally published in our Journal.§ The same writer retranscribes and edits the Bhágalpur plate of Náráyanapála which is preserved in our library and has also been published in our Journal.|| If to these be added the paper by the Rev. S. Beal on the age and writings of the great Bodhisattwa Nágárjuna, the record of work done similar to that undertaken by this Society is highly to be commended. I would add that the papers quoted as correcting articles that have appeared in our Journal, exhibit a judicial, scholarly tone, fully appreciative of the work done by members of this Society, and giving the result of later and more perfect investigation.

Other Journals.—Subsidiary to the *Indian Antiquary* and subserving a distinct purpose is the *Indian Notes and Queries* intended to conserve such waifs and strays of philology, archæology, and folk-lore as might not be considered of sufficient importance for the other Journals. With this may be mentioned Captain Temple's '*Panjab Legends*,' a serial work sufficiently described in its title. The last number of the *Journal of the Bombay Branch of the Royal Asiatic Society* contained a number of papers read during the years 1883-4-5, and since then no others have appeared. The Ceylon branch of the same Society appears not to have issued a number during 1886, but, in the *Journal of the North China Branch*, we have a paper by Mr. G. Phillips on the seaports of India and Ceylon, and, in connection therewith, I would mention one, in the *Journal of the Royal Asiatic Society* of London, by the Rev. J. Edkins, on ancient navigation in the Indian ocean, which, however, appears to be only introductory to the subject, as it is chiefly taken up with a critical examination of the early Chinese writers. Other papers of interest to us in the same Journal are one by Sir Monier Monier-Williams, one of our centenary members, giving an account of Buddhism in its relation to Bráhmanism and one by Mr. R. Sewell, of the Madras Covenanted Civil Service, on Buddhist symbolism, a subject apparently attracting some attention at present, as the papers by Mr. H. Murray-Aynsley in the *Indian Antiquary* show. Mr. G. A. Grierson also gives specimens of Bhojpuri

* Journal XXXI, p. 411: Arch. Rep. II, 357.
† Ess. II, p. 286.
‡ Journal X (i), p. 98.
§ Journal XXXI, p. 418: Arch. Rep. II, 354.
|| Journal, XLVII, (i), p. 384.

folk-songs with a translation and index, and Mr. F. Pincott, the results of a laborious examination of the arrangement of the hymns of the *Adi-granth* of the Sikhs. Captain Talbot furnishes an account of the rock-cut caves and statues at Bámián, illustrated with notes by Mr. W. Simpson and Captain Maitland, and by plans and drawings of these remarkable Buddhist remains.

Foreign Journals.—Turning now to foreign Oriental Societies, I would call attention to the Journal of the Asiatic Society of Paris (*Journal Asiatique*), which contains M. Senart's continuation of his papers on the language of the edicts of Piyadasi (Asoka) and M. H. Sauvaire's continuation of his contributions to our knowledge of Musalmán numismatics and metrology, also M. S. Levi's paper on the *Brihatkathámanjari* of Kshemendra. The Journal of the German Oriental Society (*Zeitschrift der Deutschen Morgenländischen Gesellschaft*), published in Leipsic, has several papers of interest:—one by Dr. E. Hultzsch, on a 'Collection of Indian manuscripts and inscriptions,' in which an account is given of a journey made through upper India, with a list of some 483 manuscripts collected by the author, of which 115 are Jaina works: the list gives bare titles without detailed comment or explanation. Dr. Hultzsch also notices and translates inscriptions from the temple of Váillabhaṭṭasvámin in the fort of Gwálior, one of which was previously published in our Journal.* He then describes and translates an inscription on stone at Dholpur dealing with Chandamahásena: five copper-plates from Tezpur in Assam of a Raja Vallabhadeva; two fragments of inscriptions of the Bundelkhand Chandels preserved at Allahabad and others from Benares, and gives us an index to the words of the Bharhat inscription. Professor Jacobi continues his Jaina studies in the same Journal, and contributes a paper supplementary to his treatise on the origin of the Svetámbara and Digambara sects. His conclusion is that the origin of the Boḍiya sect is much later than that of the Digambaras, and that the separation of the latter from the Svetámbaras was a gradual process commencing in the time ef Bhadrabáhu and continued through the next generation. He also has a note on the *nirosṭhyavarṇa*, or absence of labial letters in a portion of the *Dasakumára charitra;* and on the play of words called *yamaka* (in which the word at the end of each line commences the next line) that occurs in the *Sútrakritánga*. Professor Pischel, in his Vedica, furnishes notes on various words and phrases taken from the Rig-Veda. I would also mention Professor Bühler's continuation of his notes on the Asoka inscriptions, in which he more particularly compares the second half of the thirteenth edict from the Girnár and Khalsi inscriptions, and a note by the veteran O. Böhtlingk on a previous paper of Dr. Bühler. H. H.

* Journal XXXI, p. 407.

Dhruva continues his notices of Sanskrit grants and inscriptions of Gujrát kings; H. Jacobi devotes a paper to our knowledge of *Aryá;* and there is another by Dr. E. Hultzsch on inscriptions from Amarávati. In the same Journal is a valuable contribution from P. von Bradke on *Asura* and *Marut,* in which he endeavours to show the true signification of those terms. In the *Nachrichten von der Königlichen Gesellschaft der Wissenschaften,* Dr. Hultzsch has a paper on Mátarája's drama *Tápasavatsarája,* in which this work is ascribed to the second half of the ninth century, and the author is shown to be indebted to Buddhist sources for much of his plot.

In *L'épigraphie et l'histoire linguistique de l'Inde* by another of our centenary members, M. Senart, that distinguished scholar treats of the linguistic history of India from the stand-point of epigraphy and arrives at several novel conclusions, deserving of great consideration. From the inscriptions of Piyadasi, it is evident that the Vaidik and religious languages attained to considerable culture at about the beginning of the third century before Christ. As regards classical Sanskrit, its elaboration should be placed between the same date and the first century A. D. and its general use in literary and official documents at the end of the first or beginning of the second century A. D. With reference to the mixed Sanskrit, called the dialect of the *gáthás,* it is only a form of writing Prákrit, which was popularised, especially by the Buddhist Raja Kanishka, and became a literary dialect in certain schools of Buddhism. As regards the Prákrits, the earlier establishment of Sanskrit determines their grammatical form, which was fixed in the third or fourth century, so that none of the works in these dialects can be considered as existing in their present form before that time. In the *Journal of the American Oriental Society,* we have papers on Vaidik subjects by Mr. M. Bloomfield; on the Dravidians by T. S. Chandler; on negative clauses in the Rig-veda by Miss E. Channing; Hindu Eschatology and the Kathá Upanishad by Professor Whitney, whose severe criticisms of Professor Max Müller's work must be known to you all; and on the warrior caste in India and lexicographical notes on the Mahábhárata by E. W. Hopkins, who also undertook the completion of Manu's Institutes on the death of Dr. A. C. Burnell. I would indicate the *Athenæum,* and *Academy,* amongst English papers, and the Oriental Journal to be published in Vienna, as a continuation of the *Oesterreichische Monatsschrift für den Orient* and the German Literary Gazette (*Deutsche Litteraturzeitung*) founded by Dr. Max Rödiger in Berlin, amongst foreign papers, other than the Journals of Societies, in which those engaged in Oriental studies will always find matters of interest, especially in the short notices of what has been done, or is being done, and has not yet been published.

Other Works.—In the invaluable series entitled 'Sacred Books of the East,' translated by various Oriental scholars and edited by Professor F. Max Müller, we have, almost at first hand, ample materials for an accurate estimation of the religions of Asia, from Japan in the extreme east to Arabia in the west. Twenty-four volumes of the first series have been published, and a second series of twenty-four volumes has been commenced, of which the *Satapatha-Bráhmana*, part II, by Professor Eggeling, and the *Lí-kí*, or 'Collection of treatises on the rules of propriety or ceremonial usages,' forming parts II and III of the 'Texts of Confucianism,' by the veteran Sinologist, Dr. James Legge, have reached us during the year. The following works are under publication :—*Manu* by Dr. G. Bühler; the *Grihya-sútras* or rules of Vedic domestic ceremonies by Professor H. Oldenberg; the *Yazna, Visparad, Afrígán*, and *Gáhs* of the Zend-Avesta by the Rev. L. H. Mills; *Vedic Hymns* by Professor F. Max Müller; *Nárada* and some minor Law-books by Professor J. Jolly; and the *Vedánta-sútras* with Sankara's commentary by Dr. G. Thibaut. In the Aryan section of the Anecdota series, also published at the Clarendon Press in Oxford, are several of the Buddhist texts of Japan and China, of which the last received is the *Dharma-samgraha*, a collection of Buddhist technical terms. In the *Divyádána*, a collection of early Buddhist legends, edited by Professor Cowell and Mr. R. A. Neil, we have an addition of some value to our extensive Buddhistic literature. Dr. G. Bühler too, has done good service by his translation of Pandit Bhagwán Lál's work on Nepálese inscriptions, which, taken with Mr. Bendall's 'Journey of literary and archæological research in Nepál and Northern India' and Dr. Wright's Nepál, has considerably advanced our knowledge of the early history of that country.

During the year, one volume of the history of the 'Local Muhammadan dynasties of Gujarát' by our late member Sir E. Clive Bayley has been published. It is partly based on work left unfinished at his death by Professor Dowson, and contains extracts relating to Gujarát from the *Mirát-i-Ahmadi*, *Mirát-i-Sikandari*, *Tabakát-i-Akbari*, and other works. It is intended, so far as they can be recovered, that extracts from other works on Gujarát history only shall be presented in a second volume. The same volume contains án appreciative notice by Colonel H. Yule of the life of Sir E. Clive Bayley and his work in India, much of which was performed through or for this Society. The year, too, has seen the publication of that very interesting work by Colonel H. Yule and the late A. C. Burnell, bearing the quaint title of 'Hobson-Jobson' and being a glossary of Anglo-Indian colloquial words and phrases, and of kindred terms, etymological, historical, geographical, and discursive. It fully bears out the promise of its somewhat compre-

hensive title, and brings together and learnedly digests scraps of information on the subjects discussed from almost all possible sources. Nor must I omit to mention the new edition of Manu's Institutes and the principal commentary thereon brought out by our member, the Honorable Ráo Sáhib V. N. Mandlik. Also the Subháshitávali of Vallabhadeva of Kashmír, containing extracts from the works of nearly 350 different poets of Kashmír and upper India, and edited by Professor Peterson and Pandit Durgá Prasád. The notes are especially valuable as affording much information regarding the lives of the authors and the places in which they wrote. Editions of the Yajur Veda in Vaidik, Sanskrit, and Hindi have appeared at Agra by Bhárgava Jvála Parsháda, and at Allahabad by Dayánand Sarasvati, the latter of whom is also bringing out a similar edition of the Rigveda.

Lexicography.—In lexicography and in the preparation of lists and grammars of dialects considerable advance has been made. Dr. Böhtlingk is bringing to completion the abbreviated edition of his great Sanskrit dictionary; and we look forward with interest to the appearance of Mr. Anandaram Borooah's edition of the Amarakosha, of which also reprints have issued in Bombay and Calcutta during the year. In the *Revue de linguistique et de Philologie comparée*, M. R. de la Grasserie has a paper, comparing the words relating to number in all languages, and in which he advances several novel ideas as to the abstract and concrete conception of number in the various families of speech.

Assam.—Due in a great measure to the encouragement offered by Mr. C. A. Elliott, when chief Commissioner of Assam, considerable activity has been shown of late in the preparation of lists and grammars of the languages of Assam. Amongst those of recent issue are the 'Outline grammar of the Kachári language' by the Rev. S. Endle; 'Short account of the Kachár Nága tribe with an outline grammar, vocabulary and illustrative sentences' by Mr. C. A. Soppitt; and by the same writer a 'Historical and Descriptive account of the Kachári tribes in the north Kachár Hills with specimens of tales and folk-lore.' Professor Avery, in the pages of the *Journal of the American Oriental Society*, has given us papers on the Gáro language, that of the Lepchás of Sikkim, and that of the Ao-Nágas, inhabiting the hills forming the southern border of the Sibságar district; they call themselves Ao but are more commonly known by their Assamese names, Hatigonias, Dupdorias, Assiringias, &c. A dictionary of the Gáro language is under preparation by the American Missionaries at Tura. Major Macgregor's Singpho grammar and 'Rough notes on the Singphos and Khamptis,' printed at Dibrugarh, are both of practical philological and ethnographical value. To these we may add Mr. Needham's Abor grammar, Mr. MacCabe's Angámi-Nága grammar, and the

projected grammar of the Kúki by Mr. C. A. Soppitt, of the Bhútia Changlo by Mr. E. Stack, and of the Gáro and Miri, besides a Tipura vocabulary. There does not appear to be any sign of growth in the published indigenous Assamese literature, which seems to be confined chiefly to translations from the Bengáli, and has not given us a single original work of importance during the year.

Burma.—From Burma we have Mr. James Gray's educational works in Páli, his translation of 'Ancient proverbs and maxims from Burmese sources,' and a Burmese primer, besides Meng Po Hla's notes on Burmese and Páli grammar, and a collection of Anglo-Burmese stories. Judson's Anglo-Burmese dictionary, Cushing's Shán dictionary, and Forbes' 'Comparative grammar of the languages of Further India' appear to hold their old position and have not been superseded.

Semitic.—The issues in Arabic chiefly comprise extracts from the Korán, grammars, and vocabularies, and another volume of Mr. M. S. Howell's 'Grammar of classical Arabic' in English.

Iranian Aryan.—The Parsis of Gujarát have reprinted the Vendidád and other portions of the Zend scriptures with notes in Gujaráti. Throughout upper India, Persian literature receives much attention and is considered a necessary study both for the man of the world and the man of business. Reprints, with some original works, have appeared of poetical, historical, and especially of devotional treatises. Pushto has but a few works chiefly of a religious tendency.

Indian Aryan.—Urdu is the popular literary language of the Musalmán population throughout upper India, and is cultivated also in Bombay and Madras. In number, its publications exceed those in any other language, and we have to record some progress in grammars and dictionaries from a purely native point of view. Hindi literature was enriched by a new edition of Tulsi Dás's Rámáyana, and, in the first and second books of extracts from Hindi, possesses an excellent chrestomathy. I would also mention the translation of some of Shakspeare's plays by Kásináth Khattri and many original dramatic compositions. In Gujaráti, besides a new English-Gujaráti dictionary, there are reprints of old poems by M. Meheta, translations of the *Yazna* and *Visparad* with critical notes, and of the Rámáyana, and also a collection of Jaina prayers in Mágadhí and Gujaráti. The Sindhi *Vyutpatti-kosha* contains a vocabulary of Sindhi words derived from Sanskrit roots. In Maráthi, there are few original works of importance, but there are several translations showing a high degree of cultivation. In Bihári, the 'Comparative Dictionary of the Bihári language' by Dr. Hoernle and Mr. G. A. Grierson is making good progress. The second part is now all in type and the third is well advanced in manuscript, and will fully come up to the great expectations formed of this,

the principal contribution to the lexicography of the Indian dialects that has appeared of late years. Mr. Grierson has published the sixth part of his "Seven grammars of the dialects and sub-dialects of the Bihári language." Those which have appeared comprise: 1. Introductory with maps: 2. Bhojpúrí dialect of Sháhabád, Sáran, Champáran, North Muzaffarpur and the eastern districts of the N. W. Provinces: 3. Mágadhí dialect of South Patna and Gayá: 4. Maithil Bhojpúrí of Central and South Muzaffarpur: 5. South Maithilí dialect of south Darbhanga, north Munger and the Madhepúra subdivision of Bhágalpur: 6. south Maithil-Mágadhí dialect of south Munger and the Bárh subdivision of Patna. There remain only the two last parts, treating of the border dialects between Bengáli and Bihári, and containing many forms of special interest. These are in the press and will shortly be published.

Dravidian.—Amongst the Dravidian languages of southern India, the Tamil appears to hold the first place as well for the quality as for the quantity of the work produced. S. M. Natésa Sástri has published a translation of the Sanskrit play *Mudrárákshasa*, and, in the *Revue de linguistique*, Mr. Gérard Devèze has a translation into French of the Tamil edition of Sakuntalá, of which another version has been published by A. S. Venkatáchári. Several translations from the Mahábhárata and Rámáyana and some excellent anthologies have appeared, of which I would notice the collection for the matriculation examination and that for the First Arts containing parts of the Tamil *Naladiyar* and *Villiputtur Bharatam*. In grammars, we have reprints of Pope's excellent catechisms, Mahálingaiyar's grammar, the *Nannúl* of Pávanandi in Tamil and English, and a new edition of the *Nannúl Kandigái Urai*, besides a work on Tamil prosody. In Telugu, we must notice the *Sabdaratnákaram*, a new dictionary based on Johnson's and illustrating each word by extracts from authors considered classical; and, though a school-book, T. Anjaneya Sástri's elementary grammar. The text-books for the University examinations contain excellent selections, and to these I would add K. Virésalingam's translations of some of Shakspeare's plays and of some of Kalidása's dramas and Sitaráma Sástri's *Mudrárákshasa*. The Rev. E. Droese of Bhágalpur has brought to our notice, in his 'Introduction to the Malto language and vocabulary' and in two small tracts, a dialect spoken by the hill-men of the Santhál country of which very little was previously known. It appears to be an offshoot of the great Dravidian family of speech, which here reaches its extreme north-eastern limit. The new text-book for the matriculation examination in Malayálim contains the *Chánakya Sútram* and part of the *Patúmála Vrittam*; the Basel Mission sends out the Gospels

in Tulu and school-books in Kánarese and Malayálim, and Séshagiri Sástri has commenced a series of notes on Aryan and Dravidian philology. In Kánarese, besides school-books, is the *Venisanhár*, adapted from Bhatta Náráyana and founded on one of the popular stories regarding the five Pándavas.

Vernacular literature.—Even in a brief survey like the present one, I cannot omit to notice the progress made in literature in general, as shown by the records of the Library Department of Government. Under Act XXV of 1867, for the regulation of printing-presses and newspapers, and for the preservation of copies and registration of books printed in British India, a book is kept in every Province called a 'Catalogue of books printed in British India.' In this book is entered particulars of every publication showing title, language, author, subject, place and date of printing, and price, so that in this way we have a complete record of the indigenous literature of the country. Every quarter, these lists are published in English in the local Gazettes, with, in some cases, explanatory notices of the contents. When it is remembered that the annual issues comprise over 8000 separate publications, it will be understood that it would be impossible now to attempt any detailed review of the immense mass of literature thus brought to our notice, but it is possible to give you some idea of the work done in the principal Provinces, and thus indicate from the best of evidence what are the subjects that attract most attention and whither the increased literary activity that characterises the present decade tends.

Now, gentlemen, there is nothing in the dictum of our founder already mentioned to you, that prohibits us from attending to these matters. We are not a purely archæological Society, and, though, perhaps, discussions on social and political questions are wisely excluded from our meetings and our publications, the scientific aspects of these questions still remain with us. To the students of the many languages and more numerous dialects of India, the translations into them and the original works produced form valuable material for purely philological purposes, even the veriest school-book affording some aid. If to these be added the numerous anthologies of both prose and poetry selected and annotated by educated natives to whom the language is a living one, the large number of dramas, poems, novels, essays, and short stories, most with some literary merit, I may safely say that the time has come when more attention may well be paid, by those amongst us who are qualified for the task, to the study and review of this great evidence of literary effort. India has its poets and its playwrights in every Province, and if we may judge from the number and frequency of each issue, and the translations into almost every language of the more popu-

lar authors, India also has an audience capable of enjoying poetry, the drama, and fiction, to an extent not generally accepted. I would therefore commend these apparently dry lists to your notice in the belief that they are capable of affording much of practical interest and value in connection with almost all the linguistic, historical, religious, social, and political questions of the day.

Bengal.—Taking up the Bengal register, I find that in the year* 1885-86 there are 2,572 entries, of which 762 refer to educational works and 1,810 to non-educational works. During the first quarter of the year 1886, there were 523 entries, of which quite sixty per cent. were partly or wholly in Bengáli, the other principal languages being English, Sanskrit, Uriyá, and Hindi. Amongst them were 83 issues of periodicals and 145 publications devoted to educational purposes, which include school-books, anthologies for the local vernacular examinations, and treatises on law and medicine. In Bengal, as indeed in all India, literary effort, apart from educational work, is more occupied with religion than with any other subject. This tendency is clearly exhibited in the record before us, not only in a sustained attempt at a revival of Hinduism itself, but in a strong reaction against the rationalistic spirit and European influence observable in the vernacular literature of late years.

Though many of these works comprise merely reprints of stories from the Mahábhárata, or the Rámáyana, which, quaintly enough, the recorder remarks are intended for the 'ill-educated or orthodox,' others are original works of value, amongst which mention may be made of the *Krishna Charitrá* of Bankim Chandra Chatarji, in which the Krishna myths are criticised. In the part just published, the author shows that the conception of Krishna in the Mahábhárata is that of the perfect man, of the ideal humanity in its widest sense. R. C. Datta, in his '*Sansár*,' gives us a faithful picture of middle-class Bengáli life, and Sasadhar Tarkachurámani, in his '*Dharma Vyákhhya*,' an attempt at a scientific exposition of the rites and doctrines of Hinduism. Rajanikánta Gupta has issued part of his history of the Sepoy War; T. N. Mukharji, part of his encyclopædia; Shyám Lál Goswámi, a mythological dictionary; and Ráma Náráyana Vidyáratna, the continuations of several Sanskrit works with Bengáli translations, chiefly relating to Vaishnava literature. In Hindi, Dámodar Sástri has given an account of his travels in southern India, and, in Uriya, Fakír Mohan Senápati, the well-known poet, continues his versified translation of the Mahábhárata. Fiction, poetry, the drama, and essays, social and political, form an important section and represent all schools of thought, conservative, progressive, liberal, radical, and almost revolutional. There is hardly a

* From July 1885, to the end of June 1886 is usually intended.

movement of interest that is not reflected in these lists, and they indicate more clearly than anything else the influences and aspirations at work, at least amongst the educated; so that their record may, perhaps, be taken as the measure of the mental activity in any given direction.

Madras.—In Madras, the yearly issues average about 1000 chiefly in Tamil, Telugu, and Malayálim. During the first quarter of 1886, there were 249 publications, of which 16 were English; 41 Tamil; 21 Telugu; 18 Malayálim; 2 Kánarese; and 8 Hindustani, besides others in Sanskrit, Arabic, Konkani, Badagu, Kurgi, and Tulu, and periodicals in several languages. In Tamil, besides grammars and anthologies, we have numerous religious works in praise of Vináyaka, Subramaniya, Párvati, and other Saiva deities, also translations into Tamil from Sanskrit. The Telugu series comprise reprints of the Telugu Bhágavat, educational works, and, notably, translations from Kalidása's works. There are also some essays on social subjects and novels, one of which is designed to urge the necessity of female education. The publications in Malayálim are almost entirely sectarian and in the Mopla dialect and Arabic character. They are chiefly devoted to the praise of the great saints and Gházis who are held in estimation by the Musalmán Moplas in Madras. The Tamil and Telugu publications show that considerable impetus has been given to literary pursuits of late years, and that much progress has been made in adapting those languages to the necessities of the higher objects now aimed at.

Bombay.—The average annual issues in the Bombay Presidency may be set down at about 2000, of which about 400 represent periodical literature. In the first quarter of 1886, there were 497 entries, of which 69 only were periodicals, and of the remainder only 80 educational. The languages were English (14), Maráthi (115), Gujaráti (111), Sanskrit (45), besides Arabic, Arabic-Sindhi, Persian, Urdu, Kánarese, Hindi, Brij, Márwári, and bilingual and others (79). Amongst the Maráthi publications, we may notice translations from Sanskrit and a number of original dramas, besides poetry, essays, and novels. The poets Tukarám and Rámdás appear to hold a high place in popular estimation, and we have from native sources some account of their life and works. Amongst social subjects, widow-remarriage, infant-marriages, forest-conservancy, and the burlesque of Western habits exhibited by some zealous reformers are prominent: whilst there is a journal devoted entirely to tales original and translated, and Durgá Prasáda's valuable *Kávyamála.* In Gujaráti, besides translations of Pársi religious works and Jaina treatises, we have a translation of Don Quixote, which has been favourably reviewed by the vernacular press. I may mention here that the notes of the Bombay recorder are more descriptive than those of any other Province.

Panjáb.—The issues registered in the Panjáb average about 1800 per annum chiefly in Urdu, Panjábi, Hindi, Persian, and Arabic. In the first quarter of 1886, there were 645 entries, of which 97 represented periodicals. Of the remainder, 116 were educational works, and 433 non-educational, comprising 7 English works, 43 Arabic, 31 Persian, 206 Urdu, 141 Panjábi, 65 Hindi, 2 Pashto, 9 Sanskrit, 1 Sindhi, and 42 bi- and trilingual works. The Arabic issues were chiefly confined to parts of the Korán and the Persian to reprints and religious works. The large Urdu series contains in addition much purely literary work, such as dramas, histories, poetry, essays, and novels, besides papers on medicine, the arts, and on social subjects. The Hindi issues comprise religious works, dramas, stories, poetry, and essays on philological and social subjects. The Panjábi publications appear in the Gurumukhi, Nágari, Arabic, and Persian characters, and include a large proportion of works on the Sikh religion, and on the exploits of Musalmán saints, besides stories, poetry, reprints of Súfi works, and practical treatises on medicine, cattle-disease, law, and agriculture. Taken as a whole, the record indicates a healthy tone in the Province, and, though there are not many original works of importance, the presence of such a large proportion of lighter literature shows a capacity to receive and enjoy it for which one was not prepared.

N.-W. P. and Oudh.—The yearly issues in the N.-W. Provinces and Oudh average about 1,450, chiefly in Urdu, Hindi, Persian, and Sanskrit, of which about 100 represent periodicals and about one-fifth of the whole is devoted to educational purposes. During the first quarter of 1886, the entries show: 3 English; 78 Urdu; 120 Hindi; 9 Sanskrit; 3 Arabic; 15 Persian, and 50 polyglot publications besides periodicals. The Urdu series comprises original works in biography, the drama, fiction, history, poetry, law, medicine, and philology, besides translations from English, Persian, and Arabic. The Hindi publications are remarkable for their collections of popular poetry and songs of the people, and, with the aid of the numerous commentators on the first and second books of selections from the Hindi, afford valuable material for a critical examination of the literary language. The *bárah-másí*, or songs of the twelve months, are particularly curious and occur in several recensions and apparently by different authors. The drama not only finds subjects from those inexhaustible repertoires, the Mahábhárata and Rámáyana, but are the vehicle also for criticising many social foibles, and generally exhibit a healthy tone. There is not much to record from the Central Provinces, Assam, or Burma, and, in the two last, the major portion of what exists is entirely due to foreign aid.

The Oriental Congress.—The Oriental Congress, held at Vienna from the 27th September to the 2nd October last, is one of the events to which this Society looks forward with particular interest and we were fortunate to have as delegate Dr. Hoernle, our Philological Secretary, whilst he and Mr. G. A. Grierson were present as delegates from the Government of India and Dr. Bhandarkár from the Chiefs of Káthiawár. Amongst the papers of interest to Indian students read at the Congress, mention may be made of Mr. C. Bendall's paper on a manuscript procured by him in Nepál, which appears to be a fragment of a rare work on grammar used by the Buddhists in Nepál, and in a hitherto apparently unknown character. He also noticed an inscription in the Indian Museum in an unknown character, probably one of those alluded to in Buddhist works. Professor Jolly, known to you as Tagore Law lecturer, read a short note on his forthcoming edition of Manu's Institutes, of which so many reprints have appeared of late. I have no doubt that the learned Professor will make his issue an *editio princeps*, so far as careful editing and annotation is concerned. Dr. Hoernle, too, gave an account of an old manuscript found in the Panjáb, which he shows to be a work on arithmetic in the so-called Gáthá dialect. Mr. G. A. Grierson read a paper on the mediæval vernacular literature of upper India with special reference to Tulsi Dás, the translator into Hindi of the Rámáyana. Captain Temple, who is known to us for his labours in connection with Indian archæology and folk-lore, read a paper on the Panjábi epic *Híra ránjha* by Wáris Sháh, and urged the publication of a correct text. I trust that on your behalf I may be able to say that we should gladly publish a classical work of the nature if we could find a competent editor. Captain Temple also brought to notice that the Government of India had abolished the appointment held by Mr. Fleet as official epigraphist. In the discussion which followed it was agreed that this action of the Indian Government was a real loss to science.

Next followed a lecture by Dr. Stein on the Paropamisus or Hindu Kush in ancient records. Guided by the oldest Greek form of the name *Parnasos*, as given by Aristotle, he was enabled to identify it with the mountain *Upairagaena* of the Zend Avesta. The meaning of this latter name is 'higher than the flight of an eagle,' and, curious to say, in a story given by Hiuen Tsiang, the mountain is said to be too high for birds to fly over so that they have to cross it on foot. A similar legend is recorded by Marco Polo, the Emperor Baber, and, in our times, by Burnes. Dr. Stein considers that much information on the ancient geography of Afghánistán may be gleaned from the Zend writings. Dr. Kuhn also gave a note on the dialects of the Hindu Kush from

materials furnished to him by Captain Tanner of the Survey Department during the Afghán war. He was of opinion that these dialects, together with the Kashmíri, and the Romani of the gypsies, formed a special group among the languages of the Indian branch of the Aryan family. This opinion was not generally accepted; and, in the discussion that followed, Mr. Leland, the greatest living authority on the Romani language, suggested that there was a race at the present day in the Panjáb that called themselves 'Rom' and spoke Romani. This statement was not supported by those present acquainted with the dialects of the Panjáb, but I may mention that, in the Mahábhárata, a tribe of Romanas is mentioned who inhabited a country to the north-west of the Panjáb and are possibly one with the Rums of Wámastán. Mr. Macauliffe then gave an account of the discovery of a manuscript giving interesting details of the life of Bába Nának, founder of the Sikh religion.

Linguistic Survey.—Mr. Grierson brought to the notice of the Congress the necessity for a scientific survey of the Indian dialects, a project in which I heartily concur. I entirely agree with him that the literary or government language of any tract is widely different from the language actually spoken by the people, and that the polite language learned by Europeans, and by natives who desire to converse with Europeans, is totally distinct from that used by the same natives in their homes. I have had frequently practical experience of this difference, and it was only after some years of isolated residence in an out-of-the-way district and continued converse with the people themselves that I was able to get rid of the bad start with the *bungalow ke zabán* and the *kachahri ke zabán* and make myself understood by them. Except for philological purposes, I am heretic enough, however, to be glad to see some approach to unity, through this 'bungalow cum court' language, though sorry to feel that this unity is reached on such a mongrel and entirely unsatisfactory basis. I trust that I may safely say that the project of an accurate survey of Indian dialects put forth by Mr Grierson and supported by the distinguished members of the Oriental Congress will have the warm and hearty support of this Society also.

Anthropological Survey.—And now I must refer to the survey of the people themselves as to their physical characteristics, institutions, laws, and social rules that is actually in progress under Mr. H. Risley's guidance. The scheme has been framed from the first so as to serve two distinct purposes, the one in the main administrative, the other principally scientific, and I understand that this distinction will be maintained in publishing the results. For administrative uses, it is proposed to embody, in the form of an ethnographic glossary, a descriptive record of all that is known, or can by systematic inquiry be ascertained within a

reasonable time, regarding the tribes, castes, sects, and occupations of the people of Bengal. The inquiry is being conducted, on lines which have received the approval of European ethnologists, by a large body of official and non-official observers in every district in this Province; and the attempt has been made to distribute the work of collecting facts in such a manner as to secure that the statements of each observer shall be checked and verified by those of others.

Starting from this body of recorded facts, it is proposed to endeavour to classify the people of Bengal according to their ethnic affinities, and to separate and distinguish the various race elements which have combined to form the population as we now find it. It is hoped that some light may be thrown upon this obscure subject by the series of anthropological measurements now being collected in Bengal, the N.-W. Provinces, and the Central Provinces under a scheme recently sanctioned by the Government of Bengal. Special interest attaches to these experiments as being the first attempt on a large scale to apply the anthropometric system elaborated by the French school of anthropologists to the elucidation of the ethnological problems so prominent in India. There are, indeed, some reasons for expecting that India, and especially Bengal, may prove to be an exceptionally favourable field for anthropometric research. Many races meet in these provinces, and the effect of the caste system has been on the whole to keep them apart, and to preserve the characteristic physical type of each from being obscured or obliterated by the promiscuous crossing which has thrown difficulties in the way of anthropological work in Europe.

Biology.—The domain of Biology is so extensive and the works and papers dealing with it, even in matters that should prove of interest to us in India, are so numerous and scattered, that I can only barely attempt to notice a few of the subjects. It is also to be remembered that, here too, the publications for the first half of 1886 only have reached India in the great majority of cases, and that we can only deal with a portion of the year. It may not be known to many of you that owing to the enlightened advocacy of the project by Surgeon-General Simpson, the Government of India has, during the course of the year, liberally provided for the publication of a new periodical devoted specially to scientific work of a biological character. It is entitled '*Scientific Memoirs by Medical Officers of the Army in India*,' and the first number has appeared containing two papers by a member of our Society Dr. D. D. Cunningham, one 'On the relation of Cholera to the Schizomycete organisms,' and the other 'On the presence of peculiar parasitic organisms in the tissue of a specimen of Dehli boil.' A publication of this character should fulfil a very useful end, in encouraging medical men in this country to devote their leisure to science.

Biological Laboratory.—The operations of the Biological Laboratory have been continued during the year, and the most interesting results obtained, in so far as work specially relating to cholera is concerned, were those in a series of experiments on the effect of subcutaneous inoculation of the so-called choleraic comma-bacilli into the bodies of guinea-pigs. These in the first place clearly showed that any such inoculations are not unattended by serious risks, as, where a sufficient quantity of the bacilli were introduced, death with very well defined lesions occurred in a large proportion of cases. Great multiplication of the bacilli within the system was found to have occurred, especially along the lymphatic channels, with extensive softening of tissue and sanguineous effusion. The spread of the bacilli was not limited to the subcutaneous lymphatic spaces, but also involved the peritoneal cavity, which is, of course, merely a huge lymphatic space. From this they extended into the interior of the intestinal canal, where they had multiplied in excess, extensive softening and desquamation of the epithelial layer having occurred, sometimes to the extent of complete denudation of the entire mucous surface. The bacilli could not be detected in the substance of the solid organs, but cultivations showed that they were present in limited numbers in the blood. It could not be definitely shown that the morbid condition in the animals was of a truly choleraic nature, and the principal importance of the results lies in the fact that they clearly show that, whether the comma bacilli be or be not the cause of cholera, the mere presence of excessive numbers of them within the intestinal tract in any animal is no proof that this was necessarily the site of primary invasion of the system.

The late Dr. Stoliczka.—As a fasciculus of the memoirs published in the series known as the 'Scientific results of the second Yarkand mission,' we have a paper on the life and work of the late F. Stoliczka, the well-known palæontologist of the Geological Survey, and for years a distinguished member and office-holder of this Society. The paper has been written by Prof. V. Ball, also a member of this Society, and contains much of interest to all engaged in biological work. I may be allowed to quote from one of Stoliczka's papers as bearing on one of the reasons why such attention is paid to the preparation of accurate lists of species occurring in each region. He writes :—" the study of local faunas must, for some time at least, continue one of the most important means of leading to a full understanding of Indian Zoology. India combines such an enormous variety of physical conditions, namely, differences of level, climate, and vegetation, all of which have to be studied in connection with the animal life, that one is almost lost in the chaos of information required, and is very apt to overlook conditions

which may be essential for the explanation, not only of peculiarities as regards distinction of species, but also of those relating to geographical distribution." In the observation of phenomena bearing on geographical distribution, we have, perhaps, one of the most fascinating studies connected with biology. Give an expert, say a butterfly, and he should be able to state within a degree or two its range, and with it the flora of the region that the insect inhabits; and even the religion of the people of the country, for all alike are affected more or less by climatic zones: puritanism does not flourish in the tropics nor does lotus-eating find a permanent home in northern climes.

Indian Museum.—Students of biology have in the Zoological Gardens and in the collections lodged in the Indian Museum ample materials for the study of our Indian fauna. The gardens are, in addition, a recognised recreative resort of the Calcutta public, and the Museum is even more attractive, for, during the last year for which a report has been made, it had 380,297 visitors, of whom 3,987 were European males and 1,008 European females, and 297,942 were native males and 77,360 native females, giving a daily average of 1,584 persons. In a certain way both these Institutions must be considered as important factors in the education of the masses, and in a quiet way do much to spread abroad some idea of Natural Science, for which no other means exist. The Indian Museum is practically the Museum of this Society, having been based on our collections, and, though it has now far outgrown any limits that it could possibly have reached if it had remained with us, we have more than a common interest in its progress. Over 10,000 specimens were added to the collections during the year, of which the great majority were invertebrates. Attention may be called to the North American vertebrates, the Eastern Crustacea, corals, sponges, and the huge crab from Japan, the Mergui moths, Indian ants, and the European Diptera and Hymenoptera; besides coins, fragments of sculpture from Yúsafzái, and an inscription from Buddhá Gayá.

The Trustees permitted Dr. Anderson to take the zoological collection, made by him on their behalf in the Mergui archipelago off the coast of Tenasserim, to England for identification and publication of the results. These have now commenced to appear in the form of a special volume of the Journal of the Linnean Society (vol. XXI). The part received contains the Madreporaria by Prof. P. Martin Duncan, the Holothurians by Prof. F. Jeffrey Bell, and the Lepidoptera by Mr. F. Moore. The other parts will contain eighteen papers by distinguished naturalists on different branches of science. Mr. W. L. Distant has undertaken to write for the Trustees, a 'Monograph of the Eastern Cicadidæ,' a most difficult group, and Colonel Swinhoe of the Bombay

Staff Corps and Mr. E. Cotes will bring out a list of the Indian moths. Mr. Wood-Mason has been engaged in investigating the disease called pébrine, which affects both the cultivated and wild silkworm, and was so particularly virulent during the last season as to amount to an epidemic. In many cases, whole batches of worms died without spinning any silk, the glandular tissue of the silk-glands and all the other tissues of the body being full of the spore-like bodies that cause the disease and to which the name *Nosema bombycis* has been given. The Trustees have fitted up a biological laboratory for the prosecution of such studies, and I trust that ere long this essential part of the functions of a State Museum may be established on a firm basis.

Bombay Societies.—We have to welcome, as fellow-workers in the field of biology, the Bombay Natural History Society and the Bombay Anthropological Society, and trust that they may have a long and useful career before them. But I may be permitted to suggest that they should amalgamate with the Bombay Branch of the Royal Asiatic Society and employ the Journal of that Society for biological as well as for philological and archæological purposes as we do ours.

Vertebrata.—In the *Proceedings of the Zoological Society*, Mr. W. T. Blanford gives us a complete systematic account of the genus *Paradoxurus* and describes an apparently new species, *P. jerdoni*. He reduces the 49 specific names in existence, to 11 species, of which he figures two, *P. aureus* and *P. jerdoni*, from the Palni Hills of the Madras Presidency. The same writer has in preparation a work on Indian Mammals which, from his well-known qualifications for the task, will be eagerly looked for by Indian naturalists. In the same Journal, Mr. Oldfield Thomas has a paper on the Mammalia—numbering some 400 specimens—presented to the British Museum by our member Mr. A. O. Hume. The collection consisted of a few specimens from Simla, Dehli, the Nilgiris, and the Andaman and Nicobar islands, but the great mass of it came from Sámbhar, Manipur, Tenasserim, and the Malay peninsula, whence two new species and one new variety are described and figured. The zoology of the Maldive islands is the subject of a brief note by Mr. C. W. Rosset, and Dr. Sclater presents a notice 'Of the species of wild goats,' including the ibex of the Western Himálaya.

In the same Journal, Mr. F. H. H. Guillemard has six papers on the birds of the Eastern Archipelago, collected during the voyage of the yacht 'Marchesa,' in which many new species are described. Mr. T. Bowdler Sharpe, too, has commenced his notes on the magnificent series of Indian birds presented to the British Museum by Mr. A. O. Hume, and also gives a notice of some birds from Perák. In the *Ibis*, M. Menzbier has a list of the birds of the Upper Tarim, Kashgaria; Major

Yerbury contributes another of the birds of Aden and its neighbourhood; Dr. T. von Madarász describes two new birds from Tibet; and Mr. Sharpe has a notice on a collection of birds from Muscat and others from Fao and Bushire in the Persian Gulf. Mr. Murray of the Karáchi Museum has issued a prospectus for a new edition of Jerdon's 'Birds of India,' rendered necessary by the large additions to the number of species and the modifications of system introduced since the first edition was published. The number of Indian birds now known may be estimated to be nearly 1,700, whilst Jerdon has given only 1,008, and many of these being imperfectly or inaccurately described are scarcely identifiable. In this connection, mention must be made of Dr. Stejneger's scheme of classification in Mr. T. S. Kingsley's fourth volume of the 'Standard Natural History,' published in Boston. It appears to be almost entirely new, that is, as regards the larger divisions of the Class *Aves*, and especially in relation to its fossil forms, and is spoken of by Mr. Evans in the *Zoological Record* as the most remarkable ornithological work of the year. In '*Ornis*,' a new periodical for ornithology, issued at Vienna by Drs. R. Blasius and G. v. Hayek, we have a paper by Dr. Blasius on the birds of Celebes, and Mr. H. O. Forbes, in 'A Naturalist's Wanderings in the Eastern Archipelago,' gives notes on the Avian Fauna of the Keeling Islands, Sumatra, Timor-laut, and Buru.

An account of the earth-snakes of the peninsula of India and of Ceylon by Colonel R. H. Beddome appears in the *Annals and Magazine of Natural History*. In the *Proceedings of the Zoological Society*, Mr. G. A. Boulenger gives a list of the species of Batrachians added to the British Museum since 1882, which includes several Indian species and a new one from Perák. Those interested in these studies will find a discussion on the classification adopted by Mr. Boulenger in the *Bulletin de la Société Zoologique de France*. In the *American Naturalist*, Mr. A. W. Butler has notes on the hibernation of Tortoises and Batrachians, and M. G. Tirant has published in Saïgon 'Notes sur les Reptiles et les Batraciens de la Cochinchine et du Cambodge,' whilst A. A. W. Hubrecht, in 'Midden Sumatra,' gives a list of the same animals from that island. This fauna has been examined for south-east Borneo by T. G. Fischer (Arch. für Nat. li); for Mindanao in the Philippines by the same writer (T. B. Hamb. ii), and for China by O. Bœttger (Verh. xxiv, xxv); who describe many new species and offer much of interest to Indian herpetologists.

Invertebrata.—In Conchology, we have to record the continuation of Sowerby's 'Thesaurus Conchyliorum,' and of the 'Land and Freshwater Mollusca of India' by an old member of our Society, Colonel Godwin-Austen; of the latter the fifth part has been received. The

Manual of Conchology issued by the Philadelphia Society continues to uphold its high reputation, due in a great measure to its being founded on perhaps the finest collection in the world.

Amongst the invertebrates of India, butterflies and moths find most favour with entomologists. The recently issued second volume of Mr. de Nicéville's 'Butterflies of India, Burma and Ceylon' fully keeps up the reputation achieved by the first volume. Mr. W. L. Distant has given us the final instalment of his 'Rhopalocera Malayana,' and Mr. F. Moore one of his 'Lepidoptera of Ceylon.' In Mr. A. G. Butler's 'Illustrations of typical specimens of Lepidoptera Heterocera in the British Museum' will be found many Indian species, and Mr. G. Semper at Wiesbaden has published a work on the 'Butterflies of the Philippines and the Indo-Malayan Lepidopterous fauna.' In the *Proceedings of the Zoological Society* are papers on the Lepidoptera collected by Commander Carpenter in upper Burma during 1885-86 by Mr. Butler; an important revision of the butterflies of the genus *Parnassius* by Mr. Elwes; on Lepidoptera collected by Major Yerbury in the N. W. Panjab by Mr. Butler; and a notice of a small collection of dragon-flies from Murree in the Panjáb by Mr. W. F. Kirby, almost the only special notice of this family in India of recent years. In the *Annals and Magazine of Natural History* are papers 'on the genus *Terias*' by Mr. A. G. Butler; on four new species of butterflies from Burma by Mr. H. Grose Smith; and the continuation of his contributions to our knowledge of Malayan entomology by Mr. W. L. Distant. The same writer has a paper on butterflies from Perák in the *Entomologist;* and, in the *Transactions of the Entomological Society*, the Rev. W. Fowler has one on a small collection of the coleopterous family *Languridæ* from Assam. In the *Bulletin de la Société Zoologique de France* there is an important and instructive paper by M. R. Dubois on the production of light in certain species of the coleopterous family *Elateridæ*, which deals with the phenomenon from a physiological point of view, and should be of great service in similar investigations in India, where there are so many of these light-bearing species. In the *Berlin Entomologische Zeitschrift* is a learned paper by Canus on the honey-bee in ancient India which will form the literary complement to Mr. Douglas' paper on Indian bees. Though not strictly within the scope of this notice, I cannot omit to mention the continuation of the great series of works connected with the 'Voyage of the Challenger' and those belonging to the 'Biologia Centrali-Americana' edited and published by Messrs. Godman and Salvin.

Botany.—As regards botanical exploration, the past year has been one of considerable activity. Dr. Aitchison, the indefatigable traveller and botanist, who is also a member of our Society, was attached to the

Afghán Frontier-delimitation Commission, and has returned to England with a large collection of dried plants, of which the main portion consisted of about 800 species in 10,000 specimens. These are now being arranged under his own supervision at Kew, and a conspectus of the Flora of the region traversed by the Commission is under preparation by Dr. Aitchison and Mr. W. B. Hemsley, of the Kew Herbarium. This will contain* descriptions of about one hundred new species, besides adding to our knowledge of many obscure plants of considerable economic importance. Foremost among these are those belonging to the *Umbelliferæ*, of which several yield valuable gum-resins, known in commerce as gum-ammoniacum, gum-galbanum, assafœtida, &c. On the North-eastern frontier, Mr. C. B. Clarke has very considerably extended our hitherto scanty knowledge of the Flora of the Nága Hills by his herborizations near Kohima and in Manipur; while he has added not a few species to the already extensive Flora of the Khasiá Hills. Mr. Clarke proceeded to England in November, taking his collections with him; and before long we may expect to have something concerning them from his prolific pen. While exploration has been thus vigorously carried on, herbarium work has by no means been neglected. Dr. King, of the Royal Botanic Garden, has, during the year, brought to a conclusion his monograph on the large and difficult genus *Ficus* on which he has been engaged for some time. Dr. King's observations on the structure of the flowers of the genus have brought to light some hitherto unsuspected sexual arrangements, and, on the basis of these, he has founded a sub-division of the genus into seven sub-genera. A short account of this new classification is contained in a paper read at a recent meeting of this Society. Mr. Duthie, of the Botanical Garden at Saháranpur, a member of our Society, has published during the year, an excellent account of the 'Fodder grasses of Northern India.' Mr. Duthie's book affords an admirable illustration of the kind of accurate help which science may be made to give in the ordinary affairs of domestic life. For the book puts us in the way of learning how to feed our cattle and our cavalry and troop horses on the grasses that grow naturally in the neighbourhood of every cantonment in Upper India, without going to the expense of cultivating exotic plants for fodder. The book which thus helps to deliver us from the tender mercies of the voracious Commissariat contractor is withal fair to look on; for it is profusely supplied with nature-printed illustrations of all the chief grasses of Hindustan proper and of the Panjáb.

* For a fuller description of Dr. Aitchison's work see the issue of *Nature* for the 23rd of December 1886, and a paper read by him before the Pharmaceutical Society on the 8th December.

The Dictionary of Indian Economic products which, it is understood, our fellow-member, Dr. George Watt, has for some time been engaged upon has, I believe, advanced in progress during the year. By the addition to the Empire of the province of Upper Burma, a most important botanic region was rescued from the dominion of misrule; let us hope that it may before long be also wrested from the realms of ignorance. In Upper Burma, the Indo-Malayan and Chinese Floras are known to interosculate, and a rich botanic harvest awaits the explorer of those regions when order shall have been sufficiently restored to make the pursuit of knowledge moderately safe. I trust it may be the pleasant duty of a very early successor to me in this chair to chronicle to you the return of a scientific explorer from the hitherto unknown China-Burmese frontier.

Geological Survey.—In reviewing the progress for the year in Geological work in India, we may give the first place to economic results; and these unfortunately do not fulfil expectations. Coal is about the only mineral that need be mentioned, for, besides it (with the exception of iron), India has not proved rich in metals. The explorations in the Rámpur coal-field in Chhatísgarh have proved disappointing, notwithstanding the abundance of carbonaceous outcrops, nor has the Umariya coal-field in the Rewa basin been a complete success. In the Sátpura basin, the Mohpáni field on the north seems, for the present, to have failed; the thick seam in which mining has been carried on for years has stopped out on all sides, and has not yet been recovered. On the south side of the same basin, the Chhindwára coal-fields have been surveyed this year, and, though there is a fair show of out-crops of coal, it would be premature to express an opinion as to its resources, until trial borings have been made. There remains the hope that the Singareni coal-fields, to which the Nizam's State railway is expected to be open about the middle of this year, will remove the impression that there is no good coal in India outside of Bengal, for, though the tertiary coal of the Salt Range in the Panjáb has been opened out this year, the coal can only be used where no better is procurable.

Mr. Oldham holds out the hope that in Rájpútána, perhaps, a better coal may be discovered. For many years, the rocks about Jaisalmer have been known to be of jurassic age, and therefore the marine equivalents of some of the Gondwána series of the Peninsula. From observations made early in 1886, Mr. Oldham concluded that the glacial boulder conglomerate at Pokaran, some fifty miles east of Jaisalmer, represents the Talchhír boulder bed at the base of the Gondwána system and almost always found below the coal measures, and he suggested that these might also be represented in Rájpútána in the covered ground

between the marine limestones and the Pokaran boulder bed. Explorations are now being made to test this conjecture. In this connection, as fuel, mention may also be made of successful borings for petroleum lately carried out by Mr. R. A. Townsend in the hills east of Sibi. The oil occurs, as in the Panjáb, in lower tertiary strata.

For many years past, we have known of one occurrence of Gondwána coal-measures outside the Peninsula, in the carboniferous beds that seem to underlie the schists and gneiss at the base of the Sikkim Himálaya. Uppermost Gondwána rocks have also been long since identified as occurring at the top of the marine jurassic series in Kachh; and now the typical bottom Gondwána group has been found in western Rájpútána at the base of another section, high up in which these same jurassic strata occur. Another similar discovery has been made in the past year by Dr. Warth, who, when examining the coal-measures of the Salt Range, found on the top of a boulder bed some fossils which have been pronounced by Dr. Waagen to be of distinct palæozoic types, some of them identifiable with carboniferous marine fossils in Australia. This at once suggested to Dr. Waagen that this glacial boulder bed of the Salt Range probably represented the well-known Talchhír rock at the base of the Gondwána system: for Indian geologists had from the beginning contended that the lower Gondwána deposits were palæozoic, because of the association of Gondwána plants with marine carboniferous fossils in Australia. We have therefore nearly arrived at the conclusion of a discussion that has lasted for nearly thirty years, as to the homotaxis of the Gondwána system and its place in the universal scale of formations. The contention on the other side was based on the undoubted fact that the Gondwána flora is distinctly of mesozoic type, and every conjecture was hazarded to throw doubt on the association of Gondwána plants with palæozoic fossils. Further evidence is due to a visit paid to Australia by Mr. Oldham, where he confirmed the fact of interstratification of the two kinds of fossils and brought more prominently to notice a glacial boulder deposit there, associated with these beds. Perhaps the most important result of this discovery is the refutation of the commonly received dogma that fossils of such diverse types could not have co-existed. The actual demonstration has now for the first time been made, on an adequate scale from the geology of India, that a triassic flora has been contemporaneous with a carboniferous marine fauna, and, as the comparative scale of formations has to be based upon the most wide-spread class of organisms, the marine, it can now be taken as settled that the period represented by the Gondwána system of rocks extended from middle carboniferous to top jurassic.

The other great formation, the Vindhyan, is still unexplained, no trace of a fossil having, as yet, been found in it. There is a mighty gap between it and the next succeeding Gondwána deposits, and every step taken by geologists seems to make it more difficult to draw any marked general stratigraphical separation between it and the old transition rocks. In one place, it may show apparent sequence or slight unconformability with strata that elsewhere are completely discordant beneath it. Whoever discovers a fossil in the Vindhyan system will assuredly rank as a discoverer who has done good service to Indian Geology.

We may now proceed to notice the recent work of Indian geologists, mostly members of our Society, beyond the frontiers of India. Mr. Griesbach has recently returned after his two years' travel with the Afghán-delimitation Commission. From Quettah to the Siyáh Koh, Doshákh range, south of Herat, he only found cretaceous (Hippurite-limestone) and tertiary rocks, with local profuse intrusions of syenitic granite and basic trap, the same as he had previously described east and west of Kandahar. In the Doshákh range, he came upon a core of carboniferous productus-limestone, and, flanking it on the north, a great plant-bearing series with fossils of Gondwána types, passing up into marine jurassic strata, succeeded by a great thickness of cretaceous and tertiary deposits. The Paropamisan range to the north of Herat is mostly composed of these permo-trias and jurassic formations, with intrusions of igneous, rock, granite, and melaphyres, the same stretching north-westwards into the mountains of Khurásán between Nisháp̃ur and Mashad. The famous turquoise mines of Madán are in a trappean contact-rock with upper jurassic strata.

Proceeding to the north-east, Mr. Griesbach found the Tir-band-i-Turkistán, which is the principal north-western range of the Afghán mountains, to be mainly formed of upper cretaceous limestones, resting unconformably upon the trias-jura rocks, which are found locally exposed along the denuded anticlinal axes of flexure. The flanking ranges exhibit massive tertiary strata, dipping steeply under the recent deposits, forming the plains of Turkistán. In the Kára-koh region, south-east of Balkh, extensive coal-beds are found in the plant-bearing series, and here the basal members are distinctly associated with carboniferous strata, a fact giving further confirmation of the Gondwána affinities already explained. Mr. Griesbach crossed the Hindu-Kush by the Chahárdar pass, nearly due north of Kábul. In this section, he found only the rocks already noticed, but, again, with profuse intrusions of syenitic granite whereby the adjacent strata are extensively metamorphosed into crystalline schists and limestones, the

lines of disturbance being still principally east and west. The same rocks occupy the ground between Kábul and Peshawar. A remarkable feature of this traverse between the Oxus and India is that no rocks were taken to be older than carboniferous: even the crystalline schists being taken to be rocks of that period or newer.

Another labourer in the field has been Dr. Giles, who was attached as naturalist to Colonel Lockhart's mission. He passed through Yassin, Chitrál, and the border of Káfiristán, and, though not a professed geologist, has made interesting notes upon the physical features and rocks, specimens of which he brought back for inspection. Mr. Lyddeker had previously examined the ground traversed by the mission as far as Gilgit and described it as an almost unbroken geological waste of gneiss and schistose rocks, taken to be partly altered palæozoic, but largely also archæan, as the continuation of the schists and gneiss underlying the silurian and cambrian slates in the Himálayan sections to the south-west. From Dr. Giles' specimens and notes it would be inferred that the whole of the ground traversed by him westward of Gilgit was of the same description. There was no vestige of a fossil and all the rocks were more or less metamorphic, the more crystalline varieties predominating. By itself this could not be remarkable, but, compared with the concluding section of Mr. Griesbach's tour, it is rather perplexing in the greatness of the contrast. There remains about 100 miles of Káfiristán separating the two sections; and it is to be feared that some time will elapse before materials for solving the problem thus presented to us will be available.

The publications of the Geological Survey comprise the '*Records*,' '*Memoirs*,' and the '*Palæontologia Indica*.' Of the Records, the volume for 1886, contains twenty-five papers of varied interest by members of the staff and others. The Palæontologia continues its useful work and gives us contributions by Mr. R. Lydekker on the Reptilia and Amphibia of the Maleri and Denwa groups of the Indian pre-tertiary vertebrata and a supplement to his Siwálik mammalia of the tertiary and post-tertiary series, and by Messrs. P. Martin Duncan and W. Percy Sladen on the Gaj (miocene) series, the Makrán (pliocene) series, and the fossil Echinoidea of Kachh and Káthiawár belonging to the tertiary and upper cretaceous fauna of Western India. Also on the Cœlenterata of the productus-limestone of the Salt-range by Dr. Waagen, and a concluding part of the Gondwána Flora series by Dr. Feistmantel.

Meteorology.—And now I come to what may without disparagement be called the youngest of all sciences, for, notwithstanding the attention given to it of late years, meteorology is still only in the first stages of generalisation and presents us with a mass of observational detail, out

of all proportion to its generalised truths. It has been remarked by more than one recognised authority that perhaps no science has such a tale of work to shew that is virtually wasted labour: long registers of observations recorded at great expense and at the cost of no small devotion and self-denial, but which have remained infructuous, owing to the want of that familiarity with physical laws that is requisite to give them validity or to turn them to useful account. But it is encouraging to note that, of late years, this reproach has lost much of its force and generality. Although the fundamental laws of thermotics and pneumatics are still, to a large extent, unknown to many of those engaged in collecting observations, yet, owing to the action of meteorological societies and institutions, this work has become systematised and rendered at least capable of bearing fruit. If we have still to admit that weather prognosis, which is the ultimate aim, is, in its methods, mainly empirical, we have but to turn to such periodicals as the Journals of the Austrian and German meteorological societies, not to mention such separate publications as those of Ferrel, Mohn, and Guldberry, and to Hann's 'Climatology' to see that the alliance of meteorology with its sister science, physics, is being knit year by year in closer bonds.

The greater advances achieved of recent years have been made by inductive methods, of the application of which the laws of storms afford, perhaps, the most striking example. The activity in this field of inquiry is great and increasing; and the last two years have furnished some valuable additions to our knowledge, of which I may notice one or two. In America, the veteran professor, Elias Loomis, has crowned the labours of half a century by the publication of a revised edition of his 'Contributions to Meteorology.' This work, the first part of which only has reached India, is perhaps the most comprehensive summary of the tracks and other general features of cyclonic storms ever yet compiled. It deals most fully with the storms of North America, for which ample details have been furnished to him by the elaborate system of weather telegraphy for which the United States stand pre-eminent amongst nations. But it also describes and discusses the more important features of storm motion in other parts of the northern hemisphere, and brings together, in a moderate compass, the results of the older, as well as of the recent, workers in this field of research.

Nearer home, important work on the cognate subject of the typhoons of the Chinese seas has been done by M. Decheorens, the eminent director of the Zi-ka-wei observatory at Shanghai, and also by Dr. Doberek. In India, Mr. J. Eliot has given us a memoir on the Akyáb cyclone of 1884, and Mr. Pedler one on the disastrous storm of 1885 which swept away the settlement at Hookeytolla in Orissa and caused such loss of

human life. This storm is remarkable as having furnished a lower reading of the barometer than has been recorded previously in any part of the world at the sea-level. An important contribution to the meteorology of the Indian seas has recently issued, in the shape of a set of monthly weather charts of the Bay of Bengal, drawn up by Mr. Dallas from the data furnished by the London Meteorological Office. These charts represent the wind directions and force prevailing on the Bay of Bengal and the equatorial sea, also the average readings of the barometer, the frequency of gales and the recorded marine currents, and will, it is believed, be of much use to ship commanders, more especially of sailing vessels, in shaping their course between Bengal and the equator. Similar charts are under preparation for the Arabian sea.

In connection with these seas and their navigation, I would say a word or two on a matter of much practical importance in regard to the useful application of the knowledge that we possess. As your representative I am far too deeply impressed with the great merits of our former member Mr. Piddington, distinguished not only as a botanist, but more especially as a worker in this field, to appear to say anything that might seem to depreciate his work. Its value and merit have gained universal recognition, and in its main features it is unassailable. But science is progressive, and it would be very strange did the work of a generation of labourers add nothing to our knowledge. It was the idea of Mr. Piddington that the movement of the wind in storms is in circles or locally and apparently tangential to a circle, and on this idea was based his practical rules for the guidance of shipmasters. This idea is now shown by universal experience to be incorrect, and to be at least only a rough approximation to the fact. The wind it is now amply proved always moves in spirals. But Piddington's rules are still the accepted guides of seamen and are still taught authoritatively notwithstanding that, as Mr. Meldrum has shewn, their observance not infrequently leads to disaster. It is much to be desired that steps should be taken by some recognized authority to prepare a simple and popular manual on the subject, based on the sounder knowledge which modern science has acquired. And, indeed, such a work is also needed for the meteorology of the land to enable the lay public to understand and intelligently appreciate the mass of meteorological literature which the Government *Gazettes* and the entire press, weekly or daily, so lavishly place before us. We want something more popular than the very valuable 'Vademecum' of Mr. Blanford, not a scientific investigation of principles, but a brief, clear, and comprehensive explanation of the observations ordinarily made, their objects, uses, and mode of application.

Our Meetings.—It has been sometimes urged that we should make our meetings more interesting to the general public, and to those amongst our members who do not occupy themselves with cultivating any particular branch of knowledge. I can only say that the remedy is in the hands of the members themselves. The office-holders of the Society do not differ from the members, except that they have, in addition to their duties as members, undertaken the task of administering its affairs and of conducting through the press the numerous publications of the Society; they are not men of leisure, but like yourselves have full occupation in their public and private avocations. The means are at hand and have received the sanction of your Council. On notice given to our Secretaries, they will place on the agenda paper for the evening any one of the numerous subjects within the scope of our Society that any member may wish to bring forward for discussion, and this shall be the subject of conversation for the meeting, to be entered on after the formal business of the evening has been concluded, and not to form any portion of the records thereof. Thus there will be ample opportunity for any member in an informal way to bring forward any matter on which he desires such information as the members present can afford, or to communicate to us information that appears to him to be of interest. I trust that our after-business conversations may in future form a marked and useful feature of interest in our meetings. I believe that there are none amongst us who cannot add something of novelty and interest to some of the subjects that will arise for discussion and certainly none who are so wise as not to be benefited thereby. Looking back on the history of our Society and analysing the existing list of members, one fact is evident throughout, that we are essentially a Society of amateurs with a few professional men to weld our efforts together, and it is, in a great part, the labours of these amateurs that have built up this Society and made it what it is. We have a past that we may feel proud of, and, though the Societies which have arisen to achieve the objects that we have had before us are both numerous and strong, yet I think that the survey of work done that I have given you this evening may justly make you feel that the parent of all Oriental Societies is neither moribund nor languishing, and that it rests with us individually that this reproach may not fall in our time.

Survey of the Invertebrata.—In conclusion, I may be permitted to call the attention of all, whether members of this Society or not, to a subject in which I take a deep interest. In doing so I would quote the words of Mr. W. T. Blanford in his address to this Society in 1879:—"But much as hand-books of Indian *Vertebrata* are wanted, there is a far greater need of similar aids to

the study of the *Invertebrata*. The number of students would be greatly increased were the means of identifying animals greater, and even from a practical point of view, the only view in which, I regret to say, the majority of the world is capable of sympathising, much good can be done. For instance, the injury done yearly by insects to the crops of India is something enormous, without considering the mischief inflicted by our various six-footed rivals and enemies in other ways. Yet we scarcely know which kinds of insects are to be guarded against, nor what are their natural enemies, and any one desirous of ascertaining the species, and of learning what is known about their habits, must search through an extensive library in order to gain the information required." Since these lines were written, Col. Marshall and Mr. de Nicéville have taken up the Rhopalocerous section of the Lepidoptera or butterflies, Colonel Swinhoe and Mr. Cotes are about to give us a list of the Heterocerous section or moths, and Mr. E. T. Atkinson has completed the Homopterous section, and commenced the descriptions of the Heteropterous section of the Rhynchota. Still very much remains to be done, and I believe there are amongst us men to whom the work would be congenial, and who would spare no pains to make it good. I would now call on such, whether members of our Society or not, to take up even a section of the orders untouched, and to aid us by preparing lists, collecting specimens and noting the habits and life-history of the species. I should be glad to see our Native Members take more interest in Natural Science, and thus wipe away the reproach that, perhaps, with the exception of the late Babu Harimohun Mukharji and one gentleman in Bombay, there is not a single native of India, known outside its limits, for proficiency in either Botany or Zoology.

A vote of thanks to the President proposed by Mr. Westland was carried by acclamation.

The PRESIDENT announced that the Scrutineers reported the result of the election of Office-bearers and Members of Council to be as follows :—

President.

E. F. T. Atkinson, Esq., B. A., C. S.

Vice-Presidents.

Dr. Rájendralála Mitra, C. I. E.
Lieut.-Col. J. Waterhouse, B. S. C.
J. Wood-Mason, Esq.

Secretaries and Treasurer.

J. Wood-Mason, Esq.
Dr. A. F. R. Hoernle.
H. M. Percival, Esq., M. A.
J. Eliot, Esq., M. A.

Other Members of Council.

H. B. Medlicott, Esq., F. R. S.
D. Waldie, Esq., F. C. S.
C. H. Tawney, Esq., M. A.
Babu Pratápa Chandra Ghosha, B. A.
Dr. Mahendralál Sarkár, C. I. E.
E. Gay, Esq., M. A.
Pandit Maheschandra Nyáyaratna, C. I. E.
H. Beveridge, Esq., C. S.
L. de Nicéville, Esq., F. E. S.

The PRESIDENT suitably returned thanks for the re election of the Office-bearers and Members of Council.

Messrs. Meugens and King were appointed Auditors to examine and report on the accounts of the past year.

The Meeting was then resolved into the Ordinary Monthly General Meeting.

E. F. T. ATKINSON, Esq., B. A., C. S., President, in the Chair.

The minutes of the previous meeting were read and confirmed.

Eighteen presentations were announced, details of which are given in the Library List appended.

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

Babu Rákhál Dás Háldár.

The following gentleman is a candidate for election at the next meeting.

T. A. Pope, Esq., Assistant Superintendent of Survey, proposed by Lt.-Col. J. Waterhouse, seconded by H. B. Medlicott, Esq.

The following gentleman has intimated his wish to withdraw from the Society—

E. W. Oates, Esq.

The following papers were read—

1. *On the observed changes in the density of the surface Sea water, coincident with, and due to, aerial disturbances, and consequent alterations of baric pressure over adjacent sea areas.—By* S. R. Elson, *Bengal Pilot Service.*

(Abstract.)

In this paper the author shows, by means of tabulated serial observations since taken, that a statement he wrote in his Sandheads Sailing Directory some years back, that 'the waters at the Hooghly Pilot Station contained, in the dry season of the year, more salt at low water than at high water,' requires some modification of the seeming paradox, on account of some rather novel facts, which he has brought to light by means of a common soda-water bottle hydrometer, which is capable of easily testing the fluid specific gravity to the sixteenth of a thousandth: —that, when a baric depression over the sea to the south, induces, as it always does, an accelerated flow, or set of the sweet waters flowing out of the great eastern mouths of the Ganges, over the tails of the outlying sandy reefs, the specific gravity of the water at the Hooghly Pilot Station being thereby consequently lessened, there is a greater comparative difference at such times between the specific gravity of the waters outside of, and on the tails of the reefs, and that of the inshore waters of the litoral:—a difference sometimes amounting to as much as is 1·020 to 1·024. This difference the author attributes to the shelter, from the above-mentioned induced accelerated incursion of the sweeter eastern waters, afforded by Saugor Island and its outlying partially dry sand; and from the fact, as stated in a companion paper to the present one by the author, read before this Society and published in its Proceedings in November 1885, that but very little of the Hooghly River water finds it way to those more sheltered positions, to interfere with the copious evaporation, which must be ever active on those warmer inshore and muddy waters.

The author also shows by means of tabulated two-hourly serial observations made in November last whilst on his trip to and from Rangoon, during an interval of only eight days, the very marked effect which different states of weather in the Bay have on the surface temperature and density curves at, and off the Pilot station, also for some distance out into the blue water of the Bay, and the general usefulness to mariners and others, which would be the outcome, if a more exact measurement of the sea-surface specific gravity were taken and published, than is now generally observed by those willing observers who keep such registers; more especially near coasts, and off the mouths

of rivers, such as the Hooghly. A full description of the construction of the bottle hydrometer, and the author's simple plan for making the counterbalancing wire weights, are given in the paper.

The paper will be published in the Journal, Part II for 1887.

2. *On the influence of Indian Forests on the Rainfall.*—*By* H. F. Blanford, F. R. S., *Meteorological Reporter to the Government of India.*

The President made the following remarks on the above paper:—Whatever doubt there may be as to the direct influence of forests in the production of rain, there can be none in regard to their effect upon the distribution of the rain-fall by means of springs and streams. This is clearly shown in the recent report of the 'Division of Forestry' attached to the United States Department of Agriculture. It is there shown that the removal of forests from the neighbourhood of streams not only lessens the whole amount of water flowing in their channels, but renders its flow much more irregular than before. In the case of the smaller streams, where the forests adjacent to them or in which they have their head springs have been cut off, the streams have been often so reduced as, at certain seasons of the year, almost to disappear. And, in the case of streams, whether large or small, the result has been to produce floods when the snows melt in spring-time, or after heavy rains, to be followed by a greatly diminshed flow of water afterwards, especially in those seasons of the year when rains are least frequent and copious. These effects of the denudation of forest areas occur not only in the Eastern States of the United States but along the Danube, Elbe, Oder and Vistula; but it has also been shown that the reafforesting of denuded tracts restores the even flow of water at all times and mitigates the excessive flow in times of floods.

The American Forest Department consider that nothing has been better settled than that the forests are the great regulators of the distribution of the water precipitated from the clouds, and consequently of the flow of streams. By their shade, and by the obstruction which they offer to sweeping winds, they lessen the evaporation which would otherwise speedily carry off from the ground much of the rainfall, while the loose spongy soil, formed by the accumulation of their fallen leaves, absorbs the water precipitated from the sky or produced by the melting of the winter's snow, and causes it to flow off gradually into the channels of the streams, instead of flooding them at once.' As to the direct influence of forests in producing rain or increasing its amount in their immediate vicinity and their consequent favourable effect upon agriculture and the supply of water for springs and streams, Mr. Blanford's

paper will help to resolve the doubt that still exists on this subject. The Report referred to states, that although the preponderance of evidence at present seems to favour the conclusion that forests have an influence in increasing the amount of rain-fall in their immediate vicinity, further experiments are necessary before this can be considered conclusively settled. It is precisely in this direction that the observations recorded by Mr. Blanford are of great value, and we can only hope that they will be continued until this important question is set at rest.

The paper will be published in the Journal, Part II for 1887.

LIBRARY.

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Amsterdam. Revue Coloniale Internationale,—Tome IV, No. 1, Janvier, 1887.

Baltimore. Johns Hopkins University Circulars,—Vol. VI, No. 54, December, 1886.

Bombay. Anthropological Society of Bombay,—Journal, Vol. I, No. 1.

———. Bombay Branch, Royal Asiatic Society,—Index to Journals Vols. I—XVII, and to the Transactions of the Literary Society of Bombay, Vols. I—III.

———. Indian Antiquary,—Vol. XVI, Part 192, January, 1887.

Calcutta. Asiatic Researches (Popular Edition). Vol. II, Nos. 1—6.

———. Geological Survey of India,—Records, Vol. XX.

———. The Indian Engineer,—Vol. II, Nos. 8 and 9; and Index Vol. I.

———. Indian Engineering,—Vol. I, Nos. 3—5 and 7.

———. Meteorological Observations recorded at six stations in India, corrected and reduced, September, 1886.

Edinburgh. Royal Physical Society,—Proceedings, Vol. IX, Part 1, Session 1885-'86.

The Hague. Koninklijk Instituut voor de Taal,—Land- en Valkenkunde van Nederlandsch-Indië,—Bijdragen tot de Taal-Land- en Volkenkunde van Nederlandsch-Indië, Deel II (5e Volgr), Aflevering 1.

Havre. Société de Géographie Commerciale du Havre,—Bulletin, No. 6, Novembre-Décembre, 1886.

London. The Academy,—Nos. 763—767.

———. The Athenæum,—Nos. 3086—3090.

———. Geological Society,—Quarterly Journal, Vol. XLII, Part 4.

———. ———. List of Fellows, November 1st, 1886.

———. Nature,—Vol. XXXV, Nos. 894—898.

Paris. La Société de Géographie,—Bulletin, Tome VII (7e Série), No. 3.

———. Société de Géographie,—Compte Rendu des Séances, Nos. 18 et 19, 1886.

Philadelphia. Academy of Natural Sciences of Philadelphia,—Proceedings, Part I, January to March, 1886.

Rio de Janeiro. Annaes da Escola de Minas de Ouro Preto, No. 4. 1885.

Rome. La Sociéta degli spettroscopisti Italiani,—Memorie, Vol. XV, Dispensa 8a, Agosto, 1886.

Roorkee. Professional Papers on Indian Engineering,—Vol. IV, (3rd series), No. 15, December, 1886.

Sydney. Royal Society of New South Wales,—Journal and Proceedings, Vol. XIX.

Washington. United States Geological Survey,—Bulletin, Nos. 24—26.

Yokohama. Asiatic Society of Japan,—Transactions, Vol. XIV, Part 2.

Books and Pamphlets,

presented by the Authors, Translators, &c.

Darmesteter, James. E'tudes Iraniennes. Tome I et II. 8vo. Paris, 1883.

Delauney, M. Explication des Taches du Soleil. 8vo. Paris, 1886.

Doss, Brojendro Lall. Asiatic Researches (Popular Edition), Vol. II, Nos. 1—6. 8vo. Calcutta, 1886.

Growse, F. S., C. I. E. Indian Architecture of to-day as exemplified in new buildings in the Bulandshahr District, Part II. 4to. Benares, 1886.

Roy, Protap Chandra. The Mahábhárata, translated into English Prose. Part 29. 8vo. Calcutta, 1887.

Miscellaneous Presentations.

Report on the Administration of the Central Provinces for the year 1885-'86. By D. Fitzpatrick, C. S., Offg. Chief Commissioner. Fcp. Nagpur, 1886.

Returns of Railway-borne Traffic of the Central Provinces for the quarter ending 30th September, 1886. Fcp. Nagpur, 1886.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report of the Commissioner of Agriculture, United States America, for 1885. 8vo. Washington, 1885.

COMMISSIONER OF AGRICULTURE, WASHINGTON.

Report on the Administration of the Customs Department in the Bengal Presidency for the official year 1885-'86. Fcp. Calcutta, 1886.

Report on the Railway-Borne Traffic of Bengal during the year 1885-'86. Fcp. Calcutta, 1886.

Returns of the Railway-Borne Trade of Bengal during the quarter ending the 30th September, 1886.

GOVERNMENT OF BENGAL.

The Indian Antiquary,—Vol. XVI, Part 192, January, 1887. 4to. Bombay, 1887.

Selections from the Records of the Government of India in the Home Department, No. CCXXIII. Papers relating to Infant marriage and enforced widowhood in India. Fcp. Calcutta, 1886.

Statement exhibiting the Moral and Material Progress and Condition of India during the year 1884-'85, No. 21.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

International Meteorological Observations, September, 1885. 4to. Washington, 1886.

Monthly Weather Review, September, 1886. 4to. Washington, 1886.

GOVERNMENT OF INDIA, METEOROLOGICAL DEPARTMENT.

Administration Report of the Meteorological Reporter to the Government of Madras for the year 1885-'86. 8vo. Madras, 1886.

GOVERNMENT OF MADRAS.

Translations of the Coorg Inscriptions. By Lewis Rice, C. I. E., Secretary to the Government of Mysore. 4to. Bangalore, 1886.

GOVERNMENT OF MYSORE.

Johns Hopkins University Studies in Historical and Political Science, fourth Series, XI—XII. The Land System of the New England Colonies. By Melville Egleston. 8vo. Baltimore, 1886.

JOHNS HOPKINS UNIVERSITY, BALTIMORE.

Den Norske Nordhavs-Expedition 1876-'78. XVI. Zoologi. Mollusca, II. ved Herman Friele. Rl. 4to. Christiania, 1886.

DEN NORSKE NORDHAVS-EXPEDITION, CHRISTIANIA.

Tide-Tables for the Hooghly River, 1887. By Major A. W. Bird, R. E., F. R. S. in charge Tidal and Leveling Operations, Survey of India, and E. Roberts, F. R. A. S., F. S. S. Nautical Almanac Office, London. Sheet. London.

Tide-Tables for the Indian Ports for the year 1887 (also January, 1888). By Major A. W. Bird, R. E., F. R. S., in charge Tidal and Leveling Operations, Survey of India, and E. Roberts, F. R. A. S., F. S. S. Nautical Almanac Office, London. Demi 8vo. London.

SURVEY OF INDIA IN CHARGE TIDAL AND LEVELING OPERATIONS, POONA.

Supplément au Catalogue des Livres Chinois qui se trouvent dans la Bibliothéque de l'Université de Leyde. 4to. Leide, 1886.

L'UNIVERSITE DE LEYDE.

PERIODICALS PURCHASED.

Allahabad. Indian Notes and Queries,—Vol. IV, No. 39, December, 1886.

Berlin. Deutsche Litteraturzeitung,—VII Jahrgang, Nos. 46—48.

———. Journal für die reine und angewandte Mathematik,—Band C, Heft 3.

Calcutta. The Indian Medical Gazette,—Vol. XXI, No. 12, December, 1886.

Cassel. Botanisches Centralblatt,—Band XXVIII, Nos. 8—10.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XVI, No. 12.

Giessen. Jahresbericht über die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften,—Heft 1, 1885.

Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Gelehrte Anzeigen, No. 22, 1886.

———. ———. Nachrichten, No. 17, 1886.

Leeds. The Journal of Conchology,—Vol. V, Nos. 1—4.

Leipzig. Annalen der Physik und Chemie,—Band XXIX, Heft 4; Band XXX, Heft 1.

———. Literarisches Centralblatt,—Nos. 47—49, 1886.

London. The Annals and Magazine of Natural History,—Vol. XVIII, (5th series), No. 108, December, 1886.

———. The Chemical News,—Vol. LIV, Nos. 1412—1414.

———. The Entomologist,—Vol. XIX, No. 283, December, 1886.

———. The Entomologist's Monthly Magazine,—Vol. XXIII, No. 271, December, 1886.

———. The London, Edinburgh, and Dublin Philosophical Magazine, —Vol. XXII (5th series), No. 189, December, 1886.

———. Mind,—Vol. XII, No. 45, January, 1887.

———. The Nineteenth Century,—Vol. XXI, No. 19, January, 1887.

———. The Publisher's Circular,—Vol. XLIX, No. 1182.

———. The Quarterly Journal of Microscopical Science,—Vol. XXVII (New Series), Part 2, October, 1886.

London. Society of Arts,—Journal, Vol. XXX, Nos. 1778—1782.

New Haven. The American Journal of Science,—Vol. XXXII (3rd Series), 191, November, 1886.

Paris. L' Académie des Sciences,—Comptes Rendus des Séances, Tome CIII, Nos. 19 et 20.

———. Annales de Chimie et de Physique,—Tome IX (6me série), Novembre, 1886.

———. Revue Critique d'Histoire et de Littérature,—Tome XXII, Nos. 46—48.

———. Revue des Deux Mondes,—Tome LXXVIII, No. 4.

———. Revue Scientifique,—Tome XXXVIII, Nos. 20 et 21.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1887.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 2nd March 1887 at 9 P. M.

E. T. ATKINSON, Esq., C. S., President, in the Chair.

The following members were present:

G. A. Grierson Esq., Dr. Hoernle, A. Hogg, Esq., H. M. Kisch, Esq., R. D. Mehta, Esq., Dr. Rájendralála Mitra, Babu Ashutosh Mukherji, Babu Nilmani Mukherji, L. de Nicéville, Esq., A. Pedler, Esq., H. M. Percival, Esq., The Hon. Dr. Mahendralál Sarkár, D. Waldie, Esq., Lt.-Col. J. Waterhouse, J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

Seventeen presentations were announced as detailed in the appended Library List.

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

T. A. Pope, Esq.

The following gentlemen are candidates for election at the next meeting:

Dr. W. J. Simpson, Health Officer, Calcutta, proposed by H. F. Blanford, Esq., seconded by E. Gay, Esq.

F. J. E. Spring, Esq., Public Works Dept., proposed by J. Wood-Mason, Esq., seconded by E. T. Atkinson, Esq.

Fritz Noetling, Esq., Ph. D., Palæontologist to the Geological Survey of India, proposed by H. B. Medlicott, Esq., seconded by J. Wood-Mason, Esq.

The following gentlemen have intimated their wish to withdraw from the Society:

Robert Gordon, Esq.
D. G. Barkley, Esq.
Capt. T. Boileau.

The SECRETARY reported the death of the following Members:
Col. G. C. De Prée.
J. C. Douglas, Esq.

The PRESIDENT announced that in accordance with the Resolution passed by the Council at the meeting held on the 27th January last, the following Address had been presented to Her Most Gracious Majesty the Queen-Empress on the occasion of the Jubilee.

Address.

Her Most Gracious Majesty Victoria, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith, Empress of India.

As representatives of the Asiatic Society of Bengal, and on behalf of its members, we desire to offer to Her Most Gracious Majesty, our Queen, Empress of India, our loyal and hearty congratulations on the Jubilee of her Majesty's reign.

In no respect will the Victorian age be more prominently distinguished in the pages of history than by its activity in scientific research, and by that expansion of the field of knowledge, which is the meed of research. This activity is the offspring of Western culture. It was the pride and is the honour of the founders of our Society to have transplanted the spirit of research to this Eastern land; but it is more particularly during Her Majesty's long and peaceful reign that that spirit has spread abroad and fructified.

As a condensed record of the part borne by our Society in the advancement of Indian science, during the first century of its existence, a century, nearly one half of which has been passed under the auspices of Her Majesty's beneficent rule, we respectfully beg Her Majesty's gracious acceptance of the Centenary Memorial Volume of the Asiatic Society of Bengal.

57 PARK STREET,
The 16th February, 1887.

The Address, which was handsomely engrossed on parchment, was signed by the President, Vice-Presidents, Secretaries, Treasurer, and the Members of Council, and was presented to His Excellency the Vice-

roy and Governor General of India by a deputation consisting of the President, the Vice-Presidents and the senior Secretary; together with a copy of the Centenary Review of the Asiatic Society, bound in vellum and enclosed in a kincob case.

The SECRETARY read the names of the following gentlemen who had been appointed by the Council to serve on the several Committees during the current year.

FINANCE COMMITTEE.

H. B. Medlicott, Esq.
Dr. Rájendralála Mitra.
Lt.-Col. J. Waterhouse.

LIBRARY COMMITTEE.

Babu Pratápa Chandra Ghosha.
Dr. Rájendralála Mitra.
Dr. Mahendralál Sarkár.
Lt.-Col. J. Waterhouse.

PHILOLOGICAL COMMITTEE.

Abdul Latif, Nawab Bahádur.
J. Beames, Esq.
H. Beveridge, Esq.
J. Boxwell, Esq.
Dr. A. Führer.
Babu Pratápa Chandra Ghosha.
G. A. Grierson, Esq.
F. S. Growse, Esq.
Colonel H. J. Jarrett.
Maulavi Kudábaksh, Khán Bahádur.
C. J. Lyall, Esq.
Dr. Rájendralála Mitra.
Babu Nilmani Mukherji.
Pandit Maheshchandra Nyáyaratna.
Dr. Mahendralál Sarkár.
Sayyid Ahmad Khán, Bahádur.
Babu Haraprasád Shástri.
C. H. Tawney, Esq.
Dr. G. Thibaut.
Colonel A. Toker.

NATURAL HISTORY COMMITTEE.

Dr. A. Barclay.
H. F. Blanford, Esq.
E. C. Cotes, Esq.
Dr. D. D. Cunningham.
J. Duthie, Esq.
Dr. G. M. Giles.
E. J. Jones, Esq.
Dr. George King.
Dr. William King.
Major G. F. L. Marshall.
C. S. Middlemiss, Esq.
L. de Nicéville, Esq.
Fritz Noetling, Esq.
R. D. Oldham, Esq.
S. E. Peal, Esq.
Dr. J. Scully.
Colonel C. Swinhoe.

PHYSICAL SCIENCE COMMITTEE.

H. F. Blanford, Esq.
Babu Pramatha Náth Bose.
J. Eliot, Esq.
S. R. Elson, Esq.
Dr. G. M. Giles.
C. L. Griesbach, Esq.
S. H. Hill, Esq.
E. J. Jones, Esq.
Dr. William King.
Rev. Father Lafont.
J. J. D. La Touche, Esq.
H. B. Medlicott, Esq.
C. S. Middlemiss, Esq.
Fritz Noetling, Esq.
R. D. Oldham, Esq.
A. Pedler, Esq.
Dr. Mahendralál Sarkár.
Dr. W. J. Simpson.
Dr. L. A. Waddell.
D. Waldie, Esq.
Lt.-Col. J. Waterhouse.

COINS COMMITTEE.

A. Hogg, Esq.
Dr. Rájendralála Mitra.
Lt.-Col. W. F. Prideaux.
C. H. Rivett-Carnac, Esq.
C. J. Rodgers, Esq.
V. A. Smith, Esq.

HISTORY AND ARCHÆOLOGICAL COMMITTEE.

Amir Ali, Esq.
R. R. Bayne, Esq.
J. Beames, Esq.
H. Beveridge, Esq.
Dr. A. Führer.
Babu Pratápa Chandra Ghosha.
F. S. Growse, Esq.
Dr. Rájendralála Mitra.
J. H. Rivett-Carnac, Esq.
Pandit Pránnáth Sarasvati.
Kaviráj Shyamaldás.
Captain R. C. Temple.

LIEUT.-COLONEL WATERHOUSE exhibited some photographs taken on the occasion of the Jubilee Fireworks and Illuminations and made the following remarks:

These photographs are not very much in themselves but are interesting as being an application of the principle of what is known as orthochromatic photography, *i. e.*, they are taken on gelatine dry plates specially prepared so as to be more sensitive to yellow light than the ordinary dry plates, and, in fact, by suitable arrangements, plates may be made as sensitive to yellow as ordinary plates are to blue. Such plates are of the greatest use in copying paintings and other coloured objects with a truer rendering of the light and shade as seen by the eye than is possible by the ordinary plates. Being so sensitive to yellow light photographs can be taken with them by petroleum or gas light and, in some instances, with very great advantage.

In order to produce this sensitiveness to yellow the photographic film of bromide of silver is stained with certain dyes, which increase the sensitiveness of the film for the less refrangible rays of the spectrum. Among them chlorophyll, cyanin blue, eosin and its derivatives, especially those with a bluish tint, such as erythrosin, an alkaline salt of tetraiodfluorescein.

At the meeting of the Society in January 1876 I read a short paper, published in the Proceedings, on the influence of Eosin on the photographic action of the Solar Spectrum upon bromide and bromoiodide of silver, and showed its peculiar action in extending the sensitiveness of the bromide of silver to the yellow rays and, in fact, changing the maximum of photographic action from the indigo and violet, as in ordinary plates, to the green and yellow. As stated at the time, my efforts to apply this principle to copying coloured maps, yellow manuscripts, landscapes &c., on wet and dry collodion plates were not successful and I had not leisure to pursue the enquiry further. Others, however, I am glad to say, have been more successful. Ducos du Hauron found that in order to get the full benefit of the dye on collodion plates it was necessary to expose the plate through a coloured medium such as yellow glass, and by this means he worked very successfully with eosin. Abney, Vogel and Amory also experimented with the dye, and the latter, discovered an important property it has of forming an insoluble compound with nitrate of silver. However, no very practical steps seem to have been taken to utilise this dye for gelatine dry plates till Messrs. Attout, Taillefer and Clayton took out a patent for orthochromatic plates early in 1883, their plates being prepared either with eosin and ammonia, added to the gelatino-bromide of silver emulsion at the time of making, or by bathing the gelatine dry plates in a bath of eosin, ammonia and alcohol. Since then other modifications of the same principle have been adopted. Plates have also been prepared by Dr. H. W. Vogel, whose original researches in this direction have really been the foundation of orthochromatic photography, with a violet dye, called azalin, which is said to be a mixture of chinolin red and cyanine blue.

The illuminations and fireworks on the occasion of the Jubilee seemed to offer a good opportunity of testing the sensitiveness of these orthochromatic plates to the yellow light given off by the myriads of little chiraghs used in this country for illuminating.

Some of the plates I used were Taillefer's and the fact that from my house, near the Cathedral, I was able to obtain a fairly clear impression on the negative of the illuminations about Govt. House and the Post Office, nearly two miles away, with 5 minutes' exposure and a not very rapid lens, will shew how sensitive these plates are to faint yellow light.

Other plates I prepared myself by dipping ordinary gelatine dry plates into a bath of erythrosin with ammonia, also in a bath of erythrosin-silver and ammonia prepared as recommended by Mallmann and Scolik. I had tried Dr. Vogel's azalin dye but did not find it so good as the erythrosin.

Some of my plates were exceedingly sensitive, and pictures of the illuminations taken on them shew a considerable amount of faint detail, particularly one of the Town Hall which shows the windows and a good many architectural details, with 3 minutes' exposure. Unfortunately these plates shew a tendency to fog and will not bear intensifying sufficiently to bring out these details in a print.

The picture of the Financial Office, which was one of the best, though it does not show architectural details, was taken on one of the French Taillefer plates with $2\frac{1}{2}$ minutes' exposure. In this, as in some of the others, the oil lamps have come out very well but not so strongly as the gas. Some plates prepared with a mixture of cyanin blue and erythrosin, which I had expected would be specially sensitive to the yellow light, were found to be much less so than plates prepared with erythrosin alone.

The photographs of the fireworks were taken mostly on the French plates, but some of the plates I prepared myself gave very fair results. The picture of the rockets, taken by my assistant Mr. Pope on one of the French plates, is exceedingly curious; the very irregular paths taken by the rockets being quite clearly shown though the exposure must have been very short indeed.

Some photographs taken in the Eden gardens, about 7 P. M., on similar plates, may also be interesting. One of them, taken on a plate stained with erythrosin-silver, with an exposure of only 70 seconds, full aperture of an 8-in. focus rapid symmetrical lens, shows a great many distant details that one would scarcely have expected. The possibility of taking photographs at night of objects illuminated by the electric light may be of importance in naval and military operations.

As an illustration of the peculiar action of these orthochromatic plates in photographing coloured objects I have brought two photographs of a highly coloured chromo-lithograph. Both have been taken on the Taillefer plates, but one with and the other without a yellow screen. In the one case, although the plate shows a great deal more sensitiveness to yellow than an ordinary dry plate does, the girl's yellow dress has come out black, and the yellow spots of shading and tinting in various parts of the picture, almost imperceptible on the original, have all reproduced black and alter the whole appearance of the picture. In the photograph taken with the yellow screen the yellow dress is quite light, the objectionable spots have disappeared, and the resulting photograph is a very fair representation of the original chromo-lithograph.

I may also mention that these plates have been found very valuable in photomicrographical researches for photographing stained preparations, and will be useful for many other purposes where a better representation of the so-called non-actinic colours is required than can be obtained on ordinary plates.

LIEUT.-COLONEL WATERHOUSE exhibited some specimens of heliogravure lately produced in the Survey of India offices and made the following remarks :—

The two plates of archæological subjects and a quarter sheet of the Atlas of India, I have brought to show you this evening, have all been reproduced by the photo-electrotype process from manuscript drawings. The two first are from the beautiful collection of drawings of Archæological Remains in the Bombay Presidency executed under the superintendence of Dr. Burgess and were especially selected by Sir E. Buck to test the capabilities of the process. The map was drawn in the Survey of India office with particular care that it might reproduce the effect of an engraved Atlas sheet when slightly reduced.

The way of obtaining these plates has already been described in the Society's Journal, Part II, No. 2. 1878, p. 100, but we now use an improved gelatine tissue, specially manufactured by the Autotype Company, containing plumbago and other substances which give a certain roughness or 'grain' to the gelatine image and at the same time render it conductive of electricity so that when the print has been developed on the silvered copper plate and dried it is ready to go into the electrotyping battery.

We have also improved the electrotyping arrangements, and now use a form of battery I first saw in use at Vienna, consisting of two troughs; an outer one, containing solution of sulphate of copper, and an inner one having a leather bottom and containing dilute sulphuric acid. An iron plate is placed in the inner trough and coupled to the silvered copper plate bearing the gelatine matrix, placed below it on a suitable support in the lower trough. Electrical action is set up so that copper is deposited on the matrix and in the course of 3 to 4 weeks a plate is produced of sufficient thickness to stand printing from. The deposited plate is then separated from the matrix and after a little cleaning is ready for printing in the copper plate press.

The process is not an expensive one and is exceedingly cheap when compared with hand-engraving, A plate of most close and elaborate design that would take months or even a year or two to engrave by hand can in this way be reproduced in a month or six weeks. In the case of

the map before you, the drawing took about 6 months and the reproduction has taken about 5 weeks. Had the map been engraved the drawing would not have taken so long but the engraving would probably have taken a year to complete.

Dr. Burgess' two drawings were crucial tests of the process. They were very finely drawn and reduced very considerably. The delicacy and perfection of the results leave very little to be desired, as you will see from the prints, and no other photographic process I am acquainted with would have rendered such close fine work so perfectly.

Another process of heliogravure—known as photo-etching—employed in the office, is even quicker and more economical than the photo-electrotype but not quite so certain. Some specimens of it are on the table. This process is the exact opposite of the former, a direct negative is used, but a transparency has to be taken from it: this we prefer to do by the autotype process, intensifying the gelatine image with permanganate of potash. From this transparency a negative autotype print is made and developed upon a highly polished copper plate prepared for engraving. Before the copper plate receives the gelatine image a resinous grain of powdered bitumen is applied to it, which not only gives a firm hold to the gelatine film during the biting, but breaks up the image into a series of fine points which preserve the proper gradation of the half tints and enable the different parts of the engraved image to hold the ink in proper proportion. The resinous grain is fixed to the plate by subjecting it for a few seconds or a minute to the fumes of benzole.

The margins and back of the plate being protected with varnish, the copper plate with the negative gelatine image is immersed in an almost saturated solution of perchloride of iron which hardens the gelatine, though slowly permeating it, and attacks the copper, so that first the bare parts in the deep shadows of the picture, where there is little or no gelatine, are bitten; then the next darker tints, and so on until the high lights are just on the point of being attacked. With some subjects a single bath of perchloride is sufficient—with others it is advisable to begin with a very strong solution of the perchloride and pass the plate through a series of baths of decreasing strength. It is marvellous with what delicacy and perfection the most delicate gradations of half tint, even in the lightest shades, are reproduced on these plates. The biting takes only a few minutes and the whole operation of preparing a plate can be finished in a day. It is therefore exceedingly quick and the cost of materials is very small. The method is suitable either for line or half-tone subjects, but is perhaps most successful with the latter.

Dr. Rájendralála Mitra made the following remarks on the death of Mr. Arthur Grote, an Honorary Member of the Society.

Gentlemen, at the last annual meeting the President announced the death, on December 4th, of Mr. Arthur Grote; but it was not convenient at the time to give, as usual, a brief account of the life of that gentleman. He served the Society long and faithfully, and rescued it from more than one critical situation. It is meet, therefore, that we should, on the present occasion, place on record a brief obituary note to express our sense of the loss we have sustained, and as I had the privilege of his friendship for well-nigh forty years, and have a vivid personal knowledge of his career in this country, I request your permission to make a few remarks *in memoriam*.

Anglo-Indian society is so transitory that ten years suffice to replace one generation by another; and as Mr. Grote retired from India eighteen years ago, I am afraid very few of you, gentlemen, remember him. The Society, however, recognised his services by electing him an Honorary Member; and his portrait on the wall before me shows the estimation in which he was held by his colleagues during his sojourn amongst us.

Arthur Grote was born at Beckenham in Kent, on the 29th of November, 1814. His father was the leading member of a large and flourishing banking-house, and his eldest brother, George Grote, immortalized his name by writing the best philosophical history of Greece that we have in the English language. I have no information about the early life of Arthur Grote beyond the fact that he was for some time at Harrow, where he was noted for his proficiency in Latin and Greek. As a younger son, a writership in the Indian Civil Service was deemed the most appropriate profession for him, and he entered Haileybury College early in 1832. His career in that institution was a highly distinguished one, and he passed out with several prizes in Arabic, Persian, Hindustáni, and Bengali. Arriving at Calcutta in June, 1823, he had to go through the usual course of training in the then College of Fort William, where he carried away a prize for Sanskrit, and excellent certificates for general proficiency. He commenced official life as an Assistant to the Magistrate of Jessore in 1834, and, after passing through subordinate posts in Bauleah, and Murshidábád, attained the rank of a Magistrate at Hughli in 1836. This rise, even in those days of early promotion, was held to be remarkable, and it established Mr. Grote's reputation as an able and energetic officer. From Hughli he was transferred to Midnapur, where he served as a Magistrate for over five years (1838 to '43). In March, 1843, his health broke down under the arduous labours he had to get through in carrying on the Revenue settlement

of that district, and he had to proceed to the Cape of Good Hope for a change. His two years' sojourn at the Cape did not, however, do him much good, and, after a few months' service in East Burdwan, he had to proceed to England on September 10, 1845. On his return to India, in November, 1848, he was put in charge of the Calcutta Collectorate and of the office of the Superintendent of Stationery and Stamps—acting also for a short time as special Deputy Collector in connexion with the Revenue survey of Midnapur. He entered the Board of Revenue as officiating Junior Secretary in July, 1852, and soon after became the Senior Secretary; which office he held till March, 1856, when he was appointed Commissioner of the Nuddea Division. The last office he held till July, 1859, when he became a member of the Board of Revenue, whence he retired on July 5, 1868. His official life was one of unbroken success, characterised as much by consummate tact and ability, as by the most kindly and considerate feeling for the well-being of the millions who, from time to time, were placed under his control. There are still living many friends and subordinates who cherish a lively remembrance of the kindly actions which proceeded from his generous and affectionate nature. It was during his administration as Commissioner of the Nuddea Division that the Indigo disputes between Indigo planters and ryots came to a head, and it must be said to his honour that he never for a moment forsook the side of the weak and the helpless.

Mr. Grote's connexion with this Society dates from 1849, when he was elected an Ordinary Member. In the following year he was elected a member of the Council, and early in 1852, Joint Secretary. For some time he was the sole Secretary, and it was a time when the financial affairs of the Society were very much involved. His diligence, earnest attention to the affairs of the Society, and great social influence with his friends enabled him, however, soon to surmount all difficulties, and to restore the Society to a healthy position. I advert to his social influence particularly, as therein lay much of the secret of his success as a Secretary. Extensive private correspondence among a wide circle of friends, inviting recruits, encouraging the lukewarm, and urging the old members to forward notes and papers, often suggesting subjects, and offering co-operation or literary help, form no part of the official duty of a Secretary, and yet those are just the duties which are the most conducive to the advancement of public institutions, and in which Mr. Grote distinguished himself most. He was elected a Vice-President of the Society on six different occasions, (1856, '57, '58, '63, '67, and '68) and held the office of President for five years (1859 to 62 and 1865). He took an active part in the negociations which culminated in the transfer of the Society's natural history museum to Government, and in the course of it

he often reminded me of a remark of Mr. John Colvin, for some time Lieutenant-Governor of the North Western Provinces, who, on a similar occasion, once publicly said :—" When I am in the rooms of this Society I am not a servant of Government." It has often been a matter of regret to me that this is a principle which is not often acted upon by officers of Government.

Mr. Grote was very much opposed to the Presidency of the Society being held for a long time by any one individual, and it was through his earnest exertion, and against the wish of his colleagues, that the old practice was set aside, and frequent changes in the *personnel* of the office rendered imperative. His profound erudition, vast experience, high official rank, and prominent social position gave him a commanding voice in the affairs of the Society, but no one ever enjoyed such advantages in a more mild, modest, genial, conciliatory, and winning way than he did ; he never made an enemy.

Taking a deep interest in Natural History, he was early selected as the best qualified person for the Presidency of the Agri-horticultural Society of India. He held the office for ten years, and, on his retirement, the Society elected him an Honorary Member, and voted a portrait for its meeting room.

The kindliness of his nature and sympathy for living beings recommended Mr. Grote to the Presidency of the Society for the Prevention of Cruelty to Animals, and he did much to promote the usefulness of that body. He was also for a time the leading member of the late Vernacular Literature Society, which benefitted largely by his advice and cooperation.

He was a man of remarkable width and grasp of mind, and few subjects came before him in which he was not able to take the part of a master. Besides his vernacular, he knew French, German, Latin, Greek, Spanish, Portuguese, Dutch and Italian, in the first three of which he wrote with ease and elegance. Of Indian languages he had mastered Arabic, Persian, Hindustáni, Hindi, Sanskrit, Bengali and Uriya, making in all sixteen languages. In Bengali he was for some time a regular reader of our leading newspapers, and he often startled me by giving information which he had picked up from some of our then most recent books. But he was particularly attached to Greek, and never missed an opportunity of cultivating the literature of that language. By way of illustration of this remark I may mention that on the day before his departure from India, when most people are busy about packing and other domestic details, I found him when I called to bid him good-bye, sitting with a copy of the Aves of Aristophanes in his hands.

Literature, however, did not hold entire monopoly of his versatile

mind. He cultivated natural science with no less ardour, and in two branches of it—Entomology and Graminæ—he had acquired commendable proficiency. His collection of butterflies and moths was the largest in India in his time, and for years he employed several artists to draw from nature the fourfold changes which these animals undergo in the course of their ephemeral lives. His knowledge of Botany was recognised by Government, which appointed him Superintendent of the Hon'ble Company's Botanical Gardens at Sibpur for a time. He occasionally contributed short notes on these subjects to the transactions of the Zoological and the Linnæan Societies of London, of both of which he was a member.

On his retirement from India he joined the Council of the Royal Asiatic Society of Great Britain and Ireland, and took a prominent part in the management of the affairs of that Society. Though averse to authorship, he was a charming literary correspondent. I always felt deeply grateful to him for most interesting notes of the progress of Oriental Literature in Europe, which he regularly sent to me. Nor did he forget our Society. He watched its progress with deep interest, and frequently corresponded with our Secretaries and leading members. Latterly he was occupied in superintending the publication of a Memoir, by Mr. Moore, of the rarer specimens of Lepidoptera in the late Mr. W. S. Atkinson's collection, and contributed a biographical notice of Mr. Atkinson by way of introduction to the first volume of that work. I am glad to be able to announce that your Council have made arrangements for bringing out the third volume of the work under the superintendence of our late President, Mr. W. T. Blanford. We have lost in Mr. Grote a collaborateur and friend the equal of whom it will be hard to obtain. As a personal friend I deeply mourn his loss.

The following papers were read—

1. *Natural History notes from H. M.'s Indian Marine Survey Steamer "Investigator."* Commander ALFRED CARPENTER, R. N. Commanding. No. 4. *On six new Amphipods from the Bay of Bengal. By* G. M. GILES, M. D., F. R. C. S., *Surgeon Naturalist to the Marine Survey.* No. 5. *Description of a new species of Crustacea belonging to the Brachyurous family Raninidæ, from the 'Swatch of no ground.'—By* J. WOOD-MASON, *Offg. Superintendent Indian Museum, and Professor of Comparative Anatomy and Zoology, Medical College, Calcutta.* No. 6. *On some Nodular stones obtained by trawling in 675 fathoms of water off Colombo.—By* E. J. JONES. A. R. S. M.., *Geological Survey of India.*

The paper will be published in Part II of the Journal for 1887.

2. *Description of a new species of Phytophagous Coleoptera alleged to be destructive to the Dhán crops in the Chittagong District.—By* JOSEPH BALY. *Communicated by the* NATURAL HISTORY SECRETARY.

The paper has been published in Part II of the Journal for 1886.

3. *Sítá's Window, or Buddha's Shadow Cave, near Prabhása, with an eye copy of an ancient inscription in the Aśoka characters.—By* J. COCKBURN.

(Abstract.)

This is a short paper in which the writer briefly explains the circumstances that led to the discovery of the inscription, and the steps he took to get an eye-copy of it; which he eventually succeeded in making with the aid of an astronomical telescope. The inscription consists of seven lines in the Aśoka character, carved on a sunken and once polished surface which is a part of the natural rock, and resembles a tablet let into the rock; the position of the tablet is above the left top corner of the main entrance window of the cave, and the letters, which are cut in the rock to the depth of three-sixteenth's of an inch, are in a surprisingly perfect state of preservation, considering their great age. Sítá's window is described as being an ancient Buddhist hermit's cave cut into the vertical face of a precipice 50 feet high, which forms the scarp of the classic hill of Prabhása in the Allahabad district. The cave is situated 150 feet to the N. E. corner of the Jain Temple of Parishnáth, which is built on a platform immediately below the scarp; and is now known to the people as "Chetá Mátá-ka Roseiyá." Mr. Cockburn identifies the cave with the lofty stone cavern of a venomous dragon, in which Buddha was supposed to have left his shadow, but owing to its inaccessible position, and the presence of numerous swarms of wild bees, he was unable to enter the cave: it has a small entrance and two apertures about 8″ square to admit light, the irregular form of which he considers as the best proof that it is the cave in which Buddha left his shadow, as they might well be constructed to throw a shadow within, having the human outline.

Dr. Hoernle remarked:—the copy of the inscription is not quite as legible as one could wish. This is the more to be regretted as there is just a possibility of its containing a chronological date in the last line in the older style of numerals. The copy does not profess to be more than an eye-copy, taken by means of a large telescope. As such it is probably as good as it could be; but mere eye-copies are never quite satisfactory. Mr. Cockburn is fully entitled to the honour of the first discovery of the inscription; at the same time it is satisfactory to know, that—as I have

been told by Dr. Burgess—Dr. Führer of the Archæological Survey has independently discovered the inscription and is taking steps to obtain a more exact copy by means of an impression taken from the rock. At present the inscription cannot be fully read. Some of the letters are either not accurately copied, or they are not sufficiently well preserved on the rock. The inscription is written in the so-called Aśoka characters, of a somewhat later type, and to judge from that fact, it should belong to about the beginning of the Christian era. A peculiarity of it is that it writes the conjunct *r*, after as well as before the consonant to which it is joined. Thus in the 4th line we have *praputānaṃ* "of the descendants," where the *r* in *pra* is indicated by a wavy line under *pa*, exactly as in the Girnár Inscription of Aśoka. Again in lines 3 and 4 we have *nirvápita (nirvāpida)* "deceased." Here the change of *t* to *d* is another peculiarity. The *r*, however, is as often assimilated in the usual fashion, as in *mitasa (mittassa*, Skr. *mitrasya)* in the 2nd line. Another peculiarity is the frequent use of what Dr. Bühler calls the *serif*, *i. e.*, a small stroke to define the ends of the horizontal or vertical strokes which form the body of the letter.

The inscription, so far as I am able to make it out, reads as follows. The dots indicate letters which are said to be lost on the rock. The 'dashes' indicate illegible letters.

— — गोपा पुत्रस •
बपस त्रिमितस • •
मातं लेन गोपलि नि
र्वपिद्प्रपुतानं • •
धा — ढढेनेन लेना
कारित पु — — दस • • • •
मसतछ — — — — — — — — १० + ५

— — Gopā āputrasa •
bapasa trimitasa • •
mātaṃ lena Gopali ni
rvapida-praputānaṃ • •
ā — ḍhaṭenena lenā
kārita pu — — dasa • • • •
masatachha — — — — — — — — 10 + 5 (= 15)

The paper will be published in Part I of the Journal for 1887.

Library.

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

Transactions, Proceedings and Journals,

presented by the respective Societies and Editors.

Amsterdam. Revue Coloniale Internationale,—Tome IV, No. 2, Février, 1887.

Baltimore. Johns Hopkins University,—American Chemical Journal, Vol. VIII, No. 6, December, 1886.

Bordeaux. La Société Linnéenne de Bordeaux—Actes, Tome XXXIX.

Boston. Boston Society of Natural History,—Memoirs, Vol. III. Nos. 12 and 13.

———. ———. Proceedings,—Vol. XXIII, Part 2.

Bruxelles. Musée Royal D'Histoire Naturelle de Belgique,—Bulletin, Tome IV, No. 4.

Calcutta. Geological Survey of India,—Records, Vol. XX.

———. The Indian Engineer,—Vol. II, Nos. 10 and 11.

———. Indian Engineering,—Vol. I, Nos. 2, 6, 8 and 9.

———. Meteorological observations recorded at six stations in India corrected and reduced, October, 1886.

Copenhagen. K Nordiske Oldskrift-Selskab—Aarbger, 1 Bind (II Rœkke), 3 Hefte.

Chicago Ill. The American Antiquarian and Oriental Journal, Vol. IX, No. 1, January, 1887.

Edinburgh. The Scottish Geographical Magazine,—Vol. II, No. 12, December, 1886; Vol. III, No. 1, January, 1887.

Florence. La Societá Africana D'Italia,—Bullettino, Tome II, Fascicolo 8°.

London. The Academy,—Nos. 750, 768—770.

———. Anthropological Institute of Great Britain and Ireland,—Journal, Vol. XVI, No. 2, November, 1886.

———. The Athenæum,—Nos. 3091—3093.

———. Nature,—Vol. XXXV, Nos. 899—901.

———. Royal Astronomical Society,—Monthly Notices, Vol. XLVII, No. 1, November 1886.

———. Royal Geographical Society,—Proceedings, Vol. VIII, No. 12, December, 1886; Vol. IX, No. 1, January, 1887.

London. Royal Microscopical Society,—Journal, Vol. VI, (series II), Part 6, December, 1886.

———. Royal Society,—Proceedings, Vol. XLI, No. 247.

Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, Tome LXII, Part 2.

New Haven. American Oriental Society,—Proceedings, October, 1886.

Paris. Journal Asiatique,—Tome VIII (VIII^{e} Série), No. 2.

———. La Société de Géographie,—Bulletin, Tome VII (7^{e} Série), No. 4.

———. ———————————Compte Rendu des Séances, Nos. 1 et 2, 1887.

Philadelphia. American Philosophical Society,—Proceedings, Vol. XXIII, No. 123, July, 1886, and list of Surviving Members, March 5th, 1886.

Rome. La Societa Degli Spettroscopisti Italiani,—Memorie, Vol. XV, Dispensa 9^{a}, Settembre, 1886.

San Franciso. California Academy of Sciences,—Bulletin, Vol. II, No. 5, September, 1886.

Turin. La R. Academia della Scienze di Torino,—Atti, Vol. XXII, Disp. 1^{a}, 1886-'87.

Washington. United States Geological Survey,—Bulletin, Nos. 27—29, 1886.

Zagreb. Arkeologickoga Druztna,—Viestnik, Godina IX, Br. 1.

BOOKS AND PAMPHLETS,

presented by the Authors, Translators, &c.

BERG, N. P. VAN DEN, LL. D. The Financial and Economical Progress and Condition of Netherlands India during the last fifteen years and the effect of the present Currency System. 4to. Batavia, 1887.

DUKA, DR. THEODORE, M. R. A. S. An Essay on the Bráhúí Grammar. (from the 'Journal of the Royal Asiatic Society of Great Britain and Ireland,' Vol. XIX, Part 1.) 8vo. London, 1886.

MURDOCH, J. Is India becoming Poorer or Richer? with proposed remedies for the existing poverty. 8vo. Madras, 1887.

MISCELLANEOUS PRESENTATIONS,

L' Ottica di Claudio Tolomeo da Eugenio da Gilberto Govi. 8vo. Turin, 1885.

LA R. ACCADEMIA DELLA SCIENZE DI TORINO.

Annual Report of the Geological Survey of Pennsylvania for 1885. By J. P. Lesley, State Geologist. 8vo. Harrisburg, 1886.

Atlas to accompany the Annual Report of the Geological Survey of Pennsylvania for 1885. 8vo.

GEOLOGICAL SURVEY OF PENNSYLVANIA, HARRISBURG.

The Indian Forester, Vol. XIII, Nos. 1 and 2, January and February, 1887. 8vo. Roorkee, 1887.

THE GOVERNMENT OF BENGAL.

Brief Sketch of the Meteorology of the Bombay Presidency in the year 1885-86. Fcp. Bombay, 1886.

GOVERNMENT OF BOMBAY.

Charts of the Bay of Bengal and Adjacent Sea north of the Equator, shewing the Mean Pressure, Winds and Currents in each month of the year. Fol. Simla, 1886.

International Meteorological Observations, October, 1885. 4to. Washington, 1886.

Monthly Weather Review, October, 1886. 4to. Washington, 1886.

GOVERNMENT OF INDIA,—METEOROLOGICAL DEPARTMENT.

Scientific Memoirs by Medical Officers of the Army of India, Part II, 1886. 4to. Calcutta, 1887.

GOVERNMENT OF INDIA,—SANITARY COMMISSIONER.

Administration Report of the Government Central Museum, Madras for the year 1885-86. Fcp. Madras, 1886.

Report on the Administration of the Madras Presidency, during the year 1885-86. Fcp. Madras, 1886.

GOVERNMENT OF MADRAS.

Report on the settlement of the Kohat District in the Punjab, 1875-82. By H. St. G. Tucker, Offg. Deputy Commissioner. 8vo. Calcutta, 1884.

GOVERNMENT OF THE PUNJAB.

Johns Hopkins University Studies in Historical and Political Science, Fifth series, I—II. The City Government of Philadelphia. By Edward P. Allinson, A. M. and Boies Penrose, A. B.

JOHNS HOPKINS UNIVERSITY, BALTIMORE.

Additions and Corrections to the List of Foreign Correspondents of the Smithsonian Institution to January, 1883 (Smithsonian Miscellaneous Collections. 8vo. Washington, 1883.

Annual Report of the Board of Regents of the Smithsonian Institution for the year 1884, in 2 parts. 8vo. Washington, 1885.

Researches upon the Venoms of Poisonous Serpents. By S. Weir Mitchell, M. D., and Edward T. Reichert, M. D. (Smithsonian Contributions to Knowledge). 4to. Washington, 1886.

SMITHSONIAN INSTITUTION, WASHINGTON.

The Zoological Record for 1885; being volume Twenty-two of the Record of Zoological Literature. Edited by F. Jeffrey Bell, M. A. 8vo. London, 1886.

ZOOLOGICAL RECORD ASSOCIATION, LONDON.

PERIODICALS PURCHASED.

Berlin. Deutsche Litteraturzeitung,—VII Jahrgang, Nos. 49—52.
Calcutta. Indian Medical Gazette,—Vol. XXII, No. 1, January, 1887.
Cassel. Botanisches Centralblatt,—Band XXVIII, Nos. 11—13.
Geneva. Archives des Sciences Physiques et Naturelles,—Tome XVII, No. 1.
Göttingen. Der Königl Gesellschaft der Wissenschaften,—Göttengische Gelehrte Anzeign, Nos, 23 and 24, 1886; No. 1, 1887.
———. ———. Nachrichten, No. 18, 1886.
Leeds. The Journal of Conchology,—Vol. V, No. 5.
Leipzig. Annalen der Physik und Chemie,—Band XXX, Heft 2.
———. ———. Beiblätter,—Band X, Stück 12; Band XI, Stück 1.
———. Hesperos,—Vol. VI, Nos. 133—135.
———. Literarisches Centralblatt,—Nos. 50—53, 1886; No. 1, 1887.
London. The Annals and Magazine of Natural History, Vol. XIX (5th Series), No. 109, January, 1887.
———. The Entomologist,—Vol. XX, No. 284, January, 1887.
———. The Entomologist's Monthly Magazine,—Vol. XXIII, No. 272, January, 1887.
———. The Journal of Botany,—Vol. XXIV, No. 288, December, 1886; Vol. XXV, No. 289, January, 1887.
———. The London, Edinburgh, and Dublin Philosophical Magazine, —Vol. XXIII (5th Series), No. 140, January, 1887.
———. The Messenger of Mathematics,—Vol. XVI (new Series), No. 8, December, 1886.
———. The Nineteenth Century,—Vol. XXI, No. 120, February, 1887
———. The Quarterly Journal of pure and applied Mathematics, Vol XXI, No. 83, February, 1887.
———. Society of Arts,—Journal, Vol. XXXV, Nos. 1783—1785.
New Haven. The American Journal of Science,—Vol. XXXII, No. 192, December, 1886.
Paris. L'Académie des Sciences,—Comptes Rendus des Séances, Tome CIII, Nos. 21—26; Tome CIV, No. 1.
——. Annales de Chimie et de Physique,—Tome IX (6^{me} Série), Décembre, 1886; Tome X (6^{me} Série), Janvier, 1887.
——. Journal des Savants,—Novembre et Décembre, 1886.

Paris. Revue Critique,—Tome XXII, Nos. 49—52; Tome XXIII, No. 1.

———. Revue Scientifique,—Tome XXXVIII, Nos. 22—26; Tome XXXIX, Nos. 1 et 2.

Books Purchased.

Distant, W. L. Rhopalocera Malayana: A description of the Butterflies of the Malay Peninsula. Part XII, November, 1886. 4to. London, 1886.

Muller, F. Max. The Sacred Books of the East. Vol. XXV:—The Laws of Manu translated, with extracts from seven Commentaries, by G. Bühler. 8vo. Oxford, 1886.

———. ———. Vol. XXIX. The Grihya-Sûtras; rules of Vedic domestic ceremonies, translated by Hermann Oldenberg. 8vo. Oxford, 1886.

Roscoe, Sir H. E., F. R. S. and C. Schorlemmer, F. R. S. A Treatise on Chemistry. Vol. III. 8vo. London, 1886.

Quatrefages, A de. Histoire Générale des Races Humaines. Introduction a l'étude des Races Humaines. 8vo. Paris, 1887.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1887.

The Monthly General Meeting of the Asiatic Society of Benga were held on Wednesday the 6th April 1887 at 9-15 P. M.

LT.-COL. J. WATERHOUSE, Vice-President, in the Chair.

The following members were present :

Abdul Latif, C. I. E., Nawab Bahádur, H. Beveridge, Esq., H. F. Blanford, Esq., E. Gay, Esq., Dr. Hoernle, A. Hogg, Esq., Dr. Rájendralála Mitra, C. I. E., Rai Bahádur, E. F. Mondy, Esq., Babu Asutosh Mukhopádhyáya, L. de Nicéville, Esq., Pandit Mahámahopádhyáya Maheschandra Nyáyaratna, H. M. Percival, Esq., The Hon. Dr. Mahendralál Sarkár, C. I. E., Pandit Haraprasád Sástri, Maulaví Golám Sarwar, D. Waldie, Esq., J. Wood-Mason, Esq.

The minutes of the previous meeting were read and confirmed.

Twenty presentations were announced, as detailed in the appended Library List.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for, and elected Ordinary Members:

Dr. W. J. Simpson.

F. J. E. Spring, Esq.

Fritz Noetling, Esq., Ph. D.

The following gentlemen are candidates for election at the next meeting :

T. R. Munro, Esq., Port Commissioner's Department, proposed by D. Waldie, Esq., seconded by H. M. Percival, Esq.

Dr. P. K. Ráy, Professor, Presidency College, proposed by the Hon. Dr. Mahendralál Sarkár, seconded by Professor Nilmani Mukherji.

Babu Nobin Chánd Bural, Solicitor, proposed R. D. Mehta, Esq., seconded by E. T. Atkinson, Esq.

Rev. A. W. Atkinson, Principal, La Martinière, proposed by E. T. Atkinson, Esq., seconded by E. Gay, Esq.

Charles R. Lanman, Esq., Professor of Sanskrit, Harvard College, Cambridge, U. S. A., proposed by Dr. Hoernle, seconded by H. M. Percival, Esq.

The following gentleman has intimated his wish to withdraw from the Society:

Dr. K. G. Sircár.

The SECRETARY reported the receipt of a letter from the family of the late Isaac Lea, LL. D., of Philadelphia, Pennsylvania, announcing the death of that gentleman on the 8th December last, in his 95th year,—and stated that Dr. Lea was the oldest Honorary Member of the Society, having been elected in May 1834.

A Biographical sketch of Dr. Lea, with a list of his writings, is published in the Bulletin of the United States National Museum, No. 23.

The SECRETARY also intimated the death of the following member:

T. G. H. Moncrieffe, Esq.

The CHAIRMAN reported that Dr. Hoernle had returned from leave and resumed charge of the office of Philological Secretary.

The CHAIRMAN reported that A. Simson, Esq., and Abdul Latif, C. I. E., Nawáb Bahádur, had been appointed Members of Council.

The CHAIRMAN announced that the Council had proposed the following new rule to be introduced into the Society's Bye-laws, and that in accordance with Rule 78 it had been referred to the general body of members:—

"Rule 24 a. Any member of the Society not permanently resident *in India*, as defined in Rule 32, may, after he shall have paid his entrance fee, compound for the payment of all future subscriptions as a Foreign member by the payment of a single sum of Rs. 200."

The opinion was expressed that the amount should be altered to "£20 sterling, payable to the London Agents of the Society."

The CHAIRMAN reported that the following Circular had been received from the Secretary, Harvard Medical School, Boston, Mass., U. S. A. regarding the Elizabeth Thompson Science Fund, with the request that it might be made known at the next meeting of the Society:—

ELIZABETH THOMPSON SCIENCE FUND.

This fund which has been established by Mrs. Elizabeth Thompson of Stamford, Connecticut, "for the advancement and prosecution of scientific research in its broadest sense," now amounts to $25,000. As accumulated income is again available, the trustees desire to receive applications for appropriations in aid of scientific work. This endowment is not for the benefit of any one department of science, but it is the intention of the trustees to give the preference to those investigations *which cannot otherwise be provided for*, which have for their object the advancement of human knowledge or the benefit of mankind in general, rather than to researches directed to the solution of questions of merely local importance.

Applications for assistance from this fund should be accompanied by a full statement of the nature of the investigation, of the conditions under which it is to be prosecuted, and of the manner in which the appropriation asked for is to be expended. The applications should be forwarded to the Secretary of the Board of Trustees, Dr. C. T. Minot, Harvard Medical School, Boston, Mass., U. S. A.

DR. RÁJENDRALÁLA MITRA in bringing to the notice of the meeting the new edition of Manu with seven Commentaries,* recently published by the Hon. Rao Sahib Visvanáth Náráyana Mandlik, C. S. I. made the following remarks: Among the presentations lately received there is an edition of the Institutes of Manu, which is worthy of special notice. The text of the Manu-saṅhitá has been already printed some twenty times or more in India, and some of the editions contain also the commentary of Kulluka Bhaṭṭa; a new edition therefore may not appear anything out of the common. The new one, however, comes with a special recommendation; it includes seven different commentaries, six of which are rare and have now been printed for the first time. The editor is well-known for his literary labours, his high scholarship, and his profound knowledge of Hindu law, and he has taken great pains to make his edition in every way worthy of his reputation. Of the text he has had access to a large number of MSS. from almost every part of India where Sanskrit is largely cultivated, and has made excellent use of them to secure a complete critical apparatus for the study of the work. Of most of the commentaries, MSS. are exceedingly rare,

* Mánava-Dharmá Sástra, with the Commentaries of Medhátithi, Sarvajña náráyana, Kulluka, Rághavánanda, Nandana, Rámachandra, and Govindarája. Edited with notes by the Hon. Ráo Sáhab Vishvanáth Náráyan Mandlik, C. S. I.; M. R. A. S.; F. R. G. S.; F. S. S. (Lond.) Additional Member of Council of the Governor-General of India, &c. &c. &c.

and the editor had to content himself with only a few; but none has been printed from a single MS. The *variæ lectiones* supplied leave no room for doubt that we have got the works intact, and to philologists and historians, as well as to practical lawyers, they will not fail to be of immense value.

I am aware that some leading European orientalists attach little importance to Indian commentaries; a few go the length of saying that it would have been better had no commentaries existed of the Vedas and other very ancient texts, since they warp our judgment, and often mislead us in our search for the original meaning of our ancient records. They hold concordance, analogy, philological arguments to be better proofs, and insist that we should always abide by them to the exclusion of the commentaries. As a matter of course, orthodox Hindus look upon this course with great repugnance, and their arguments *per contra* are not by any means weak. A *reductio ad absurdum* argument they sometimes use is amusingly effective. There is a precept in Sanskrit which is daily recited by a large number of Indians, and it runs thus:—

Śuklámbaradharam devam śaśivarṇam chaturbhujam prasannavadanam dhyáyet.

It means 'let the devotee meditate on the divinity as dressed in white garments, refulgent, of the colour of the moon, four-handed, and of benign countenance.' Now, an advocate of the concordance school intervenes, and says that cannot be. The first term is a compound of three words, of which the first *śukla* means 'white;' the second *ambara*, 'cloth;' and the third *dhara* 'to bear' or 'carry,' the whole meaning 'that which carries white cloth,' *i. e.* a washerman's donkey, which carries home white clothes from the bleaching field. It is called *deva* or 'bright,' or light coloured, and no one has yet seen a jet black donkey. Any possible doubt in the case is removed by the epithet, *śaśivarṇa*, moon-coloured, which can only mean ash-grey. The epithet 'four-handed' (*chaturbhuja*) is a very becoming euphemism for four-footed, and the 'benign countenance' (*prasanna-vadana*) is obviously indicative of the natural non-expressiveness of the countenance of a donkey. The different meanings of the words may be supported by hundreds of concordant passages, and the conclusion follows that the Hindu S'ástras require a Vaishṇava devotee, for his salvation, to meditate on the image of a washerman's donkey loaded with recently bleached cloth.

Grammatical ingenuity is, however, not satisfied with this exposition. The philologist comes forward, and argues from his own peculiar standpoint. He holds, and with perfect grammatical and lexi-

cographical accuracy, that *s'uklá*. "white" also, means 'fair,' and, since the next member of the compound is *ambá* a "mother," the meaning fair is the most appropriate here, and the two words together mean, 'he whose mother is a fair lady', *i. e.*, Gaṇeśa, the elapho-cephalic god whose mother is pre-eminently called *Gaurí*, the 'fair one.' The next element of the compound is *ra* which means 'to take or take about, *i. e.*, to serve as a vehicle or *Váhana*.' This makes the word to mean 'he who carries Gaṇeśa,' *i. e.*, a mouse who is well-known to be the vehicle of the god named. The last member of the compound, *dhara*, means 'to seize' or 'catch,' as well as to carry, and the whole compound must mean, 'he who has caught the vehicle of him who has a fair lady for his mother,' in other words, a cat holding a mouse. The qualifying epithets apply to this cat just as well as to the donkey, especially the 'benign countenance,' for a cat holding so delectable a morsel in his mouth as a plump mouse cannot but look particularly pleased. The conclusion according to this interpretation is that the devotee should meditate, for the salvation of his soul, on the image of a cat holding a mouse in his mouth. Seeing that the Hindus do worship monkeys, bulls, Bráhmaṇí kites, and other animals, the addition of the donkey and the cat to the list need not be looked upon as improbable, and anthropologists may well look upon these animals as totems. To the Hindus, however, the absurdity is patent, and no further argument is needed to prove the extremely misleading character of exegesis by grammar and concordance.

Doubtless much may be said *per contra*, but I need not dwell upon the theme. Suffice it to say that, whatever its merits in expounding the Vedas in regard to which imaginative scholars like to have ample elbow room, the plan of concordance is totally unsuited for the exposition of law. The danger is imminent, and much mischief has already been done by the misinterpretation of our law-books by English Judges, working under the light of imperfect translations. A notable instance of this may be found in the judge-made law about adoptions by women and S'údras. A mediæval quasi-religious maxim says, 'Women and S údras should not repeat mantras,' (*Strí-s'údro'mantrakah,*) and, with that verse before them, our English Judges, not excepting their Lordships of the Privy Council, have decided that S'údras may adopt, *i. e.*, accept a *dattaka* son without any form of religious ceremony, forgetting that the word *mantra* in the verse simply means a verse of the Ṛig Veda Saṅhitá, whereas in ordinary parlance it means all Sanskrit words used in religious service, including the declaration of giving and receiving a child, as in the Dattaka ceremony, or of a bride in a marriage.

The most rigid attention to commentaries is necessary to avoid such absurdities. In these alone we can have the traditional meaning, the meaning which the people have hitherto assigned to their texts, and every departure from them is an outrage on the law of the land, which the Government is pledged to uphold. And as the text of Manu is cited in every judicial proceeding concerning Hindu Law, Mr. Maṇḍalik has done valuable service to legal practitioners, by placing the commentaries before them in so acceptable a form.

The necessity for a careful comparison of the different commentaries was felt a long time ago. The late lamented scholar, Mr. Burnell, took in hand a translation of the text of Manu with voluminous notes, showing the differences of the different commentaries. Our Society also wished to do something in the same way, and very readily accepted a proposition of Dr. J. Jolly to print, in the "Bibliotheca Indica," extracts from all the commentaries then accessible to him, except that of Kulluka Bhaṭṭa. Two fasciculi of this work have already been published under the title of 'Manu-ṭiká-sangraha.' Owing to other engagements the learned editor of the work has not been able to push on this undertaking as fast as could be wished. The published portion comes up to only about one-ninth of the total, and now that all the commentaries have been published in their entirety, it will be for your Council to consider whether your undertaking should not be dropped. Disjointed extracts, without even the texts to which they refer, cannot be of any value, or at all worth having, when the entire works are at hand in so convenient a form.

MR. H. F. BLANFORD read the following remarks on some recent evidence on the subject of the variation of the rainfall of the Carnatic and N. W. Himalayas with the sun-spot period.

The supposed variation of the rainfall of the globe in response to those changes in the sun's condition which we know best by the variation in the magnitude and frequency of the spots on his surface has been tolerably familiar to all who busy themselves with meteorological enquiries, ever since in 1872 Mr. Charles Meldrum communicated to the British Association his discovery that the cyclones of the South Indian Ocean were subject to such a cyclical variation. In 1872, Mr. Norman Lockyer drew public attention to the fact that the rainfall of Madras (that is, that recorded at the Madras Observatory) appeared to vary in like manner, inasmuch as the average rainfall in years when sunspots were at or near their maximum frequency, very appreciably exceeded that of years when they were at or near their minimum. Subsequently other writers took up ths subject: among others, one of the

best known is Dr. now Sir, W. W. Hunter who in a pamphlet written in his well known brilliant style of exposition, set forth these now familar facts of the rainfall, basing them, however, on the much more extensive data of sixty-four years' registers, together with the further important observation, which I believe originated with Mr. Pogson, *viz.* that the famines of Southern India recurred at intervals of about 11 years, coinciding with the recurrence of the sun-spot minimum. It fell to me, as an official duty, to review the evidence adduced in Dr. Hunter's pamphlet and other writing, on the subject, the economic bearings of which were obviously of the highest importance, and I had to point out that while the rainfall registers of the Madras Observatory, undeniably showed a certain amount of fluctuation of the kind pointed out by Mr. Norman Lockyer and Dr. W. W. Hunter, any other stations in Southern India, the rainfall registers of which were among the oldest extant, to wit Bangalore and Mysore and other stations in the peninsula and other parts of India, *viz.*, Bombay, Calcutta, Nagpur and Jubbulpore, with a partial and doubtful exception in the case of Nagpur, failed to shew any trace of such a cyclical variation. But it was notorious that the famines the periodicity of which was considered corroborative of the rainfall oscillation had sometimes affected the Carnatic, sometimes Mysore and Bellary, sometimes Hyderabad and the Deccan, and sometimes the Northern Circars and Orissa; so that the two classes of facts must be regarded as to a great extent independent of each other.

In a lecture delivered on the 18th May 1877 at the Royal Institution in Albemarle Street, General R. Strachey also pointed out the insufficiency of the evidence adduced to bear out the conclusions drawn from them. His criticism is so much to the point, and the objection raised, notwithstanding its obvious validity, is so frequently disregarded by persons who enter on enquiries of this kind, that it is worth quoting in its original form of expression. Speaking of Dr. Hunter's results he says, "He has inferred from what must be held to be altogether insufficient numerical data that sure indications of periodicity exist. He arrives by an arithmetical process at certain figures, which he regards as the probable mean amount of rainfall in the successive years of the 11 year's cycle, and finding a maximum and minimum among them, he infers that this is a proof of a true periodical variation. But such a result alone proves nothing. To test its value, it is necessary to compare the calculated quantities of rain for the several years with the quantities actually observed. and then to consider whether the differences are of a character to justify the belief that the calculated quantities afford a reliable approximation to the truth and what sort of approximation * * * The only conclusion that seems possible from such

an examination of the figures as I have described, is the negative one, that they cannot be accepted as supplying any evidence in support of the views put forward by Dr. Hunter."

In 1877, another key-note was struck simultaneously or nearly so by Mr. Douglas Archibald and Mr. S. A. Hill. The former in a letter to the *Englishman*, which was afterwards noticed in *Nature*, pointed out that the winter rainfall of Calcutta is marked by a distinct periodicity, and of the opposite character to that supposed to be shewn by the Madras rainfall registers; the maximum rainfall occurring during the years of minimum sun-spots and the minimum rainfall during the years of maximum sun-spots. The latter in a report on the rainfall of the N. W. Provinces addressed to the Government of the N. W. Provinces, noticed that the registers seemed to lend some support to the theory that underlying very great irregular and non-periodic variations, there is a fluctuation of the total annual rainfall coinciding approximately with that of sun-spot frequency, and further that the winter rains of Northern India are generally heavier when the total fall of the year is below the mean than when the summer rains are excessive. These three ideas were further brought to the test and worked out with a more definite result, in a paper published by Mr. Hill in 1879 in the Indian Meteorological Memoir. The final conclusions were that "The winter rains are heaviest when the summer rains are defective, and *vice versâ*." That "the maximum of winter rainfall appeared to be reached rather more than a year before the minimum of sun-spots and the minimum rainfall to coincide with or follow the maximum of sun-spots, at about an equal interval."

With regard to the rainfall Mr. Hill concluded that there is an eleven-year cycle but of a different character, the maximum being reached about 4 years after the sun-spot maximum and the minimum three years later. His figures shew, however, that this minimum is followed by a rise and then by another minimum as great as the first or nearly so, the intervening year corresponding to that of minimum sun-spots.

Nearly eight years have elapsed since the latest of these notices was published, and meanwhile further data have been steadily accumulating. Recently in the course of a searching enquiry into all the facts of the distribution of the Indian rainfall and its vicissitudes, I have had occasion to go again over all the ground surveyed in the writings I have referred to, and very much more in addition, I have done so with due regard to the cautionary monitions of General Strachey, and with results so distinct as to leave but little doubt on my mind that we have really to do with a cyclical variation very distinct in character and of such mag-

nitude as to be of considerable economic importance, but differing in different parts of India.

I will first take the facts relating to Southern India. Instead of dealing with the rainfall registers of one station only, a very feeble and unsatisfactory basis for testing any question of the kind, I have taken the rainfall registers of all the sudder and some sub-divisional stations in the Carnatic, including under this designation the plain below the eastern ghats extending from Tinnevelly to the mouth of the Kistna. There are 38 stations representing 72,000 square miles, and the registers extend over 22 years, two complete sun-spot cycles, *viz.*, from 1864 to 1885. On simply tabulating the average of each year it was obvious that during the first 13 years with very slight irregularities the rainfall varied very nearly with the sun-spots. Being already below the average in 1864 it fell to a minimum in 1867, when it was 9·4 inches below the average of 34·6 inches, these increased steadily year by year up to 1872 when it was at a maximum, being 11·5 inches above the average. With a sudden fall to an average amount in 1873 and a recovery in the following year to 7·3 inches above the average, it declined steadily for 3 more years to another minimum in 1876, when it was 13·2 inches below the average. After this it became more irregular, but with sundry oscillations it rose again to 11·6 inches above the average in 1884. The years of minimum sun-spots were 1867 and 1878. The years of maximum sun-spots 1870 and 1883 or the beginning of 1884. Thus the first minimum year of rainfall was a year of minimum sun-spots, the second preceded the latter minimum by 2 years. The first maximum of rainfall was 3 years after the sun-spot maximum, the second coincided with it or followed it by a few months only. These facts taken in conjunction with the amplitude of the oscillation amounting to considerably more than half the average rainfall of the province are striking enough.

But it remained to ascertain how far this is a real cyclical oscillation, to compute the amount for each year as it would be determined by such a cycle, and to compare this year by year with the amount actually recorded. Only in this way, as General Strachey pointed out, could we ascertain how much of the result is due to the operation of a law and how much due to other and non-compatible agencies.

By the application of Bessel's well known harmonic formula it is quite feasible to ascertain from any given series of figures what, according to the theory of errors, is the most probable value of any cyclical oscillation underlying them, when the length of the cycle is approximately known. This is so in the present case. The cycle of the sun-spots has been determined by Wolf to be 11·1 years. For convenience, as I have only two cycles to deal with, I have taken it at exactly

eleven years, and computing out the hypothetical rainfall of each year of the cycle, on this assumption, I find that the periodical variation so determined is at the time of the minimum 6·7 inches below the average of 34·3 inches, and at the time of maximum 7·3 inches above it, the total mean oscillation being 14 inches, or more than two-fifths of the whole. The recorded rainfall of any single year deviates on an average from the hypothetical value by only 3·6 inches. The result is far greater and more striking than I, or I believe any one else, would have ventured to anticipate.

But now comes a curious point. No other province of Southern India, as far as I have yet ascertained, exhibits anything approaching to such regularity. The rainfall of Mysore and Bellary, a region more subject to famine than Madras itself, shews scarcely an appreciable oscillation coinciding with the sun-spot cycle, except that it exhibits a very distinct minimum in 1876. The province of Malabar has indeed two very distinct minima in 1866-67 and 1875-76, but there was another greater than either in 1881 and the maxima were very irregular, occurring in 1871, 1874, 1878 and 1882, and the Deccan and Hyderabad are not more concordant. At present therefore only the Carnatic can be said to have its rainfall varying in an eleven-year cycle, but in this case the coincidence is very marked indeed.

On the question of the periodical recurrence of famines, I have nothing to add to the facts detailed in the Report of the Famine Commissioners.

The conclusions drawn by Mr. Hill that the winter rainfall and summer rainfall of the N.-W. Provinces both shew a periodical variation, but of a different character in the two cases, and that the summer rainfall tends to vary in the opposite direction to the winter rainfall have also been critically examined.

Taking the rainfall of the N. W. Himalayan stations alone, from November to May inclusive, and tabulating it year by year for about 26 stations, I find that it shews amid some irregularities a very much more distinct cyclical variation than that obtained by Mr. Hill from the registers of twenty stations, half on the hills and half on the plains. It seems to have been at a maximum in the winter and spring of 1864-1865, to have decreased with some irregular variations, but on the whole pretty steadily, till 1872-73, to have again increased in like manner till 1877-78, after which it became more irregular, dropping to a minimum in 1878-79, then increasing again till 1880-81 and decreasing to 1883-84. Notwithstanding these irregularities, when the probable oscillation in the eleven-year cycle is computed out it is found to be not less striking than that of the Carnatic rainfall. It amounts when at its

maximum to 33 per cent. in excess of the average, when at its minimum to nearly 18 per cent. below it. The first almost exactly coincides with the minimum of the sun-spots, the second follows the sun-spot maximum by 2 or 3 years. The cyclical variation therefore on the experience of two cycles amounts to more than 50 per cent. of the average, but it does not seem to vary concurrently with the quantity of the spots, in other words, with the activity of the movements in the solar photosphere, but rather to consist of a sudden intensification of the winter and spring precipitation on the mountains about the time when the sun-spots are at their minimum.

The variation of the summer rainfall of the plains I have tested by comparing the rainfall of the months June to September of the whole of North-Western India east of the Ravi, *viz.*, the Eastern Punjab, Rajputana, the N.-W. Provinces and Oudh and the Central India States, Saugor and Nerbudda, and comprising about 100 registering stations. The most noticable feature is that in those years when the winter and spring rainfall is very excessive on the hills, and the snowfall remarkably thick and copious there is a great deficiency of rain on the plains in the following summer. Especially was this the case in 1868 and 1877, and to a certain degree in 1865. In general in 14 years out of 22 the variations of the summer rainfall on the plains vary in the opposite direction to the winter rainfall on the hills, but it is only in years of extraordinary precipitation on the hills that this opposition is very strongly manifested.

This conclusion, as I need hardly point out, is strongly confirmatory of the view I put forward originally in 1877 and which has been made the basis of forecasts of the monsoon rainfall, *viz.*, that the snowfall has a direct and prejudicial influence on the summer rainfall.

Nor is this influence restricted to Northern India. There is much community between the phenomenon, of dry winds and droughts in Northern India, and in Western and even Southern India, but the discussion of this point would lead me far afield beyond the subject of my present notice, the purport of which is that I consider it no longer doubtful that a cyclical variation of a very marked kind regulates the rainfall of the Carnatic on the one hand, and the winter rainfall of the North-Western Himalaya on the other, and that in some degree similar or opposite oscillations are traceable in the rainfall of other provinces. But I have been quite unable to detect such an oscillation in the rainfall of India as a whole.

The PHILOLOGICAL SECRETARY read a report by V. A. Smith, Esq., of Bastí, N.-W. P. of a find of old coins in Pargáná Bánsí, east of the Bastí district.

Some Chamárs in October 1886 when ploughing at Masná near Kakrahí Ghát in Tappa Nandipár, Pargáná Bánsí, east of the Bastí District, N. W. P., found a metal pot containing coins. The pot is said to have contained 54 coins, but only 38 have been recovered, *viz.*,

Ghiyáṣ-ud-dín Balban. 25 (Thomas, Pathan Kings, page 134, No. 112, Plate II, 42).

Muízz-ud-dín Kaikobád. 12 (ibid., page 141, No. 116, Plate II, 46).

'Alá-ud-dín Muḥammad Sháh (ibid., p. 171, No. 132 or 133, Pl. III, 57).

The village where the find occurred is on the road between Bánsí and Nepál.

The coins of 'Alá-ud-dín are very common. Those of Balban appear to be less common, and those of Muízz-ud-dín Kaikobád scarce. Two coins of this last named prince were found last year in the south of the Bastí District (Proceedings, A. S. B, April 1886, p. 68).

Action has been taken under the provisions of the Treasure Trove Act, and as many of the coins as Government may desire to take can be acquired.

The PHILOLOGICAL SECRETARY read an extract from a letter from C. J. Rodgers, Esq., of the Archæological Survey Department, regarding coins that he had collected during his recent tour.

"I am just finishing my tour. During it I have collected upwards of 300 coins of different kinds for Government. These include a Sikandar Súrí and an Ibráhím Súrí, coins of the greatest rarity. I have also found a chau ṭánke of Akbar's. This I take to be the *four* ṭánke-piece. Several ním ṭankahs have also turned up, and a quantity of fulús of various mints. In one place in the hills here I obtained seven Iláhí months of *one* mint,—*Dihlí*. Yesterday I secured here three months of another mint, Gobindpúr.

"But the most puzzling thing I have found is a series of coins struck at Dár ul Khiláfat and Dár ul Islám Dogám (دوگام).* They are simply more abundant than any other mint, and yet I can find no clue as to what it was or where.

"I *think* I have found remains of the temple destroyed by Mahmúd of Ghazní in Kángṛá. But of this I am not quite certain."

The PHILOLOGICAL SECRETARY read the following extract from a letter from A. M. Markham, Esq., Bijnaur, forwarding two terra-cotta Buddhist medals (see Plate I).

* [See a mention of these coins in Mr. Oliver's paper in the Journal, A. S. B. Vol. LV, for 1886.]

"I have sent you by parcel post a box containing (1) the pieces of a terra-cotta circular medal, so to speak, bearing a beautiful impression of a seated Buddha under a chaitya, with an armed (?) attendant standing on either side, and with small flying figures playing round the apex of the '*htee*' of the chaitya. Underneath is a tolerably plain inscription, and below the inscription a strange little figure in an attitude of servility (or worship ?) before an object which I cannot make out. On the reverse is what I take to be meant for the Bo tree.

"May I beg of you to be so good as to decipher the inscription for me, and tell me the probable, or perhaps exact, age of the medal. I would put it in about the 8th or 9th century A. D.

"I also put in the box (2) a perfect specimen of a smaller and less beautiful medal, also with an inscription. May I request you to favour me with a reading of it also. These, with many hundreds of small terra-cotta moulded plaques of Buddha seated, measuring 3 inches by $1\frac{3}{4}$ in., all identical, were found by me recently in a mound. On receiving translations from you, I shall send you a paper on the mound and its opening and hope to be permitted by Government to send for the Society's Museum specimens of the articles found in it. I am under an obligation to send them to the N.-W. P. and Oudh Museum at Lucknow; but have no doubt that, as they are so numerous, I shall obtain permission to send some to your Society."

Dr. Hoernle remarked: The medals are correctedly described in Mr. Markham's note. Representations similar to that on the larger medal may be seen on the Barhut stones in the Indian Museum (see General Cunningham's *Stúpa of Bharut*, Pl. XIII, XXXI *et passim*). The flying figures are human, and bear garlands. The attendants carry *chaurīs* in their right hands. The objects in their left hands are not distinct; that in the hand of the right-hand figure seems to be a long bow. The left-hand figure wears a necklet. Both are clothed in *dhotīs* only. Their head-dresses slightly differ. Their heads appear to be encircled by a halo. Buddha, on the chaitya, is represented seated, in the attitude of meditation. The figure below the inscription would seem to be a woman, to judge from the head dress. The object before which she kneels is perhaps a pan on a woodfire, which she is represented as blowing. The inscription is merely the well-known Buddhist creed, which runs as follows:

ये धर्मा हेतुप्रभवा हेतुन्तेषान्तथागतो ह्यवद-
न्तेषां (च यो निरोध ए) वंवादि महाश्रमण [:]

i. e., 'All things that proceed from a cause, their cause the Tathágata has declared as well as what is their destruction. Such is the dic-

tum of the great Śramaṇa.' (See the *Proceedings* for June 1881, p. 113.) The words enclosed in brackets are broken away on the medal.

The inscription on the smaller medal is the same Buddhist creed, but it is nearly illegible. This medal shows a panel, containing Buddha seated in the attitude of meditation, with two attendants standing on each side. The panel is surmounted by a large stúpa with one small one on either side. The whole, panel and stúpas, are encircled by a garland of small bells. The inscription is below the panel.

The PHILOLOGICAL SECRETARY exhibited a new gold Gupta coin forwarded by Mr. H. Rivett-Carnac. The following is the description of the coin supplied to him by Mr. V. Smith:

Obv. Bull to right. Above *Śrí Víra* ×, below between legs, two characters.

Rev. Lakshmí as usual; legend on right edge, *kramáditya.*

Diameter about $\frac{7}{10}$ of an inch.

DR. HOERNLE remarked, that the letters were so badly preserved, that he would not venture to say what the legend was. The only distinct letter was *mā* on the reverse. He would also take this opportunity of exhibiting three other coins. One was a small copper coin from Kashmír sent to him by Mr. L. W. King. It showed on the obverse a humped bull to the left, with very indistinct traces of one or two letters; on the reverse a standing figure with outstretched arms; legend *sahijaví.* The other coin was a silver forgery of a gold Gupta coin, received from Mr. W. Crooke, C. S., Etah. The type was that of the 'Rider, and peacock-feeding female.' (See *Journal, A. S. B.*, Vol. LIII, plate III, fig. 13.) It appeared to have come from Kanauj, where it is known that forgeries of this kind are carried on. The third was a copper coin, also received from Mr. Crooke. It belonged to the well-known type of Rámadatta. But it was peculiar on account of its being a beautiful specimen of a double-struck coin. The legend read *Rájño Rámadatasa* (see Plate I).

The PHILOLOGICAL SECRETARY exhibited a MS. in two volumes called "Viśuddhi Márga," by Buddha Ghosha, lent by the Archbishop of Siam.

DR. HOERNLE reported his attendance at the Seventh International Congress of Orientalists, Vienna, on behalf of the Society, and submitted a copy of the report drawn up by himself and his colleague, Mr. G. A. Grierson, for the Government of India by whom they had been sent to Vienna as joint-delegates. The following is the substance of the report:

"We arrived in Vienna on September 26th, and after inscribing our names at the Kanzlei of the University received an invitation for a

social gathering the same evening. At this gathering the members of the Congress met for the first time, and made each other's acquaintance.

"Next morning (27th September) the first formal general meeting took place at 10-30 A. M. in the Fest-Saal of the University. His Imperial and Royal Highness the Archduke Rainer presided, and on his declaring the Congress open, the delegates and members were welcomed by His Excellency Dr. P. Gautsch von Frankenthurn, Austrian Minister of Public Instruction, in the name of the Government. The President, Baron von Kremer, next thanked the Archduke for undertaking the protectorate, and the Government for its support, and read his inaugural lecture on the connections between Europe and the East. We were then welcomed by the Bürgermeister in the name of the City of Vienna, and after a few addresses by various delegates and presenters of books, the President requested the members to constitute themselves into sections.

"The following sections were then constituted:—

(1) Arabic.
(2) Semitic (omitting Arabic).
(3) Aryan.
(4) African and Egyptian.
(5) Chinese and Polynesian.

"We enrolled ourselves as members of the Aryan Section, and shall confine our remarks to it. We were, of course, unable to attend the meetings of the other sections.

"At the first sitting of the section, officers were appointed, *viz.*:—

Professor R. von Roth—President.
Professor A. Weber and Professor C. Lignana—Vice-Presidents.
Professor Ch. Michel and Dr. J. Hanusz—Secretaries.

"The Session then adjourned till 2 P.M., when business was regularly begun. The first person called upon to read his communication was Mr. Grierson. He had two papers to read, one a short note suggesting a systematic survey of Indian vernaculars, and the other a historical sketch of mediæval Hindí poetry. He requested to be allowed to postpone reading the latter for a day or two as it was not quite ready, and, in connexion with the note, laid on the table a set of the grammars of the Bihár dialects, and a copy of Bihár Peasant Life, as specimens of what the Government of Bengal was doing in the way of surveying the vernaculars in its territories. Dr. Hoernle and Professor Bühler spoke in support of his proposal, and it was finally agreed to postpone any formal resolution, till his paper on Hindí poets, which was fixed for the following Wednesday, should have been read.

"Mr. Cecil Bendall, of the British Museum, then read a paper on a manuscript and an inscription discovered by him during his late tour in India, in a character not hitherto noticed. The manuscript was a fragment of a rare work on grammar used by the Buddhists, and was bought in Nepal. The inscription was in the Calcutta Museum. Nothing was known about the character, and the alphabet was possibly one of those alluded to in works of the Buddhists. In the discussion which followed, Professor R. von Roth and Professor E. Kuhn took part.

"Dr. Pollak next announced the preparation of a German-Persian Dictionary.

"Professor Bühler laid on the table the following works:—

(1) A specimen of the Atharvavédabháshya by S. P. Pandit.
(2) The Lingánuśásana of Vámanáchárya by Dr. P. Peterson.
(3) A paper by Dr. Bhagvanlál Indrájí on two Chalukya inscriptions.

"The thanks of the section were voted to the three authors.

"Professor J. Jolly, the well known Tagore Law Lecturer, and now Professor of Sanskrit at Würzburg, read a short note on the new edition of the Mánava Dharmaśástra, usually known as the laws of Manu, which he is preparing. It is to be regretted that this valuable work could not be printed in time for the Congress. It will be the first critical edition of this important law-book, and will well deserve the attention both of Indian students and of Indian lawyers.

"Dr. R. G. Bhandarkar read portions of a long and interesting paper which he had prepared on the result of his search for Sanskrit manuscripts. At its conclusion the thanks of the section were voted to the Chiefs of Kathiawar, and to the Bombay Government, for deputing Dr. Bhandarkar.

"Professor A. Weber drew the attention of the members to an Indian edition of the famous controversial work entitled Khalavaktrachapeṭiká or 'a slap in the face of the wicked.'

"The first meeting of the section fitly terminated with an interesting ceremony. Professor E. Windisch, of Leipzig, the Secretary of the German Oriental Society, reminded the section that yesterday was the hundredth anniversary of the birth of Horace Hayman Wilson. All the members present then stood up in reverence of his memory.

"In the evening we attended a reception at the official residence of the Minister of Public Instruction.

"On Tuesday, the 28th, the session opened with an important paper by Dr. Hoernle on an ancient book lately found in the Panjáb, known as the 'Bakhsháli Manuscript,' which he was the first to decipher. The contents of the paper were too technical for a detailed account to be

given here. It will suffice to state that Dr. Hoernle showed that the manuscript, written on birch-bark, probably dates from the 8th or 9th century A. D., and therefore is one of the oldest Indian manuscripts known to exist. It contains a work on arithmetic, written in the so-called Gáthá dialect, the literary form of the ancient North-Western Prákrit, exhibiting a strange mixture of Sanskrit and Prákrit forms. The work itself is much older than the manuscript in which it has been preserved. On various grounds it appears probable that it is the product of a member of the Buddhist or Jain community, dating from before the 4th century of our era. It is, therefore, the earliest known Indian work on arithmetic. It will shortly be published, partly at the expense of the Panjáb Government.

"Dr. Hoernle was followed by Professor C. G. Lignana on the Navagváḥ and the Daśagváḥ of the Rigveda, and by Professor Hunfalvy of Budapesth, who dealt with the origin of the Rumanian language.

"Attention was next drawn by Captain R. C. Temple to Dr. Fallon's Dictionary of Hindústání proverbs, and the sitting concluded with a paper by Dr. K. Glaser on ancient Indian descriptions of precious stones

"On Wednesday, the 29th September, Professor R. von Roth drew attention to Professor Bühler's new translation of Manu, and Professor Bühler to Dr. Dillon's new work entitled 'the Fatherland and age of the Avesta.'

"Professor Leumann, of Strasbourg, read a note on a Jaina text entitled Angavijjá lent to him by Dr. Bhandarkar. He was followed by Professor Jacobi who read a most interesting paper on Jainism and the worship of Kriṣṇa. In the discussion which ensued, Mr. Grierson took part, and pointed out some Jain folk-customs in India which were apparently not known in Europe.

"Next followed Mr. Grierson's paper on Hindí poetry. Its full title is 'The Mediæval Vernacular Literature of Hindústán with special reference to Tul'si Dás.'

"At the conclusion of the paper his note regarding a survey of the Vernaculars of India was again brought forward, and an animated discussion arose as to the best means of forwarding the suggestions contained in it. One of the speakers, we may mention, was Mr. C. Leland (Hans Breitmann), the eminent Romani scholar. He drew attention to the fact that the American Government was now holding a very similar survey of the dialects of the North American Indians. Nearly every scholar in Europe, who was unable to attend the Congress, and who was interested in the subject, had written a short note warmly supporting the proposal. Finally, Professor Bühler made a formal proposition on the subject, which was seconded by Professor Weber of Berlin and carried

by acclamation. We trust that when the formal proposal reaches the Government of India in due course from the authorities of the Congress, it may be deemed worthy of consideration.

"The session for this day concluded with the reading of a French poem by M. Bellin, in honour of the Congress, and with a paper by Herr L. de Milloué on the Vṛiṣabha-Myth.

"In the afternoon the members of the Congress were received at the Rathhaus by the City of Vienna, and were shown over the magnificent building, with its unique collection of arms. In the evening we attended a reception held by their Imperial and Royal Highnesses the Archduke (the Protector of the Congress) and Archduchess Rainer. We had the honour of being presented to both as delegates of the Government of India.

"On Thursday, the 30th September, a great deal of solid work was got through.

"The session opened with a communication from Captain Temple regarding the value of the well-known Panjábí epic by Wáris Sháh entitled Hírá Ránjhá. No Panjábí is considered to know his own language till he has read this work. A correct printed text is urgently required, and the speaker could lay his hands upon some very old manuscripts of the poem.

"He was followed by M. J. M. Grandjean on the origin of the toneless explosive sounds in the Indo-Germanic speeches.

"Professor R. von Roth, our President, spoke with all the weight of his great authority on the exegesis of the Veda, and the effect of euphony on certain case inflexions. In the discussion which followed, the speakers were Professors G. Bühler, A. Weber, and A. Ludwig.

"Professor H. Schuchardt then handed in a new work by Professor Ascoli of Milan, entitled 'Due recenti lettere glottologiche e una poscritta nuova.' At the same time he communicated Professor Ascoli's regret that he had been unable to complete the commission made to him and Professor Joh. Schmidt, by the Berlin Congress of 1880 on the subject of a system of transcription.

"Professor Bühler then presented to the section some photographs forwarded from India by Dr. Leitner, and a specimen from Mr. Fleet's third volume of the 'Corpus Inscriptionum Indicarum,' and this led on to the next subject, broached by Captain Temple, who brought to the notice of the section that the Government of India had abolished the post of Epigraphist to the Government of India. A keen discussion followed in which Professors Weber, Bühler, Kielhorn and Bendall took the principal part, and in which it was agreed that this action of the Indian Government was a real loss to science, and that it was most

desirable to make a representation to the Government of India as to the propriety of reviving the post. Mr. Fleet had rendered great services, and there were few, if any, scholars so well qualified for the duty.

"Next followed an interesting lecture in English by Dr. Stein, of Budapesth, on the Paropamisus, or Hindú Kúsh, in ancient Geography. Guided by the oldest Greek form of the name, Parnasos, as given by Aristotle, he was enabled to identify it with the mountain Upairigaena of the Zend Avesta. The meaning of this last name is 'higher than the flight of an eagle,' and a curious legend concerning the Hindú Kush is recorded by the Chinese traveller Hiuen Tsiang (A. D. 600) that it is too high for birds to fly over it, but that they have to cross it on foot. This legend is also mentioned by Marco Polo, by the Emperor Baber in his memoirs, and in modern times by the traveller Burnes. Dr. Stein considered that much correct information as to the geography of Afghanistán could be found in Avestic texts.

"He was followed by Professor E. Kuhn, of Munich, who read an important paper on the dialects of the Hindú Kush, founded on materials furnished by Captain Tanner, of the Survey Department, which were collected during the last Afghan war. Professor Kuhn was of opinion that these dialects, together with Kashmírí and the Romani of the Gypsies, formed a special group among the languages of the Indic branch of the Aryan family. A lively discussion followed, in which, amongst others, Mr. Leland, Professor Hunfalvy, Dr. Burkhard, and Mr. Grierson took part. The point which excited most criticism was the theory that Romani belonged to this family of languages. To this we, as well as some others, were unable to agree.

"The question of the Gypsies was next handled by Mr. G. Leland, the well known 'Hans Breitmann,' and probably the greatest master of the Romani language and lore in the world. His paper dealt with the origin of the Gypsies. He concluded a most interesting paper with the statement that he had found that there actually existed in the Panjáb a wandering race, who called themselves Rom and spoke Romani. Mr. Leland does not profess to be well acquainted with the Indian Vernaculars, and this final statement immediately gave rise to the most lively criticism on the part of the Indian scholars then present. Dr. R. Cust, Mr. Macauliffe, Captain Temple, and both of us, all united in being unable to confirm his opinion. That there are in India argots, or slangs, or thieves' languages, or artificial trade languages, there can be no doubt, but no proof could be asserted of the existence of a so-called Romani language in that country. Mr. Grierson, who had studied Romani both in Europe and in India, was disposed to believe that Mr. Leland's former identification of Rom, 'a Gypsy,' with the Ḍoms of

India was the only tenable one, and that, so far as his researches had gone, without at present speaking positively, Romani was most closely connected with the languages of Eastern Hindústán. The points urged were too technical to repeat here.

"In the evening we were invited to a great dinner party given by the Organization Committee to the members of the Congress.

"On Friday, Dr. Rost, of the India Office Library, handed in the two first sheets of the classified catalogue of Sanskrit manuscripts in that collection.

"He was followed by Dr. W. Cartellieri, who read a paper on Subandhu and Báṇa, and by Professor F. Müller, who discussed various passages in the Avesta.

"Mr. Macauliffe, of the Panjáb Civil Service, then gave some interesting details concerning the recent discovery of a manuscript which contains an account of Bábá Nának, founder of the Sikh Religion.

"Dr. Hanusz read an interesting paper on the Polish Armenian dialect of Kuty in Galicia, and dealt specially with its sound laws. He then, in the author's absence, laid before the session Dr. J. Thumajan's paper on 'the History of the classical Armenian literary language.'

"In the afternoon we all went for an excursion to the heights of the Kahlenberg, overlooking the City of Vienna, and commanding a magnificent prospect.

"On Saturday morning, the 2nd October, was held the final sitting of the section. The papers read were—

On the Turkish element in Rumania, by Professor C. P. Hasdeu, of Bucharest:

On the Śraddhas, and the worship of the dead amongst the Indo-Germans, by Dr. M. Winternitz:

On the origin of the Philosophic idea amongst the Indians and Chinese, by Professor M. Straszewski of Cracow; and

On the Kutzovalachians of Epirus and Thessaly, and their languages, by Professor S. Papageorgios of Korfu.

"After a rather hurried sitting there was held a meeting of the delegates and principal officers of the Congress at which it was resolved to accept the gracious invitation of His Majesty the King of Sweden, and to hold the next Congress at Stockholm in two or three years' time, the exact date to be fixed by His Majesty.

"There was then held a final general meeting of the Congress at 1 P. M., under the presidency of His Imperial and Royal Highness the Protector, and after a number of valedictory speeches in various languages the Oriental Congress of 1886 was declared closed.

"We may mention here, amongst other objects of interest visited by

us in Vienna, the collection of papyri found at El Fayum in Egypt, and the property of the Archduke Rainer. These are being gradually decyphered by Professor J. Karabacek. They form, apparently, a portion of the contents of an ancient office for registration of deeds. Some of these papers are as old as the 7th century A. D., and, judging from the style of the Arabic writing and from the phrases used, might have been written in an Indian *Cutcherry* yesterday. We refrain from writing more about this collection as it would require a whole treatise to itself.

"Another object of great interest to us was the *Gewerbe Museum*. This is a Museum of Arts and Industries, closely corresponding to one branch of the Calcutta Economic Museum. One department of it struck us as being specially worthy of imitation in every large town in India. In a conveniently arranged room all the principal Vienna houses exhibit specimens of their manufacture. On each specimen the price is written in plain figures. The whole collection is under the care of a Curator, whose business it is to take visitors round and to show them the various articles exposed. If any one takes a fancy to anything exhibited, he can pay the Curator the price marked upon it, and walk away with it. In this way every one is benefitted. The local manufacturers acquire an unequalled opportunity for exhibiting their wares, being subjected at the same time to a healthy competition, the merchant seeking for articles to export to a foreign country finds all the best articles of local manufacture conveniently grouped together, and the casual visitor on the look-out for curiosities can go there and buy the best, with the assurance that his ignorance will not be imposed upon, and that he will only pay the fair market price for his work. A somewhat similar institution, on a very small scale, we have noticed in Jaipur in the 'School of Arts.' But we think that this kind of Museum could well be imitated in Calcutta and perhaps in one or two other large towns in the Provinces and other Presidencies. It would doubtless tend to stimulate trade, and would be a great blessing to the numerous travellers who now visit India for enjoyment, and who too often pay ten times the proper amount for what they buy.

"In conclusion we would wish to put on record the great kindness which was shown to us foreigners by the many *savants* we met at Vienna. For our own part we can only say that nothing could exceed the hospitality and courtesy shown to us as delegates of the Indian Government. We owe that Government a debt of gratitude for having placed us in so pleasant a position, in which we were enabled to make many new, and we hope lasting, friendships amongst gentlemen whose pursuits and tastes were similar to ours. We are sure that we were justified in promising them that, if circumstances ever took them to India, they might count

on receiving the same consideration in Calcutta, Madras, or Bombay, which they had extended to the Indian delegates at Vienna.

The following is Mr. Grierson's note, referred to in the above report.

"In laying on the table a copy of 'Bihār Peasant Life,' and a complete set of the 'Grammars of the dialects and sub-dialects of the Province of Bihār,' I would ask to be excused for drawing attention to the fact that they are a first attempt at a systematic survey of the language actually spoken in a given tract of British India.

"A glance at any one of these books will show how radically the real language,—the mother-tongue of all classes, rich and poor, educated and uneducated alike—in Bihár, differs from the so-called Hindí and Hindú stáni languages which have hitherto been the only languages of Northern India known to students.

"I would now urge the necessity there is of making a systematic attempt at finding out what are the actual languages spoken at the present day throughout India, and what relics there are of their past history.

"*Firstly*, the actual state of affairs at the present day. We have the Neo-Aryan languages of India at present roughly classified into Maráṭhí, Gujarátí, Punjábí, Sindhí, Hindí, Bengálí, Asámí, Oriyá, Kashmírí and Singhalí, to which by a process of fission Bihárí has lately been added as a younger sister. As having, in a manner, attended at the birth of the last named, I naturally take an interest in her condition, but that does not prevent my seeing that what is the case with her is in great measure the case throughout all India, and specially in Hindústán. That is, that the literary or Government language of any tract is widely different from the language actually spoken by the people. In some cases this is only a question of dialect, but in others the polite language learned by Europeans, and by natives who wish to converse with Europeans, is totally distinct both in origin and in construction from that used by the same natives in their homes. In the course of future years, no doubt, through the agency of railways and the printing press, the literary language will in many cases become the norm of home-conversation, but at present that is not the case. The fact is, and it is one that should be faced, that nowhere in Hindústán is the language of the village the same as the language of the court and of the school. This is true to a certain extent all over the world, but in India the difference between the two languages is peculiarly great. Before a poor man can sue his neighbour in the court he has to learn a foreign language, or to trust to interpreters, who fleece him at every step; and before a boy can learn the rule of three he has to learn the foreign language in which it is taught. In some parts of Hindústán this difficulty exists in greater degrees than in others, but it is always more or less present.

"As the tracts ruled by each Government are very large, a multiplicity of court languages would be a manifest inconvenience, but that is no reason why the European official should not learn the vernacular *patois* or language (I care not what it is called) of the district committed to his care. This has hitherto been a practical impossibility to the average official for whose aid no grammars or dictionaries existed, and for this purpose, I undertook the preparation of the Bihárí grammars, which have, I believe, been found useful. The Magistrate need no longer have recourse to an interpreter, and can now, after a minimum expenditure of labour, converse with a witness in the latter's mother tongue.

"So much for the practical side of the question. I believe that similar vocabularies and sets of grammars for the whole of India would be not only equally practically useful, but would also be of assistance to students of philology in Europe, and to missionaries. The Hindústání* hitherto studied, though a useful *lingua franca*, is but a camp jargon, and Urdú and Hindí, which are founded on it, are mere inventions of the closet, and nowhere vernaculars. They are hence nothing but misleading to the European student.

"*Secondly*, the relics there are of the past history of the languages of India.

"Here I must confine myself to Hindústán, for I do not pretend to have any acquaintance with the older literatures of other Indian languages. In my paper on the mediæval literature of Hindústán which I propose to read at this Congress, I hope to be able to show that, from the 13th century down to the present day, there is a rich mine of literature awaiting the labour of the student. This literature is of every variety, commentaries on Sanskrit works, histories, (with dates), epic poems, collections of sonnets, huge anthologies, treatises on medicine, mathematics and grammar, in short, every subject with which we are

* I use these terms here in the sense in which natives use them in the part of India where my lot has been cast. By Hindústání, I mean that useful *lingua franca*, understood by every one all over Northern India, borrowing something from each of many languages, but nowhere a vernacular. By Urdú, I mean that form of Hindústání which has been elaborated by Musalman pedants in their books, which is overloaded with Arabic and Persian words, and understood only by learned Muhammadans. Similarly, by Hindí, I mean the Pandit-ridden form of Hindústání which is overloaded with Sanskrit words, and understood only by learned Hindús. Urdú differs from Hindí not only in its vocabulary, but in its idioms, and, above all in the collocation of its words. This last, and not the vocabulary, is considered by Hindú scholars the true discriminating test. This Hindí is often called Jabání by natives. *In talking to Europeans*, natives will sometimes use Hindí for the language of Súr Dás, and Tul'sí Dás, but they rarely do so amongst themselves, preferring the terms Braj, Baiswárí, and so on.

familiar in Sanskrit, and others besides. These books were all written in the vernacular, and their authors meant them to be understood by the unlearned, and thus they reflect the progress of the languages of India from the era of the Prákrit writings down to this century. What a mass of ore awaiting the furnace of European science!

"I believe, therefore, that the time is ripe for commencing *a deliberate systematic survey of the languages of India, nearer and further, not only as they exist at the present moment, but as far back as MSS. can take us.*

"Such a task is beyond the power of private enterprise; but I am persuaded that the Government which has carried out the statistical survey of India, and which has such literary powers at its command as those which conceived the idea of and carried out the great Gazetteer of India would not shrink from such a survey as I now refer to, if it were proposed with all the weight of authority which belongs to this Congress."

The note was supported by the following scholars: A. Barth, Cecil Bendall, E. B. Cowell, Robert Cust, A. F. Rudolf Hoernle, Sir Monier Monier-Williams, F. Max Müller, R. Rost, A. H. Sayce, E. Senart.

The following motion with regard to the note, was proposed by Professor Bühler, seconded by Professor A. Weber, and carried by acclamation:

"That this Section strongly urge upon the Government of India that the present is a suitable time for the commencement of this most important work.

"Just now there happens to be in India a number of Scholars who have made the Vernaculars of that country their special study.

"The search for Vernacular MSS. could be conveniently united with that of Sanskrit ones, now being conducted by officers of Government, who might be requested to spend a fixed proportion of their funds on Vernacular MSS.

"The Survey of the Vernaculars as they exist at present could be carried out by the subordinate officers of the Education Departments with the least possible expenditure of trouble and money. They should be in each Presidency or Province under the supervision of one or more skilled specialists, who would no doubt, in many cases, give their services voluntarily."

The following papers were read—

1. *On a second series of new species of Ficus from New Guinea.* —*By* GEORGE KING, M. B., *Superintendent, Royal Botanical Gardens, Calcutta.*

The paper will be printed in Part II of the Journal for 1887.

2. *Note on a passage in the Mṛichchhakaṭiká.*—*By* Asutosh Mukhopádhyáya, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

In this paper the writer takes up the question as to the author of the celebrated Sanskrit drama Mṛichchhakaṭiká, reputed to be the production of King Śudraka. He first states that it could not have been the production of Śudraka, because in the introduction very near the beginning of the play, a stanza occurs, the last line of which may be rendered thus: "Śudraka having attained the age of a hundred years and ten days entered the fire." On the supposition, that Śudraka himself was the author of the play, it is not possible to explain how he could foresee the date and manner of his death. Rejecting the various hypotheses that have been put forward to explain away the difficulty, the writer is of opinion that the drama was not the production of Śudraka, but was composed under his patronage, or possibly under the patronage of his son, who is mentioned in the stanza as having succeeded him on the throne. The stanza being placed in the midst of a lengthy laudatory panegyric on Śudraka it is hardly possible to believe that it could have been written by himself in self-praise, if he was really so very distinguished in arms and letters as he is represented to have been; whilst if it is admitted that the drama was composed only under royal patronage, every difficulty vanishes, and such a supposition is in perfect accordance with what is known of other reputed productions of royal authors.

Dr. Hoernle remarked: The theory of the authorship of the Mṛichchhakaṭiká, put forward by Bábú A. Mukherjea, and the argument in support of it drawn from the fact that king Śudraka's death is mentioned in a passage of the introduction to the drama, are by no means new. They are already mentioned in Professor Weber's History of Indian Literature, p. 205. But I am glad of this opportunity to bring to the notice of those who take interest in such questions, a new theory lately advanced by Professor Pischel which, to my mind at least, has a very great air of probability. It carries the enquiry a little further, as it attempts to identify both the real author as well as the patron of that play. It will be found fully detailed in the Introduction to Professor Pischel's edition of Rudraṭa's Çringáratilaka and Rayyaka's Sahṛidayalílá (Kiel, C. F. Haeseler, 1886). According to it, the real author of the famous drama is no other than the well-known poet Daṇḍin. He is now generally believed to have lived in the 6th or 7th century A. D. Besides many other works, tradition ascribes to him three great works "famous in the three worlds." Two of these are the famous *Kávyádarśa*

and the *Daśakumáracharitra*. As to the third there is a dispute. But none of those hitherto named are famous enough to be linked with the two others just mentioned. On the other hand, the Mṛichchhakaṭiká is a very famous work, and its author is unknown. Professor Pischel's contention is that this is the third of the three world-widely famous works of Daṇḍin. The proof is this. In the *Kávyádarśa*, Daṇḍin twice quotes a verse to illustrate a rhetorical rule of his (*K.* 2, 362): क्षिप्यतीव तमो दिग्भ्यो वर्षतीवाञ्जनं नभः । असत्पुरुषसेवेव दृष्टिर्विफलतां गता ॥ This verse also occurs in the Mṛichchhakaṭiká (Act I, p. 14, ed. Stenzler). Now it is well-known that Daṇḍin uses no other illustrations in the *Kávyádarśa* but such as are composed by himself. It follows therefore that he quotes a verse of his own, and that therefore he was the real author of the Mṛichchhakaṭiká. Daṇḍin accordingly must have been a protegée of king Śudraka to whom, being his patron, the work is usually ascribed. That poet, in all probability, was a native of the Dakhan. Curiously enough in a gloss on Vámana's *Kávyálankára Vṛitti*, on the name *Śudraka*, it is said that this king was '*Komati*.' Now *Komati* is a South Indian name. Moreover the state of life as described in the Mṛichchhakaṭiká is precisely the same as that in the Daśakumára Charitra, which is a well-known work of Daṇḍin. Finally it is now generally admitted, that the Mṛichchhakaṭiká is not so old as it was at first believed to be, but belongs to about the 6th or 7th century A. D. Thus everything seems to agree in confirming the authorship of Daṇḍin.

The subject of conversation by the PHILOLOGICAL SECRETARY "The International Congress of Orientalists at Vienna, held in 1886," was postponed.

LIBRARY.

The following additions have been made to the Library since the Meeting held in March last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

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Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Abhandlungen, Band IX, Heft 1.

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———. The Athenæum,—Nos. 3394—3098.
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BUDDHIST CLAY MEDALS.

Ancient Gold and Copper Coins.

Photo Collotype. Survey of India Offices, Calcutta. May 1887.

Notice.

Foreign Societies who favour the Asiatic Society of Bengal with their publications are informed that they may be sent either to the address of the Society at Calcutta, or to the Agents of the Society in London, Messrs. Trübner & Co., 57 and 59, Ludgate Hill, London.

Avis.

Des Sociétés Etrangères qui honorent la Société Asiatique de Bengale de ses publications, sont priées de les envoyer ou directement à l'adresse de la Société, 57, Park Street, Calcutta, ou aux Agents de la Société à Londres, Messrs. Trübner et Cie, 57 and 59, Ludgate Hill.

Anzeige.

Ausländische Gesellschaften welche die Asiatische Gesellschaft von Bengalen mit ihren Publicationen beehren, sind hierdurch ersucht dieselben entweder direct an die Adresse der Gesellschaft, 57, Park Street, Calcutta, oder an deren Agenten in London, Messrs. Trübner & Co., 57 and 59, Ludgate Hill, senden zu wollen.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MAY, 1887.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 4th May, 1887, at 9-15 P. M.

LT.-COL. J. WATERHOUSE, Vice-President, in the Chair.

The following members were present:

Abdul Latif, C. I. E., Nawab Bahádur, Sir Ali Kadar Syud Hassan Ali, K. C. I. E., Bahádur, H. Beveridge, Esq., C. L. Griesbach, Esq., Dr. Hoernle, A. Hogg, Esq., Prince Jahán Qadr Muhammad Wáhid Ali, Bahádur, Dr. William King, R. D. Mehta, Esq., Babu Asutosh Mukhopádhyáya. L. de Nicéville, Esq., Dr. Fritz Noetling, H. M. Percival, Esq., T. A. Pope, Esq., Maulaví Golám Sarwar, Pandit Haraprasád Sástri, F. J. E. Spring, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

The minutes of the previous meeting were read and confirmed.

Eleven presentations were announced, as detailed in the appended Library List.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members:

T. R. Munro, Esq.
Dr. Prasanna Kumár Ráy.
Babu Nobin Chánd Bural.
Rev. A. W. Atkinson.
Charles R. Lanman, Esq.

The following gentlemen are candidates for election at the next meeting:

The Rev. Graham Sandberg, Barrister-at-Law, Inner Temple, Junior Chaplain, Bengal Establishment, proposed by A. Pedler, Esq., seconded by J. Eliot, Esq.

Ráo Govind Ráo Narain, son of the late Ráni of Jalaun, proposed by Dr. Hoernle, seconded by H. M. Percival, Esq.

J. H. Apjohn, Esq., Public Works Department, proposed by F. J. E. Spring, Esq., seconded by J. Wood-Mason, Esq.

The following gentlemen have intimated their wish to withdraw from the Society:

Lt.-Col. W. F. Badgley.

Major G. F. L. Marshall.

On the motion of the CHAIRMAN a vote of thanks to Mr. H. B. Medlicott for his long and valuable services to the Society was unanimously agreed to.

The CHAIRMAN announced that Dr. W. King had been appointed Member of Council in place of Mr. H. B. Medlicott, and that Mr. A. Pedler had been appointed Member of Council and Treasurer in place of Mr. J. Eliot, and Trustee of the Indian Museum on behalf of the Society in place of Mr. H. F. Blanford.

The CHAIRMAN intimated that the opinion expressed at the last meeting that the fee of Rs. 200, for compounding the subscription of Foreign Members in the proposed new rule 24 a, should be altered to "£20 sterling, payable to the London Agents of the Society," had been duly laid before the Council, and that the amendment would now be brought forward for discussion.

The change was approved, and voting papers ordered to be circulated.

The CHAIRMAN reported that the Council had sanctioned the publication of the Persian work "Máásir-ul-Umárá" in the Bibliotheca Indica, to be edited by Maulaví Abdur Rahim.

The PHILOLOGICAL SECRETARY exhibited twenty old copper coins—Kashmiri, Indo-Scythian and Indo-Bactrian—presented to the Society by Babu Jogesh C. Dutt.

The PHILOLOGICAL SECRETARY exhibited some ancient copper coins from Nepál, forwarded by Mr. V. Smith, C. S. with the following note on the same:

"I am indebted to the kindness of Dr. Gimlette, Residency Surgeon at Khatmandu, for a batch of ancient copper coins recently found in Nepál, which appear deserving of notice.

"The find comprised 40 coins, but a few were worn beyond all possibility of recognition. I describe below all the specimens on which anything can be made out.

I. One coin. (Plate II, fig. 1.)

Obv. Central boss, encircled by legend '*Mahárájádhirájasya.*'

Rev. Horned animal, perhaps a goat, to l., standing.

Above, a short legend of two or three characters, of which the first is a conjunct character seemingly beginning with क *k*, and the second looks like गा *gá* or शा *śá*.

Diameter 1 inch.

Weight, nearly $\frac{1}{2}$ ounce.

II. 5 coins. (Plate II, fig. 2*a* and 2*b*.)

Obv. Winged lion (?), standing to l.

Legend above, following margin, '*Srí Sálhipá*,' श्री शाधिपा (?)

Rev. Cow standing to l.

Legend in horizontal line above, '*Kamadeha*' or '*Kámadeha*, कमदेह or कामदेह.

Diameter 1 inch.

Weight as above.

III. 11 coins. (Plate II, fig. 3 *a*, 3 *b*, 3 *c*.)

Obv. Figure seated cross-legged, facing front, r. arm raised, l. on hip.

Legend on r. margin, श्री भोगिनी, '*Srí Bhoginí.*' The first letter of the name may possibly be गो '*go.*'

Rev. Lion standing to l.

Legend on r. margin, श्री पानङ्क, '*Srí Pánanka.*' There is no doubt about the concluding character being '*nka*,' and the others are tolerably certain.

In one coin there is a sort of standard in front of the lion. In another the object in front of the lion is clearly a flower, probable intended for a lotus.

IV. 7 coins. (Plate II, fig. 4 *a* and 4 *b*.)

Obv. Lion standing to l.

Legend above '*Srí—vamá*, or possibly—*vapá*.'

Rev. Lion standing to l. No legend.

Diameter 1 inch.

Weight as above.

The characters on these coins have a general resemblance to those used on the Gupta coins, and I should be inclined to think that the coins are not of later date than, say, 300 A. D.

Both obverses and reverses of all the coins are surrounded by circles of dots."

Dr. Hoernle remarked: the coins forwarded by Mr. V. Smith are of great interest. They appear to be of a type hitherto quite unknown. I have myself never seen them before. Mr. Smith readings are on the whole correct. But the letters on the reverse of the first coin (Plate II, fig. 1) are श्रीगो *śrí-go*. The first character is undoubtedly श्री *śrí*; the second looks to me like गो *go*, though it might be गे *ge*, but not गा *gá* or शा *śá*. The animal is clearly the same as that on the obverse of the coins No. IV (see Plate II, fig. 4, *a* and 4, *b*). I take it to be a winged lion with a crest on the head. The obverse of the coins No. II shows the same animal, a winged lion; the legend above is श्रीसुधर्म *śrí-sudharma* (or perhaps श्रीसुवर्म *śrí-suvarma*). The letter र is marked on the top of the left hand vertical stroke of the final म, by a small upright stroke with a long horizontal one, at right angles, and extending over the whole of the म (see Plate II, fig. 2*b*). The animal on the reverse is a cow with a sucking calf below her; the latter is distinctly recognizable in both fig. 2*a* and 2*b*. The legend above is कामदेही *kámadehí*; the final í is distinctly marked by a crescent (opening to the right) placed at the top of the left-hand vertical stroke of ह; it is clearly seen in fig. 2 *a*; but in fig. 2 *b*, unfortunately, it has not come out well in the photograph. The obverse side of the coins No. III must be that with the lion, as it is on all the other coins of this collection; the reverse being that with the seated female figure. The latter device very closely resembles one found on many reverses of gold Gupta coins, and probably represents Lakshmí seated on the lotus. That flower and its stalk are well seen on fig. 3*a* and 3*c*. The legend on the obverse is श्रीपानाङ्क *śrí-pánánka*; the second character might also be मा *má*. The legend on the reverse is certainly श्रीभोगिनी *śríbhóginí*. The lion on the obverse of these coins is not winged, but on some of the coins (fig. 3*a* and 3*c*) there is a flower in front of it, in others (fig. 3*b*) the flower is absent; I have not noticed any standard. The lion on the obverse of the coins No. IV is again a winged one; and the same animal but without wings is shown on the reverses. The latter also have the crescent moon above the lion. The reverse bears no legend; but that on the obverse is श्रीसुधर्म *śrí-sudharma* (or perhaps श्रीसुवर्म *śrí-suvarma*). These coins would seem to belong to three kings, *Go*—, styled *Mahárájádhirája*, *Sudharma*, and *Pánánka*. Coins No. 1 belong to the Go—; coins Nos. II and IV to Sudharma, and coins No. III to Pánánka. Nothing beyond their names appears to be known. The type of the Gupta letters does not appear to me to be quite so old as Mr. V. Smith thinks.

So far as they are concerned, I think, the coins need not be older than the 10th century.

The following papers were read—

1. *A collection of Kashmírí Riddles.—By the* Rev. J. H. Knowles, *of Kashmír*, postponed from last meeting.

This paper will be published in the Journal, Part I, for 1887.

2. *On some new species of* Ficus *from Sumatra.—By* Dr. George King.

3. *On the species of* Loranthus *indigenous to Perak.—By* the same.

These papers will be published in the Journal, Part II, for 1887.

4. *Description of a new* Satyrid *from India.—By* Lionel de Nicéville, F. E. S.

Zophoessa Ramadeva, n. sp.

Habitat: Sikkim.

Expanse: ♂, 2·4 inches.

Description: ♂. Allied to *Z. baladeva*, Moore, from Sikkim and to *Z. andersoni*, Atkinson, from Upper Burma. From the former it differs on the underside of the *forewing* in the absence of the short yellow streaks at the base and apex of the discoidal cell, the streak across the middle of the cell and the discal streak are broader and of a deeper shade of yellow; on the *hindwing* it differs in the absence of the subbasal streak from the costal to the median nervure, the streak along the submedian nervure and the narrow discal line beyond the cell: in all these characters it agrees with the latter species, but differs therefrom in the colour of the ground of the underside, which instead of being "bright ferruginous" is of a greenish-brown, and instead of having all the bands pure silvery the third band from the base in the forewing, the discal band on the hindwing as far as the median nervure, and the band placed inwardly against the series of submarginal ocelli are alone silvery. Differs also from *Z. andersoni* but agrees with *Z. baladeva* in having on the underside of the forewing a submarginal series of six small perfect ocelli: the series of ocelli on the hindwing also are larger and better formed than in *Z andersoni*.

A single specimen is in my collection taken by Mr. Otto Möller's native collectors in August in Sikkim, probably in native territory. *Z. baladeva* is a very constant species, of which I possess many specimens, some taken in Sikkim in September, so *Z. ramadeva* can hardly be a seasonal form of that species.

5. *On Pandyan Coins.—By the* REV. JAMES E. TRACY, M. A., *with a plate and exhibit of Coins.*

6. *Notes on the Coinage and Currency of Siam.—By* BABU SARAT CHANDRA DÁS, C. I. E., *with an exhibit of Coins.*

Previous to, and during, the reign of H. M. Somdetch Pra Nang Klow, (1824 A. D.) the lowest currency of Siam consisted of a species of sea-shell or *cowrie* called *bi-ah* in the Siamese language. The amount of 1,500 *bi-ah* was usually accepted as equivalent to the smallest silver coin called the *fu-ang*. Latterly when the shell became scarce in the market, probably from the destruction of the species from some unknown natural causes, the Government fixed the value of the *fu-ang* at 800 *bi-ah*. The currency of the *bi-ah* is now-a-days discouraged by Government, yet they make their appearance in the remote and obscure markets of Bang-kok and in the interior of Siam. In the same manner the *cowrie*, the primitive currency of India, still continues to be the currency of modern India though it is not recognized by Government. The place of the *bi-ah* was first taken by lead coins and then by copper coins, according to the Rev. S. Smith, during the reign of H. M. Somdetch Pra Charem Klow. When lead was introduced in the currency, Government attached too much value to the new coins on the idea that the Government seals impressed on them raised their value. This encouraged counterfeits, a circumstance which forced the people to refuse altogether the valueless metal, lead, as an article of currency. During this reign the silver, copper and lead coins of the country continued to be of the peculiar *bullet* shape, but slightly different from what prevailed during the preceding reign. Some people in Siam say that during the latter part of King Chuam Klow's reign the flat silver and copper pieces stamped with the sacred Buddhist symbols were tried as a medium of currency.

His Majesty the present King of Siam on the occasion of opening the Bangkok Exhibition of 1882 said that His Majesty was pleased to see "the large collection of very old and curious lead coins that was exhibited on that auspicious day." From this it appears that lead coins existed in Siam from the earliest time when the Indian islands and the countries of Further India were under the sway of the Siam-Cambodian monarch of Unkor who built the great monastery of Nakhon-mal—the grandest of the Buddhist ruins of Asia.

It is the general belief of the Europeans residing at Bangkok that the Siamese heretofore have not known that silver mines existed in their country, and it is but lately that they have learnt to work the mines. The people who had commercial intercourse with the Chinese

and the Japanese in the Middle Ages could not in my opinion have failed to see the mineral resources of their own country. The Chinese have, since time immemorial, been the developers of the industry and resources of Siam. Their eyes could not have long remained shut to the silver mines which existed in Siam. There is no doubt of the fact that the Siamese did not know the art of mining as it prevails in Europe, and that few mines were worked, and these too very rudely. It is for this reason that the Siamese have ever been dependent on foreign monies, such as the horse-shoe shaped silver pieces of China and the silver currency of India, which they used to re-melt to manufacture ticals, salungs, fu-angs &c. the prevailing silver coins of Siam. In former times when the importation of foreign coins was not inconsiderable, the Siamese used to make their ticals of an alloy of lead and silver, sometimes of iron and nickel.

There are several gold mines in Siam. The mines at Bang Tapahn are said to contain the purest gold in the country. The Siamese gold is mostly used in manufacturing vases, water goblets, teapots, betel boxes, and other fancy articles, generally used for presentation on festive occasions.

Leaf-gold is imported in large quantities from China for manufacturing jewellery and coins. The latter is not an article of currency in the country. On State occasions and ceremonies such as the royal coronation, marriage, cremation, &c. the King and the distinguished members of the royal family make presents of gold coins to their friends and servants. These coins are therefore kept as objects of curiosity or honour, and are valued at six times the price of their weight of silver. In shape they resemble the ordinary ticals, salungs and fu-angs and are called by the same designations, such as gold ticals, gold salungs and gold fu-angs.

The Rev. Samuel Smith of Bangkok gives the following account of the modorn currency and its market value :—" The export trade of the country (Siam) is greatly in excess of the import trade. The foreign merchant must import foreign coin to effect his purchasers. The people, however, will not take foreign coin in exchange for their commodities. The importer must apply to the Government for native coins. The Siamese officers in connection with the Mint, burn the foreign coin, place before them a pair of scales, then 80 ticals of a given weight are placed on one scale of the balance, and enough of the burnt dollars are put on the other to balance. For this sum of burnt dollars, the importer was charged at $4\frac{1}{2}$ ticals for manufacturing that amount of dollars into Siamese money. When the Siamese Mint people remelted these dollars they added lead enough to make up for any loss that might result from remelting.

This was the usual method of exchanging dollars for ticals, till the reign of H. M. Somdetch Pra Charun Klow, the late king. This sovereign established the law making 5 ticals equivalent to 3 Mexican dollars. Since the passage of that law, importers exchange their Mexican dollars very readily. The Mint officers burn the dollars, and if they are all found to be genuine, five silver ticals are given for every three dollars without any further loss of time. This law makes the par value of the Siamese tical 60 cents of a dollar, the salung 15, and the fu-ang $7\frac{1}{2}$ cents, the tam-lang $\$ 2.^{40}$ and the chahug $\$ 48.^{00}$. The hahp $\$ 2{,}400.^{00}$ and the páhrah $\$240{,}000.^{00}$."

Table of Money and of Weights.

	50 Bi-ah	make	1	Solot.
Copper.	2 Solots	„	1	Att.
	2 Atts	„	1	See-o (Indian pie.)
	2 See-o	„	1	Seek (two pies.)
	2 Seek	„	1	Fu-ang.
Silver.	2 Fu-ang	„	1	Salung.
	4 Salung	„	1	Baht (generally called *tical*)
	4 Baht	„	1	Tumlang.
Weight just like ounce, pound &c.	20 Tumlang	„	1	Chang = $22\frac{2}{3}$ lbs. pounds English.
	50 Chang	„	1	Hahp.
	100 Hahp	„	1	Pahrah.

The impressions on the bullet shaped coins are the Buddhist symbols the Swastika the Srivatsa, the elephant, the umbrella, the Dhuaja (sacred flag), the twin fish, the gem and the water pot (jar of life or immortality). The modern *tical* contains three chatyas and the rising sun.

7. *Rock cut figures and inscriptions in the Chittral valley (Kashmir) and at Gangani on the Upper Indus.—Communicated by* COL. BIDDULPH.

They appear to be of comparatively modern date, and contain nothing of interest.

8. *Notes on the city of Herat.—By* CAPT. C. E. YATE, Political Officer, Afghan Boundary Commission.

The paper will be printed in Part I of the Journal for 1887.

9. *On the Differential Equation of a Trajectory.*—*By* ASUTOSH MUKHOPÁDHYÁYA, M. A., F. R. S., F. R. S. E.—*Communicated by the* HON. DR. MAHENDRALÁL SARKÁR, C. I. E.

(Abstract.)

This paper is devoted to a consideration of Mainardi's problem of determining the oblique trajectory of a system of confocal ellipses. Mainardi's result, which is reproduced by Boole in his Differential Equations, pp. 248—251, comes out in a very complex form; it is, however, shewn in the present paper that the co-ordinates of any point on the trajectory may be represented by the remarkably simple pair of equations

$$x = a \cos \phi \cos h\, n\, (\lambda \times \phi)$$
$$y = b \sin \phi \sin h\, n\, (\lambda \times \phi)$$

where a, b are the semi-axes of the ellipse, n the tangent of the angle of intersection, λ an arbitrary constant, and ϕ a variable parameter; an elegant geometrical interpretation of these equations, by means of a hyperbola, is added.

The paper will be printed in the Journal, Part II, for 1887.

The subject of conversation by the PHILOLOGICAL SECRETARY—"The International Congress of Orientalists at Vienna, held in 1886,"—was postponed.

LIBRARY.

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University,—American Chemical Journal, Vol. IX, No. 1, February, 1887.

———. ———. American Journal of Philology, Vol. VII, No. 4, December, 1886.

———. ———. Circulars,—Vol. VI, No. 56, March, 1887.

———. ———. Studies from the Biological Laboratory,—Vol. III, No. 9, February, 1887.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—Notulen, Deel XXIV, Aflevering 4.

Bombay. The Indian Antiquary,—Vol. XVI, No. 195, April, 1887.

Calcutta. Geological Survey of India,—Memoirs, Vol. XXIV, Part 1.

———. The Indian Engineer,—Vol. III, Nos. 2 and 3, and Index, Vol. II.

———. Indian Engineering,—Vol. I, Nos. 15—18.

———. Meteorological Observations recorded at six stations in India corrected and reduced,—December, 1886.

Chicago, Ill. The American Antiquarian and Oriental Journal,—Vol. IX, No. 2, March, 1887.

Florence. Società Africana D'Italia,—Bullettino, Tome III, Fascicoli 1°, 2°, e 3°.

Hamilton. Hamilton Association,—Journal and Proceedings, Vol. I, Parts 2 and 3.

Havre. Société de Géographie Commerciale du Havre,—Bulletin, No. 1, Janvier—Février, 1887.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XL, Heft 4.

London. The Academy,—Nos. 777—779.

———. Anthropological Institute of Great Britain and Ireland,—Journal, Vol. XVI, No. 3, February, 1887.

———. The Athenæum,—Nos. 3100—3102.

———. Geological Society,—Quarterly Journal, Vol. XLIII, Part 1, No. 169, February, 1887.

———. Nature,—Vol. XXXV, Nos. 907—910.

———. Royal Astronomical Society,—Monthly Notices, Vol. XLVII, No. 3, January, 1887.

———. Royal Geographical Society,—Proceedings, Vol IX, No. 3, March, 1887.

———. Royal Microscopical Society,—Journal, Part 1, February, 1887.

———. Royal Society,—Proceedings, Vol. XLI, Nos. 249 and 250.

New Haven. Connecticut Academy of Arts and Sciences, Transactions, Vol. VII, Part 1.

Paris. Journal Asiatique,—Tome IX (VIII^{e} série), No. 1, Janvier, 1887.

——. Société de Géographie,—Compte Rendu des Séances, Nos. 5 et 6, 1887.

Rome. La Societá Degli Spettroscopisti Italiani,—Memorie, Vol. XVI, Dispensa 1^{a}, Gennaio, 1887, et Indice, Vol. XV.

San Francisco. Kosmos,—Vol. I, No. 1, February, 1887.

St. Petersburgh. Comité Géologique,—Bulletins, Tome VI, Nos. 1—3.

———. ———. La Société Impériale Russe de Géographie,—Journal 1879.

———. ———. Proceedings,—Tome XVI; Tome XXII, Nos. 4 et 5.

Turin. La R. Accademia della Scienze di Torino,—Atti, Vol. XXII, Disp. 4ª—8ª, et Elenco Degli accademici Residenti, Nazionali non Residenti, Stranieri e Corrispondenti al 1° Gennaio 1887.

Miscellaneous Presentations.

Catalogus der Archeologische Verzameling van het Bataviaasch Genootschap van Kunsten en Wetenschappen, door W. P. Groeneveldt. 8vo. Batavia, 1887.

Bataviaasch Genootschap van Kunsten en Wetenschappen, Batavia.

Returns of Railway borne traffic of the Department of Agriculture, Central Provinces for the quarter ending 31st December, 1886. Fcp. Nagpur, 1887.

Chief Commissioner, Central Provinces.

Administration Report on the Jails of Bengal for the year 1886, by A. S. Lethbridge, Esq., M. D., Inspector-General of Jails, Bengal. Fcp. Calcutta, 1887.

Returns of the Rail-borne trade of Bengal during the quarter ending the 31st December, 1886. Fcp. Calcutta, 1887.

Government of Bengal.

The Avifauna of British India and its dependencies, by James A. Murray. Vol. I, Part I. 8vo. Bombay, 1887.

The Indian Antiquary,—Vol. XVI, Nos. 193—195, February to April, 1887. 4to. Bombay, 1887.

Government of India, Home Department.

Report on Public Instruction in the Madras Presidency for 1885-'86, Fcp. Madras, 1886.

Government of Madras.

Report on the Administration of the N. W. Provinces and Oudh, for the year ending 31st March, 1886. Fcp. Allahabad, 1887.

Government of N. W. Provinces and Oudh.

Report on the Administration of the Punjab and its Dependencies for 1885-'86. Fcp. Lahore, 1887.

Government of the Punjab.

The Sacred Books of the East edited by F. Max Müller, Vol. XXV The Laws of Manu, translated, with extracts from seven commentaries, by G. Bühler. 8vo. Oxford, 1886.

———. Vol. XXIX. The Grihya-Sûtras, rules of vedic domestic ceremonies, translated by Hermann Oldenberg, Part I. 8vo. Oxford, 1886.

India Office, London.

Supplementary Catalogue of books added to the lending department of the Newcastle-upon-Tyne Public Libraries, compiled by W. J. Haggerston, Chief Librarian. 8vo London, 1887.

THE NEWCASTLE-UPON-TYNE PUBLIC LIBRARIES.

PERIODICALS PURCHASED.

Berlin. Deutsche Litteraturzeitung,—VIII Jahrgang, Neu 7—10.

Calcutta. The Calcutta Review,—Vol. LXXXIV, No. 168, April, 1887.

———. Indian Medical Gazette,—Vol. XXII, No. 3, March, 1887.

Cassel. Botanisches Centralblatt,—Band XXIX, Neu 7—11.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XVII, No. 3.

Göttingen. Der Königl Gesellschaft der Wissenschaften,—Göttingische Gelehrte Anzeigen, Neu 2 and 3, 1887.

———. ———. Nachrichten,—Register, 1886.

Leipzig. Annalen der Physik und Chemie,—Beiblätter, Band XI, Stück 2 and 3.

———. Hesperos,—Vol. VI, No. 138.

———. Literarisches Centralblatt, Neu 7—10, 1887.

London. The Annals and Magazine of Natural History,—Vol. XIX (5th series), No. 111, March, 1887.

———. The Chemical News,—Vol. LV, Nos. 1425—1428.

———. The Entomologist, Vol. XX, No. 286, March, 1887.

———. The Entomologist's Monthly Magazine,—Vol. XXIII, No. 274, March, 1887.

———. The Journal of Botany,—Vol. XXV, No. 291, March, 1887.

———. The London, Edinburgh, and Dublin Philosophical Magazine, —Vol. XXIII (5th series), No. 142, March, 1887.

———. The Messenger of Mathematics,—Vol. XVI (new series), No. 11, March, 1887.

———. Mind, Vol. XII, No. 46, April, 1887.

———. The Nineteenth Century,—Vol. XXI, No. 122, April, 1887.

London. The Numismatic Chronicle,—Vol. VI (3rd series), No. 24.

———. The Quarterly Journal of pure and applied Mathematics,—Vol. XXII, No. 85, October, 1886.

———. Society of Arts,—Journal, Vol. XXXV, Nos, 1791—1794.

New Haven. The American Journal of Science,—Vol. XXXIII, No. 194, February, 1887.

Philadelphia. Manual of Conchology,—Vol. VIII, Parts 32 A and B; 2nd series, Vol. II, Part 8.

Paris. L'Académie des Sciences,—Comptes Rendus des Séances,—Tome CIV, Nos. 6—9, et Table des matières du Tome CII.

——. Annales de Chimie et de Physique,—Tome X (6me série), Février, 1887.

——. Journal des Savants,—Février, 1887.

——. Revue Critique d'Histoire et de Littérature,—Tome XXIII, Nos. 7—10.

——. Revue Scientifique,—Tome XXXIX, Nos. 7—10.

Books Purchased.

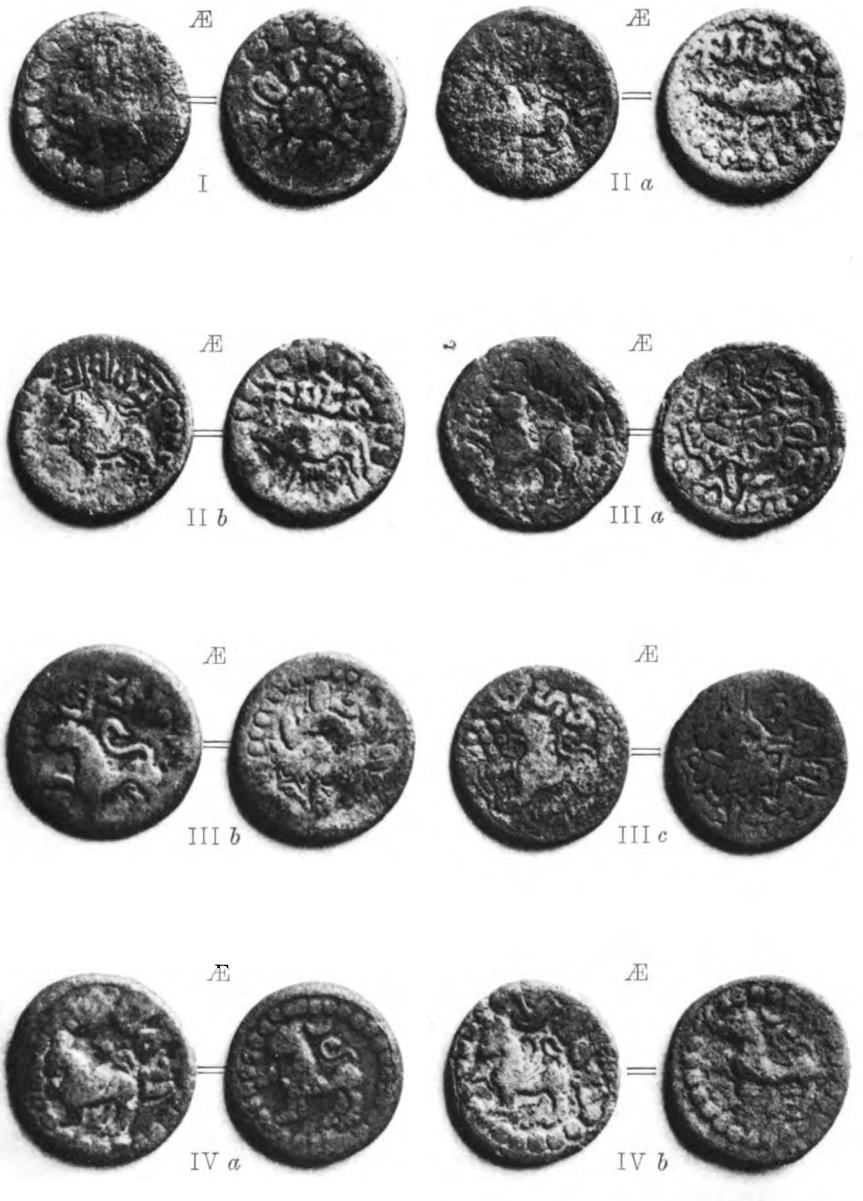
Buckler, William. The Larvæ of the British Butterflies and Moths, edited by H. T. Stainton, F. R. S., Vol. II—(Ray. Society). 8vo. London, 1887.

Fallon, S. W., Ph. D. A Dictionary of Hindustani Proverbs, edited and revised by Captain R. C. Temple, F. R. G. S., Part V. 8vo. Benares, 1886.

Gould, John, F. R. S. The Birds of New Guinea and the adjacent Papuan Islands, Part XXIII. Fol. London, 1887.

Angelo Heilprin. The Geographical and Geological Distribution of Animals (The International Scientific Series, Vol. LVIII). 8vo. London, 1887.

Report on the Scientific Results of the Exploring Voyage of H. M. S. Challenger (Botany), Vol. II; (Zoology), Vols. XVII, XVIII, Parts 1 and 2 and Plates. 4to. London, 1886-'87.



ANCIENT COPPER COINS FROM NEPAL.

Photo-Collotype, Survey of India Offices, Calcutta, June 1887.

ERRATUM.

Read F. R. A. S. instead of F. R. S. in line 2 from the top, page 151 of the Proceedings, No. V for May 1887.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JUNE, 1887.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 1st June 1887, at 9-15 P. M.

E. T. ATKINSON, ESQ., C. S., President, in the chair.

The following members were present:—

H. Beveridge, Esq., Babu Nobin Chánd Bural, R. D. Mehta, Esq., E. F. Mondy, Esq., T. R. Munro, Esq., H. M. Percival, Esq., Maulavi Golám Sarwar, Pandit Haraprasád Sástri, Dr. W. J. Simpson, F. J. E. Spring, Esq., D. Waldie, Esq., J. Wood-Mason, Esq., Lt.-Col. J. Waterhouse.

Mons. E. Gasselin. Consul General for France, by invitation.

The minutes of the previous meeting were read and confirmed.

Sixteen presentations were announced, as detailed in the appended Library List.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members:—

The Rev. Graham Sandberg, B. A.

Ráo Govind Ráo Narain.

J. H. Apjohn, Esq.

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

Moung Hla Oung, Esq., Financial Department, Government of India, proposed by E. T. Atkinson, Esq., seconded by J. Wood-Mason, Esq.

The PRESIDENT announced that Professor C. R. Lanman, of Harvard College, Cambridge, U. S. A. had compounded for his subscription for life as a Foreign Member, by the payment of Rupees 200 in a lump sum.

Mr. F. J. E. Spring exhibited some Burmese MSS.

The PHILOLOGICAL SECRETARY read the following report on a find of six old coins forwarded by the Deputy Commissioner of Rawal Pindí, with his No. 498 G, dated 2nd March 1887.

"These coins are stated to have been found in the Kahuta subdivision of the Rawal Pindi district. Five of them are of copper, and one of debased silver.

"They were submitted by me to Mr. Rodgers of the Archæological Survey, in Lahore; and were by him identified as follows:—

	No. of Coins.
a, *Of debased silver;* a forged rupee of MUḤAMMAD SHÁH DURRÁNÍ of Herat.....	1
b, *Copper;* round pice of AKBAR II, date 1225 A. H., Mint: Sháh Jahánábád.....	1
c, *Copper;* round pice, probably of MUḤAMMAD SHÁH of Delhi; no date; Mint: Etáwá.....	1
d, *Copper;* round pice; Sikh coinage in Persian, struck at Amritsar. Inscription on obverse is inverted as in type.....	1
e, *Copper;* irregular shaped pice; Sikh coinage; legends almost illegible.....	1
f, *Copper;* square pice; commonly called 'Massúrí' or 'Mansúrí' pice all over the Panjáb; in some bazaars met with extensively, and current among certain classes of the community. They never have any name or figure on them. Sometimes they are punched.....	1

"They have been given to the Imperial Museum in Calcutta, by order of the Government."

The PHILOLOGICAL SECRETARY intimated having been informed by Mr. V. A. Smith, of Basti, that his General Index to Cunningham's Archæological Reports was in the press and would shortly be published by the Government of India as Vol. XXIV of the Series.

The following papers were read—

1. *E'tudes sur les Arachnides de l'Asie méridionale faisant partie des collections de l'Indian Museum (Calcutta). I. Arachnides recueillis à Tavoy (Tenasserim) par Moti Ram. Par* M. E. SIMON *de Paris. Communicated by the* SUPERINTENDENT OF THE INDIAN MUSEUM.

2. *Notes on Indian* Rhynchota. Heteroptera, No. 2.—*By* E. T. ATKINSON, ESQ., C. S., PRESIDENT.

(Abstract.)

Mr. E. T. Atkinson contributes a second paper on the *Rhynchota. Heteroptera*, in which he gives descriptions of the species included in the sub-family *Scutellerina* of which the following genera are recorded from India :—Oxyprymna, 1 : Solenostethium, 1 : Hyperoncus, 1 : Cantao, 1 : Pœcilocoris, 12 : Tetrarthia, 2 : Scutellera, 2 : Brachyaulax, 1 : Calliphara, 2 : Chrysocoris, 16 : Lamprocoris, 4 : Hotea, 3 : Alphocoris, 1 : Eurygaster, 1 : Arctocoris, 1, and uncertain, 7.

This paper will be published in the Journal, Part II.

3. *On the Mammals and Birds collected by Captain C. E. Yate, C. S. I. of the Afghan Boundary Commission.—By* DR. J. SCULLY.

(Abstract.)

In this paper an account is given of a collection made by Captain Yate in Afghan Turkestan which comprises thirteen species of mammals and one hundred and ten species of birds. Among the mammals are two rodents, apparently new to science, which are described under the names of *Spermophilus bactrianus* and *Ellobius intermedius*.

This paper will be published in the Journal, Part II.

4. *On three grants of Govinda Chandra Deva of Kanauj, in the 12th Century.—By* DR. FÜHRER.

(Abstract.)

All the three plates are written in the Devanágarí characters, with the texts in Sanskrit. Each plate had a ring and a seal attached. These still remain only in the case of the first plate. The first plate, Samvat 1180, was found in April 1885 at Raiwán in the Sítápur district, and is now in the Provincial Museum, Lucknow. It measures 1′ 2″ by 9″, and is inscribed, as also are the other two plates, on one side only. The text contains essentially the same historical information as that derived from the four grants of the same sovereign already known ; but it further states that Govinda Chandra Deva acquired sovereignty

over Kanyákubja, and that his kingdom included Benares, Ayodhyá and ancient Delhi.

The other two plates are now in the possession of Dr. G. C. Hall in Allahabad, who obtained them from their owner, Sítárám Agarwallá in Benares. There is no information forthcoming as to where they were originally found. They were both granted by the king when he was at Benares. Of these the second plate, Samvat 1181, measures 1′ 4″ by 1′ 1″. The text is dated "Thursday, the 8th lunar day of the bright half of the month Bhádrapada." The grant was that of a village, Tribháṇḍí in the Avajrala district, to a Bráhman, Paṇḍita Bhúpatiśarmá of the Mauneya Gotra. The third plate, Samvat 1185, measures 1′ 6″ by 1′ 4″. The text is dated "Friday, the 15th lunar day of the bright half of Chaitra." The grant was that of a village Java in the Puroha district to the same donee as above. The historical value of this grant lies in the fact that it proves Govinda Chandra Deva to have been still reigning at the date mentioned, corresponding to 1128 A. D. The texts and translations of the three grants are given in full.

This paper will be published in the Journal, Part I.

5. *Some observations on Major Raverty's notes in his translation of the Ṭabaqát i Náṣirí on the coinage of the Kings of Ghazní.*—*By* C. J. RODGERS, ESQ.

(Abstract.)

In this paper Mr. Rodgers calls in question the genuineness of the source—an unnamed writer—from which Major Raverty derives certain information regarding the dates of the last two kings of the house of Sabuk-Tigīn—Khusrau Sháh and Khusrau Malik. Extracts given by Major Raverty from this writer fix A. H. 552 and A. H. 555 as the first years of the reigns of these two kings, respectively, these dates being mentioned as such on the reverse of coins said to have been struck at Lahore. In his notes, Major Raverty further states that Mr. Thomas, in his Paper on the Ghazní coins, takes no notice of these two kings.

In reply Mr. Rodgers points out, first, that in the paper referred to, Mr. Thomas does give notices of two silver coins of Khusrau Sháh, and of five coins of Khusrau Malik; secondly, that in the case of coins struck by the Ghazní kings the year of the Hijrá is always given on the margin, and that the year of the reign is never given; and thirdly, that coins of the type mentioned by Major Raverty,—*i. e.*, coins with the Hijra year on the reverse, and with the year of the reign specified—are of the time of Aurangzíb or later. On these grounds, and from the fact that no cabinet possesses a single specimen of a Ghazní

coin of the type mentioned by the anonymous author, Mr. Rodgers comes to the conclusion that the work on which Major Raverty relies is a forgery by a man unacquainted with the character of the coinage of the later Ghaznî kings and the earlier Paṭhán Sulṭáns of Delhí, who bases his formula for the pretended coins in question, upon that of the rupees of Aurangzíb and his successors.

This paper will be published in the Journal, Part I.

The subject of conversation by Mr. Beveridge was "The image of Ban Asur at Arrah."

LIBRARY.

The following additions have been made to the Library since the meeting of May last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Amsterdam. Revue Coloniale Internationale,—Tome IV, No. 4, Avril, 1887.

Baltimore. Johns Hopkins University,—American Journal of Mathematics, Vol. IX, No. 3, April, 1887.

———. ———. Circulars, Vol. IV, No. 57, April, 1887.

Bombay. The Indian Antiquary,—Vol. XVI, Part 196, May 1887.

Calcutta. Agricultural and Horticultural Society of India,—Journal, Vol. VIII.

———. Geological Survey of India,—Records, Vol. XX, Part 2, May, 1887.

———. The Indian Engineer,—Vol. III, Nos. 4 and 5.

———. Indian Engineering,—Vol. I, Nos. 19—22.

———. Meteorological Observations recorded at six stations in India, corrected and reduced,—Index for the year 1886.

Edinburgh. Botanical Society,—Transactions and Proceedings, Vol. XVI, Part 3.

The Hague. Koninklijk Instituut voor de Taal,—Land-en Valkenkunde van hederlandsch-Indië,—Bijdragen tot de Taal-Land-en Volkenkunde van Nederlandsch-Indië, Dal II (5e Volgr), Aflevering 2.

London. The Academy,—Nos. 780—783.
———. The Athenæum, Nos. 3103—3106.
———. Nature,—Vol. XXXV, Nos. 911—914.
———. Society of Telegraph Engineers and Electricians,—Journal, Vol. XV, No. 64.
Moscow. La Société Imperiale des Naturalistes de Moscou,—Bulletin, Tome LXII, No. 4; Tome LXIII, No. 1, et supplement Tome LXII.
Paris. Société de Géographie,—Compte Rendu des Séances, No. 9, 1887.
Rome. La Società degli spettroscopisti Italiani,—Memorie, Vol. XVI, Dispensa 2ª, Febbraio, 1887.
St. Petersburgh. Imperial Russian Geographical Society,—Proceedings, Vol. XXII, No. 6.
Shanghai. Royal Asiatic Society (China Branch),—Journal, Vol. XXI, (new series), Nos. 3 and 4.
Tōkyō. Imperial University (College of Science),—Journal, Vol. I, Part 2.
Toronto. Canadian Institute,—Proceedings, Vol. IV, (3rd series), No. 2.
Turin. La R Accademia della Scienze di Torino),—Atti, Vol. XXII, Disp. 9ª.
Vienna. Der K. K. Zoologisch-botanischen Gesellschaft in Wien,—Verhandlungen, Band XXXVII, 1 Quartal.

Books and Pamphlets,

presented by the Authors, Translators, &c.

ROY, PROTAP CHANDRA. The Mahábhárata, translated into English Prose. Part XXXI. 8vo. Calcutta, 1887.
WHINFIELD, E. H., M. A. Masnavi-i-Ma'navi. The Spiritual couplets of Maulána Jalálu-'d-dín Muhammad I Rumi.—Translated and Abridged (Trübner's Oriental Series). 8vo. London, 1887.

Miscellaneous Presentations.

Informe de la Direccion General de Estadistica, 1886. 8vo. Guatemala, 1887.

DIRECCION GENERAL DE ESTADISTICA, GUATEMALA.

The Indian Forester, Vol. XIII, Nos. 4 and 5, April and May, 1887. 8vo. Roorkee, 1887.
Report of the Calcutta Court of Small Causes for the year 1886. Fcp. Calcutta, 1887.

Seven Grammars of the dialects and subdialects of the Bihárí Language. By George A. Grierson, B. C. S., Part VIII. 8vo. Calcutta, 1887.

GOVERNMENT OF BENGAL.

Magnetical and Meteorological Observations made at the Government Observatory, Bombay, 1885. 4to. Bombay, 1887.

GOVERNMENT OF BOMBAY.

Army Estimates of effective and non-effective services, for 1887-88. Fcp. London, 1887.

The Avifauna of British India and its dependencies. By James A. Murray, Vol. I, Part 2. 8vo. Bombay, 1887.

Further Correspondence relating to Burmah (in continuation of No. 3 of 1886.) Fcp. London, 1887.

The Indian Antiquary, Vol. XVI, Part 196, May, 1887. 4to. Bombay, 1887.

Memorandum of the Secretary of State relating to the Army Estimates, 1878-88. Fcp. London, 1887.

Return of all Loans raised in England under the Provisions of any Acts of Parliament, chargeable on the Revenues of India, outstanding at the commencement of the half-year ended on the 30th September, 1886. Fcp. London, 1887.

Return of all Loans raised in India, chargeable on the Revenues of India, outstanding at the commencement of the half-year ended on the 30th September, 1886. Fcp. London, 1887.

Selections from the Records of the Government of India, Home Department, No. CCXXIV. Reports on Publications issued and registered in the several Provinces of British India during the year 1885. Fcp. Calcutta, 1887.

Statement of the Trade of British India with British Possessions and Foreign countries for the five years 1881-82 to 1885-86. Fcp. London, 1887.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

International Meteorological Observations, December, 1885, and January, 1886. 4to. Washington, 1887.

Monthly Weather Review, December, 1886 and January, 1887. 4to. Washington, 1887.

GOVERNMENT OF INDIA,—METEOR. REPORTER.

Madras Meridian Circle Observations 1862-64. 4to. Madras, 1887.

GOVERNMENT OF MADRAS.

Johns Hopkins University Studies in Historical and Political Science, fifth series IV. The City Government of Saint Louis. By Marshall S. Snow. 8vo. Baltimore, 1887.

JOHNS HOPKINS UNIVERSITY, BALTIMORE.

Periodicals Purchased.

Allahabad. Indian Notes and Queries,—Vol. IV, No. 42, March, 1887.
Calcutta. Indian Medical Gazette,—Vol. XXII, No. 4, April, 1887.
Geneva. Archives des Sciences Physiques et Naturelles, Tome XVII, No. 4.
Leeds. The Journal of Conchology,—Vol. V, No. 6, April, 1887.
Leipzig. Annalen der Physik und Chemie,—Band XXXI, Heft 1.
———. ———. Beiblätter, Band XI, Stück 4.
London. The Chemical News,—Vol. LV, Nos. 1429—1432.
———. The Nineteenth Century,—Vol. XXI, No. 123, May, 1887.
———. Society of Arts,—Journal, Vol. XXXV, Nos. 1795—1798.
Vienna. Vienna Oriental Journal,—Vol. I, No. 2.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JULY, 1887.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th July 1887, at 9-15 P. M.

E. T. ATKINSON, ESQ., C. S., PRESIDENT, in the Chair.

The following members were present:

H. Beveridge, Esq., E. C. Cotes, Esq., Dr. Hoernle, A. Hogg, Esq., Dr. Rájendralála Mitra, C. I. E., Rai Bahadur, E. F. Mondy, Esq., Babu Asutosh Mukhopàdhyáya, Babu Nilmani Mukherji, H. M. Percival, Esq., T. A. Pope, Esq. The Hon. Dr. Mahendralál Sarkár, C. I. E., Pandit Haraprasád Sástri, Dr. J. Scully, Dr. W. J. Simpson, D. Waldie, Esq., Lt.-Col. J. Waterhouse., J. Wood-Mason, Esq.

The Minutes of the last Meeting were read and confirmed.

Twenty-two presentations were announced, as detailed in the appended Library List.

The following gentleman, duly proposed and seconded at the last meeting of the Society, was ballotted for and elected an Ordinary Member—

Moung Hla Oung, Esq.

The following gentleman is a candidate for election at the next meeting.

Babu Haricharan Basu, proposed by Dr. Rájendralála Mitra, seconded by Professor Mahesachandra Nyáyaratna.

The following gentlemen have expressed a wish to withdraw from the Society.

The Hon. C. T. H. Crosthwaite, C. S. I.

R. H. Wilson, Esq.

The PRESIDENT announced that the votes would now be taken on the proposed new rule 24*a*., for compounding the subscription of Foreign Members, reported at the meeting in April last. A. Hogg, Esq., and the Hon. Dr. Mahendralál Sarkar, were appointed Scrutineers, who reported that there were 81 votes in favour of, and 9 against the rule.

The PRESIDENT thereupon announced that the proposed new rule had been duly carried.

DR. RÁJENDRALÁLA MITRA submitted to the inspection of the meeting a copper-plate inscription in three parts received from Mr. C. T. Metcalfe, Commissioner of Orissa. The plates record the grant of a village by Rája Vidyádhara Bhanja. A transcript and translation of the record, together with facsimiles, will be published in the Journal, Part I.

The PRESIDENT read the following appeal to Naturalists for local aid on behalf of Mr. W. L. Distant in the preparation of a Monograph of the *Cicadidæ* of the Indian and Indo-Malayan Regions :—

Attention is called to the enclosed Circular from Mr. W. L. Distant, and an appeal is now made for local aid from Naturalists towards making the proposed Monograph of the family *Cicadidæ* of the *Rhynchota* as complete as possible. *Cicadæ* are easily killed in the ordinary cyanide bottle, and can be sent in camphorated clean sawdust, moss, or paper in an ordinary tin or wooden box by parcel post, either direct to Mr. Distant or to Mr. J. Wood-Mason, Superintendent of the Indian Museum, Calcutta, who will forward them. Mr. E. T. Atkinson, who is engaged on the *Rhynchota* of India, will be glad of any specimens of other families of the *Rhynchota* that can be procured ; these also should be sent to the Indian Museum, or to Mr. Atkinson, 15, Loudon Street, Calcutta. As collected they could be kept in spirit until a sufficient quantity is procured for transmission.

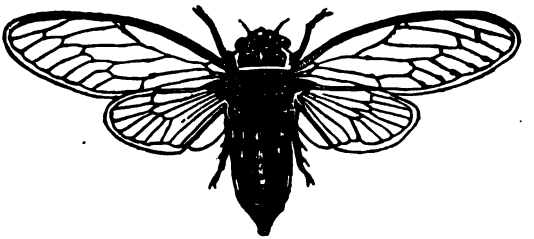
Circular.

RUSSELL HILL ROAD,
PURLEY,
Surrey.

DEAR SIR,

"As I am preparing a Monograph of the *Cicadidæ* of the Indian and and Indo-Malayan Regions, under the auspices of the Indian Museum, Calcutta, I am anxious to make the work as complete and exhaustive as possible, and for that purpose am desirous of receiving specimens

belonging to this family of Insects. Every species will be figured, and every acknowledgment made to the donors, in the work. The family is little worked, and so it is safe to rely upon new species being easily collected.



"For those who are non-conversant with the *Cicadidæ* the figure here given will prove a guide.

I am &c.,
W. L. Distant."

The Philological Secretary read the following extract from a letter of Mr. Rodgers.

"By the way in my late tour I purchased for Government nearly 400 coins of kinds. Amongst them are 4 of Ibráhím Súrí in copper and two of Sikandar Súrí. There are also several new things belonging to Akbar, conspicuous amongst which are a Kalimah Fulús, a Chau Tanke and a Chau Tánke piece. There is also a dam of Sher Sháh with the Kalimah on it. The list will I expect be published although the list for last year is still unpublished.

"I have made no discoveries this year like the exhumed temple at Núrpúr. But still I think I have discovered the remains of the temple at Kángrá destroyed by Mahmúd of Ghazní. And I have discovered a group of temples cut out of the solid rock at a place called Masrúr near Kángrá and yet never previously visited by an Englishman."

Dr. Rájendralála Mitra made the following remarks on a note by Mr. F. S. Growse on the derivation of the Buddhist term *Ekotibháva.*

In the 'Academy' for May last there is a letter from Professor Max Müller in which he has given publication to an extract from a letter by Mr. Growse on the derivation of the Buddhist term Ekotibháva. I think it desirable to make a few remarks on the same.

Mr. Growse is not satisfied with the derivation suggested by me in a note which I submitted to this Society about a year ago. He says my

proposal seems to him to be 'quite untenable.' He does not, however, condescend to give any reason for this demurrer. In my note I showed that the two words *eka* and *úti* were as old as the Saṅhitá of the Ṛig Veda; that they had been frequently used in Sanskrit literature; that their union was in perfect accord with the rules of Sanskrit Grammar; and that the meaning they produced by the union was exactly what the Ceylonese Buddhists assigned to the compound term, and what was most consonant with the requirements of the passage in the Lalita Vistara in which the word was first met with. It has since been met with in other Sanskrit Buddhist works. It may be that I am totally wrong, and my arguments are of no value; but in the face of my remarks a simple denial without a single reason appears to me inconsonant with the practice usually followed in the republic of letters—not to say uncourteous. It comes to me and to the public generally as an *ex cathedrâ* assertion. It reminds me of the advice which a learned judge is said to have given to his son—'pass your sentence, but give no reason.' Under these circumstances I am not now in a position to say anything about it.

I find myself in a better situation as regards the constructive part of Mr. Growse's letter. Writing to Professor Max Müller Mr. Growse says, 'I entirely agree with your view that it is a contraction of *eka-koṭi*; though when you are content to characterize it as an irregularity I am bold enough to maintain that it is quite in accordance with rule. The elision of the syllable *ka* in *eka* would no doubt be an anomaly, though the analogies you adduce might sufficiently defend it on the score of euphony. I think, however, that it is not the *ka* in *eka* that is elided, but the *k* in *koṭi*, by Vararuchi's well-known rule that *k* (as in *súar* for *súkara*), *g* and other consonants, when simple and non-initial, are generally elided, the first letter of the latter member of a compound being regarded as non-initial.'

There is an omission in these remarks—quite an accidental one, I presume—which is calculated to mislead the great bulk of English readers for whom the 'Academy' is published. In a discussion on the derivation of a Sanskrit word most people would naturally think that the rule cited by Mr. Growse with the predicate 'well-known' was a rule of Sanskrit orthography; but in the present instance such an inference, however legitimate, would be a mistaken one. Vararuchi is not the author of any known Sanskrit Grammar, and the rule cited occurs in his Grammar of the Prákrit language. Had Mr. Growse put in the word 'Prákrit' before 'rule' the case would have been clear enough. Supplying the omission, the first question that suggests itself to me is—Are the rules of Prákrit orthography applicable to Sans-

kritic orthography? This is *mutatis mutandis* the same question as that which would ask, are the rules of Italian orthography—of the language of Dante and Petrarch—applicable to the elucidation of the Latin of Virgil, Horace, Cicero, or Cæsar? And put in this form I have no doubt the reply would be an emphatic negative. The Italian of Dante is the result of a process of decay, regeneration and hybridism, of the Latin of Virgil, and the course which this process followed is exactly the same which we meet with in the transition of the Sanskrit into Prákrit. In either case the change took place slowly, gradually, but steadily, and the principles which regulated it were the same, the ends sought being simplification, softening and economy. Both in Italy and India, the change began with the lower orders, and was looked upon by the higher classes with contempt. In Italy the changing language was indicated by the opprobrious names of *lingua romana rustica, lingua vulgaris,* or *lingua plebeia* in contradistinction to the *lingua aulia* of the patricians. During its earlier growth it was not thought fit for literary composition, and so we have not any connected chain of proofs to show the different stages in its growth for several centuries from the time of Virgil. The poetry of the Troubadours is the earliest written proof we have, but the literary Italian of Dante suggests a long anterior history, which we cannot now follow with precision. The same is the case with the other Romance languages. In connexion with French we have the language of the Troubadours, the Provençal, the Langue d'Oc, and the Langue d'Oil, leading to the modern language of France. In none of these can the forms of the later stages be appealed to for what occur in previous ages. And the history of the transition of the Sanskrit into Prákrit is a repetition of that of the Latin into the Romance languages. We have in it two well-marked stages, the Gáthá and the Páli. Of the former I shall say nothing here, as some people fancy that it is not the outcome of a process of natural growth, but the result of ignorance. The latter is now, I believe, universally admitted by European Orientalists and philologists to be an issue of the Sanskrit, produced by the same process of change, which at a subsequent stage gave birth to the Prákrit; and we may safely accept it as a guide in the enquiry we have now in hand. It does not, however, afford us any help. It contains not a single instance to show that the change to which Mr. Growse refers had made even a beginning in the age of the Páli. I have gone through Mr. Childers' Páli Dictionary with some care, but have failed to find any indication of it. Simple non-initial *k, g,* &c., in Páli always retain their places, and are never elided. To give a few examples. We have

Aputto	not	Autto	for	Sanskrit	Aputra
A'bádho	,,	A'ädho	,,	,,	A'bádha
Achetano	,,	Aëtano	,,	,,	Achetana
Achiro	,,	Aïro	,,	,,	Achira
A'daro	,,	A'äro	,,	,,	A'dara
A'káro	,,	A'áro	,,	,,	A'kára
A'káso	,,	A'áso	,,	,,	A'kása
Bhágo	,,	Bháo	,,	,,	Bhága
Dado	,,	Daö	,,	,,	Dada
Kavi	,,	Kaï	,,	,,	Kavi
Kedaro	,,	Keäro	,,	,,	Kedára
Papáko	,,	Páäo	,,	,,	Pápaka
Sakuno	,,	Saüno	,,	,,	S'akuna
Udaram	,,	Uäram	,,	,,	Udara
Uchito	,,	Uïto	,,	,,	Uchita

It is obvious hence that the system of eliding simple non-initial consonants had not come into operation at the time when the Páli language was current, and with this fact before us, can we with any propriety accept the rule as a guide for the elucidation of Sanskrit philology of a time when Prákrit grammar had not yet been in existence? It would be, in my opinion, as reasonable to do so, as to cite a rule of modern Italian orthography to account for the spelling of a word in Virgil. In Sanskrit grammar when two Sútras or aphorisms on kindred topics (*adhikára*) are interrupted by an extraneous rule, it is usual to defend the break by what is called 'the principle of the frog's jump' (*maṇḍuka-pluti-nyáyaḥ*). In the present instance the little rule of Vararuchi must make a tremendous jump to get over the barrier of the two dialects of Gáthá and Páli, and span a period of six centuries or more.

It should be mentioned here that the Prákrit grammars now extant are not grammars in the same sense in which we accept grammars of the Latin, French, German or English language. They are sequels of Sanskrit grammar, and devoted to the description of the changes which Sanskrit idioms, words, inflections, syllables and letters undergo when converted into Prákrit. The Sanskrit is always taken as the type, and the Prákrit as the issue thereof, and we cannot reverse the order without casting overboard all ancient landmarks.

It might be said that as the system of elision must have come into currency very slowly and gradually it may have commenced from before the time when the Lalita Vistara was composed, and *ekotibháva* may be the earliest instance we have of the operation of that tendency of the organs of speech which brought on the change. This would,

however, amount to a mere begging of the question. It cannot serve the purposes of a major term—a universally accepted premiss—to sustain the position taken up by Mr. Growse.

Assuming, however, for the sake of argument that the rule may be, somehow or other, made to bear on ancient Sanskrit, I think it necessary to enquire, what is its exact nature, and how far is it applicable to the word under consideration? It occurs in all the Prákrit grammars that have come under my observation. As given in Cowell's translation of Vararuchi, it runs thus: 'These nine consonants, *k*, *g*, *ch*, *j*, *t*, *d*, *p*, *y*, *v*, or *b*, when single and non-initial, are generally elided.' (*Kagachajatadapayavám práyo lopah*, II, 2).

It is always understood that when a letter is elided under this rule the vowel with which it happens to be associated is left behind, and when so left it is not subject to any rule regarding coalescence or *sandhi*. This is well illustrated by the example cited by Mr. Growse. The original word being *súkara*, the 'bristled one', the elision of the *k* leaves its vocalic associate *a* behind, which retains its place and makes *suára*, and Mr. Growse accepts it in that form. Had sandhi been permissible the *ú* of *s'ú* and the *a* of *ka* would have coalesced and produced *svara*. The prohibition of sandhi is necessary to preserve the skeleton of the words: without it there would be no limit to the process of metamorphosis.

The qualifying term *práyah*, 'generally', in the rule shows clearly that the rule was not universal, and the commentator restricts it by saying that "where euphony is not disturbed there should be no elision" (*prayograhaṇát yatra śrutisukhamasti tatra na bhavatíti*). No rule is anywhere given to define what euphony is, nor is such a definition practicable. As a matter of course it is dependent upon taste, and must differ greatly in different cases. Practically, the qualifying term with its commentary made the rule quite optional in its operation. There is another rule which says that a simple non-initial first letter of each class in Sanskrit may, at option, be replaced by the third letter of its class in Prákrit. Thus *k* may be changed to *g*, *ch* to *j*, *ṭ* to *ḍ*, *t* to *d*, and *p* to *b*.

Now, according to a well understood law of grammatical interpretation two options always imply three forms: 1st, the original form; 2nd, the modified form produced by the first optional rule; and 3rd, that which is the result of the second optional rule. Usage, without actually prohibiting the first form, is not much in favour of it. Instances, however, are numerous of it, and the commentator cites several. (Cowell P. P., p. 116). Generally speaking words are most frequently met with in the second and the third forms: in some cases, only one form is met with.

There is no positive rule for the treatment of two or more simple non-initial letters in the same word, but according to usage the two letters are sometimes subjected to the two optional rules successively, and sometimes to the same rule. Accordingly the Sanskrit word *Upadeśa*, is in some places written as *Ubadesa*, at others *Uädesa* or *Uäesa*. It is obvious that a rule acknowledged to be optional and governed by so many conditions cannot be accepted as proof in any particular case without an amount of information which it is hopeless to expect in regard to so obscure a term as the hypothetical *eka-úti*. There is nothing to show that Mr. Growse is in possession of such information.

But to proceed a step further, and bring the rule with its governing conditions to bear upon the term. Mr. Growse holds that 'the elision of the syllable *ka* (he means the letter *k*) would no doubt be an anomaly,' but I see no reason why such should be the case. That *k* is 'simple and non-initial,' and legitimately comes under the purview of the rule, and Prákrit writers have always acted upon this belief. Vararuchi, in his grammar has cited *eäm* as the equivalent for the Sanskrit *ekam*, and in the 'Venisanhára' I find *eäi* for *ekáki*. In 'Sakuntalá' we have *eäiṇí* for *ekákiní*. In the 'Prákrita-Prakáśa' *ëáraha* stands for *ékádaśa*. In other works *egáraha* is also met with, shewing that the second rule is that which is in operation. When neither of the optional rules is accepted the *eka* remains unchanged; and we find *ekadara* for *ekatara* in the 'Málaviká-agnimitra.' And with such evidence before me I fail to perceive why it would be 'an anomaly' to elide the *k* of *eka*.

Making the elision, the first form of the hypothetical word would be *eä-koṭi*. Applying the first rule to the second *k* also we get *ea-oṭi*. If the rule be limited to the second member of the compound, the result becomes *eka-oṭi*. The second rule would give us *egakoṭi*, *ega-oṭi*, *eka-goṭi* or *eägoṭi*. There is no rule in any Prákrit or Sanskrit grammar under which the *k* of *koṭi* can be elided and its associate vowel *o* carried over to the syllable *ka* of *eka* and produce *ekoṭi*, sandhi being, as already stated, absolutely prohibited. Were it otherwise, the union of *o* with the *a* of *eka* would make *ekauṭi* and not *ekoṭi*. Thus under no circumstance can the rule appealed to, produce *ekoṭi*. The rule in fact is quite fatal to the validity of the conjecture set forth.

In the above remarks I have confined myself to the effect of the rule cited by Mr. Growse. I should add here that that gentleman has quoted no rules to show how the cerebral *ṭ* of *koṭi* is metamorphosed into the dental letter. As far as I am aware of, there is no rule in any Sanskrit or Prákrit grammar to provide for the change. Under these cir-

cumstances, I am obliged, with much reluctance, to say that Mr. Growse has been very hasty in saying 'I am bold enough to maintain that it (the derivation of *ekoti*) is quite in accordance with rule.' He has obviously nothing at hand to maintain the assertion.

The following papers were read—

1. *On the Etymology and Meaning of the Buddhist term, Ekotíbháva.—By* Babu Sarat Chandra Dás, C. I. E.

In his address the President of the Asiatic Society of Bengal made mention of the work I have in hand, *i. e.*, the compilation of a list of Buddhist philosophical and technical terms in Sanskrit, and their equivalents in Tibetan and English. When I commenced this work in October last I had doubts as to its usefulness, but the importance attached to one such term as "Ekotíbháva" by the attempts of Max Müller, Morris, Schiefner and Dr. Mitra to explain it, in "The Academy" and elsewhere, has encouraged me to push on my work with some vigour. I have, therefore, ventured to write a short note on the etymology and meaning of the term "Ekotíbháva," with a view to explain an important fact connected with the doctrine of incarnation which prevails in Tibet and Mongolia.

I have brought with me from Lhasa some very old Sanskrit and Tibetan Dictionaries; one of them, called "Mahávyutpatti" [in Tibetan Lopon mañpo *s-m* dso*d* pa*h*i bye—bragtu *r* tog*s* bya*d* chhen mo, *i. e.*, "the great critical work prepared by many Pandits and Lochavas", (Tibetan Interpreters)] is a manuscript written in the Devanágarí characters of the 8th or 9th century A. D. and the rest are in Tibetan. The term* "Ekotíbháva" occurs in all of them written with dental *t* and a long *i*, in consequence of which its etymology becomes very simple. It is derived from eka + uta + bháva. Uta comes from ve (वे) and the affix *kta* (क्त). The verb ve (वे) means "to sew" or "unite." Hence the compound means "something sewn or united together." The Tibetan version of this term is †*Rgyud* + *g*chig-tu + gyur-pa, *i. e.*, *Rgyud gchigtu* gyur-pa." "*Rgyud gyur*-pa"= strung or united together, gchig = one and "tú" means "into." The compound word therefore means formed into one string or line. In Csoma's translation of a

* The term Ekotíbháva with long *i* incidentally also occurs in Professor Max Müller's note published in The Academy, April 3, 1886. *Vide* the following passage. "Schiefner's explanation, too, which Dr. Morris does not mention, namely, that "Ekotíbháva" represents "Eka vatí or Eka vati bháva, is not convincing.

† *Rgyud*, méans string, extraction, connection nature &c. Gyurpa, means formed, become, changed, &c.

Sanskrit Tibetan vocabulary "Ekotíbháva "or *Rgyud gchig-tu gyur-pa*" is rendered as union (with the Supreme Spirit).

Ekotíbháva with short *i*, *i. e.*, "Ekotibháva* does not seem to me quite correct. In the first place it does not directly give the meaning of the term in accordance with the rules of Sanskrit grammar, and does not tally with the explanation given by the Indian savants who translated the Buddhist sacred books into Tibetan under the auspices of Kings Thisrong, Ralpachen &c. In the second place it does not occur in any of the books I have consulted.

It is more natural that after "uta" the suffix "chvi" should be inserted implying the occurrence of something not existing before (abhúta tad bháva) rather than that the last component part should be joined with "uti" meaning an act of sewing or uniting. But in order that the compound word may give the intended signification in consonance with the rules of grammar the components should be "eka + uta + bháva." A learned Lama of Tibet has kindly sent me a note on this term the purport of which I give below:—

"*R gyud gchig-tu gyur-pa* (Ekotíbháva) means the continued connection of "one with another without break or division. A soul (vijñá na or R nam S'es) "existing from eternity has undergone numberless transmigrations. In all its "births it has run through an unbroken line of existence until it is cut short by "Nirvána."

All living beings have this kind of continuous existence. A soul undergoing transmigrations may be compared to a string or wreath of flowers, its different embodiments being the individual flowers which drop off one by one after each death. Bodhisatvas and saints alone can know the circumstances of their former births which ordinary mortals cannot. Some of the grand Lamas of Tibet are the acknowledged incarnations of Bodhisatvas. When the fresh embodiment of a Bodhisatva is announced a Committee of the living Bodhisatvas (grand Lamas) is formed to identify his spirit with that of the Lama whose incarnation he professes to be. At the time of the identification the claimant (generally a child of 3 or 4) is required to prove by signs that his spirit is one and the same with the spirit of the Lama whose incarnation he declares himself to be. This identity of the claimant with the spirit of a Lama is called Ekotíbháva and it forms one of the cardinal doctrines of Tibetan Buddhism. I here annex the Sanskrit

* The word with short *i*, *i. e.*, Eka + uti + bhâva when compounded together must according to the Rules of Sanskrit Grammar be "Ekotíbhâva." I quote the rules.

(1) Abhúta tad bhâve chvik Kṛisubastishu.

(2) A kâra h ṇ sva svarâ vidîrghan.

explanation of the term given by Prof. Nilmani Mukherjea, M. A. in Devanágarí.

एकस्मिन् लूने इत्यर्थः ततः ग्रथितः एकोतः ततः च्विः ततः भावः एकोतीभावः ।
एकलूने ग्रथितत्वम् अनलधारावाचिकतया सम्बद्धत्वम् इति भावः ।

Dr. Hoernle remarked that he agreed with Dr. Mitra that every rule of Prákrit phonetics could not *eo ipso* be applied to the Páli or Gáthá. With regard to the particular case of *ekotibháva*, though there was no rule in any Prákrit grammar under which a consonant might be elided and its associate vowel carried over to the preceding syllable, still occasional instances of this practice did occur in Prákrit literature; thus Pr. *suhelli* for Skr. *sukhakeli* (Saptaśataka, 211, 261, etc., contracted from *suhaelli)*; Pr. *deula* for Skr. *devakula* (Sapt. 109, contr. from *deaula*). Some of these instances were expressly noted in Hemachandra's grammar; thus *deula* in Hem. I, 271, *rāula* (for Skr. *rájakula)* in Hem. I, 267. After the analogy of these cases, the word *ekakoṭibháva* might contract from *eka-oṭibháva* into *ekoṭibháva*, as Mr. Growse seemed to suggest. It seemed to him unsafe, however, to explain the formation of an old word like *ekotibháva* on the authority of word-forms which occurred in a much later stage of the language, and even there only as exceptions. Another serious difficulty was the change of the cerebral *ṭ* to the dental *t*, which the derivation of *ekotibháva* from *ekakoṭibháva* would require. There was no other example of such a change, as far as he was aware, known. The only two apparent instances, referred to in Prof. Kuhn's *Beiträge* (p. 37, Páli *deṇḍima* = Skr. *ḍiṇḍima*, Pr. suffix *ittha* = Skr. *ishṭa*), were obviously of a different character. To his mind, the great difficulty attending the derivation from *ekakoṭibháva* lay in the accumulative force of the objections. Each objection, taken by itself, might be met more or less successfully; but the derivation assumed the concurrent operation of three distinct phonetic laws (elision of a consonant, elision of the associate vowel, and change of cerebral to dental) all of which would be very exceptional in Páli or Gáthá, and two of which were exceptional even in Prákrit.

Dr. R. Mitra expressed his thanks to Dr. Hoernle for his remarks and for the instances he cited. They opened a new line of research. They were apparently of a later date than the Prákrit grammars, and belonged to Jain Magadhí and other dialects which differed considerably from the Máhárāshṭrí Prákrit of Vararuchi; but they were not enough to prove that Mr. Growse was right when he urged that the transmutation of eka-koṭi into ekoti was in accordance with rule. Turning then to the note of Bábu Saratchandra Das, he said—

'I am glad Bábu Saratchandra Dás has sent us the fruits of his researches in connexion with the subject under discussion which has for some time engaged the attention of Oriental scholars in Europe. Ordinarily, so rare are the contributions we get from the Bœotia of Central Asia, that every little crumb we obtain from that quarter in regard to matters with which we are interested is welcome.

'It is interesting to be informed that the term ekotibháva is well-known in Tibet, and is to be met with in many Tibetan works. To me it is particularly gratifying to know that the second member of the compound term is *úti*, as I took it to be, when I submitted to the Society my note on the subject, and not *koṭi* as originally supposed by Professor Max Müller, and since repeated by Mr. Growse. I regret only that the Bábú has not made greater use of the resources he has at command than what he seems to have done in the note now before the meeting. Some extracts from the Tibetan and Sanskrit works he has procured from Lhasa, would have been most welcome to us. In questions of this kind, ancient records are of infinitely greater use than the cogitations of modern scholars.

'In regard to the spelling of the term, the Bábú says that in all the dictionaries he has got, the term is written with a dental *t* and a long *í*. The dental *t* is what I have met with in seven different MSS. of the Lalita Vistara and in one of the Daśabhúmíśvara, and it is what is invariable in ancient Páli texts. But I am rather puzzled about the long *í*. The Bábú's MSS. are all Tibetan, with one exception, which, he says, 'is written in the Devanágarí character of the 8th or 9th century A. D.' Now, the Tibetan alphabet does not include a letter or mark for the long *í*. Csoma de Koros, in his Tibetan Grammar, gives only one *i*, and that the short one. And if the authority of this renowned Tibetan scholar is of any value we cannot expect to find the long *í* in Tibetan MSS. In his preface he says, 'there are five vowel sounds: *a*, *i*, *u*, *e*, *o*, pronounced according to the general pronunciation in Latin in the continent of Europe, without any distinction into short or long, but observing a middle sound.' In his Dictionary there is not a single word given with a long *í* or *ú*. My friend Bábu Pratápachandra Ghosha has favoured me with an extract, either from Carey's translation of Schoeter's Tibetan Grammar or some other authority, the name of which he has forgotten, which runs thus: 'Sometimes the vowels are placed above each other, and then they are pronounced as a long vowel; but it is more frequently the case that they denote an abbreviation of the word, so that the reader ought to make two syllables of it. Sometimes the vowel (*i*) is placed over a letter in an opposite direction to that above mentioned, for instance ◌ ◌, &c.; but though the shape is altered the

sound is the same; it is read to express the Sanskrit ऋ.' This reversed mark is very uncommon, and in ordinary Tibetan writings it is not met with. It is certain too that the Tibetans do not make any distinction between the long and the short *i*. It is unsafe therefore to rely upon Tibetan texts in this respect.

'The reference to the Sanskrit MS. is also puzzling to me. I cannot make out what Bábu Saratchandra Dás means by 'Devanágari character of the 8th or the 9th century A. D.' I am not aware of any such specific character, and I should very much like to know how the vowel-marks are put in it before I can decide its value. The Bábu's reading may be correct, but I cannot say as much for the correctness of the MS. Anyway we have on the one side a single MS., and that in a country where the distinction between the long and the short *i* is very much neglected, if not positively unknown, and on the other eight MSS. from a country where the distinction is carefully observed, and the whole of the Páli texts examined by Mr. Childers. In this state of evidence before me, I cannot venture to come to other than an adverse conclusion.

'The derivation given by Bábu Saratchandra Dás of the term under notice is not his, nor taken from his Tibetan MSS., but founded upon a Sanskrit passage written by Professor Nílmaṇi Mukerji. The passage has been incorrectly transliterated by Bábu Saratchandra Dás. The word *uttarthaḥ* is obviously intended for *ityarthah*, and the *utah* should have been written with a long *ú*.

'The derivation of the word as given by the Professor does not appear to me to be satisfactory. The crucial word is *úti*, the second member of the compound, and it may be derived from more than one Sanskrit root. Professor Mukerji derives it—from *ve*, *kta* and *chvi*, but it is not what we find in our Sanskrit dictionaries, and it necessitates recourse to two affixes when one is quite sufficient. *Chvih* as an affix is rarely used, and not at all needed here. *Ve* with *kti* makes *úti*, and this is the form most used by our lexicographers and exegetes, and I see no reason to reject it in favour of a derivation which no Sanskrit author has used, and which involves the use of two affixes for a single purpose. It amounts to a preference for a novelty for the sake of novelty only. I go further, and hold that, under the rule of Páṇini, *kribhvashiyoge sampadya kartari chvih* (5. 4. 50) the affix *chvi* seems inapplicable in the present instance. The rule requires a complete change of substance (*abhútatadbháva*—and the leading example is *Brahmí bhavati*, or change into Brahma. The subject has been explained at some length by Professor Taránátha Tarkaváchaspati, in a note in his edition of the Siddhántakaumudí, but I cannot cite his words from memory. This much, however, is certain that the stringing on a thread does not imply such a change

of condition. There can be no unification of substance in the act of stringing on a thread, and therefore the affix appears to me to be of doubtful propriety. In fact the learned Professor has resorted to it solely to account for the supposed long *í* in the Tibetan texts, and as I cannot see my way at present to admit the accuracy of the reading, I deny the necessity of the inappropriate affix.

'Bábu Saratchandra Dás says that my derivation of the word from *ve* and *kti* does not seem to him to be correct, because it does not strictly give the meaning of the term in accordance with the rules of Sanskrit grammar.' He has not cited the rule, but certain it is that whatever the rule, it did not stand in the way of Srídhara Svámí, the commentator on the Bhágavata nor of the authors of the Ṛig Veda: they all use the word with a short *i*, and I am content to err with them.

'The word *sútra* has been used apparently with a view to make the meaning consonant with the interpretation of the compound term given by a Lámá, but it is not permissible. It is not suggested by the text. The same remark applies to the epithet *ananta-dhárá-váhikatayá* 'the endless flow of the stream.' There is no justification for it in the text. It may be that in Tibet the meaning of the term is different from what Sanskrit and Páli scholars have assigned to it; but that does not necessitate a different derivation. The learned Professor is thoroughly familiar with the Lalita Vistara, which is the oldest work in which the term was first met with, for he is the author of a Sanskrit abridgment of that work, and he must have noticed in the 22nd chapter of it, that the term cannot there be explained to mean 'the endless flow of the stream.' The term there qualifies the first of a set of four meditations, each of which lasts for a few minutes. Of course during the continuance of any one of these meditations there is a continuous, or unbroken, or undisturbed flow of attention as shown in Aphorism 2 of the 3rd Book of Patanjali's Yoga, but there is no endlessness in it. When the second meditation begins, the first is lost, and with it 'the flow of the stream' terminates, and does not return again in its original form in the course of the subsequent meditations. In such a case the most appropriate meaning is that which the Páli authorities ascribe to the word, and which Professor Max Müller has accepted, *i. e.*, it means concentration of the mind or *ekágratá*, or as I put it on the authority of Srídhara Svámí, making one subject the object of our thought, and there need be no doubt that that is the right meaning. Just now I have not access to Csoma's MS. glossary of Tibetan technical terms, it being with Bábu Saratchandra Dás at Darjiling, but from the quotation given in his paper, it is evident that Csoma had no idea about the 'endless stream.' He uses the word 'union' which for a popular rendering

is about the same as concentration, or bringing the mind to one centre. The Tibetans may have current among them a different meaning, but in an enquiry about the radical meaning of a Sanskrit term found in Sanskrit works, we are not concerned with any possible change which it may have undergone in the language of a non-Sanskritic nation.'

Professor Nilmani Mukerjea said—Ekotíbháva is a kind of meditation in a Buddhistic sense, meaning literally absorption into one. It also means, according to Tibetan writers, the apostolic succession, so to speak, of grand Lamas. The succession of Lamas is compared to a garland of flowers; and one who succeeds to the musnud of the High Priest in Tibet, is looked upon as a new flower strung into the garland of lamahood.

Prof. Max Müller analyses the word into eka, koti, and bháva. Though no known rule of grammar is cited to justify the elision of ka, and though the attempts of Mr. Growse to explain the same by rules of Prákṛita grammar are unsatisfactory, there are instances in Sanskrit in which such elisions of intermediate syllables are admitted as anomalies (nipátas) by Sanskrit grammarians. I would cite a few instances only—Prishat-udara Prishodara, Patat-anjali Pátanjali, Vári-váhaka Valáhaka, Jívana-múta Jímúta, &c., &c.

According to the etymology given by Prof. Max Müller, ekotibháva may mean a kind of meditation; but it can scarcely be strained to mean the unbroken succession of grand Lamas, in which sense the word is understood by Tibetan authors.

Dr. Rájendralála Mitra has given a less anomalous, though not quite a correct derivation of the word, dividing it into eka, úti and bháva. Now the component parts of the word as stated by the learned doctor, meaning respectively 'one,' "weaving" and "being" cannot be compounded by any known rule of Sanskrit grammar, inasmuch as úti and bháva are both verbal nouns,* and cannot satisfy the first and most important rule of Sanskrit composition (samása)†.

According to Dr. Mitra's etymology the word would mean "being weaving into one," which is not intelligible enough. I have therefore thought fit to adopt the reading "ekotíbháva" with a long *í* recommended by my friend, Babu Sarat Chandra Dás, C. I. E. The above reading occurs twice in a dictionary of Sanskrit words by a Tibetan

* At the last meeting of the A. S. B., Dr. Mitra, while admitting that úti comes from a verbal root and a verbal affix, denied that it is a verbal noun, and saw no objection to its being compounded with another verbal noun.

† समर्थः पदविधिः—पाणिनिः।

देवां शेऽव्यये——वोपदेवः।

author. I have also been assured by my friend that he has found the word spelt with a long *í* in other Sanskrit works of Tibetan origin. Dr. Mitra contends that as the Tibetan alphabet has no long *í*, the word in question cannot be written with a long *í*. But the question, whether the Tibetan alphabet has a long *í* or not, has nothing to do with the word ekotíbháva, inasmuch as it is found in Sanskrit books compiled by Tibetan authors, and written with a long *í* in the Devanágarí characters.

Now ekotíbháva with a long *í* will most appropriately convey the two meanings stated above. I would therefore analyse the word into eka, uta,* chvi, and bháva. The effect of the suffix chvi on the base uta according to the well-known rule of Sanskrit grammar, would be the changing its final vowel into a long *í*; and the whole compound word would thus mean the state of being woven into one.

Dr. Mitra contends that the suffix chvi means abhúta-tadbháva (occurrence of a thing that did not exist before), and that it cannot be a component part of ekotíbháva, which has nothing of that idea in it. With due deference to the learned doctor, I must take the liberty to differ from him. When ekotíbháva is used in the sense of meditation, it clearly means concentration of attention on one object and thereby connotes a state of mind which did not exist before. Similarly when ekotíbháva signifies the succession of a Tibetan pontiff, it as clearly points to the happening of an event which was not in existence before.

Dr. Mitra also objects to the insertion of the suffix chvi after "uta" on the ground that it is preceded by "eka," maintaining that it cannot be said of one single object that it has come to pass and did not exist before. But surely it would not be too much to attribute abhúta-tadbháva to the installation of a new pontiff who thereby becomes a member of the Tibetan Lamahood.

The learned doctor takes exception to the etymology of "uta," given in S. C. Dás note. Uta is derived from वे and क्विप्, but Dr. Mitra derives it from वय and क्विप्. Now the verb वय means going, not weaving; and though वे is changed into वय in the second preterite (विवय), it can never take that form before the affix क्विप्.†

* Uta has another form úta, but it matters little, which form is used.

† In the Sanskrit explanation of the phrase ekotíbháva inserted in Bábu Sarat Chandra's note, I have said, एकत्विम् सूत्रे पवितम्। Dr. Mitra objects to my Sanskrit, remarking that instead of sútre the locative form, sútreṇa the instrumental form should be substituted. But I have used the locative form advisedly, because the idea of instrumentality is kept in the background, and prominence is given to that of something (आधार) containing something else. I would cite here only one parallel passage from the Kádambarí, p. 14, G. C. Vidyaratna's edition, Uttara-bhága—"पवित्रेण इव नाभिकाकूपे."

After what has been stated above, it is superfluous perhaps, to cite examples in which the last अ of a word compounded with bháva is converted into a long *í*. The rule on the subject is too clear to admit of cavil; and a few instances will suffice—गुणीभावः, एकीभावः, भस्मीभावः, स्वकी-भावः &c., &c.

In reply to Prof. Mukerjea's remarks, Dr. Mitra observed that he did not derive the word from *vaya* and *kti*. He had been careful in saying that he derived it from *ve* and *kti*. As to the difficulty raised about a participle being made the subject of a condition (*bháva*), it was a mistake. He did not accept *úti* as a particle, but as a noun substantive, meaning *lílá* 'recreation', as explained by S'rídhára S'vámí, and therefore there was no participle to disturb his explanation. The other points raised were too technical to be explained off hand at the meeting; many things had been assigned to him which he had not said.

The following remarks with reference to the subject of the above discussion have been received from Babu Sarat Chandra Dás since the meeting:—

"In the Tibetan passage from Lam-rim Chhenpo, "Tsonkhapa," the founder of the Gelug-pa (the yellow-cap school) is identified with the 11th Buddha or Tathâgata. In the Sanskrit passage from page 33 of Vyutpatti" the word "*ekotîbhâvâd*" is used to convey the literal signification explained by me, but only with reference to the *mind* and its motives.

Page 33 "vyutpatti."

"sa vitarkaḫ vichârâṇam vyupa sámâ dadhyâtmam samprasâdâch-chetasa *ekotîbhâvâd* vitarkamavichâram samâdhija samprîti sukham dvitîyam dhyânam upasampadya viharati."

In this passage the word *ekotîbhâva* conveys the *literal* meaning (as explained by me) with regard to mind.

from "Lamrim" ssin-bri*s* (leaf 150—151.)

"*B*dag-chag-gi *s*ton-pa śâkya thub-pa*h*i *bs*tan-pa *h*di dañ
"*R*je Rin-po chhe (Tsoñ khapa) dañ thug*s* (spirit) *r*gyu*d* *g*chig-pa*h*i.
"(Ekota*h*) *bs*kal *b*ssañ gi*s* sañ*s* *r*gya*s* *b*chu *g*chig-pa
"de-*b*shin *g*seg*s*-pa *s*pyan leg*s*-dañ, *bs*kal *b*ssañ sañ*s* *r*gya*s*
"*S*toñ po thamd chad kyi *m*dsa*d* pa*h*i *s*monlam gi *m*thu
"grub-pa *m*tha*h* ma sañ*s* *r*gya*s* ma*s* pa*h*i
*bs*tan-pa *g*sum-la *h*byuñ Shiñ &c. &c.

In this passage the Tibetan equivalent of the word Ekota*h* clearly explains the identity of the spirit of the 11th Tathágata with that of Tson-khapa.

2. *On the Ṣafwí dynasty of Persia and their coins, with four Plates of unpublished coins.—By* E. E. OLIVER, ESQ.

(Abstract.)

The paper is an attempt to give an historical outline of the rise and fall of the Ṣafwí dynasty of Persia, who ruled from 905 to 1160 A. H. The materials have been taken mainly from Malcolm's history of Persia, Jonas Hanway's travels, and Mr. Stanley Law Poole's tables for contemporary dynasties.

The account is supplemented by a description of 48 coins of different rulers, and illustrated by drawings of the coins.

The paper will be published in Part I of the Journal.

3. *On the effects produced by small quantities of Bismuth on the ductility of Silver.—By* SURGEON-MAJOR J. SCULLY, *Assay Master, H. M.'s Mint, Calcutta.*

This paper will be published in Part II of the Journal.

4. *On a find of sixteen Gold Gupta coins in the Gorakhpur district.—By* V. A. SMITH, ESQ.

Sir Alfred Lyall, Lieutenant-Governor of the N.-W. P. has sent me for identification a parcel of 16 Gupta Gold coins lately found in the Gorakhpur District, a description of which will be interesting to numismatists.

Mr. D. T. Roberts, Collector of Gorakhpur, states that the coins were found by some chamárs when digging in a field adjoining an old '*díh*' in the village of Kotwá in Tahsíl Bánsgaon of the Gorakhpur District. They were found loose under some bricks. Nothing is known as to the history of the mound of ruins at Kotwá. This last remark applies to all the numerous mounds which are found in almost all parts of the Gorakhpur and Bastí Districts.

The buildings were in all cases of brick, and the images and ornaments appear generally to have been made of terra cotta, and in consequence a recognizable building is never met with, excepting some *stúpas*, which can be recognized by their circular outline.

Tradition is absolutely silent concerning all these ancient remains. The villagers as a rule ascribe them to the forest tribe of Thárús, but the ascription is evidently incorrect, and due to the fact that when the ancestors of the present inhabitants immigrated, they found the country, as far as it was peopled at all, in possession of the Thárús. The immigrants knew nothing of an earlier and vanished civilization, and naturally ascribed all ruins to the people whom they found in

occupation of the country. In the south-west of the Bastí District the Rájpút and other mediæval settlers displaced Bhars. In parts of Gorakhpur and Bastí the Doms or Dom Katárs were the ruling tribe, which had to give way before the immigrants from the west. Consequently in some places ruined mounds will be ascribed to Bhars or Doms instead of Thárús, but nowhere is there any trace of a genuine continuous tradition handed down from the times of Budhhist ascendancy and civilization. So far as appears, the Gorakhpur and Bastí Districts lapsed into jungle during the disturbances which accompanied the extinction of Buddhism, and remained for centuries unoccupied by settled or civilized inhabitants.

The thread of tradition was thus broken, and nothing can be learned of the past history of the country except from coins, and such other fragments of antiquity as may have survived.

In the course of three and a half years' residence in the Bastí District I have not succeeded in discovering a single inscription. Coins are therefore of special importance in the eastern districts of the N.-W. P. from being almost the only legible memorials of the past which have survived.

The hoard of sixteen coins which is the subject of this notice is remarkable for the variety of types included in it. No less than seven distinct types are comprised in this small batch of coins. They all belong to the reigns of Chandra Gupta II, and Kumára Gupta Mahendra of the Imperial or Early Gupta dynasty.

If Mr. Fleet is right in placing the beginning of the dynasty in A. D. 318—319, the approximate date of these coins is A. D. 400, but I refrain from expressing any opinion on this subject pending the completion of Mr. Fleet's great work on the Gupta Inscriptions.

In the following description the references are to my Catalogue published in Part I. of the Society's Journal for 1884.

Nos. 1—5.

Chandra Gupta II. Archer Type, Class II, var. *a*.

On Nos. 1 and 2 the monogram is 10*a*, on Nos. 3 and 4 it is 19*b*, and on No. 5 either 8*b* or 10*b*. At first I thought that No. 5 was a coin of Skanda Gupta's, but closer examination showed that it is a poor specimen of Chandra Gupta's coinage.

(*Catalogue, page* 180, *Plate III*, 1.)

No. 6.

Kumára Gupta Mahendra.

Archer Type, Class I, ? var. *a*. *Obv.* 'Ku' with crescent under king's arm. On l. margin, outside arrow, 4 characters of which the

second is 'Gu,' and the fourth 'rá.' Above bird standard three or four more characters. These legends perhaps represent 'Kumára Gupta rájádhirájá.'

On r. margin 'Jayati Mahendra,' and remains of three characters following. This obverse legend does not appear to agree with that of any published coin.

Rev. as usual but no monogram.

(*Catalogue, page* 190, *Plate III*, 10.)

Nos. 7, 8, 9.

Kumára Gupta Mahendra.

Horseman to Right type, var. *α*. *Obv.* marginal legends not legible.

On one coin the character over the horse's head is distinct, but I cannot decipher it. No character between horse's legs.

Rev. as usual. No monogram.

(*Catalogue, page* 192.)

Nos. 10 and 11.

Ditto, Ditto, var. *γ*. *Obv.* legend '[Aji]ta Mahendra Gupta,' followed by seven or eight characters. Character between horse's legs.

Rev. as usual. Legend 'Ajita Mahendra' distinct. No monogram.

(*Catalogue, page* 192, *Plate III*, 12.)

No. 12.

Kumára Gupta Mahendra.

Horseman to Left type. In poor condition. Scarcely a trace of *obv.* legend.

Rev. legend 'Ajita Mahendra,' but the 'ma—' of Mahendra has been left out. The peacock is not fully formed, and would not be recognizable from this coin only.

(*Catalogue, page* 193, *Plate III*, 13.)

Nos. 13, 14.

Kumára Gupta Mahendra.

Peacock type, var. *β*. The *obv.* legend on r. margin of No. 12 certainly begins with 'Jayati,' thus confirming Sir E. C. Bayley's reading. The legend on l. margin may be 'Kumára,' the last character is certainly 'ra.' Kittoe reads 'Srí Kumára' on the *obv.* of these coins.

Rev. legend of No. 12 has disappeared, but that of No. 13 is clearly '[Mahe]ndra Kumára,' thus confirming Sir A. Cunningham's reading.

(*Catalogue, page* 195, *Plate IV*, 2).

No. 15.

Kumára Gupta Mahendra.

Lion-Trampler type, var. *a*. *Obv.* design as described in catalogue. Legend 'Srí Sikye Devata.' The 'Srí Si—' are plain, but I am not sure of the remaining letters. At first I read 'Srí Siṇha,' but this seems hardly tenable.

Rev. legend, 'Srí Mahendra Siṇha,' Lion to r. monogram 8*a*.

The *obv.* legend is new.

(*Catalogue, page* 196.)

No. 16.

Uncertain, probably Chandra Gupta II, Lion-Trampler type.

The *obv.* and *rev.* devices agree with var. δ of Chandra Gupta II, (*Catalogue, page* 184). The only legible character in the *obv.* legend is 'ka.'

No trace of *rev.* legend. Lion to left. Monogram 19*b*.

5. *On the Couplets, or "Baits," on the Coins of Sháh Núru-d-dín Jahangír, the son of Akbar.*—*By* C. J. Rodgers, Esq.

The paper will be published in Part I of the Journal.

6. *On Monge's Differential Equation to all Conics.*—*By* Babu Asutosh Mukhopádhyáya, M. A., F. R. A. S., F. R. S. E. *Communicated by the* Hon. Dr. Mahendralál Sarkár, C. I. E.

(Abstract.)

This paper, which is devoted to a consideration of Monge's differential equation to lines of the second order (noticed by Boole at the end of the first chapter of his "Differential Equations"), is divided into six sections. The first section gives a short historical introduction; the second section treats of the easiest way of deriving the Mongian equation from the equation of the Conic; the differential equations of all parabolas, all circles, and all Conics referred to co-ordinate axes through the centre, are easily obtained incidentally. The third section shews how the Mongian equation can be completely integrated by ordinary methods, a problem which does not appear to have been solved before. The fourth section shews how the same equation may be integrated by means of an integrating factor; and, this process furnishes an immediate proof of a theorem by Professor Michael Roberts, relating to a second integral of the Mongian equation. The fifth section furnishes an easy proof of the permanency of form of the Mongian equation, as well as of several other differential equations whose geometrical

meanings are pointed out; formulae are added for the verification of the theorem stated in this section. The last section contains a criticism of Professor Sylvester's geometrical interpretation of the Mongian equation; the Professor's theorem is deduced with ease, but it is pointed out that the geometrical theorem, though perfectly correct, is not at all the geometric interpretation of the Mongian equation as contemplated by Boole; the theorem is, in fact, a truism; what Boole sought for in vain has yet to be discovered.

The paper will be printed in Part II of the Journal for 1887.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR AUGUST, 1887.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 3rd August 1887 at 9.15 P. M.

LT.-COL. J. WATERHOUSE, Vice-President, in the Chair.

The following members were present:

Nawab Abdul Latif, Bahádur, C. I. E., Rev. A. W. Atkinson, Babu Nobin Chánd Bural, Babu Pratápa Chandra Ghosha, Dr. Hoernle, A. Hogg, Esq., E. J. Jones, Esq., Rev. Father Lafont, R. D. Mehta, Esq., Babu Asutosh Mukhopádhyáya, Dr. Noetling, Pandit Maheschandra Nyáyaratna, C. I. E., Moung Hla Oung, Esq., H. M. Percival, Esq., Dr. Prasanna Kumár Ráy, H. M. Rustomjee, Esq., The Hon. Dr. Mahendralál Sarkár, C. I. E., Pandit Haraprasád Sástri, J. Wood-Mason, Esq.

The minutes of the previous meeting were read and confirmed.

Thirty-four presentations were announced, as detailed in the appended Library List.

The following gentleman, duly proposed and seconded at the last meeting of the Society, was ballotted for, and elected an Ordinary Member:

Babu Haricharan Basu.

The following gentlemen are candidates for election at the next meeting:

Kumár Vinayakrishna Deva, Bahádur, Calcutta, proposed by Dr. Rájendralála Mitra, seconded by Babu Rájkumár Sarvádhikári.

Lieut. E. Y. Watson, 5th Madras, N. I., Berhampur, Ganjam, proposed by L. de Nicéville, Esq., seconded by E. T. Atkinson, Esq.

William Risdon Criper, Esq., proposed by Dr. Waldie, seconded by H. M. Percival, Esq.

The following gentlemen have expressed a wish to withdraw from the Society:

R. S. Whiteway, Esq.

Babu Rangalál Mukherji.

The Secretary reported the death of the following member:

The Hon. Sir Ashley Eden.

The Natural History Secretary exhibited some antiquities discovered in the Miri, or Citadel, of Quetta, by Major J. T. Garwood, R. E.

Dr. Rájendralála Mitra submitted a diagram illustrating the positions of the Moon and the shadow of the Earth during the partial eclipse of the moon on the night of the 3rd August, 1887, which he had received from some Pandits of his acquaintance at Alwar.

The following papers were read—

1. *Notes on Indian* Rhynchota. Heteroptera, No. 3.—*By* E. T. Atkinson, Esq., C. S., President.

The paper will be published in the Journal, Part II.

2. *On the Chiroptera of Nepal.—By* Dr. J. Scully.

The paper will be published in the Journal, Part II.

3. *Notes on recent Neolithic and Palæolithic finds in South India.—By* R. Bruce Foote, Esq., F. G. S., F. M. U., *Offg. Director Geological Survey of India.*

The paper will be published in the Journal, Part II.

4. *The Era of Lakshmana Sena.—By* H. Beveridge, Esq., C. S.

(Abstract.)

In this paper the author first draws attention to the fact that the era of Lakshmana Sena is mentioned by Abul Fazl in the Akbarnama, according to whom it began in 1119 A. D., and states that although the era has been discussed by more than one scholar it appears that its date, or even the event denoted by it, has not yet been positively ascertained. He then reviews the dates that have been assigned by different writers for the commencement of the era, and explains how the era came to be mentioned by Abul Fazl, and why there seems to be a probability of the date given by him being correct, there being also a corroboration of it in the Tabaqát-i-Náṣirí. The point being a most interesting one the author

trusts that some one will take up the enquiry, since it concerns the date of the accession of the last Hindu king of Bengal.

In a supplement to the paper the author advances further reasons for concluding that the date of the commencement of the era given by Abul Fuzl is correct, and finally he suggests that the translation of a Sanskrit inscription from Buddha Gya given by Dr. Mitra in his second paper on the Sena Rájás of Bengal might bear a slightly different interpretation, which would make it refer to the 74th year of the reign of Lakshmana Sena, instead of 74 years after the expiration of his reign, and from which it would follow that the era originated with that king.

The paper will be published in the Journal, Part I.

5. *The sacred and ornamental characters of Tibet.*—*By* Babu Sarat Chandra Dás, C. I. E.

(Abstract.)

After a brief allusion to the introduction of the art of writing into Tibet, the writer gives a short account of the steps taken to establish Buddhist institutions in the country consequent on Buddhism being made the State religion, and of the subsequent necessity for increasing the written characters of the language, the letters of the alphabet originally designed being found insufficient for the translation of the Buddhist sacred scriptures and Sanskrit grammars and dictionaries into Tibetan. The account is followed by a description of the principal changes that the written language has undergone, accompanied with drawings of the various kinds of characters and the purposes for which they are used.

The paper will be published in the Journal, Part I.

6. *On the Authorship of the Mṛichchhakaṭiká.*—*By* Pandit Maheschandra Nyáyaratna, C. I. E.

A paper was read by Bábu Ásutosh Mukerji, M. A., F. R. A., F. R. S. E., at a meeting of this Society on the 6th April last, in which he attempted to prove that king Súdraka, the reputed author of the *Mṛichchhakaṭiká* was not its real author. Commenting on this paper Dr. Hoernle referred to a new theory about the authorship of the play advanced by Professor Pischel in the Introduction to his edition of *Śringárla-tilaka.* This theory ascribes the authorship to the celebrated Daṇḍin, the author of *Daśakumára-charita* and *Kávyadarśa.*

I purpose to briefly examine the theories of Bábu Ásutosh Mukerji and Professor Pischel.

The chief ground on which Bábu Ásutosh Mukerji bases his theory is, that in the introduction of the play, a stanza occurs in which

Súdraka is said to have entered the fire (शूद्रकोऽग्निं प्रविष्टः). Bábu Asutosh thinks that Súdraka could by no means be the author when his entering into fire is mentioned in the play itself. Another argument of Bábu Asutosh Mukerji is, that there are lengthy panegyrics on Súdraka in several stanzas which could hardly have occurred in the play, had it been written by himself. Bábu Asutosh Mukerji concludes that the play was composed under royal patronage, and that the dramatist assigned the work to his patron; such a supposition being, according to Bábu Asutosh Mukerji, in perfect accordance with what is known of poets and their royal patrons.

The second argument of Bábu Asutosh Mukerji, *viz.*, the presence of verses laudatory of the author in the work itself, has hardly any weight. There is a rule* that in Sanskrit dramas there should be praise of the author and his work in the introduction, through the mouth of one of the actors, in order to excite the interest of the audience; and in almost all Sanskrit dramas extant we find this rule strictly observed. It need hardly be noticed that the verses come out of the mouth of one of the *dramatis personæ* and therefore the author does not directly take upon himself the indelicacy of praising himself.

Babu Asutosh Mukerji's first and chief argument is also not a very strong one.

It can easily be met by supposing that the stanza in question is an interpolation. There are three other stanzas in the introduction ascribing the play to Súdraka, and the play is traditionally ascribed to him. Prithvídhara and other commentators of the play all hold that Súdraka was the author. The rules† elaborated for the construction of Sanskrit dramas require that the name of the author should be given at the beginning of a play. Here the name of Súdraka has been given as that of the author in several stanzas. It is hardly possible to overlook all these considerations simply because there is a line in one of the stanzas which seems to indicate that Súdraka could not be its author. It is hard to believe that a poet who wished the work to pass for the work of Súdraka would put in a line from which the imposture would at once be detected. If a modern critic can see the absurdity of a poet's saying of himself that "he entered the fire," the same absurdity would doubtless have presented itself to the minds of the men who set up the story. It is paying but a poor compliment to the intelligence of the poet and his royal patron to suppose that they could not perceive that this line would serve effectually to expose the imposture.

* उन्मुखीकरणं तत्र प्रशंसातः प्ररोचना। भरतः।

† प्रसाद्य रङ्गं विधिवत्कवेर्नाम च कीर्त्तयेत्। धनिकः।

Either, therefore, the line in question is an altered reading introduced subsequent to the death of Súdraka, or the stanza in which it occurs is an interpolation, or it is susceptible of an interpretation which will remove the difficulties felt by the critics.

Such an interpretation is not hard to come by. *Díkshita Lalla* in his commentary thus explains the passage "लब्ध्वा चायुः-शतार्द्धं"—"अग्निं प्रविष्टः" ज्ञातकादिगणितद्वारा ज्ञात्वा। आगामिसूत्रधारवचनापेक्षया अग्निं प्रविष्ट इत्यादि भूतकालप्रत्ययो न विरुद्धः इति मर्मज्ञाः। अग्निप्रवेशोऽपि सर्वस्वारनामकयज्ञविशेषे, यथा शरभङ्गेन कृतः तथा बोध्यम्।

The purport of this is that by means of astrological calculations he came to know the time of his death, and entered the fire at a sacrifice called *Sarvasvára*, like Sarabhaṅga (in the *Rámáyaṇa*). The use of the past tense (प्रविष्टः) is with reference to *Sútradhára's* reciting the stanzas on the stage in future time, (aud not in reference to the time when the play was composed). It may appear strange to Western ideas that a man should mention the time of his death from mere astrological calculations. But the thing is quite a common occurrence in this country. My uncle, a profound Sanskrit scholar, found on a reference to his horoscope that he should die when 75 years and 7 months old. When he nearly reached that age he hastened to Benares to die in that sacred city. The late venerable Professor Táránáth Tarka-váchaspati also repaired to Benares a short time before his death, and would not wait even for a month though he had some urgent business at hand, and was in sound health at the time, for his horoscope told him that his end was near. I know of another profound Sanskrit scholar who drew up his will in all haste because his horoscope seemed to indicate that he had but a short time to live.

The phrase अग्निं प्रविष्टः may also be explained thus अग्निं प्रविष्टः अन्नभोक्तृत्वार्थतया अग्निं प्रवेशितः आत्मनीति शेषः। यतिधर्मग्रहणार्थं आत्मनि अग्निसमारोपमकरोदित्यर्थः। *

that is, he performed the rite of *Agnisamáropaṇa* (before he entered the ascetic stage). It was not an uncommon practice of kings of old of this country to abdicate the throne in favour of their eldest sons and repair to the forest and lead an ascetic life. A certain religious observance called the *Agnisamáropaṇa* had to be performed on this occasion. It may be mentioned that in the stanza in which "(अग्निं प्रविष्टः)" occurs, exactly the same circumstances in which a man may enter the ascetic stage according to the rules of the *Sástras* are to be found.†

* आत्मन्यग्निं समारोप्य ब्राह्मणः प्रव्रजेद् गृहात्। मनुः। ६। ९८।

† ऋग्वेदं सामवेदं गणितमथ कलां कौशिकीं हस्तिशिक्षां।
ज्ञात्वा, सर्वप्रसादादपगततिमिरे चक्षुषी चोपलभ्य॥

It is difficult to say which of these two interpretations is the correct one. But it is manifest from this that the passage does not place any insuperable difficulty in the way of our accepting the traditional belief that S'údraka was the author of the play. It may be remarked by the way that the assertion that it is a very common practice to name works after the names of the royal patrons of their authors is too vague and general to be of use in settling a debatable question; as a matter of fact the practice is not so common as is assumed. Except in the instance of *S'ríharsha* who was the royal patron of *Dhávaka*, and had the works of the latter named after himself, there is no other case on record in the annals of Sanskrit literature; and even the case of *S'ríharsha* himself is now admitted to be a doubtful one. Under the circumstances I hold it reprehensible to raise a doubt where satisfactory explanations are accessible. To accept a conclusion founded upon such a doubt is to open a wide door for the falsification of history.

The chief argument of Dr. R. Pischel may be summarised thus:—Daṇḍin is the reputed author of three famous works; of these *Kávyádarśa* and *Daśakumára* are two. As to the third there is difference of opinion. Daṇḍin in his *Kávyádarśa* twice quotes a verse लिम्पतीव तमो-ऽङ्गानि &c., which is found in the *Mṛichchhakaṭiká*. Now, it is generally supposed that Daṇḍin never quotes verses from other writers; and all the verses given in the *Kávyádarśa* are of his own composing. It is, therefore, highly probable that the *Mṛichchhakaṭiká*, from which he has quoted a verse, is a work of his own, the missing third. The force of this argument depends entirely on the premiss that Daṇḍin never quotes his examples from others. I do not think it necessary for me on the present occasion to examine all the verses he has given in his work by way of examples. I may note, however, that Professor Wilson in the preface to his edition of *Dasakumára Charita* writes.—" It (*Kavyádars'a*) is not of great extent; but the rules are illustrated by examples taken, it is affirmed, from different authors." And Professor Wilson is quite right, for the following four verses from the *Máhabhárata*, *Sákuntala* *Sisupálbadha* and *Kádamvari* cannot otherwise be accounted for. The second part of the second example is borrowed *verbatim*.

राजानं वीक्ष्य पुत्रं परमसमुदयेनाश्वमेधेन चेष्ट्वा ।
लब्ध्वा चायुः शताब्दं दशदिनसहितं शूद्रकोऽग्निं प्रविष्टः ॥
मृच्छकटिकम् ।
" वनाद् गृहाद्वा कृत्वेष्टिं सर्ववेदसदक्षिणाम् ।
प्राजापत्यां तदन्ते तानग्नीनारोप्य चात्मनि ॥
अधीतवेदो जपकृत्पुत्रवानन्नदोऽग्निमान् ।
शक्त्या च यज्ञकृन्मोक्षे मनः कुर्यात्तु नान्यथा" ॥
याज्ञवल्क्यः ।

(१) अद्य या मम गोविन्द जाता त्वयि गृहागते ।
कालेनैषा भवेत् प्रीतिस्तवैवागमनात् पुनः ।
काव्यादर्शः २ । २७९ ।

या प्रीतिः पुण्डरीकाक्ष तवागमनकारणात् ।
सा किमाख्यायते तुभ्यमन्तरात्मासि देहिनाम् ।
महाभारतं उद्योगपर्व ।

(२) इन्दोरिन्दीवरद्युति । लक्ष्म लक्ष्मीं तनोतीति ।
काव्यादर्शः १ । ४५ ।

मलिनमपि हिमांशोर्लक्ष्म लक्ष्मीं तनोति ।
शाकुन्तलं । १ ।

(३) रत्नभित्तिषु संक्रान्तैः प्रतिबिम्बशतैर्वृतः ।
काव्यादर्शः । २ । ३०२ ।

रत्नभित्तिषु संक्रान्तप्रतिमास्ते चकाशिरे ।
शिशुपालवधम् । २ । ४ ।

(४) अरत्नालोकसंहार्य्यमवार्य्यं सूर्य्यरश्मिभिः ।
दृष्टिरोधकरं यूनां यौवनप्रभवं तमः ॥
काव्यादर्शः । २ । १९७ ।

निसर्गत एव अभानुभेद्यम् अरत्नालोकच्छेद्यम् अप्रदीपप्रभापनेयम् अतिगहनं तमो यौवनप्रभवम् ॥ कादम्बरी ।

The verse on which the argument is founded is, I hold, adverse to the theory. An explanation of the first passage where the verse लिम्पतीव &c. is given (II, 226, p. 218, Cal. edition, 1863) would itself show that the verse has been quoted from some other author. Having given there the definition of the rhetorical figure *Utpreksha* and illustrated it by examples, the author writes :

लिम्पतीव तमोऽङ्गानि वर्षतीवाञ्जनं नभः ।
इतीदमपि भूयिष्ठमुत्प्रेक्षालक्षणान्वितं ।
केषाञ्चिदुपमाभ्रान्तिरिवश्रुत्येह जायते
नोपमानं तिङन्तेनेत्यतिक्रम्याप्तभाषितं ॥
Do. Do. Do.
काव्यादर्शः । २ । २२६ ।

Here the author evidently controverts the opinion of some rhetoricians who regarded the verse in question लिम्पतीव &c. as an example of *Upamá*. He shows by a long argument, and it may be remarked, by the way, that this is the only instance where the author is distinctly controversial—that these rhetoricians are mistaken. Now these rhetoricians may very well be assumed to be older than Daṇḍin himself, in which case the verse could not possibly be Daṇḍin's. But even supposing that

the rhetoricians referred to were not older but contemporary writers, it is hard to imagine that they would have noticed a verse written by a contemporary, as Sanskrit authors, when they quote, usually quote from old authors. In his note on this passage the late Professor Premchánd Tarkabagíśa, very justly writes, "इतीदमपि प्राचीनपद्यार्थमपि इत्यर्थः ।" that is, by the words "इतीदमपि," is meant the old verse (hemistich). The presumption is almost irresistible that the verse must have been old and well-known when it was discussed by several rhetoricians. The verse is quoted a second time later on, (II, 362, page 314) and here the whole couplet, and not the first two feet only, has been given. The object here was to give an example of two distinct and independent rhetorical figures in one and the same stanza. Now it is not quite easy to give an example in which no dispute could possibly arise. It is likely, therefore, that the author here quotes a stanza, in the first half of which he has established conclusively that there is the figure *Utpreksha*, and in the second half of which there is a clear and undisputed case of *Upamá*. It may also be mentioned that this stanza is the stock example in Sanskrit treatises on rhetoric of distinct and independent rhetorical figures occurring in one and the same verse.

Daṇḍin, in his *Kávyádars'a*, does not say, as the author of *Rasagaṅgádhara* does*, that he will not extract verses from other authors by way of rhetorical examples. On the contrary he distinctly states that he will compile from old writers and take into account the usage of old poets.† It may be mentioned that Jagannátha, the author of *Rasagaṅgádhara*, who distinctly lays down for himself the rule that he will never give examples from other authors, but will always give examples of his own composing, has himself quoted the verse "लिम्पतीव तमोऽङ्गानि" &c. (See उत्प्रेक्षाप्रकरणम्) exactly under the same circumstances as those in which it has been quoted by Daṇḍin. Both the authors give certain examples of the rhetorical figure *Utpreksha*, and then go on to discuss the figure in this verse. Is it then to be wondered at that Daṇḍin should have quoted a verse from a well-known work, a verse moreover which has become a stock example with rhetoricians?

It may also be remarked that if the *Mrichchhakaṭiká* were really a work of Daṇḍin's, it would be rather strange that he should quote only one single verse from it, (and that on two occasions) for he might very

* निर्माय नूतनमुदाहरणानुरूपं काव्यं मयात्र निहितं न परस्य किञ्चित् । किं सेव्यते सुमनसां मनसापि गन्धः कस्तूरिकाजननशक्तिभृता मृगेण ।

रसगङ्गाधरः । १ आननम् ।

† पूर्वशास्त्राणि संहृत्य प्रयोगानुपलक्ष्य च । यथासामर्थ्यमस्माभिः क्रियते काव्यलक्षणम् ।

काव्यादर्शः । १ । २

easily have quoted many more. In a treatise on rhetoric all that the author has to do is to expound rhetorical rules, and if he had a long play written by himself it would be strange if he did not make a freer use of the materials it would offer to his hand.

That the age of the *Mṛichchhakaṭiká* is anterior to that of Daṇḍin will abundantly appear from the following considerations :

That the *Mṛichchhakaṭiká* was composed at the time of S'údraka, or at least immediately after his death, hardly admits of doubt.

Now there is only one S'údraka known in ancient Indian history. And the age of that Sudraka has been given in the *Skandapuráṇa* as 3290 years after the advent of the *Kaliyuga,** that is, about 1700 years ago. This brings the age of S'údraka to the second century of the Christian era. But Professor Pischel himself admits that the age of Daṇḍin cannot be earlier than the 7th or the 6th century. In the *Subháshita-Háràvali* there occurs the following verse :

तौ शूद्रककथाकारौ रम्यौ रामिलसोमिलौ ।
काव्यं ययोर्द्वयोरासीदर्धनारीश्वरोपमम् ।

From this it appears that S'údraka was anterior to, or at least contemporary of, Saumila. Now Saumila is anterior to Kálidasa, as appears from the following passage from the introduction to the *Málavikágnimitra*

प्रथितयशसां धावकसौमिल्लकविपुत्रादीनां प्रबन्धानतिक्रम्य वर्तमानकवेः कालिदासस्य कृतौ किं कृतो बहुमानः ? ।

Daṇḍin, however, is unquestionably later than Kalidása, so that the *Mṛichchhakaṭiká* could never have been written by Daṇḍin. Again Vámana, in his *Kávyalankára-sútravṛitti* mentions S'údraka.† That

* त्रिषु वर्षसहस्रेषु कलेर्यातेषु पार्थिव । त्रिशते च दशन्यूने ह्यस्यां भुवि भविष्यति । शूद्रको नाम वीराणामधिपः सिद्धसत्तमः । नृपान् सर्वान् पापरूपान् वर्धितान् यो हनिष्यति ।
स्कन्दपुराणम्, भविष्यद्वृत्तान्तः ।

Quoted by Pundit Ishwar Chandra Vidyasagar in his 2nd pamphlet on "*Widow marriage.*" Professor Wilson in the Introduction to his translation of *Mṛichchhakaṭiká* has also referred to this passage of the *Skandapuráṇa.* (See Works, Vol. XI, p. 6.)

† शूद्रकादिरचितेषु प्रबन्धेष्वस्य भूयान् प्रपञ्चो दृश्यते ।
वामनः । ३ । १ ।
द्यूतं हि नाम पुरुषस्यासिंहासनं राज्यम् । अङ्क । २ ।
वामनः । ४ । ३ ।
यासां बलिर्भवति मद्गृहदेहलीनाम्-इत्यादि ॥ अङ्क । १ ।
वामनः ॥ १ ॥

Vámana's age is much older than that of Daṇḍin is unquestionable. It follows therefore that Daṇḍin could by no means have been the author of the *Mṛichchhakaṭiká*. More remarkable still is the fact that Vámana not only mentions Súdraka, but quotes passages from the *Mṛichchhakaṭiká* itself. This hardly leaves any doubt that the *Mṛichchhakaṭiká* is anterior to the time of Daṇḍin. Moreover, the author of the *Vrihat Sángadharapaddhati* quotes several verses from *Kávyádarsa* ascribing the authorship of each of them to Daṇḍin; but when quoting the verse, छिन्नतीव &c., he does not mention the name of Daṇḍin as its author. This conclusion is very much strengthened by a comparison of the style of the *Dasakumára Charita* with that of the *Mṛichchhakaṭiká*. It leaves no doubt that the two works could not have proceeded from the pen of one and the same writer. The *Daśakumára* abounds in long *samásas*, unusual verbal inflections, and inversions of the regular position of words in sentences. The *Mṛichchhakaṭiká*, on the other hand, even in its prose portion, is written in quite a simple and easy style. Professor Pischel holds that "The state of life as described in *Mṛichchhakaṭiká* is precisely the same as that in the *Daśakumára Charita*." This opinion is hardly tenable. The hero of the *Mṛichchhakaṭiká* is a man of true nobility of nature, truthful, generous, gentle, and brave. The play gives a vivid description of different phases of society including a very graphic account of the administration of justice. The moral tone of the *Daśakumára* is distinctly lower. The tales are full of low love intrigues, and are sometimes conceived in very bad taste indeed.

In fact a careful perusal of the two works, *Mṛichchhakaṭiká* and the *Daśakumára*, would, I feel sure, convince every candid reader that they could hardly have been written by one and the same author.

It is needless to examine the other arguments advanced by Professor Pischel. They do not seem to me to have much weight. If his main argument is untenable, the subsidiary arguments will hardly be of any avail.

I trust I have said enough to shew that neither Bábu Ásutosh Mukerji nor Professor Pischel has succeeded in establishing each his theory regarding the authorship of *Mṛichchhakaṭiká*.

7. *The Mean temperature of the deep sea waters of the Bay of Bengal, from observations taken on board H. M.'s I. M. Steamer "Investigator."*—*By* Commander Alfred Carpenter, R. N., D. S. O., F. R. Met. Soc. F. Z. S.

This paper will be published in the Journal, Part II.

8. *The hot springs of the Namba Forest in the Sibsagar district, Upper Assam. Unpublished Memoranda by the late* J. W. MASTERS, ESQ.,* *with observations by* SURGEON D. PRAIN, I. M. S., *Curator of the Herbarium, Royal Botanical Gardens, Calcutta.*

When stationed at Kohima in 1886 I often heard both from Europeans and natives of the springs in the Namba forest. On my way to Calcutta last January I visited one of these. As the only notice of them hitherto published† is meagre and barely correct, further observation seemed called for. I was assured that in place of being of a scalding temperature those who resorted thither bathed in the springs. No European at Kohima knew the exact temperature.

On my way down I received from an officer‡ passing up, a better account of the largest spring. The temperature I was told, is that of a comfortable bath, varying little throughout the year; the water in the rains reaching above the knee, at this time, (January), would probably not reach further than half way up the calf.

The spring was reached at noon on January 16th. It is eleven miles from Golaghat on the Golaghat-Dimapur road where this crosses the Namba river, from whose right bank it is six paces distant at a point twenty-five paces above the bridge. Thirty paces below the bridge the Dhunsiri river, a considerable stream, receives the Namba from the left. The Dhunsiri even in the cold weather is muddy, the Namba is a clear stream, with a bed of white sand, containing some rather angular quartz pebbles. The banks of both streams are about 18 feet high, and are clay with alluvial mud above.

The depression in which the spring lies, is circular, about 20 feet across and 3 feet deep; the edges mud, the bottom white sand with pebbles, as in the bed of the adjacent stream 15 feet lower. This depression is in Long. 93° 55′ E. and Lat. 26° 24′ N., and is 350 feet above the sea.§ Gas bubbles up all over its area, a very strong escape in the

* Sub-Assistant to the Commissioner of Assam at Golaghat. (Several botanical papers by Mr. Masters may be found in the Journal of the Agri. Hort. Soc. of India, Vols. III, V and VI, and a paper on the Meteorology of Assam in the Cal. Jour. of Nat. Hist. Vol. IV. The greater part of Mr. Masters' papers have never been published, though they contain matter of much interest.)

† Oldham: Thermal springs of India. Mem. Geol. Survey of India, vol. xix, pt. 2, p. 51.

‡ Mr. Lynch, Subordinate Telegraph Department.

§ Assam, 1884. Map issued by office of Surveyor General of India. [Golaghat on the R. bank of the Dhunsiri is marked 349 feet, the country along the banks of the river is fairly level.]

centre, two well marked minor rents, and small bubbles coming up everywhere, these last not confined to the part under water at the time of my visit. The gas was odourless and did not burn. The water was five inches deep in the centre; my feet sank slowly in the sand, causing more violent ebullition of gas; by the time the sand had reached my knees it was difficult to extract my feet. The water was beautifully clear, with a sharp but not disagreeable taste. The temperature of the spring was 110° Fh., that of the Namba being 63·6° Fh. The effects on the skin appeared to be only those of hot water. Still, all classes of natives attribute to it curative properties in cases of skin disease, and take long journeys to bathe there, leaving offerings of money in the pool. These disappear; removed they suppose by the spirit of the spring. I was fortunate enough to find a bronze coin. Its upper surface is much corroded: that which rested on the sand is less affected. To an expert* the effects looked like those which H_2S would produce. From a rough calculation I estimated the discharge at over eight gallons per minute. I brought away some of the water for chemical examination.

Before the result of this examination was received a number of manuscripts were discovered in a long unopened drawer in the Library of the Royal Botanical Gardens. Among these was a series of MS. memoranda relating to the hot springs of the Namba forest; these appear so valuable as to deserve publication now.

"Memoranda† relative to the hot-springs situated in the bed of, and near to, the Nambur river, on the left bank and right bank of the Dhunsiri river in Upper Assam; obtained from personal observations registered on the spot at the hours and dates stated below.

"No. 1. Soroo Noon-poong, the principal spring, is eleven miles from Golaghat and situated close to the edge of the right bank of the Nambur, exactly where the road leading from Golaghat to Deemapoor crosses it, on the left bank of the Dhunsiri.

Date.		*Temperature.*	
1845.	Feb. 17, 1 P. M.	Air	72°
		Water of Nambur	64°
		Ditto spring	112°
1851.	Jan. 1, 12.30 P. M.	Air	65°
		Water of spring	110°

* Dr. Warden, the chemical adviser to the Government of Bengal, who also kindly undertook the examination of a sample of the water.

† The quotation is a transcript of pp. 489-492 of the MSS. memoranda of the late Mr. Masters, consisting of his notes on the hot-springs *in full*.

Date.		*Temperature.*	
1851.	Feb. 16, 11 A. M.	Air, shade	66°
		Ditto, full sun	98°
		Water of spring	108°
„	Nov. 25, 2.30 P. M.	Air	74°
		Water of Nambur	70°
		Ditto spring	112°
„	Nov. 26, sunrise	Air	61°
		Water of Nambur	67°
		Ditto spring	112°
1854.	Oct. 27, 11 A. M.	Air	78°
		Water of Nambur	74°
		Ditto spring	110°
„	Oct. 28, 1 P. M.	Air, shade	81°
		Ditto, full sun	102°
		Water of Nambur	76°
		Ditto spring	112°

"No. 2. BURRA NOON-POONG, situated nearly two miles south-west of No. 1 in the bed of a jan (streamlet) near to the Nambur falls.

Date.		*Temperature.*	
1845.	Feb. 17, 3.30 P. M.	Air	80°
		Water of spring	96°
„	Feb. 18, sunrise	Air	59°
		Water of Nambur	62°
		Ditto spring	100°
„	Mar. 15, 1.30 P. M.	Air, partial shade	82°
		Ditto, full sun	90°
		Water of Nambur	70°
		Ditto spring	100°
1854.	Oct. 28, 11 A. M.	Air	82°
		Water of jan (streamlet)	78°
		Ditto spring	100°

"No. 3. GILLA-POONG, situated on the right bank of the Dhunsiri river distant about a mile north-east, from No. 1. A muddy swamp (bheel) spread over some 3,000 square feet of surface and discharging (now) about 10 gallons per minute; completely above the ordinary floods of the Dhunsiri.

Date.		*Temperature.*	
1854.	Oct. 27, 3 P. M.	Water of spring	110°
„	Oct. 28, 2 P. M.	Air, perfect shade	84°
		Ditto, full sun	104°
		Water of Dhunsiri	80°
		Ditto spring	112°

"The springs are not regular in the quantity of water which they discharge. On the 27th of October last, I estimated that the Soroo Noon-poong was discharging about 30 gallons of water per minute. The waters of the Burra Noon-poong being mingled with those of the jan, renders it difficult to form any just estimate of the quantity of water discharged in a given time; this circumstance also accounts for the low temperature of the spring."

The memoranda are dated, Golaghat, November 1st, 1854.

The chemical examination by Dr. Warden yielded the following information:—

	parts per 100,000
Total solids at 100° C	124
Chlorine	66 !!

The water was too old for estimation of organic matter. Nitrates and sulphates were present: nitrites absent. There was a distinct trace of H_2S, but whether this was originally present in the water or produced by the action of sulphates in the presence of organic matter the analyst was not in a position to offer an opinion. There was blackening of the solid residue left after evaporation of the water—on ignition—indicating presence of much organic matter.

9. *Further notes on Indian Amphipoda.—By* G. M. Giles, M. D., F. R. C. S., *Surgeon Naturalist, Indian Marine Survey.*

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 July last.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR NOVEMBER, 1887.

Plates 3 and 4 will be issued with the December number.

[illegible] Esq., Dr. Hoernle, A. Hogg Esq., E. J. Jones Esq., T. Munro Esq., L. de Nicéville Esq., Moung Hla Oung Esq., H. M. Percival Esq., Dr. Prasanna Kumár Ráy, Rev. Graham Sandberg, The Hon. Dr. Mahendralál Sarkár, C. I. E., Maulavi Gholám Sarwar, Dr. W. J. Simpson, D. Waldie Esq.

The Minutes of the last Meeting were read and confirmed.

Sixty-eight presentations were announced, as detailed in the appended Library List.

The Secretary reported that the following gentlemen had been elected Ordinary Members of the Society during the recess, in accordance with Rule 7.

Kumár Vinayakrishna Deva, Bahádur.
Lieut, E. Y. Watson.
William Risdon Criper Esq.

The following gentleman, duly proposed and seconded at the October meeting of the Council, was ballotted for and elected an Ordinary Member.

W. H. P. Driver, Esq.

The following gentlemen have expressed a wish to withdraw from the Society.

Alan Cadell Esq.
Kumar Debendra Mallik.

The SECRETARY reported the death of the following Members.

Dr. Rám Dás Sen.
Lt. Col. T. C. Plowden.
Babu Girijábhusan Mukerji.

The PHILOLOGICAL SECRETARY read the following letter from Bábú Rakhal Das Haldar, presenting some coins, inscriptions and a stone figure, which were exhibited:

"I beg to present herewith to the Society the following:

(1.) An inscription on stone (broken into three parts) dated 1720 Vikramáditya Samvat, found in village Khukhrá, which was at one time the seat of the Mahárájas of Chuṭiá Nágpur. The text (see Plate III) may be read thus—

1 × × करसिंधु मथं
2 क मुदि. माघ पंच
3 मी चंद. ब्रह्मचारि
4 शिवमठ कियो. श्री
5 रघु नाथ नरेंद्र १७२०

"The Raghunáth Narendra" mentioned in the inscription, was the most renowned among the former chiefs of Chuṭiá Nágpur.

(2.) A photographic negative of the above inscription.

(3.) Twenty-five copper coins dug out of the earth in the village of Khukhrá in Chuṭiá Nágpur, probably of the age of the emperor Akbar.

(4.) And lastly, a mutilated stone idol, found in the Súraj Mandil (temple of the Sun) at the village Sutiambá, in Chuṭiá Nágpur. The so-called temple of the sun, a mere thatched shed, is mentioned in the annals of the Nágavaṃsí family.

"I beg further to send you herewith for preservation some rubbings I took last year from inscriptions found in and about Doesanagar, once the capital of Chuṭiá Nágpur. I had not had sufficient time at my disposal to complete my enquiries about them. One of the inscriptions is dated 1711 Samvat, and names Mahárája Ráma Sháh, father of Raghunáth mentioned above. This is the oldest inscription I have seen in Chuṭiá Nágpur."

Dr. Hoernle stated that he had examined the coins, which were of the following types:

1 Copper, of Islám Sháh (like No. 363, in Thomas' "Chronicles").
4 do., of Ibrahím Sháh Sharqí, of Jaunpur, d. 822, 834.
8 do., of Husain Sháh, of Jaunpur, date 864.
1 do., of Gangeya Deva of Chedi.
The remainder, extremely worn and illegible.

Regarding the rubbings from Deosanagar, Dr. Hoernle said, that they were inscriptions in the Hindí language and in modern Nágarí characters of large size. The body of the letters measured about 2 inches, and with the superscribed vowel-marks, 3 inches. The several inscriptions run as follows:

I

1 सम्वत सत्रह सइ एगारह जानियो।
2 वैशाष अष्टमी शुक्ल शनिश्चर गा
3 नियो। श्री राम साह नर देव मुख हरि
4 नाथ ने। ता दिन वापी कीन्ह गङ्ग
5 समजलघने ॥ १७११ संवत

i. e., 'Know it to be the year seventeen hundred and eleven; count it to be Saturday the eighth of the light half of Vaiśákh. Srí Rám Sháh has made on that day a reservoir full of water like that of the Ganges, for Hari Náth, the guru of the devas and men.'

II

1 संवत करजुगसिंधुशशि अक्षयतृतीय चंद
2 ब्रह्मचारि हरिमठ दियो श्रीरघुनाथ नरेंद १७४२

i. e., 'In the year of the moon (1), oceans (7), ages (4) and hands (2), on Monday, the third day of the bright half of Vaiśákh *(akshaya-tṛitíya)*, the prince Srí Raghunáth gave a convent of Hari to the Brahmachárí.'

III

संवत १७२९ दि माघ सु ...

i. e., 'In the year 1729 on the second day of the dark half of Mágh,' (apparently a fragment).

The inscription, transcribed in the Bábú's letter, may be translated thus, supplying *śúnya* as the first word: "In the year of the moon (1), oceans (7), hands (2) and the void (0), on Monday, the fifth day of the bright half of Mágh, the prince, Srí Raghunáth made a convent of Siva for the Brahmachárí, in 1720.

The princes named in the above inscriptions belonged to the Nágavaṃśí Rájás of Chuṭíya Nágpur. From the Nágavaṃśávalí, published by Bábú R. D. Haldar, and a copy of which the Bábú had kindly given him, Dr. Hoernle stated, he had extracted the following genealogy. The founder of the family was Phaṇímukuṭa Ráy, who reigned 59 years;

he was followed by 26 lineal successors, all bearing the surname of Ráy. Then there appeared to have been some kind of break. The 28th member of the family was Bhímakarṇa, who at first reigned together with his elder brother Shyámakarṇa, but afterwards became sole ruler for 10 years. He was followed, in lineal succession, by 16 rulers, all distinguished by the surname of Karṇa. Then followed, as the 44th Rájá, Vairísála, who reigned 14 years. He was said to have served with distinction in many wars under the Mogul emperor Aurangzíb (1658—1707). He was followed by Durjana Sála, who fell out with the Emperor and was imprisoned by him in the fort of Gwáliyar for 12 years. At the end of that time he was reconciled to the emperor, who not only permitted him to return home, but conferred on him and on his successors the title of *Sháh*. Durjana S'ála reigned altogether 41 years. He had four sons, of whom the eldest was Madhukara Sháh and the youngest Ráma Sháh. The former succeeded his father and reigned 18 years. He was succeeded by his son, Deva Sháh, who again was succeeded by his uncle Ráma Sháh, the 48th of the line of Nágavaṃsí Rájás. He was said to have been in great favour with the emperor of his time (Sháhjahán or Aurangzíb) to whom he gave a daughter in marriage. He was the Sháh of the inscription of 1711. He reigned 25 years and was succeeded by his son Raghunáth Sháh, the most celebrated of the line, who reigned 36 years, and was succeded by his son Jadunáth Sháh for 18 years, and his grandson Sivanáth Sháh for 9 years, and great-grandson Udayanáth Sháh for 7 years. The latter was succeeded by his uncle, Shyám Sundar Sháh, a brother of Sivanáth Sháh, who only reigned 5 months, and was followed by his brother Balarám Sháh. He reigned 3 years and was succeeded by his son Maṇináth Sháh, who reigned 14 years. Now followed Darpanáth Sháh, a son of Ṇripanáth Sháh, who was another of the 13 brothers of Sivanáth Sháh. Darpanáth reigned 29 years and was succeeded by his son Devanáth Sháh who reigned 14 years, and his grandson Govindanáth Sháh who reigned 17 years. The latter appeared to have been the first to assume the title of Mahárájá, in addition to the family title of Sháh. He was succeeded by his eldest son Mahárája Jagannáth Sháh, the 59th of his line who, at the time of the composition of the Nágavaṃśávalí, had been reigning 17 years. This was in the year 1895 Samvat, or 1838 A. D. Calculating backwards from this date, Rám Sháh would have ascended the throne about 1649 A. D.; which would agree with his inscription dated 1711 Samvat or 1654 A. D. Raghunáth Sháh came to the throne about 1674 A. D., and his inscriptions are dated 1720 Sam. = 1663 A. D., and 1742 Sam. = 1685 A. D. The unnamed inscription of 1729 Sam. = 1672 A. D. would also belong to him. The emperor, to whom Rám Sháh gave his daughter might have been Sháhjahán, who reigned up to

1658 A. D., or his successor Aurangzíb. It was quite clear, however, that the Nágavaṃśávalí was wrong in making Durjana S'ála a contemporary of Aurangzíb; for the former's reign commenced about 1590 A. D. when Akbar was on the throne of Dehlí. His imprisonment in Gwáliyar, accordingly, must be placed in the time of Akbar or of Jahángír, the latter of whom commenced to reign in 1605. This agreed with a statement of Bábú R. D. Haldar, that the coins presented by him were traditionally said "to have been brought to Chuṭiyá Nágpur by the followers of Durjana S'ála from Gwáliyar, where he was incarcerated during the time of Akbar or Jahángír." The person Hari Náth, mentioned in Rám Sháh's inscription, was according to the Nágavaṃśávalí, the minister of Rám Sháh as well as of Raghunáth Sháh. He was referred to in the latter Sháh's inscription as the *Brahmachárí*, a title by which he was also mentioned in the Nágavaṃśávalí.

The PHILOLOGICAL SECRETARY exhibited two gold coins, forwarded by F. S. Growse Esq., Magistrate of Fathgaṛh. One of them was a coin of Chandra Guptá II, in a rather clipped condition; the other was a coin of Gangeya Deva of Chedi (A. D. 1020-1040) in very good condition.

The PHILOSOPHICAL SECRETARY read the following Reports on finds of Treasure Trove Coins.

Report on 232 silver coins forwarded by the Collector of Muzaffarpur, with his No. 717, R. dated Muzaffarpur, the 8th August 1887.

The coins were found by six persons at Rájapakhar, Thana Mahna, Zillah Muzaffarpur.

A nominal list of the coins was attached to the Collector's letter, in which the coins were stated to belong to the following Mughal Emperors: Akbar, Jahángír, Sháh Jahán, Aurangzíb, Bahádur Sháh, Farukhsír, Rafíu-d-darját, Muḥammad Sháh, and Sháh 'Álam. This is not quite correct. There are no coins of Sháh 'Álam in the collection; those attributed to him, really belong to Bahádur Sháh, as shown by the dates they bear. Again, among the coins ascribed to Sháh Jahán, there are two which belong to Rafíu-d-daulah, as also shewn by the dates they bear, and from other numismatic considerations.

The following is a correct list of the coins.

		No. of Coins.
I.	AKBAR, lettered surfaces, type as in Marsden, *Num. Orient.*, No. DCCCXXVIII, but round piece, Mint Aḥmadábád, ...	3
II.	JAHA'NGÍR (*Núru-d-dín*), lettered surfaces, type more or less as in Marsden, *Num. Orient.*, No. DCCCLXXII, ...	8

No. of Coins.

III. Sha'h Jaha'n I. *(Shihábu-d-dín).*

a, type with square areas, as in Marsden, *Num. Orient.*, No. DCCCLXXVI, 3 or 4 varieties, dates and mints mostly illegible, 44

b, type with circular areas, as in Marsden, *Num. Orient.*, No. DCCCLXVII and DCCCLXXVII, ... 7

c, type, lettered surfaces, 1040, Súrat, etc., as in Marsden, *Num. Orient.*, No. DCCCLXIV, ... 13

IV. Aurangzíb *('Álamgír).*

a, type, lettered surfaces, with date in top line above name, as in Marsden, *Num. Orient.*, No. DCCCXCVII, dates 1075, 1077, 1090, 1092, 1093, 1094, 1097, 1098 (two) 1099, (two) 1101, 1103, 1104 (three) 1106, 1110 (two) 1111 (three) 1112, 1113, 1114, (two) 1115, 1116, 1117 (five) 1118 (two), and six others illegible; mints: Aurangábád, Dáru-l-Khiláfat Sháh Jahánábád, Dáru-s-Salṭanat Láhor, Golkanda, Etáwah, Murshidábád, etc., ... 41

b, type, lettered surfaces, with date in top line below name (not in Marsden); dates 1077, 1093, 1107 and others illegible, ... 10

c, type, lettered surfaces, with date in middle line, as in Marsden, *Num. Orient.*, No. DCCCLXXXIV and DCCCXC, 2 varieties, dates 1076, 1078, 1081, 1111, 1112, 1113, 1114, and others illegible, ... 22

d, type, lettered surfaces, with date in bottom line, as in Marsden, *Num. Orient.*, No. DCCCLXXXIII, 2 varieties, dates: 1100, 1101, 1102 (two) and others illegible; mints Láhor, Akbarábád, Dáru-l-Jáhanábád, etc., ... 22

V. Baha'dur Sha'h *(Sháh 'Álam)* lettered surfaces, two varieties, as in Marsden, *Num. Orient.*, No. DCCCCI and DCCCCII, and a third variety (not in Marsden), dates 1119, 1120, etc., mint: 'Aẓímábád, Jahangírábád, Láhor, etc 17

		No. of Coins.
VI.	FARUKHSI'R *(Muḥammad)*.	
	a, type, with name in top line, two varieties, as in Marsden, *Num. Orient.*, No. DCCCCVIII and DCCCCXII	23
	b, type, with name in middle line (not in Marsden), ...	15
VII.	RAFÍU-D-DARJA'T, lettered surface, 1131, mints: Patna, Jahangírnagar, ...	2
VIII.	RAFÍU-D-DAULAH *(Sháh Jahán* II) lettered surfaces, date 1131, mint: 'Aẓímábád, ...	2
IX.	MUḤAMMAD SHA'H, two types, as in Marsden, *Num. Orient.*, Nos. DCCCCXVIII and DCCCCXXI, dates 1131 (two), 1133, mint 'Aẓímábád,	3
	Total ...	232

All the coins are Rupees, except three which are half rupees (or 8 annas), viz. 1 of Sháh Jahán I, and two of Farukhsír. There were not two half rupees and one quarter-rupee, as stated on a slip of paper, enclosed with the coins, but three half rupees, as shown by the weight.

Report on thirteen old gold coins, forwarded by the Offg. Deputy Commissioner of Jabalpur, with his No. 3286, dated 24th August 1887.

The coins are reported as having been found in the village of Karan Bál, in the Jabalpur District.

They are all of gold, and belong to GA'NGEYA DEVA. the Kulachuri Rájá of Chedi, who reigned from about A. D. 1020-1040, and was a contemporary of Maḥmúd of Ghazní. They are described and figured in General Cunningham's, *Archaeological Survey Reports*, Vol. X, p. 25 (plate X, fig. 1-4.) On the obverse is represented the goddess Durgá seated; the reverse contains the legend: *Srí Madgángeya Deva.*

Report on 112 old coins, forwarded by the Deputy Commissioner of Gujrát, with his No. 434, dated 2 May 1887.

The coins are said to have been found in the villages of Dillawal, Dhul and Dhunu, of the Gujrát District.

They are all of silver, and belong to two entirely different species of coins; viz., 81 are rupees of different Mughal emperors of Dehlí, while 31 are half-rupees of the Hindú kings of Kabul; total 112 coins. The Kabul coins are the more ancient, and date from the 9th century A. D. The Mughal coins range between 1627 and 1761 A. D.

The 81 Mughal coins belong to the following emperors:

I,	*Sháh Jahán* 1627-1658 A. D., indifferent specimens; date and mint unknown, ...	2

II, *Aurangzíb*, 1658-1707 A. D. lettered surfaces,	
a, Type I, date in top line, 2 varieties, of various dates and mints ...	18
b, Type II, date in middle line, 2 varieties, of various dates and mints, ...	6
c, Type III, date in the bottom line, of various dates and mints ...	5
III, *Bahádur Sháh*, 1707-1712 A. D., of 3 different types, various dates and mints ...	11
IV, *Jahándár Sháh*, 1712 A. D., mint: Lahor, ...	3
V, *Farukh Sír*, 1712-1719 A. D., of 2 different types, various dates and mints ...	11
VI, *Rafíu-d-darját*, 1719 A. D., mint Multán ...	1
VII, *Rafíu-d-Daulah*, (Shah Jehán II) 1719 A. D. mint: Dáru-l-Khiláfat Sháh Jahánábád ...	1
VIII, *Muḥammad Sháh*, 1719-1748 A. D., of various dates and mints:	
a, Type I, *Sáḥib Qirán*, ...	9
b, Type II, *Bádsháh Ghazí*, ...	13
IX, *'Álamgír Sání*, 1754-1761 A. D. mint Sirhind,	1
Total ...	81
The 31 Kabul coins, all belong to the type *Samanta Deva; obv.* Horseman, with date 814; *rev.* sitting Bull:	31
Grand Total ...	112

Report on 327 "coins of old date" forwarded by the Deputy Commissioner of Sealkoṭ, with his No. 1258, dated 16 September 1887.

These coins are said to have been found near the village of Adálatgaṛh, by six different persons, on the 6th December 1884, when digging an *adh* or water course.

They belong to the class commonly called "old Hindú punched coins." They are well known and have been often described by Prinsep, Thomas, and others (see Indian Antiquities, Vol. I, pp. 209 fig). They are supposed to be the earliest kind of Indian coins but probably were in use down to the comparatively late times of the Mahammadan conquest, side by side with more regular currencies. They consist of small flat pieces of metals of all kinds of shapes, marked with a great variety of "punches," some on one side only, others (though rarely) on both

sides. Many of these punches are of a distinctly Buddhist character, e. g., the bodhi tree within a railing. Other punches represent a peacock above a chaity, an elephant, bull, deer, dog, frog, three human figures placed in a row, wheels or suns of various forms, etc. etc. Generally these coins consist of more or less pure silver. They are numerously found all over India. A large hoard of such coins, containing 1191 pieces, was found in January 1885, in the Chaibassa District of Bengal (see Proceedings, As. Soc. Beng., for November 1885, p. 126).

The coins in the present collection appear to be, nearly all, of either pure or nearly pure silver. Most of them, about 200, are square or oblong; some 75 are nearly circular, the others are of no definite shape. Most of them are in very good condition, but 113 are more or less spoilt by abrasion or corrosion.

The PHILOLOGICAL SECRETARY read the following letter from Mr. F. S. Growse, with regard to the discussion on the word *Ekotibhâva* which took place at the last meeting of the Society:

"I have not seen the 'Academy,' and therefore I cannot say how much of my letter Professor Max Müller has published.

"Had I anticipated that any part of it would have the honour of appearing in print I should have been more careful to emphasize the deference I really entertain for Dr. Mitra's extensive learning, before proceeding to dissent from the view of so eminent a scholar even on such a minor matter as the derivation of a single word. I did not think it necessary to cumber a short private note with the elaborate formalities of conventional compliment.

"I presume that my letter was not published in its entirety, otherwise it would have been clear to any reader that the gist of it was the suggestion that classical Sanskrit formations are more influenced by Prákrit rules than orthodox grammarians have ever yet acknowledged. Thus I was by no means guilty of omitting the important word 'Prákrit'; upon the presumed omission of which Dr. Mitra has commented at considerable length.

"One example that I quoted was the Sanskrit *vîja*, 'seed.' This is ordinarily derived from the root *jan* with the prefix *vi*. I prefer to see in it a contraction—on Prákrit rule—of the word *vîrya*, 'virility.'

"Similarly, *pace* Dr. Mitra, I believe that the rules of modern Italian orthography throw much light on the colloquial pronunciation of ancient Latin, and help to solve many of the difficulties and prosodiacal anomalies of Plautine scansion.

"The assertion that 'under no circumstances can the rule appealed to produce *ekoti*, but only *ekauti*,' is—I am sure—one that Dr. Mitra

would not wish to press. The substitution of *o* for *au* being one of the very commonest features of Prákrit etymology.

"I am still of opinion that the only serious objection to the derivation from *eka-koṭi* is the conversion of the cerebral *ṭ* in *koṭi* into a dental. And this Professor Max Müller at the very outset clearly recognised as an irregularity.

"To conclude with an incidental criticism. I cannot think that *súkara* is rightly explained as 'the bristled one.' Rather I should say the name means 'the grunter'; in the same way as *mayúra* is the bird that 'miows', the peacock's cry being often with difficulty distinguishable from that of a cat."

The PHILOLOGICAL SECRETARY read the following notes.—

Find of Coins of Gánggeya Deva of Chedi.—By V. A. SMITH Esq.

Sixty-five silver coins of Gánggeya Deva, king of Chedi (A. D. 1020—1040) were lately found by two labourers digging a field in Pargána Salimpur-Majhaulí of the Gorakhpur District, and have been sent to me by the Collector, Mr. D. T. Roberts, for identification. The name of the village iu which they were found is not stated. The coins all agree with the specimen figured and described by Sir A. Cunningham in Archæological Reports, Vol. X, page 25, Plate X, 3. They are all in excellent condition. I had not the means of weighing them accurately, but they doubtless agree in weight with Sir A. Cunningham's eight specimens, which weighed 60 or 61 grains each.

Steps have been taken to acquire the coins under the Treasure Trove Act.

I take this opportunity of informing the Society that Sir Alfred Lyall, Lieutenant-Governor of the N. W. P., has lately issued an excellent set of rules under the Treasure Trove Act, framed with the object of mitigating, so far as possible, the severity of the law, and of encouraging finders to bring coins to the Collector. But the people in this part of the country are so ignorant and suspicious that no rules are of much use to encourage them to come forward. These eastern districts of the N. W. P. are full of ancient mounds, many of which are of very early date, and great numbers of coins must be annually found, but it is very difficult to get hold of any. The various finds which I have acquired for Government were all obtained through the intervention of the police.

Large Find of Coins of Govinda Chandra Deva of Kanauj—By V. A. SMITH Esq. (1125—1150 A. D.)

The workmen of the Bengal and North-Western Railway recently

found about 800 coins of Govinda Chandra Deva of Kanauj near Naupára in the Bahraich District, Oudh.

The coins are in the hands of Mr. A. Izat, Agent of the Railway Company, who proposes to devote the proceeds of the sale of the treasure to the endowment of the school at Gorakhpur for the children of European railway employés.

The metal of the coins is very impure gold, with a large admixture of silver. Two, which I bought for six rupees each, are in very fine condition.

Mr. Izat will be glad to sell any number. The coins are of the usual and well-known type.

Find of Gold Gupta Coins in the Bastí District, N. W. P.—By V. A. Smith Esq.

During the month of August 1887, after a heavy fall of rain, a shepherd found eleven gold Gupta coins at Mauza Sarai, about half a mile south of the Bastí Jail. Mauza Sarai, which is uninhabited, and the adjoining village of Misraulier, on the bank of the Kuána river, occupy the site of an ancient town, which ignorant tradition ascribes to the forest tribe named Tháru.

One of the eleven coins found has been made away with, but I succeeded with a little difficulty in securing the remaining ten, which will be dealt with under the Treasure Trove Act. The usual allegations were made that a large quantity of the coins had really been discovered, but I have not been able to elicit any proof of the alleged fact.

Nine of the coins belong to the Archer Type, class II, with lotus seat reverse, of Chandra Gupta II, which is by far the commonest type of the Gupta coinage. Two specimens of this type are in very fine condition. The monograms are 8*a*, 8*b*, 10*b*, and 19*b*.*

The tenth coin is a variety of the rare Swordsman and Umbrella type of Chandra Gupta II, but is at first sight not readily recognizable, owing to the fact that there is not room on the coin for the umbrella. A close inspection shows that the attendant is holding its handle, but no more of it is visible. The obverse legend is illegible, except the single character क्र 'kra', probably part of the word 'Vikramáditya'. The reverse legend is distinctly 'Vikramádityaḥ'. The coin now described differs from that shown in my Plate III, figure 8, in that the reverse goddess of the new coin has no pedestal.

The form of the conjunct *y* in the coin under discussion is unusual,

* The references are to my paper on the Gupta Gold Coinage in Journal Asiatic Society of Bengal for 1884, Part I.

and consists of two closely parallel horizontal lines, two tenths of an inch long, brought back under the *t* and two preceding characters.

Monogram 7*a*. Weight, not ascertained, but seems to be normal. The coin is oval, its length from top to bottom being ·75, and its width ·68 of an inch.

The fire-altar on the obverse, which is sometimes wanting in coins of this type, is very distinct in this specimen.

The Weight of the Ratí Seed in Southern India.—By V. A. Smith Esq.

The weight of the *ratí* seed *(Abrus precatorius)*, which is the basis of the Hindú metrical system, is known to vary in different localities. General Cunningham's experiments fixed the weight for Northern India as 1·8229, and Mr. Laidlay's yielded the practically identical result of 1·825, which is the more convenient value to adopt for calculation.

My friend Mr. F. C. Black, C. E., informs me that in Southern India the seeds run to a larger size. When at Hampí in the Bellary District of the Madras Presidency, he was struck with this fact, and took the trouble of weighing 672 seeds. The gross weight was 1440 grains, and the average figure is consequently 2·1428 grains.

The difference between the weights of the *ratí* seed in Northern and Southern India seems worth noting, as it would have to be taken into account in discussing the meteorology of the Southern coinages, should such a discussion be undertaken.

On the Assurs—*By* W. H. P. Driver Esq.

Quite lately I have come upon a variety of stone beads which have been washed out of the ground, and which the villagers tell me their ancestors informed them were made and worn by mythological people called Assurs. There are no Assur settlers near the villages where the beads were found, the population being Uraon and having no knowledge whatever of the existence of the Assur tribe, who live in the extreme west of this district.

As the Assurs themselves say they come from the east, I am inclined to think they are descendants of the mythological Assuras of the Puranas, and had at one time reached an advanced state of civilization, of which they have now lost all traces.

Coins similar in size and shape to these* were found in fields with stone beads, pieces of iron and thick tiles, but I do not send them, as owing to exposure and the ignorant people who found them having tried to polish them up, the original marks have been almost all obliterated.

These beads, coins &c. were not all found in the same spot but in different parts of the same fields.

* Viz. Two silver coins forwarded by Mr. Driver to the Secretary.

From time immemorial similar beads have been found in certain fields by the cowherd boys (Uraons) and the tradition regarding them has been handed down, that they belonged to 'Assurs', who lived there before the Uraons came into the country. These Uraons do not know that such people as Assurs exist at the present day, but say they belonged to the "Sat-jug." These fields have for generations been owned and cultivated by Uraons, and neither Hindus nor Muhammadans have ever had anything to do with them.

There are no settlements of Assurs now within fifty miles of these sites, nor have there been any for many generations, but they have a tradition that they came from the east, they being now settled in the west of this district (Lohardagga).

These same Assurs, though now in a very degraded condition, have traditions amongst them, that before the Uraons came and turned them out, they rode in palkis and were clever artisans. They are still rather clever at smelting and working iron.

As some of the beads I have found are still unpierced, although shaped and polished, it would appear that they were being manufactured where they are now found.

From all these considerations I am inclined to believe that the present Assurs are really descendants of the people who made the beads and used the coins, though it is quite possible that they learnt their art from Greek settlers.

I believe similar stone beads have been found in various parts of India, and I should feel much obliged if you could let me know what is the opinion of antiquarians concerning them, and if it is not possible that they might have been used as money, words or numbers, by people who did not know how to write.

I believe there has not been found any written character which can be attributed to the Kols, who are undoubtedly the most ancient settlers of India.

Babu Sarat Chandra Dás exhibited some Tibetan,* Sanskrit-Tibetan,† and Nepalese‡ MSS. in which the much discussed word "Eko-tibhâva" occurred with a dental "t" and a long "î"; and made the following remarks: "Dr. Mitra has said (*vide* p. 176, Proceedings of

* A Tibetan Dictionary written in Tibetan characters.

† A Sanskrit-Tibetan Dictionary written in a form of the Deva-Nâgari character and Tibetan.

‡ "Dasa Bhumisvara" a Nepalese MS. obtained from Nepal by B. H. Hodgson. (In Dr. Mitra's Notice of Nepalese Buddhist Literature I find that there is only one copy of this work in the library of this Society. Pandit Harimohan Vidyâbhushan, Librarian of the Oriental section, assures me that this is the copy which has been noticed by Dr. Mitra.)

this Society, No. VII, July last) " some extracts from the Tibetan and Sanskrit works he has procured from Lhasa would have been most welcome to us. In questions of this kind ancient records are of infinitely greater use than the cogitations of modern scholars." Gentlemen, if you be disposed to consider these MSS. which I now submit for examination, as old and genuine, the etymology of this Buddhist term will, I hope, be definitely settled; for in all these MSS. which are obtained from different place, by different persons, at different times, the word occurs with a dental t and a long " î." Among these MSS. you will find Csoma's MSS. Glossary of Tibetan technical terms in English in which the word " Ekotîbhâva " is clearly written with a dental " t " and a long " î." If, according to Dr. Mitra and his friend Babu P. C. Ghosha, there exists no means to write the Sanskrit ट् in Tibetan, how could Csoma in his transliteration of a chapter of the Tangyur write the word with a long " î " ? Csoma's Glossary is about 50 years old, and it is in his own handwriting. With regard to Dr. Mitra's assertion of the long " î ", I would refer you to p. 20 of Csoma's Tibetan Grammar where, under the heading " Alphabetical scheme of the Sanskrit language when written in Tibetan characters," you will find a long " î " (ट्) written as  ."

The Philological Secretary exhibited to the meeting a curious old brass vase, belonging to Dr. Geoffry C. Hall, Superintendent of the Central Prison in Allahabad. It had been found some few years ago in the District of Mirzapur, buried in an old temple. It was in the form of a small jug (see Plate IV), about 3 inches high, with two figures attached on opposite sides, forming supporters. One of the figures was represented standing, holding a fan in its right hand; the other was seated, having a spoon in its right hand, and a pan in the left.

Bábú Sarat Chandra Das, explained that the vase, of bell metal, was a miniature representation of an incense-burner, such as are set up in Nepalese temples. They are of very large size, about 4 feet high, and are served by Nepalese monks of the Tantrik school who wear locks. Two of the latter are represented in the act of serving the miniature burner. One holds a spoon in his right hand to put incense into the burner from a pan which is in his left hand. The other holds a fan to blow the glowing mass in the burner.

The following papers were read.—

1. *E'tudes sur les Arachnides de l' Asie méridionale, faisant partie des collections de l' Indian Museum (Calcutta). II. Arachnides recueillis aux Isles Andaman par M. R. D. Oldham.*—*Par* M. E. Simon *de Paris. Communicated by the* Superintendent of the Indian Museum.

2. *A description of the commoner Uredines occurring in the neighbourhood of Simla (Western Himalayas).* *By* A. Barclay. M. B. *Bengal Medical Service.*

These papers will be published in full in the Journal Part II.

3. *On the Resin of* Cannabis indica.—*By* P. Brühl, Esq: *Rajshahye College.*

First Paper.

Preliminary Experiments.

Resins, bitter principles, and colouring matters form those groups of naturally occurring compounds the knowledge of which is yet in a rather rudimentary and therefore unsatisfactory state. Chemists have not yet discovered the key to the secret of the constitution of most of those compounds; and as long as this key is not found, an investigation of them must be destitute of that attraction which attaches itself to experiments on those groups of compounds which can be made the subject of a well-planned series of experiments. For there being comparatively little to guide the experimenter in his researches, the latter must be of a more or less tentative character, and the time and labour spent in such researches are not unfrequently disproportionate to the results obtained. As, however, resins as well as bitter principles and colouring matter are of considerable interest to the student of vegetable physiology, a thorough investigation of these somewhat heterogeneous groups of compounds is highly desirable; and India, as a tropical country, might be expected to offer a fair field to the investigator.

Among the Indian resins about which comparatively little is known to the chemist, the resin of *Cannabis indica* deserves to be specially mentioned. When we remember the peculiar intoxicating effects of ganja and the valuable medicinal properties of the extract and tincture of *Cannabis indica*, we should feel rather astonished at the scantiness of the information one can obtain from books and periodicals with reference to the ingredients and active principles of ganja, churrus, and bhang, if it were not for the high price of these substances, which makes a full investigation of them a rather expensive business.

The following is an account, interspersed with a few historical notes, of a number of qualitative experiments chiefly undertaken with the object of obtaining some data which might come of use in a more extensive series of experiments on *Cannabis indica*.

Preparation.—A method of preparing the resin from ganja has been devised by T. and H. Smith. The subject was also taken up by G. Martins, who in the year 1855 wrote a dissertation entitled: 'Studien über den Hanf.' He prepared the resin from the *Extractum Cannabis*

indicae spirituosum, and found it easily soluble in alcohol, ether, and essential oils, but only little soluble in dilute solutions of alkalis and acids. I have prepared a small quantity of the resin according to Martins' method; but I find that the latter is liable to entail some loss.

Physical properties.—As many resinous substances have been proved to be mixtures of several resins by the judicious use of different solvents, I have studied the action of different solvents on the resin of *Cannabis indica*, and I have found it soluble in carbon disulphide, methylic, ethylic, butyric, and amylic alcohols, in acetic, benzoic, and œnanthic ethers, further in methylnitrate, trichloronitromethane, ethene dichloride, ether, oil of turpentine, benzene, toluene, and naphthalene dichloride. In all these liquids the resin dissolves easily and completely with the formation of brown solutions. It appears from these experiments that the pure resin of *Cannabis indica*, that is to say, the resinous substance remaining after the removal of colouring matters and essential oils, *must be regarded as a homogeneous substance.*

As in the case of other resins, an emulsion is formed when water is added to the alcoholic solution. Whilst, however, ether completely extracts the resin when shaken up with this emulsion; benzene, toluene, and mineral naphtha are not able to do so. A convenient mode of preparing the resin in a state of purity might, perhaps, be based on this observation.

Martins describes the taste of the resin as extremely bitter. I find that if taken in small lumps, especially after treating it for a length of time with boiling water, it appears at first to be nearly tasteless, but produces afterwards a grating sensation in the throat. If, however, swallowed in a state of fine subdivision, which can be obtained by one or two drops of the alcoholic solution being poured into say twenty cubic centimeters of water; or when evaporated in alcoholic solution with milk-sugar under constant stirring, it is very bitter indeed and leaves a peculiarly nasty after-taste.

If ganja be cohobated with alcohol, the distillate, especially that obtained on heating the substance with alcohol to the boiling point of the latter in a retort connected with a Liebig's condenser and a receiver and allowing it to stand for some time when only a small quantity of alcohol passes over, is of a greenish colour and has a nauseous odour. The aqueous and dilute sulphuric acid extracts of ganja also have a sickening smell, especially when allowed to stand for a short time. This smell is evidently due to the volatile oil contained in ganja, which was found by Personne to consist of two hydrocarbons, called by him Cannabene and Cannabene hydride respectively, the latter being a crystallizable solid, whilst the former is a colourless liquid, causing giddiness and headache. According to Martins, 'the narcotic effects

of Hashish are due to hemp-resin'; whilst Personne ascribes them to Cannabene.

Physiological Action.—This leads us to the physiological action of the resin. In the 'Chemisches Centralblatt' of 1886 occurs a short note on 'Cannabinon', which is described as a balsamo-resinous substance prepared in a state of purity by E. Merk in Darmstadt. This 'Cannabinon', evidently identical with the resin which forms the subject of this paper, is there said to be soluble in alcohol, ether, chloroform, carbon disulphide, amylic alcohol, benzol, volatile and fixed oils. 0·1 gram is dispensed with one gram of ground roasted coffee. It is said to be an hypnotic, inducing a quiet sleep. According to some observers no evil after-effects have been observed, whilst according to others the administration of the drug causes vomiting, giddiness, trembling, etc. It is stated in the note that 'Cannabinon' must not be confounded with 'Tetanin', which produces the hemp-intoxication. The tetanin here mentioned is probably identical with one of the constituents of the essential oil of *Cannabis indica;* but as the term tetanin has been applied to one of the Ptomaïnes, it will be preferable to use the terms introduced by Personne. I have tried an experiment on myself with the following results:

At 8-30 A. M. swallowed a dose of 0·12 grams of the freshly prepared resin mixed with milk-sugar; at 10 A. M. drowsiness came on; slight nausea and headache; at 10-30 A. M. gone to bed; lying for some time in a half-waking state; a certain amount of nervousness and great tendency to magnify sounds; (the calling-out of a little girl developed into a fearful, sustained wail, which caused me to jump out of bed in great alarm; the crackling of the straw in the mattrass was magnified into the patter of hail); sleep rather disturbed; fully awake again at 4 P. M.; giddiness, nausea, slight headache, dulness and disinclination to think, on the whole a feeling very much like sea-sickness, alleviated by a walk in the fresh air and by taking a cup of tea. It remains to be seen whether these evil after-effects can be avoided by continued treatment of the resin with boiling water. On the whole the effects of the drug on different persons appear to differ considerably.* It does not appear to be perfectly settled whether this difference solely is due to differences in race, climate, etc., or to slight differences in the composition of the drug. The question can be definitely settled only by carefully isolating the constituents of ganja and testing the physiological effects of each by a series of experiments. At one time it was thought possible that some of the

* See Lauder Brunton, Pharmacology, page 1027; Ringer's Therapeutics, page 561 and ff.

physiological effects of ganja might be due to the presence of an alkaloid. Dragendorff,* in dealing with the opium alkaloids, remarks that our knowledge of the active principles of *Cannabis indica* can hardly be said to be complete, and states that at his suggestion Mr. Masig examined Hashish and Herba *Cannabis indica* for alkaloids without any positive result. I have performed three collateral series of experiments in order to ascertain whether traces of an alkaloid can be detected in tolerably fresh ganja. The available ganja was divided into three portions; the one was macerated for about seven hours in dilute acetic acid (2 cc. of glacial acetic acid to 98 cc. of water); the other two were digested twice with very dilute sulphuric acid at a temperature of from 40° to 50° C for about three hours each time, and the brown liquid was filtered after pressing out the ganja. To one of these two portions four times its own volume of absolute alcohol was added; the other was concentrated by being heated to about 50° C for some hours, while a current of dry air was passed through it; and after concentration it was mixed with four times its own volume of absolute alcohol. On addition of the alcohol the liquid became turbid and a sediment was soon formed. After standing for 36 hours the liquid was cooled by means of a refrigerating mixture and filtered. The course pursued further on was, on the whole, that recommended by Dragendorff,† excepting that the petroleum-naphtha at my disposal, having its boiling-point above 70° C, could not be used for the purpose. The results of the three series of experiments were identical. The benzene extract from the acid solutions left a yellow, oily, strongly smelling residue, when evaporated on watch-glasses; the oily liquid, when gently heated, lost its disagreeable smell, being at the same time converted into a soft resinous substance; it consisted therefore of a mixture of the essential oil and the resin of ganja, which was already proved by Martins to be slightly soluble in dilute acids. The acid chloroform extracts yielded some long and slender, colourless, microscopical crystals, but in too small a quantity to allow of their identification; on applying the usual tests, however, it was easy to prove the absence of any distinct alkaloidal reaction. On addition of ammonia to the acid solution, after having been agitated once more with benzene, a slight precipitate was formed, which was seen under the microscope to consist of stellar groups of badly developed crystals, which did not react like alkaloids. Neither the benzene and chloroform, nor the amylic alcohol and the last chloroform extracts

* Dragendorff, Die gerichtlich-chemische Ausmittlung von Giften, 2nd ed., page 240.

† Loc. cit., pages 141—153.

from the alkaline solutions left any residue that might have been mistaken for an alkaloid. I can therefore confirm the results of Mr. Masig's experiments, according to which ganja does not contain any alkaloid.

Chemical behaviour. Action of acids.—It has been already observed that the resin is slightly soluble in dilute acids. As some resinous substances belong to the group of glucosides, the resin of *Cannabis indica* was treated for some time with boiling dilute sulphuric acid, and the resulting liquid tested for glucose in the usual way. No glucose was found to have been formed; from which it appears that *the resin of Cannabis indica is no glucoside.*

Concentrated sulphuric acid easily dissolves the resin at the common temperature to form a brown solution; a drop of this solution poured into a few cubic centimeters of water causes a pale-yellow turbidity.

When treated with a mixture of equal volumes of nitric (spec. gr. = 1·41) and sulphuric acids (spec. gr. = 1·81), the resin swells up and a somewhat violent reaction sets in; the mixture becomes hot; a dark brown solution is formed; and when the quantity of the acid mixture used is not too great, a brownish-black friable mass floats on the surface. This mass is scarcely soluble in pure water, but easily dissolves in alcohol and in a hot solution of sodic carbonate, in the latter case forming a dark-brown solution, which when evaporated leaves an amorphous residue, and when treated with dilute hydrochloric acid gives an amorphous brown precipitate, whilst dilute acetic acid produces apparently no change. The substance therefore behaves very much like some humic acids; it contains, however, nitrogen, inasmuch as it evolves vapours having an effensive smell and a strongly alkaline reaction, when subjected to dry distillation.

Nitric acid of specific gravity 1·41 acts only slowly on the resin at the common temperature, but more rapidly at the boiling-point; whilst nitric acid of specific gravity 1·50 acts violently on the resin even at the common temperature, forming a reddish-brown solution, in which the addition of water causes the formation of a flocculent amorphous precipitate. The product of the action of the nitric acid on the resin has, however, been already studied by Bolas and Francis*), who prepared a nitro-derivative of the resin, to which they gave the name Oxycannabin; according to them it is a colourless crystalline substance and has a composition expressed by the formula $\underset{20}{C}\,\underset{20}{H}\,NO_{27}$.

Action of nascent hydrogen.—Two portions of the resin were exposed to the action of nascent hydrogen, evolved in the one case from

* See Neues Handwörterbuch der Chemie, vol. II, page 385.

magnesium filings and dilute sulphuric acid, in the other case from sodium amalgam and water.

In either case the resin hardly changed in appearance. It was washed with water, dissolved in alcohol, the solution filtered, and the alcohol driven off. The residue exactly resembled the original resin; caustic potash solution did not act on it at the common temperature; nitric and sulphuric acids dissolved it to form brown solutions, etc. Hence it appears that *the resin is not acted upon by nascent hydrogen.*

Action of halogens.—In order to study the action of chlorine on the resin, the latter was made up with finely powdered potassic chlorate into small pellets, which were thrown, one by one, into hydrochloric acid of specific gravity 1·15. The pellets soon began to swell up and to assume an orange yellow colour. Some more hydrochloric acid and powdered potassic chlorate was added from time to time; and finally the resulting mass was rubbed up in a mortar together with fresh quantities of the acid and salt, until the colour of the product had become a uniform orange-yellow. It was then washed with a large quantity of hot water and the residue dissolved in benzene, in which potassium chloride and chlorate are insoluble. The benzene was next distilled off; the residue consisted of a reddish-brown mass, somewhat adhesive at the common temperature and still more so when gently heated. It was found to be easily soluble in alcohol, ether, acetone, ethyl, acetate, benzene. When heated on a piece of platinum foil, it melts, then evolves white fumes, and finally disappears without leaving any residue. On application of the exceedingly delicate test recommended by Beilstein in his Handbuch der organischen Chemie, the substance was found to contain chlorine. *It is therefore a Chloro-derivative of the resin of Cannabis indica.*

The alcoholic solution of this chlorine-compound gives an emulsion with water. An alcoholic solution of silver nitrate, which is reduced by the resin itself on standing for a short time, gives no precipitate with a similar solution of the chloro-derivative at the common temperature; but when heated to the boiling-point, a white precipitate comes down, soluble in ammonia, whilst the liquid assumes a brown colour.

An aqueous solution of potassic hydroxide dissolves the chloro-derivative, slowly at the common temperature, more rapidly when heated. Treated with a solution of caustic potash in absolute alcohol it dissolves rapidly to form a dark-brown solution, which gives, of course no precipitate with water. A current of carbonic anhydride was next passed for some time through the alkaline solution, and the liquid was filtered off from the precipitate of potassic carbonate due to an excess of the alkali used. A portion of the solution, which had still an alka-

line reaction, was evaporated and ignited in a platinum crucible, when a residue was left. This was dissolved in dilute hydrochloric acid and a drop of this solution was mixed with a drop of platinic chloride on a glass slide, when the characteristic octahedra and three-rayed groups of potassic platinichloride made their appearance under the microscope Hydrochloric acid causes a turbidity in the alkaline solution of the chloro-derivative; the precipitate proves itself amorphous under the microscope. Precipitates are formed, when aqueous solutions of calcic chloride, magnesic chloride, cupric chloride, silver nitrate, ferric chloride, platinic chloride are added to the aqueous or dilute alcoholic solution of the potassium compound of the chloro-derivative. All these precipitates are soluble in alcohol and are therefore not formed, when alcoholic solutions of the above-mentioned salts are added to an alcoholic solution of the potassium compound. As result of the preceding investigation it may therefore be stated that *the resin of Cannabis indica is acted upon by Chlorine, a chloro-derivative being produced, which has decidedly acid properties, forming with most metals amorphous compounds insoluble in water, but soluble in alcohol.*

Bromine also acts on the resin. When alcoholic solutions of the resin and of bromine are mixed and the resulting mixture is poured into water, a sulphur yellow precipitate comes down, which by the aid of the microscope is seen to be granular-amorphous. It dissolves in alcohol, ether, ethyl acetate, and benzene to form yellow or orange-yellow solutions. In the solid state it forms an orange-yellow resinoid substance, hardly soluble in an aqueous solution of caustic potash. When rubbed up with cupric oxide and tested before the blow-pipe, it gives the bromine-reaction. Hence *bromine acts on the resin with the formation of a bromo-derivative.*

Action of caustic alkalis. A number of experiments were also performed with a view to study the action on the resin of potassic and sodic hydroxides in aqueous and alcoholic solutions as well as in the solid state, and at different temperatures. The want of sufficient materials, however, have prevented me hitherto from arriving at definite results.

The following paper on the subject will contain an account of qualitative and *quantitative* experiments concerning the products of the action of halogens on the resin as well as the products of the dry distillation of the resin *per se* and with potassic and sodic hydroxides, whilst the constituents of the essential oil of *Cannabis indica* as well as the colouring matter of ganja will occupy my attention, as soon as time and circumstances permit.

4. *Materials for a literary history of Hindustan.—By* G. A. GRIERSON, ESQ., C. S.

5. *Notes on ancient mounds in the district of Quetta.—By* MAJOR J. T. GARWOOD, R. E.

6. *The mother of Jehangir.—By* H. BEVERIDGE, ESQ., C. S.

These papers will be published in full in the Journal, Part I.

7. *A Memoir on Plane Analytic Geometry.—By* ASUTOSH MUKHOPADHYAY, M. A., F. R. A. S., F. R. S. E. *Communicated by* THE HON'BLE MAHENDRALÁL SIRKÁR, M. D., C. I. E.

(Abstract.)

The object of the author in the present memoir, has been to bring together a number of theorems and methods in Plane Analytic Geometry which have accumulated in his hands during his study of that subject; some of the easier of these propositions have already been given in the author's Lectures on Analytic Geometry, now in course of delivery at the Indian Association for the Cultivation of Science; a few have been published elsewhere without demonstration; most of the theorems, however, are here given for the first time. The paper now printed contains the first thirty-two sections of the memoir, which, when completed, will, in addition to the sections now printed, contain theorems on Elliptic Coordinates, Elliptic Inversion, and other analogous subjects. The first section is introductory, and contains a statement of the object of the memoir, and a very brief outline of the principal topics discussed. The second section is devoted to a consideration of the notions which lie at the basis of analytical geometry; the relation between analysis and geometry is pointed out, as well as two fundamental ideas which made possible the existence of analytical geometry; the terms Translation-transformation, Rotation-transformation and Compound-transformation, which are freely used later on, are here explained for the first time. Sections three to five are devoted to the right line. In the third section is obtained the Cartesian equation of the line at infinity, which is used in the theory of asymptotes given in the twelfth section. The fourth section contains a new proof of the condition that the general equation of the second degree may represent a pair of right lines; this method has the additional advantage of furnishing at once the coordinates of the point of intersection of the two lines given by the general equation; the term Point-function is here first used and defined. The fifth section contains an investigation of the area of the triangle formed by any line with a pair of lines given by the general equation of the second degree; the length

of the intercepted portion of the line, as well as the product of the two sides, is easily found; as an application of the formulæ in this section, which are all very compactly expressed in the determinant notation, the area of the parallelogram formed by two lines given by the general equation and two others drawn parallel to them through the origin, is found. In the two following sections, some properties of the circle are discussed; the sixth section shews that the constant term in the equation of a circle represents the square of the tangent drawn from the origin to the circle, whence flow some interesting properties; the seventh section treats of the chords and tangents of circles and conics; the geometric meaning of Professor Burnside's equation is pointed out, and the equation of the tangents, drawn from any point to a conic, is obtained by a process of transformation. The next eight sections contain a systematic discussion of the general equation of the second degree, supplementary to what is given in ordinary text-books. The eighth section contains some preliminary remarks; the ninth section treats of the transformation of the general equation, and introduces the subject of the classification of conics, which is completed in the eleventh section; the term Asymptotic Constant is here introduced and explained. The tenth section gives an elaborate discussion of the invariants and covariants of a single conic; the terms Translation-invariant, Rotation-invariant, and General-invariant are here introduced and explained; some extensions of Dr. Boole's Theorems are given, and the results finally arrived at, are classified and tabulated. In the eleventh section, the lengths of the axes and the area of the conic given by the general equation, are obtained with ease. The twelfth section contains a very satisfactory improvement on the ordinary method of obtaining the equation of the asymptotes of a conic; a modification of this method, as well as some applications, are added. The thirteenth section gives two methods of determining the well-known equation for the eccentricity, and a third method, given later on, is here mentioned. The fourteenth section determines the position and magnitude of the director-circle, both in rectangular and oblique coordinates; and, in the case of the equilateral hyperbola, it is proved to degenerate into the centre of the curve. In the fifteenth section, two methods are given for transforming the general equation, when the asymptotes are taken as lines of reference; the new equation thus obtained is then geometrically interpreted. Sections sixteen to twenty deal with Laplace's Linear Equation to a Conic; the sixteenth section treats of the genesis of the equation; the seventeenth section furnishes the meaning of the constants involved; the eighteenth section shews the intimate connection which subsists be-

tween Laplace's Equation and the Theory of Elliptic Motion; the nineteenth section throws still further light on the matter by a geometric interpretation and a reference to Gauss's Characteristic Equation; the twentieth section shews how the equation for the eccentricity may be obtained from Laplace's Equation. The twenty-first section primarily deals with the area of the triangle formed by two tangents drawn from any point to a conic and the line joining their points of contact; the length of the chord of contact is also found; numerous interesting applications of the formulæ are added; thus, the area of the quadrilateral formed by two tangents and the two central radii-vectores to the points of contact, is calculated; and, finally the very interesting theorem is established that any point is outside a conic, on the curve, or inside it, according as the point-function is positive, zero or negative. The next two sections treat of the inclinations of tangents to conics; the twenty-second section gives a very general theorem connecting the inclinations of any two tangents to a conic and of the chord of contact, to any line, while the twenty-third section gives some geometrical applications, which clearly bring out the correlation between some properties of the circle and the ellipse. The twenty-fourth section furnishes a method of generating similar conics; the case of the equilateral hyperbola is shewn to be a limiting case, in a very peculiar and special sense. In the twenty-fifth section, it is proved, as an illustration of the general theory of envelopes, that the envelopes of the sides of an equilateral triangle inscribed in any given triangle, are three parabolas, which are connected by some very neat geometrical relations. The twenty-sixth section deals with the reciprocals of central conics, and, it is shewn that the second focal pedal of a conic is the inverse of a conic. The twenty-seventh section treats of the reciprocal polars of evolutes of a family of curves which include conics as a very particular case; the formulæ are finally extended to the case of any curve, and, it is shewn that if the coordinates of a point on the primitive curve can be expressed by means of a single variable parameter, the coordinates of the corresponding point on the reciprocal polar of the evolute may be similarly expressed; the analytical theorems obtained in this section are of very great generality, and some of them, of beautiful symmetry. The twenty-eighth section gives various miscellaneous properties of the ellipse, while the twenty-ninth section is concerned with two theorems on plane confocals. The next two sections deal with the parabola; the thirtieth section solves a purely dynamical problem, which is applied in the thirty-first section to obtain some beautiful properties of the parabola, relating to the sum of the squares of the reciprocals of the radii-vectores of the pedals of that curve.

The thirty-second section discusses the locus of the middle point of the polar-chord of a conic with respect to points situated on any curve; and, at the end of this section, the method of Elliptic Inversion is mentioned. This completes the analysis of the memoir, so far as it is at present ready for publication.

The paper will be published in full in Part II of the Journal for 1887.

Library.

The following additions have been made to the Library since the Meeting held in August last.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For December, 1887.

The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 7th December 1887, at 9 P. M.

E. T. Atkinson, Esq., C. S., President, in the Chair.

The following members were present:

Babu Gaurdás Baisák, H. Beveridge, Esq., Babu Saratchandra Dás, C. I. E., E. Gay, Esq., Dr. Hoernle, A. Hogg, Esq., E. J. Jones, Esq., Dr. W. King, Rev. Fr. E. Lafont, S. J., C. I. E., C. S. Middlemiss, Esq., Babu Asutosh Mukhopádhyáy, L. de Nicéville, Esq., Moung Hla Oung, Esq., H. M. Percival, Esq., T. A. Pope, Esq., Pandit Haraprasád Sástri, Maulavi Gholám Sarwar, D. Waldie, Esq.

The minutes of the last meeting were read and confirmed.

Eighty-nine presentations were announced, as detailed in the appended Library List.

The following gentlemen have expressed a wish to withdraw from the Society:

J. R. Napier, Esq.
Lt.-Col. W. E. Gowan.

The Secretary reported the death of the following Member of the Society:

Babu Rákhál Dás Háldár.

The President announced that the Council had sanctioned the following works for publication in the Bibliotheca Indica:

1. The commentary on the Nyáyavindu, by Dharmostaráchárya, to be edited by Professor Peterson, of Bombay.

It is in contemplation to print the Tibetan text of the work *pari passu* with the Sanskrit, and Professor Peterson has been asked how the arrangement can be best carried out.

2. The translation of the Ain-i-Akbari, by Lt.-Col. Jarrett, from where it was left off by the late Mr. Blochmann.

3. The Riáz-us-Salátín, or the Garden of Kings, Persian text and English translation. By Maulvi Abdul Haq Abid, Professor of Arabic and Persian in the Calcutta Madrasah College.

4. The Brihaddharmapurána, one of the principal Upapuránas, to be edited by Pandit Hara Prasád Sástri.

5. The Bodhisatvávadána Kalpalatá, by Kshemendra, to be edited by Babu Sarat Chandra Dás.

With regard to the Bodhisattvávadána Kalpalatá, Pandit Hara Prasád Sástri remarked as follows:—

The three copies of the Bodhisattvávadána Kalpalatá which we have in Cambridge and in Calcutta are incomplete. They contain, so to say, only the second volume of the work, *i. e.*, from 50 to 108th Pallava.

At the end of the colophon, in Add. 913, Cambridge Library, the scribe declares that the first half of the work is lost and could not be found anywhere.*

In noticing an old manuscript of the same work in the Asiatic Society's Library Dr. Rajendralál Mitra says that "the codex under notice is obviously incomplete as it commences from the 51st chapter or pallava. It appears, however, from the presence of an invocatory verse at the beginning of the chapter and the absence of all such invocation at the beginning of subsequent chapters that the work was divided into two parts, of which the first included 50 chapters and the second 58."

From the similarity of names one might at first be inclined to infer that the Bodhisattvávadána Kalpalatá is the sequel of another work called the Bodhisattvávadána, but the following facts show that those two works are quite distinct.

In Add. 1306, Cambridge Library, a palm leaf manuscript copied in the reign of Anantamalla of Nepal in, N. S. 422, A. D. 1302, we get for the first time a glimpse of the existence of the first part of the work. The first 174 leaves of that manuscript are lost and the 175th leaf begins with the middle of the 41st *Avadána* and continues to the end of the 49th and then begins the second half. The entire manuscript was in existence in 1302 and since then the first volume has been missing.

Further there is a metrical list appended at the end of the manuscript in the Society's Library which gives the names and contents of the *avadánas* of the first volume. On examination, I find that, with one exception, all the names mentioned in that list agree with the names

* एतत् चेमेन्द्रक्षत-अवदानशतकग्रन्थस्य परार्द्धमेव। पूर्व्वार्द्धं कुत्रचिन्न प्राप्तं।

of the *avadánas*, as given in the copy of the work brought from Tibet by Bábú Sarat Chandra Dás. The single exception is, that the Bábú's Tibetan MS. substitutes an *avadána*, called *Garbhakránti*, for the *avadána* of the metrical list which is called *Shaḍdanta*.

Since therefore among 50 *avadánas* there is only a difference of one name, the identity of the Tibetan manuscript with the lost work may be said to be complete. To Bábú Sarat Chandra Dás, is due the credit of recovering an ancient and valuable work which was given up for lost in India for about six hundred years.

In editing the second volume of the work Bábú Sarat Chandra will have the benefit, besides the block-print and the Tibetan translation, which he has brought from Lhasa, of the three manuscripts in the Libraries of Cambridge and Calcutta. But in editing the first volume he will have to depend entirely on the excellent and very carefully executed block-print and the Tibetan translation. I shall of course be always ready to render him any assistance that lies in my power in editing the Sanskrit portion of this valuable work, which may be considered as a store-house of Buddhist legends of the Mahâyâna school, as the Mahávastu is a store-house of those of the Mahásanghikás. The work is written in easy flowing verse and in simple poetic and idiomatic Sanscrit. It is entirely free from that verbosity and tediousness of narration which characterises Buddhist Sanskrit works in general, a circumstance which may be accounted for by the fact that, as tradition informs us, the Kalpalatá was composed by a Brahmanic Sanskrit scholar, at the request of his Buddhist friends. Bábú Sarat Chandra's edition of Kalpalatá will not only be a valuable contribution to the Buddhist Sanskrit Literature, but will be a great help to scholars desirous of studying the Tibetan language, because they will be able to learn it through the medium of Sanskrit.

The work will be published with the Sanskrit and Tibetan texts in juxta-position.

The following extract from a letter from Professor Max Müller to Bábú Sarat Chandra Dás on the subject of *Ekotibháva* was read—

It seems to me that your interpretation is right—at all events, it is the best I know. I have taken the liberty to make a few alterations in your quotations from Pâṇiní's grammar, so as to enable English readers to understand better what you mean. I have always had great faith in Tibetan translations, and I expect much from that quarter for an elucidation of Buddhist difficulties.

Bábú Sarat Chandra Dás exhibited a curious reed organ, called Phêng, the favourite musical instrument of the Siamese and the people

of Laos: also an old Tibetan Sanskrit Dictionary, brought from Lhasa, arranged in alphabetical order, and written in the U-mé, or headless character of Tibet.

The Rev. Fr. Lafont made the following remarks on the musical instrument exhibited by Bábú Sarat Chandra Dás:—

The Phêng is a free-reed instrument, of very sweet tone and very cleverly made. The fourteen pipes are most carefully tuned to a full natural octave in the middle key and ré, mi, fa of a treble, with the la and di of a lower tone. The perfect chord do, mi, sol, do, is particularly good, and the two pipes tuned in sol are in perfect unison. It is interesting to see the careful manner in which the length of each pipe is adjusted by deep longitudinal slits, cleverly corrected for pitch by tiny little bits firmly cemented. The performer has only to blow gently through one universal mouth-piece carrying the wind to all the pipes, but allowing only those to speak where the little hole made above the reed is covered by the fingers of the musician. It is difficult to believe that the instrument is the result of pure native Siamese ingenuity, I feel inclined to think that a European musician had a hand in it.

The following papers were read—

1. *A general Theorem on the Differential Equations of Trajectories.*—*By* Bábú Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

In a paper on "The Differential Equation of a Trajectory," which has been published in Part II of the Journal for 1887, and an abstract of which has already been given in the present volume,* the author pointed out that Mainardi's complicated solution of the problem of determining the oblique trajectory of a system of confocal ellipses, is equivalent to a pair of remarkably simple equations, which admit of an interesting geometrical interpretation. On re-examining the whole question to see if the very artificial process of Mainardi, by no means less complicated than his result, could be materially simplified, the author has been led to a very general theorem on the differential equations of trajectories, which is established and illustrated in the present paper. The paper is divided into five sections, of which the first is introductory. The second section contains the enunciation and demonstration of the theorem, the chief characteristic of which is the property that whenever the coordinates of a point on any curve can be expressed

* The equations on page 151 are wrongly printed; they should have been

$$x = h \cos\phi . \cosh n(\lambda + \phi)$$
$$y = h \sin\phi . \sinh n(\lambda + \phi)$$

where $h^2 = a^2 - b^2$, so that h is half the distance between the foci.

by means of a single variable parameter, the coordinates of the corresponding point on the oblique trajectory may be similarly expressed. The third section gives the first example where the theorem is applied to the solution of Mainardi's problem. The fourth section contains the next six examples; the second example deals with a system of confocal hyperbolas; the third example considers a system of parabolas which have a common principal axis, and which touch each other at their common vertex; the fourth example treats, in two different ways, of a pencil of coplanar rays radiating from a point; the fifth example is about a system of circles which touch each other at a given point; the sixth example is concerned with a system of parabolas which have a common focus and principal axis; the seventh example considers the case of a certain transcendental curve. The fifth and last section of the paper treats of the application of the theory of Conjugate Functions to the subject under consideration; a new theorem is established which materially simplifies the calculations in many cases, of which three striking examples are given; the eighth example treats of the oblique trajectory of a tricircular sextic; the ninth example considers the inverses of a system of confocal ellipses, while the tenth example deals with a transcendental curve; the results are obtained with remarkable ease by the general theorem of this paper and a judicious use of conjugate functions; but from an inspection of their very form, it is clear that to have obtained the equations of these trajectories by the ordinary process, would have been well-nigh impossible. Lastly, a very interesting method is pointed out by which we may obtain, without any difficulty, an infinite number of curves whose oblique trajectories may be determined with ease by the theorems and methods of this paper.*

The paper will be published in full in Part II, of the Journal for 1887.

2. *The Kudarkhot inscription of Takhshadatta.—By* Dr. A. Führer, (with an ink impression).

3. *Couplets on coins of Jehangir.—By* C. J. Rodgers, Esq., *Archæological Survey of the Punjab.*

4. *Notes on the Aboriginal tribes called Assurs, Brijias, Brihas, Karias.—By* W. H. P. Driver, Esq.

* Since this paper was read, a note has been added at the end of the fifth section, containing an elaborate discussion of Mainardi's problem by means of Elliptic Coordinates; it is pointed out that Mainardi's result is really equivalent to two solutions, of which only one is relevant to the problem, while the other is wholly extraneous; this remarkable fact does not seem to have been noticed before.

5. *The excavated temple at Núrpur, Kangra valley.*—*By* C. J. RODGERS, ESQ., (with 5 photographs and a ground plan).

These papers will be published in full in the Journal, Part I.

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INDEX

TO

PROCEEDINGS, ASIATIC SOCIETY OF BENGAL.

FOR 1887.

PLATE III.

HE SURVEY OF INDIA OFFICES, CALCUTTA, NOVEMBER 1887.

'D AT KHUKHRÁ.

LIST OF MEMBERS

OF THE

ASIATIC SOCIETY OF BENGAL.

ON THE 31ST DECEMBER 1886.

COUNCIL AND OFFICERS FOR 1886.

PRESIDENT.

E. F. T. Atkinson, Esq., B. A., C. S.

VICE-PRESIDENTS.

Dr. Rájendralála Mitra, C.I.E., LL.D.
Hon. H. J. Reynolds, C. S. I., B. A., C. S.
Lt.-Col., J. Waterhouse, B. S. C.

SECRETARIES AND TREASURER.

J. Wood-Mason, Esq.
Dr. A. F. R. Hoernle.
H. M. Percival, Esq., M. A.

OTHER MEMBERS OF COUNCIL.

H. B. Medlicott, Esq., F. R. S.
D. Waldie, Esq., F. C. S.
C. H. Tawney, Esq., M. A.
Babu Pratápchandra Ghosha, B. A.
D. D. Cunningham, Esq., M. A.
Dr. Mahendralál Sarkár.
T. G. H. Moncrieffe, Esq.
E. Gay, Esq., M. A.
Pandit Maheschandra Nyáyaratna.
J. Beames, Esq., C. S.

LIST OF ORDINARY MEMBERS.

R. = Resident. N. R. = Non-Resident. A. = Absent. N. S. = Non-Subscribing.
L. M. = Life Member. F. M. = Foreign Member.

N. B.—Members who have changed their residence since the list was drawn up are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alteration may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the Secretaries.

Members who are about to leave India and do not intend to return are particularly requested to notify to the *Secretaries* whether it is their desire to continue members of the Society; otherwise, in accordance with Rule 40 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.	R.	Abdul-Latíf, C. I. E., Nawab Bahádur. *Calcutta.*
1885 Mar. 4.	R.	Abdur Rahman, A. F. M. Barrister-at-Law. *Calcutta.*
1860 July 4.	N.R.	Ahmad Khán, Bahádur, Hon. Sayyid, C. S. I. *Aligarh.*
1872 April 3.	N.R.	Ashán-ullah, Nawáb. *Dacca.*
1860 April 4.	A.	Aitchison, J. E. T., M. D., Secretary to the Surgeon General, H. M.'s Forces, Bengal. *Europe.*
1884 Mar. 5.	L.M.	Ali, Sir Ali Kadar Syud Hassan, K. C. I. E., Bahadur. *Murshedabad.*
1874 June 3.	R.	Amír Alí, C. I. E., Hon. Syud, Barrister-at-Law. *Calcutta.*
1865 Jan. 11.	A.	Anderson, John, M. D., F. R. S., F. L. S., Superintendent, Indian Museum. *Europe.*
1884 Sept. 3.	R.	Anderson, J. A. *Calcutta.*
1871 Sept. 6.	R.	Atkinson, Edwin Felix Thomas, B. A., C. S. Acct.-General, Bengal. *Calcutta.*
1869 Feb. 3.	N.R.	Attar Singh Bahádur, Sirdár, C. I. E., M. U. F. Chief of Bhadour. *Ludiana.*
1870 Feb. 2.	L.M.	Baden-Powell, Baden Henry, C. S., C. I. E., Offg. Judge, Chief Court of the Panjab. *Lahore.*
1873 Aug. 6.	N.R.	Badgley, Lt.-Col. William Francis, S. C., Offg. Deputy Superintendent of Surveys. *Madura.*
1862 Feb. 5.	R.	Baisák, Gaurdás, Deputy Magistrate. *Calcutta.*
1865 Nov. 7.	N.S.	Ball, Valentine, M. A., F. R. S., F. G. S. *Europe.*
1862 Aug. 1.	R.	Barclay, Arthur, M. B., Surgeon Major, Bengal Medical Service. *Calcutta.*

Date of Election.		
1869 Dec. 1.	L.M.	Barker, R. A., M. D., Civil Surgeon. *Nya Doomka, Santhal Pergunnah.*
1879 Aug.28.	A.	Barkley, D. G., M. A., C. S. *Europe.*
1877 Jan. 17.	N.R.	Barman, Kishor Kumár Rádhá Dev, Juvráj of Hill Tipperah. *Tipperah.*
1885 Nov. 4.	R.	Barman, Damudar Dás. *Calcutta.*
1885 Aug. 5.	A.	Barnett, John, Bengal Pilot Service. *Europe.*
1881 Aug. 3.	N.R.	Barstow, Henry Clements, C. S., Magistrate and Collector. *Cawnpore.*
1886 Jan. 6.	R.	Barnes, Frederick Carnac. *Calcutta.*
1886 June 2.	F.M.	Baumgarten, Casper Wilhelm. *Batavia.*
1873 Feb. 5.	R.	Bayne, R. R., M. R. I. B. A., Chief Engineer's Office, E. I. Railway. *Calcutta.*
1864 Sept. 7.	N.R.	Beames, John, B. C. S., Offg. Commissioner, Burdwan Division. *Burdwan.*
1878 Sept.25.	N.R.	Beighton, T. D., C. S., Offg. Judge. *Murshedabad.*
1862 Oct. 8.	N.R.	Bernard, Sir Charles Edward, K. C. S. I., C. S., Chief Commissioner. *British Burmah.*
1872 Aug. 7.	R.	Beverley, The Hon. Henry, M. A., C. S. *Calcutta.*
1876 Nov.15.	R.	Beveridge, Henry, C. S., District and Sessions Judge. *Alipur.*
1878 Oct. 4.	R.	Bhakta, Krishna Gopal. *Calcutta.*
1879 Mar. 5.	N.R.	Biddulph, Lt.-Col. J., B. S. C. *Deoli.*
1884 Jan. 2.	N.R.	Bidie, G. Brigade-Surgeon, M. B., F. L. S., C. I. E., Supdt. Govt. Central Museum. *Madras.*
1884 Feb. 6.	N.R.	Bigg-Wither, Major A. C., B. A., A. I. C. E. *Quetta.*
1885 Jan. 7.	N.R.	Bignold, T. F., C. S., Dist. and Sessions Judge. *Sooree.*
1885 Mar. 4.	N.R.	Bilgrámi, Syud Ali, B. A., A. R. S. M., F. G. S. *Hyderabad.*
1886 Aug. 4.	N.R.	Bingham, Capt. Charles Thomas, B. S. C., Deputy Conservator of Forests. *Burmah.*
1857 Mar. 4.	L.M.	Blanford, H. F., A. R. S. M., F. R. S., F. G. S., Meteorological Reporter, Govt. of India. *Calcutta.*
1859 Aug. 3.	L.M.	Blanford, W. T., A. R. S. M., F. R. S., F. G. S., F. R. G. S., F. Z. S. *London.*
1879 Aug.28.	R.	Blyth, W. D., M. A., LL. D., C. S., Under-Secretary to the Govt. of Bengal. *Calcutta.*
1883 Dec.12.	N.R.	Boileau, Capt. Thomas Smalley, B. S. C. *Dibrughar.*
1885 Mar. 4.	N.R.	Bolton, C. W., C. S., Magte. and Collector. *Gya.*
1880 Nov. 3.	N.R.	Bose, Pramatha Náth, B. SC., F. G. S., Geological Survey of India. *Raipur, C. P.*
1876 Nov.15.	A.	Bowie, Major M. M. *Europe.*
1868 Jan. 15.	N.R.	Boxwell, John, C. S., Offg. Comr., Patna Divn. *Bankipur.*
1876 May 4.	A.	Bradshaw, Brigade-Surgeon A. F., A. M. D. *Egypt.*
1860 Mar. 7.	L.M.	Brandis, Sir Dietrich, K. C. I. E., C. I. E., PH. D., F. L. S., F. R. S. *Europe.*

Date of Election.		
1879 April 2.	R.	Calcutta, The Rt. Rev. the Lord Bishop of. *Calcutta.*
1869 Jan. 20.	N.R.	Cadell, Alan, B. A., C. S., Magte. *Aligarh, N.-W. P.*
1880 Mar. 3.	N.R.	Carlleyle, A. C., Archæological Survey of India. *Allahabad.*
1881 Feb. 2.	N.R.	Carter, Philip John, Deputy Conservator of Forests. *Rangoon.*
1876 Nov.15.	A.	Cayley, Surgeon-Major H. *Europe.*
1885 April 1.	N.R.	Chambers, J. W. *Narainganj.*
1881 Mar. 2.	A.	Channing, Francis Chorley, B. C. S. *Europe.*
1880 May 5.	N.R.	Chatterji, Tárá Prasáda, Deputy Magte. *Burdwan.*
1880 Jan. 7.	R.	Chaudhuri, Govinda Kumár. *Calcutta.*
1861 Mar. 1.	N.R.	Chaudhuri, Haranchandra, Zamindar. *Sherpur, Maimansingh.*
1880 Nov. 3.	N.R.	Chaudhuri, Khirod Chandra Rai. *Berhampore College.*
1886 April 7.	N.R.	Chaudhuri, Rádhaballabha. *Sherpur, Mymensingh.*
1885 Feb. 4.	N.R.	Chaudhuri, Raja Suryakánta, Bahádur. *Mymensing.*
1885 April 1.	N.R.	Clark, H. Martyn, M. B. *Amritsar.*
1877 Aug.30.	F.M.	Clarke, Major Henry Wilberforce, R. E. *Europe.*
1880 Aug.26.	F.M.	Clerk, Lieut.-Colonel Malcolm G. *Europe.*
1881 May 4.	N.R.	Cockburn, John, Asst. Sub-Depy. Opium Agent. *Karwi.*
1884 April 2.	N.R.	Cole, Major H. H., R. E. *Mhow.*
1886 Aug.26.	F.M.	Condenhove, Count H. Attaché Austro-Hungarian Legation in the Argentine Republic Uruguay and Paraguay.
1874 Nov. 4.	N.R.	Constable, Archibald, Resident Engineer and Personal Asst. to Chief Engineer, Oudh and Rohilkund Railway. *Lucknow.*
1884 Aug. 6.	R.	Cotes, E. C., Indian Museum. *Calcutta.*
1876 Mar. 1.	N.R.	Crawfurd, James, B. A., C. S., Barrister-at-Law, Offg. District and Sessions Judge. *Nuddea.*
1877 June 6.	R.	Croft, The Hon. Sir A. W., K. C. I. E., C. I. E., M. A., Director of Public Instruction, Bengal. *Calcutta.*
1874 Mar. 4.	N.R.	Crombie, Alexander, M. D., Civil Surgeon. *Dacca.*
1883 April 4.	N.R.	Crosthwaite, C. H. T., C. S. I., C. S., Chief Commissioner, Central Provinces. *Nágpur.*
1873 Aug. 6.	R.	Cunningham, David Douglas, M. D. *Calcutta.*
1873 Dec. 3.	N.R.	Dames, Mansel Longworth, C. S., Asst. Commissioner. *Dera Ismail Khan.*
1877 June 6.	N.R.	Darbhanga, Sir Luchmessur Sing, K. C. I. E., Bahádur, Mahárájá of. *Darbhanga.*
1865 June 7.	N.R.	Dás, Rájá Jaykishna, Bahádur, C. S. I. *Bijnor.*
1879 April 7.	N.R.	Dás, Rám Saran, M. A., Secy. Oudh Commercial Bank, Limited. *Fyzabad, Oudh.*
1869 April 7.	F.M.	Day, Dr. Francis, F. L. S., F. Z. S. *Europe.*

Date of Election.		
1885 May 6.	N.R.	Dé, Kumár Baikuntanáth. *Balasore.*
1885 Jan. 7.	A.	De Prée, Col. G. C. Surveyor General of India. *Europe.*
1885 Mar. 4.	R.	Deb, Kumár Nilkrishna, Bahádur. *Calcutta.*
1859 Oct. 6.	N.R.	Delmerick, J. G., Extra Assistant Commissioner. *Mussoorie.*
1862 May 7.	N.R.	Dhanapati Singh Dughar, Raí Bahádur. *Azimganj.*
1877 July 4.	R.	Diler Jang, Nawáb Syad Ashgar Alí, Khan Bahadur, C. S. I. *Calcutta.*
1875 Mar. 3.	N.R.	Douglas, J. C., Supdt. of Telegraph. *Vizagapatam.*
1886 June 2.	R.	Doyle, Patrick, C. E., F. G. S., M. R. A. S. *Calcutta.*
1879 Feb. 5.	N.R.	Duthie, J. F., Superintendent, Govt. Botanical Gardens. *Saharanpur.*
1877 Aug.30.	R.	Dutt, Kedárnáth, Depy. Collector. *Calcutta.*
1881 Mar. 2.	F.M.	Eden, The Hon. Sir Ashley, K. C. S. I., C. I. E. *Europe.*
1870 Mar. 9.	L.M.	Edinburgh, H. R. H. The Duke of. *Europe.*
1863 May 6.	A.	Edgar, John Ware, C. S. I., C. S. *Europe.*
1874 Dec. 2.	A.	Egerton, The Hon. Sir Robert Eyles, K. C. S. I., C. I. E., C. S. *Europe.*
1871 Dec. 2.	R.	Eliot, J. M. A., Meteorological Reporter to the Govt. of Bengal. *Calcutta.*
1886 Jan. 6.	R.	Elson Samuel, R. Bengal Pilot Service. *Calcutta.*
1863 Jan. 15.	N.R.	Fedden, Francis, Asst., Geological Survey of India. *Vizagapatam.*
1876 Jan. 5.	F.M.	Feistmantel, Ottokar, M. D. *Europe.*
1880 April 7.	N.R.	Fiddian, W., M. A., C. S., Offg. Magistrate and Collector. *Birbhum.*
1879 July 2.	R.	Finucane, M., C. S., Director of Agriculture, Bengal. *Calcutta.*
1869 Sept. 1.	A.	Fisher, John Hadden, C. S. *Europe.*
1886 April 7.	N.R.	Fleet, John Faithfull, C. I. E., BO., C. S. *Sholapur, Bombay Presidency.*
1876 July 5.	N.R.	Foulkes, The Rev. Thos., F. L. S., M. R. A. S., F. R. G. S., Chaplain. *Coimbatore, Madrus Presy.*
1869 Sept. 1.	A.	Fryer, Colonel G. E., M. S. C. *Europe.*
1880 April 7.	N.R.	Gajapati, Ánanda Rám, Raja of Vizianagram. *Vizianagram.*
1873 Dec. 3.	N.R.	Gamble, J. S., M. A., Conservator of Forests, Northern Circle. *Madras.*
1883 Aug. 1.	N.R.	Garga, Kumár Isvariprasád, Zemindar. *Maisádal.*
1859 Aug. 3.	L.M.	Gastrell, Major-General James Eardley. *Europe.*
1867 Dec. 4.	R.	Gay, E., M. A., F. R. A. S., Comptroller-General. *Calcutta.*
1883 Aug.30.	R.	Ghose, Manmohan. *Calcutta.*

Date of Election.		
1871 May 3.	R.	Ghosha, Káliprasanna. *Calcutta.*
1869 Feb. 3.	R.	Ghosha, Pratápachandra, B. A. *Calcutta.*
1884 Dec. 3.	N.R.	Giles, George M., M. B., F. R. C. S., Surgeon Naturalist, S. S. "Investigator." *Sandoway.*
1886 Sep. 30	N.R.	Gimlette, George Hart Desmond, Surgeon, Bengal Medical Service, M. D., M. CH., M. R. C. S., L. S. A. *The Residency Nepal.*
1861 Feb. 5.	N.S.	Godwin-Austen, Lieut.-Colonel H.H., F. R. S., F. Z. S., F. R. G. S. *Europe.*
1882 May 3.	R.	Golam Sarwar, Maulaví. *Calcutta.*
1862 July 2.	N.R.	Gordon, Robert, C. E. *Rangoon.*
1881 Mar. 2.	R.	Gosáin, Hem Chunder. *Calcutta.*
1863 Nov. 4.	F.M.	Gowan, Major-General J. Y. *Europe.*
1879 Jan. 8.	R.	Gowan, Major W. E. *Calcutta.*
1877 Nov. 7.	L.M.	Grant, Alexander, M. I. G. E. *Europe.*
1876 Nov.15.	R.	Grierson, George Abraham, C. S. *Howrah.*
1885 Dec. 2.	N.R.	Griesbach, C. L., C. I. E., F. G. S., Deputy Superintendent Geological Survey of India.
1861 Sept. 4.	A.	Griffin, Sir Lepel Henry, C. S., K. C. S. I. *Europe.*
1861 Feb. 6.	N.R.	Growse, Frederick Salmon, M. A., C. S., C. I. E., Magistrate and Collector. *Fatehgarh, N.-W. P.*
1886 Mar. 3.	N.R.	Gupta Ashootosh, C. S., Assistant Magistrate and Collector. *Munshigunge, Dacca.*
1880 Feb. 4.	N.R.	Gupta, Behárilál, C. S. *Furreedpore.*
1883 June 6.	N.R.	Gurdyál Singh, Sirdár, C. S., Asst. Commissioner. *Hoshiarpur, Panjab.*
1867 July 3.	N.R.	Hacket, Charles Augustus, Assistant Geol. Survey of India. *Camp Abu, Rajputana.*
1883 Jan. 3.	N.R.	Harding, Francis Henry, B. A., C. S. *Europe.*
1879 Mar. 5.	A.	Harraden, S. *Europe.*
1877 Sep. 27.	R.	Hart, J., Attorney-at-Law. *Calcutta.*
1875 Mar. 3.	N.R.	Hendley, Surgeon Major Thomas Holbein. *Jeypore.*
1883 May 2.	N.R.	Hill, Samuel, Alexander, B. SC., A. R. S. M., F. C. S., Prof. of Physical Science, Muir College and Meteor. Reporter to Govt., N.-W. P. and Oudh. *Allahabad.*
1872 Dec. 4.	F.M.	Hoernle, Rev. A. F. R., PH. D., Principal of the Calcutta Madrasah. *Europe.*
1878 Mar. 6.	N.R.	Hoey, W. *Etawah.*
1886 June 2.	R.	Hogg, Alexander. *Calcutta.*
1884 Mar. 5.	N.R.	Hooper, John, C. S., Settlement Officer. *Basti, N.-W. P.*
1873 Jan. 8.	L.M.	Houstoun, G. L., F. G. S. *Europe.*
1863 Jan. 15.	N.R.	Howell, Mortimer Sloper, C. S. *Mirzapur, N.-W. P.*
1878 Sep. 25.	N.R.	Hughes, G., C. S., Deputy Commissioner. *Jhang.*
1867 Aug. 7.	N.R.	Hughes, T. H., A. R. S. M., F. G. S., Geol. Survey of India. *Kutni, E. I. E.*

Date of Election.		
1866 Jan. 17.	A.	Hughes, Major W. G., M. S. C. *Europe.*
1870 Jan. 5.	N.R.	Hume, Allan Octavian, C. B., C. S. *Allahabad.*
1884 May 2.	N.R.	Hussein, Syud, B. A., Secy. to Nizam of Hyderabad's Council.
1872 Dec. 4.	N.R.	Ibbetson, Denzil Charles Jelf, C. S., Deputy Commissioner. *Delhi.*
1866 Mar. 7.	N.R.	Irvine, William, C. S., Magistrate and Collector. *Ghazipur.*
1884 May 2.	N.R.	Iskander Ali Mirza, Prince. *Murshedabad.*
1880 Dec. 1.	A.	Jackson, William Grierson, B. C. S. *Europe.*
1869 Aug. 4.	R.	Jahán Qadr Muhammad Wáhid Alí, Bahádur, Prince. *Garden Reach, Calcutta.*
1876 July 5	A.	Jarrad, Lieut. F. W., R. N., F. R. A. S., Marine Survey Dept. *Europe.*
1879 Mar. 5.	R.	Jarrett, Lt.-Col. H. S., B. S. C., Secy. to the Board of Examiners. *Calcutta.*
1881 Feb. 2.	N.R.	Jenkins, Major Thomas Morris, M. S. C., Deputy Commissioner. *Sandoway.*
1862 Mar. 5.	A.	Johnstone, Lieut.-Colonel James William Hope. *Europe.*
1867 Dec. 4.	A.	Johnstone, Col. Sir James, K. C. S. I., C. S. I. *Europe.*
1873 Dec. 3.	N.R.	Johore, H. H. the Mahárájá of, K. C. S. I. *New Johore, Singapore.*
1884 Aug. 6.	R.	Jones, E. J., Geol. Survey of India. *Calcutta.*
1875 Nov. 3.	N.R.	Jones, S. S., B. A., C. S. *Tipperah.*
1882 Mar. 1.	N.R.	Kennedy, Pringle, M. A. *Mozufferpur.*
1874 Dec. 2.	N.R.	Khudá Baksh, Khán Bahádur, Maulaví. *Bankipur.*
1884 Nov. 5.	A.	Kitts, Eustace John, C. S. *Europe.*
1867 Dec. 4.	R.	King, G., M. B., F. L. S., Supdt., Royal Botanic Garden. *Sibpur.*
1881 Mar. 2.	N.R.	King, Lucas White, B. A., LL. B., C. S. *Ajmere.*
1862 Jan. 15.	R.	King, W., Jr., B. A., D. SC. F. G. S., Depy. Supdt., Geol. Survey of India. *Calcutta.*
1880 Dec. 1.	A.	Kirton, Surgeon-Major William Henry, F. L. S., Medical Store-Keeper. *Europe.*
1880 Jan. 7.	R.	Kisch, H. M., M. A., C. S. *Calcutta.*
1877 Sep. 27.	N.R.	La Touche, James John Digges, B. A., C. S. *Menbu, Upper Burma.*
1881 Feb. 2.	R.	Laughlin, Robert Campbell, Asst. Supdt., Govt. Telegraph Department. *Calcutta.*
1881 Mar. 2.	N.R.	Lee, J. Bridges, M. A., F. G. S., F. C. S., F. Z. S., Barrister-at-Law. *Lahore.*
1880 July 7.	A.	Lewis, Rev. Arthur, B. A., Vice-Principal, St. John's Divinity School. *Europe.*

Date of Election.		
1873 Feb. 5.	A.	Lewis, Timothy Richards, M. B., Special Asst. to the Sanitary Commissioner with the Government of India. *Europe.*
1886 Sep. 30.	N.R.	Luson, Hewling, C. S., Assistant Magistrate. *Meherpur.*
1869 July 7.	N.R.	Lyall, Charles James, B. A., C. S. *Shillong.*
1870 April 7.	L.M.	Lyman, B. Smith. *Northampton, Mass., U. S., America.*
1884 Dec. 3.	A.	McCabe, R. B., C. S. *Europe.*
1868 Dec. 2.	N.R.	Macauliffe, Michael, B. A., C. S., Judicial Assistant Commissioner. *Sialkot.*
1886 June 2.	R.	Macdonald, A. Editor, "Englishman." *Calcutta.*
1880 June 2.	N.R.	Macdonald, James, C. E. *Rurki*
1884 Mar. 5.	R.	Macdonnell, A. P., B. A., C. S., Offg. Secy., Govt. of India, Home Dept. *Calcutta.*
1879 Feb. 5.	A.	Macgregor, Major C. R., F. R. G. S., 44th N. I. *Europe.*
1848 April 5.	L.M.	Maclagan, General Robert, R. E., F. R. S. E., F. R. G. S. *Europe.*
1873 Dec. 3.	R.	MacLeod, Surgeon-Major Kenneth, M. D. *Calcutta.*
1880 May 5.	N.R.	MacLeod, Roderick Henry, B. C. S., Asst. Magte. *Kasia, Gorakpur, N.-W. P.*
1881 July 6.	R.	Mahomed Firukh Sháh, Prince. *Calcutta.*
1886 Jan. 6.	N.R.	Mahomed Latif Khán, Sayyid, Khán Bahádur. *Bamu, Panjab.*
1882 Aug. 2.	R.	Mahomed Yusoof, Hon. Maulavi. *Calcutta.*
1867 April 3.	R.	Mainwaring, Major-General George Byres, S. C. *Serampur.*
1878 April 3.	A.	Mallet, F. R., Geological Survey of India. *Europe.*
1864 July 6.	R.	Mallik, Kumár Debendra. *Calcutta.*
1869 Sept. 1.	R.	Mallik, Yadulál. *Calcutta.*
1880 May 5.	N.R.	Mandalik, The Hon. Rao Sahib Visvanáth Náráyana, C. S. I. *Bombay.*
1869 July 7.	N.R.	Markham, Alexander Macaulay, C. S., F. R. G. S., Collector. *Banda.*
1877 Feb. 7.	A.	Marshall, Major George Fred. Lycester, R. E., Asst. Secy., Govt. of India, P. W. D. *Europe.*
1886 Aug. 26.	N.R.	Meade, Capt. Malcolm John, S. C., Supdt. Moghea Operations. *Nimach.*
1860 Mar. 7.	R.	Medlicott, H. B., M. A., F. R. S., F. G. S., Director, Geological Survey of India. *Calcutta.*
1877 Mar. 7.	N.R.	Medlycott, Rev. Adolphus Edwin, PH. D., Military Chaplain. *Ferozepur, Panjab.*
1886 Mar. 3.	R.	Mehta, Roostumjee Dhunjeebhoy. *Calcutta.*
1884 Nov. 5.	N.R.	Middlemiss, C. S. *Chakrata, N.-W. P.*
1871 Sept. 6.	F.M.	Miles, Lieut.-Colonel S. B., S. C., Political Agent. *Muscat.*

Date of Election.		
1884 Sept. 3.	R.	Miles, William Harry. *Calcutta.*
1870 July 6.	A.	Miller, A. B., B. A., Barrister-at-Law, Official Assignee. *Europe.*
1874 May 6.	N.R.	Minchin, F. J. V. *Aska, Ganjam.*
1875 Aug. 4.	A.	Minchin, Colonel, C. C. *Europe.*
1856 Mar. 5.	R.	Mitra, Rájendralála, Rái Bahádur, LL. D., C. I. E. *Calcutta.*
1876 Dec. 6.	F.M.	Mockler, Lt.-Col. E., British Consul. *Basrah, Persian Gulf.*
1886 May 5.	N.R.	Molesworth, Capt. E. H. Commandant Police Levy. *Dibrugarh.*
1883 Dec. 12.	N.R.	Möller, Otto Chrestien. *Tukvar, Darjeeling.*
1881 May 4.	N.R.	Molloy, Major Edward, 5th Goorkhas. *Abbottabad, Hazara, Panjab.*
1884 June 4.	R.	Moncreiffe, T. G. H. *Calcutta.*
1884 Apr. 2.	R.	Mondy, Edmund F., Civil Engineering Coll. *Sibpur.*
1881 Dec. 7.	F.M.	Monteath, J. J., M. D. *Europe.*
1864 Nov. 2.	N.R.	Muir, J. W., M. A., C. S. *Mirzapore.*
1879 May 7.	R.	Mukerjea, Bhudeva, C. I. E. *Calcutta.*
1886 Aug.26.	R.	Mukerji Rangalála. *Rahuta, 24-Pergunnahs.*
1867 Mar. 6.	R.	Mukerjea, Raja, The Hon. Pearimohan, C. S. I., M. A. *Uttarpara.*
1882 Jan. 4.	R.	Mukerji, Girijábhushan, M. A. *Calcutta.*
1885 July 1.	R.	Mukerjea, Nilmani, Professor, Sanskrit College. *Calcutta.*
1886 May 5.	R.	Mukhopádhyáya, Asutosh, M. A., F. R. A. S., F. R. S. E. *Bhowanipur, Calcutta.*
1885 June 3.	N.R.	Naemwoollah, Maulavi, Depy. Magte. *Bulandshahr.*
1880 Dec. 1.	A.	Napier, J. R. *Europe.*
1876 May 4.	R.	Nash, A. M., M. A., Inspector of European Schools, Bengal. *Calcutta.*
1881 Nov. 2.	R.	Nicéville, L. de., F. E. S. *Calcutta.*
1869 July 7.	N.R.	Nursing Rao, A. V. *Vizagapatam.*
1885 Feb. 4.	R.	Nyáyaratna, Pandit Mahámahopádhyáya Maheschandra. *Calcutta.*
1871 July 5.	N.R.	Oates, E. W., C. E., Engineer, P. W. D., Garrison Div., Sittang Canal. *Burmah.*
1879 Aug.28.	N.R.	Oldham, Surgeon-Major C. F., F. R. G. S. *Dharamsalla.*
1883 Dec. 1.	N.R.	Oldham, R. D., A. R. S. M., Asst., Geol. Sur. of India.
1883 Aug.30.	N.R.	Oliver, Edw. Emmerson, M. I. C. E., Under-Secy. to Govt. Panjab, P. W. D. *Lahore.*
1885 Feb. 4.	F.M.	Oliver, James William, Forest Dept. *Europe.*
1880 Aug. 4.	L.M.	Pandia, Pandit Mohanlall Vishnulall, F. T. S., Member and Secy., Royal Council of Meywar. *Oodeypur.*

Date of Election.		
1880 Jan. 7.	F.M.	Pargiter, Frederick E., B. A., C. S. *Europe.*
1880 Jan. 7.	A.	Parry, J. W., C. E., ASSOC. M. I. C. E., Asst. Engineer. *Europe.*
1862 May 7.	L.M.	Partridge, Surgeon-Major Samuel Bowen, M. D. *Europe.*
1871 Dec. 6.	N.R.	Peal, S. E. *Sibsagar, Assam.*
1860 Feb. 1.	F.M.	Pearse, General Geo. Godfrey, C. B., R. H. A., Godfrey House. *Cheltenham.*
1873 Aug. 6.	R.	Pedler, Alexander, F. C. S., Professor of Chemistry, Presidency College. *Calcutta.*
1864 Mar. 2.	A.	Pellew, Fleetwood Hugo, C. S. *Europe.*
1865 Sept. 6.	N.R.	Peppé, T. F. *Shahabad.*
1881 Aug.25.	R.	Percival, Hugh Melville, M. A., Professor, Presidency College. *Calcutta.*
1883 Jan. 3.	N.R.	Plowden, Lieut.-Colonel Trevor C., Deputy Commissioner. *Dera Ghazi Khan.*
1877 Aug. 1.	N.R.	Peters, C. T., M. B., Surgeon-Major. *Burmah.*
1868 May 6.	A.	Peterson, F. W., F. C. S. *Europe.*
1881 Feb. 2.	R.	Prideaux, Lieut.-Colonel William Francis, B. S. C. *Calcutta.*
1880 April 7.	N.R.	Rai, Bipina Chandra, B. L. *Rungpore.*
1881 Mar. 2.	R.	Reynolds, The Hon'ble Herbert John, B. A., C. S. *Calcutta.*
1880 Aug. 4.	A.	Reynolds, Herbert William Ward, C. S. *Europe.*
1884 Mar. 5.	N.R.	Risley, H. H., B. A., C. S. *Darjeeling.*
1860 Jan. 3.	N.R.	Rivett-Carnac, John Henry, C. S., C. I. E., F. S. A., Opium Agent. *Ghazipur.*
1878 Sep.25.	A.	Robertson, Rev. J. *Europe.*
1865 Feb. 1.	A.	Robinson, S. H. *Europe.*
1881 Aug.30.	N.R.	Roy, Nanda Kumár. *Giridhi.*
1885 Mar. 4.	R.	Rustomjee, H. M. *Calcutta.*
1880 Sep. 30.	A.	Sage, E. M., Asst. Engineer, P. W. D. *Europe.*
1877 May 2.	N.R.	Sandford, W. *Somastipur, Tirhoot.*
1872 Dec. 4.	R.	Sarasvati, Pránnáth, Pandit, M. A., B. L. *Bhowanipur.*
1867 April 3.	R.	Sarkár, The Hon. Dr. Mahendralál, C. I. E. *Calcutta.*
1885 Mar. 4.	R.	Sarvádhikári, Rájakumár. *Calcutta.*
1885 Feb. 4.	R.	Sástri, Haraprasád, M. A. *Calcutta.*
1870 May 4.	A.	Schlich, Dr. W. *Europe.*
1884 April 2.	N.R.	Scotland, John Parry, C. E., Ex. Engineer. *Buxar.*
1874 July 1.	R.	Scully, Dr. John. *H. M.'s Mint, Calcutta.*
1886 Mar. 3.	N.R.	Sen, Hirálál, Excise Department. *Berhampur, Murshidabad.*
1874 Dec. 2.	N.R.	Sen, Dr. Rám Dás. *Berhampur, Murshidabad.*
1885 April 1.	N.R.	Sen, Yadunáth. *Khurda, Puri.*
1885 April 1.	R.	Sen, Narendranáth. *Calcutta.*

Date of Election.		
1879 Jan. 8.	F.M.	Sewell, R., M. C. S. *Europe.*
1879 May 7.	A.	Sheridan, C. J., C. E. *Europe.*
1881 Mar. 2.	N.R.	Shopland, E. R., Indian Marine, Port Officer. *Akyab.*
1882 May 3.	N.R.	Shyamaldáss, Kaviráj, Private Secy. to H. H. the Mahárańá of Udaipur. *Udaipur.*
1878 April 3.	A.	Simson, A. *Europe.*
1884 Sep. 3.	R.	Singh, Kumár Indrachandra, of Paikparah. *Calcutta.*
1853 Dec. 7.	N.R.	Singh, Isvariprashád, Mahárájá, C. S. I. *Benares.*
1885 April 1.	R.	Singh, Kumár Saratchunder. *Calcutta.*
1882 June 7.	N.R.	Singh, Mahárájá Kumár Harendra Kishore. *Bettiah.*
1878 Oct. 4.	N.R.	Singh, Lachman, Rájá. *Bulandshahr.*
1882 Aug. 2.	N.R.	Singh, Narain, Rájá Rám. *Khugrah, Monghyr.*
1880 June 2.	N.R.	Singh, Thákur Garuradhawaya Prasád, Rájá of Beswan, Beswan Fort. *Aligarh.*
1859 Aug. 3.	R.	Siñha, Baláichánd. *Calcutta.*
1886 July 7.	R.	Sircár, Krishna Gopál, M. B. *Calcutta.*
1872 Aug. 5.	N.R.	Skrefsrud, Rev. L. O., Indian Home Mission to the Santháls. *Rampur Hát.*
1864 Sept. 7.	N.R.	Sladen, Col. E. B., M. S. C. *Akyab.*
1885 Nov. 4.	R.	Smith, N. F. F. *Calcutta.*
1874 June 3.	N.R.	Smith, Vincent Arthur, C. S., Settlement Officer. *Basti, N.-W. P.*
1872 July 3.	N.R.	Stephen, Carr, B. L., Judl. Asst. Commr. *Ludianah.*
1879 Oct. 2.	N.R.	Sterndale, R. A., F. R. G. S., Asst. Commr. of Currency. *Bombay.*
1882 May 3.	A.	Stewart, H. E. Sir Donald M., Bart., G. C. B., G. C. S. I. *Europe.*
1876 Aug. 2.	N.R.	St. John, Lieut.-Col. Sir Oliver Beauchamp, R. E., K. C. S. I., Agent Governor General. *Beluchistan.*
1880 Nov. 3.	N.R.	Sturt, Lieut. Robert Ramsay Napier, B. S. C., Panjab Frontier Force. *Kohar.*
1884 Mar. 5.	N.R.	Swinhoe, Lieut.-Col. C., B. S. C., Asst. Comy. Genl. *Kurachi.*
1864 Aug. 11.	R.	Swinhoe, W., Attorney-at-Law. *Calcutta.*
1880 Nov. 3.	N.R.	Swynnerton, Rev. Charles. *Naushera.*
1868 June 3.	R.	Tagore, The Hon. Mahárájá Jotendra Mohun, K.C.S.I. *Calcutta.*
1865 Sept. 6.	R.	Tawney, C. H., M. A., Principal, Presidency College. *Calcutta.*
1874 Mar. 4.	A.	Taylor, Commander A. D., late Indian Navy. *Europe.*
1884 May 5.	N.R.	Taylor, W. C., Settlement Officer. *Khurda, Orissa.*
1860 May 2.	A.	Temple, Sir R., Bart, K. C. S. I., C. I. E. *Europe.*
1878 June 5.	N.R.	Temple, Capt. R. C., S. C. *Ambala.*
1876 Feb. 2.	A.	Tennant, Major-General James Francis, R. E., F. R. S., C. I. E., Mint Master. *Europe.*

Date of Election.		
1875 June 2.	N.R.	Thibaut, Dr. G., Principal, Sanskrit College. *Benares.*
1886 Aug. 4.	R.	Thomas, Robert Edmond Skyring. *Calcutta.*
1886 Jan. 6.	N.R.	Thomson, Colonel, W. B., B. S. C. *Kashmir.*
1847 June 2.	L.M.	Thuillier, Major-Genl. Sir Henry Edward Landor, R. A., C. S. I., F. R. S. *Europe.*
1883 June 6.	N.R.	Toker, Lieut.-Col. Alliston Champion, B. S. C., 18th N. I. *Burma.*
1871 April 5.	F.M.	Trefftz, Oscar. *Europe.*
1861 June 5.	L.M.	Tremlett, James Dyer, M. A., C. S., Judge, Chief Court. *Panjab.*
1872 July 3.	R.	Trevor, Colonel William Spottiswoode, R. E., with the Supreme Govt. *Calcutta.*
1880 Mar. 3.	N.R.	Tufnell, Lieut. R. H. C., 30th M. N. I. *Madras.*
1885 May 6.	R.	Verdeau, Ivan. *Calcutta.*
1886 Sep. 30.	N.R.	Waddell, Dr. Laurence Austine, M.B., Indian Medical Service. *Upper Burmah.*
1865 Nov. 1.	R.	Waldie, David, F. C. S. *Calcutta.*
1865 May 3.	R.	Waterhouse, Lt.-Col. James, B. S. C., Dy. Supdt., Survey of India. *Calcutta.*
1874 July 1.	F.M.	Watt, Dr. George, C. I. E. *Europe.*
1876 Dec. 6.	A.	Webb, W. T., M. A., Professor, Presidency College. *Europe.*
1869 Sept. 1.	R.	Westland, James, C. S., Financial Secretary. *Calcutta.*
1875 Feb. 3.	N.R.	Whiteway, Richard Stephen, C. S., Collector. *Etawah.*
1878 Aug. 29.	A.	Whittall, R., Forest Dept. *Europe.*
1880 Feb. 4.	A.	Wilson, The Hon. Arthur. *Europe.*
1870 Aug. 3.	R.	Wilson, Robert Henry, B. A., C. S. *Calcutta.*
1878 Mar. 6.	N.R.	Wilson, J., C. S., Deputy Commissioner. *Sháhpur, Panjab.*
1870 Jan. 5.	R.	Wood-Mason, James. *Calcutta.*
1873 Aug. 6.	N.R.	Woodthorpe, Lieut.-Col. Robert Gossett, R. E., Asst. Supdt., Survey of India. *Manipur.*

SPECIAL HONORARY CENTENARY MEMBERS.

Date of Election.	
1884 Jan. 15.	James Prescott Joule, Esq., LL. D., F. R. S. *Manchester.*
1884 Jan. 15.	Dr. Ernst Haeckel, Professor in the University of *Jena.*
1884 Jan. 15.	Charles Meldrum, Esq., M. A., F. R. S. *Mauritius.*
1884 Jan. 15.	A. H. Sayce, Esq., Professor of Comp. Philology. *Oxford.*
1884 Jan. 15.	M. Emile Senart, Member of the Institute of France. *Paris.*
1884 Jan. 15.	Sir Monier Monier Williams, *Knt.*, K. C. I. E., C. I. E., M. A., D. C. L., LL. D., Boden Prof. of Sanskrit. *Oxford.*

HONORARY MEMBERS.

1848 Feb. 2.	Sir J. D. Hooker, K. C. S. I., C. B., M. D., D. C. L., F. R. S. F. G. S. *Kew.*
1853 April 6.	Major-General H. C. Rawlinson, K. C. B., D. C. L., F. R. S. *London.*
1858 July 6.	B. H. Hodgson. *Europe.*
1860 Mar. 7.	Professor Max Müller. *Oxford.*
1860 Nov. 7.	Dr. Aloys Sprenger. *Heidelberg.*
1860 Nov. 7.	Dr. Albrecht Weber. *Berlin.*
1868 Feb. 5.	Major General Sir A. Cunningham, K. C. I. E., C. S. I., C. I. E., R. E. *Europe.*
1868 Feb. 5.	Professor Bápu Deva Sástri. *Benares.*
1872 May 1.	Sir G. B. Airy, K. C. B., M. A., D. C. L., LL. D., F. R. S. *London.*
1872 June 5.	Prof. T. H. Huxley, LL. D., PH. D., F. R. S., F. G. S., F. Z. S., F. L. S. *London.*
1875 Nov. 3.	Dr. O. Böhtlingk. *Leipzig.*
1875 Nov. 3.	Prof. J. O. Westwood. *Oxford.*
1876 April 5.	Col. H. Yule, R. E., C. B. *London.*
1876 April 5.	Dr. Werner Siemens. *Berlin.*
1879 June 4.	Prof. E. B. Cowell, D. C. L. *Cambridge.*
1879 June 4.	Dr. A. Günther, V. P. R. S. *London.*
1879 June 4.	Dr. J. Janssen. *Paris.*
1879 June 4.	Prof. H. Milne-Edwards. *Paris.*
1879 June 4.	Prof. P. Regnaud. *Lyons.*
1879 June 4.	E. Renan. *Paris.*
1881 Dec. 7.	Professor Hermann L. F. Helmholtz. *Berlin.*
1881 Dec. 7.	Dr. Rudolph v. Roth. *Tübingen.*
1881 Dec. 7.	Sir William Thomson, Knt., LL. D., F. R. S., F. R. S. E. *Glasgow.*
1881 Dec. 7.	Professor William Wright, LL. D. *Cambridge.*
1883 Feb. 7.	W. T. Blanford, A. R. S. M., F. R. S., F. G. S., F. R. G. S., F. Z. S. *London.*
1883 Feb. 7.	Alfred Russell Wallace, F. L. S., F. R. G. S. *Godalming.*
1883 Feb. 7.	Prof. William Dwight Whitney. *Newhaven, Connecticut,* U. S.

CORRESPONDING MEMBERS.

Date of Election	
1844 Oct. 2.	Macgowan, Dr. J. *Europe.*
1856 July 2.	Krämer, A. von. *Alexandria.*
1856 „ 2.	Porter, Rev. J. *Damascus.*
1856 „ 2.	Smith, Dr. E. *Beyrout.*
1856 „ 2.	Tailor, J., Esq. *Bussorah.*
1857 Mar. 4.	Nietner, J., Esq. *Ceylon.*
1859 Nov. 2.	Frederick, Dr. H. *Batavia.*
1860 Feb. 1.	Baker, The Rev. H. *E. Malabar.*
1861 July 3.	Gösche, Dr. R.
1862 Mar. 3.	Murray, A., Esq. *London.*
1863 July 4.	Barnes, R. H., Esq. *Ceylon.*
1866 May 7.	Schlagintweit, Prof. E. von. *Berlin.*
1868 „ 5.	Holmböe, Prof. *Christiana.*

ASSOCIATE MEMBERS.

1874 April 1.	Lafont, Rev. Fr. E., S. J., C. I. E. *Calcutta.*
1875 Dec. 1.	Bate, Rev. J. D. *Allahabad.*
1875 „ 1.	Maulavi Abdul Hai, Madrasah. *Calcutta.*
1882 June 7.	Giles, Herbert, Esq. *Europe.*
1883 Feb. 7.	Rodgers, C. J. *Amritsar.*
1884 Aug. 6.	Moore, F., F. R. S., F. L. S. *London.*
1885 Dec. 2.	Dr. A. Führer. *Lucknow.*
1886 Dec. 1.	Babu Saratchandra Dás, C. I. E. *Darjeeling.*

LOSS OF MEMBERS DURING 1886.

By Retirement.

J. M. Douie, Esq., C. S.
C. W. Marshall, Esq.
Dr. C. J. Jackson.
L. J. K. Brace, Esq.
S. Gore-Brown, Esq.
Sir Auckland Colvin.
Maulavi Dilawar Hussein Ahmed.
Maulavi Kabir-uddin Ahmed.
J. A. Bourdillon, Esq., C. S.
E. E. A. Kuster, Esq.
Maulavi Serajul Islam.
C. S. Bayley, Esq., C. S.
W. C. Benett, Esq.
R. G. Thomson, Esq., C. S.

J. R. Reid, Esq., C. S.
F. C. Black, Esq.
C. Girdlestone, Esq., C. S.

By Death.

Ordinary Members.

H. L. St.-Barbe, Esq., C. S.
J. Holdsworth-Fisher, Esq.
The Hon. James Gibbs, C. S. I., C. I. E.
Dr. J. E. N. Wise.
Babu Rajkrishna Mukerji.

Honorary Members.

Edward Thomas, Esq.
A. Grote, Esq., C. S.

Corresponding Members.

R. von. Schlagintweit, Esq.

Associate Members.

J. Schaumburgh, Esq.
Rev. C. H. Dall.

By Removal.

Under Rule 9.

Maulvi Syad Mahdi Ali Nawaz Jang, Bahadur.

Under Rule 38.

T. Blissett, Esq.
Babu Bhairubchunder Chatterji.
Captain L. A. C. Cook.
Babu Sibchunder Nag.
Babu Protap Narain Singh.
J. C. Rees, Esq.
G. R. C. Williams, Esq., C. S.
P. de Lacy Johnstone, Esq., C. S.
Babu Benode Behary Mullick.
Mirza Saraiya Jah Bahadur.

[APPENDIX.]

ABSTRACT STATEMENT

OF

RECEIPTS AND DISBURSEMENTS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR

THE YEAR 1886.

STATEMENT

Asiatic Society

Dr.

To Establishment.				
Salaries	Rs.	3,659	0	9
Commission		368	2	5
		4,027	3	2
To Contingencies.				
Stationery		87	8	9
Lighting		70	8	0
Building		393	0	0
Taxes		786	0	0
Postage		569	0	3
Freight		8	7	0
Meetings		91	4	0
Miscellaneous		165	14	3
		2,171	10	3
To Library and Collections.				
Books		3,682	8	8
Local Periodicals		33	6	0
Binding		359	6	0
		4,075	4	8
To Publications.				
Atkinson's Lepidoptera, Part III		2,293	0	3
Journal, Part I		1,075	9	0
Journal, Part II		2,761	10	4
Proceedings		1,087	12	11
		7,218	0	6
To Printing charges of circulars, receipts-forms, &c.		78	10	0			
To Extraordinary Miscellaneous		403	11	0	17,974	7	7
To Personal Account (writes off and Miscellaneous) ..		.....			381	0	0
To Balance ...		.....			141,492	7	10
	Total Rs. ...				159,847	15	5

NO. 1.
of Bengal.

Cr.

By Balance from last Report				Rs. 142,583 15 10
By Cash Receipts.				
Publications sold for Cash	Rs.	1,831 12 5		
Interest on Investments	...	6,216 2 7		
Advances recovered	...	5 4 6		
Miscellaneous	...	281 11 8		
		8,334 15 2		
By Personal Account.				
Admission Fees	...	768 0 0		
Subscriptions	...	7,640 0 0		
Sales on Credit	...	466 10 0		
Miscellaneous	...	54 6 5		
		8,929 0 5		
Total Income ...	.....			17,263 15 7
			Total Rs.	159,847 15 5

H. M. Percival,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal,

Examined & found correct.
Meugens & King,
Public Accountants.

STATEMENT

Oriental Publication Fund in Account

Dr.

To Cash Expenditure.

Printing Charges	...	...	...	Rs.	9,513	4	6			
Editing Charges	...	...	...	...	4,053	10	0			
Salaries	...	...	...	...	1,255	6	0			
Advertising	...	...	...	...	120	0	0			
Binding	...	...	...	...	16	14	0			
Freight	...	...	...	...	46	0	0			
Stationery	...	...	...	...	36	4	0			
Postage	...	...	...	...	678	2	0			
Contingencies	...	...	...	...	81	2	9			
Commission on Collecting Bills		...	...	...	69	9	1			
Iron racks &c. for keeping the publications				...	1,963	1	9			
					17,833	6	1			
To Personal Account (writes off and Miscellaneous)					49	2	0			
				Total Expenditure				17,882	8	1
				To Balance ...	.....			16,943	2	6
				Total Rs. ...				34,825	10	7

NO. 2.

with the Asiatic Society of Bengal.

Cr.

By Balance from last Report			Rs.	20,071 6 7
By Cash Receipts.				
Government Allowance	Rs.	9,000 0 0		
Publications sold for Cash	...	2,273 1 6		
Advances recovered	...	127 9 0		
Interest on Investments	...	660 0 0		
		12,060 10 6		
By Personal Account.				
Sales on Credit	...	2,606 15 6		
Miscellaneous	...	86 10 0		
		2,693 9 6		
Total Income ...	.....			14,754 4 0
	Total Rs. ...			34,825 10 7

H. M. Percival,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined & found correct.
Meugens & King,
Public Accountants.

STATEMENT

Sanskrit Manuscript Fund in Account

Dr.

To Cash Expenditure.

Salaries	...	...	...	...	Rs.	1,402	2	3		
Travelling expenses		...	...	...	...	10	0	0		
Printing	...	...	..	...	...	594	8	0		
Postage	...	...	...	...	...	5	0	0		
Stationery	...	...	...	..	...	26	12	0		
Purchase of MSS.		...	...	...	..	154	6	0		
Freight	...	...	...	...	...	5	0	0		
Copying	...	...	...	...	...	54	13	6		
Contingencies	...	...	...	...	...	.7	12	0		
Commission	...	...	...	...	...	9	4	9		
			Total Expenditure						2,269	10 6
			To Balance...			.....			2,121	11 0
					Total Rs.	...			4,391	5 6

NO. 3.

with the Asiatic Society of Bengal.

Cr.

By Balance from last Report			Rs.	1,120 11 0
By Cash Receipts.				
Government Allowances	Rs.	3,200 0 0		
Publications sold for Cash	...	54 0 0		
Advances recovered		0 10 6		
		3,254 10 6		
By Personal Account.				
Publications sold on Credit		16 0 0		
Total Income ...		.....		3,270 10 6
				4,391 5 6

H. M. Percival,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined and found correct.
Meugens & King,
Public Accountants.

STATEMENT

Personal

Dr.

To Balance from last Report			Rs. 4,084	1 9
To Cash Expenditure.				
Advances for purchase of Sanskrit MSS., postage of Books to Members, &c.	2,089	14 7		
To Asiatic Society	8,929	0 5		
To Oriental Publication Fund	2,693	9 6		
To Sanskrit MSS. Fund	16	0 0		
			13,728	8 6
Total Rs. ...			17,812	10 3

NO. 4.

Account.

Cr.

By Cash Receipts	Rs.	13,475	3 1
By Asiatic Society		381	0 0
By Oriental Publication Fund		49	2 0
			13,905 5 1

By Balances.	Due to the Society.			Due by the Society.			
Members	4,171	13	8	205	10	0	
Subscribers to publications	41	0	3	49	5	6	
Employees	280	0	0	250	0	0	
Agents	108	4	0	93	14	9	
Miscellaneous	128	10	6	223	9	0	
	4,729	12	5	822	7	3	3,907 5 2

Total Rs. 17,812 10 3

H. M. PERCIVAL,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined and found correct.
MEUGENS & KING,
Public Accountants.

STATEMENT

Invest

Dr.

		Nominal.			Actual.		
To Balance from last Report	Rs.	159,800	0	0	159,271	5	8
To Cash		... ...			4	10	8
Total Rs.		159,800	0	0	159,276	0	4

STATEMENT

Trust

Dr.

To Balance (Servants' Pension Fund)	Rs.	1,071	3	10
Total Rs.		1,071	3	10

NO. 5.

ments.

Cr.

		Nominal.			Actual.		
By Cash	Rs.	3,500	0	0	3,455	6	6
By Balance	...	156,300	0	0	155,820	9	10
	Total Rs.	159,800	0	0	159,276	0	4

H. M. PERCIVAL,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined and found correct.
MEUGENS & KING,
Public Accountants.

NO. 6.

Funds.

Cr.

By Balance from last Report	Rs.	1,031	3 10
By Interest on Investments	.....	40	0 0
	Total Rs.	1,071	3 10

H. M. PERCIVAL,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined and found correct.
MEUGENS & KING,
Public Accountants.

STATEMENT
Cash.

Dr.

To Balance from last Report	Rs.	1,451	13 10
RECEIPTS.			
To Asiatic Society		8,334	15 2
To Oriental Publication Fund		12,060	10 6
To Sanskrit Manuscript Fund		3,254	10 6
To Personal Account		13,475	3 1
To Trust Fund		40	0 0
To Investments		3,455	6 6
Total Rs.		42,072	11 7

STATEMENT
Balance

Dr.

To Cash	Rs.	1,900	10 2
To Personal Accounts		3,907	5 2
To Investments		155,820	9 10
Total Rs.		161,628	9 2

NO. 7.

Cr.

EXPENDITURE.

By Asiatic Society	Rs.	17,974	7	7
By Oriental Publication Fund		17,833	6	1
By Sanskrit Manuscript Fund		2,269	10	6
By Personal Account		2,089	14	7
By Investment		4	10	8
By Balance		1,900	10	2
Total Rs.		42,072	11	7

H. M. PERCIVAL,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined and found correct.
MEUGENS & KING,
Public Accountants.

NO. 8.
Sheet.

Cr.

By Asiatic Society	Rs.	141,492	7	10
By Oriental Publication Fund		16,943	2	6
By Sanskrit Manuscript Fund		2,121	11	0
By Trust Fund		1,071	8	10
Total Rs.		161,628	9	2

H. M. PERCIVAL,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

Examined and found correct.
MEUGENS & KING,
Public Accountants.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

EDITED BY

THE HONORARY SECRETARIES.

JANUARY TO DECEMBER,

1888.

CALCUTTA:

PRINTED BY G. H. ROUSE, BAPTIST MISSION PRESS,

AND PUBLISHED BY THE

ASIATIC SOCIETY, 57 PARK STREET.

1889.

CONTENTS.

LIST OF PLATES.

Plate I will be issued with a future number of the Proceedings.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JANUARY, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 4th January 1888, at 9 P. M.

E. T. ATKINSON, ESQ., C. S., PRESIDENT, in the Chair.

The following Members were present:

H. Beveridge, Esq., Babu Nobin Chánd Burál, E. C. Cotes, Esq., W. R. Criper, Esq., Maulavi Abdul Hai, Dr. Hoernle, R. D. Mehta, Esq., Babu Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., Moung Hla Oung, Esq., H. M. Percival, Esq., T. A. Pope, Esq., Hon. Dr. Mahendralál Sarkár, Maulavi Golám Sarwar, Pandit Haraprasád Sástri, D. Waldie, Esq., Lieut.-Col. J. Waterhouse, J. Wood-Mason, Esq.

The Minutes of the last meeting were read and confirmed.

Forty-four presentations were announced, as detailed in the appended Library List.

The following gentlemen are candidates for election at the next meeting:—

Dr. A. Alcock, I. M. S., 4th Panjab Infantry, Dera Ghazi Khan, proposed by Col. W. B. Thomson, seconded by R. A. Sterndale, Esq.

W. L. Sclater, Esq., B. A., Oxon., Deputy Superintendent Indian Museum, proposed by J. Wood-Mason, Esq., seconded by Lieut.-Col. J. Waterhouse.

H. H. Anderson, Esq., Rector, St. James' High School, proposed by J. Wood-Mason, Esq., seconded by Dr. Hoernle.

Major C. H. E. Anderson, Deputy Commissioner, Bhamo, Burmah, proposed by E. T. Atkinson, Esq., seconded by L. de Nicéville, Esq.

W. H. Lee, Esq., B. C. S., proposed by J. Wood-Mason, Esq., seconded by E. T. Atkinson, Esq.

The Hon. Ajodhyánáth Pandit, Allahabad, proposed by Nawab Abdul Latif, Bahadur, seconded by E. T. Atkinson, Esq.

The following gentlemen have intimated their wish to withdraw from the Society:

F. W. Peterson, Esq.
W. Trego Webb, Esq.
F. J. E. Spring, Esq.

The SECRETARY reported the death of the following Member:

F. Fedden, Esq.

The PRESIDENT reported that Sirdar Gurdyal Sing and Rev. A. E. Medlicott were largely in arrears of subscription, and though registered letters had been sent to them in accordance with Rule 37 no notice had been taken of them. Their names would therefore be suspended for a month as defaulters in the Society's meeting-room, and unless the sums due were paid in the meantime they will be declared removed from the Society at its next meeting. In accordance with Rule 38 this fact will be notified in the Proceedings.

COL. WATERHOUSE exhibited some views of Jaunpur and other specimens of heliogravure by the photo-etching process and said:—

"At the meeting of the Society in March 1887, I exhibited some specimens of heliogravure, chiefly by the photo-electrotype method. These I have now the pleasure of showing you are by the photo-etching process, and are reproductions from the original negatives of some views of Jaunpur intended for the illustration of Dr. Burgess' Archæological Survey Report. My assistant, Mr. Turner, has carried out a good many improvements in the process lately, and it is now being worked with considerable success. We find that many of these reproductions are really much better than ordinary silver prints from the same negatives, and this was particularly the case with some reductions we lately made from Dr. Giles' negatives taken in Gilgit. The etching process is exceedingly rapid, the plates require very little touching up, and the prints being pulled in the copper-plate press are as permanent as ordinary engravings.

I gave a description of the *process* on the occasion referred to and need not repeat it, but I may remark that we have now adopted the plan of etching with baths of perchloride of iron of different strengths, usually 45° 40° 36° and 27° B. commencing with the strongest."

The following papers were read—

1. *Notes on Indian* Rhynchota. Heteroptera, No. 4.—*By* E. T. Atkinson, Esq., C. S., President.

2. *Reliquæ Indicæ: being contributions to the Prehistoric Archæology of India and adjoining Provinces, founded chiefly on objects in the collection of the Indian Museum, Calcutta. No.* 1, *on some objects from a Neolithic settlement recently discovered by Mr. W. H. P. Driver at Ranchi in the Chotá-Nágpur district.—By* J. Wood-Mason, Esq., *Superintendent Indian Museum and Professor of Comparative Anatomy and Zoology in the Medical College of Calcutta.*

These papers will be published in full in the Journal, Pt. II.

3. *On Miscellaneous Coins.—By* C. J. Rodgers, Esq., *Archæological Department.* (With a plate.)

In years gone by whenever I came across a rare coin, obtained for my own cabinet or for the cabinets of my friends, I made a point of drawing it. After several years I find myself in possession of a small collection of drawings. As most of these coins thus drawn are of the greatest rarity, I have put the drawings of them on the accompanying plate (Plate 1). I will give a short description of each with a transcription of the legends as far as they are legible.

No. 1. Rupee of Sháh Shujá', son of Sháh Jahán.

Obverse:— In square: شاه شجاع محمدي
بادشاه غازي

Margins illegible:

Reverse:— Kalimah and date ١٠٦٨ in square.

Margins, names of the four companions of Muhammad.

This rupee I obtained some years ago in Dehli. It is now in the cabinet of Sir A. Cunningham.

No. 2. Rupee of Murád Bakhsh, son of Sháh Jahán.

Obverse:— in square: محمد مراد بخش
بادشاه غازي

Margins:— ضرب كهنبايت || سنه احد || ابوالمظفر || مروج الدين

Reverse:— Kalimah in square.

Margins:— Names and titles of the four companions and date ١٠٦٨

This rupee was obtained by me for Government this year. It gives the *kuniyat* of Murád Bakhsh, *Murauwaju-d-Dín*, not *Táju-d-Dín* as given by Mr. Delmerick in this Journal for 1875, p. 127. This reading of mine is supported by the Súrat rupee given in Marsden, Pl. XLII, No. DCCCLXXXII. These rupees are very rare indeed now.

No. 3.—A rupee of Kám Bakhsh, son of Aurangzíb.

Obverse :— سکهٔ در دکن زد بر خورشید و ماه
بادشاه کام بخش دین پناه ۱۱۲۰

Reverse :— ضرب دارالظفر بیجاپور
سنه ۴ جلوس میمنت مانوس

The couplet on the obverse I have made up by comparing this coin with Nos. 4 and 11. The mint is Bíjápúr, Dáru-l-Ẓafar (the gate of Victory), a title occurring on the rupees of Aurangzíb, struck in this mint.

No. 4.—A second rupee of Kám Bakhsh.

Obverse :— Same as on No. 3, but without date.

Reverse :— Mint not legible. Year احد

No. 5.—A rupee of A'ẓam Sháh, son of Aurangzíb.

Obverse :— زد در جهان سکه دولت و جاه
پادشاه ممالک اعظم شاه ۱۱۱۹

Reverse :— ضرب احمدآباد سنه احد
جلوس میمنت مانوس

No. 6.—A mohur of A'ẓam Sháh, struck at Asír (Garḥ).

Obverse :—Same as No. 5, but date ۱۱۱۷

Reverse :— ضرب اسیر سنه احد

These two coins of A'ẓám Sháh are in the cabinet of General Sir A. Cunningham. I found the rupee in Amritsar, years ago.

No. 7.—A rupee of Rafí'u-d-Darját, struck at Akbarábád (Agra).

Obverse :— سکه رد باهزاران برکات
شاهنشه بحروبر رفیع الدرجات ۱۱۳۱

Reverse :— ضرب مستقر الخلافت اکبرآباد
سنه احد جلوس میمنت مانوس

No. 8.—A rupee of Sháh Jahán III., also struck at Akbarábád.

Obverse :— سکه مبارک شاه جهان بادشاه غازي ۱۱۷۴

Reverse :— Same as on No. 7.

No. 9.—A copper pice of Aurangzíb, struck at Machchlípatan (Masulipatam).

Obverse :— سنه جلوس مبارک ۱۱۱۷

Reverse :— ضرب مچهلي پتن ۴۹

No. 10.—A second pice of Aurangzíb, struck at Ḥaidarábád.

Obverse :— سنه جلوس مبارک

Reverse :— ضرب حیدرابار ۱۱۰۷

No. 11.—A mohur of Kám Bakhsh, struck at Ḥaidarábád, here called Dáru-l-Jihád, 'the gate of war for religion.'

Obverse :— Same as on No. 3.

Reverse :— دارالجهاد حیدرابادٔ ۲

&c. &c.

This mohur was in the cabinet of the late Hon. J. Gibbs, C. S. I., C. I. E., who gave me an electrotype copy of it before he went home.

No. 12.—A small, but fine mohur of Aurangzíb, struck at Malikanagar, a place I know nothing about. The inscription on the obverse differs from that usually on the mohurs of this Sulṭán.

Obverse :— محی‌الدین محمد اورنگ‌زیب بهادر بادشاه غازی

Reverse :—ملکه نگر ۹۰ (۱۰) جلوس ۲۲

The inscription on the obverse is found on rupees of the 1st year of Aurangzíb. It is not often that the year of accession (jalús) and of the Hijrah come on the same face of the coin. This mohur is in my cabinet.

In reading these coins one must begin, as a rule, at the last line, and read upwards. This is nearly always the case where coin couplets are concerned. There are no less than three coin couplets on the coins here described. It will be seen from the rupees of Kám Bakhsh, how difficult it is to read the whole couplet from a single coin.

The subject of conversation was Xavier's *Historia Christi Persica* by H. Beveridge, Esq.

Library.

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

Transactions, Proceedings, and Journals

presented by the respective Societies and Editors.

Amsterdam. Revue Coloniale Internationale,—Tome V, No. 5, Novembre, 1887.

Berlin. Der Königlichen Akademie der Wissenschaften zu Berlin, —Sitzungsberichte, 19—39, 1887.

Buenos Aires. La Academia Nacional de Ciencias en Cordoba,—Actas, Tome V, Entrega, 3.

Calcutta. The Indian Engineer,—Vol. IV, Nos. 6 and 7.

———. Indian Engineering,—Vol. II, Nos. 24—27.

Edinburgh. The Scottish Geographical Society,—Magazine, Vol. III, No. 11, November, 1887.

Frankfurt, a. O. Des Naturwissenschaftlichen Vereins des Reg.-Bez. Frankfurt,—Monatliche Mittheilungen aus dem Gesammtgebiete der Naturwissenschaften, 4 Jahrgang, Nr, 7 und 8.

Havre. Société de Geographie Commerciale du Havre,—Bulletin, Septembre et Octobre, 1887.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLI, Heft 3.

London. The Academy,—Nos. 811—814.

———. Anthropological Institute of Great Britain and Ireland,—Vol. XVII, No. 2.

———. The Athenæum,—Nos. 3134—3137.

———. Nature,—Vol. XXXVII, Nos. 940—945 and Index to Vol. XXXVI.

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———. Royal Asiatic Society of Great Britain and Ireland,—Journal new series, Vol. XIX, Part 4, October, 1887.

———. Royal Astronomical Society,—Monthly Notices, Vol. XLIII, No. 9, supplementary number.

———. Royal Geographical Society,—Proceedings, Vol. IX, Nos. 10—12, October—December, 1887.

———. Royal Society,—Proceedings, Vol. XLII, Nos. 257—258.

———. Royal Statistical Society,—Journal, Vol. L, Part 3, September, 1887.

———. Zoological Society of London,—Proceedings, Part 3, 1887.

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Munich. Akademie der Wissenschaften,—Abhandlungen, Historische Classe, Vol. XVII, No. 3.

———. ———. Mathematisch-Physikalische Classe, Vol. XV, Nos. 2-3; Vol. XVI, No. 1.

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———. ———. Sitzungsberichte, Mathematisch-Physikalische Classe, Heft 2—4, 1885; Heft 1—3, 1886; Inhaltsverzeichniss Jahrgang 1871—1885.

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Naples. Società Africana D'Italia,—Bollettino, Anno VI. Fasc. 9—10 Settembre et Ottobre 1887.

Paris. Journal Asiatique,—Tome X, No. 1—Juillet-Août, 1887.

———. La Société de Géographie,—Compte Rendu des Séances, No. 13, 1887.

———. La Société d'Ethnographie,—Bulletin, 2e Série, Nos. 6—7, Juin—Juillet, 1887.

Roorkee. The Indian Forester,—Vol. XIII, No. 11, November, 1887.

Schaffhausen. La Société Entomologique Suisse,—Bulletin, Tome VII, Heft Nr. 8. Juni, 1887.

Simla. United Service Institution of India,—Journal Nos. 1—34, and Vol. XV, No. 69, 1887.

St. Petersburg. La Société Impériale Russe de Geographie,—Journal, Tome XXIII, No. 4.

Sydney. Linnean Society of New South Wales,—Proceedings, Vol. II, Part 2, 1887.

———. Royal Society of New South Wales,—Journal and Proceedings, Vol. XX, 1886.

Tókió. Der Kaiserlich-Japanischen Universität,—Mittheilungen aus der Medicinischen Facultät, Band I, No. 1, 1887.

Toronto. The Canadian Institute,—Proceedings, Vol. V, (3rd series) No. 1, October, 1887.

Vienna. Der K. K. Naturhistorischen Hofmuseums,—Annalen, Band II, Nr. 3.

Yokohama. Der Deutschen Gesellschaft für Natur-und Völkerkunde Ostasiens in Tokio,—Mittheilungen, Heft 37. October 1887.

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presented by the Authors, Translators, &c.

Murdoch, J. Religious Reform, Part I (Popular Hinduism.) 8vo. Madras, 1887.

Roy, Protáp Chandra. The Mahabhárata of Krishna-Dwaipayana Vyása, translated into English Prose, Part XXXVI. 8vo. Calcutta, 1887.

Thurston, E. Preliminary Report on the Marine Fauna of Rameswaram and the neighbouring Islands. 8vo. Madras, 1887.

Miscellaneous Presentations

Gedächtnissrede auf Carl Theodor v. Siebold, von Richard Hertwig. 4to. München, 1886.

———. ———. Leopold von Ranke, von Wilhelm v. Giesebrecht. 4to. München, 1887.

Gedächtnissrede auf Joseph von Fraunhofer, von Carl Max v. Bauernfeind. 4to. München, 1887.

Joh. Andr. Schmeller. Eine Denkrede, von Konrad Hofmann. 4to. München, 1885.

Zum Begriff und Wesen der römischen Provinz, von Alois von Brinz. 4to. München, 1885.

AKADEMIE DER WISSENSCHAFTEN. MÜNCHEN.

Annual Report of the Department of Mines, New South Wales, for the year 1886. Fcp. Sydney, 1887.

Geology of the Vegetable Creek Tin-Mining Field, New England district, New South Wales, with maps and sections. 4to. Sydney, 1887.

DEPARTMENT OF MINES, NEW SOUTH WALES, SYDNEY.

Adhua Mazda und die Asuras, ein Beitrag zur Kenntniss Altindogermanischer Religionsgeschichte. Habilitationsschrift der Philosophischen Facultät der Ludewigs-Universität zu Giessen zur Erlangung der venia legendi, vorgelegt von Dr. P. von Bradke. 8vo. Giessen, 1884.

GIESSEN UNIVERSITY.

Report on the Administration of the Customs Department in the Bengal Presidency for the official year 1886-87. Fcp. Calcutta, 1887.

Report on the Calcutta Medical Institutions for the year 1886. Fcp. Calcutta, 1887.

Report on the Charitable Dispensaries under the Government of Bengal for the year 1886. Fcp. Calcutta, 1887.

Selections from the Records of the Government of India, Home Department, No. CCXIII. Reports on publications issued and registered in the several provinces of British India during the year 1884. Fcp. Calcutta, 1886.

GOVERNMENT OF BENGAL.

The Avifauna of British India and its dependencies, by James A. Murray. Vol. I, Part 3. 8vo. Bombay, 1887.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Memoir on the winds and monsoons of the Arabian Sea and North Indian Ocean, by W. L. Dallas. 4to. Calcutta, 1887.

Monthly Weather Review August, 1887. 4to. Washington, 1887.

METEOROLOGICAL REPORTER, GOVERNMENT OF INDIA.

Archæological Survey of Southern India, Vol. I, the Buddhist-Stupas of Amaravati and Jaggayyapeta, by Dr. J. Burgess. Fcp. 1887.

GOVERNMENT OF INDIA, REV. & AGRI. DEPT.

Annual Administration Reports of the Forest Department (Southern and Northern circles,) Madras Presidency for the official year 1885-86. Fcp. Madras, 1887.

GOVERNMENT OF MADRAS.

Summary of the Administration of the North-Western Provinces and Oudh—April, 1882—November, 1887. Rl. 8vo. Allahabad, 1887.

GOVERNMENT OF N.-W. P. & OUDH.

Johns Hopkins University. Studies in Historical and Political Science, Fifth Series, X. The study of History in England and Scotland, by Paul Frederico. 8vo. Baltimore, 1887.

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Anuario del Observatorio Astrónomico Nacional de Tacubaya, para el Año de 1888. Año VIII. 8vo. Mexico, 1887.

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The Sumaṅgala-Vilásiní, Buddhaghosa's Commentary on the Dígha Nikáya. Edited by T. W. Rhys-Davids and J. Estlin Carpenter, Part I. 8vo. London, 1886.

The Vemána-Vatthu of the Khuddhaka Nikáya Sutta Pitaka. Edited by Edmund Rowland Gooneratne. 8vo. London.

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Annual Report of the Director of the Royal Alfred Observatory, Mauritius, for the year 1886. Fcp. Mauritius, 1887.

Mauritius Meteorological Results for 1886. Fcp. Mauritius, 1888.

C. MELDRUM, ESQ.

Results of the Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich in the year 1885. 4to. London, 1887.

ROYAL OBSERVATORY, GREENWICH.

Proceedings and Transactions of the Royal Society of Canada for the years 1885 and 1886, Vols. III and IV. 4to. Montreal, 1886 and 1887.

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Calcutta. Indian Medical Gazette, Vol. XXII, No. 11, November, 1887.

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———. The Journal of Botany,—Vol. XXV, Nos. 298 and 299, October and November, 1887.

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New Haven, Conn. The American Journal of Science,—Vol. XXXIV, (3rd series), No. 202, October, 1887.

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———. Journal des Savants,—Septembre, 1887.

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———. Revue Scientifique,—Tome XL, Nos. 13—18.

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Philadelphia. Manual of Concholgy,—Vol. IX, Part 35; Vol. III (2nd Series), Part 11.

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BÖHTLINGK, OTTO. Sanskrit Wörterbuch in Kurzerer Fassung, Theil VII, Lieferung 1. 4to. St. Petersburg, 1887.

GODWIN-AUSTEN, LT.-COL. H. H., F. B. S. Land and Fresh Water Molusca of India, Part VI, September, 1887. 4to. London, 1887.

Report on the Scientific Results of the Exploring voyage of H. M. S. "Challenger"—1873-1876—Zoology, Vol. XXII. 4to. London, 1887.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR FEBRUARY, 1888.

The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday the 1st February 1888, at 9 P. M.

E. T. ATKINSON, ESQ., C. S., President, in the chair.

The following members were present:

H. Beveridge, Esq., Babu Nobin Chánd Burál, E. C. Cotes, Esq., Babu Saratchandra Dás, Kumár Vinayakrishna Deva, Báhádur, S. R. Elson, Esq., E. Gay, Esq., Dr. G. M. Giles, Dr. Hoernle, A. Hogg, Esq., Dr. George King, Dr. William King, Rev. Fr. E. Lafont, Dr. K. MacLeod, R. D. Mehta, Esq., Babu Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., Moung Hla Oung, Esq., H. M. Percival, Esq., Dr. Prasanna Kumár Ráy, Hon. Dr. Mahendralál Sarkár, Pandit Haraprasád Shástri, Dr. W. J. Simpson, D. Waldie, Esq., Lieut.-Col. J. Waterhouse, J. Wood-Mason, Esq.

Visitors:—W. L. Sclater, Esq., Babu Pratápchandra Roy, Babu Siddheswar Mitra, Pandit Harimohan Vidyábhushan, Lama Ugyen Gyatsho, Lama Namgyal, (Lama of Tsun-thang *dgon-pa*,) Lama Ralang.

According to the Bye-Laws of the Society the President ordered the voting papers to be distributed for the election of officers and members of Council for 1888, and appointed Messrs. Beveridge and Gay, Scrutineers.

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

ANNUAL REPORT FOR 1887.

The Council of the Asiatic Society of Bengal have the honor to submit the following Report on the state and progress of the Society's affairs during the past year.

Member List.

During the year under review, 19 gentlemen were elected Ordinary Members of the Society, 17 members withdrew, and 8 members died. Of the 19 elections one was a re-election. The total number of members, therefore, at the close of 1887 was 313, against 319 at the end of the preceding year. Of these 98 were Resident, 137 Non-Resident, 15 Foreign, 17 Life, 44 Absent from India, and 2 Special Non-Subscribing members, as will be seen from the following table, which also shows the fluctuations in the number of Ordinary Members for the past 6 years.

Year.	Paying.				Non-paying.				Grand Total.
	Resident.	Non-Resident.	Foreign.	Total.	Life.	Absent.	Special Non-Subscribing.	Total.	
1882 ..	101	155	18	274	15	47	1	63	337
1883 ...	100	142	18	260	15	47	1	63	323
1884 ...	102	157	12	271	15	39	1	55	326
1885 ...	105	161	13	279	16	34	1	51	330
1886 ...	93	142	18	253	16	48	2	66	319
1887 ...	98	137	15	250	17	44	2	63	313

The 8 Ordinary Members, who died during the year, were Colonel G. C. De Prée, Mr. J. C. Douglas, Mr. T. G. H. Moncrieffe, the Hon'ble Sir Ashley Eden, Dr. Rám Dás Sen, Lieut.-Colonel T. C. Plowden, Babu Girijá Bhusan Mukherji, and Babu Rákháldás Háldár.

Among the Corresponding Members intimation of the deaths of the following gentlemen was received:—Mr. J. Nietner and Mr. R. H. Barnes, both of Ceylon, Dr. E. Smith of Beyrout, Mr. J. Taylor of Bussorah, and Dr. H. Frederick of Batavia. Their number now stands at 8.

The lists of Honorary and Associate Members continue unaltered from last year, their numbers standing at 27 and 8 respectively.

Mr. C. R. Lanman compounded for his subscription as Foreign Member.

Indian Museum.

The list of Trustees appointed by the Asiatic Society to the Museum under Act XXII of 1876, remained unaffected by the new Indian Museum Act, No. IV, of 1887.

Mr. A. Pedler was appointed a Trustee *vice* Mr. H. F. Blanford in April.

A collection of 20 old copper coins, presented to the Society by Babu Jogesh Chunder Dutt, was transferred to the Museum, the Society's Cabinet being amply provided with coins of the several descriptions contained in the collection.

Finance.

The accounts of the Asiatic Society are shown in the Appendix under the usual heads.

Statement No. 8 contains the Balance Sheet of the Asiatic Society and of the different Funds administered through it.

The Budget of the year 1887 was estimated at the following figures: Receipts, Rs. 14,200 and Expenditure, Rs. 13,816.

Taking into account only the ordinary items of receipt and expenditure for the year 1887, the actual results have been:—Receipts, Rs. 14,082-10-1, and Expenditure, Rs. 13,267-13-5 leaving a balance in favour of the Society on its ordinary working of Rs. 814-12-8.

In the present year's accounts there are, however, shown in the first place a large item under extraordinary receipts due to the sale of a narrow strip of the Society's land to Government for the purpose of widening the footpath in Park Street amounting to Rs. 2,116, and on the other hand the total expenditure is swelled by the fact that some heavy repairs to the Society's premises have had to be undertaken, during which many beams &c. have had to be changed, and the cost of them has amounted to no less than Rs. 2,489-10-0.

The total receipts for the year 1887 have therefore been Rs. 16,198-10-1, and the total expenditure Rs. 15,757-7-5, which still shows a balance in favour of the Society of Rs. 441-2-8 on the gross transactions. This, however, is only a nominal balance, for it has been decided to apply the amount received from the sale of the land towards the erection of a substantial iron railing in the place of the present boundary wall which has to be pulled down. The cost of such heavy repairs as have been carried out during the year 1887, cannot, however be fairly charged wholly to this one year, but should be spread over at least four or five, and the credit balance of the Society on the ordinary working shown to be Rs. 814-12-8 is a substantial set off against this item of expenditure which must be classed as extraordinary.

The ordinary receipts for the year have been Rs. 14,082-10-1, against the estimated amount of Rs. 14,200. The slight falling off in the receipts is mainly due to the very small amount of the sales of the Society's publications made by Messrs. Trübner and Co. during 1886; and which sales are credited in this year's accounts. On the other hand one or two items of receipts show a decided advance; and thus the subscriptions

have exceeded the budget estimate by more than five hundred rupees, part of which is accounted for by the receipt of a compounding fee from a foreign member. The ordinary expenditure was estimated in the last annual report to be Rs. 13,816, but the actual expenditure has been Rs. 13,267-13-5. Leaving out of consideration the extraordinary expenditure in building above referred to, the purchase of books has shown an excess on the budget expenditure of Rs. 340-15-5; the expenditure on the Journal has been smaller than that budgetted for by between seven and eight hundred rupees, and the Proceedings show a diminished cost of about a hundred rupees. There has thus been a total diminished expenditure below the budget allotment. The expenditure on Part II of the Journal in 1887 has been very heavy, and thus out of a total expenditure of Rs. 3,421-2-6 on the Journal Rs. 3,000-10-3 have been debited to Part II.

The budget estimate for ordinary expenditure and receipts for 1888 does not show much change from that of 1887. The probable receipts are put down as Rs. 14,000, and the ordinary expenditure at Rs. 13,824. On the receipts side, the estimate under the heading "Subscriptions" is based upon the average of the actual amounts received in the past 3 years. The amount estimated to be received from the sale of periodicals has been placed at Rs. 400; this estimate is Rs. 600 less than that of the previous year, but it is rather larger than the actual receipts of the past year. On the expenditure side the changes in the estimated amounts are merely nominal; and thus while in 1887, the estimated ordinary expenditure stood at Rs. 13,816, for 1888 it stands at Rs. 13,824.

There will, however, be two extraordinary items of expenditure to be dealt with during the year 1888. The first item will be the erection of an iron railing in the place of the wall which has to be pulled down to widen the footpath in Park Street, and the erection of a new Durwan's lodge. The cost of these is estimated to be about four thousand rupees, but against this more than two thousand rupees have been received by the sale of the strip of land. The second large item will be the continuation of the repairs to the Society's house, godowns &c. for which a further estimate of more than two thousand rupees has been sent in. If this work is carried out it will make a total expenditure of about Rs. 5,000 on repairs in the two years, and this excess expenditure will probably have to be temporarily met by the sale of perhaps four or five thousand rupees of the Government Securities belonging to the Society. As before stated, such expenditure as this is not strictly chargeable to any one year, but should be equitably spread over a period of years.

The Budget Estimate for 1888 is as follows:—

RECEIPTS.

Subscription	Rs.	7,300	0	0
Sale of Periodicals		400	0	0
Interest on Investment		6,200	0	0
Miscellaneous		100	0	0
		14,000	0	0

EXPENDITURE.

Salaries	Rs.	4,000	0	0
Commission		330	0	0
Stationery		150	0	0
Lighting		80	0	0
Building (ordinary)		100	0	0
Taxes		714	0	0
Postage		600	0	0
Freight		20	0	0
Meeting		100	0	0
Contingencies		150	0	0
Books		1,500	0	0
Local Periodicals		30	0	0
Binding		500	0	0
Journals		4,200	0	0
Proceedings		1,200	0	0
Printing Circulars &c.		100	0	0
		13,824	0	0

Probable extraordinary expenditure during 1888.

For repairs to House	Rs.	2,500	0	0
Iron Railing and new Durwan's Lodge		4,000	0	0

London Agency.

The statement submitted by Messrs. Trübner & Co. of their account with the Society for 1886, showed a debit balance for £183-7-9. This is an unusually large and unfavourable balance against the Society. In last year's accounts the balance for 1885 was only £107-8-8½. The cause of this exceptionally large balance is apparently due to two facts.

First, the sales made by Messrs. Trübner and Co. in 1886, are only about one-fifth of the usual amount, the total sum credited being only £21-1-10, instead of annual average sale proceeds of about a hundred pounds, but no explanation of this fact has been received. The expenditure side has also been largely swelled by the cost of plates for Part II. of the Journal, which has amounted to £88-9-0.

The sales of the Society's Publications effected by Messrs. Trübner and Co. in 1886 amounted to only £14-19-4½, against the sum of £49-5-9 in 1885, while the sales of the Bibliotheca Indica only reached £6-3-6 in 1886, against the sum of £59-9-3 in 1885.

The numbers of copies of parts of the Journal, of the Proceedings and of the Bibliotheca Indica sent to Messrs. Trübner and Co. during 1887 for sale were 180, 240, and 483 respectively.

Thirteen invoices of books purchased and of Publications of various Societies sent in exchange were received in 1887. The value of the books purchased in 1887, was £116-5-1.

The amount of £129-8-9, the balance in the hands of the late Mr. Grote on account of the publications of Atkinson's Lepidoptera, Part III, was made over to Messrs. Trübner and Co. in March 1887.

Library.

The total number of printed volumes or parts of volumes added to the Library during the year was 2,171, of which 797 were purchased, and 1374 presented.

Of the Catalogues of Manuscripts reported last year as in progress, the Burmese Catalogue has been completed, and is in the press.

A Manuscript of the *Riyáz-ush-Shu'ará*, a history of Persian poetry, was purchased at a cost of Rs. 40.

Publications.

There were published for the year ten numbers of the Proceedings containing 275 pages of letter-press, and 4 plates; three numbers of the Journal, Part I, containing 173 pages of letter-press and 10 plates; and four numbers of the Journal, Part II, containing 376 pages of letter-press and 15 plates. There was also published a fifth part of the Journal Part II for 1886, after the report for that year had been issued. There were also published during the year the Indexes to the Journal Part II for the years 1884, 1885 and 1886.

Building.

The expenditure on the building during the year was Rs. 2,428, of which Rs. 1,214 was for renewing decayed beams and burgahs in the roof, and Rs. 1,214 for half-terracing the roof.

Coin Cabinet.

During the year 63 coins were added to the Cabinet, of which 2 were of gold, 57 of silver and 4 of copper. One of the two gold coins, a Kufi coin found in Seistán, was acquired by purchase; the four copper coins were presented to the Society by Kaviráj Shyamal Dás of Udaipúr, in connection with his paper on the ancient remains at Nagari in Meywár, published in the Journal Part I.; all the rest were acquired under the Treasure Trove Act, and were from the Bengal Presidency. Detailed descriptions of the coins are given in the Society's Proceedings for January and November, with the exception of the four copper coins, which were so defaced as to be past identification.

Office of the Secretaries.

Mr. J. Wood-Mason, and Mr. H. M. Percival, continued as Natural History Secretary, and General Secretary during the year. During the temporary absence of the General Secretary in May and October his duties were taken up by the Treasurer.

Dr. Hoernle took over charge of the duties of Philological Secretary from Mr. H. Beveridge in January.

Mr. J. Eliot held the Treasurership from January to the beginning of May, when, on his departure for Simla, Mr. A. Pedler succeeded him as Treasurer.

Mr. H. Ronaldson continued as Assistant Secretary during the year.

Mr. J. H. Elliott continued as Assistant Librarian till December, when, on his being granted leave without pay for one year, his duties were distributed between the Cashier and the Copyist, and sanction given for the appointment of a new Copyist.

Babu Nritya Gopal Bose has continued as Cashier, Babu Hari Mohan Mukherji as Pandit, and Babu Jogesh Chandra Chatterji as Copyist, during the year.

Bibliotheca Indica.

Fifty-two fasciculi were published during the year, of which seventeen were in the Arabic-Persian, and thirty-five in the Sanscrit Series. They belong to twenty-two different works, of which four are in the Arabic-Persian, and eighteen in the Sanskrit Series. There was one new publication,—the Maásir-ul-Umará,—in the former Series, whilst in the latter there were five new publications, *viz.*, Ashṭa Sáhasriká Prajñá Páramitá, Madana Párijáta, Nyáya Vártikam, Varáha Puráṇa, and Institutes of Parásara (English translation): the last being complete in one fasciculus.

In the annual report of the preceding year it had been estimated that 45 fasciculi would be published in the course of the ensuing year, at a probable cost of Rs. 18,045. The actual out-turn has been, as stated, 52 fasciculi. The expenditure out of the Oriental Publication Fund during the year amounted to Rs. 16,987-3-4, which sum includes Printing charges for 37 fasciculi, and Editing charges for 45 fasciculi, and gives an average cost of Rs. 376 per fasciculus. For the year 1888 the out-turn may be reckoned at 50 fasciculi. These, at the above average rate, will cost Rs. 18,800. The average annual income calculated on the receipts of the last five years is Rs. 13,081, which gives an excess of estimated expenditure over average income amounting to Rs. 5,719. Towards meeting this excess there is a Balance of Rs. 12,368. This balance will have to meet a further charge of Rs. 1,500, if a proposal that has been made to purchase a set of the Tibetan Tangyur in block-print, is carried out.

Of the following works of which fasciculi have appeared in previous years no fasciculi were published during the year under review :—

1. TABAQÁT-I-NÁSIRÍ (Index of persons and places). 2. PRÁKṚITA LAKSHAṆA (English translation and notes). 3. KÁTANTRA (introduction). 4. SUŚRUTA SAMHITÁ (English translation). 5. MUNTAKHAB-UL-TAWÁRÍKH (English translation). 6. ÁPASTAMBA ŚRAUTA SÚTRA (Text). 7. PARÁŚARA SMRITI (Text). 8. MANU ṬÍKÁ SAMGRAHA (Text). 9. PRITHIRÁJA RÁSAU (Text). 10. LALITA-VISTARA (English translation).

Of the following works sanctioned in previous years no fasciculi have as yet appeared :—

1. BRIHADDEVATÁ (Text). 2. PRÁKRITÁDHYÁYA (Text and translation). 3. CHARAKA (English translation with notes). 4. NAQÁID-UL FARAZDAQ-JERIR (Text with English translations in prose and verse.) 5. KÁLA VIVEKA (Text). 6. VEDÁNTA SÚTRA Commentaries on, (Text). 7. YOGINÍ TANTRA (Text). 8. KARAṆA GRANTHA (Text). 9. MUNTAKHAB-UL-TAWÁRÍKH Vol. I. (English translation). 10. TÁJ-UL MAÁSIR (Text). 11. TÁRÍKH-I-WASSAF (Text). 12. TÁRÍKH-I-YÁMÍNÍ. (English translation with notes). 13. JÑÁTÁ DHARMAKATHÁ and VIPÁKA SÚTRA (Text). 14. SADDHARMA PUṆḌARIKA (Text). 15. SAT-SAÍ (Text). 16. GADYA KUSUMÁNJALI (Text). 17. AL TABRIZI'S Commentary (Text). 18. MÁRKANDEYA PURÁṆA (English translation). SVAYAMBHU PURÁṆA (Text). 19. BAUDHÁYANÍYA ŚRAUTA SÚTRA and HIRANYAKESI ŚRAUTA SÚTRA (Text). 20. ADVAITA BRAHMA SIDDHI (Text). 21. ANIRUDDHA'S Commentary (Text). 22. TUZAK-I-JEHÁNGIRI (Text). 23. TÁRÍKH-I-FÍROZ SHÁHÍ (Text).

The following new works have been sanctioned during the year for publication :—

A. *Arabic-Persian Series.*

1. MAÁSIR-UL-UMARÁ : Text, to be edited by Maulaví 'Abdur Rahím.

2. AÍN-I-AKBARÍ : English Translation (to be a continuation of that begun by Mr. Blochmann) by Lieut.-Col. Jarrett.

3. RIYÁZ-US-SALÁTÍN : Text and English Translation, by Maulaví 'Abdul Haq 'Ábid and Dr. Hoernle.

B. *Sanskrit Series.*

1. COMMENTARY on the NYÁYAVINDU by DHARMOTTARÁCHÁRYA, to be edited by Professor P. Peterson.

The Tibetan Text of this work is to be published *pari passu* with the Sanskrit.

2. BRIHADDHARMA PURÁṆA : Text, to be edited by Pandit Haraprasád Shástri.

3. BODHISATVÁVADÁNA KALPALATÁ by Kshemendra : to be edited by Babu Sarat Chandra Dás. This work will be published with the Sanskrit and Tibetan Texts in juxtaposition.

The following is a detailed list of the publications issued during 1887.

A. *Arabic-Persian Series.*

1. ISÁBÁH, edited by Maulavi Abdul Hai of the Calcutta Madrasa. Nos. 257, 258, 259, 260, 261, 263, (Old Series) Fasc. XXXIV, XXXVI, XXXIX. Vol. II. Nos. 10, 11, 12, and Fasc. XXXIII, XXXV, XXXVII. Vol. III. Nos. 12, 13, 14. Total *six* fasciculi.

2. AKBARNÁMAH OF ABUL FAZL. The publication of this great work has now been completed under the editorship of Maulavi Abdur Rahim of the Calcutta Madrasah. He took up the work on the death of Maulavi Aga Ahmed Ali, under whose superintendence the first twenty-four fasciculi were published. It is needless to expatiate on the merits of the Akbarnámah, or on the great importance of having a correct edition of it. The publication of the Lucknow edition is due to the munificence of the Rájá of Pattiálá, but unfortunately, says Professor Dowson, its literary value is by no means commensurate with the money expended upon it. The present edition has been prepared from ten MSS. of which the editor gives an account in his preface. He also pays there a well-merited tribute to the memory of Professor Blochmann, through whose influence and exertions the work was under-

taken. In a preface to the 3rd volume the editor states that the Akbarnámah up to the 47th year of Akbar's reign is the work of Abul Fazl, and that the continuation to the end of the reign is by Mahábat-'Áli Khán. This writer is not mentioned by Sir Henry Elliot in his account of the Akbarnámah in Vol. VI. The supplement to the Akbarnámah which he quotes is the Takmila-i-Akbarnámah by Mazat-Ulla. Index to Vol. III. Total *one* fasciculus.

3. MAÁSIR-UL-UMARÁ, or Memoirs of Nobles, by Nawáb Samsám-ud-Dowlá Sháh Nawáz Khán, edited by Maulavi Abdur Rahím of the Calcutta Madrasah. Professor Dowson says of this work that it may be called "The Peerage of the Mughal Empire." It is a biographical dictionary of the "pillars of the empire" from Akbar's time down to the latter part of the 18th century. It is a modern work, for the author lived till 1757, when he was killed at Aurangábád in the Deccan by the soldiers of Bussy. But the author was a man of much research and consulted many authorities. His book has been much used by Professor Blochmann in drawing up his accounts of Akbar's gardens (*vide* his translation of the Ain-i-Akbari, p. 308 note), and Professor Dowson remarks that the *Maásir* must always hold its place as one of the most valuable books of reference for the student of Indian History. The real name of the author is Abdu-r-Razzák, Samsám-ud-Dowlá &c. being his titles. The work was completed and brought down to 1780 by his son Abdul Hai. Both father and son held high office in Hyderábád. An interesting account of the work and of its authors will be found in Dr. Rieu's Catalogue of the Persian MSS. in the British Museum Vol. I, 339. See also Elliot's History of India, Vol. VIII, 187. Nos. 623, 628, 634, 637. Fasc. I. II. III. IV. Total *four* fasciculi.

4. ZAFARNÁMAH by Maulánà Sharfuddín 'Alí of Yazd, edited by Maulaví Muhammed Iláhdád. The Zafarnámah, or Book of Victory, is the history of the exploits of Timur. It was used by Gibbon, (in the French translation of Petis de La-Croix), who says of Sharfuddin that his Geography and Chronology are wonderfully accurate, and that he may be trusted for public facts, though he servilely praises the virtue and fortune of his hero. An account of the Zafarnámah and numerous extracts from it will be found in Elliot, VIII, 478—522. See also Catalogue of Persian MSS. in the B. M. I, 173. Nos. 604, 610, 616, Vol. I. Fasc. VII, VIII, IX. Nos. 624, 633, 636, Vol. II. Fasc. I, II, III. Total *six* fasciculi.

B. *Sanskrit Series.*

5. ASHṬASÁHASRIKÁ PRAJÑÁ PÁRAMITÁ, or, the Transcendental Knowledge of the Buddhists in 8,000 slokas, edited by Dr. Rájendralála

Mitra, contains the substance of the metaphysical speculations of the Mahâyâna school of the Buddhists. It is one of the nine canonical works of the Bauddhas of Nepal. A translation of this work forms the 20th volume of the Sher-chin section of the Kah-Gyur collection of the Thibetan Buddhist works. The work gives much interesting information as to the difference between the Mahâyâna and the Hînayâna schools of the Buddhists of the Middle Ages. Nos. 603, 620, 629—Fasc. I, II, III. Total *three* fasciculi.

6. KÂLA MÂDHAVA, edited by Pandit Chandra Kânta Tarkâlankâr, is an astrological treatise by Mâdhavâchâryya, the great commentator of the Vedas, for the determination of the proper time for various rituals of the Hindus. No. 622. Fasc. III. Total *one* fasciculus.

7. KATHÂ SARIT SÂGARA, translated by Mr. Tawney. This work is said to be a metrical abridgment of a much larger prose work entitled Brihat Kathâ by Kshemendra, now lost. The Kathâ Sarit Sâgara was compiled by Somdeva of Kashmir. This fasciculus brings Mr. Tawney's labours to a close. It contains an alphabetical index of proper names and subjects in the work. No. 615, Fasc. XV. Total *one* fasciculus.

8. MADANA PÂRIJÂTA, edited by Pandit Madhusûdan Smritiratna, is a well known digest of Hindu law compiled during the reign of Madana Pâl of Delhi, said in the work to belong to the Kâshṭha dynasty. No. 641. Fasc. I. Total *one* fasciculus.

9. NYÂYA VÂRTIKA, edited by Pandit Vindhyeswari Prasâd Dube, is a commentary on the Vâtsyâyana bhâshya on the aphorisms of the Nyâya school of Philosophy. It was something like a missing link in the long chain of commentaries on the Nyâya Sûtras, and the publication of this rare work will supply a long-felt desideratum. No. 625, Fasc. I. Total *one* fasciculus.

10. MIMA'NSA' DARŚANA, edited by Mahâmahopâdhyâya Maheśhachandra Nyâyaratna, C. I. E., with the bhâshya commentary by Śabara Svâmi, has been finished in the last fasciculus issued. It now only remains to add a preface from the pen of the learned editor to complete the edition. No. 605, Fasc. XIX. Total *one* fasciculus.

11. TAITTIRIYA SAMHITA', or the Samhitâ of the Black Yayur Veda, edited by the same learned editor, with the commentary of Mâdhavâchâryya. This fasciculus brings the work down to the end of the 19th Anuvâka of the 5th Prapâṭhaka of the 5th Kânda. No. 617, Fasc. XXXIV. Total *one* fasciculus.

12. INSTITUTES OF PARA'ŚARA, translated by Pandit Krishna Kamal Bhaṭṭâchâryya, treats of the *Achâra* and *Prâyaschitta* of the Hindus. The work is complete in one fasciculus. No. 611, Fasc. I. Total *one* fasciculus.

13. VARA'HA PURA'ṆA, edited by Pandit Hrishikesh Shástri, is one of the eighteen *Mahápuránas.* It contains an account of the world as given by the *Mahá Varáha* or the Great Boar Incarnation to the goddess Earth, while raising her from the bottom of the sea by means of his immense tusks. Nos. 601, 631, 635, 640, Fasc. I. II, III. IV. Total *four* fasciculi.

14. The AŚVA-VAIDYAKA, a treatise on the diseases of the Horse. Compiled by Jayadatta Súri, edited by Kaviráj Umesachandra Gupta Kaviratna. Nos. 597, 598, Fasc. IV, V. Total *two* fasciculi.

15. CHATURVARGA CHINTA'MAṆI, by Hemádri, edited by Pandits Yogesavara Smritiratna and Kámákhyánátha Tarkaratna, Nos. 607, 621, Fasc. XVI, XVII. Total *two* fasciculi.

16. KÚRMA PURÁṆA, edited by Pandit Nilmani Mukhopádháya, Professor, Presidency College, Nos. 602, 618, 642, Fasc. III, IV, V. Total *three* fasciculi.

17. NIRUKTA, with commentaries, edited by Pandit Satyavrata Sámaśramí. Nos. 613, 626, Vol. IV, Fasc. III, IV. Total *two* fasciculi.

18. S'A'NKHA'YANA S'RAUTA SÚTRA, edited by Dr. Alfred Hillebrandt, Professor of Sanskrit and Comparative Philology in the University of Breslau, Nos. 606, 638, Vol. I. Fasc. IV, V. Total *two* fasciculi.

19. TATTVA CHINTÁMAṆI, edited by Pandit Kámákhyánátha Tarkaratna, Nos. 612, 627, 639, Fasc. VI, VII, VIII. Total *three* fasciculi.

20. UVA'SAGADASA'O, the seventh Anga of the Jains, on the rules of conduct of Jain laymen; edited by Dr. A. F. Rudolf Hoernle. Nos. 614, 644, Fasc. III, IV. Total *two* fasciculi.

21. VIVA'DARATNA'KARA, a digest of laws relating to jurisprudence; edited by Pandit Dinanátha Vidyálankára, Nos. 599, 619, 630, Fasc. V, VI, VII. Total *three* fasciculi.

22. VṚIHANNA'RADI'YA PUR'AṆA, edited by Pandit Hríshikeśa Saśtri, Professor, Sanskrit College, Calcutta, Nos. 600, 632, Total *two* fasciculi.

List of all Societies, Institutions, &c., to which the Publications of the Asiatic Society have been sent during the year, or from which Publications have been received.

* Societies, &c., which have received the Asiatic Society's publications, and have sent their publications in return.

† Societies, &c., which have received the Asiatic Society's publications, but have sent none in return.

§ Societies, &c., whose publications have been received, but to which nothing has been sent in return.

* Allahabad :—Editor, Pioneer.

§ American Philological Association.

* Amsterdam :—Royal Zoological Society.
* Angers :—Société d' E'tudes Scientifiques d' Angers.
* Baltimore :—Johns Hopkins University.
* Batavia :—Society of Arts and Sciences.
§ ——— :—Magnetic and Meteorological Observatory.
* ——— :—Kon. Natuurkundige Vereeniging in Nederlandsch-Indië.
* Berlin :—Royal Academy of Sciences.
§ ——— :—Entomologischer Verein.
† Berne :—Société Suisse d' Entomologie.
§ Birmingham :—Birmingham Philosophical Society.
* Bombay :—Anthropological Society.
* ——— :—Bombay Branch, Royal Asiatic Society.
* ——— :—Editor, Indian Antiquary.
* ——— :—Editor, Times of India.
* ——— :—Natural History Society.
* Boston :—Natural History Society.
* Bordeaux :—L' Académie Nationale des Sciences, Belles-Lettres et Arts.
§ ——— :—Société de Géographie Commerciale.
* ——— :—Société Linnéenne.
* Brisbane :—Royal Society of Queensland.
* Brookville :—Society of Natural History.
* Brunswick :—Verein für Naturwissenschaft.
* Brussels :—L' Académie Royale des Sciences.
* ——— :—Musée Royal d' Histoire Naturelle de Belgique.
* ——— :—Société Entomologique de Belgique.
* ——— :—Société Royale Malacologique de Belgique.
* Buda Pest :—Royal Hungarian Academy of Sciences.
* Buenos Ayres :—Museo Nacional.
* ——— :—Academia Nacional de Ciencias de la Republica Argentina.
* Calcutta :—Agri-Horticultural Society of India.
* ——— :—Geological Survey of India.
* ——— :—Editor, Englishman.
* ——— :—Editor, Hindu Patriot.
* ——— :—Editor, Indian Daily News.
* ——— :—Indian Mirror.
* ——— :—Indian Museum.
† ——— :—Mahommedan Literary Society.
* ——— :—Public Library.
* ——— :—Survey of India.
* ——— :—Tuttobodhini Shova.
† ——— :—University Library.

* Cambridge :—University Library.
* Cassel :—Der Verein für Naturkunde.
* Cherbourg :—Société Nationale des Sciences Naturelles.
* Christiana :—University Library.
* Clinton :—Editor, American Antiquarian and Oriental Journal.
* Colombo :—Ceylon Branch, Royal Asiatic Society.
* Copenhagen :—La Société Royale des Antiquaires du Nord.
† Cuttack :—Cuttack Library.
* Danzig :—Naturforschenden Gesellschaft.
* Dehra Dun :—Great Trigonometrical Survey.
* Dublin :—Royal Dublin Society.
* ——— :—Royal Irish Society.
§ ——— :—Geological Society of Dublin.
* Edinburgh :—Royal Society.
* ——— :—Scottish Geographical Society.
§ ——— :—Botanical Society.
* Florence :—Società Italiana di Anthropologia e di Etnologia.
* ——— :—Società Africana d' Italia.
* Frankfurt :—Senckenbergische Naturforschende Gesellschaft.
* ——— :—Naturwissenschaftlichen Verein.
* Geneva :—Société de Physique et d' Histoire Naturelle.
* Genoa :—Museo Civico di Storia Naturale.
* Giessen : Oberhessische Gesellschaft für Natur und Heilkunde.
* Graz :—Naturwissenschaftlicher Verein für Styria.
§ Hague :—Koninklijk Instituut voor de Taal-Land-en Volkenkunde van Nederlansch-Indië.
* Hamburgh :—Naturhistoriches Museum zu Hamburgh.
* ——— :—Naturwissenschaftlichen Verein.
* Halle :—Deutsche Morgenländische Gesellschaft.
† ——— :—Die Kais. Leopoldinisch-Carolinische Akademie.
* Hamilton :—Hamilton Association (Canada).
* Harrisburgh :—Second Geological Survey of Pennsylvania.
* Havre :—Société de Géographie Commerciale du Havre.
* Helsingfors :—Societas pro Flora et Fauna Fennica.
* ——— :—Société des Sciences de Finlande.
§ Ithaca (U. S. A.) :—Cornell University.
* Königsberg :—Die Physikalisch-Oekonomische Gesellschaft.
* Lahore :—Editor, Civil and Military Gazette.
§ ——— :—Anjuman-i-Panjab.
§ ——— :—Agricultural Society.
* Leyden :—Royal Herbarium.
* Liége :—La Société Géologique de Belgique.

* Liége :—La Société des Sciences.
§ Lille :—Société de Géographie.
* Liverpool :—Literary and Philosophical Society.
* London :—Anthropological Institute.
* ——— :—Editor, Academy.
* ——— :—Editor, Athenæum.
* ——— :—British Museum.
* ——— :—Geological Society.
* ——— :—Institution of Civil Engineers.
* ——— :—Institution of Mechanical Engineers.
* ——— :—Editor, Nature.
* ——— :—Linnean Society.
* ——— :—Royal Asiatic Society of Great Britain and Ireland.
* ——— :—Royal Astronomical Society.
* ——— :—Royal Geographical Society.
* ——— :—Royal Institution.
* ——— :—Royal Microscopical Society.
* ——— :—Royal Society.
* ——— :—Society of Telegraph Engineers.
* ——— :—Statistical Society.
* ——— :—Zoological Society.
* Lyons :—La Société d' Agriculture, d' Histoire Naturelle et des Arts Utiles.
* ——— :—Muséum d' Histoire Naturelle.
* ——— :—Musée Guimet.
* ——— :—La Société d' Anthropologie.
§ ——— :—La Société de Géographie.
† Madras :—Literary Society.
* ——— :—Government Central Museum.
* Manchester :—Literary and Philosophical Society.
§ Melbourne :—Royal Society of Victoria.
* Mexico :—Sociedad Cientifica " Antonio Alzate."
* Moscow :—Société Impériale des Naturalistes.
* ——— :—Imperial Society of Amateurs of Natural Sciences, Anthropology and Ethnology.
* Munich :—K. Bayerische Akademie der Wissenschaften.
* ——— :—Editor, Repertorium der Physik.
* Naples :—Societa Africana d' Italia.
* Netherlands : Royal Society.
* New Haven :—Connecticut Academy of Arts and Sciences.
§ ——— :—American Oriental Society.
* Newport (R. I.) :—Natural History Society.

* Ottawa :—Geological and Natural History Survey of the Dominion of Canada.
* Oxford :—Bodleian Library.
* ——— :—Indian Institute.
* Paris :—La Société de Géographie.
* ——— :—Société d' Anthropologie.
* ——— :—Société Asiatique.
* ——— :—National Library.
* ——— :—Société Zoologique.
* ——— :—Société Académique Indo-Chinoise.
§ ——— :—Institution Ethnographique.
* Philadelphia :—Academy of Natural Sciences.
§ ——— :—American Philosophical Society.
* Pisa :—Società Toscana di Scienze Naturali.
§ Prague :—K. K. Sternwarte.
§ Rio de Janeiro :—Museo Nacional.
* Rome :—Società degli Spettroscopisti Italiani.
§ ——— :—R. Accademia dei Lincei.
* Santiago :—Sociedad Cientifica Alemana.
* St. Petersburgh :—Comité Géologique.
* ——— :—Imperial Library.
* ——— :—Société Impériale Russe de Géographie.
* ——— :—Académie Impériale des Sciences.
* ——— :—Hortus Petropolitanus.
* San Franciso :—Californian Academy of Arts and Sciences.
* Schaffhausen :—Schweizerischen Entomologischen Gesellschaft.
* Shanghai :—North China Branch, Royal Asiatic Society.
* Simla :—United Service Institution of India.
* Stettin :—Entomologischen Verein.
* Stockholm :—Kongl : Svenska Vetenskaps Academiens.
* Sydney :—Royal Society of New South Wales.
* ——— :—Linnean Society of New South Wales.
* Tokyo :—Imperial University of Japan.
* Toronto :—Canadian Institute.
* Trieste :—Società Adriatica di Scienze Naturali.
* Turin :—Reale Accademia delle Scienze.
† Ulwar :—Ulwar Library.
* Vienna :—Anthropologische Gesellschaft.
* ——— :—K. K. Akademie der Wissenschaften.
* ——— :—K. K. Central-anstalt für Meteorologie und Erdmagnetismus.
* ——— :—K. K. Geologische Reichsanstalt.
* ——— :—K. K. Zoologisch-Botanische Gesellschaft.

* Vienna:—K. K. Naturhistorichen Hofmuseum.
* ——— :—Ornithologische Verein.
* Washington:—Commissioners of the Department of Agriculture.
* ———— :—Smithsonian Institution.
§ ———— :—U. S. Army Signal Service.
* ———— :—United States Geological Survey.
§ ———— :—U. S. Coast and Geodetic Survey.
* Wellington:—New Zealand Institute.
* Württemberg:—Natural History Society.
* Yokohama:—Asiatic Society of Japan.
* ———— :—Deutschen Gesellschaft für Natur-und Völkerkunde Ostasiens.
* Zagreb:—Arkeologickoga Druztva.

Abstract of Proceedings of Council during 1887.

January 27th, Ordinary Meeting.

The names of the five Trustees appointed by the Society under the new Indian Museum Act, No. IV of 1887, were furnished to the authorities of the Indian Museum with the information that the present list remained unaffected by the new Act.

On a report from Colonel Waterhouse on the probable cost of printing the Photographs, Maps and Plans connected with Mr. Hoey's report on the excavations and exhumations at Sahet Mahet, the estimate of Rs. 1,050 for executing the work by Collotype, was accepted.

On the recommendation of the President the *Zeitschrift für Ethnologie* was subscribed for.

A letter from Syud Mahomed Karrar Husain enquiring whether the Society would purchase any of the MSS. in his Library, a list of which he forwarded, was referred to Dr. Hoernle and Maulaví Kabiruddin.

The work of supervising the publication of Atkinson's *Lepidoptera*, undertaken by the late Mr. A. Grote, was entrusted to Mr. W. T. Blanford, while the remittance made by the Society for the purpose was made over in deposit to Messrs. Trübner and Co.

Dr. Hoernle submitted a report of his attendance at the International Congress of Orientalists at Vienna on behalf of the Society.

On a proposal by the Secretary that the Society asks for a Charter enabling it to confer the title of *Fellow of the Asiatic Society, Bengal*, upon its distinguished members, it was ordered that the old papers on the question, when it was raised before, be brought out.

On the motion of the President, a resolution was passed " that the Society in its corporate capacity present an address to Her Majesty on

the occasion of the Jubilee, with a suitably bound copy of the *Centenary Review*," and a Sub-Committee, consisting of the President, Mr. Blanford, Mr. Medlicott and the General Secretary, was appointed to carry out the resolution.

An application from Maulaví Abdur Rahim to be allowed to edit the *Álam-árá-i-Abbási* was referred to the Philological Committee.

On a letter from Mr. E. Gay stating that Mr. R. Taylor was willing to present the Society with a set of the Oriental Series of Facsimiles of MSS. published by the Palæographical Society, Mr. Gay was desired to convey the thanks of the Council to Mr. Taylor for his offer, and to inform him that the Society already possessed a set.

The Assistant Secretary was authorized to spend a moderate sum in illuminating the Society's building during the Jubilee celebration.

February 24th, Ordinary Meeting.

On a letter from Dr. H. Haupt the Government of India was asked to place the University of Giessen on the list of institutions to which the Catalogue of Sanskrit MSS. is to be sent.

A copy of the *Vienna Oriental Journal*, a new quarterly publication, edited by the Directors of the Oriental Institute of the University of Vienna, was subscribed for.

The several Committees for the current year were appointed.

Mr. A. Simson and Nawab Abdul Latif Bahadur were appointed to be Members of the Council.

Dr. Hoernle reported that he had resumed charge of the Philological Secretaryship from Mr. Beveridge.

An offer from Maulaví Khudá Baksh, Khán Bahádur, to place Rs. 500 at the Society's disposal towards the publication of a Persian work by himself entitled *Kanzúl Lúbáb fi Márifatil Kútúb i wal Kúttáb*, was declined.

Messrs. Meugens and King were re-appointed Auditors for the year.

March 31st, Ordinary Meeting.

An enquiry from the Honorary Secretary, Executive Committee, Jubilee of the Queen-Empress, whether the Society would wish their address to be forwarded in the casket in which the addresses from public bodies and associations were to be forwarded to Her Majesty, and if so, whether the Society would contribute Rs. 100 towards the cost, was answered in the negative.

At the suggestion of the Natural History Secretary, it was resolved to make a representation to the Government of India pointing out that

little had been done towards a systematic investigation of the Zoology of the Indian Seas in connexion with the survey of the coasts.

A substantial reduction was effected through the Natural History Secretary in the rates charged by the Baptist Mission Press for printing the Proceedings and Journals.

A copy of a reprint, with considerable additions, of the *Sabda Kalpa Druma* was subscribed for.

A new edition of the Library Rules was ordered to be printed.

April 28th, Ordinary Meeting.

On Mr. H. B. Medlicott resigning his seat on the Council on leaving India, Dr. W. King was appointed to succeed him.

An offer from the *Société des Naturalistes de la Nouvelle Russie*, Odessa, for an exchange of publications was declined.

An exchange of publications (Proceedings and Journal, Pt. II,) with the College of Science, Imperial University of Japan, was sanctioned.

An exchange of publications (Journal, Part II,) with the *Naturwissenschaftlichen Verein*, Hamburg, was sanctioned.

An exchange of publications (Journal, Part I,) with the Literature College, Imperial University of Japan, was sanctioned.

An offer from Pandit Haraprasád Shástri to edit the Svyambhu Puráṇa was referred to the Philological Committee, and it was resolved that Professor Cowell be asked to procure for the Society a loan of two MSS., of the work from the Cambridge University Library.

In accordance with the minutes of the Philological Committee, in circulation, Maulaví Abd-ur-Rahím was allowed to withdraw his application to edit the *Alam-Arú-i-Abbási*, and was appointed to edit the *Maásir-ul-Umará* instead.

A grant of Rs. 2,428 was sanctioned for renewing all the decayed beams and burgahs in the roof of the Society's building, and for half-terracing the roof.

Read a letter from Messrs. Trübner and Co. acknowledging the receipt from Mrs. Sterling, executrix to the estate of the late Mr. A. Grote, of the sum of £129-8-9, and forwarding receipts for a further sum of £32-7-9 paid in 1882, together making up the sum of £161-16-6, that had been remitted to Mr. Grote in September last on account of the publication of Atkinson's *Lepidoptera*.

Mr. A. Pedler was appointed Treasurer *vice* Mr. Eliot proceeding to Simla; Mr. Pedler was also appointed a Trustee of the Indian Museum *vice* Mr. H. F. Blanford, proceeding to England.

May 26th, Ordinary Meeting.

An exchange of publications (Proceedings and Journals) including the back numbers from 1866 to 1886, as far as available, with the Zoological and Anthropological-Ethnographical Museum of Dresden, was sanctioned.

An application from the *Verein für Erdkunde zu Leipzig* for an exchange of publications was declined.

On Mr. L. De Nicéville resigning his seat on the Council and on the Natural History Committee, Mr. J. Beames was asked to accept a seat on the Council.

A request from Sirdár Lál Triloki Náth Singh that the Council would be good enough to forward his work on Magic Squares, entitled *Bhuvaneśa-aṇka-prakáśa*, to Her Majesty the Queen, to whom he had dedicated the work, was declined.

A suggestion by General Maclagan whether it would not be an advantage to revert to the former mode of issuing the Journal on a fixed date, containing such papers as were ready, with the Proceedings, instead of dividing the Journal into Parts I. and II., was declined.

A proposal by Bábu Ásutosh Mukhopádhýa to adopt a new rule in connection with the rule 24*a* then under consideration, to the effect that Foreign members who had compounded, on becoming Resident members should, after payment of the usual annual contribution for 5 years, be exempted from any further payment, was declined.

An application from Professor W. H. Lowe, Cambridge, to undertake a translation of the Persian work *Khafi Khán* on a remuneration at the rate of 2 shillings to the rupee was declined; and it was resolved that any proposal to pay for editing and other work done for the Society for the Bibliotheca Indica Series in England, at the exchange of 2 shillings per rupee, could not be entertained.

On the General Secretary reporting the receipt from the Collector under the Land Acquisition Act, of a notice regarding a strip of the Society's land about to be taken up under Act X. of 1870 for widening the foot-path in Park Street, it was resolved that the Secretary appear before the Collector to defend the Society's position in the matter, and to ask for an adequate remuneration to meet the expenses of putting up a handsome iron railing.

June 30th, Ordinary Meeting.

Read a letter from Mr. J. Beames declining the offer of a seat on the Council.

Read a letter from the Secretary to the Government of Bengal acknowledging receipt of the statements showing the receipts and dis-

bursements of the Oriental Publication Fund and the Conservation of Sanskrit MSS., Fund, for 1886, and stating that the Lieutenant-Governor approved of the manner in which the Government grants in aid of the Funds had been applied.

Read a letter from the Collector under Act X. of 1870 (in reply to the General Secretary's letter under Council orders forwarding a claim amounting to Rs. 2,460 on behalf of the Society as compensation for the strip of land required for widening the foot-path in Park Street), stating that the land, &c., had been valued at Rs. 1,641-0-9, and asking whether the Council was willing to accept the valuation: Resolved that the Collector be informed that the Council cannot accept the valuation.

A copy of the *Játaka-málá* or *Bodhisattvávadána-málá*, to be edited by Professor Kern was subscribed for.

An enquiry from Professor Garbe whether he could be paid his honorarium for editing in the Bibliotheca Indica without deducting exchange, was answered in the negative.

July 28th, Ordinary Meeting.

Read a letter from the Surveyor and Assessor to the Calcutta Municipal Corporation (in reply to the General Secretary's letter asking for a reduction on the assessment of the Society's premises) stating that the present assessment could not be disturbed except by the Appeal Bench at the ensuing revision of the assessment of the ward.

An exchange of publications with the *Sociedad Científica Alemana*, Santiago de Chilé, was sanctioned.

Read a letter from the Collector under Act X. of 1870 (in reply to the General Secretary's letter, under Council orders, regarding the amount of compensation for the land required for widening the foot-path in Park Street) stating that he was prepared to pay the Society Rs. 1,819-4-9, and that if this valuation was not accepted, he would refer the case to Court, and take possession of the land in the first week of August: Resolved that the Collector be informed that the Council cannot accept this valuation.

An application from Professor P. Peterson, with the minutes of the Council in circulation thereon, for editing the *Commentary on the Nyáyavindu* by Dharmottaráchárya was referred to the Philological Committee.

On the recommendation of the Philological Secretary an increase of pay to the Pandit, from forty to fifty rupees, as conditionally promised on his appointment, was sanctioned with effect from 1st August.

An estimate from the contractor repairing the building, amounting to Rs. 432-6-8 for replacing another beam subsequently found defective,

for sundry petty repairs, and for hire of tarpaulins was referred to the General Secretary.

On the recommendation of the Finance Committee, Rs. 49-12-0 standing against the name of the late Mr. J. C. Douglas, ordinary member, and Rs. 28 against the name of Col. Godwin-Austen, ordinary member, elected non-subscribing member, were written off.

August 25th, Ordinary Meeting.

An exchange of publications with the *Societa Africana d' Italia*, Naples, was sanctioned.

One copy of *Sástraprakáśa* to be published in monthly parts was subscribed for.

On a representation by the Superintendent, Baptist Mission Press, as to the difficulty of procuring a fresh supply of the colored paper used for the cover of the Proceedings, it was left to the General Secretary to arrange for the present.

Read a letter from the Collector under Act X. of 1870 (in reply to the General Secretary's letter under Council orders) stating that as the total length of wall to be dismantled did not exceed 120 feet instead of being 180 feet as at first stated by him, he was now prepared, after discussing the matter with Dr. Mahendralál Sarkár, to pay the Society Rs. 2,116 in satisfaction of all claims: Resolved that the Collector's offer be accepted.

On an application from the Provincial Museum Committee, Lucknow, for copies of certain publications of the Society, and requesting that the Secretary of the Provincial Committee be reckoned as a member of the Society, it was ordered that the publications of the Society, as far as available for presentation, be given, and that the Secretary be informed that the rules of the Society did not admit of his request as regards membership being granted.

Professor P. Peterson was appointed to edit the *Commentary on the Nyáyavindu* by Dharmottaráchárya.

A letter from Dr. Hoernle enquiring whether advertisements, other than those of the Society's own publications, can be inserted in the Society's publications, was referred to the General Secretary for enquiry as to rates.

October 6th, Ordinary Meeting.

On an application from Professor Aufrecht for the loan for three months of the Sanskrit MS. *Kshírataranginí* in the Government Collection, which he wished to examine to try to elucidate some obscure points in the *Dhátupátha*, it was ordered that the cost of making a copy of the MS. be ascertained.

Read the minutes of the members of the Council, in circulation, relating to the erection of an iron railing to replace that portion of the wall of the Society's premises to be dismantled by the Municipality. The General Secretary also submitted four tenders with designs received in answer to an advertisement for putting up 160 feet of iron railing and a pair of iron gates. Resolved that it would be desirable to extend the railing along the entire frontage, and that a Sub-Committee consisting of Colonel Waterhouse, Mr. Pedler and the General Secretary, be appointed to make the best possible arrangements to secure this.

Read the minutes of the Philological Committee, in circulation, on a memorandum by Mr. Beveridge on the following points: (*a*) that an Index should be prepared to Major Raverty's translation of the *Tabaqát-i-Násiri* (*b*) that the preface to the text of Khafi Khán had never been written and (*c*) that there are errors in Professor Lowe's translation of the *Muntakhab-ul-Tawárikh.*

Read the minutes of the Philological Committee in circulation regarding the purchase of a complete set of Block-prints of the Tibetan *Tangyur* in 225 volumes at a cost of Rs. 3,000, including cost of carriage from Tibet. Resolved that the Government of Bengal be applied to for half the purchase money, and for permission to meet the second half out of the Oriental Publication Fund.

On the minutes of the Philological Committee, in circulation, Colonel Jarrett was asked to undertake a translation of the *Aín-i-Akbari* at the rate of Rs. 3 a page.

The Treasurer reported the receipt of a cheque for Rs. 2,116 from the Collector under Act X of 1870 for the strip of the Society's land taken up at the cost of the Municipality for widening the foot-path in Park Street, being the amount of compensation accepted by the Council.

On the motion of Nawab Abdul Latif, a Sub-Committee was appointed to examine and report on the damage said to have been caused to some of the MSS. by damp during the repairs.

October 27th, Ordinary Meeting.

An exchange of publications (Proceedings) with the *Sociedad Cientifica "Antonio Alzate,"* Mexico, was sanctioned.

Read the minutes of the Philological Committee, in circulation, on a memorandum by Mr. Beveridge pointing out defects in the arrangements for publishing text editions of Persian works in the Bibliotheca Indica.

Read the minutes of the Philological Committee on the question of the publication of the text of the *Riyáz-ush-Salátin* by Ghulám Husain.

On the report of the Philological Secretary as to the cost of making a copy of the *Kshírataranginí* it was ordered that a copy be made and carefully examined.

Read the report of the Sub-Committee appointed to arrange for the erection of an iron railing along the frontage of the premises: also a letter from Messrs. Mackintosh, Burn and Co. offering to erect an iron railing with two pairs of iron gates, a new Durwan's lodge and the necessary carriage road-way, in exchange for a piece of land facing Chowringhee Road, containing about six and a half cottahs: Resolved that Messrs. Mackintosh, Burn and Co.'s offer cannot be entertained; and that complete estimates for the railing with one and with two pairs of gates respectively, together with a memorandum showing the funds available, be drawn up.

Read the report of the Sub-Committee appointed to enquire into the damages to the MSS. through damp, to the effect that the damages were slight.

On an application from Babu Sarat Chandra Dás that the Lama Sherab Gyatso, who was coming to Calcutta to aid him in the compilation of a philosophical and technical dictionary of Tibetan, may be permitted to reside in the Society's premises for three months, permission was given, if a suitable place was available.

November 24th, Ordinary Meeting.

A set of Photographs from the Paintings at Ajunta, executed between March 1882 and February 1884 was received from the Government of India.

Colonel Jarrett expressed his willingness to undertake the translation of the *Aín-i-Akbari* in continuation of that by the late Mr. Blochmann.

A copy of a French-Arabic Dictionary by E. Gasselin, Consul General for France, was subscribed for.

A copy of the *International Archives für Ethnographie* to be published under the auspices of the Musée Nationale d' Ethnographie de Leide, was subscribed for.

A copy of the *Prithirája Rásau*, edited by Pandit M. L. Pandia, was subscribed for.

Read a letter from the Surveyor and Assessor to the Municipal Corporation (in reply to the General Secretary's letter asking for a reduction) stating that the assessment of the Society's building had been reduced from Rs. 400 to Rs. 350 per mensem, with effect from the current quarter.

Read the minutes of the Council in circulation on the question of

the erection of an iron railing: also, the General Secretary submitted an estimate by a Contractor for Rs. 4,348 for putting up an iron railing, two pairs of gates, a Durwan's lodge, and making a new carriage roadway: Resolved that the Treasurer and the General Secretary be empowered to contract at a rate not exceeding the above sum for the whole work, as detailed.

Maulaví Abd-ul-Haq Abid was appointed to edit the text of the *Riyáz-ush-Salátin*, by Ghulám Husain.

Professor Cowell's proposal to prepare a translation of *Khafi-Khan* was sanctioned.

Pandit Haraprasád Shástri was appointed to edit the *Brihaddharma Puráṇa*.

Babu Sarat Chandra Das was appointed to edit the *Bodhisattvávadána Kalpalatá* in Sanskrit and Tibetan.

A MS. of the *Riyáz-ush-sh'uará*—a history of Persian Poetry (incomplete) was purchased.

An examination of the beams and burgahs on the ground floor was ordered.

December 29th, Ordinary Meeting.

An exchange of publications with the Linnean Society of New South Wales was sanctioned.

A copy of a forthcoming work by Dr. E. Bonavia on the cultivated Oranges and Lemons of India and Ceylon was subscribed for.

An offer from the *Club de Engenharia* of Rio de Janeiro for an exchange of publications was declined.

A copy of a forthcoming work entitled *Récherches Anthropologiques dans le Caucase*, was subscribed for.

On a letter from Mr. F. E. Pargiter offering to resign the work of translating the Márkandeya Puráṇa, on the ground that he would be unable to furnish annotations as pointed out by the Philological Secretary, it was resolved that Mr. Pargiter be asked to publish a translation without notes.

The University of Breslau was placed on the list of institutions entitled to receive the Bibliotheca Indica publications.

The General Secretary reported the result of his enquiries as to the rates charged for advertisements by other publishers.

The Contractor's Bill for Rs. 2,428 as sanctioned in April last, was passed.

The following amounts were ordered to be written off:—Rs. 9, standing against the name of the late Babu Girijábhusan Mukherji, ordinary member: Rs. 90 and Rs. 77 standing against the names of

Sirdar Gurdyál Singh and Mr. A. E. Medlycott, respectively, ordinary members, defaulters under rule 38.

A letter of condolence on the illness of Dr. Rájendralál Mitra was sent to his son.

The Report having been read the President invited the Meeting to put any questions or offer any remarks which any member might think necessary in connection therewith.

No remarks having been offered the President moved the adoption of the Report. The motion was unanimously carried.

The PRESIDENT then addressed the Meeting as follows:

Address.

The Society.—In the explanation of the affairs of the Society, read by our General Secretary, you will find a full account of the manner in which the trust committed to us by you has been managed during the past year. We have again to state that our income just about balances our expenditure, and this is a matter for congratulation, since the quantity of our publications has been more than the average, and, I am glad to say, has also kept up to the high standard attained by the Society's Journal. Before reviewing the work accomplished during the year, it affords me great pleasure to again bring to your notice the valuable services rendered by the officers of the Society. Mr. H. M. Percival, the General Secretary, Mr. J. Wood-Mason, the Natural History Secretary, Dr. Hoernle, the Philological Secretary, Mr. J. Eliot and Mr. A. Pedler as Treasurers, have all devoted themselves to the work entrusted to them with the result that you may rest assured that your affairs are well administered. I would ask you therefore for a vote of thanks to the office-bearers mentioned for their voluntary services during the year 1887. *(Carried unanimously.)*

Obituary.—Year by year we have to announce the loss of members who have been active contributors to the Society's Journal or who have aided its objects in other ways. The obituary for 1887 records the deaths of the Honourable Sir Ashley Eden, Colonel G. C. De Prée, Mr. J. C. Douglas, Mr. T. G. H. Moncrieffe, Lieut.-Col. T. C. Plowden, and Bábú Girijábhúsan Mukharji. I need not recall to your minds the services of Sir Ashley Eden, for there is hardly any important institution or public movement in Bengal during the last thirty years with which he had not been more or less connected. Mr. J. C. Douglas is known to you for his paper on Indian bees; and his efforts in attempting the acclimatisation of Italian bees in India. I have also to record the

death of Bábú Rámdás Sen of Murshidabad, known for his work on Indian antiquities entitled *Aitihásik Rahasya*, and his fine collection of manuscripts. Also of Bábú Rákhál Dás Háldár, whose edition of the *Nága Vaṃsávalí* of Benírám, a poet of Chuṭiyá Nágpur, and papers on the ethnology and antiquities of that District, form valuable contributions to our knowledge of a little known tract.

Publications :—Journal.—For the first part of our Journal which is, as you know, devoted to philology and literature, we have had, during the year 1887, a number of papers which have either already been published or will appear during the current year. Amongst them is one on the 'Ṣafwí dynasty of Persia' by Mr. E. E. Oliver; Kashmírí riddles by the Rev. J. H. Knowles; the 'era of Lachhman Sen', and 'the Mother of Jahángír' by Mr. H. Beveridge; 'Materials for a literary history of India' by Mr. G. A. Grierson; 'On the couplets or '*baits*' on the coins of Sháh Núru-d-dín Jahángír' by Mr. C. J. Rodgers, and, by the same author, some critical remarks on the notes on the coins mentioned by Major Raverty in his translation of the *Ṭabaqát-i-Náṣirí*. Bábú Sarat Chandra Dás gives an interesting digest of the Tibetan work on geography called the *Dsam Ling Gyesha*, and another on 'the sacred and ornamental characters of Tibet.' Dr. Führer publishes three grants of Govindachandra Deva of Kanauj, dating from the twelfth century, and also the Kudarkhoṭ inscription of Takshadatta, and Dr. Rájendralála Mitra, a donative inscription of Vidyádhara Bhanja, an Orissa Raja. We have papers on the ruins at Nagarí in Mewar by Kaviráj Syámal Dás, describing a tower mentioned by Tod as 'Akbar's lamp': on Buddha's Shadow-cave near Prabhása by Mr. Cockburn: on the excavated temple at Núrpur in Kángrá by Mr. C. J. Rodgers: on the city of Hirát, by Captain Yate, and on ancient mounds in the Quetta district by Major J. F. Garwood, R. E. Mr. W. H. P. Driver, also, has given us ethnological notes on the Asuras, Bírijiyás, Bír'hors and Khariyás, aboriginal tribes of the Chuṭiyá Nágpur division.

In Part II of the Journal, we have a paper on the mammals and birds collected by Capt. Yate during his service with the Afghán Boundary Commission, prepared by Dr. Scully, and also one on the Chiroptera of Nepál by the same writer. Mr. J. Baly describes a new phytophagous coleopteron found feeding on rice in the Chittagong district, and Mr. E. T. Atkinson continues his notes on Indian Rhynchota, the third part of the catalogue of species falling under the sub-order Heteroptera having been read. M. E. Simon gives us two valuable papers on the *Arachnida* of the Indian Museum collected in Tavoy and the Andamans. Dr. G. Giles has two others on *Amphipoda* from the Bay of Bengal; Mr. Wood-Mason, one on a new crustacean belonging to the

Brachyurous family *Rananidæ;* and Mr. E. J. Jones one 'on nodular stones dredged from 675 fathoms of water off Colombo.' All these last are chiefly based upon materials furnished by the Marine Survey party under Commander A. Carpenter, R. N., who himself gives a paper 'on the mean temperature of deep sea waters in Bengal.' Mr. Elson, of the Pilot service, has a paper 'on observed changes in the density of sea-water coincident with and due to aerial disturbances, and consequent alterations of baric pressure over adjacent sea areas.' Mr. H. F. Blanford gives an interesting and suggestive paper 'on the Influence of Indian forests on rain-fall,' and Dr. Prain brings to notice the hot-springs of the Namba forest. Dr. G. King, F. R. S., has three papers on new species of *Ficus* from New Guinea and Sumatra, and the species of *Loranthus* indigenous to Perak, and Dr. Barclay one on the commoner uredines of the neighbourhood of Simla. Bábu Aśutosh Mukhopádhyáya contributes four valuable mathematical papers, on the differential equation of a trajectory, Mongé's differential equation to all conics, and on plane analytical geometry, nor must I omit to mention Dr. Scully's paper on the effects of bismuth on the ductility of silver, which has been reprinted at home in the '*Chemical News*,' and that on neolithic and palæolithic finds in Southern India, by Mr. R. B. Foote.

In the *Proceedings*, the discussion on the term '*Ekotíbháva*' opens with a letter from Professor Max Müller, in which he practically concurs in the view held by Dr. Rájendralála Mitra as to its meaning. Contributions to the subject were subsequently made by Bábú Sarat Chandra Dás, from Tibetan sources, as to the derivation, and also by Mr. F. S. Growse, and Dr. Hoernle. Pandit Maheśachandra Nyáyaratna has some notes on the authorship of the Sanskrit drama *Mṛichchhakaṭiká*, popularly ascribed to Rája Śúdraka, but by Professor Pischel to Daṇḍin, a poet who lived in the seventh or eighth century of our era. Dr. Mitra also gives a notice of Mandlik's edition of Manu with the seven commentaries, and Dr. Hoernle, an account of the seventh Oriental Congress held at Vienna in 1886. Amongst the other minor papers of importance, mention may be made of Mr. H. F. Blanford's note on the rain-fall in the Carnatic, Mr. E. T. Atkinson's note on an insect destructive to rice in the Tinnevelly district, and descriptions of four insects belonging to the genus *Chrysocoris*, Hahn, which are new to science; and Mr. de Nicéville's description of a new satyrid. In addition, we have the usual reports on the coins added to the Society's cabinet, which, however, do not contain much of novelty, and notes on some inscriptions which are of little more than local interest, as well as remarks by the Rev. T. Tracy on Pandyan coins, and a communication from Col. Biddulph on rock-cut caves in Chitrál. Altogether the work of the year as shown in our Journal and Proceedings is a fair result for voluntary effort in India.

Bibliotheca Indica.—Fifty-two numbers of the *Bibliotheca Indica* series were issued during the year, of which 35 belong to the Sanskrit division and 17 to the Arabic-Persian division. The former represent eighteen separate works, and the latter four, including an index to the third volume of the *Akbarnámah*. We have sanctioned, during the year, the publication in the Sanskrit series of the text of the Sanskrit Buddhist work Dharmottarácháryа's commentary on the *Nyáyabindu*, to be edited by Professor Peterson, and the *Bṛihad Dharma Puráṇa* to be edited by Pandit Hara Prasáda Sástrí, also the *Bodhisattvávadána Kalpalatá* with a Tibetan version, of which I shall have more to say hereafter. In the Persian series, we have arranged for a translation of the remainder of the *Áín-i-Akbarí* by Colonel Jarrett, so well begun by the late Professor Blochmann, and of the *Muntakhabu-l-Lubáb*, better known as the *Tarikh-i-Kháfi Khán*, by Professor Cowell; the text and a translation of the *Riázu-s-salátín* by Maulaví Abdul Hak Abid jointly with Dr. Hoernle; and the text of the *Ma'ásiru-l-Umará* edited by Maulaví Abdur Rahím, of which four fasciculi have already appeared. There are, however, still some twenty works for which sanction has been given, but which have not yet been taken up, and ten of which no part has issued during the past year.

Tibetan literature.—Last year, I stated that steps had been taken to furnish aids to those who might be disposed to undertake the study of Tibetan, and I now have the very great pleasure of placing on the table the first fasciculus of the first Tibetan manuscript printed in India, due to the energy and industry of our member, Bábú Pratápa Chandra Ghosha. I trust that it may be the pioneer of a long series of Tibetan issues from our *Bibliotheca*, opening up a new field of great philological and literary interest which has too long been left neglected. The fasciculus before you contains the commencement of the '*Shes-rab-kyi—pha-rol-tu-phyin-pá*' (by contraction '*Sher-phyin*' and pronounced '*Sher-chin*'), which is itself a translation made in the ninth century, into Tibetan, from the Sanskrit of tho Buddhistic work entitled *Prajñá-páramitá* forming, according to Csoma de Körös, the second division of the *Ká-gyar*, or Tibetan *Tripiṭaka*, a collection of the sacred books of Tibet, translated from the Sanskrit, and comprising one hundred volumes. There are, however, twenty-one volumes in this division, of which twelve comprise the *Sher-chin* of 100,000 *ślokas*. Of the remainder, eight volumes form abridgements of more or less authority of the *Sher-chin* itself, the first being the 20,000 *ślokas* abridgement, containing however the equivalent of 25,000 *ślokas*, the next that of 18,000 *ślokas*, the third that of 10,000, and the last that of 8,000, the Sanskrit text of which, under the name *Ashṭasáhasriká Prajñápáramitá*, is now being brought out for us in the

Bibliotheca by Dr. Rájendralála Mitra. This last is taken from Nepálese manuscripts, and three fasciculi have appeared in 1887. It is also the first work of its character printed in India, nor has any edition or translation of it ever been made or attempted, to the best of my knowledge, in any European country. The last volume of the series is entitled the *S'na-ts-hogs*, or 'the miscellany,' and comprises treatises of the *Sútra* class explanatory of the preceding volumes. The Society has undertaken the publication of the 100,000 *ślokas* Tibetan text, and, as already stated, since there is only the one impression available, the efforts of the editor will be devoted to faithfully reproducing the text as it stands, leaving it to others hereafter with better materials to make such corrections as will doubtless be found necessary, for there are evident traces of mistakes made by the engraver. It may be possible also to omit many of the tedious repetitions with which the work abounds.

The entire work is in prose, and forms twelve volumes, comprising 303 divisions (*bam-po*), each containing 300 *ślokas*, or rather their equivalent in prose, and occupying each about twenty-one leaves of the block print. In preparing the work for the press, Bábú P. C. Ghosha has separated the several words by spacing them out, and has also arranged the sentences in paragraphs for more easy reference, and, only so far, has not followed the original, which gives neither divisions nor paragraphs. The numbering of the pages in the original is also reproduced in the body of the text now printed. The *Sher-chin* is devoted to Buddhistic philosophy, theoretical and practical, and, as stated by Csoma de Körös, contains the psychological, logical, and metaphysical terminology of the Buddhist faith without entering into or reconciling conflicting views on any particular subject. There are 108 subjects or *dharmas*, regarding which, if any predicate be added to them, affirmative or negative judgments may be formed. All these contain the substance of the teachings of the great teacher himself delivered on the Gṛidhrakúṭa hill at Rájagṛiha in Magadha. To the student of the earlier systems of philosophy and religion in India, the *Sher-chin* should be of much interest, for a Buddhistic philosophical work is very uncommon in India, and most of the information that we possess on the subject is at second-hand and comes through those who hated the very name of Buddhist.

In continuation of the same project, our Associate Member, Bábú Sarat Chandra Dás, is bringing out for the Society a hitherto unpublished work by the poet Kshemendra, entitled *Avadána Kalpalatá*, of which we have the complete Sanskrit with an interlinear Tibetan version in a manuscript recently acquired from Tibet. It is intended to publish the Sanskrit and Tibetan texts in parallel columns, the

first fasciculus is in the press, and I place on the table the proofs of the first few pages. The manuscript is in verse, and was translated into Tibetan by Lochava Shoñton Dorje and the Indian pandit Lakshmíkara at the *vihára* of Gedun Shidé in Mañyul under the orders of Ponchhen Shakya Ssañpo, ruler of Tibet in 1279 A. D. The blocks from which the print used was taken were engraved by the direction of the Dalai Lama Nágwañ Lossañ in 1645 A. D. The work consists of 108 *pallavas*, of which 107 were written by Kshemendra and one by his son Somendra. The copies hitherto procured and now deposited in our library and that of the Cambridge University are imperfect, containing only the second part of the work, and a fragment of the first, so that the publication of this Sanskrit and Tibetan version of the entire poem will restore to India a portion of a valuable Buddhistic work that has been lost to it for over five hundred years. Kshemendra is said to have been the court poet of Ananta, Rájá of Kashmír, and undertook the work at the instance of his Buddhist friend Nakka. It is a veritable store-house of the legends as to Buddha's life and acts according to the Mahâyâna school of Northern Buddhism, and is written in a simple, elegant style, quite free from the turgid verbosity and tedious repetition usually characteristic of Buddhist Sanskrit works. The arrangement of the original and Tibetan version in juxtaposition should give an impetus to the study of classical Tibetan and afford an accurate basis for further research.

In my address last year, it was brought to your notice that Bábú Sarat Chandra Dás was also engaged upon a vocabulary of Tibetan Buddhistic terms. Since then he has procured several manuscript dictionaries in Sanskrit-Tibetan and Tibetan-Sanskrit, and it is now proposed, if it can be arranged, to compile a comprehensive Tibetan-Sanskrit-English dictionary, with an appendix containing the Sanskrit-English portion with a reference to the Tibetan equivalent. This work when completed should serve as a key to the great collections of manuscripts in St. Petersburgh, Paris, and London which written, as they are, in classical Tibetan require more aid to understand them than is afforded by the dictionaries of Csoma de Körös and Jäschke. It is not unreasonable to expect from the works, now in progress under your auspices, a flood of light on the history of northern Buddhism, regarding which our knowledge at present is so mixed with conjecture. Learned Indian Buddhist pandits travelled to Tibet and communicated to the Lochavas there the received interpretation of the phrases and terms used which were subsequently embodied in the dictionaries prepared in Tibet, and found in the B*stan-hgyur* (M*do* class, *Go* volume), so that we, perhaps, could not reasonably expect a more authoritative interpretation than

that afforded by these manuscripts.* It should be a subject of congratulation to this Society that as it was the first in the field in bringing to the notice of European scholars the Sanskrit literature of India, it is again the first to open up this new source of knowledge, clearing away yet another cloud from the mists overhanging the history of the dark middle ages of India. I would also notice that the catalogues of the Burmese and Tibetan manuscripts belonging to the Society have been completed, the first has been prepared by Moung Hla Oung, and the second by Bábú Pratápa Chandra Ghosha.

Notices of Sanskrit MSS.—The 'Catalogue of Sanskrit manuscripts,' edited by Dr. Rájendralála Mitra, has reached its twenty-second number during 1887. This contains 160 pages with notices of 183 manuscripts, making the total of notices in this series amount to 3072. As already observed, this great mass of material requires collation and consolidation with the similar work undertaken in the other Provinces of India.

Work outside the Society.—Following the practice adopted last year, I purpose very briefly to review the work done outside the Society, and to bring to your notice matters that may interest you as bearing on the objects which the Society itself has in view. My time during the year has been so fully occupied by my official duties that I have not been able to keep myself so well acquainted as I should wish with the progress of research, but, thanks to the kindly aid of my colleagues,† I shall endeavour to tell you something of what has been done to advance our knowledge during the year 1887.

Survey of India.—Most of the operations of the Survey of India during the past year have been devoted to remunerative work as distinguished from purely scientific investigation. Parties have been engaged on the Revenue Survey of Akyáb and Bassein in Burma; parts of Orissa and Dinájpur in Bengal; Gorakhpur and Bastí in the N. W. Provinces; Jabalpur, Biláspur, Ráipur, Sambhalpur, Ságar, Narsinghpur, Damoh, Seóni, and Chhindwára in the Central Provinces; Muzaffarpúr, Gurdáspur, Amritsar, and Sháhpur in the Panjáb, and Darrang in Assam, besides Topographical and Forest surveys in Madras and Bombay, and a 50-feet to an inch survey of Calcutta. In many districts, the survey is cadastral with a record of rights. The Baluchistán parties have done a considerable amount of large-scale work around Quetta and towards the Khwája Amran range, and are now engaged on the half-

* See As. Res. XX, p. 393, 1836: Journ. I, p. 375, 1852.

† I beg to particularly record my obligations to Dr. G. King, Dr. W. King, Dr. Burgess, Dr. Barclay, Mr. Eliot, Mr. H. Risley, and Colonel Thuillier; also to the Secretaries for aid in passing these pages through the press.

inch survey of that province. The Himálayan party has been working under Colonel Tanner towards Kulu, and the Andaman party has completed the survey of the coasts of the Nicobars.

In Burma, Captain Hobday, R. E., has been able to get through a large amount of work around Mandalay and towards Thebaw in the Shán States, whilst Colonel Woodthorpe, R. E., has connected his triangulation, carried down the Kyindwin from Manipur, with that of Captain Hobday around Mandalay. The latter officer and Mr. Kennedy have also surveyed portions of the Ruby Mines district. Colonel Woodthorpe, in the early part of 1887, explored the Kubo valley and the basin of the Yeu river, visiting Paungbyin on the Kyindwin and Thaungdut. A special officer has been employed in taking astronomical observations for latitudes from Jabalpur southwards towards Madras, and a party has extended a series of secondary triangles northwards from Madras, over a distance of 170 miles, to fix beacons and the position of prominent land-marks, for the Marine survey. Tidal observations have been taken at seventeen posts by self-registering guages, and lines of spirit levels are being carried from these posts connecting them with the nearest triangulation stations. During the year, Tuticorin was thus connected with Erode, Negapatam with Trichinopali and Cochin, and Marmagoa with Shoránur and Kárwár. The reports and maps of the explorations of the surveyor M—H to the North of Nepal have appeared, but those of R—N in eastern Bhután, are not ready, and have not yet been issued in India.

Royal Geographical Society.—The *Proceedings of the Royal Geographical Society* contain as usual a number of papers that deserve our attention, and amongst them a prominent place must be given to those relating to Tibet and Central Asia. We have here notes of the progress made from time to time by the French travellers M.M. Bonvalot and Camus, who, after suffering much hardship in their adventurous journey across the western highlands from Samarkand, arrived safely in Simla in September last, by way of Chitrál and Gilgit. In Major-General Sir H. C. Rawlinson's article on 'the Dragon lake of Pámír', we find that he has discovered, from Mr. Ney Elias' account of his remarkable journey from the neighbourhood of Yengi-Hissar to Shighnán, that the route taken by that traveller is none other than the famous trade-route used by the caravans of Rome passing from Baktria along the 'Vallis Comedarum' to the Stone-tower on the border of Chinese territory; and, also, there is reason to believe that it is the same as that used by the great Chinese traveller Hiuen Tsiang in the seventh century. It would appear that there has been some confusion in the Buddhist ideas of geography, in making the Rang-kul, a lake on this route, one with the

Mánasarovara to the north of Kumaon, and attributing to it the name usually given to the Rákhas Tál, to the west of and close to the Mána lake. We have also an account of the journeys made by Captains Maitland and Talbot in Afghánistán, during which the Hirát triangulation has been carried to Bámián, and connected with points in the immediate neighbourhood of those fixed by the Kábul triangulation, a total area of about 9000 square miles having been surveyed and reconnoitred on the one-eighth inch scale. Nor should I omit to mention the survey work done by Colonel Woodthorpe, R. E., with the Gilgit Mission, covering some 10,000 square miles of the important and little-known districts of Yasin, Chitrál, Hunza-Nagar, and Wákhán and to complete which with General Lockhart he has been deputed to England.

Major C. R. Macgregor describes a journey made by himself and Colonel R. G. Woodthorpe from Sadiyá, on the upper waters of the Brahmaputra, to the Kampti Shán region, on the western branch of the Iráwadi. The expedition passed through a country inhabited by Kamptis or Sháns, Singphos or Kákhyens, Mishmis, Nágas and Kunnungs, and visited several of their villages including Lungnu and Padao. Another paper on the same region is that by General J. T. Walker, R. E., on the question whether the Lu river of Tibet is the source of the Iráwadi or of the Salwín. It gives a summary of our existing knowledge on the subject and an interesting discussion, the general result leaning towards the belief that the Lu-chu of Tibet forms the principal source of the Iráwadi. This is in its present stage a matter of purely speculative geography which will doubtless soon find a solution when affairs in Burma become a little more settled. We have also a brief notice of M. Potanin's lecture on his travels through North-Western China and Eastern Tibet, and a paper by Mr. H. E. M. James, giving a detailed account of his travels in Manchuria. Mr. E. D. Morgan's *resumé* of Russian geographical work in 1886 tells us of much that has been accomplished by the St. Petersburgh Geographical Society, and in military topographical work by officers of the staff-corps and corps of military topographers in Asiatic Russia and Bokhára.

Mr. A. D. Carey's very modest account of his journey with Mr. Dalgleish round Chinese Turkistán, and along the northern frontier of Tibet, tells of an achievement second to none accomplished of late. Travelling from India by Leh, he crossed into Tibet by way of Polu and Kiria to Khoten, thence keeping the line of the Yurangkash river to Sháhyár, he struck the Tárim and followed it up to Lob Nor. Proceeding thence in a south-easterly direction, he skirted the great mountain ranges forming the northern boundary of the Tibetan highland, known as the Altun and

Kuen-lun, to Naichi. Here he was obliged to commence his homeward journey, which he effected by Sachu, Ghainshé, Hami, Turfán, Kuchár, and Yárkand to Leh, thus completing the circuit of Chinese Turkistán. Much of this route lay over country never visited hitherto by a European and not likely to prove attractive in the future. As Mr. Carey writes: 'the chief characteristic of the country is its extreme poverty: it may be described as a huge desert fringed by a few small patches of cultivation.' The paper is accompanied by a map prepared by Colonel Haig, R. E., from Mr. Dalgleish's notes. We have also an account of Prejevalsky's recent journeys and discoveries in Central Asia by Mr. E. D. Morgan, and we may shortly expect the first instalment of the traveller's own work on his last and perhaps most important expedition.

The Paris Geographical Society's Proceedings have a number of papers on the French possessions in Tongking, amongst which mention may be made of those on the Mekong river and the tribes inhabiting its banks, by M.M. Gouin and L. de Mazenad. In the '*Missions Catholiques*' there is a useful map of the lower Mekong, compiled by the missionaries, and in '*Excursions et Reconnaissances*,' a paper by M. Aymonier on Annam, the country and people. We should also obtain some valuable information from M. Dutreuil de Rhin's forthcoming work on Tibet. The Berlin Geographical Society has the substance of a lecture delivered by Dr. F. Sarasin of Basle on the lengthened visit paid by him and his brother to Ceylon, during which they appear to have thoroughly investigated the physical and ethnological phenomena of the island. '*Globus*' has a series of articles on Merv and Prejevalsky's travels, and '*Das Ausland*,' a short notice of a pilgrimage to Jagannáth. The Parliamentary blue-book containing the 'Correspondence respecting the affairs of Central Asia' is furnished with maps which add much to its value, as it is presumed that they contain the latest information available from the records of the Survey, and, for those who are curious in this matter, the Russian official account entitled 'Délimitation Afghane. Négociations entre la Russie et la Grande Bretagne, 1872-85,' lately published by the Russian Foreign office, gives the other side of the question. I must also mention Keane's 'Geography of the Malay peninsula, Indo-China and the Eastern Archipelago, Philippines and New Guinea,' and Dr. Bastian's 'Indonesien oder die Inseln des Malayischen Archipels.'

Indian Antiquary.—The *Indian Antiquary* upholds the high place that it has deservedly taken, and I have again to record the continuation of Mr. Fleet's 'Sanskrit and old Kánarese inscriptions' (Nos. 168-171), and, by the same writer, papers on the date of the poet Rájáśekhara, and on the Gupta era. Professor Kielhorn continues his notes

on the *Mahábháshya*, and gives an inscription of Yakshapála from the Sati Ghát in Gayá, and fresh readings of three Chandela copper-plate grants which have already appeared in our Journal, two edited by Mr. V. A. Smith,* and one by Dr. Rájendralála Mitra.† They are dated in the end of the tenth and the beginning of the eleventh century, and were inscribed by order of Dhangadeva, Devavarmadeva, and Madanavarmadeva, Rájás of Kalanjara. Mr. Howorth continues his valuable series of papers on Chingiz Khán and his ancestors, and the Rev. S. Beal has a paper on Nágárjuna Bodhisattwa and the King Shatopahanna. Pandit Bhagwán Lál Indrají gives an account of the Sirpur (Khandesh) grant of Maháráját Rudradása, and Mr. Logan contributes to the discussion of the vexed question of Sankaráchárya's date which, from all that has been written, may be placed at the end of the seventh and beginning of the eighth century of our era. A feature of the year's issue is the collection of folk-lore from Southern India by Pandit S. M. Nateśa Sástrí, from Western India by Putlibai D. H. Wadia, Salsette by G. F. D'Penha, and Kashmír by the Rev. J. H. Knowles.

Indian Notes and Queries.—With the *Indian Antiquary* may be mentioned '*Indian Notes and Queries*,' edited by Captain Temple and a competent staff. It admits short notices and articles, questions and answers to those questions, on all points connected with the physical and ancient geography, antiquities, history, fauna and flora, or products of India; or with its people, their history, distribution, languages, castes, customs, trade, and occupations. In fact, everything connected with India is admitted, except politics and religious topics of a controversial character. This periodical fulfils a distinct purpose, somewhat similar to that of its English namesake, and should be acceptable to the members of this Society as a useful adjunct to its own publications. Another interesting serial, also edited by Captain Temple, is the '*Legends of the Panjáb*,' which is intended to give the exact words used by the narrators themselves with a running translation and notes in explanation where necessary. Of this work two volumes have been published, and the third is under issue.

Other Journals.—The last number of the Journal of the *Bombay Branch of the Royal Asiatic Society* is taken up with Professor Peterson's third report on the Sanskrit manuscripts collected by him for Government, or catalogued as occurring in the Western Presidency, of which, also, a notice by Professor Bühler appears in the *Vienna Oriental Journal*. Attention may be drawn to the account of the Buddhist Sanskrit manuscript by Dharmottaráchárya, which is to be published for this

* xlvii, (1), p. 81, 84.

† *Ibid*, p. 73.

Society. The '*Madras Journal of Literature and Science*' contains papers by the editor, Captain R. H. C. Tufnell, on 'Hints to coin-collectors in Southern India,' by the Rev. M. Phillips, 'on the cosmogony of the Vedas,' and the text and a translation of a Pallava inscription from Amarávatí, by Dr. Hultzsch. We have not received anything from the *Ceylon Branch* of the Asiatic Society during the year, but in the *Journal of the Straits Branch of the Royal Asiatic Society*, there are some papers of interest to us in India. One is an English-Sulu-Malay vocabulary, another is 'on roots in the Malay language,' by Dr. Pijnappel, and a third is Mr. E. M. Satow's paper on the bibliography of Siam. I would also notice the second series of 'Miscellaneous papers relating to Indo-China' edited by Dr. R. Rost, which have been reprinted for the Straits Society from the Malayan 'Miscellanies,' the *Transactions* and *Journals* of the Batavian Society, and the *Journals* of the Royal Geographical and Royal Asiatic Societies, and our own *Journal*. The *Journal of the China Branch of the Royal Asiatic Society* contains a further instalment of Mr. G. Phillip's paper on the seaports of India and Ceylon from Chinese sources. In the *Journal of the Royal Asiatic Society* of London, I would draw attention to the papers by Mr. Senáthi Rája on 'the pre-Sanskrit element in ancient Tamil'; Major General Haig, 'on Ibn Baṭúṭa in Sindh'; and Mr. G. A. Grierson 'on some useful Hindí books'. Mr. F. Pincott continues his studies on the metrical arrangement of the hymns of the Ṛig-Veda, and gives his views on the peculiar system adopted in the first *Maṇḍala*, and Mr. H. G. Keene has an article 'on the revenues of the Moghul Empire.' Dr. T. Duka furnishes an essay on the Bráhúi grammar of the late Dr. Trumpp, in which he makes some valuable additions to our knowledge of this little-known language. The note by the Rev. S. Beal on Fah-Hien, the Chinese traveller, may be mentioned with his new translation of the life of Hieun Tsiang.

Foreign Societies.—In America, under the auspices of the American Oriental Society, a goodly number of papers have been published of interest to us in India. Professor Bloomfield gives us an article on 'two hymns from the Atharva Veda,' and Professor E. W. Hopkins contributes papers on 'the condition of Hindu women in the Mahábhárata,' 'the *Vyúha* or order of battle in the Mahábhárata, 'Fire-arms unknown in ancient India,' and a short critique on Professor Bühler's edition of Manu. Dr. A. V. W. Jackson pursues his Zend studies, and has two papers on 'Avestan similes,' and a translation with notes of the *Afrígán-Rapithwina* of the Avestá, whilst the Rev. J. S. Chandler gives an article 'on the transliteration of Sanskrit proper names in Tamil,' and Professor Avery has an essay 'on the relationship of the Kachári and Gáro lan-

guages of Assam.' The Journal of the Asiatic Society of France (*Journal Asiatique*) contains the conclusion of M. Senart's papers on the language of the Aśoka edicts, which is also published separately, and also the conclusion of M. Sauvaire's 'materials for the history of Musalmán Numismatics and Metrology.' Attention may also be called to M. Abel Bergaigne's notes on the primitive *saṃhitá* of the Rig-Veda; M. L. Feer's translation of and notes on the *Upálisuttam*, and Mr. J. Darmesteter's paper on 'the *Mahábhárata* and *Sháhnámah*.' The Journal of the German Oriental Society (*Zeitschrift der Deutschen Morgenländischen Gesellschaft*) contains as usual much of interest on Indian subjects; Professor O. Böhtlingk giving a supplement to *Vasishṭha* which is criticised by Professor Bühler, and also a paper on *Ápastamba*. Professor Bühler contributes a paper on the Aśoka edicts, and P. von Bradke continues his contributions to our knowledge of Indian religion and antiquities. To A. Hillebrandt we are indebted for an article on Vaidik ritual, and to A. Ludwig, for one on the meanings of words occurring in the Vedas, while Dr. Spiegel continues his *Avestá* studies. I am glad to hear that the Kashmír manuscripts described in last year's issue of the same Journal as having been collected by Dr. Hultzsch, have since been acquired by the Bodleian library at Oxford. In the *Vienna Oriental Journal*, we have a paper by Professor Bühler on the meaning of the particles '*iti*' and '*cha*,' with which may be compared Professor Böhtlingk's paper criticising the same in the Leipsic Journal. Dr. W. Cartellieri advances further evidence for the views of Professor Hall that Subandhu, author of the *Vásavadattá*, preceded Bána, and therefore that the books and stories quoted by him are older than the beginning of the seventh century. V. G. Ojha edits a new Valabhí grant, and Professor Jolly has a paper on Manu and Bṛihaspati. Professor Bühler further gives us gleanings from the *Kosha* entitled *Vaijayantí* by Yádavaprakáśa, an essay 'on the authenticity of the Jaina tradition,' and a review of S. P. Paṇḍit's *Gauḍaváha*, whilst Dr. Hultzsch commences a series of notes on new Indian inscriptions, giving an account of the Pallava inscription from Amarávatí of which the text appears in the Madras *Journal*. We have also to welcome the appearance of the first numbers of the publications of the new Italian Asiatic Society (*La Società Asiatica Italiana*) of Florence, which are apparently due to the recent visit of Count Angelo di Gubernatis to this country, and should do much to popularise Oriental research in Italy. I should also mention '*The Asiatic Quarterly Review*,' in which almost every article that has appeared is more or less concerned with Indian subjects, and which forms a valuable addition to an Indian library.

Other works. Semitic.—Besides the rather numerous editions of

the works of Arabic grammarians, especially in the Panjáb, we have to record the publication of the great grammar of Sibwayh or Síbawaihi, entitled '*Al kitáb*' or 'the Book' by Maulaví Kabíruddín Ahmad at the '*Urdu Guide*' press in Calcutta. I note that an edition of this work is also appearing in Paris, edited by Professor H. Derenbourg. We may also record the near completion of a new edition of Lane's great lexicon, and the completion of the first volume of the *Dictionnaire Français-Arabe* by M. E. Gasselin, French Consul-General at Calcutta, containing all the words of the French language, including technical terms, with their Arabic equivalents, which are further grammatically and etymologically explained and illustrated by examples from classical writers. Dr. Lansing publishes a practical Arabic grammar at Chicago, and we have French translations of Ibn Baṭúṭá and Mas'udí's 'Meadows of gold.' But perhaps the most important Arabic work of the year is Professor Sachau's edition of the text and translation of the great work of Al Berúní, published under the auspices of the Secretary of State for India. Written in the eleventh century of our era, it contains the most accurate and philosophical account of the Hindu inhabitants of India of the time that is to be found in the whole range of Musalmán literature. Dr. O. S. Jayakar, Civil-Surgeon of Maskat, also gives us a brief account of the dialect spoken in the Oman district of Arabia.

Iranian-Aryan.—Portions of the Zend scriptures and writings have been reprinted in Gujrát and Bombay. We have the text with translation, commentary, and lexicon of the *Gajastak Abalish* prepared by A. Barthelemy, and reviewed by Kirste in the Vienna Journal, and also by the Rev. L. H. Mills, the third part of the English translation of the *Avestá*. M. C. Salaman's '*Mittelpersische Studien*,' in the *Bulletin* of the St. Petersburgh Academy, criticises Peshutan Dastúr Behramjí Sayana's edition of portions of the Pahlavi writings transliterated in Zend characters, and translated into Gujráti and English with a commentary and glossary.

Sanskrit.—Your attention may be drawn to two serial publications in Bombay which serve the same purposes as our *Bibliotheca Indica*, for the minor Sanskrit works. One is the '*Kávyamála*,' carefully edited by Pandit Durgá Prasáda and Káshináth P. Paraba, and containing reprints of short poems and verses, and the other is the '*Kávyetihása saṃgraha*,' giving editions of dramas, chronicles, philosophical and theological works. We have also from Bombay, Dr. Taylor's translation of the *Prabodha chandrodaya*. Amongst new editions, a high place is taken by Professor Peterson's *Hitopadeśa;* Professor Jolly's *Mánava Dharma Sástra*, of which several notices appear; the *Maitráyani saṃhitá* by Schrœder, and Kátyáyana's *Sarvanukramaṇí* to the Rig-Veda by Mr.

A. A. Macdonell, brought out through the authorities of the Cambridge University. Professor Pischel's editions of Rudraṭa's erotic poem *Śṛingáratilaka* and Ruyyaka's *Sahṛidayalílá* win a commendatory notice from M. S. Levi. We have also the *Kaushítaki Bráhmaṇa* by Dr. B. Lindner, Hemachandra's *Lingánuśáyina* with a commentary by Dr. R. v. Franke, and Dr. Solf's 'die Kaśmír recension der *Pañçaśiká*.' Amongst grammars and dictionaries are Böhtlingk's edition of Páṇini, and a new edition of Max Müller's grammar by Mr. A. A. Macdonell, who is also engaged on a Practical Sanskrit dictionary. Parts of Prof. C. Capeller's '*Sanskrit-Wörterbuch*,' based on the great St. Petersburgh dictionary, have appeared, and Dr. Speijer's valuable Syntax of classical Sanskrit, of which we hope soon to see a translation into English. I may mention here that the Paris Academy has chosen as one of the subjects for prizes in 1889, 'the Hindu drama.'

Indian Aryan.—The versions of the Scriptures in Maráṭhi, Dakhaní, Hindí, Santálí, Uriyá, and Urdu are now under-going revision at the hands of competent scholars, and should, from a merely philological point of view, furnish valuable results. Tulsidás's *Rámáyaṇa* has been republished in Bombay, and selections from it in the N. W. Provinces. It is to be regretted that it was not possible to issue any part of the Bihárí dictionary of Dr. Hoernle and Mr. G. A. Grierson during the year. Generally speaking, the school series of books in the various dialects spoken in India form a valuable contribution to the aids for their acquisition, by this I mean not only those published by the State Educational Department, but also those prepared by private Native compilers. In Urdu, special attention may be drawn to the new Hindustání dictionary in preparation by the Rev. J. D. Bate of Allahabad which, it is promised, will contain many thousands of words that have never yet appeared in any dictionary hitherto published. Sindhi in Arabic characters makes a little progress: we have the '*Kisso sa×i panhuja*,' a love story, and, in Hindi characters, a translation of the Bhágavat.

Tibeto-Burman.—The Rev. S. Endle has published a grammar of the Kachári-Bara, as spoken in the Darrang district in Assam; and Mr. Needham, already known for his labours in this field, has given us one of the Shaiyang-miri, spoken by the Miris near Sadiya, with texts and a vocabulary.

Indo-Chinese.—M. Azémar has published in Saigon a vocabulary of the Stieng language spoken in the valley of the Mekong, and M. Guion has, in the pages of the *Journal* of the Paris Geographical Society, several contributions on the Muongs, a tribe occupying portions of the upper banks of the same river. In the *Mélanges Orientaux*

we have a '*Texte Malais*' by the Abbé Faire, and Professor Abel des Michels' edition of some Annamite tales.

Dravidian.—Tirandumagni's commentary on the classical Tamil work *Tolkáppiyám* has been published in Madras, and it is hoped that we may soon have a translation, as this should throw considerable light on the ethnological condition of the people of Southern India. The *Nannúl* of Pávanandi, the standard grammar of Tamil, has gone through two editions, and Professor Vinson gives a 'Specimen of Tamil palæography' in the *Mélanges Orientaux*. Mr. L. Garthwaite has brought out a work on the essentials of Malayálim grammar, and the *Panchatantram* in the same language. In Telugu, we have several reprints of grammars and selections for educational purposes. The Rev. E. Droese continues his labours in the Maler language of the Bhágalpur district, and has produced a translation of a Gospel, and prepared some small works for educational purposes. The Gospels in the Badaga language are also under preparation by the Rev. W. Lutz; and revisions of the Telugu, Tolu and Konkani existing versions by other competent scholars.

Vernacular literature.—Bengal.—Your attention was called last year to the record of the current literature of India to be found in the 'Catalogue of books printed in British India' published quarterly in each Province. It is intended only very briefly to refer to it here, as the subject is too large to be usefully considered in an address of this nature, but it is desirable to keep it prominently before the members of this Society, and I would commend a review of the vernacular literature of the last decade as not unworthy of their attention. In Bengal there were 2,475 entries in the catalogue, from the middle of 1886 to the middle of 1887, for which alone the lists are available, and of these 838 works are described as written for educational purposes, and 1,657 as non-educational. The Bengal school of novelists is well represented by the '*Sítárám*' of Bábú Bankim Chandra Chattarji, which is intended to illustrate a more perfect stage of *nishkáma dharma* than has hitherto been attempted. The '*Saktikánan*' of Bábu Srísh Chandra Majumdár, also, is notable, as giving a correct realistic view of the state of Hindu society in Bengal during the early part of the last century, when the rivalry of the Vaishnavas and Sáktas caused dissensions throughout the Province. The '*Harishe Bishád*,' of Bábú Táraka Chandra Gangúli, satirises the pretentious style adopted by some of the younger educated native officers of Government. In the domain of poetry, '*Apúrba máyá milan*' by a young author, and the '*Raivataka*' of Bábú Nabin Chandra Sen, are both worthy of notice. The latter attempts to give a rational explanation of the events recorded in the Mahábhárata. The year is remarkable for the publication of what may be considered

the oldest work in existence in the literary language of Bengal, the *Srí srí Krishṇa bijayá* of Gunaráj Khán, who flourished some 450 years ago. The labours of Pandit Rámanáráyaṇa Vidyáratna in reprinting a large and interesting series of Vaishnava works, and of Bábú Maheśa Chandra Pál in publishing works on philosophy deserve honourable mention. The latter has recently completed the commentary on the Vedánta by Mádhváchárya with the gloss of Jayatírtha. I have also to notice an important *bháshya*, or commentary in Sanskrit, on the *Vaiśeshika-darśana*, by Mahámahopádhyáya Chandrakánta Tarkálankára. Already well known by his commentary on the *Gobhiliya-grihya sútra* and the exposition of the tenets of the philosophical schools in his *Tattwabali*, the learned pandit now comes forward with a system of his own and shows himself a worthy successor of the Bháshyakáras of old. Another of our recently created Mahámahopádhyáyas, Pandit Rákhál Dás Nyáyaratna of Bhátpárá, justifies his selection for that honour by publishing a treatise on the Nyáya, in which he contests the views ordinarily held by the Naiyáyiks of Bengal. Mr. R. C. Datta has completed his edition of the Ṛig-veda, with a Bengali translation based on Sáyana's commentary, and notes derived both from indigenous sources and the results of the labours of European scholars. For using the latter he has received severe censure at the hands of some of his orthodox fellow-countrymen, but we may trust that more liberal views will soon prevail, and that the work done by Europeans who have rescued from oblivion so much that is valuable in Sanskrit literature will be fittingly recognized and valued even by the followers of the old orthodox school. Bábú Pratápa Chandra Ráya's valuable edition of the Mahábhárata, translated with the aid of competent European and Native scholars, has now reached the thirty-seventh part, which falls within the *Bhíshmaparvan*. Whether due or not to the prominence into which Buddhistic ideas have risen owing to the progress made by the Theosophical Society, it cannot but be regarded as a sign of the times that a commencement has been made in making the tenets of Buddhism more widely known by a translation from the Páli into Bengáli of the *Sutta Nipate* of the *Suttapiṭaka*, a portion of the sacred *Tripiṭaka*.

Madras.—The Madras issues comprise works in English, Tamil, Telugu, Malayálim, Kánarese, Urdu, Sanskrit, and polyglots. In Tamil, there are several works on grammar with commentaries, numerous religious works advocating the *advaita* system, or in praise of particular forms of the deity, such as the Kanjíviram Siva and Vishnu, the Tanjor Ganapati and Subramaniya. In Telugu, we have to note reprints of the works of the great southern teacher Rámanúja Áchárya, besides the usual series of translations from the Sanskrit. The Malayálim issues

comprise both Hindu devotional works and numerous religious didactic treatises in the Arabic character and Mopla dialect, for the use of the Musalmán Moplas of the western districts of Madras. Several editions of well-known Sanskrit works have been brought out, amongst which mention may be made of the Black Yajur-Veda, the recognized ritual of the Smárta Brahmans.

Bombay.—The Bombay register contains books printed in English, Maráṭhí, Gujrátí, Sanskrit, Zend, Arabic in Hebrew and Arabic characters, Sindí in Persian and Hindí characters, Persian, Urdu, Marwárí, and Kánarese. Amongst those published in English, mention may be made of Mr. V. Shivrám Apte's 'Life and writings of the poet and dramatist Rájaśekhara,' who is placed not earlier than the seventh century. In Maráṭhí, the life of the sage and poet Dnyáneśwar, whose shrine exists in the Poona district, gives an interesting account of one who is famous in the popular songs of Mahárashtra. An edition, also, has been published, of his *Paribhásháyukta* on the *Bhagavad-gíta*, which is probably one of the oldest specimens of literary Maráṭhí. Some curious legends, too, will be found in the account of the temple of the popular deities Vithoba and Rukmini in Pundharpur. There are many dramas founded on episodes in the Mahábhárata and Rámáyaṇa, besides several of which the plot is original, such as that of the '*Gunotkarsha-nátik*' of V. Váman Sástrí Khare, laid in the time of Sivají—and those with a didactic purpose, showing the evil effects of infant-marriage, drunkenness, and debauchery. Nor is the practical side of modern life neglected, for we have an encyclopædia of arts and manufactures based on Spon's standard work, and a Journal ('*Shetkari*)' devoted to the improvement of agricultural processes. In *Gujráti*, also, there is an agricultural journal, and a practical treatise on the working of cotton-mills, whilst light literature is represented by translations of 'Valentine Vox,' 'Munchausen's travels', and others, besides some original stories and plays. There are several collections also of popular ballads and of the songs sung by women on festive occasions. A member of the Beni-Israel community gives an account of a journey to Jerusalem, and a devout Hindu one of a pilgrimage to Rámeśwar. These all indicate progress of the right kind, and a large increase in literary activity, which should lead to important results.

Panjáb.—The Panjáb register contains works in English, Arabic, Persian, Urdu, Sindí, Sanskrit, Hindí, Panjábí, and Marwárí. The Arabic-Persian series chiefly consists of reprints of grammars, commentaries on and parts of the Koran and Musalmán law-books, and poetry, and indeed the great mass of the issues in other languages comprises reprints of books of poetry and fiction, or of those designed

for educational or religious purposes. There were very few original works of any importance, and those that have appeared are mainly devoted to religious controversy, Sikh, Hindu, Musalmán, or Christian.

North-Western Provinces and Oudh.—The opening, during the year, of the new University at Allahabad supplies a long-felt want in the N. W. Provinces and Oudh. Hitherto the local institutions were affiliated to the Calcutta University, where there could be little sympathy or encouragement for the study of the local vernaculars, which, it is hoped, will now receive the attention that they so much deserve and need. The issues during the year, excluding periodicals, amounted to 800, of which 25 were in English, 361 Urdu, 261 Hindi, 31 Sanskrit, 19 Arabic, 69 Persian, and 30 polyglot. There were, as in the Panjáb, very few original works of value, though mention may be made of some treatises on medicine and on mathematics intended for educational purposes. Parts of Tulsídás's Rámáyaṇa have gone through several editions, and in the '*Vijaya-dohávalí*' an attempt is made to explain the obscure *dohás*, *chaupáís*, and *sorathás* occurring in that work.

Other Provinces.—Burma, Assam, and the Central Provinces, as might be expected, present but a meagre record. In Burma, there are numerous manuscripts both in Burmese and Páli, but the aid of the printing-press has been little resorted to, and there is here a tolerably wide field open to students. In Assam, Bengális are the principal writers, and their works, for the most part, are mere translations or simply reprints of Bengáli works, usually of a religious character.

Archæological Survey.—The survey of the Archæological remains in each Province continues to be prosecuted as vigorously as the organisation at the disposal of the Department admits. In the *Panjáb*, Mr. Rodgers has given the fruits of some of his labours in articles which will appear in our *Journal*, especially that relating to the old temple of Núrpur in Kángrá, besides collecting a large number of inscriptions. In *Bengal*, Mr. Beglar and his assistants have been employed on the ruins at Gaur in the Málda district and in Tirhút, but no detailed report is as yet available.

N. W. Provinces.—Dr. Führer, with Mr. E. W. Smith in charge of the survey in the N. W. Provinces and Central Provinces, in the beginning of the year, made a tour through Banda and parts of Allahabad and Bundelkhand, visiting Pratishṭhánapur, Bitháhbhayapaṭṭana, Bhaṭṭagráma or Garhwa, Kausambi, Prabhásá, Kalanjar, Mahobá, Ráhilyá and other important sites, and collecting numerous inscriptions, long and short, of which Dr. Führer has translated 10 Arabic, 24 Persian, and over 250 Sanskrit inscriptions in his report. Amongst these are 24 Gupta ones, and over 35 belonging to the sixth and seventh centuries; all of which

are new and of considerable importance. Gopála's cave at Prabhása, on which Mr. Cockburn has given us a paper already published in our *Journal*, was entered and surveyed, and all the inscriptions both inside and outside copied by means of ink impressions. These include three of the Indo-Skythian period, the oldest of which is dated Vikrama saṃvat 10, which may be 47 B. C., or only a regnal date, and five belong to the Gupta period. We may congratulate Dr. Führer on the success of his year's exploration. The draftsmen of the staff also made careful drawings of the architectural and other objects of interest at all the places visited during the tour. The report on the previous season's work at Jaunpur and in the eastern districts of the N. W. Provinces, with some important additions from the present season's work, is nearly ready for publication and will be richly illustrated. During the present season, the architectural assistant and draftsmen have been hitherto at Jaunpur, completing, in full detail, the survey of the Sharqi remains there, before they are further injured by unskilful 'restoration.' Dr. Führer has meantime been engaged upon a survey of the districts to the east of the Ganges and will, at a later date, be joined by the architectural staff in Rohilkhand. He has also compiled a very valuable descriptive list of the antiquarian and architectural remains in the N. W. Provinces and Oudh, which will be published by the Local Government at an early date. It is drawn up on the plan of the Bombay lists, but is fuller in details, and will afford an admirable guide to the archæology of the area with which it deals.

Dr. Burgess himself visited Kálsi in Dehra Dún, in the end of October, and took a complete impression in duplicate of the Aśoka inscription there, which it is expected from its clearness will leave little to be desired by scholars. He also obtained from the Lakkhá Maṇḍal temple, much further up the Jumna, two early inscriptions, one being a record of a temple built by Iśvará, a princess of the royal family of Singhapura who had married a Chandragupta prince of Jálandhara. It is not dated, but probably belonged to about 600 A. D., and gives a *vaṃsávalí* of eleven generations of the Singhapura family. From Sháhbázgarhi, he has also obtained, through the Assistant Commissioner, a new inscription in Baktrian-Páli, that may turn out to be the twelfth of the Aśoka edicts which was wanting in the great epigraph close by. It has been sent to Professor Bühler to be edited. From the Lalitpur district comes a long inscription, bearing the date 869 in some era, and from near Mathura, one of Kanishka of which the date may be 85 A. D. In last February, Dr. Burgess took impressions of all the inscriptions in the Nágpur Museum which are being now edited by Dr. Kielhorn

who has, also, recently ascertained the initial date of the Chedi era to be 248 A. D.

Bombay.—The Bombay Survey party made a tour last season in northern Gujarát and the west of Káṭhiáwáḍ, visiting Kápadwanj, Vaḍnagar, Tarangi, Siddhapur, Aṇhilváḍápaṭṭan, Mudhera, &c. in Gujarát, and the Jaina *tírthá* of Satruñjaya at Pálitáná; the results, with a large number of photographs, drawings and inscriptions, as regards the Baroda territories, will, it is hoped, be brought out at His Highness the Gaekwár's expense, for whom a volume on other places in his State is now under preparation by the Director. It is understood that Col. S. Jacob of Jaipur is also making steady progress with his work on architectural ornament and detail from the buildings in the dominions of His Highness the Mahárájá, and which will be issued at His Highness's expense.

It is a most promising symptom of progress that these native Princes are taking so practical an interest in the work of the Archæological Surveys, and helping them. The Bombay party is devoting the present season chiefly to as thorough a survey, as its strength will permit, of the architecture of Bijapur, the capital of the Adil Sháhi dynasty (1489-1686 A. D.). The volume published by the late Mr. Fergusson and Meadows Taylor has given the student some general idea of the character of the Bijapur buildings, but a much more detailed survey is absolutely necessary to illustrate the wealth and beauty of the ornament and details, and the variety of structures represented. This it is hoped to accomplish by the present survey.

Madras.—The Madras Survey under Mr. A. Rea is understood to have done excellent work last season at Vellore, in the North Arcot district and elsewhere, having made a complete survey of the beautiful temple at Vellore, and of many others in the course of the season's tour. Mr. Rea has also been specially requested by Government, and very wisely we think, to visit and examine several prehistoric burial-grounds, and his explorations have been attended by success, far beyond those of any of his predecessors, in saving almost every object they contained intact. From Pallavaram, which had previously been visited by Dr. Bidie and Mr. Thorowgood, even in the rains, Mr. Rea excavated and carried entire to Madras an early earthen-ware coffin 6 feet long, of the most brittle material, with all its contents, and deposited it uninjured in the Madras Museum. His progress reports and accounts of these excavations are printed *in extenso* from time to time in the Madras Government orders, and would be well worth reproduction in a more permanent and accessible form. The present season is being devoted to the Kṛishṇá and Godávarí districts; and near Bejwáḍá, Mr. Rea has ex-

cavated the foundations of a genuine structural Buddhist vihára, very similar to the only other hitherto noticed, that at Sanchi. The circuit of the walls is complete, except a part of the side wall, which some one has injured not knowing its importance : It is hoped, however, that the orders recently issued will be sufficient for its protection in future. Mr. Rea has also made important investigations at other places which will doubtless be duly reported in the Madras Government orders.

Dr. E. Hultzsch has completed the manuscript of what will form a considerable volume of inscriptions, chiefly in the Tamil character, and we may hope the Madras Government will not be slow to publish it. He is at present on tour through Salem, Trichinopali, Tanjor, &c. collecting impressions and copies of fresh inscriptions to be edited in the coming hot season and rains. I may also mention an interesting account of the ruins at Vijayanagar that has appeared in *The Madras Christian College Magazine*. Dr. Burgess' report on the Amarávatí and Jaggayyapeṭa stúpas, completed so far as the author was concerned in 1886, has recently reached this country. Besides an account of these stúpas and the principal new sculptures and inscriptions, it contains, in the last chapter, a carefully written monograph on the Aśoka inscriptions from Dhauli and Jaugaḍa by Professor Bühler, based on impressions taken personally by Dr. Burgess. This chapter marks the last decided advance in the criticism of these important documents, and is accompanied by lithographic reproductions, on a small scale, of the impressions. Amongst the illustrations, Dr. Burgess has included the remainder of Colonel Colin Mackenzie's drawings made from slabs in 1816 and 1817, and not included in Mr. Fergusson's 'Tree and Serpent worship.' All the slabs so drawn, it is much to be regretted, have disappeared since 1817. This work reflects the highest credit on Dr. Burgess and his assistants, both for its method and execution and the excellence of the plates, woodcuts and plans. With it and Fergusson's work before us we have some of the best and most accurate materials in existence for a knowledge of Indian life in the earlier centuries of the Christian era. The Archæological Department may be justly proud of this, its latest contribution to the history of India, and I have no doubt that the same energy and rare discretion will be shewn in publishing the lapidary records of Eastern India, which have never yet been adequately represented.

The volume too is handsomely got up, but sells at the almost prohibitive price of three guineas, and we understand that Dr. Burgess rightly considers that the Reports of the surveys under his charge could be published in a form quite worthy of their importance at half the cost, by subscription, if no publisher's large profits had to be insured

Let us hope that both the Secretary of State and the Government of India will listen attentively to his proposals before they adopt other counsels. It would be a boon to all interested in Indian Art and Archæology if they could obtain by subscription the volumes of the Survey, containing 60 beautiful plates with the letter press, for Rs. 20, instead of at double or treble that cost through a publisher, and it is computed that a moderate subscription list would render this easily practicable.

The inscriptions it is expected will be issued in quarterly parts, either with or without other miscellaneous papers on archæological matters.

Anthropology.—The ethnographic enquiry which has been going on in Bengal for the last three years is now approaching completion, and a first instalment of the results is likely to be published in the form of a volume on 'The Tribes and Castes of Bengal' before the end of the current year. The scheme of this volume, of which the greater part is now in type, is purely ethnographic in the strict sense of the word, and it attempts to do little more than describe the internal structure, customs, and marriage system of all the castes and tribes found within the Province of Bengal. As the work is intended to serve administrative as well as scientific purposes, it is cast in the form of a glossary showing castes, tribes and their subdivisions in alphabetical order. Tables grouping these under their main heads are given in an Appendix, so as to illustrate the almost incredible extent to which the original social groups have broken up and multiplied. The large question of physical characteristics will be treated in a second volume, containing the measurements of most of the chief tribes in Bengal, the N. W. Provinces, Central Provinces, and the Panjáb. In this volume, I understand, an attempt will be made to distinguish the main types now discernible in the people of Northern India, and to ascertain how far these types correspond with the divisions based upon languages. For this latter we have a useful review of our present knowledge in Professor Fried. Müller's recent work on the language of all peoples and tribes of which grammars and dictionaries exist, and for another phase of the subject *L'histoire des religions* by M. M. Vernes. The '*Journal of the Anthropological Society*' of Bombay contains a number of interesting articles, amongst which I would notice one 'on demonolatry in South India' by Bishop Caldwell; 'on explorations in the Vedirata of Ceylon,' by Mr. C. W. Stevens, and 'on the formation and uses of an Anthropological Museum' by Captain R. C. Temple.

Biology.—The series of papers entitled '*Scientific Memoirs by Medical Officers of the Army in India*,' to which your attention was drawn last year, has, as was expected, rescued from oblivion many

discoveries in Natural Science which might have remained unrecorded for some time, if not for ever. In Part II, published early in 1887, there are six papers, whilst in Part III there are eleven memoirs; these, however, will be more properly considered amongst the results of 1888, as this part has not yet left the printer's hands. Of the papers in Part II, those by Dr. Cunningham are (1) 'On the effects sometimes following the injection of the choleraic comma-bacillus into the subcutaneous tissues in guinea-pigs,' and (2) 'On the phenomenon of gaseous evolution from the flowers of *Ottelia alismoides*.' In the former paper, it is shown that his inoculations were, in some instances, followed by an excessive multiplication of the bacilli within the bodies of the animals operated upon, and death with certain symptoms resembling those which characterise cholera in the human subject supervened, but the author does not think that the phenomena induced warrant the conclusion that they were of a truly choleraic nature. The two papers by Dr. Barclay are on the life-histories of two species of *Uredineæ*, one parasitic on *Strobilanthes dalhousianus*, which he has named *Æcidium strobilanthis*, and the other on *Urtica parviflora*, which he considers to be a variety of *Aecidium urticæ*, a parasite well-known in Europe. Both parasites are heteroecious, or requiring two distinct hosts on which to complete their development. In the case of the former, the second host is *Pollinia nuda*, and in that of the latter, it is *Carex setigera*. These are the first species of *Æcidia* whose life-histories have been worked out in India.

Dr. King, F. R. S., discusses, in his paper 'On the fertilisation of *Ficus hispida*,' a problem of great interest in vegetable physiology which still remains unsolved. Lastly, Dr. Bomford notes the discovery of some eggs of *Distoma* (*Bilharzia*) *hæmatobium* in the intestines of two transport cattle which died in Calcutta. The discovery is of some importance, since hitherto the existence of this parasite has only been known in Africa, the Mauritius, and Arabia.

Indian Museum.—The Indian Museum continues to hold a high place in popular estimation, the number of visitors during the year of report being 460,992, giving an average of 1,928 for each day during which it was open to the public. Amongst the principal acquisitions of the year are the zoological collection from the Indian shores and deep seas contributed by the Marine Survey, and a collection of snakes from Singapore, mammals nad birds from Afghánistán collected by Captain Yate, European Diptera from Dr. E. Becher, British Hymenoptera from Mr. E. T. Atkinson, invertebrates of the Arctic seas from the Stockholm Museum, and the Mergui collections that have been named through Dr. Anderson. The Trustees have long recognised their position as guardians of Imperial scientific research in India, but it has

not been found possible to do much hitherto in communicating the results of the collections that have been from time to time made. I am glad to be able to state that the cataloguing of our Indian fauna has at length been systematically commenced. Mr. W. Sclater has taken up the continuation of the 'Catalogue of the Mammalia,' so well begun by Dr. Anderson: Colonel C. Swinhoe and Mr. E. Cotes have published the second part of their 'Catalogue of Indian Moths' for the Trustees, and Mr. Wood-Mason has in hand a 'Catalogue of the *Mantoidea*' of which we have an excellent collection. The first plate of Mr. W. L. Distant's 'Monograph of the Oriental *Cicadidæ*' is ready, so that we may expect an instalment of the work during the current year. Last year I announced the commencement of the publication by the Linnæan Society of the results of the examination of the collections made for the Indian Museum in the Mergui archipelago named through or by Dr. J. Anderson. A special volume has been devoted to these memoirs, and the following have appeared during the year:—Marine Sponges, by Mr. H. S. Carter: *Ophiuridæ* and on some parts of *Ophiothrix variabilis*, Dunc., and *Ophiocampsis pellicula*, Dunc., by Professor P. Martin Duncan: *Polyzoa* and *Hydroida* by the Rev. T. Hincks: a new species of *Brachyonychus* by Mr. H. W. Bates: the Birds, by Dr. J. Anderson: on *Dichelopsis pellucida*, Darwin, from the scales of an Hydrophid obtained at Mergui, by Dr. P. P. C. Hoek, and the Podophthalmous Crustacea by Dr. J. G. deMan. Most of these collections have already been returned, and all will eventually find a place in the Museum.

Nor has the practical side of zoology been forgotten. Collections of the silk-producing moths have been made for distribution to the several Provinces, and aid has been given to the inquiries now being made into the diseases affecting silk-worms. The laboratory has been completed, and stocked with appliances for the prosecution of these studies. To Mr. E. Cotes has been assigned the task of surveying the insect-pests of India, regarding which we are practically in utter ignorance, but this work can only be successfully accomplished by the co-operation of intelligent observers throughout the country, and I need only mention the subject to ensure your sympathy and support. An effort is also being made to re-arrange in a practical way the great mass of 'Economic Products' that has come into the possession of the Museum from the late Economic Museum and the Calcutta Exhibition. The object is to arrange the specimens so as to make them a practical commentary on Dr. Watt's 'Dictionary of Economic Products', now being prepared by him for the Government of India. This will contain the history, so far as known, of each specimen exhibited, and hereafter it is intended to add to this by a purely commercial survey of these products, showing the place where

each is procurable, the season, price, and probable quantity, and whether the supply is permanent or only casual. At first only those products that are of value and occur in marketable quantities will be examined, and in this way much useful work can be accomplished. Collections have already been made for and despatched to Russia, Italy, Belgium, France, and the Australian colonies. In connection with the Museum, I may be allowed to express the hope that steps may be taken to centralise within its walls the direction of the scientific research now fitfully undertaken in India. It has even now within its enclosure the Geological Department and Museum, and the nucleus of an Imperial archæological collection, and within reasonable distance the magnificent herbarium of the Royal Botanical Gardens, but, if the Directors of these great branches of scientific inquiry became associated with the Board of Trustees and undertook the supervision of similar efforts in other Provinces, the work could be better apportioned and more efficiently and economically carried out, and neither friction nor interference with local wants or prejudices need necessarily follow.

Vertebrata.—We have in the '*Proceedings of the Zoological Society*' a paper on the gnu-goat (*Budorcas taxicolor*, Hodgs.), by Mr. A. O. Hume and papers on the birds of Perak and on some birds in the Hume collection by Mr. Sharpe. In the '*Annals and Magazine of Natural History*,' there are papers by Mr. O. Thomas on two new squirrels and a new rat from N. Borneo, as well as a reprint from our Journal of the article on Mammals from Northern Afghanistan which I have previously mentioned. Amongst those bearing on Asiatic ornithology in the '*Ibis*,' mention may be made of one, by Dr. M. Menzbier, on some new birds from the palæarctic region, and of three, by Mr. Seebohm, on the birds of the Loo-choo islands, on the bull-finches of Siberia and Japan, and on *Phasianus colchicus* and its allies. Mr. Gurney contributes a paper on *Falco babylonicus* and *Falco barbarus* and Mr. Styan describes a new *Trochalopteron* from Yunnan, and gives an account of the birds of Foochow. Mr. Hargett describes a new woodpecker, *Gecinus gorii* from Southern Afghanistan. Another paper enumerates the birds collected by Prejevalski in his last expedition in Central Asia; and Mr. R. Bowdler Sharpe contributes papers on the birds of Fao, Bushire, and N. Borneo. Little has been done for our Indian species beyond the continuation of Mr. Murray's 'Avi-fauna of British India,' of which the third part has appeared. This work, as previously stated, is intended to correct and bring up to the present level of our knowledge Jerdon's well-known 'Birds of India.' It will serve as a very useful guide to bridge over the period between its issue and the publication of the results of the examination of Mr. A. O. Hume's unequalled collection of Indian birds, now

the property of the British Museum. In the *Zeitschrift f. d. ges. Ornithologie*, we have an interesting paper by Dr. Blasius on the birds of Celebes, and in the *Bulletin* of the St. Petersburgh Academy, one by Prof. V. Bianchi, on the birds of E. Bokhara. In the *Annals*, Mr. J. A. Murray describes a new *Zygæna* from Karáchi; Dr. Günther gives notes on batrachians from Perak, and Mr. G. A. Boulenger describes new batrachians from Corea and Malacca, and reptiles from Maskat, Afghánistán, Sumatra, and Borneo.

Invertebrata.—The Zoological Society's proceedings contain a paper on earth-worms from the Nilgiris and Shevaroys by Mr. A. G. Bourne, and on a collection of Echinodermata from the Andamans by Professor F. J. Bell, whilst the conchologist has before him the continuations of Godwin-Austen's 'Land and Freshwater Mollusca of India,' of Sowerby's 'Thesaurus conchyliorum,' of Martini and Chemnitz's '*Systematisches Conchylien Cabinet*,' and of the great Philadelphian catalogue. In the '*Madras Journal of Literature and Science*,' Mr. J. R. Henderson has 'Notes on the Madras species of *Matuta*,' and Mr. H. S. Thomas a paper on the pearl oyster of Mannár. Amongst minor papers, mention may be made of those, by P. V. Gredler, on the shells of China, and by S. Clessin on the shells of India, Borneo, and Sumatra in *Malakozoologische Blätter;* by M. L. Morlet on the shells of Tongking in the '*Journal de Conchyologie:*' by Dr. O. F. von Möllendorff on the shells of the Philippines and by Dr. H. Pohlig on the landshells of N. Persia, in the *Jahrbücher* of the German Conchological Society, and by Dr. O. Böttger on the *Melanidæ* and *Neritina* of China and Japan in the same publication. In the *Annals*, Mr. E. A. Smith describes some new shells from Sumatra, Java, and Borneo, and Mr. A. Dendy has a paper 'on the sponge-fauna' of Madras. In the same *Journal*, Mr. F. W. Pascoe describes some Asiatic *Curculionidæ* and Mr. C. O. Waterhouse some *Erotylidæ* from Batchian and New Guinea and *Lucanidæ*, *Eutelidæ*, and *Lamiidæ* from Perak. In the '*Annales*' of the Entomological Society of Paris, M. Fairmaire describes some coleoptera from the interior of China including Yunnan and Kiang-si, of some interest as containing European forms side by side with special, local and Asiatic forms; and M. Fleutiaux brings forward others from Annam. In the *Journal of the Linnean Society*, we have a paper on the *Colydiidæ* of Ceylon by Mr. G. Lewis, and one by Mr. J. S. Baly on new species of *Galerucinæ*. In the '*Revue d' Entomologie*', Dr. O. M. Reuter continues his studies on Asiatic *Rhynchota*, and Mr. W. L. Distant in the '*Annals*,' describes *Cicadidæ* from S. India, China, and the Andamans, besides giving a paper on *Pentatomidæ* in the '*Transactions of the Entomological Society*' containing a number of new species collected by Mr. E. T. Atkinson in Sikkim.

In the Zoological Society's Proceedings, Colonel Swinhoe has a paper on the Lepidoptera of Mhow, and Mr. H. J. Elwes and Mr. L. de Nicéville describe new Indian species. Mr. de Nicéville is also engaged on the *Lycœnidæ* which will form the third part of his work on the butterflies of India, Burma and Ceylon. In the '*Annals*,' Mr. H. Grose Smith records new species of butterflies from N. Borneo, Celebes, Philippines, Timor, Burma, and S. Afghánistán; Mr. W. L. Distant furnishes notes on the *Sphingidæ* from the Malay Peninsula, and describes a new species of *Ambulyx* from North Borneo, and, with Mr. Pryer, some Rhopalocera from the same tract. I would notice in the '*Journal of the Bombay Natural History Society*,' the interesting chatty notes entitled the 'Waters of Western India', and Captain Macpherson's life-history of *Hestia malabarica*. Mr. E. D. Morgan tells us that the Russian naturalist, M. Grumm-Grshimailo examined carefully the lepidopterous fauna of the Pámírs in 1884-85, and considers it to be distinct from that of the Thian-Shan, so far as known, but it has many affinities with that of the Hindu Kúsh, at least so far as types common to both would appear to indicate. 'The inference drawn from this fact is that at the period when the lepidoptera (and therefore other orders as well) of the Pámír were established, this region was in closer connection with the countries to the south of it than with those to the north; in other words, the Pámírs were then detached from the Thian-Shan. This may be explained in two ways; (1) a non-synchronous upheaval of the two mountain masses, or (2), if their upheaval took place at the same time, there was a certain interval of time during which they were parted from one another by a wide aqueous expanse, that is to say, at that period the ranges which now unite the Pámír with the Thian-Shan were non-existing, and Ferghána and Kashgár formed the bed of one sea—the Tárim-Ferghána.' I quote this suggestion at some length to show to what ingenious purposes the geographical distribution of our insect fauna may be applied. The '*Mémoires sur les Lépidoptères*,' edited by N. M. Romanoff, and published in St. Petersburgh, contains many illustrated papers on the butterflies of Asiatic Russia and the neighbouring countries.

Botany.—Since I last addressed you, Government has made an arrangement by which the energies of Mr. J. F. Duthie, of the Saháranpur Botanic Garden, shall be almost exclusively devoted to the botanical exploration of the northern part of the Empire. The Flora of the whole of the North West frontier and of the Himálaya as far east as Nepál, together with the plains provinces of Sindh, the Panjáb, Rájputána, the North West Provinces and Oudh, can now thus be explored on a definite and well-organised plan. The

hope which I expressed in my last annual address that we should soon learn something of the botanical riches of the new province of Upper Burma is being realised more speedily than I had ventured to expect. For General Collett, an excellent and most enthusiastic botanist, has already sent to the Herbarium of our Botanic Garden several most interesting collections from the Shán hills. These collections contain several species which appear to be new to science, and many which have not been collected since Wallich's visit to Burma sixty years ago: and I learn from Dr. King that he has arranged for botanical collections being made at Bhámo. Thanks to the energy of Mr. G. Mann, Conservator of Forests, the botany of the Assam hill ranges is being gradually worked up, and the region between Assam and Burma will soon (there is some reason to believe) cease to be botanically a *terra incognita*. Mr. Mann appears at present to be the only Forest officer in Northern India who in any way forwards Botanical science, a state of matters little creditable to the Forest Department which of all others has the best and rarest materials at its disposal.

The chief work of public interest done in the Herbarium of the Botanical Garden at Síbpur has been the preparation, by Dr. King, of a monograph of the 'Oaks and Chestnuts of South-Eastern Asia,' similar to the same author's recently completed work on the 'Figs' of the Indo-Chinese countries. Dr. Prain, the recently appointed Curator of the Herbarium, has, I am informed, occupied part of his time in preparing a monograph of the difficult herbaceous genus *Pedicularis*. This monograph will probably see the light during the current year.

In the department of physiological Botany, our member Dr. D. D. Cunningham, has been hard at work, and has completed a remarkable memoir on the phenomena of movement in the leaves of the well-known 'Sensitive plant.' The cause of the movement has long been discussed by biologists. For many years it was considered to be explained by a mechanical theory, but Gardener and some recent writers have endeavoured to explain it by a theory of nervous or vital energy. This theory has for its basis the new anatomical doctrine that the protoplasmic contents of neighbouring cells in this plant are connected by thin threads, and that thus a kind of moniliform protoplastic tissue is formed. These writers seek to explain the phenomena of movement by the transmission along this continuous protoplasm of a low kind of nervous force. The results of five hundred experiments and observations made by Dr. Cunningham on living sensitive plants go to prove that, even were the protoplasmic continuity an indubitable fact, the movements cannot be explained by any nervous force proceeding from the axis of the plant to the extremities of its leaves. Although not on a

botanical subject, another of Dr. Cunningham's researches merits notice here, as it is one in which every inhabitant of the Gangetic delta is practically interested. Dr. Cunningham, in his memoir on the nature of the sub-soil of the neighbourhood of Calcutta, shows that this soil is singularly porous in texture; and that, in a cubic foot of it, there is an air space equal to from one-fourth to one-third of its entire bulk. When the air in this space is replaced by water, the mass assumes a superficial resemblance to clay, although in fact it is a mixture of sand and water in the proportions just stated.

I may also mention here that the '*Journal of the Bombay Natural History Society*' contains interesting papers, by Mr. Birdwood, on the flora of Mahableshwar and Matheran with a vernacular index, and by Dr. Dymock on the Maráṭhí names of plants. In the '*Annals*,' also, we have a useful paper by Mr. G. Murray on the 'Ceylon Algæ in the Herbarium of the British Museum.'

Geological Survey. Economic.—The most important economic work of the Geological Survey during the year has been the examination of the auriferous tracts of Mysore by Mr. Foote, who reports on all its known gold localities and their capabilities. The more interesting geological feature of his work lies in the fact that he has recognized a transition series to which in Mysore, and in the country on towards Dhárwár, the gold bearing reefs are confined. This Dhárwár series may eventually turn out to include some, if not all, the many transition groups of the northern portion of the peninsular area of India; and it is to be noted at the same time that the more decidedly metalliferous deposits are confined to such transition rocks rather than to the great crystalline or gneissic series. The next most interesting ore tract is that of the manganese and iron near Jabalpur, which is again under examination by Mr. Bose. Several new features have been noted which may lead to a larger estimate of the distribution and, perhaps, extent of the manganese ores than that put forth by Messrs. Medlicott and Mallet in their original reports.

The estimate of the capabilities of the Chhatísgarh coal-field remains unchanged, though a seam of workable coal has been discovered and proved in one place near Korba. The example of the Mohpáni colliery, however, shows how necessary it is to carefully examine a seam before expensive works are undertaken; and, here also, it would be very hazardous to commence operations until further borings are made. With regard to the other great coal areas in Chhatísgarh, which have as yet given most indifferent and, in some cases, unreliable boring assays, a few trial pits to test the coal in bulk are about to be carried out. Mr. Oldham's further explorations in Rájputána have not yielded any

more promising evidence as to the coal possibilities in that region. Nor does his report on the long-known bituminous occurrence at Tijára in Ulwar do more than confirm the conclusion formerly arrived at that the substance is merely a superficial deposit of sandy clay, containing vegetable organic matter, formed on the site of a deserted village. The substance burns, but, owing to the small amount, is of no use except locally for fuel. Mr. La Touche while employed by the Kashmír Darbár in examining the sapphire deposits in the Zanskár district, the survey of which has not yet been completed, has also explored the coal outcrops at Jammu, originally brought to notice by Mr. Medlicott. He is inclined to look hopefully on the occurrence, provided some method can be devised for compressing the very crushed and powdery fuel procurable into bricks. The one coal-field (Singareni) in the Madras Presidency is at last being worked under the direction of Mr. Hughes, and we may now hope for extended and definite information regarding its capabilities; and, by comparison, the possibilities of the other areas of coal-measures known to occur further to the west in the Godávarí Valley. The Singareni field has always laboured under the disadvantage of being known only to the Geological Survey by its one outcrop and its area. The borings made, though on the sites marked out by Dr. King, were not put down under the direction of the Survey and consequently nothing is known by it of the character or quality of the samples of coal, or of carbonaceous shale (as it is feared some of them were) brought up from the borings. Though Upper Burmah has not yet come under the systematic work of the Survey, Mr. E. J. Jones has been able to send in some useful reports on the principal coal fields, and on the metalliferous mines in the Shán Hills.

Scientific.—Much and interesting information has been obtained on matters bearing strictly on scientific geology. The discussion on the geology of the Salt Range, arising out of Dr. Warth's find of concretions, and pebbly concretions containing *Conularia*, in the boulder bed at the base of the "speckled sandstones" and the "olive shales," and its bearing on the original observations of Wynne and Waagen, and the later ones of Oldham, has ceased for the present; and the old term 'olive shales' (presumed cretaceous) will now be discarded as a formational group, it being really identical with the "speckled sandstones" of the western portion of the range, of which the palæozoic (or 'upper carboniferous,' according to Dr. Waagen's latest conclusions) age was already inferred or known. So much being settled, the term 'speckled sandstone' will stand in the Salt Range nomenclature and classification.

Mr. Oldham has also visited Ladák and Kashmír with a view to determining how far the discrepancies between the sequence of beds

in Kashmír as described by Mr. Lydekker, and that of the Simla region were real. His report brings out points in what we may term the new view of the origin of the crystalline rocks, in the working out of which Col. C. A. Macmahon has done such excellent service, and to the microscopic study of which Mr. C. S. Middlemiss is now applying himself. The difficulty of distinguishing between gneissose granite and granitoid gneiss, still exists and gives rise to much diversity of opinion; and, perhaps too, the origin and recognition of the gneisses themselves are as controversial subjects among geologists as any. It is, therefore, interesting to notice that Mr. Oldham is at times, (particularly regarding the 'central gneiss' of the Wangar Valley) as decided in his recognition of their sedimentary origin from well defined and parallel beds differing in lithological and mineralogical structure, as some of his predecessors of so far back as 1857. While crossing the Bábeh Pass, Mr. Oldham noted that one of the most striking features is the marked absence of distinct traces of glaciers south of the pass and their presence north of it; on the latter side glacier evidences extend to a distance of 3000 feet below and 17 miles from the crest, while on the south no certain traces can be found below 1000 feet, or about half a mile from the summit. Mr. Oldham remarks that this difference is paralleled by the present distribution of ice, and that the contrast is doubtless due to the fact that the waste is much less on the north than on the south side, not only from the intensity of the sunshine being less, but to a much larger extent owing to the comparative absence of rain, little of which falls north of the pass, while there is probably a much less proportional difference in the snow-fall.

Regarding the very interesting question of the origin of the Rupshu lakes, Mr. Oldham does not think that the simple view of their arising out of the damming up of river valleys by the fans of their tributaries is completely satisfactory. In some cases, it may be that these fans form the entire barriers: but it would seem that local elevation of the river valley at a more rapid rate than that of the erosion of the river must be brought in as an ultimate cause. Mr. Oldham also suggests that the gradual and progressive drying up of Ladák appears to have been a direct result of the gradual elevation of the Himálaya, which in course of time cut off a larger and larger proportion of the moisture coming from the south. The lake basin and karewahs of Kashmír, which have hitherto been accounted for, either by a glacier descending into the Jhelam Valley, or by the formation of a talus fan similar to the supposed barriers of the Rupshu lakes, rather than by the more obvious hypothesis of a rock barrier since cut through, have also received notice from the same writer. He again falls back on the

supposition that, during the elevation of the Himálaya, there have been times when the rocky bed of a river has been elevated more rapidly than it could erode its channel, a deposit being formed above the barrier; and that this is the case in Kashmír, the greater extent of the valley being partly due to its drainage escaping across the junction of the Pír Panjál and Hazára systems of disturbance, a region which may well have been exposed to more repeated or extensive upheavals than other parts of the Himálaya.

Mr. R. Lydekker has added to the utility and completeness of the 'Records of the Survey,' by his excellent resumé of the 'Fossil Vertebrata of India;' and his description of the 'Eocene Chelonia of the Salt Range,' forms the new fasciculus of the 'Palæontologia Indica.' The issue of the concluding part of Dr. Waagen's great work on the 'Productus Limestone Fossils' of the Salt Range has only been temporarily delayed. Professor Martin Duncan's "notes on the *Echinoidea* of the cretaceous series in the Lower Narbada Valley," published by the Survey, and arising out of the views put forward by Mr. P. N. Bose in his memoir on the geology of the Lower Narbada Valley, is, as might be expected, a scholarly and courteous consideration of these views; and following this, it is eminently satisfactory to learn from Dr. Nöetling, the Palæontologist of the Survey, that his examination of the *Ammonitidæ* collected by Mr. Bose, entirely confirms Dr. Duncan's original conclusions regarding the exclusively Cenomanian age of these Bág fossils.

Meteorology.—There is not much to record in the science of meteorology in India during the past year, though steady progress is undoubtedly being made both in Europe and India. The recent visit of a distinguished English meteorologist has, judging from his subsequent writings, been the means of calling attention to what has been pointed out by Indian workers for years, the marked differences between the meteorology of Temperate (European) and Tropical (Indian) regions. Rain, for example, occurs in India in many cases under conditions different from those obtaining in Europe. Several of the more important features of cyclones are far more prominent in the Bay of Bengal than in the Atlantic, whilst others again are much less strongly marked. Ascensional movement of the air occurs on a larger, grander scale, and far more regularly than in Europe, exercising a powerful influence on the character of the weather. In India, weather forecasting must, therefore, probably take a different course from that which it has done in Europe and America, and indeed the forecasts of storms in the Bay of Bengal are more satisfactory and more to be relied upon than of those which visit the British shores from the Atlantic.

The forecast of weather in India for 24 hours in advance is, for the greater part of the year, a very easy matter, though, owing to the great distances, it is not easy to disseminate the information in time to be of practical value to those immediately interested. Seasonal forecasts have now been attempted with fair success for some years; and it is this branch of the science which seems likely to develop into a very useful aid to the administration. The recent disastrous shipwrecks drew attention to the storm-signal service for the protection of the Húghli and its approaches, and to the necessity for connecting Port Blair with the Meteorological office in Calcutta, and the Eastern Channel Light-ship by a cable with the mainland, in order to watch the progress of the larger cyclones. I regret that neither of these measures has, as yet, been carried into execution. Arrangements have, however, been made for warning all the more important ports in the Bay of Bengal from Maulmain to Negapatam of the existence and approach of dangerous storms, and arrangements are in progress for warning the ports at present unprotected on the Bombay side, which, when completed, will place the whole coast of India in communication with the telegraphic signal service.

The daily report, issued by the Simla office and based on observations at about 100 stations, has been considerably improved during the past year. It is now issued with a chart shewing the distribution of pressure, rainfall, wind direction and force throughout India for the day reported on. The charts of the Arabian Sea shewing the mean distribution of pressure, wind and currents, month by month, have been published on the same plan as those of the Bay of Bengal, noticed by me last year. Charts of the Bay of Bengal, shewing the specific gravity, distribution of the temperature of the air and of the surface water, have also been issued, and similar charts for the Arabian Sea are in preparation, thus completing the work commenced some years ago on marine meteorology, and based on the observations accumulated by the Board of Trade, during the years 1855—1878.

The PRESIDENT announced that the Scrutineers reported the result of the election of Office-Bearers and Members of Council to be as follows:—

President.

Lieut.-Col. J. Waterhouse, B. S. C.

Vice-Presidents.

E. T. Atkinson, Esq., B. A., C. S.
Rájá Rájendralála Mitra, C. I. E., D. L.
J. Wood-Mason, Esq.

Secretaries and Treasurer.

J. Wood-Mason, Esq.
Dr. A. F. R. Hoernle.
H. M. Percival, Esq., M. A.
A. Pedler, Esq., F. C. S.

Other Members of Council.

D. Waldie, Esq., F. C. S.
C. H. Tawney, Esq., M. A.
Babu Pratápa Chandra Ghosha, B. A.
Hon. Dr. Mahendralál Sarkár, C. I. E.
E. Gay, Esq., M. A.
Pandit Mahámahopádhyáya Maheschandra Nyáyaratna, C. I. E.
H. Beveridge, Esq., C. S.
W. King, Esq., B. A., D. Sc.
Nawab Abdul Latif Bahádur, C. I. E.
A. Simson, Esq.
Dr. J. Scully.
Pandit Haraprasád Sástri, M. A.

The meeting was then resolved into the Ordinary Monthly General meeting.

LT.-COL. WATERHOUSE on taking the chair said:—

GENTLEMEN,—I have to tender you my warm acknowledgments for the great and unexpected honour you have done me in electing me to the honourable and responsible position of President of this Society. I must own my first impulse was to decline the honour in favour of some one possessing better scientific or literary qualifications, and with more time at his disposal to devote to the service of the Society. Friends, however, dissuaded me from taking a step which might have appeared ungracious, or due to a desire to evade duties which my long connection with the Council of the Society seemed to render incumbent upon me. I therefore resolved to accept the post if it were the pleasure of the Society that I should do so, and endeavour to fulfil its responsibilities to the best of my power. I need not say that personally it is very gratifying to me to be in a position to advance the interests of the Society. I can only regret that the rules of the Society prevented the longer continuance in office of our late esteemed President, who has done so much to aid the work of the Society both in the Philological and Natural History Departments, and I would propose that a vote of thanks be passed to him for his great services to the Society during his term of office. (*The vote of thanks was carried unanimously.*)

After the very able and interesting exposition of the work of the Society Mr. Atkinson has just given us I need not enter into that subject, and can only hope that notwithstanding my want of qualification for the post of President, the Society may at any rate not go back in its career of usefulness.

The minutes of the last meeting were read and confirmed.

Thirty-three presentations were announced, details of which are given in the Library List appended.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members.

Dr. A. Alcock.
W. L. Sclater, Esq.
H. H. Anderson, Esq.
Major C. H. E. Adamson.
W. H. Lee, Esq.
Hon. Ajodhyánáth Pandit.

The following gentleman has intimated his wish to withdraw from the Society.

E. F. Mondy, Esq.

The PRESIDENT announced that, in accordance with Rules 37 and 38 of the Society's Bye Laws, the names of the following gentlemen had been posted up as defaulting members since the last monthly General Meeting, and would now be removed from the list of Members, and the fact published in the Proceedings.

Sirdar Gurdyal Sing.
Rev. A. E. Medlycott.

The PRESIDENT announced that Babu Gaurdás Baisák had compounded for his subscription for life as a Non-Resident member by the payment in a single sum of Rs. 100.

Babu SARATCHANDRA DÁS exhibited the charmed horn called *Thunrva*, used by the Tantriks of Tibet.

The NATURAL HISTORY SECRETARY read the following letter from Lieut.-Col. Allan Cunningham, R. E. remarking upon a statement contained in Babu Asutosh Mukhopádhyáy's paper on "Monge's Differential Equation to all Conics," published in the Journal, Part II, No. 2 for 1887:—

Brompton Barracks, Chatham, England, 29th December, 1887.

"At page 134 of Part II, No. 2, of the Journal of the Asiatic Society

of Bengal for 1887 there is a Paper on "Monge's Differential Equation to all Conics" wherein the author quotes the late Dr. Boole's remark that our powers of geometrical interpretation fail for this equation, (and presumably for nearly all except those of straight line and circle).

I would refer your readers to Vol. XIV of the Quarterly Journal of Pure and Applied Mathematics for 1877, page 226, wherein I gave three general geometric interpretations of differential equations in general.

These were as follows:—

1. The curve whose differential equation is of the m^{th} order can be drawn so as to satisfy m independent consistent conditions.

2. If the m^{th} order differential equation of a curve F be satisfied at any point of another curve f, then these curves have contact at that point of the m^{th} order (one degree higher than ordinary).

3. All fundamental geometric quantities (*e. g.* lengths, areas, eccentricities &c) connected with a variable curve F possessing m degrees of freedom and osculating in the highest or $(m-1)$ degree another fixed curve *of same species*, similarly *conditioned*, are constant right round the latter.

This last condition is the generalized form of those given by Boole for the straight line and circle: the interpretation of the Mongian thus becomes:—"The eccentricity of the osculating conic of a given conic is constant all round the latter." For proofs, see the paper referred to."

Babu Asutosh Mukhopádhyáy made the following remarks in reply:

Mr. President and Gentlemen,

When my paper on Monge's equation was read before the Society, I was not aware of Lt.-Col. Cunningham's paper, and, in fact, I had not the opportunity of examining it till I had learnt the contents of the letter which has just been read to you. With reference to the letter, and the paper to which we are referred therein, I will remark in the first place that they do not touch upon any of the vital points discussed in my paper. You may remember that my paper on Monge's equation was devoted principally to a consideration of four things, *viz.*, the easiest way of forming the Mongian differential equation from the integral equation of the conic, the integration of the Mongian by ordinary methods,* the permanency of form of the equation, and lastly, a cri-

* I find that in the *Messenger of Mathematics*, (Vol. XVII, pp. 118—145, December 1887 to February 1888), there is a paper by Col. Cunningham on the Depression of Differential Equations, the chief object of which seems to be the solution of the Mongian equation in different ways; I find that my transformation (*Journal*, A. S. B. Vol. LVI, Part II, p. 138) is reproduced on pp. 141—142, of course, without the slightest acknowledgement that it had been given before by me; that the Colonel was acquainted with my paper at the date of the publication of his article, is now sufficiently obvious, and his reasons for not acknowledging that the transformation in question had been given six months before by me, are best known to him.

ticism of Professor Sylvester's geometrical interpretation of the equation. Under this last head, which I consider to be the most important part of my paper, I pointed out that Professor Sylvester's interpretation was not anything like the one which had been sought for by mathematicians, and I took care to explain as fully and as clearly as I could, my reasons for differing from that eminent authority. To none of these points do the Colonel's remarks refer.* On the other hand, he takes objection to the statement which I incidentally made that as Professor Sylvester's interpretation cannot be accepted, the true interpretation has yet to be found; and the Colonel claims to have given the true interpretation in a paper published by him eleven years ago in the Quarterly Journal of Mathematics (Vol. XIV, 226—229). Before enquiring into the correctness or otherwise of the interpretation given in that paper, I may point out that Professor Sylvester's interpretation, which in my former paper was proved to be untenable, was given in 1886, and, while giving his own interpretation, the Professor not only made no mention of the Colonel's paper, but in fact seemed to hold, at least implicitly,† that he was himself the first person to give the true interpretation. Now, this could arise only in one of two ways, *viz.*, either Professor Sylvester had some doubts as to the soundness of the interpretation given by Col. Cunningham, or he was not at all aware of the Colonel's interpretation; as to the improbability of the latter assumption, I will simply say that Professor Sylvester's name appears as that of one of the editors on the title-page of that very volume of the Quarterly Journal which contains the Colonel's paper.

I shall now proceed to consider the Colonel's interpretation, and, I may tell you at once that after a very careful consideration of the subject, I have come to the conclusion that it is not at all the true interpretation of the Mongian equation. As there seems to be a total misconception about the true nature of the process of geometrical interpretation of differential equations, I shall first point out as clearly as I can, what I consider to be the only logical and correct view of the subject. In the first place, then, the integral equation of every curve contains a certain number of available arbitrary constants, by assigning particular values to which we may obtain all the curves of the family; the differential equation, on the other hand, being free from constants, denotes all the curves of the system. Now, it is well-known that the differential equation always comes out in the form

$$F = 0,$$

* I may mention here that Professor Cayley in a letter to me from Cambridge (14th September, 1887) remarks about my criticism of Professor Sylvester, that "it is, of course, all perfectly right."

† See American Journal of Mathematics, Vol. IX, pp. 18—19.

where F is a certain function of the variables and the differential coefficients; and, the process of geometrical interpretation of the differential equation is simply the process of discovering the geometrical meaning of the quantity which we have denoted by F; in other words, we are required to find out a geometrical quantity, represented by F, which vanishes at every point of every curve of the system whose differential equation is

$$F = 0.$$

It is clear, therefore, that there are two tests which may be applied if we wish to examine whether a proposed interpretation of a given differential equation is relevant or not, *viz.*,

1. The interpretation must give a property of the curve whose differential equation we are interpreting; in fact, it must give a geometrical quantity which vanishes at every point of every curve of the system.

2. The geometrical quantity must be adequately represented by the differential equation to be interpreted.

To illustrate these propositions, let us first take the simple case of a straight line; the integral equation being

$$y = mx + b,$$

the differential equation is

$$\frac{d^2y}{dx^2} = 0,$$

and the interpretation clearly is that the curvature vanishes at every point of every straight line.

Again, in the case of the circle, the integral equation being

$$x^2 + y^2 + 2gx + 2fy + c = 0,$$

the differential equation is

$$\left\{1 + \left(\frac{dy}{dx}\right)^2\right\} \frac{d^3y}{dx^3} - 3\frac{dy}{dx}\left(\frac{d^2y}{dx^2}\right)^2 = 0,$$

and the only true geometrical interpretation of this equation is that the angle of aberrancy vanishes at every point of every circle.

Let us now take Col. Cunningham's interpretation, *viz.*, the eccentricity of the osculating conic of a given conic is constant all round the latter. From what I have already explained to you, it is clear that this cannot be the geometric interpretation of the Mongian equation; it fails to furnish a geometrical quantity which, while adequately represented by the differential equation, vanishes at every point of every conic; in fact, it satisfies neither of the fundamental tests I have laid down. I may also point out that the general theorem which Col. Cunningham lays down, *viz.*, the constancy of all fundamental properties of the osculating curve, is, for similar reasons, not at all the geometric

meaning of the differential equation of any curve. The other interpretations given in the Colonel's paper are similarly wholly extraneous. To my mind, the matter appears to be simply this, *viz.*, the differential equation of any curve is nothing but the analytical representation of the vanishing of a certain geometrical quantity in connection with that curve, and the geometrical interpretation is exactly the process of discovering what this quantity is; Professor Sylvester's interpretation is irrelevant as not satisfying the first test laid down above, and Col. Cunningham's interpretation, as satisfying neither of the tests, has surely no better claims to our attention.

But, gentlemen, it is possible to prove not only that the Colonel's interpretation has entirely missed the mark, but also that it is the interpretation of a differential equation very different from the Mongian equation; and, guided by the wholly erroneous interpretations which Col. Cunningham has given in the case of the straight line and circle, I have been able to discover the differential equation to which in reality belongs the geometrical interpretation given by the Colonel. In fact, as we have already *a priori* shewn that the Colonel's interpretation is irrelevant, we may further strengthen our position by shewing that the interpretation belongs to a differential equation, which, though wholly distinct from the Mongian equation, stands in a very important relation to it.

Let us first take the case of the straight line, whose differential equation is interpreted by the Colonel to mean that the direction of a straight line is the same at all parts; this, as have already remarked, is totally erroneous. But, at the same time, the geometrical property is obviously the interpretation of the equation.

$$\frac{dy}{dx} = m,$$

which we at once recognize to be the first integral of

$$\frac{d^2y}{dx^2} = 0$$

which is the differential equation of all straight lines.

Similarly, in the case of the circle, the interpretation given by the Colonel, *viz.*, the curvature of a circle is constant, really belongs to the equation

$$\frac{\left\{1+\left(\frac{dy}{dx}\right)^2\right\}^{\frac{3}{2}}}{\frac{d^2y}{dx^2}} = r,$$

which, again, we recognize to be a first integral of

$$\left\{1+\left(\frac{dy}{dx}\right)^2\right\}\frac{d^3y}{dx^3}-3\frac{dy}{dx}\left(\frac{d^2y}{dx^2}\right)^2=0$$

which is the differential equation of all circles. Guided by these two analogous cases, we guess that the Colonel's interpretation in the case of the conic may belong to a first integral of the Mongian equation, and, this point we now proceed to examine; the process will consist of two parts, *viz.*, we shall first form the differential equation whose interpretation is that the eccentricity of the osculating conic of any conic is constant, and, secondly, we shall examine whether this differential equation is a first integral of the Mongian equation.

The Mongian equation being one of the fifth order, it is clear that it has five independent first integrals, and, curiously enough, gentlemen, Col. Cunningham's interpretation does not belong to any of those first integrals which may easily be derived from the equation. Consider, now, the osculating conic of any conic; the equations of the two conics are identical, *viz.*, either being

$$ax^2+2hxy+by^2+2gx+2fy+c=0,$$

we have

$$y=Px+Q\pm\sqrt{Ax^2+2Hx+B},$$

where

$$P=-\frac{h}{b},\ Q=-\frac{f}{b},$$

$$A=\frac{h^2-ab}{b^2},\ H=\frac{hf-bg}{b^2},\ B=\frac{f^2-bc}{b^2}.$$

Hence, as usual,

$$\frac{dy}{dx}=P\pm\frac{Ax+H}{(Ax^2+2Hx+B)^{\frac{1}{2}}}$$

$$z=\frac{d^2y}{dx^2}=\pm\frac{AB-H^2}{(Ax^2+2Hx+B)^{\frac{3}{2}}}$$

$$\frac{dz}{dx}=\frac{d^3y}{dx^3}=\mp\frac{3(AB-H^2)\ (Ax+H)}{(Ax^2+2Hx+B)^{\frac{5}{2}}}$$

$$\frac{d^2z}{dx^2}=\frac{d^4y}{dx^4}=\pm\frac{3(AB-H^2)\left\{4(Ax+H)^2-(AB-H^2)\right\}}{(Ax^2+2Hx+B)^{\frac{7}{2}}}.$$

Now, as shewn in my previous paper (*Journal A. S. B.* Vol. LVI, Part II, 140), if we employ $z^{-\frac{1}{3}}$ as an integrating factor, a first integral is obtained from

$$z^{-\frac{5}{3}}\frac{d^3z}{dx^3}-5z^{-\frac{8}{3}}\frac{dz}{dx}\frac{d^2z}{dx^2}+\frac{40}{9}z^{-\frac{11}{3}}\left(\frac{dz}{dx}\right)^3=0$$

to be

$$z^{-\frac{5}{3}}\frac{d^2z}{dx^2}-\frac{5}{3}z^{-\frac{8}{3}}\left(\frac{dz}{dx}\right)^2=-3c_1.$$

The value of the left hand side is found on calculation to be

$$-3A\,(AB-H^2)^{-\frac{2}{3}}.$$

Hence,

$$c_1=A\,(AB-H^2)^{-\frac{2}{3}}=\frac{h^2-ab}{\Delta^{\frac{2}{3}}}$$

where Δ is the discriminant of the conic. But, as the area of the conic is

$$\frac{\pi\Delta}{(ab-h^2)^{\frac{3}{2}}},$$

we have

$$(\text{Area})^{\frac{2}{3}}=-\frac{\pi^{\frac{2}{3}}}{c_1}.$$

It follows, therefore, that the geometric meaning of the above first integral of the Mongian equation is the constancy of the *area* of the osculating conic.

Another first integral may be obtained as follows, *viz.*, employing $z^{-\frac{1}{3}}$ as an integrating factor, we have from

$$z^{-\frac{7}{3}}\frac{d^3z}{dx^3}-\left(\frac{7}{3}+\frac{8}{3}\right)z^{-\frac{10}{3}}\frac{dz}{dx}\frac{d^2z}{dx^2}+\frac{40}{9}z^{-\frac{13}{3}}\left(\frac{dz}{dx}\right)^3=0$$

the first integral

$$z^{-\frac{4}{3}}\frac{d^2z}{dx^2}-\frac{4}{3}z^{-\frac{10}{3}}\left(\frac{dz}{dx}\right)^2=3c_2.$$

The value of the left hand side is found on calculation to be (always taking the upper sign)

$$-3\,(AB-H^2)^{-\frac{1}{3}}.$$

Hence,

$$c_2=-(AB-H^2)^{-\frac{1}{3}}.$$

But, as

$$AB-H^2=\frac{\Delta}{b^3},$$

we have

$$c_2=-b\Delta^{-\frac{1}{3}},$$

so that this first integral shews the constancy of

$$\frac{\Delta}{b^3}.$$

It may be noted that both the above first integrals may be obtained

from Roberts' Theorem that

$$cz^{\frac{2}{3}} + c'z^{\frac{10}{3}} = \left(\frac{dz}{dx}\right)^2$$

is a second integral of the Mongian equation, *viz.*, differentiate this equation, then, eliminating c, we have one first integral, and, eliminating c', we have the other.

The constancy of the quantities shewn above may also be shewn in another way, *viz.*, as Dr. Wolstenholme has shewn by actual calculation, (Educational Times Reprint, t. XXIV, 105) the equation of the conic leads to

$$\left(\frac{d^3y}{dx^3}\right)^2 = \frac{9b}{\Delta^{\frac{1}{3}}}\left(\frac{d^2y}{dx^2}\right)^{\frac{10}{3}} + \frac{9(h^2-ab)}{\Delta^{\frac{2}{3}}}\left(\frac{d^2y}{dx^2}\right)^{\frac{8}{3}}.$$

But, if we have

$$\left(\frac{d^3y}{dx^3}\right)^2 = c'\left(\frac{d^2y}{dx^2}\right)^{\frac{10}{3}} + c\left(\frac{d^2y}{dx^2}\right)^{\frac{8}{3}},$$

where c, c' are any two constants, we see that by differentiating twice and eliminating c, c', the Mongian equation is obtained; hence, the quantities

$$\frac{b}{\Delta^{\frac{1}{3}}}, \frac{h^2-ab}{\Delta^{\frac{2}{3}}}$$

are constants. From these we have

$$c_2^2 = b^2\Delta^{-\frac{2}{3}}$$

$$c_1 = (h^2-ab)\,\Delta^{-\frac{2}{3}},$$

so that

$$\frac{c_1}{c_2^2} = \frac{h^2-ab}{b^2}.$$

These relations, however, do not shew the constancy of the eccentricity; but, as the Mongian being an equation of the fifth order has five independent first integrals, the fact of the eccentricity of the osculating conic being constant is probably the geometrical interpretation of one of the other three first integrals; before, however, actually proceeding to form that equation, we shall show how the constancy of the eccentricity may be otherwise established. Thus, we have

$$z = \pm\frac{(AB-H^2)}{(Ax^2+2Hx+B)^{\frac{3}{2}}}$$

or,

$$Ax^2+2Hx+B = \frac{(AB-H^2)^{\frac{2}{3}}}{z^{\frac{2}{3}}},$$

and, from

$$\frac{dz}{dx} = \mp\ 3\ (AB - H^2)\ (Ax+H)\ (Ax^2+2Hx+B)^{-\frac{5}{2}}$$

$$= \mp\ 3\ (Ax+H)\ z^{\frac{5}{3}}\ (AB-H^2)^{-\frac{2}{3}},$$

we have

$$Ax+H = \mp\ \tfrac{1}{3}\ \frac{z^{-\frac{5}{3}}}{(AB-H^2)^{-\frac{1}{3}}}\ \frac{dz}{dx}.$$

Substituting in

$$\frac{dy}{dx} = P \pm \frac{Ax+H}{(Ax^2+2Hx+B)^{\frac{1}{2}}},$$

we get, after reduction

$$\frac{dy}{dx} - P = -\tfrac{1}{3}\ \frac{(AB-H^2)^{\frac{1}{3}}}{z^{\frac{4}{3}}}\ \frac{d^3y}{dx^3}.$$

Now, it is clear from the mode of genesis of this equation, that if we differentiate it twice and eliminate

$$P,\ (AB-H^2)^{\frac{1}{3}},$$

we should obtain Monge's equation; but, that would also be the case, if

$$P,\ (AB-H^2)^{\frac{1}{3}}$$

are replaced by any two constants; hence, it follows that P and $(AB-H^2)$ are constants. Now, as we have already shewn that

$$\frac{h^2-ab}{b^2} = \frac{h^2}{b^2} - \frac{a}{b}$$

is a constant, we see, by remembering that

$$P = -\frac{h}{b},$$

that $\frac{a}{b}$ is also a constant. But, the equation of the eccentricity is

$$\frac{(2-e^2)^2}{1-e^2} = \frac{(a+b)^2}{ab-h^2} = \frac{\left(\frac{a}{b}+1\right)^2}{\frac{a}{b} - \frac{h^2}{b^2}};$$

so that it follows at once that the constancy of the eccentricity is the geometrical interpretation of a first integral of the Mongian equation.

We now proceed to form the actual differential equation whose geometrical meaning is the constancy of the eccentricity. The above investigation shews that

$$K_1 \left(\frac{d^2y}{dx^2}\right)^{\frac{4}{3}} + K_2\ \frac{d^3y}{dx^3} = \frac{dy}{dx} \left(\frac{d^2y}{dx^2}\right)^{\frac{1}{3}}$$

where K_1, K_2 are any two constants is a second integral of the Mongian equation. From this we have

$$\frac{d}{dx}\left[\frac{\left(\frac{dy}{dx}-P\right)\left(\frac{d^2y}{dx^2}\right)^{\frac{4}{3}}}{\frac{d^3y}{dx^3}}\right]=0.$$

Taking the logarithmic differential, we get

$$\frac{\frac{d^2y}{dx^2}}{\frac{dy}{dx}-P}+\frac{4}{3}\frac{\frac{d^3y}{dx^3}}{\frac{d^2y}{dx^2}}-\frac{\frac{d^4y}{dx^4}}{\frac{d^3y}{dx^3}}=0$$

which gives

$$P=\frac{3\frac{dy}{dx}\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-4\frac{dy}{dx}\left(\frac{d^3y}{dx^3}\right)^2-3\left(\frac{d^2y}{dx^2}\right)^2\frac{d^3y}{dx^3}}{3\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-4\left(\frac{d^3y}{dx^3}\right)^2}$$

Let,

$$U=3\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-5\left(\frac{d^3y}{dx^3}\right)^2$$

$$V=3\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-4\left(\frac{d^3y}{dx^3}\right)^2$$

$$W=4\frac{dy}{dx}\left(\frac{d^3y}{dx^3}\right)^2+3\left(\frac{d^2y}{dx^2}\right)^2\frac{d^3y}{dx^3}-3\frac{dy}{dx}\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}$$

$$=3\left(\frac{d^2y}{dx^2}\right)^2\frac{d^3y}{dx^3}-V\frac{dy}{dx}.$$

Now as

$$P=-\frac{h}{b},$$

we have

$$\frac{h}{b}=\frac{W}{V}=c_3, \text{ say.}$$

But, we have shewn that

$$\frac{c_1}{c_2^2}=\frac{h^2}{b^2}-\frac{a}{b},$$

whence,

$$\frac{a}{b}=c_3^2-\frac{c_1}{c_2^2},$$

$$\frac{h}{b}=c_3.$$

Therefore, the equation for the eccentricity becomes

$$\frac{(2-e^2)^2}{1-e^2}=\frac{\left(\frac{a}{b}+1\right)^2}{\frac{a}{b}-\frac{h^2}{b^2}}=\frac{\left\{c_2^2(1+c_3^2)-c_1\right\}^2}{-c_1c_2^2}.$$

To get the actual equation for the eccentricity, we have now simply to substitute for c_1, c_2, c_3 the differential expressions to which they are equivalent. For this purpose, we recall that the two first integrals

$$z^{-\frac{5}{3}}\frac{d^2z}{dx^2}-\frac{5}{3}z^{-\frac{8}{3}}\left(\frac{dz}{dx}\right)^2=-3c_1$$

$$z^{-\frac{7}{3}}\frac{d^2z}{dx^2}-\frac{4}{3}z^{-\frac{10}{3}}\left(\frac{dz}{dx}\right)^2=\quad 3c_2$$

lead to the relations

$$3\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-5\left(\frac{d^3y}{dx^3}\right)^2=-9c_1\left(\frac{d^2y}{dx^2}\right)^{\frac{8}{3}},$$

$$3\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-4\left(\frac{d^3y}{dx^3}\right)^2=\quad 9c_2\left(\frac{d^2y}{dx^2}\right)^{\frac{10}{3}},$$

which give

$$9c_2\left(\frac{d^2y}{dx^2}\right)^{-\frac{10}{3}}=\quad \mathrm{V}$$

$$9c_1\left(\frac{d^2y}{dx^2}\right)^{-\frac{8}{3}}=-\mathrm{U}.$$

Hence, we have

$$1+c_2^2=1+\frac{\mathrm{W}^2}{\mathrm{V}^2}=\frac{\mathrm{W}^2+\mathrm{V}^2}{\mathrm{V}^2}$$

and

$$c_2^2(1+c_3^2)=\frac{\mathrm{W}^2+\mathrm{V}^2}{81\left(\frac{d^2y}{dx^2}\right)^{\frac{20}{3}}}.$$

Therefore,

$$c_2^2(1+c_3^2)-c_1=\frac{\mathrm{W}^2+\mathrm{V}^2}{81\left(\frac{d^2y}{dx^2}\right)^{\frac{20}{3}}}+\frac{\mathrm{U}}{9\left(\frac{d^2y}{dx^2}\right)^{\frac{8}{3}}}$$

$$=\frac{\mathrm{T}\,\mathrm{V}}{81\left(\frac{d^2y}{dx^2}\right)^{\frac{20}{3}}},$$

where

$$\mathrm{T}=3\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}-4\left(\frac{d^3y}{dx^3}\right)^2+3\left(\frac{dy}{dx}\right)^2\frac{d^2y}{dx^2}\frac{d^4y}{dx^4}$$
$$-4\left(\frac{dy}{dx}\right)^2\left(\frac{d^3y}{dx^3}\right)^2+9\left(\frac{d^2y}{dx^2}\right)^4-6\frac{dy}{dx}\left(\frac{d^2y}{dx^2}\right)^2\frac{d^3y}{dx^3}.$$

Also,

$$c_1 c_2^2 = -\frac{U V^2}{729 \left(\frac{d^2y}{dx^2}\right)^{\frac{2s}{3}}}.$$

Hence, finally, we have

$$\frac{(2-e^2)^2}{1-e^2} = \frac{\left\{c_2^2 (1+c_3^2) - c_1\right\}^2}{-c_1 c_2^2}$$
$$= \frac{1}{9\left(\frac{d^2y}{dx^2}\right)^4} \cdot \frac{T^2}{U}.$$

This, therefore, is the differential equation to which in reality belongs Col. Cunningham's interpretation. I may mention in passing that when $e^2 = 2$, we have $T = 0$, and, when $e^2 = 1$, we have $U = 0$; so that, $T = 0$ is the differential equation of all equilateral hyperbolas, $U = 0$ of all parabolas, $V = 0$ of all pairs of right lines, and, $W = 0$ of all central conics. I may also remark that I have never seen the eccentricity thus expressed in terms of the differential coefficients. Also, since

$$(\text{Area})^{\frac{2}{3}} = -\frac{\pi^{\frac{2}{3}}}{c_1}$$

and,

$$c_1 = -\frac{U}{9\left(\frac{d^2y}{dx^2}\right)^{\frac{8}{3}}}$$

we have,

$$\text{Area} = \frac{27\,\pi \left(\frac{d^2y}{dx^2}\right)^4}{U^{\frac{3}{2}}},$$

and, I have never seen the area expressed in this form.*

* Of course, the two absolute invariants, *viz.*, the area and the eccentricity, may be expressed in terms of the radius of curvature ρ, and arc, s; thus, we have

$$\text{Area} = \frac{27\,\pi\,\rho^2}{\left\{9 + \left(\frac{d\rho}{ds}\right)^2 - 3\rho\,\frac{d^2\rho}{ds^2}\right\}^{\frac{3}{2}}}$$

$$\frac{(2-e^2)^2}{1-e^2} = \frac{4}{9}\left\{9 + \left(\frac{d\rho}{ds}\right)^2\right\} + \frac{\rho^2\left(\frac{d^2\rho}{ds^2}\right)^2}{9 + \left(\frac{d\rho}{ds}\right)^2 - 3\rho\,\frac{d^2\rho}{ds^2}}.$$

We now proceed to verify that the differential equation

$$\frac{(2-e^2)^2}{1-e^2} = \frac{1}{9\left(\frac{d^2y}{dx^2}\right)^4} \cdot \frac{T^2}{U}$$

whose geometrical meaning is Col. Cunningham's theorem about the constancy of the eccentricity, is a first integral of the Mongian equation. Thus, putting

$$p = \frac{dy}{dx},\ q = \frac{d^2y}{dx^2},\ r = \frac{d^3y}{dx^3},\ s = \frac{d^4y}{dx^4},\ t = \frac{d^5y}{dx^5},$$

we have,

$$\frac{(e^2-2)^2}{1-e^2} = \frac{T^2}{9\,q^4\,U},$$

so that taking the logarithmic differential and remembering that

$$\frac{dT}{dx} = (1+p^2)(3\,qt - 5\,rs) + 10\,qr\,(3\,q^2 - 2\,pr)$$

$$\frac{dU}{dx} = 3\,qt - 7\,rs,$$

we get

$$q^2\,(3\,q^2 - 2\,pr)(45\,qrs - 9q^2t - 40\,r^3)$$
$$= (1+p^2)(qs - 2\,r^2)(45\,qrs - 9\,q^2t - 40\,r^3),$$

which proves that the equation of the eccentricity leads on differentiation to the equation

$$9\,q^2t - 45\,qrs + 40\,r^3 = 0$$

and is, therefore, a first integral of the Mongian equation.

Gentlemen, I have now examined the subject as completely as was necessary to shew the erroneous nature of Col. Cunningham's interpretation. I have explained to you, as lucidly as I could, the true meaning of geometrically interpreting a differential equation, and I have shewn you that the Colonel's interpretation signally fails to satisfy the fundamental tests which every geometrical interpretation ought to satisfy; I have, further, pointed out to you that the Colonel's interpretation really belongs to a differential equation which is quite distinct from the Mongian equation, and, by actually forming that equation (as I have never seen done before), I have proved it to be a first integral of theMongian equation. But, gentlemen, as this first primitive contains an arbitrary constant, it denotes any member of the given family of curves, while the differential equation itself indiscriminately denotes all the members of the family. Col. Cunningham's interpretation, therefore, involves a quantity, which remains constant as we pass from point to point on the same curve, but varies as we pass from one curve of the system to another. In reality, therefore, he failed to perceive the fundamental difference between a differential equation and its first primitive; he did not notice that while

the differential equation holds for every point of every curve of the system, the first primitive holds only for every point of the same curve, the different curves of the family being obtained by the variation of the constant which occurs in the first primitive. There can be no doubt that, failing to notice this distinction, Col. Cunningham has given an interpretation which belongs not to the Mongian equation but to one of its first primitives. Indeed, gentlemen, the error into which he has fallen reminds me of an old story with which you are familiar in eastern lore; you have often been told how an oriental king, desirious of testing the powers of an astrologer placed a finger-ring set with precious stones in a casket, and having closed it asked the astrologer to divine its contents; the astrologer moved the admiration of the prince when after long calculation, he pronounced the contents to be a hard stone, circular in form, with a hole in the centre and an object of every-day use; but, imagine the disappointment of the king when on pressing the astrologer, he was told that the hidden object was a grinding stone such as you find in every Hindu household. Such is the facility of error where we have to fix upon a particular object from a not very definite description of it, and, Col. Cunningham's paper shews that such an error is possible even in an exact science like mathematics. To sum up: the Colonel's remarks do not refer to any of the vital points of my paper, and, as to his geometrical interpretation of the Mongian equation, it is wholly irrelevant. I, therefore, stick to my statement that the true interpretation of the Mongian equation has yet to be found.*

The following paper was read—

On Poisson's Integral.—By BABU ASUTOSH MUKHOPÁDHYÁY, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of the author in the present paper has been mainly to discuss a remarkable definite integral, which was first considered by Poisson in his memoir on definite integrals, inserted in the tenth volume (seventeenth cahier) of the *Journal de l'école Polytechnique*. The paper is divided into four sections, of which the first is introductory. The second section is devoted to a consideration of the transformation of the integral; the method of reduction is first applied to a generalized indefinite form of Poisson's integral, from which Poisson's result is deduced with ease; and the process at once leads to four remarkable definite integrals which are believed to be new. The third section gives

* Since these remarks were made, I have succeeded in discovering the geometrical meaning of the differential equation of all parabolas, which I hope to communicate to the Society at an early date.

a symbolic value for π, which is deduced as an immediate consequence, as well of Poisson's integral, as of an analogous definite integral also considered by that eminent mathematician. The fourth section contains an interesting geometrical interpretation of the analytical transformation in Poisson's remarkable result; the geometrical property used is the well-known relation between the true and eccentric anomalies, with which we are familiar in the planetary theory; in conclusion, the geometrical interpretation leads to a definite integral which is evaluated.

The paper will be published in the Journal, Part II for 1888.

Library.

The following additions have been made to the Library since the Meeting held in January 1888.

Transactions, Proceedings and Journals,

presented by the respective Societies and Editors.

Baltimore. American Chemical Journal,—Vol. IX, No. 6, November, 1887.

————. American Journal of Philology,—Vol. VIII, No. 3. October, 1887.

————. Johns Hopkins University,—Circulars, Vol. VII, Nos. 60—61, November, December, 1887.

Birmingham. Birmingham Philosophical Society,—Proceedings, Vol. V, Part II, Session 1886-87.

Budapest. Magyar Tudományos Akadémia,—E'rtekczések, Kötet XIII Szám 3, 4, 6—12.

————. ————. Nyelvtudományi Közlemények, Kötet XX, Füzet 1—2.

————. ————. Régi Magyar Költök Tára, Kötet V.

————. ————. Mathematische und Naturwissenschaftliche Berichte aus Ungarn. Band IV.

————. ————. Ungarische Revue, Heft 1—7, 1887.

————. ————. Ethnologische Mitteilungen aus Ungarn, Jahrgang I, Heft. I.

Bombay. Anthropological Society, Journal, Vol. I, No. 3, 1887.

————. Indian Antiquary, Vol. XVII, Part CCIV, January 1888.

————. Royal Asiatic Society, Bombay Branch,—Journal, Vol. XVII, No. XLVI, 1887.

Calcutta. Geological Survey of India, Records, Vol. XX, Part 4.
———. Indian Engineering, Vol. III, Nos. 1—4.
———. The Indian Engineer,—Vol. IV, Nos. 8—9.
———. Meteorological Observations recorded at seven stations in India, corrected and reduced, August and September, 1887.
———. Stray Feathers, Vol. X, No. 6, 1887.
Dublin. Royal Geological Society of Ireland,—Journal, Vol. VIII, (new series), Part II.
Hamburg. Naturhistorisches Museum zu Hamburg,—Bericht, 1886.
London. The Academy,—Nos. 815—818.
———. The Athenæum,—Nos. 3138—3142.
———. Nature,—Vol. XXXVII, Nos. 946—950.
Mexico. La Sociedad Cientifica "Antonio Alzate",—Memorias, Tome I, No. 5.
Mendon, Ill. The American Antiquarian and Oriental Journal, Vol IX, No. 6, Nov., 1887.
Paris. La Société de Géographie,—Compte Rendu des Seances, Nos. 14—16, 1887.
Philadelphia. Academy of Natural Sciences of Philadelphia,—Proceedings, Part III, October—December 1886, Part I, January—April 1887.
———. American Philosophical Society,—Proceedings, Vol. XXIV, No. 125, January to June, 1887.
Rome. La Società degli Spettroscopisti Italiani,—Memorie, Vol. XVI, Dispensa 9ª, Settembre, 1887.
San Francisco. California Academy of Sciences,—Bulletin, Vol. II, No. 6, January 1887.
St. Petersburg. Comité Géologique,—Bulletins, Tome VI, Nos. 8—10 and supplement to Tome VI.
———. ———. Memoires, Vol. II, Nos. 4, 5, Vol. III, No. 3, 1887.
———. ———. La Société Impériale Russe de Géographie,—Journal, Tome XXIII, No. 5.
Trenton, N. J. Trenton Natural History Society,—Journal, Vol. I, No. 2, January, 1887.
Turin. La R. Accademia della Scienze di Torino,—Atti, Vol. XXIII, Disp. Iª, 1887-88.
Vienna. Des K. K. Naturhistorischen Hofmuseums.—Annalen, Band, II, Nr. 4.
———. Der K. K. Zoologisch-Botanischen Gesellschaft in Wien,—Verhandlungen, Band XXXVII, Quartal, 4.
Washington. United States Geological Survey,—Bulletins, Nos. 34-39, Index to Vol. IV, 1886.

Washington. Smithsonian Institution,—Annual Report, Part I, 1885.

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Zagreb. Hrvatskoga Arkeologickoga Druztva,—Viestnik, Godina X, Br. I.

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presented by the Authors, Translators, &c.

Adams, H. B. Circulars of Information of the Bureau of Education :— No. 1, 1887. The College of William and Mary. No. 2, 1887. The Study of History in American Colleges and Universities. 8vo. Washington, 1887.

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Gardner, Prof. P. New Greek coins of Bactria and India. 8vo. London, 1887.

Jolly, Prof. J. Mánava Dharma Sástra, the Code of Manu. Original Sanskrit Text. 8vo. London, 1887.

Kohler, Prof. Dr. J. Die Gewohnheitsrechte des Pendschabs. Separatabdruck aus Zeitschrift für vergleichende Rechtswissenchaft. 8vo.

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Fourth Annual Report of the Bureau of Ethnology 1882-83. 4to. Washington, 1886.

Bureau of Ethnology, Washington.

Mineral Resources of the United States, 1885. Division of Mining statistics and Technology. 8vo. Washington, 1886.

Monographs of the United States Geological Survey. Vol. X, Dinocerata, an extinct order of gigantic Mammals. 4to. Washington, 1886.

Geological Survey United States, Washington.

Report on the River-Borne Traffic of the Lower Provinces of Bengal, and on the Inland Trade of Calcutta, and on the Trade of Chittagong and the Orissa Ports, with notes on Road Traffic, for 1886-1887. Fcp. Calcutta, 1887.

Returns of the Rail-Borne Trade of Bengal, during the quarter ending the 30th September 1887. Fcp. Calcutta, 1888.

Report on the Rail-Borne Traffic of Bengal, during the year 1886-1887. Fcp. Calcutta, 1887.

Indian Forester,—Vol. XIII, No. 12, 1887, Vol. XIV, No. 1, 1888.

GOVERNMENT OF BENGAL.

Report on the search for Sanskrit Manuscripts in the Bombay Presidency during the year 1883-84. By Rámkrishna Gopál Bhándárkár, M. A., Ph. D. 8vo. Bombay, 1887.

GOVERNMENT OF BOMBAY.

Statement exhibiting the moral and material progress and condition of India during the year 1885-86. Fcp. London, 1887.

Review of Forest Administration in British India for the year 1885-86. Fcp. Simla, 1887.

Statistical Abstract relating to British India from 1876-77 to 1885-86. 8vo. London, 1887.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Annual Report on the Lunatic Asylums in the Madras Presidency for the year ending December 1886. Fcp. Madras, 1887.

Report on the Administration of the Madras Presidency during the year 1886-87. Fcp. Madras, 1887.

GOVERNMENT OF MADRAS.

Maps to accompany the Land Revenue Settlement Report of the Jhelum district, 1874-80.

GOVERNMENT OF PUNJAB.

Johns Hopkins University. Studies in Historical and Political Science, Fifth Series, XI. Seminary Libraries and University extension. By H. B. Adams. 8vo, Baltimore, 1887.

JOHNS HOPKINS UNIVERSITY, BALTIMORE.

Votják Népköltészeti Hagyományok. Gyüjtöttee és Forditotta Dr. Munkácsi Bernát. 8vo. Budapest, 1887.

A Phonetika Elemei, Különös Tekintettel a Magyar Nyelvre. Irta Dr. Balassa József. 8vo. Budapest, 1886.

MAGYAR TUDOMÁNYOS AKADEME'MIA, BUDAPEST.

Brief sketch of the Meteorology of the Bombay Presidency in 1886-87. By F. Chambers. Fcp. Bombay, 1887.

METEOROLOGICAL OFFICE, BOMBAY.

International Meteorological Observations, August, 1886. 4to. Washington, 1887.

Report on the Meteorology of India in 1886. By John Eliot, M. A. 4to. Calcutta, 1887.

METEOROLOGICAL REPORTER, GOVERNMENT OF INDIA.

Annual Report of the Director of the Royal Alfred Observatory, Mauritius, for the year 1886. Fcp. Mauritius 1887.

C. MELDRUM, ESQ.

Abhandlungen aus dem Gebiete der Naturwissenschaften. Band X.

Zeitschrift zur Feier des fünfzigjahrigen Bestehens des Naturwissenchaftlichen Vereins in Hamburg. 18th November 1887.

NATURWISSENSCHAFTLICHEN VEREINS, HAMBURG.

Prodromus of the Zoology of Victoria, or figures and descriptions of the living species of all classes of the Victorian indigenous animals. Decade XV. 8vo. Melbourne, 1887.

PUBLIC LIBRARY, VICTORIA.

Tide Tables for the Indian ports for the year 1888 (also January 1889). By Major J. Hill, R. E., in charge Tidal and Levelling operations, Survey of India, and E. Roberts, F. R. A. S., F. S. S. Nautical Almamac Office, London. Demi 8vo. London.

Tide Tables for the Hooghly River 1887 and 1888. By Major J. Hill, R. E., in charge Tidal and Levelling operations, Survey of India, and E. Roberts, F. R. A. S., F. S. S. Nautical Almanac Office, London. Two Sheets. London.

SURVEY OF INDIA, TIDAL AND LEVELLING OPERATIONS.

PERIODICALS PURCHASED.

Calcutta. Calcutta Review,—Vol. LXXXV, No. 171, January, 1888.

———. Indian Medical Gazette,—Vol. XXII, No. 12, December, 1887.

Geneva. Archives des Sciences Physique et Naturelle,—Tome XVIII, No. 12.

Leipzig. Annalen der Physik und Chemie,—Band XXXIII, Heft I.

———. ———. Beiblatter, Band XI, Stuck 11.

London. The Chemical News,—Vol. LVI, Nos. 1464—1468.

———. Mind,—Vol. XIII, No. 49, January, 1888.

———. The Nineteenth Century,—Vol. XXIII, No. 131, January, 1888.

———. Society of Arts,—Journal, Vol. XXXVI, Nos. 1830—1834.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1888.

ERRATUM.

Read *grandees* for *gardens*, in line 17 from the top, page 22 of the Proceedings No. II for February 1888.

J. Wood-Mason, Esq.

T. D. La Touche, Esq., visitor.

The minutes of the last meeting were read and confirmed.

Twenty-seven presentations were announced, as detailed in the appended Library List.

The following gentlemen are candidates for election at the next meeting:

Babu Haridása Shástri, Principal, Mahárájá's College, Jeypúr, proposed by Pandit Haraprasáda Shástri, seconded by H. M. Percival, Esq.

Maulvi Ahmad, Arabic Professor, Presidency College, proposed by Nawab Abdul Latif Bahádur, seconded by A. Pedler, Esq.

The following gentleman has intimated his wish to withdraw from the Society:

F. C. Barnes, Esq.

The SECRETARY reported the death of the following member:

S. S. Jones, Esq., C. S.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th March 1888, at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the chair.

The following members were present :

Nawab Abdul Latif Bahádur, C. I. E., E. T. Atkinson, Esq., W. R. Criper, Esq., S. R. Elson, Esq., E. Gay, Esq., Dr. Hoernle, Prince Jahán Qadr Muhammad Wáhid Ali, Bahádur, E. J. Jones, Esq., Rev. Father E. Lafont, Babu Asutosh Mukhopádhyáya, T. R. Munro, Esq., L. de Nicéville, Esq., Moung Hla Oung, Esq., H. M. Percival, Esq., Hon. Dr. Mahendralála Sarkár, C. I. E., C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

T. D. La Touche, Esq., visitor.

The minutes of the last meeting were read and confirmed.

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Babu Haridása Shástri, Principal, Maháráj's College, Jeypúr, proposed by Pandit Haraprasáda Shástri, seconded by H. M. Percival, Esq.

Maulvi Ahmad, Arabic Professor, Presidency College, proposed by Nawab Abdul Latif Bahádur, seconded by A. Pedler, Esq.

The following gentleman has intimated his wish to withdraw from the Society :

F. C. Barnes, Esq.

The SECRETARY reported the death of the following member :

S. S. Jones, Esq., C. S.

The SECRETARY read the names of the following gentlemen who had been appointed by the Council to serve on the several Committees during the year:

LIBRARY COMMITTEE.

Nawab Abdul Latif, Bahádur.
E. F. T. Atkinson, Esq.
E. Gay, Esq.
Babu Pratápachandra Ghosha.
Prince Jahán Qadr Muhammad Wáhid Ali, Bahádur.
Dr. W. King.
Rájá Rájendralála Mitra.
Mahámahopádhyáya Pundit Maheśachandra Nyáyaratna.
Hon. Dr. Mahendralála Sarkár.
W. L. Sclater, Esq.
Dr. J. Scully.

FINANCE COMMITTEE.

E. F. T. Atkinson, Esq.
E. Gay, Esq.
Babu Pratápachandra Ghosha.
Rájá Rájendralála Mitra.

PHILOLOGICAL COMMITTEE.

Nawab Abdul Latif, Bahádur.
H. Beveridge, Esq.
J. Beames, Esq.
J. Boxwell, Esq.
Dr. A. Führer.
G. A. Grierson, Esq.
F. S. Growse, Esq.
Babu Pratápachandra Ghosha.
Prince Jahán Qadr Muhammad Wáhid Ali, Bahádur.
Col. H. S. Jarrett.
Maulaví Khudá Bakhsh Khán Bahádur.
C. J. Lyall, Esq.
Rájá Rájendralála Mitra.
Babu Nilmani Mukerjee.
Mahámahopádhyáya Pundit Maheśachandra Nyáyaratna.
Hon. Ajodhyanátha Pandit.
Hon. Dr. Mahendralála Sarkár.
Babu Haraprasáda Shástri.
Hon. Sir Sayyid Ahmad.
C. H. Tawney, Esq.
Dr. G. Thibaut.
Col. A. C. Toker.

COINS COMMITTEE.

Dr. A. Führer.
A. Hogg, Esq.
Rájá Rájendralála Mitra.
Lt.-Col. W. L. Prideaux.
J. H. Rivett-Carnac, Esq.
C. J. Rodgers, Esq.
V. A. Smith, Esq.

HISTORY AND ARCHÆOLOGICAL COMMITTEE.

Syud Amír Ali.
J. Beames, Esq.
H. Beveridge, Esq.
Babu Gaurdás Bysack.
Babu Pratápachandra Ghosha.
Mahámahopádhyáya Kaviráj Shyamaldás.
Rájá Rájendralála Mitra.

W. H. P. Driver, Esq.
Dr. A. Führer.
F. S. Growse, Esq.
J. H. Rivett-Carnac, Esq.
Capt. R. C. Temple.

NATURAL HISTORY COMMITTEE.

H. H. Anderson, Esq.
Dr. A. Barclay.
E. C. Cotes, Esq.
Dr. D. D. Cunningham.
J. F. Duthie, Esq.
Dr. G. M. Giles.
E. J. Jones, Esq.
Dr. G. King.
Dr. W. King.
C. S. Middlemiss, Esq.
L. de Nicéville, Esq.
Dr. Fritz Noetling.
R. D. Oldham, Esq.
S. E. Peal, Esq.
Dr. J. Scully.
W. L. Sclater, Esq.
Col. C. Swinhoe.

PHYSICAL SCIENCE COMMITTEE.

P. N. Bose, Esq.
Dr. D. D. Cunningham.
J. Eliot, Esq.
S. R. Elson, Esq.
Dr. G. M. Giles.
S. A. Hill, Esq.
E. J. Jones, Esq.
Rev. Father Lafont.
Dr. W. King.
J. J. D. La Touche, Esq.
C. S. Middlemiss, Esq.
Babu Á'sutosh Mukhopádhyáya.
Dr. Fritz Noetling.
R. D. Oldham, Esq.
Hon. Dr. Mahendralála Sarkár.
Dr. W. J. Simpson.
D. Waldie, Esq.

The PRESIDENT announced that the Hon. Adjodhyanátha Pandit, of Allahabad, had compounded for his subscription as a non-Resident member by the payment in a single sum of Rs. 300.

The PRESIDENT announced that the Council had sanctioned the publication in the Bibliotheca Indica of Bhaṭṭotpála's commentary on Varáha Mihira's Bṛihat Saṃhitá, to be edited by Dr. G. Thibaut; also that they had appointed Messrs. Meugens and King to be Auditors of the Society's Accounts for 1888.

The PHILOLOGICAL SECRETARY read the following extract from a letter from Prof. E. Senart:—

"J'ai vu les deux rochers de Mauhrah et de Shahbaz Garhi. J'espère que ma visite ne sera pas tout-à-fait sans résultat pour l'établissement de ces textes. Malheureusement ils sont, pour une grande partie, en si fâcheuse condition, qu'il n'y a aucun espoir d'arriver jamais à une conclusion définitive. Je vous ai écrit, je pense, que le xii.e édit venait d'être retrouvé à Shahbaz Garhi par le capitaine Deane. A Mauhrah il ne

manque dans les xiv édits que les Nos. 13 et 14. Je ne doute pas qu'ils n'existent quelque part autour des pierres connues. Mais je n'ai pu ni les découvrir ni recueillir aucun renseignement. Il faudrait avoir plus de temps dans la place.

Tout ce pays-là est plein de promesses certaines pour qui saurait y chercher. J'espère bien des choses de l'intelligence de capitaine Deane. Il a trouvé récemment de curieuses sculptures en *bois* très-anciennes. Elles m'ont fait repenser à cette grande masse de forme conique sculptée de pierres que nous avons vue ensemble à l'Indian Museum. Je serais bien curieux d'en avoir de bonnes photographies. Si vous trouviez possible d'en obtenir je serais tout disposé à faire quelques frais dans ce but."

The PHILOLOGICAL SECRETARY exhibited two silver coins of the reign of Gangeya Deva, the Kálachuri rájá of Chedi, received from the Government, N.-W. P. and Oudh.

The PHILOLOGICAL SECRETARY read reports on two finds of Treasure Trove coins.

I. Report on 37 silver pieces, forwarded by the Deputy Commissioner of Jabalpúr, with his No. 600, dated 13th February 1888.

1. The silver pieces are said to have been found in a place called Khitoba, in the Jabalpúr district.

2. They make up 36 silver coins, two of the pieces being fragments of one coin. These coins belong to the well-known class of "old Hindú punch coins," bearing a variety of symbols punched on their surface, generally on one side only. There are, among these 36 coins, 30 of a more or less square or oblong, and 6 of a more or less circular shape. Some of these bear punches on both sides. Most of them are of more or less impure silver. They are worth from two to four annas each.

II. Report on eleven old rupees, forwarded by the Deputy Commissioner of Sháhpur, with his No. 1141, dated 15th December 1887.

1. The coins were found by a labourer while digging for a foundation near a Khangah named Azim Jatti at Badar, on the Chenab, in the Sháhpur District.

2. They are Rupees of the following Mogul emperors of Delhi:—

	No. of specimen.
I. *Aurangzíb*, 1068—1118 A. H. = 1658—1707 A. D., dates 1111, 43—1105, Mints: Súrat, Akbarnagar.....	3
II. *Muḥammad Sháh*, 1131—1161 A. H. = 1719—1748. a, *Sáḥib Qirán* type, dates 114*, 19—11**, 25—11**, 5 1***, 8—Mint:—Sháhjehánábád...	5

b, *Bádsháh Ghází* type, dates: 1146, 16—113*, 5—do.—Mint: Akbarábád	3
Total ...	11

3. They are not in a state of good preservation, and belong to very common types. Their value is R. 1 each.

The PHILOLOGICAL SECRETARY read the following note from Mr. V. A. Smith regarding a paper on the Gupta coinages, on which he is engaged:

"Mr. V. A. Smith is engaged in preparing a paper on the silver and copper Gupta coinages, with supplementary notes on the gold coinage, and will be much obliged for any information on the subject with which he may be favoured. Details of the weight and find-spots of coins will be especially welcome. Mr. Smith believes that the Gupta copper coins are not so rare as has been supposed, and that many of them probably exist in private collections. Until November 1888 Mr. V. A. Smith's address will be "Care of Messrs. Wm. Watson & Co., 27 Leadenhall Street, London, E. C.""

The following papers were read—

1. *On the Barisál Guns.—By* BABU GAURDÁS BYSACK (postponed from last meeting.)

I need scarcely make an apology for reverting to the subject of the physical phenomenon known as the Barisál Guns, a subject too important and too interesting to be lost sight of, or buried in oblivion. My object in doing so, is to place on record certain facts that have come to my notice since the subject was, for the first time I believe, broached at your meeting in 1867, (*vide* my paper on the Antiquities of Bagirhát published in Part I of the Journal for 1867, Vol. XXXVI), and to ask you not only to invite the attention of all learned scientific gentlemen, but to organise a system of enquiry and observation with a view to arrive at a solution of the problem.

You are already aware that the sounds resemble the booming of distant cannonade, and that they are usually heard during the months from April to September in a lull after a squall, or after a shower of rain, or when the clouds begin to break np. Barisál Guns they are called because at Barisál the explosions happened to be first noticed, but the area is vast over which such noises are heard. They are heard as high up as at Fureedpur and all over the south of Backergunj and Jessore (now Khulna) specially in the neighbourhood of the Baleswar river.

Recent facts that have come to my knowledge shew that other places than those enumerated above are wont to enjoy the honor of these mysterious salutes.

Similar sounds are heard, I heard them distinctly, at Tumlook. While in temporary charge of the Sub-Division during April and May 1883, and staying in the Government Bungalow standing formerly some way off, but at the time of my residence only 25 feet from the edge of the high bank that was being cut away by the river Rupnarayan, it was on an afternoon between 1 and 2 o'clock that, after a shower of rain, the reports like those of a distant cannon struck my ears. The similarity of the sounds to what I knew as Barisal Guns at once attracted my notice and excited my curiosity. I made an enquiry of the oldest inhabitants, and they told me that they were accustomed to hear the sounds from their childhood, but they knew not how to account for them, at least no superstitious legend like the Khanja Ally salutes ascribed to the Barisal Guns was attached to them. I utilised the opportunity by sending out a dinghy to cruise up and down the river for several miles, in order to ascertain if the banks had any where fallen in heavy masses, but nothing of the kind was discovered to favour the theory of those who ascribe the noise to such a cause. When I mentioned the fact to Mr. Medlicott he told me that he has heard from a friend that similar sounds are heard at Cherra Punji. Babu Karunadas Bose of the Subordinate Judicial Service, an inhabitant of Dacca, wrote to me to say that these strange reports are heard in Vikrampur, more frequently in the wet than in the dry weather, but never in Dacca. These places are far out of the reach of the sea-beach, a fact that directly discountenances the surf theory, *i. e.*, surf breaking on the sea-shore and causing the noise, which seems to have found favour with certain learned gentlemen, who confidently laid stress upon it when the subject came in for fresh discussion at your meeting in August 1870: the theory, however, still remains where it was in the dark region of conjecture.

In order to arrive at a correct solution of the problem one must enquire on the spot, and frame his inquiries according to such information as he can collect, and such suggestions as he may gather from his first impressions. Any one who hears the noise may trace out its cause and origin. Very little can be suggested by one who has not heard it, and who is many hundred miles away. Mr. Blanford told me that with that view a set of questions from the Society were prepared, printed and circulated, but that no information was received in reply to them. Diligent search was made for a copy of the questions but without success.

I would suggest that a fresh effort be made to collect information, or to direct inquiry from a scientific point of view, so that the origin or cause of the sounds may be ascertained with as much precision or

accuracy, as the resources of science may enable us to do. If necessary, Government might be requested to aid the endeavours of the Society by asking the local officers of the places in which the sound is audible to institute inquiries in reference to the points suggested in the paper of questions that may be sent out to them.

The theories that have been hazarded to account for the cause of the phenomenon are the following :

1st. Breaking up of surf.

2nd. Falling of heavy masses of earth in the river.

3rd. Electrical discharges under water, or explosive gases stirred up by some sort of volcanic action escaping through the waters.

4th. Some subterranean or volcanic agency.

Postscript.

Since the above was written copies of the former series of queries referred to by me have turned up. I wrote with a copy of them to my friend Mr. P. N. Mittra, Barrister-at-Law, who resided at Barisal for several years, and whose professional duties took him to all parts not only of Backerganj, but also the neighbouring districts, asking him to let me have his impressions of the phenomenon. The answers given by him are noted below :

1. "The sounds are like the reports of big guns going at a distance. They are always heard at regular intervals, sometimes following one another in quick succession like minute guns, sometimes at intervals of 10 or 15 minutes. So far as I have been able to observe, I have heard these guns going sometimes for 3 or 4 hours together.

2. These reports are generally heard in the mornings and evenings, and seldom or never in the middle of the day. They may be heard at all times of the night.

3. The rainy season is the time of the year when these reports are most frequently heard. They are generally heard *after* a heavy shower, and sometimes *before*, just when the clouds have formed in the sky.

4. The reports seem generally to come from the south and are always accompanied by a *south wind.* I observed these phenomena in the town of Barisal itself and also in the southern parts of the District of Backerganj.

5. I know from personal experience that they are heard most frequently during the rains. I have never heard them in the cold weather or at the beginning of the hot weather either, during my eight years' experience in the district of Backerganj.

6. I never heard these sounds at Rungpore, and I am not aware that they are heard there. I have heard that these sounds can be

heard at Rajpur near the Sonarpur Railway Station (E. B. S. Railway) a few miles south of Calcutta."

It is necessary, with a view to see that all the facts already ascertained are correctly placed in their true light, and beyond the possibility of a doubt or dispute, that I should refer to one or two points in Mr. Mittra's answers, and also in the lucid summary of our President.

Mr. Mittra observed that he never heard these sounds during the cold weather. This qualifies the remark I made in my first paper on the Antiquities of Bagerhat, that at that station the sounds are heard at all times of the year. I did not carefully specify the periods when these sounds are most frequent, but generally stated that they occur most distinctly during a lull after a storm, or after a heavy shower of rain. It was not noticed by me that they were heard before a shower. It is certain that they do not occur after every shower of rain. I know from personal experience that at Barisal these sounds are very common, as common as they are at Bagirhát, but the fact recorded by me that, though the sounds are heard at Bagirhát they are not heard at places near there, nor in other parts of the Sunderbunds equally distant from the shores of the Bay, and where the surf is violent, might, I suspect, be open to correction. It may be accounted for in this way, that during the cold weather, November to February, I used to be absent from the Station and moving about (on tour) in the interior of the Subdivision, and the reason why I did not hear the sounds at the places I encamped, is because they did not occur at all. Having been familiar with the noise during nine months of the year at Bagirhát, it was but natural that the impression left on my mind was that it is heard at all times of the year, but this, as well as the fact of its being altogether inaudible during the cold weather in all parts of the two districts in question, should be tested by due inquiry and accurate observation before they are accepted or rejected for the purpose of ascertaining the cause of the phenomenon.

I was hitherto under the impression that the sound is not audible at Khulna, as it was never noticed by me although my stay there extended over 9 months (May to December) in 1863, and 17 months in 1869-70: but I observe that it is and has been heard there. My friend Babu Bunkim Chunder Chatterjee, who was in charge of the Subdivision for several years, writes me to say,

"Rainey is right after all. I remember very well that I used to hear the Barisaul guns while at Khulna. I also remember that they were audible at various places within the Subdivision further east. I distinctly remember that I heard them on one occasion while encamped at Tála on the *Kapataka*. I have always thought the only possible way

of accounting for these noises is to accept the current theory that they proceed from subterranean sources."

I mention this to shew that people are generally indifferent to external occurrences, however curious or extraordinary in their nature, until their attention is drawn by somebody.

The fact mentioned by Mr. Mittra that the sounds are not known at Rungpore should be noted, as it is very near the Teesta, a very big and boisterous river; Mr. Mittra resided there for a long time.

The character of the sounds bears a strong resemblance to the booming of distant cannonade: it is neither like the rattle of musketry nor like the rumbling sound that precedes an earthquake, nor the crashing noise caused by the falling in of large masses of earth. If Mr. Elson had once heard the real Barisal Guns he would have at once given up the idea that they were due to the falling in of the river banks on the bight either of the Hughly or the Baleswar.

I may mention here an incident to illustrate the sharpness—the intensity with which the reports sometimes break on our ears. It was at Bagirhát on a moonlight night at about 9 P. M. that a report like that of a gun struck my ears. My servants had my permission to use my gun to shoot the *pariah* dogs or jackals that infested the compound, I called out to them to inquire what the matter was; they said they did not use the gun, but that it was the Khanja Ali salute.

Referring to the surf theory, it is said "the transmission of sound waves is, however, dependent very much on the conditions under which it takes place, and when these are favourable they travel to enormous distances," but I cannot conceive that the conditions under which sound travels could be so materially different as to render the Barisal Guns distinctly audible at Tumlook, and thoroughly inaudible at Diamond Harbour, almost a seaboard town.

The PRESIDENT read the following letter from Mr. H. J. Rainey on the subject:

RAINEY VILLA,
Khulna, Feb. 23, 1888.

DEAR SIR,

I have heard that at the next meeting of the Society a paper will be read on the so-called "Barisál Guns": I have for many years taken a great interest in the subject, and as I do not think it is at all likely that a satisfactory solution of the physical phenomena can be arrived at without a series of independent observations from various places in the districts where the sounds are heard, I would suggest that printed forms stating the several points on which information is desirable, should

be circulated to the several meteorological stations where the "Barisál Guns" are likely to be heard, and to all residents in such localities who may be expected to assist in the investigation.

If you will refer to one of my articles on "Jessore" published in the *Calcutta Review*, Vol. LXIII, p. 7, you will find that Mr. H. F. Blanford of the Meteorological Department, the then Secretary of the Society, forwarded to me such forms for circulation, but though some of my friends were good enough to promise to assist in the enquiry by recording their observations, yet not a single return was sent to me. The Society, however, acting directly with public and private persons, if it resolves to do so, is likely to meet with success.

I may add that I shall be very glad to assist in any way in investigating the matter if my aid is at all necessary.

Yours faithfully,
H. J. RAINEY.

In continuation the PRESIDENT said that the Society were much indebted to Babu Gaurdás Bysack for having again brought this interesting subject before their notice, and the paper is particularly interesting because it gives additional names of places where these sounds have been heard. It was much to be regretted that former efforts of the Society to elucidate the origin of these curious sounds had been unsuccessful, and that during the 18 years that had elapsed since the subject was discussed at the Society's meetings no new facts had been brought forward regarding them. In the absence of more definite information than already existed, it was difficult to see in what direction further enquiries could usefully be prosecuted.

As it might be interesting to the meeting he had drawn up a short memorandum of the facts already recorded regarding these mysterious sounds.

First as to the sounds themselves:—Most observers agree that they resemble the reports of guns fired or explosions at a distance. Sometimes the sound is dull, at others loud enough to wake a person from sleep. They are heard sometimes singly, sometimes in rapid succession or at intervals, occasionally lasting for several hours.

In his paper on the "Antiquities of Bagirhát" (Journ. As. Soc. Beng. 1867), Babu Gaurdás Bysack describes it as a dull roaring sound, as of the booming of distant cannonade, which is said to be fired by aerial hands in honour of Khanja Ali, or Khán Jahán, who was tehsildar of Baghirhát some 400 years ago.

Mr. Pellew says the noise exactly resembles the sound of surf as heard by him at Púri, when, on account of the cessation of the S. W.

Monsoon, the swell rises to an unusual height before breaking and then breaks simultaneously for perhaps a length of 3 miles of coast, the succession of reports being caused by the breaking of successive waves along the beach.

Mr. Beveridge has referred very fully to this phenomenon in his "Account of the District of Bakarganj." He says the sounds are heard like the discharge of cannon in Bakarganj, and part of Dacca, Faridpur, and Jessore at the beginning of the rains, *i. e.*, in May and June. At Barisál the sound comes from the S. and S. W., and is generally heard in a south wind and before rain. It is sometimes heard only for a minute or two; sometimes it continues for one or two hours, at intervals of two or three minutes between each discharge. It seems to be heard usually in the evening or at night, but perhaps this is only because the attention is more drawn to it in the absence of other noises. It has been supposed by some that the sounds are merely those of guns fired at marriages; by others that they are caused by the falling in of the river banks. But they are heard away to the south, among the Sundarbans where there are no marriages, and where there are no high river banks to fall in. They are heard down at Kúkri Múkri, the most southerly island in the district, and the Maghs there say that they are distinct from the noise of breakers or of the tide coming in. The natives say it is the sound of the opening and shutting of Ravan's gates in the Island of Lanka (Ceylon), which fiction, as Mr. Beveridge remarks, is valuable because it shews that the sound comes from the south. And he concludes by saying that it is not altogether impossible that it originates in that curious submarine depression in front of Jessore and Bakarganj which is known by the name of the "Swash of no ground."

In another part of the same work Mr. Beveridge records that he was told by a native of Kúkri Múkri that the sounds were sometimes heard from the north,—south, and south-west. The statement as regards their coming from the north is important because they are nearly always reported as coming from the south.

Captain W. J. Stewart, of the Revenue Survey, describes the sound as similar to the noise caused by the explosion of torpedoes under water, but at a great distance.

Mr. H. J. Rainey says the sounds resemble the report of cannons or loud explosions heard at a distance. Occasionally the reports are heard 3 or 4 times in rapid succession, while at others a minute or two intervenes between them.

Mr. Westland heard them at Jessore during the night, exactly like the distant firing of cannon occurring in single detonations and at irregular intervals.

Other observers record them as occurring at intervals of a few seconds.

The sounds are heard not only at Barisál, where they are very distinct, but over the whole delta of the Ganges from the Húghlí to the Megna. They are recorded from Cherra Punji, but do not appear to be generally heard further north than Dacca and Farídpur, and are not heard at Balasor. Sir W. Herschel says he never heard them spoken of as occurring at Kushtia, Rajshahaye, Nadiya or Maldah.

It is curious to note that the sounds are somewhat capricious, being frequently heard at certain places, but not at others close by.

They appear to be almost invariably heard from a southerly direction. According to Mr. H. J. Rainey they are quite independent of the direction of the wind and come from the south and south east directions, after a heavy fall of rain, or cessation of a squall and while the tide is rising. Captain Stewart says they are always heard in Barisál from one direction, and there and at Kúkri Múkri, Chapli Chur, Tiger Point and other places in the Sundarbuns he noticed the sounds always from the direction of the depression known as the "Swash of no-Ground," and from the fact of the direction being always the same he argues against the sounds being caused by the falling in of river banks, falling of trees or firing of bombs.

Mr. Beveridge says that at Barisál the sounds come from the south and south-west, and are generally heard in a south wind and before rain. At the Island of Kúkri Múkri they are said to be heard from the north, south and south west, and to be quite unconnected with the bore, the tides, or the surf.

Mr. T. R. Sarr reports their occurrence at Luckipara Factory, district Jessore, on the 28th June 1871, between 5 and 6 P. M. from the N. W., the direction of the wind being S. W. Reports sudden and momentary like bombs.

The sounds are said to have been heard at all hours of the day or night, though more often in the stillness of evening or night. Mr. Sarr reports them as occurring principally through the day.

They appear to be usually observed during the hot weather and rainy months from March to September. Mr. Sarr heard them near Jessore in May and June only. In 1870 they were frequent; in 1871 few and far between.

Captain Stewart heard them in the Sundarbans in March 1862 and again at Chapli Chur, on the Sea-face, in March 1863, as well as in April and May at Barisál.

Mr. Rainey says they are only heard during the S. W. Monsoon and rainy season.

They appear to be heard more distinctly after rain or in the lull after a squall, but are also recorded as occurring before rain.

Several theories have been brought forward to account for these sounds, and among them the principal are:

(I.) The breaking of enormous surf rollers on the shores of the upper part of the Bay of Bengal; the sound of this travelling inland along the surface of the rivers, and to long distances under the favourable atmospheric conditions of the S. W. Monsoon.

(II.) The breaking down of the banks of the rivers in the vicinity of places where they are heard.

(III.) The firing of bombs or guns on the occasion of marriages.

(IV.) Subterranean or sub-aqueous volcanic or seismic agencies.

(V.) Atmospheric electricity.

Also by the bursting of bamboos or the falling of trees in the jungles. The evidence hitherto recorded, however, in support of these possible causes is altogether insufficient to warrant our attributing the sounds to any one of them.

It is evident that the first theory is dependent upon the proximity of the places where the sounds are heard to the sea coast or to rivers along which the sound could be carried.

Now we find that they are heard in nearly all parts of the Gangetic delta, a tract of almost absolutely flat country bordering the extreme north-western corner of the Bay of Bengal, extending from the Húghlí to the Megna, and intersected by innumerable streams and water-courses. They appear to be most common along the course of the Megna, but have also frequently been heard along the course of the Haranghatta about the middle of the Delta.

Babu Gaurdás Bysack records that at Bagirhát, on a tributary of the Haranghatta at a distance of about 56 miles from the open sea, they are heard at all times of the year, particularly when the weather is calm and the sky clear. They are most distinct after a storm or heavy shower of rain.

At Barisál, on the Baleswar River, about 34 miles from the sea, they are equally prominent, and are heard all over south Jessore and Bakarganj, at least in the neighbourhood of the Baleswar River, and extending to the foot of the Chittagong Hills. Mr. Pellew, who has given a good deal of information about them, says he has not heard them himself west of Morellgunj on the Haranghatta, about 42 miles from the sea, though Mr. Rainey has recorded them at Khulna, which is situated at the confluence of the Bhairab and Rupsa rivers, about 60 miles from the sea.

Babu Gaurdás Bysack has, however, recorded the curious fact that

though the sounds are heard at Baghirhát they are not heard at places near there, nor in other parts of the Sundarbans equally distant from the shores of the Bay and where the surf is equally violent.

In the 'Proceedings' of the Society, for August 1870, Mr. Rainey records that these sounds are heard as far north as Farídpur on the Padda River, about 104 miles from the nearest point of the sea coast at the mouth of the Tetulia river.

Mr. Dall also heard of them occurring at Farídpur, like discharges of artillery 3 or 4 miles away and loud enough to wake a person from sleep.

Captain Stewart writes that his assistant, Mr. N. T. Davey, constantly heard them in District Húghlí, as well as at Farídpur.

Again, in the 'Proceedings' for November 1870, Mr. Pellew records their occurrence on the Saplenga river in the Sundarbuns, about 30 miles from the coast. They were loud enough to wake him up and were heard on 4 or 5 different occasions the same night. The sound came from the south and could not have been marriage guns because the country to the south was all forest.

He also mentions that at Púrí, when the S. W. Monsoon has lulled, he has seen far to the south a very lofty wave break with a distinct booming noise, a second or two after another nearer, then one opposite to him, and then others towards the north as far as one could see. "Even to one standing on the beach, the noise of these waves (except the nearest) was so like that of guns that we used to remark on the resemblance." When the wind was blowing strongly the wave was turned over by the force of it, before it attained its full height; but when there was no wind or a slight breeze from the shore, whilst the swell was still high from the effect of the monsoon, this phenomenon often occurred, the wave rising to an immense height and breaking over a mile or two of beach at one moment. He contends also that to a person close by the sound of each wave would appear continuous; but to a person 40 or 50 miles away it would be a boom like that of a gun. He further remarks that the wind blows very obliquely at Purí and would not take the sound so far inland as at Bakarganj.

In the same 'Proceedings' Mr. Rainey records that the direction of the sounds appears to travel invariably along the course of the streams that discharge themselves into the Bay, and that when he was living at Khulna, which is at the confluence of the rivers Rupsá and Bhoirab, he noticed that the sounds came from the S. E., while when he lived on the other side of the Rupsá, on the west side of it, the noises were heard from the S. W. Again he lived at a place called Nali—or Schillerganj, on the Baleswar river and to the east of it, when the detonations were

heard from the S. W. At Schillerganj, which is distant about a tide from the open sea, the sounds were heard much louder than they were at Khulna, while below that point, as far down the Haranghatta river as a boat could venture out in the S. W. Monsoon, he heard them with even still greater precision, but the reports were quite as distinct then from one another as they were elsewhere, and he considers this as not bearing out Mr. Pellew's surf theory.

In the paper we have just heard read Babu Gaurdás Bysack records that similar sounds are heard at Támlúk on the Rupnarain river in the estuary of the Húghli, about 50 miles from the sea and only about 36 from Calcutta. Also that Mr. Medlicott had told him of their being heard at Cherra Punji, which is about 200 miles from the coast at the head of the Bay, and that a friend of his had heard them in Bikrampur near Múnshíganj, about the confluence of the Megna and the Padda rivers, some 104 miles from the coast, but never in Dacca.

It will be noticed that many of these places where the sounds are undoubtedly heard are at a great distance from the sea-beach, and further than one would imagine that the sound of breaking surf could possibly be heard. The transmission of sound waves is however dependent very much on the conditions under which it takes place, and when these are acoustically favourable they travel to enormous distances. With the exception, perhaps, of Cherra Punji, none of the stations named are outside the distance at which the sound of guns could be heard, and it is probable that the simultaneous breaking of heavy surf rollers two or three miles in length, as mentioned by Mr. Pellew, would be at least as loud if not louder. Under certain atmospheric conditions the noise might be heard at places a great distance from the sea more distinctly than at nearer places.

It is said that the cannonade at Waterloo was heard at Dover, and other instances are on record of cannon fired during naval engagements in the Channel being heard in the centre of England. Col. Sconce tells me that he heard the cannonade during the siege of Delhi over 60 miles away, and I may mention that when on duty with my battery at Saugor in Central India, between 1860 and 1864, we heard one day the sound of a salute of guns fired at Jubbulpore, over 80 miles away with intervening hills. I do not recollect hearing it myself, but it was the talk of the mess, and, I believe, was verified by letter. The guns used must have been the ordinary old bronze nine-pounders, which would give a sharper report than larger iron guns.

As regards distance, therefore, it seems quite within possibility that the sounds heard at places so far inland could be caused by the enormous rollers of the S. W. Monsoon, especially as it appears from the

evidence recorded that the places at which the sounds are best heard are near the courses of streams running up from the sea and from the direction of the courses of the streams, and we know that water is an admirable conductor of sound. During the rains, too, when the sounds are generally heard, the whole country is like a wet sponge, and the air laden with vapour at a high temperature.

At the meeting in August 1870 Mr. Justice Phear, then President of the Society, stated that similar sounds were heard in Cornwall and Devonshire, undoubtedly caused by breaking surf.

It is to be regretted that we have not fuller details of the conditions under which these sounds were heard at Cherra Punji and their direction, but it may be remarked that the station lies exactly in the direction of the upper course of the Megna, and its position on the extreme edge of the hills may in some way be connected with the sounds being heard, if it were possible that the sound of distant surf could be carried to such a distance under favourable conditions.

It seems also possible that the peculiar configuration of the Gangetic Delta and its position at the head of a deep trumpet-shaped Bay, on one side a dead flat and the other lined with fairly high hills, may favour the transmission of the sound of breaking surf inland.

It has been objected by Dr. Mitra that the sounds are not heard in other deltas, such as the Irrawádi, the Mahanadi, the Mississippi, and the Amazon—but in these cases the geographical conditions are quite different. The Delta of the Irrawádi is open on the west. The Deltas of the Sittoung and Salwín reproduce more nearly the conditions, but on a much smaller scale. The Mahanadi debouches into a much wider and more open part of the Bay, the Mississippi into an almost landlocked gulf, and the Amazon into the open sea.

The second theory, that the sounds are caused by the falling in of river banks, does not appear so far to be supported by any direct evidence; the facts recorded by Mr. Beveridge even seem to negative it. It is quite possible, however, that the sounds heard by some observers may be attributed to this cause.

As regards the sounds being caused by the explosions of fireworks or bombs on the occasion of marriages, Mr. Pellew states that the Musalmans of Perojpur and round the Kocha river celebrate their marriages chiefly in September, and always fire off earthen bomb-shells, and it is almost impossible to tell the sounds of these from the Barrisál guns. In another place, however, he says the sound is quite distinct. Sir W. Herschel heard sounds in Dacca which he easily recognised as bomb-firing or could be attributed to it, unless proof were forthcoming that no bombs had been fired within the possible distance. It is not improbable,

therefore, that in some cases the sounds may be caused in this way, though it is certain that they are not the sole cause, as shown by Capt. Stewart's and Mr. Beveridge's statements that the sounds are heard in places where no marriages ever take place and where there are no river banks to fall in, and though the latter further states that his informants at Kúkri Múkri told him that the sounds were quite unconnected with the surf, the bore, or the tide, still these sound-producing agencies existed on or near the spot and might have been instrumental in causing the sounds, though the islanders may not have recognized it.

As regards the fourth theory, that the sounds are due to subterranean or subaqueous volcanic or seismic agencies, there is again no direct evidence, but the current opinion that such is the case and the fact recorded by Capt. Stewart of the sounds being like the explosion of a distant torpedo, and always coming from the same direction of the 'Swash of no-Ground,' when he heard them at Barisál, Kúkri Múkri, and other places in the Sundarbans, seem to point to some submarine source. Mr. Beveridge also suggests their connection with the 'Swash of no-Ground' and the statements he received from natives regarding the sounds being heard at Kúkri Múkri from the south-west, or direction of Ceylon, agree with Capt. Stewart's observations.

Capt. Stewart had an idea that the 'Swash' was the crater of an extinct volcano or submarine volcano and that subterraneous explosions found vent and sound through it, which were heard inland during the south-west monsoon. In the description of the 'Swash' by Commander Carpenter, R. N., of the Marine Survey, (Journal, A. S. B., Part II, 1885), there is no allusion to any such volcanic character, but the formation of the depression is shown to be caused by the convergence towards this region of all the channels through the shoals formed off the mouths of all the rivers of the Delta. The result of this tendency of the ebbing water is a number of whirls and eddies in that locality, the position of the 'Swash' being central with regard to the Deltaic mouths. This constant agitation of the sea hereabouts prevents the mud settling here during the ebb-tides, as it does on the banks on either side, which have thus never been able to meet, and consequently the depth still remains considerable. It would be most important to have further observations as to the state of the sea during the monsoon over this depression, and whether the contending currents cause such disturbance as would produce explosive sounds loud enough to be heard miles inland.

Mr. Rainey has also suggested that the sounds may be of volcanic or subterraneous origin, perhaps the upheaval of land as small islands on the sea-face of the Delta or Sundarbans. He further notes that the sounds travel from the direction of the active volcanic train running

from Chittagong along the coast of Arracan and Akyab. The occurrence of similar sounds at Cherrapunji, as recorded by Mr. Medlicott, would appear more probably connected with volcanic or seismic agency than with any water-borne sounds.

That they are commonly produced by volcanic or seismic causes seems improbable, because these would be accompanied by movements of the earth, which could not escape observation, and none of the observers have noted anything of the kind.

It only remains to consider the possible connection of the sounds with atmospheric electricity and the thunder-storms especially prevalent in Eastern Bengal at the changes of the seasons and during the S. W. monsoon. Distant thunder frequently sounds exactly like the firing of heavy guns far away, and in the case of such sounds being heard shortly before or after a thunderstorm or when thunder clouds were in the neighbourhood, their connection with the thunder would seem obvious unless otherwise accounted for. Such sounds would excite no special attention and might be heard all over the world. It is important, therefore to note that none of the persons who have observed the phenomenon have attributed it directly to thunder, and very few have connected it in any way with electrical action. Nothing, moreover, is recorded indicating any special meteorological or physical conditions obtaining in the Delta which would cause distant thunder to be heard in any very peculiar and unusual manner.

Capt. Stewart mentions that his Assistant, Mr. N. T. Davey, who had taken a good deal of interest in the question, had heard them in district Hughli and also at Faríd pur from the southward, generally when the atmosphere was overloaded with electricity preceding thunderstorms. Mr. Davey attributed the sounds to electrical action in an atmosphere surcharged with moisture, as would be the case along the coast. At Faríd pur they are heard from over the enormous *bhíls* in the neighbourhood, which may also explain their being heard at Barisál and other places.

Mr. Sarr and Mr. Rainey both report the occurrence of the sounds near Jessore in very close weather after heavy falls of rain or squalls, but say nothing about thunder.

I have been unable to find any reference to the theory that the sounds are caused by the bursting of bamboos in the jungles in any of the papers on the subject to which I have had time to refer. This cause would not, however, be peculiar to the Gangetic Delta, as the Barisál guns seem to be, and certainly cannot be the principal cause of the sounds. The same remark applies to the falling of trees.

In the present very imperfect state of our knowledge regarding this

mysterious phenomenon it is impossible to form any decided opinion as to its cause, though from the evidence it would appear that the balance of probability favours the connection of the sounds in some way with the sea; the sodden state of the soil, the vapour-laden state of the atmosphere and the direction of the wind being exceptionally favourable for the transmission of such sounds, which seem to be heard most frequently at times of the year when the sea is at its highest and the contending influences of the river floods against wind and tides strongest. At the same time, some of the evidence seems to decidedly negative this theory, and it is quite possible that more causes than one may be active in producing similar sounds. The more or less intimate connection of the sounds with the river system of the Delta also seems to be established, but whence the sounds proceed there is nothing to show.

As will be seen from the foregoing remarks, the question opens up a very wide and interesting field of enquiry, and it would be very desirable that, if possible, further evidence should be obtained on the subject and a system of observations started on both sides of the head of the Bay, from Balasore to Diamond Island, and at as many inland stations as possible in the districts where the sounds are heard. Copies of the former series of queries referred to by Babu Gaurdás Bysack and Mr. Rainey are in existence, and would form a model upon which a new series of enquiries might be drawn up. I would propose, therefore, that the Council should be asked to refer the question to the Physical Science Committee with a view to arrangements being made, in consultation with the officers of the Meteorological Department, for a series of observations being carried out during the coming monsoon. The numerous meteorolcgical stations now existing in this part of the country would afford much greater facilities for such observations than was formerly the case.* The assistance of the Marine authorities should also be sought in making observations of the state of the sea on the sea-face of the Sundarbans and in the neighbourhood of the 'Swash of no-Ground.'

Mr. T. D. La Touche made the following remarks :—

I have frequently heard the sounds known as the Barisál guns while camping in the south-western portion of the Garo Hills, in Assam. The

* Since the meeting some papers have been discovered containing the replies to the circular issued by the Physical Science Committee in 1871, from Sir W. Herschel, Mr. Westland, Capt. W. J. Stewart, Mr. Rainey and Mr. Sarr. These add considerably to our knowledge of the subject, especially Capt. Stewart's observations in the Sundarbans, and I have therefore thought it desirable to entirely revise this memorandum and complete it as a note of the facts hitherto recorded on the subject.—J. W.

sounds may be heard at any time during the day or night, and always appear to come from the direction of the Brahmaputra, which skirts the western end of the hills. They are heard at considerable distances from the river banks, at least 30 miles in a direct line, over hills and valleys covered with dense jungle; and I hardly think that the fall of a bank of even 30 ft. high could be heard at that distance. They seemed to be most distinct near the village of Mohendraganj at the S. W. corner of the hill area, close to an old bed of the river, but I did not see any banks fall in during the few days I was there. I have heard them only during the cold weather, but I believe they are heard at other times. They can hardly then be caused by heavy surf during the S. W. monsoon, unless different causes could give rise to the same phenomenon.

With regard to the bamboo theory, I have often seen and heard dry bamboo jungle on fire in March and April, when the Garos burn their jhúms, and though the bursting of the bamboos makes a great noise, it is more like the rattle of musketry than the firing of heavy guns and cannot be heard at any great distance, especially when hills intervene.

It has occurred to me that a possible cause of these sounds may be the daily increase and decrease in depth of the water in the rivers of the delta, caused by the tides. It may be that the rising of the waters places the superficial strata in a state of strain, which is relieved when the tide falls, and the consequent earth movements, though slight, *may* give rise to these sounds. This is, however, merely a conjecture, and I do not feel inclined to lay much stress upon it until the subject has been more thoroughly investigated.

MR. ELSON remarked, with reference to what had been read about the Barisál Guns having been heard at Tumlúk on the Rúpnaráin river, that it was just possible the explosive noises were due to the falling in of portions of the high right river bank in Hooghly Bight, a spot peculiarly fitted for the production of the phenomenon, situated immediately at the mouth of that river, at its junction with the Hooghly. The rolling action of the joined streams of the two rivers had so cut away and undermined the bank, that the original raised embankment had in some places succumbed, the bank itself being 'up and down' like a wall, with some ten or twelve fathoms alongside it at low water: and Mr. Elson had himself often witnessed the crashing sound of the falling in of large masses of earth when anchored near this spot; generally at about low water, when the falling tide left the bank without its supporting lateral pressure, the bank gave way and fell. And he believed the sound of these landslips might be conveyed for many miles along a dense water medium: and very possibly distance so altered sound waves through this medium that the noise would not be heard as a loud

splash as those near would hear it, but as a sudden short explosion, a sharp thud, such as he himself had on two occasions been in a position for proving, and resembling the sound of guns, the dull thud, thud, he had heard actually emanating from out the sea on a calm still day from right alongside the boat in which he was at the time, situated about fifty miles from the north African coast, when the French were fighting at Algiers in 1859; or the same peculiar sharp sound of the 9 o'clock gun of one of Her Majesty's frigates at Saugor Roads, heard by him some years ago for three successive evenings, at the Pilot station, some thirty-five miles off, and that against a southerly breeze.

So that, on the whole, the theory of the sounds in question being caused by the falling in of river banks, and of their being propagated even along crooked river bends, should not, Mr. Elson thought, be entirely ignored nor discarded.

2. *Note on some Buddhist copper coins, and a terra-cotta figure.*—*By* Gaurdás Bysack (with a plate).

"In April and May 1883, during my stay at Tumlook, I noticed the River Rúpnarayan to cut into and wash away large portions of the bank below that town, leaving exposed specimens of old coins, fragments of pottery, and clay figures imbedded for ages. On the tide retiring, these relics happened to be picked up by the people, especially children. I stopped them from this proceeding on the shore in front of the Sub-divisional bungalow, where the findings were collected for me by my servants. The coins thus got I now send for presentation to the Society. In local opinion, they are said to have been in currency under the old Hindú Rájás, but who they were, and when they flourished, nobody knows. There were first the Buddhist kings, and afterwards the Gangá Vansa princes ruling from Tumlook and Midnapore to Orissa, in the 12th century. I am not aware whether the Society is in possession of any of their coins, in which case they may help to throw light on the determination of the specimens sent by me.

"As to the terra-cotta utensils and figures secured for me, they are all more or less in a mutilated condition, excepting one, which being in fair preservation, is herewith forwarded for exhibition to the meeting. I wish I had an opportunity to compare it with similar figures found elsewhere, in order to solve the mystery of its representative character. But I have hardly a doubt of its great antiquity and of its being a Buddhist image. As such, it leads me to refer to those times when Tumlook was a great Buddhist emporium on our Delta, known under the name of Tamaralipta, or sea-laved,—answering to Tambapanni (the Taprobane of the Greeks) the earliest Buddhist name for Ceylon. The

port flourished when prince Mahendra, the son of Aśoka, sailed by the place from Pataliputra, on his religious mission to that Island. From this post, Fa Hian, the Chinese pilgrim, took shipping to return to his country *viâ* Ceylon and the Archipelago, in the 5th century. His countryman Hwen Thang visited it in the 7th century. The ancient Buddhist town and harbour is now about forty miles from the sea, lying buried deep under the silt of the Delta. It would not be amiss for me, I think, to refer the clay figure under consideration to some time in the Buddhistic history of Tumlook. The image strongly resembles the females of Buddhist sculpture. The size makes it a doll, the ornamentation and attitude give it the air of a dancing-girl. But I believe it is neither of these characters. Most probably it was a household image; but I am not in a position to offer a pronounced opinion. I would suggest a comparison with the Bhuvaneśwara temple female figures, and the figures of other Buddhist places, and could form a definite conclusion only by the result of such a comparison."

The PHILOLOGICAL SECRETARY said that the coins sent by the Bábú were of a well-known kind of which a large number had been sent to the Society some years ago. There were, however, among those now sent by the Bábú, some which were in a particularly good state of preservation. They were round and square coins, bearing a variety of Buddhist emblems on both sides, such as the bodhi tree, elephant, chaitya, swastika, and others. They have been already described and figured by Prinsep in his Indian Antiquities (ed. Thomas), Vol. I, pp. 84, 86, plate IV, fig. 8, 22. The terracotta figure (see Plate III) was that of a female fully dressed and profusely bedecked with jewels. It was the finest specimen of this kind of terracotta work that he had ever seen; but he would not venture to say how old it might be, though, of course, it could not be modern.

3. *Note on some Ancient Nepalese Coins.*—*By* DR. HOERNLE.

Dr. Rudolf Hoernle read the following note on some ancient copper coins from Nepal:—

"At the May meeting of last year I exhibited some ancient copper coins from Nepál which had been forwarded by Mr. V. Smith (see Proceedings for May 1887, pp. 144-147). I was then under the impression that that was the first public notice of coins of that description. I have lately, however, come across an earlier notice, by Mr. Cecil Bendall, which I regret had quite escaped my memory. It is published in volume XXXVI of the Journal of the German Oriental Society of 1882, and is also referred to on page xxxix of the Introduction to Mr. Bendall's *Catalogue of Buddhist Sanskrit Manuscripts* in Cambridge

(1883). It does not appear, however, so far as I can make out, that coins of this description have ever before been figured, and the plate accompanying my notice of last year will therefore still be welcome to numismatists. Moreover, among the coins noticed by Mr. Bendall, there do not appear to have been any like Mr. Smith's No. I. On the other hand, in Mr. Smith's collection there was none like Mr. Bendall's No. I. Mr. Smith's Nos. II appear to be identical with Mr. Bendall's Nos. 6 and 10, his Nos. III with Mr Bendall's Nos. 2, 3, 4, 5, and his Nos. IV with Mr. Bendall's Nos. 7, 8, 9, 10, 12.

"The reverse legend of Nos. II, Mr. Bendall reads as कामं देहि *kámaṃ dehi* (on his No. 1), but, as will be seen from the facsimiles, the correct reading is undoubtedly कामदेही *kámadehí*. The animal on the obverse Mr. C. Bendall, I observe, also takes to be a winged lion. The legend on the obverse Mr. Bendall reads अंशुवर्म *amśuvarma*. I read it श्रीसुधर्म *śrísudharma* or श्रीसुवर्म *śrísuvarma*. I think Mr. Bendall's reading is substantially correct, only it should be श्र्यंशुवर्म *śryaṃśuvarma*; the first 'akshara' is not अ *a* but श्र्य *śrya*, at least it is distinctly so on the coins figured in my plate. The presence of the 'anusvára' is doubtful. The legend, in fact, is exactly the same as that occurring in some of king Aṃśuvarman's inscriptions, published by Pandit Bhagvánlál Indrají in the *Indian Antiquary*, Vol. IX, for 1880 (see, *e. g.*, Inscription, No. 8, p. 171).

"The reverse legend of Nos. III Mr. Bendall reads श्रीभगिनी *śrí Bhaginí*, and suggests that it refers to the sister of king Aṃśuvarman, who is recorded (in Inscription, No. 7, in *Ind. Ant.*, Vol. IX, p. 171) to have dedicated a 'linga' to a temple of Paśupati. The figure which accompanies the legend, he describes as a 'squatting figure of Buddha.' This is certainly incorrect; at least, on the specimens figured on my plate, the figure is clearly that of a female, squatting on a lotus, the petals and stalk of which are distinctly seen; and the legend is श्रीभोगिनी *śrí bhoginí*, 'the enjoyable one.' There is a similar connection between the legend and the image, as that pointed out by Mr. Bendall in the case of the legend *kámadehí* (on his No. 1).

"The legend on the obverse of Nos. III is read मानाङ्क *mánánka* by Mr. Bendall. I read the name doubtfully पानाङ्क *pánánka* or मानाङ्क *mánánka*. I now agree with Mr. Bendall that, for the reasons suggested by him, the name must be read *mánánka*. The legend, however, is not simply मानाङ्क *mánánka*, but (at least on the specimens I have seen) श्रीमानाङ्क *śrímánánka*.

"From Mr. Bendall's remarks on these coins (his Nos. 1-12) it would seem that he ascribed them all to king Aṃśuvarman. The coins, Nos. II and IV, certainly belong to that king; for they bear his name. But I doubt the ascriptions of the *śri-mánánka* coins to him. The

prefix *śrí*, I think, shows that the name *mánánka* must be that of a king; and the name *śrí-bhoginí* on the reverse might be taken to be an allusion to the king Aṃśuvarman's sister Bhogadeví. In that case the name Mánánka must be another name or a *biruda* of king Aṃśuvarman. Now in the time of the latter king there were two ruling families in Nepal (see Fleet, *Early Chronology of Nepal*, in the *Indian Antiquary*, Vol. XIV, p. 350), the Ṭhákurí family residing in the palace *(bhavana)* of Kailásakúṭa, and the Lichchhaví family residing in the palace (*gṛiha*) of Mána. A member of the latter family might call himself by a name derived from their residence, *mánánka*, 'the mána-marked,' or 'he of Mána.' But Aṃśuvarman belonged to the Ṭhákurí family, and he could not well bear the *biruda* of Mánánka. But there is a king of the Lichchhaví family who does call himself, after his residence, *Mánadeva*, 'the Lord of Mána.' For him Mánánka would be a most appropriate *biruda*. I am disposed, therefore, to ascribe the *Srí-mánánka* coins (Nos. 3) to king Mánadeva.

"There remains the coin No. 1. The name of the king on the obverse is nearly illegible. The reverse shows distinctly the title of Mahárájádhirája. This title was borne only by two kings of Nepal of that period (6th and 7th centuries), *viz.*, Aṃśuvarman and Sivadeva II, both of the Ṭhákurí family. Two aksharas only are visible on the obverse. The first resembles closely the first akshara on the obverse of the coins Nos. II, and looks like श्रृं *śryaṃ*. This could only be read as the commencement of *śryaṃśuvarma*. The second letter I read as गो *go* or गे *ge*; it might, however, be शि and in that case the name would be *śríśivadeva*. Till other specimens are found, the question must be left undecided.

"Aṃśuvarman reigned from about 637 to 651 A. D., Mánadeva from about 705 to 732 A. D., and Sivadeva from about 725 to 749 A. D. The coins, therefore, belong to the 7th and 8th centuries A. D.

"I do not think the object which the lion is 'pawing' can be a vine-branch, as Mr. Bendall describes it. On the specimens I have seen, the object, when present, is clearly a flower, made up of six dots in a circle with one dot in the centre, and a stalk below it (see fig. III, *a* and III, c). Mr. Smith speaks of a "sort of standard in front of the lion," on one coin. This might be the "vine-branch"; but I have not been able to identify the coin referred to."

4. *Akbar and Father Jerome Xavier.*—*By* H. BEVERIDGE, ESQ., C. S.

This paper will be published in the Journal, Part I.

5. *On the nature of the Toxic principle of Aroideæ.*—*By* C. H. T. WARDEN, ESQ., F. C. S. and A. PEDLER, ESQ., F. C. S.

This paper will be published in the Journal, Part II.

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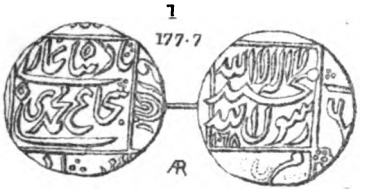

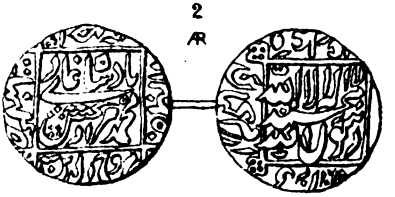

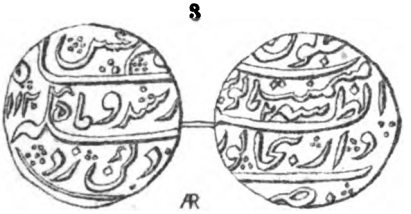

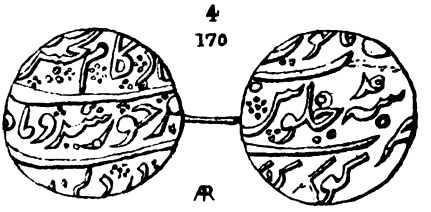

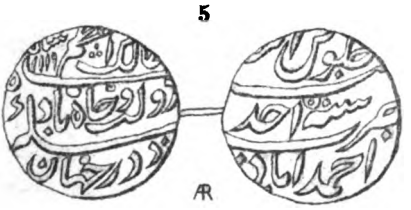

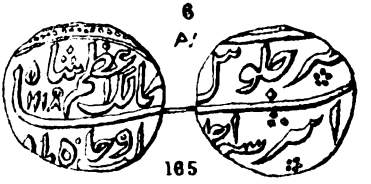

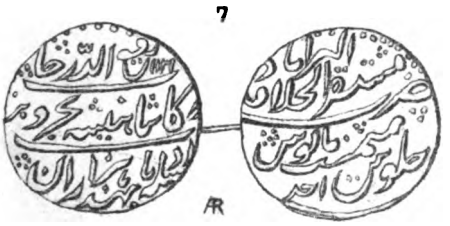

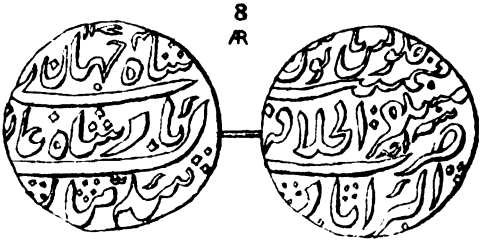

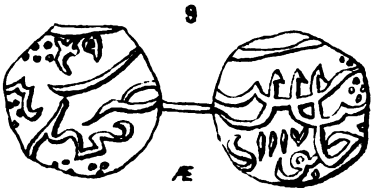

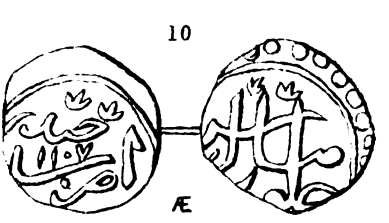

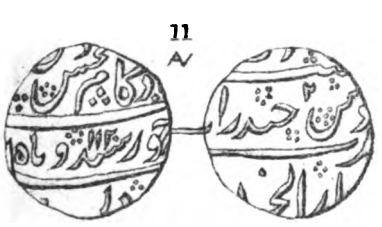

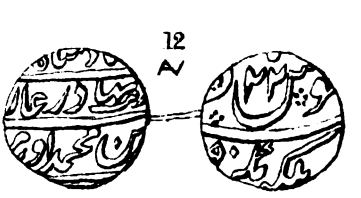

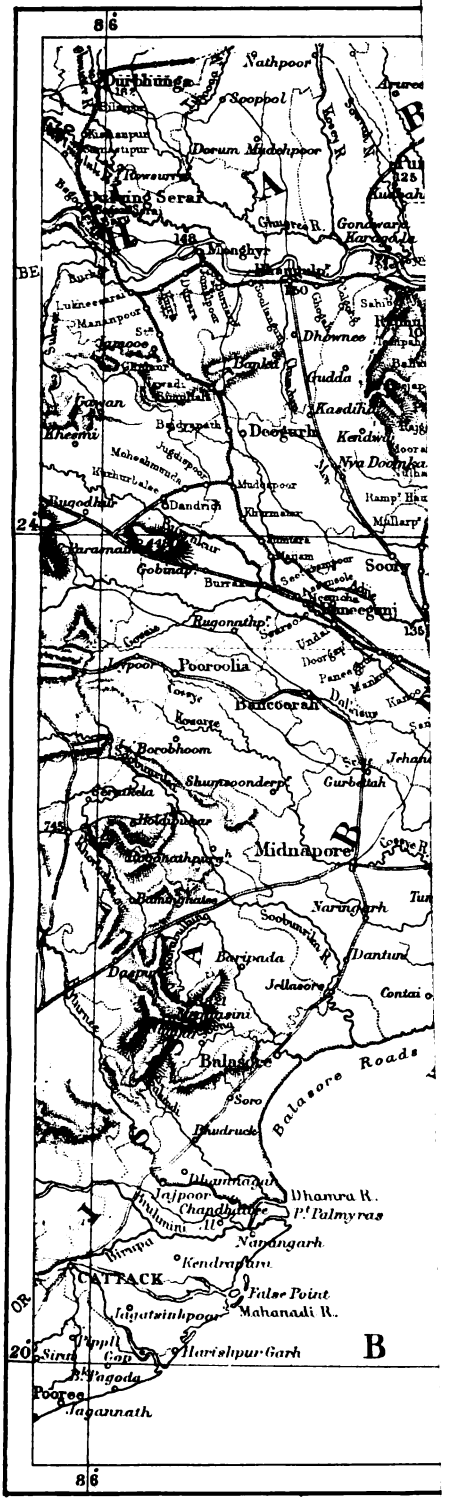

MAP SHOWING THI

Photo Collotype, Survey of India Offices, Calcutta, April 1888.

OLD BRASS VASE

(found in Mirzapur District).

Nearly full size.

ERRATUM.

At page 84, line 10 of the Proceedings No. II for February 1888

For all pairs of right lines, *read* all hyperbolas having one of their asymptotes parallel to a fixed direction (which may be taken as the direction of the axis of y).

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 4th April 1888 at 9-15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present:

H. Beveridge, Esq., Babu Gaurdás Bysack, Dr. Hoernle, A. Hogg, Esq., Babu Asutosh Mukhopádhyáy, T. Munro, Esq., L. de Nicéville, Esq., R. D. Oldham, Esq., H. M. Percival, Esq. The Hon. Dr. Mahendralál Sarkár, W. L. Sclater, Esq., Dr. Scully, Pandit Haraprasád Shástri, D. Waldie, Esq.

The Minutes of the last meeting were read and confirmed.

Fifteen presentations were announced, details of which are given in the Library List appended.

The following gentlemen proposed and seconded at the last meeting, were ballotted for and elected Ordinary Members:

Babu Haridás Shástri.
Maulvi Ahmad.

The following gentleman is a candidate for election at the next meeting:

Nawab Mir Mahomed Ali, proposed by Babu Gaurdás Bysack, seconded by Lieut.-Col J. Waterhouse.

The following gentleman has intimated his wish to withdraw from the Society:

J. G. Delmerick, Esq.

The President announced that the Council had sanctioned: (1) as a special case, the exemption of Babu Gaurdás Bysack, who has compounded for his subscription as a non-Resident Member, from payment of further subscription as a Resident Member, in consideration of his having been an old officer of the Society and a member of very long standing: (2) the purchase of a collection of old coins for Rs. 250 offered by Mr. Delmerick, some of them being very rare.

The President also announced that the Council, on the application of the Finance Committee, had authorized the sale of Government Promissory Notes of the nominal value of Rs. 2,000.

The President said that Members of the Society would be glad to hear that on the invitation of Commander Carpenter, R. N., commanding the Indian Marine Survey vessel "Investigator," the Trustees of the Indian Museum had given leave to Mr. Wood-Mason, the Superintendent of the Museum, and Natural History Secretary of the Society, to go on a cruise as Naturalist to do some deep sea dredging in the Indian Ocean. It was an opportunity which had been looked forward to by Mr. Wood-Mason, and there was no doubt he would take the fullest advantage of it to the benefit of the Museum and of the Society.

The General Secretary exhibited an old portrait in oil colours found in the Public Library at Allahabad sent by the Hon. Mr. Quinton, for the purpose of identification, if possible, and stated that it appeared from inscriptions in English and Persian faintly traceable on the Canvas at the top that the portrait was intended for a Mr. G. T. Dankin or Donkin, but that nothing could be ascertained from old directories or lists of civilians about any gentleman of that name.

Mr. W. L. Sclater exhibited some specimens of the Mammalia of the genus *Paradoxurus*, and made the following remarks thereon:

The first specimen I have to exhibit was recently presented to the Indian Museum by Mr. James Ross of Ootacamund and was shot near that place; at first it seemed to be nothing but the common Palm cat of India (*Paradoxurus hermaphroditus* or *musanga*) but on examining the skull it was at once manifest that it was a species recently described by Mr. Blanford (P. Z. S. 1885, p. 613) and named by him *Paradoxurus jerdoni*.

The skull of *Paradoxurus jerdoni* can be at once distinguished from that of all other species of *Paradoxurus* by the length of the anterior palatal foramina, which extend back to the level of a line drawn across the palate behind the anterior pair of premolars.

The fur of the specimen exhibited has the same grizzled appearance mentioned by Mr. Blanford in his description, due to a subterminal band of gray on each individual hair, but it wants the white tip to the tail which is such a conspicuous feature in the coloured plate of Mr. Blanford's memoir on *Paradoxurus* (P. Z. S. 1885, pl. XLIX).

Mr. Gray in the Proceedings of the Zoological Society for 1864 p. 538, described a new species of *Paradoxurus* from a single skull in the British Museum; this skull differed from all other *Paradoxurus* skulls in the very much larger size of the teeth, especially of the 3rd upper premolar, which is provided with a distinct cingulum and a rudimentary inner lobe, the skull had no skin attached to it, and the locality was unknown.

In examining the specimens of *Paradoxurus* in the collection of the Indian Museum, I found three skulls which were undoubtedly skulls of *Paradoxurus macrodus* of Gray; the skulls in question had been extracted from a series of three mounted specimens from Malacca presented to the Asiatic Society in 1843 by Messrs. Frith and Lindstedt.

I have carefully examined the stuffed specimens to which the above skulls belong, and can see absolutely no character by which they could be distinguished from the ordinary *Paradoxurus hermaphroditus* or *musanga* as it occurs near Calcutta. However the species can easily be distinguished from *P. musanga* by its skull, and will therefore stand, and the addition to our knowledge is the locality whence it comes, *i. e.*, Malacca.

The third point is the question of the specific identity of the Burmese and Indian forms of Palm cat. Blyth and Jerdon only allow one species, *i. e.*, *Paradoxurus musanga*, but Mr. Blanford in his paper quoted above, has separated *P. musanga* into two species (*a*) *P. hermaphroditus* from Burma, Siam, Malayia, Lower Bengal, Nepal and Sikkim distinguished by its striped back, grey frontal band, even fur and by certain tooth measurements. (*b*) *P. niger* from the peninsular of India and Ceylon, distinguished by its unstriped back, ragged fur, absence of frontal bend and by the tooth characters.

After examining the specimens in the Museum here I have come to the conclusion that it is quite impossible to separate the two forms; there are in the Museum specimens from Rangoon resembling *P. niger* in having an unstriped back; there are specimens having the teeth of *P. niger* combined with the striped back of *P. hermaphroditus*, in fact not one of the characters enumerated by Mr. Blanford are constant, as indeed he himself says, no one can have no choice but in following the footsteps of Blyth and Jerdon in regarding the two forms of Palm cat as merely varieties of one species *Paradoxurus hermaphroditus*, Pall. (= *P. musanga*, Raffles.)

The Philological Secretary read a report on a find of 538 Treasure Trove coins supposed to be copper, forwarded by the Deputy Commissioner of Sháhpur, with his No. 1886, dated 16th October 1886.

1. I much regret the delay in submitting this report. The coins were originally received while I was on furlough in Europe. They were handed over to my locum-tenens, who, on account of pressure of official work, was unable to attend to them till some time after my return, when they were made over to me. It was only then that they could be examined for the first time, and identified and classified.

2. The original letter of the Deputy Commissioner, No. 1886, dated 16th October 1886, advised the despatch of 549 coins. My locum-tenens, on making the coins over to me, stated, however, that on counting them, he found there were 534 coins. On recounting them, when made over to me, I found there were 538 coins, as detailed below.

3. I am unable to specify the exact locality where the coins were found. The original letter of the Deputy Commissioner above referred to, which presumably contained information on the subject, appears to have been lost during my absence on furlough. A copy of it probably exists in the Deputy Commissioner's office, and may be referred to, if it be considered necessary.

4. The coins were supposed to be copper. On cleaning, however, selected specimens, I find that they are of more or less impure silver, *i. e.*, silver and copper mixed. Most of them are in a moderately good state of preservation.

5. They belong to the following rulers :

		No. of specimens.
No. 1.	Mu'izzu-d-dín, Muḥammad bin Sám, the conqueror of India, A. D. 1193—1205, type : *Mahamad Sáme*, as in *Chronicles*, p. 15, No. 10 ; Bull and Horseman, with Nágarí legends	371
No. 2.	Ditto ; type as in *Chronicles*, p. 15, No. 5 ; *Obverse :* horseman with Nágarí legend ; *Reverse :* Arabic inscription	3
No. 3.	Maḥmúd bin Ghiyáṣu-d-dín, about A. D. 1200 ; type as in *Chronicles*, p. 32, No. 25	1
No. 4.	Táju-d-dín Ilduz, about A. D. 1210 ; type as in *Chronicles*, p. 31, No. 24	2
No. 5.	S'rí Cháhaḍa Deva, Rájá of Ajmír, about A. D. 1215.	
	a. Type *Samasorala Deva*, as in *Chronicles*, p. 70, No. 40.....	45

		No. of specimens.
	b. Type *Sámanta Deva*, as in *Chronicles*, p. 70, No. 39	57
No. 6.	S'RÍ PRITHVÍ RÁJÁ DEVA, Rájá of Dehlí, about 1190 A. D.	
	a. Type *Prithví Rájá*, as in *Chronicles*, p. 64, No. 38	19
	b. Type *Pithimba Deva*, as in *Chronicles*, p. 59, No. 2	1
	c. Type *Pipala Rájá Deva*, as in *Chronicles*, p. 59, No. 3	4
No. 7.	S'RÍ SOMEŚVARA DEVA, Rájá of Ajmír; about A. D. 1160; type as in *Chronicles*, p. 63, No. 37	6
No. 8.	S'RÍ MADANAPÁLA DEVA, Rájá of Mahoba, about A. D. 1150; type as in *Chronicles*, p. 62, No. 34	22
No. 9.	S'RÍ AṆAMGAPÁLA DEVA, Rájá of Dehlí, about A. D. 1060; type as in *Chronicles*, p. 59, No. 32	2
No. 10.	S'RÍ SALLAKSHAṆAPÁLA DEVA, Rájá of Mahoba, about A.D. 1090; type as in *Chronicles*, p. 62, No. 33	3
No. 11.	NÁṢIRU-D-DÍN KUBÁCHAH, Sulṭán of Sind, about A. D. 1210; type *S'rí Kubáchá Suritán*, as in *Chronicles*, p. 100, No. 86	2
	Total, ...	538

The following paper was read—

Notes on some new Bactrian and Gupta coins.—*By* Dr. A. F. RUDOLF HOERNLE. (With a plate.)

Among the Bactrian coins which the Society lately purchased from Mr. J. G. Delmerick there are two of considerable interest.

No. 1. One is a new variety of a silver hemidrachm of Strato I., (see Plate IV, fig. 1). It reads as follows :—

Obv. ΒΑΣΙΛΕΩΣ ΣΩΤΗΡΟΣ ΣΤΡΑΤΩΝΟΣ, with king's head to right, with diadem.

Rev. (in Arian Páli characters) *Maharajasa tradatasa dhramikasa Thratasa*, with Pallas standing with thunderbolt and shield to left; on the left side the monogram, No. 22, on Pl. XI, c, in Princep's *Indian Antiquities* (ed. Thomas), Vol. II.

No hemidrachm of Strato I., exactly like this, has hitherto been known. There is, as I am informed by Mr. R. Stuart Poole, none like it in the British Museum. The usual reverse legend of the silver coins of Strato has *prachachhasa* (the Prákrit for ἐπιφανοῦς) in the place of *dhramikasa* (the Prákrit for δικαίου), thus: *Maharajasa prachachhasa tradatasa Thratasa.* The obverse legend usually reads βασιλέως ἐπιφανοῦς σωτῆρος Στράτωνος; but occasionally, as on the present coin, ἐπιφανοῦς is omitted. There are square copper coins of Strato I., which have the same legend with *dhramikasa*, as this new silver coin; but their obverse reads βασιλέως σωτῆρος δικαίου Στράτωνος, being an exact translation of the Páli. The legend with *dhramikasa* occurs also on the reverse of square copper coins of Strato and his wife Agathokleia, the obverse of which reads βασιλίσσης θεοτρόπου Ἀγαθοκλείας, (see Sallet's *Nachfolger Alexanders des Grossen*, pp. 127, 128; *Ind. Ant.*, vol. II, p. 196, and the *British Museum Catalogue*). Unfortunately, on the present coin, the word *dhramikasa* is not quite as distinct as one could wish; the two middle letters *mi* and *ka* are much worn; but the first letter *dhra* and the last latter *sa* are sufficiently clear to justify the identification of the word as *dhramikasa.* In any case it is impossible to read it a *prachachhasa;* for that word, when it occurs on Strato's coins, occupies a different position in the legend, before *tradatasa*, not after it.

The name of the king I read as *Thratasa*, not (as is usually done) *Stratasa.* The fact is that the value of the first letter has hitherto always been wrongly assumed to be *str*, for no other reason (as it would seem) than because the corresponding place in the Greek name is occupied by the letters *str.* But the compound *st* or *str* was always unpronounceable to the vernacular tongues of India; and it is, therefore, *a priori* unlikely that there would be a graphic symbol to indicate a combination of sounds which did not exist in the language. In the North-Western Prákrit (as in all Prákrits) the conjunct *st* was replaced by *th*, and the conjunct *str* by *thr.* Hence the Greek name *Strato* became *Thrata* (थ्रत) in the mouth of the natives of North-Western India. Similarly the Greek name *Hippostratos* became *Hippathrata* (हिपथ्रत), and is thus to be read, when it occurs on bilingual Bactrian coins. But the true value of the Arian Páli character 𑀣 is directly and clearly proved by its occurrence in genuine Prákrit words in which it indubitably represents the dental aspirate *th* (थ). Numerous instances occur in the Sháhbázgaṛhí inscription of Aśoka. Thus, in line 23, letters 17 and 18, we have *nathi* 'it is not' (Skr. *násti*); in line 24, letters 26 and 27, we have *tatha* 'there' (Skr. *tatra*). As the same words occur in the Khálsí inscription, where they are written in Indian Páli characters, there can be no doubt regarding the true value of the Arian Páli equivalents.

It may be useful to record here the normal form of the surd cerebrals and dentals, regarding which some uncertainty still seems to prevail. They are: 𐨚 = ट = *ṭ*; 𐨛 = ठ = *ṭh*; 𐨟 = त = *t*; 𐨠 = थ = *th*. Occasionally variations of these normal forms occur, in which the cross line is not drawn straight or not continuous; thus we may have ┽ or ┣ or T for 𐨚 = ट *ṭ*; or ㄱ for 𐨛 ठ *ṭh*, or ⊤ or ⊤ or ⊤ for 𐨠 थ *th*. These are mere inaccuracies (sometimes owing to the nature of the surface on which the letters are incised), which cannot mislead when the normal form is known.

No. 2. The second Bactrian silver coin is a hemidrachm of Diomedes (see Plate IV, fig. 2). It is identical, or very nearly identical, with one in the British Museum collection, but, as will be seen by a reference to fig. 11, of Plate VIII, in Professor Gardner's catalogue (p. 31), the Prákrit inscription on the reverse is not nearly as complete as on the Society's newly acquired specimen. Sallet (*ib.*, p. 114) mentions another as an "unicum" in an "English private collection," which, however, is perhaps the identical one of the British Museum. The Society's specimen reads as follows:

Obv. ΒΑΣΙΛΕΩΣ ΣΩΤΗΡΟΣ ΔΙΟΜΗΔΟΥ, with king's head, helmeted, to right.

Rev. (in Arian Páli characters) *Ma*[*harajasa*] *tradatasa Diyomidasa*, with Dioscuri standing, lance in hand, to front; on the left side the monogram, No. 20 *a* or *b*, on Pl. XI, c in *Ind. Ant.*, vol. II.

The name seems to read distinctly *Diyomidasa* or *Diyumidasa;* the left leg of the letter *y* has a distinct curve attached to it, usually indicative of the vowel *u* or *o*.

No. 3. About two months ago I received from Mr. Henry S. Boys, B. C. S., in Lucknow, for decipherment, a gold Gupta coin, which he had obtained at Badaulí, about 25 miles from Ajudhyá. It is of a quite new type, and apparently unique. It is of somewhat coarse workmanship, though not more so than many other Gupta coins of well-known types, and is undoubtedly genuine, as it was bought of a common man at a little above its intrinsic value. Weight 112,5 grains. See Plate IV, fig. 3.

Obv. King standing in the same posture as on Samudra Gupta's coins of the "Javelin" type, (see Mr. Smith's Catalogue, J. A. S. B., vol. LIII, Part I, p. 172). King standing to left, dressed in be-jewelled close-fitting tail coat, trowsers, and tall pointed cap, left arm resting on javelin, right hand casting incense on a small altar in left field; behind right arm the bird standard; corona round the head. Under the king's left arm, within the field, चन्द्र *chandra;* along the left hand

margin परः मः भग॰ *para. ma. bhaga;* along the right hand margin प्रवीरः गुप्त *pravíraḥ Gupta.* The obverse is imperfectly struck; it looks as if the coin slipped on the die; most of the letters appear double, slightly overlapping each other; still they are all tolerably distinct, except गुप्त *gupta*, the प *p* of which is wanting. The marginal legend consists of abbreviated words, which I take to be in full *paramabhágavata-pravíraḥ Chandra Guptaḥ, i. e.,* "The most devoted worshipper of Vishṇu, the mighty Chandra Gupta." The circle is a well-known mark of abbreviation; its being used three times would seem to indicate three abbreviated words; but the first circle may be redundant; otherwise the phrase might be *parama-mahá-*(or *mahad-*) *bhágavata.*

Rev. King and queen sitting on a couch, facing each other. The king sits on the right side, right leg drawn up on the couch, and his right hand holding up and apparently showing to the queen a cup, shaped somewhat like a modern shallow champagne glass. The queen sits on the left-side margin of the couch, with both legs down, supporting herself with the right arm on the corner of the couch, and her left arm a-kimbo. Both figures are dressed in lower garments (*dhoties*), the king in short ones reaching to above the knees, the queen in long ones coming down to below the knees. Both wear jewels in their hair and ears, also bracelets, the king also a necklace, and the queen anklets. There is a sort of corona round the king's head. The scene seems to represent a drinking bout, similar to what may be seen on old Buddhist sculptures. On the margin, behind the queen, श्री वि *śri vi*, similarly behind the king, क्रमः *kramaḥ;* that is, श्री विक्रमः *S'rí Vikramaḥ.*

It is doubtful whether this coin should be attributed to Chandra Gupta I. or Chandra Gupta II. The only point, however, which really seems to favour the attribution to the latter king, is the reverse legend *S'rí Vikramaḥ*, which has hitherto been only found on coins of that king. The words *paramabhágavata* (if correct) have also been met with on coins of the same king (see J. A. S. B., vol. LIII, pp. 180, 182). But another, and more striking peculiarity points rather to an older date for the coin, and to Chandra Gupta I. as its issuer. The king's figure on the obverse has a decidedly antique look. It closely resembles that on the early coins of the so-called Ghaṭotkacha, and of Chandra Gupta I. (*ibid.*, plate II, figs. 1—4). The reverse device of 'King and Queen', too, has hitherto been only observed on coins of Chandra Gupta I. and of Skanda Gupta (see *ibid.*, pp. 129, 171). If the coin should be attributed to Chandra Gupta II., we must assume that, on some of his coins, he reverted to the more antique obverse device of his early predecessors. On the other hand, as hitherto only one type of coin (King and Queen) of Chandra Gupta I. has been discovered, it is impossible

to assert, that he might not have used the legend *S'rí Vikramaḥ* on other coins. On the whole the ascription to Chandra Gupta I. appears to me the more probable one.

No. 4. The next is a gold coin of Chandra Gupta I., forwarded to me by Mr. H. Rivett-Carnac. It belongs to Mr. Sykes, barrister-at-law at Lucknow, and was acquired by him either at Lucknow or Fyzabad. This is an undoubted coin of Chandra Gupta I., of the well-known type of "King and Queen" (*ibid.*, p. 171). It is only published here (see Plate IV, fig. 4), because, so far as I am aware, no specimen with the lion turned to the *left*, has been hitherto published. The usual reverse has the lion turned to the right (see *ibid.*, plate II, fig. 2). The legends on this coin, unfortunately, are very imperfect; but चन्द्रगुप्त *Chandra Gupta* on the obverse is clear. The action of the king appears to me that of offering the queen something to drink (or to eat); the idea of the device, therefore, being similar to that on the reverse of the preceding coin. Weight 112·5 grains.

No. 5. The next is a gold coin of Chandra Gupta II.; also forwarded by Mr. Rivett-Carnac, and belonging to Mr. Sykes, obtained at Lucknow or Fyzabad. See Plate IV, fig. 5. It is a new variety of the "Horseman to left" type, combining the mounted figure of the king of that type with the legend of the "Lancer" or "Horseman to right" type; (see *ibid.*, pp. 182, 183). The legend on the obverse is परमभागवत [श्री चन्द्रगुप्तः *parama-bhágavata-[śrí-Chandragu]ptaḥ, i. e.*, 'The most devoted worshipper of Vishṇu S'rí Chandragupta.' The reverse has the usual female figure, dressed in lower garments and seated on a *moṛhá* or Indian wickerstool, with fillet in right and lotus in left hand. Legend, with a straight line of dots underneath, अजितविक्रमः, *i. e.*, 'he of unvanquished might,' or 'the unconquered hero.' Weight 118·25 grains.

No. 6. This is a gold coin belonging to Mr. H. Rivett-Carnac. Its find-place is not specified further than "somewhere between Benares and Fyzabad." It is a coin of Kumára Gupta, of the "Horseman to left" type, (see *ibid.*, p. 193). I publish it, because it has the obverse legend exceptionally well preserved, and may help to establish its correct reading. See Plate IV, fig. 5. It runs thus: + + महाराजपत behind the king's back, the vowel marks being clipped off; क्षि between the king's and the horse's head; तिपति रथीपाद् + + + in front and below the horse; there would be space for about six more letters behind the horse, joining the two preserved portions of the legend, though possibly the whole of the space was not occupied by letters. I would suggest to restore the legend thus: महाराजपति-क्षितिपति-रथीपाद् [विजय-कुमारगुप्तः] *mahárájapati—kshitipati—ratháipáda—vijaya—Kumára—Guptaḥ, i. e.*, "the lord of Mahárájas, the lord of the earth, the famous chariot-man,

the victorious Kumára Gupta." The reading of the preserved portion of the legend, as above given, is practically certain, except the *akshara* थी *thí*, the consonant of which is too blurred to be recognizable, and the vowel might be a long *á*. The bracketed portion of the reading I have supplied from another specimen of the "Horseman to left" type in the Society's collection (see *Proceedings*, A. S. B., for 1882, pp. 111—114, also J. A. S. B., vol. LIII, p. 194). The reverse has, as usual, the legend अजितमहेन्द्र *ajita-Mahendra*, *i. e.*, "the unconquered Mahendra", and a female figure seated on a *morhá*, holding a fillet in her right, and a long-stalked lotus in her left hand. There is no monogram. The weight is 123·75 grains.

Nos. 7, 8, 9 are new specimens of later Indo-Scythic coins, or "link-coins" as Prinsep called them. They have been discussed by the late Mr. E. Thomas in a paper in the *Indian Antiquary*, Vol. XII, p. 6. No. 7 is evidently the oldest and purest. Along the obverse rim (to be read from outside the coin) there are mutilated traces of the well-known Indo-Scythic legend, in Greek characters, PAO (in front of the king's face). In the angle, formed by the king's left armpit, there appears to be the letter ग *ga* or श *śa*; in the field outside the spear, there are two letters, apparently ग्स *gasha* or त्स *tasha*; at the left-hand bottom, there seems to be वि *vi* or perhaps ख *kha*. The reverse also shows traces of the Greek letters *ορρο*(?) in a very debased form. Weight 121 grains.

No. 8 very closely resembles a specimen figured and described in Mr. Thomas' paper (*ibid.*, p. 9). The obverse has किर्द *kirda* under the king's left arm. Along the right-hand margin there is ग्रह *gaḍaha*; and in the left bottom of the field, between the fire-altar (partially visible on the rim) and the king's legs, there are three very minute and not very distinct letters placed beside (not above) one another. The first appears to be a compound letter, though I cannot identify it with Mr. Thomas' reading (*kshaṇa*); the other two look like पुर *pura*. The reverse, with the usual figure of the enthroned goddess, shows two letters (above one another) on the right-hand margin, यु *yasha*. Weight 118, 25.

No. 9 is the crudest and latest specimen. The obverse apparently has किद्द *kkida* (or किर्द *kirda*) under the king's left arm; under his right arm there are two characters, which seem clearly to read बश *baśa*. The reverse, with a crude enthroned goddess, shows on the right-hand margin traces of श्रीष्ट . वर्म्म *śr*[*í*] *pri* . *va*[*r*]*mma*. Weight 112·5 grains.

Besides the above-mentioned, I received from Mr. H. Rivett-Carnac other twelve gold and one silver coins. All these, however, belong to well-known types and varieties that have been already published. Among

them there are four gold Indo-Scythians; *viz.*, one Kadphises, with king's head to left (as in *Ariana Antiqua*, Plate X, figs. 8, 10, 11), weight 97·175 grains; one Kanerki with MAO reverse (as *ibid.*, Plate XII, fig. 1), weight 119·75 grains; and two Bazodeo, with OKPO reverse (OKPO to be read from the rim of the coin, (as *ibid.*, plate XIV, fig. 14), except that there is a nimbus round Śiva's head, (as *ibid.*, figs. 12, 13); one of the two coins is slightly broader and thinner, but without any trace of that slight concavity generally shown by the thinner specimens of Bazodeo's coins; weight 112,5 grains; the other weighs 125·825 grains. The Kadphises and Kanerki coins, I may add, belong to Mr. Sykes.

The remainder are all Gupta coins; *viz.*, 1, one Ghaṭotkacha, with a very fine reverse (as in J. A. S. B., vol. LIII, pl. II, fig. 1), weight 125,825 grains.

2, four Chandra Gupta II., "Archer" type, with lotus seat reverse (as *ibid.*, pl. III, figs. 1, 2); one of the ordinary kind, weight 123,75 grains; one has the क *ka* doubled in the rev. legend, weight 125,825 grains; another shows a circle (or wheel) over the king's right shoulders (as in var. *β*, *ibid.*, p. 180), weight 125·75 grains; and one appears to be a cast forgery, weights 92,075 grains.

3, one Kumára Gupta, belonging to Mr. Sykes, of the "Combatant lion" type (as *ibid*, p. 197, pl. IV, fig. 3), weight 119·75 grains; the obverse legend is very imperfect; on left margin there are traces of three letters, the last two of which look like क्रम *krama* (perhaps विक्रम *vikrama*); on the right margin there are traces of seven letters, the first two looking like द्य श्री *dya śrí*, and the last like कु *ku*; there must have been other letters below the king and behind the lion, joining the two preserved portions, and making up कुमारगुप्तस्य *Kumára Guptasya*, the initial कु *ku* of which is preserved. The reverse legend reads clearly कुमारगुप्ताधिराज्ञो *Kumára Guptádhirájño* (not merely *Kumára Guptádhirája*).

4, one Skandagupta, "Archer" type (as *ibid.*, p. 198), weight 142,175 grains.

5, apparently a crude imitation of Chandra Gupta's coins of the "Archer" type; the name under the king's right arm is a mere scroll; the reverse legend is fairly legible as श्री विक्रम *śrí-Vikrama*; weight 146·25 grains.

6, a silver Gupta coin of the "peacock" type, but with the legend quite illegible, weight 28,125 grains.

LIBRARY,

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University.—Circulars, Vol. VII, No. 63.

Bombay. The Indian Antiquary.—Vol. XVI, Parts 204—206, January—March, 1888.

Budapest. La Société Hongroise de Géographie.—Bulletin, Tome XVI, Fascicule I—II.

Brussels. La Société Royale des Sciences de Liège.—Mémoires, 2de série, Tome XIV.

Buenos Aires. La Academia Nacional de Ciencias en Cordoba.—Boletin, Tome X, Entregas. I.

Copenhagen. La Société Royale des Antiquaries du Nord.—Mémoires 1887.

Calcutta. Geological Survey of India,—Records, Vol. XXI, Part I, 1888.

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Paris. La Société de Géographie,—Bulletin, Vol. VIII, (7e série) 4e Trimestre.

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Sydney. Linnean Society of New South Wales,—Proceedings, Vol. II, Part I.

Turin. La R. Accademia delle Scienze di Torino,—Atti, Vol. XXIII, Disp. 2a et 5a, 1887—1888.

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Murdoch, J. Religious Reform, Part II. (Philosophic Hinduism.) 8vo. Madras, 1887.

Miscellaneous Presentations.

Resolution on the Revenue Administration of the Central Provinces for the year 1886-87. Fcp. Nagpur, 1888.

Chief Commissioner, Central Provinces.

Catalogue of Canadian Plants, Part III—Apetalæ. By John Macoun, M. A. 8vo. Montreal, 1886.

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GOVERNMENT OF INDIA, HOME DEPARTMENT.

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GÖTTINGISCHEN GELEHRTEN ANZEIGEN, GÖTTINGEN.

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Scientific memoirs by Medical officers of the army of India, edited by Sir Bengamin Simpson, Part III, 1887. 4to. Calcutta, 1888.

SURGEON GENERAL WITH THE GOVT. OF INDIA.

Proceedings of the Trustees of the Newberry Library for six months from July 1, 1887 to January 5th, 1888. 8vo. Chicago, 1888.

THE NEWBERRY LIBRARY, CHICAGO.

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———. Journal für die reine und angewandte Mathematik,—Band CII, Heft III.

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———. ———. Beiblätter, Band XII, Stück 2.
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———. The Entomologist's Monthly Magazine,—Vol. XXIV, No. 284, January 1888.
———. The Ibis,—Vol. VI (5th Series), No. 21, January 1888.
———. The Journal of Botany,—Vol. XXVI, No. 301, January 1888.
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———. The Messenger of Mathematics, Vol. XVII, No. 8, December, 1887.
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New Haven, Conn. The American Journal of Science, Vol. XXXV, No. 205, January, 1888.
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———. Revue Critique,—Tome XXIV, Nos. 51—52, 1887, Tome XXV, Nos. 1—4, 1888.
———. Revue Scientifique, Tome XLI, Nos. 6—11, 1888.
Vienna. Vienna Oriental Journal,—Vol. II, No. I, 1888.
Vienna. Mittheilungen aus der Sammlung der Papyrus Erzherzog Rainer,—Band 2 und 3, 1887.

Books Purchased.

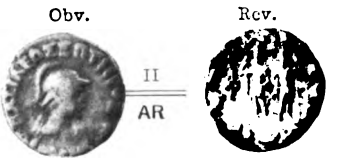
Levi, Leone. International Law, with materials for a code of international law (The International Scientific Series, Vol. LXII). 12mo. London, 1887.

Phillips, William. A manual of the British Discomycetes, with descriptions of all the species of Fungi hitherto found in Britain. (The International Scientific Series, Vol. LXI). 12mo. London, 1887.

Photo-zincked at Survey of India Office, Calcutta, April 1868.

TERRACOTTA FIGURE FOUND AT TUMLOOK.

Scale about two inches



SOME NEW BACTRIAN AND GUPTA COINS.

Photo-Collotype, Survey of India Offices, Calcutta, June 1888.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MAY, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd May, 1888, at 9.15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present :

E. T. Atkinson, Esq., P. N. Bose, Esq., Babu Gaurdás Bysack, E. C. Cotes, Esq., E. Gay, Esq., E. J. Jones, Esq., Babu Asutosh Mukhopádhyáy, L. de Nicéville, Esq., R. D. Oldham, Esq., A. Pedler, Esq., H. M. Percival, Esq., T. A. Pope, Esq., Abdur Rahman, Esq., Dr. P. K. Ray, H. M. Rustomjee, Esq., W. L. Sclater, Esq., D. Waldie, Esq.

The minutes of the last meeting were read and confirmed.

Thirty-one presentations were announced, as detailed in the appended Library List.

The following gentleman, duly proposed and seconded at the last meeting of the Society, was ballotted for and elected an Ordinary Member :

Nawab Mir Mahomed Ali.

The following gentlemen are candidates for election at the next meeting :

A. P. Pennell, Esq., C. S., proposed by J. Crawfurd, Esq., seconded by A. Pedler, Esq.

Kumar Devendra Narayan Roy, proposed by Babu Gaurdás Bysack, seconded by H. M. Percival, Esq.

Maulvi Kabíruddín Ahmad, Khan Bahadur, (for re-election), proposed by Babu Gaurdás Bysack, seconded by H. M. Percival, Esq.

Babu Peary Mohun Roy, proposed by Babu Gaurdás Bysack, seconded by Lt.-Col. Waterhouse.

The following gentlemen have intimated their wish to withdraw from the Society:

W. D. Blyth, Esq., C. S.
B. L. Gupta, Esq., C. S.

The PRESIDENT announced that the Council had sanctioned expenditure up to Rs. 500 for the purpose of carrying out enquiries as to the cause of the explosive sounds known as "Barisal guns," with reference to the paper on the subject read at the March meeting of the Society.

The PHILOLOGICAL SECRETARY read the following report on a find of Treasure Trove Coins in the Sialkot District:—

Report on 125 old coins forwarded by the Deputy Commissioner of Sialkot, with his No. 521, dated 23rd March, 1888.

1. The coins are stated to have been found as follows: 13 were dug from a mound of earth at Naugal Satkan, Tahsíl Zafarwal; 38 were found buried in a sugarcane-field in Chak Ram Dass, Tahsíl Doska; 74 were found in digging at the banks of a swamp in Mouzah Saddhar, Tahsíl Pasrur. There is no means of identifying the coins belonging to these several finds.

2. All the coins, with the exception of one, are (silver) Rupees of the following Moghul Emperors of Delhi.

	No. of specimens.
I. SHÁH JAHÁN, 1037—1068 A. H. = 1627—1658 A. D.,	
a, *Type* I, two square areas, date 1050, 13—mint Súrat, others illegible;	5
b, *Type* II, one round area; mint, date illegible;	1
c, *Type* III, lettered surfaces, 1041, 1044, Multán.	2
II. AURANGZÍB, 1068—1118 A. H. = 1658—1707 A. D.	
a, *Type* I, lettered surfaces, dates 1099[4]—1102—1103—1108—1109—1110—1111[2]—1112—1113—1115—1116—1117—1118; Mints: Súrat,[4] Patnah, Dáru-ẓ-Ẓafar (Akbarabad ?), Dáru-s-Salṭanat Láhor[3], Etáwá, Barelí, Mustaqiru-l-Khiláfat Akbarábád, ...	19
b, *Type* II, two square areas, 1096, Akbarábád...	1
III. BAHÁDUR SHÁH, 1119—1124 A. H. = 1707—1712 A. D.	
Two different types of lettered surfaces, dates 1121, mints: Dáru-s-Salṭanat Láhor, Dáru-l-khiláfat Sháhjahánábád, Dáru-s- ?)	4

		No. of specimens.
IV.	Farokh Sír, 1124—1131 A. H. = 1712—1719 A. D.	
	Two different types of lettered surfaces; dates: 1127, 1128, 1130[4], mints: Dáru-s-Salṭanat Lahor[4], Dáru-l-khiláfat Sháhjahánabad? ...	6
V.	Rafí'ud Daraját, 1131 A. H. = 1719 A. D.	
	Date 1131, mint: Dáru-l-khiláfat Sháhjahánábád	1
VI.	Muḥammad Sháh, 1131—1161 A. H. = 1719—1748 A. D.	
	a, *Type* I, *Ṣáḥib Qirán*, two varieties, dates various; mint of all: Dáru-l-khiláfat Sháhjahánábád	34
	b, *Type* II, *Bádsháh Ghází* dates 1142, 1145 and others, mints: Dáru-s-Salṭanat Láhor[16], Korá[4], Dáru-l-khiláfat Akbarábád[2], Multán...	23
VII.	Aḥmed Sháh 1161—1167 A. H. = 1748—1754 A. D.	
	Two varieties of lettered surfaces; dates: 1161, 1162, 1163, 1165 and others, mints: Dáru-s-Salṭanat Láhor[3], Aḥmadábád, Bhirat.....	12
VIII.	Alamgír Ẓání', 1167—1175 A. H. = 1754—1761 A. D.	
	Type I, *Alamgír*, dates 1172[4], mint: Dáru-s-Salṭanat Láhor[6]	6
	Type II, *Azízuddín*, dates 1173[5], mints: Dáru-s-Salṭanat Láhor[7], Aṭṭak	10
	Total ...	124

3. IX. One coin is a Rupee of *Nádir Sháh*, struck in Peshawer, in the year 1153 A. H. = 1740 A. D. during his expedition to India 1

Grand total... 125

Mr. R. D. Oldham exhibited some flexible sandstones and made a few remarks thereon.

Mr. W. L. Sclater exhibited the head and antlers of a stag from Darjeeling.

The following paper was read—

An account of the Dacca Tornado of April 7th, 1888, *by* DR. A. CROMBIE, *Civil Surgeon, Dacca, with a short description of the Meteorology of Bengal at that period.—By* A. PEDLER, ESQ., F. C. S.

(Abstract.)

The opening part of the paper by Mr. Pedler consists first of a short explanation of the manner in which tornadoes differ in their phenomena from the ordinary storms such as cyclones &c. which visit Bengal. The second part gives a very short account of the few well-authenticated cases of tornadoes which have previously occurred in Bengal. The third section is devoted to a brief resumé of the state of our knowledge of tornadoes and their occurrence and of the conditions which are found to precede them as ascertained by the scientific work done in America by the Meteorological Department of the United States. This section also gives very briefly the theories which are held to account for the formation of the phenomena called nor'-westers and dust-storms, while the fourth or concluding part of the meteorological section of the paper gives a very brief outline of the meteorology of the period, April 6th to the 8th, and the conclusion is come to that the conditions which preceded the formation of the storm are similar to those which precede similar tornadoes in the United States.

Incidentally also a description is given of three other tornadoes which have recently occurred in Bengal, one in the Magura Sub-division of the Jessore District on the 27th March 1888, a second in the Pubna District on the same date, and the third of a tornado which occurred at Bhadreswur, close to Serampore, on the 27th of April 1888.

The second part of the paper is by Dr. Crombie who details the phenomena of the actual storm, giving also certain explanations of the path selected by the storm, and of the damage done. Dr. Crombie first discusses the action which a storm with winds gyrating in direction opposite to the hands of a watch would have on obstacles in its path and proves that the storm in question was a tornado with winds rotating from right to left, (*i. e.*, against the hands of a watch) by taking up its action in one part of its course on the Buckland Bund close to the Nawab's palace, and shews also how by the position of the objects thrown down, the precise track of the centre of the storm can be proved. It appears the tornado began its destructive course at the extreme west end of the municipal limits of Dacca. The first clear signs of the rotatory nature of the tempest occur in an orchard to the north-east of Fakirinka Masjid, where there is a clump of plantain trees thrown down, and twisted in all directions, and even in its first mani-

festations, it is clear that the storm was of great violence. The vortex commenced to travel in a south easterly-direction between the old river bed and the road running parallel to it, destroying every kutcha hut in this portion of Dacca. In its passage eastward it gradually edged more and more towards the old river bed, and when it was opposite the Elephant Ghat, the vortex was actually in the bed of the river, and it appeared as if the storm would have moved in the direction of least resistance, and have passed out into the open maidan lying to the south of Nawabgunge. Suddenly, however, the vortex moved to the north, and was met with winds of hurricane force apparently quite separate from the true tornado, blowing from the north, the track of which was not more than 60 paces across, and was very local. Having advanced a short distance in a N. E. direction it again turned towards the south-east. Up to this time the tornado does not seem to have had power to destroy pucca masonry buildings, though it had destroyed very numerous huts, trees, &c. It, however, here passed into the maidan to the south of Lalbagh, and on being freed from such obstacles as buildings &c., it seems rapidly to have accumulated additional force, and from this point it was able to destroy even the strongest houses. From Lalbagh the vortex passed into the river gradually crossing to the opposite bank, where it almost ground to powder a newly built masonry house. It was then approaching a village called Subudiya, and at this time the part of Dacca on the north bank of the Buriganga seemed safe and Subudiya doomed, but when crossing an open maidan it appears to have encountered a strong current of air blowing up from the south, when it abruptly altered its direction, wheeled nearly at a right angle to the north and travelled in a north-easterly direction back to Dacca, when the largest amount of damage was done, masonry houses being demolished and everything in the track being destroyed until the storm reached the Sankari Bazar, where it more or less suddenly rose from the ground and passed high into the air. In no part of its course did the breadth of the tornado exceed 200 paces and at the part where it did most damage it was only 180 paces wide. It travelled altogether over $3\frac{1}{2}$ miles and its rate of progress was according to different estimates from 20 to 12 miles an hour. The lateral force of the wind as above stated was enormous and the uprush must have been equally strong, as after the walls of houses had been blown out, large beams were kept from falling for distinct periods by this violent uprush. The shape of the tornado cloud appears to have been something like a top cut off a little above the sharp point, it was accompanied by a distant rumbling sound, considerable electrical disturbance seems to have accompanied it and the cloud appears to have been more or less illuminated.

The storm caused 118 deaths, while 1200 persons were somewhat severely wounded and nearly 7 lakhs worth of property was destroyed.

The paper will be published in full in Journal Part II for 1888.

LIBRARY.

The following additions have been made to the Library since the meeting held in April, 1888.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies and Editors.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JUNE, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 6th June 1888, at 9.15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present :

Nawab Abdul Latif Bahádur, C. I. E., Prince Jahán Qadr Muhammad Wáhid Alí, Bahádur, H. Beveridge, Esq., E. C. Cotes, Esq., E. Gay, Esq., E. J. Jones, Esq., Babu Asutosh Mukhopádhyáy, T. Munro, Esq., L. de Nicéville, Esq., R. D. Oldham, Esq., H. M. Percival, Esq., W. L. Sclater, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

The Minutes of the last meeting were read and confirmed.

Twenty-four presentations were announced, as detailed in the appended Library List.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members :

A. P. Pennell, Esq., C. S.
Kumár Devendra Náráyan Roy.
Maulvi Kabir-ud-din Ahmad, Khán Bahádur (re-elected).

The following gentlemen are candidates for election at the next meeting :

Lieut. Eaton W. Petley, R. N., Offg. Port Officer, Calcutta, proposed by Lieut.-Col. J. Waterhouse, seconded by A. Pedler, Esq.

Babu Kiran Chandra Roy, Zemindar of Narail, Zillah Jessore, proposed by Nawab Abdul Latif Bahádur, seconded by Babu P. C. Ghosha.

The following gentleman has intimated his wish to withdraw from the Society :

C. A. Hackett, Esq.

The PRESIDENT announced that the Council had, on the application of the Finance Committee, sanctioned the sale of Government Promissory notes of the nominal value of Rs. 3,000 out of the Oriental Publication Fund, to meet excess expenditure for the present year : as also the re-grant of a sum of Rs. 1,000 for binding the principal periodicals, which had been sanctioned some time back, but had lapsed.

The PHILOLOGICAL SECRETARY read the following extract from a letter from Mr. C. J. Rodgers, of Amritsar, regarding coins collected by him for Government in his tour during the past winter ;—

" Perhaps you may be interested to hear that I have, during my tour of the past winter, again made a collection of coins for Government. This collection includes a fine square mohur of Sháh Jahán's and a new type in gold of Muḥammad Tughlaq. In Sonepat I came across the leavings of the great find of which General Cunningham bagged so many. (See his analysis of the find in Num. Chron., Vol. XII, N. S., p. 159). I obtained in Sonepat one hemidrachma of Agathokleia (her bust and name on obverse) with Straton's name on reverse. One hemidrachma of Heliokles, helmeted head of king, to left, with spear behind shoulders ; two hemidrachma of ditto, bare head with fillet to right, 3 of Apollodotus square, 3 of Menander of different types ; one of Hermæus, helmeted king to right ; one of ditto and Kalliope : one of Antialkides. I saw a poor one of Antimachus and a good one of Philoxenes. People say they are constantly turning up in the rains in the ruins of Sonepat.

" Besides these I obtained a new rupee of Muḥammad Tughlaq, and a new one of Ghiyáṣu-d-dín Tughlaq I. and Náṣiru-d-dín Bughra of Bengal.

" In Dehli I obtained remarkably good specimens of rupees of the following Sulṭáns of Bengal, Jalálu-d-dín, Muḥammad Sháh, Dáúd, Bahádur Sháh, and a fine one of Mubárizu-d-dín Muḥammad Sháh Súrí. I also obtained there some fine rupees of Jahángír and Akbar. There had been a find of the Bengálí rupees. I saw a bag full also of the rupees of the Paṭhán Sulṭáns 'Aláu-d-dín Masa'úd Sháh and Náṣiru-d-dín Maḥmúd Sháh. These, however, nearly all lacked dates.

" In Panipat I came across an old Sanskrit coin with letters very old on it (रामदमष), over an image, with tree to left and a flower-pot to right.

" In Ludiánah I secured a hemidrachma of Zoilus. In Firozpur I obtained a copper coin of some Satrap, probably Rajnabala.

"But everywhere, even in Dehli, what a falling off is there in the matter of old coins? It is true there are such things in the bazaars, but nothing really fine is now obtainable; everything has long since been nipped up. And now-a-days with the bazaars inundated with globe-trotters who buy anything and everything at fabulous prices, it is a wonder I obtained anything. I still think, however, that if a great effort were made, a really good collection of coins might even yet be made for the Imperial Museum in Calcutta. My success last year and this seems to show that in places *off the rail*, there are still coins obtainable.

"In Amritsar and Lahore nothing seems to have turned up during the past year. I hope, however, to have more of a find of silver coins of Maḥmúd of Ghazní, made at Pindí or its neighbourhood during the past year. The coins may have come from Kábul. I hear there are many new types.

"Besides coins I obtained impressions of inscriptions of about twenty Sulṭáns of Dehli. Several are of Balban, one of 'Aláu-d-dín Masa'úd Sháh, *many* of Bábar and Humáyún and of the time of Sikandar and Ibrahím Lodí. I made also a collection of sculptures and of carved bricks for the Lahore Museum. I came across many Jain images of great beauty and execution and the ruins of many Jain or Hindú temples. My five draftsmen have made some beautiful drawings of images and pillars, &c."

Mr. E. C. Cotes exhibited specimens of the Wheat and Rice Weevils and made the following remarks upon them:—

I have brought some specimens of weevilled wheat and rice here to-night which I thought might be of interest to the Society.

According to Messrs. Ralli Brothers of Calcutta this weevil destroys an average of $2\frac{1}{2}$ per cent. of Indian wheat, which represents an annual loss of £150,000 in exported wheat alone, and that this is not an excessive estimate is shown by the fact that the Delhi wheat merchants, from whom careful inquiries have been made, estimate the damage in some cases at as much as eight or ten seers per maund. And in two of the samples I have brought here to-night, which were taken at random from the wheat godowns in Calcutta last January, you will see the refraction due to weevil is estimated by the trade at 2 and 5 per cent. respectively.

I need hardly say that this is a very serious matter, especially now that India has entered into competition with America and Russia for supplying the world with wheat.

In America and Europe this weevil is known and is called the "Rice weevil" (to distinguish it from the allied European wheat weevil *Calandra granaria)*; it is, however, very sensitive to cold, and consequently

in temperate climates is only able to develop under exceptional circumstances, and therefore it does relatively but little damage, while out here in India it is to be found in every grain-dealer's godown and wherever wheat or rice is exposed to the air, whether in sacks or bulk.

The life history of the weevil is briefly this. The female weevil bores a minute hole in the grain of wheat or rice, as it lies in the store and deposits a single egg in it, covering up the hole with saliva and dust, so as to make it almost invisible, thence it goes on to other grains and deposits a single egg in each, laying in all some 150 eggs. Out of each egg soon creeps a tiny white grub which bores its way into the grain, but does not damage the integument, so that the grain continues to look quite sound. When it is full fed the grub sheds its skin and becomes a pupa. The pupa lies dormant inside the grain until it is ready to transform into the perfect insect, when it wriggles out of its pupal skin and becomes a weevil. This weevil cuts its way out through the skin of the grain and is then ready to commence a new generation.

We thus see that from the time the egg is laid to the emergence of the perfect insect, the grain is apparently quite sound, and hence it is that the connection between the original weevils and the generation of their offspring which cut their way out of the grain, is usually quite lost sight of, the native dealer believing that the weevils appear from outside and eat up the wheat. And this period of incubation (as it were) accounts, I think, for the many stories one hears of weevils appearing in clean wheat stored in a clean godown, the explanation being that the wheat may have been already affected by eggs, larvæ or even pupæ of the beetle before it was put into the clean godown.

Most of the weevils cut their way out of the grain during the rains, and consequently it is then that the weevils are generally noticed for the first time, although the mischief had been going on for weeks or even months while the grub was eating and growing inside the grain, without, however, any sign of its presence being visible externally.

The cultivator succeeds in protecting his wheat by storing it in pits or mud erections, which he lines with broken straw and chaff from the threshing-floor, or even with sand, covering up the whole carefully with earth. Preserved in this way his grain lies unharmed by weevil in some cases for many years. It is, however, after it leaves his hands, when the wheat find its way into the dealers' godowns, that it is invariably attacked.

Much the same is the case with rice, which appears to be quite free from weevil as long as it remains in the village granaries where it is stored in the husk, but which becomes affected as soon as ever it is taken out of the husk and stored in the dealers' godowns.

No attempt seems to be at present made in any of the godowns that I have visited in Calcutta or up-country to clean out and disinfect them before introducing new wheat; the native grain-dealers indeed appearing to have no idea whatever of the natural history of the weevil, and refusing to believe that the weevils use the grains as a place for depositing their eggs, and insisting that weevils come from outside in the rains and eat up the wheat.

This being the case there seems to be every probability that by carefully disinfecting the granaries and removing all old weevily wheat before introducing clean wheat, it will be possible to a great extent to do away with the weevil and put a stop to its ravages.

There seems to be a somewhat widespread idea that although wheat is apparently free from weevil when it leaves the fields or the village granaries, yet that it will invariably develop weevil whenever it is stored so as to be exposed to the air, independently of any further contamination by weevils.

This idea is no doubt chiefly due, as has been pointed out, to the fact that after the eggs are laid a period of at least about six weeks elapses before anything is seen of the resulting weevils. And consequently that the grain may have lain in some infested place and thus got infected before ever it reached the clean godown.

But it is also possible that in some cases the eggs of the weevil may be laid in the grain when it stands in the ear, though everything I have learnt about it seems to point the other way. At the same time this prevailing idea militates against the adoption of the preventive measures which appear promising. It would seem very desirable therefore to have careful experiments made in order to settle the question beyond dispute. And I hope that this will be done; several maunds of clean wheat from different floors and stores in the N. W. P. and from the Punjab are being sent down to Calcutta, and these I am distributing to different places where there is no fear of contamination from old grain, with a view to ascertaining to what extent the storage under the conditions which would obtain in a properly kept godown will protect the wheat from attack.

On the whole it would seem that in reasonable precautions to prevent the spread of infection will be found a practicable means of dealing with a pest that at present is doing very considerable injury to the wheat and rice trades in India.

The GENERAL SECRETARY read the following Memorandum by Colonel A. Bloomfield, of Narsingpúr, on Copper Celts in the Bálághát district, C. P.

"Ever since the great discovery of Copper Celts in the Balaghat

district about 1870 I have taken great interest in such matters. But I never could find out that any natives knew anything about them or ever saw any of them. During this last touring season I have discovered that they are to some extent known. They are noted as being made of the very best copper obtainable.

"The people here call them Kurabháu (or it may be Kurupháu ?) and they believe they fall from the sky during the thunderstorms. They are occasionally ploughed up and brought to the Sonars and brass workers, who purchase them at 12 annas to 1 rupee per ser, and melt them up. An old Kasera of Chiebli, before me to-day, told me he has seen 15 or 20 of them, but never knew they were of value."

The following papers were read :—

1. *A list of the Ferns of Simla, in the N. W. Himalayas, between levels of* 4,500 *and* 10,500 *feet.—By* H. F. BLANFORD, ESQ., F. R. S.

2. *Notes on some Indian Chiroptera.—By* W. F. BLANFORD, ESQ., F. R. S.

3. *On new or little known butterflies from the Indian Region.—By* L. DE NIC'EVILLE, ESQ., F. E. S.

These papers will be published in full in the Journal, Part II.

4. *On the Differential Equation of all Parabolas.—By* BABU ASUTOSH MUKHOPÁDHYÁY, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of the author in the present paper has mainly been the discussion of the differential equation of all parabolas, which, it is believed, is geometrically interpreted here for the first time. The paper is divided into four sections, of which the first is introductory, giving the easiest method of deriving the differential equation of all parabolas from the integral equation of the conic, and explaining the exact meaning of the process of geometrically interpreting differential equations. The second section is devoted to a full exposition of Transon's Theory of Aberrancy; in addition to the ordinary terms, angle of aberrancy, axis of aberrancy and centre of aberrancy, three new terms are introduced, namely, the *radius of aberrancy*, being the distance between the given point on the curve and the corresponding centre of aberrancy, the *index of aberrancy*, being the reciprocal of the radius of aberrancy, and the *aberrancy curve*, being the locus of the centre of aberrancy. A lemma is then proved, establishing a relation between the angle included by the normal and central radius vector at any point of a conic, the radius of curvature of the conic at that point, and the radius of curvature at the corresponding point of the evolute. The well-known value of the angle of aberrancy is then easily obtained, and expressions are also

derived for the radius of aberrancy and the index of aberrancy. In the next place, expressions for the co-ordinates of the centre of aberrancy, when the curve is referred to rectangular axes through any origin, are written down with ease, and, it is pointed out that several interesting results, including the equation of the axis of aberrancy, are immediate consequences of the formulæ obtained. The third section contains the geometric interpretation; from the formula for the index of aberrancy previously obtained, it is shewn that the true geometric interpretation of the differential equation of all parabolas, is that *the index of aberrancy vanishes at every point of every parabola.* The fourth and last section contains a discussion of some miscellaneous theorems; it is pointed out that the differential expression, the vanishing of which is found to be the differential equation of all parabolas, may appropriately be taken to distinguish the species of the conic of closest contact at any point of a given curve; lastly, the differential equation of all parabolas in terms of the radius of curvature and the angle which the normal makes with the principal axis, is obtained from a result incidentally given in the course of the foregoing discussion; and, by integrating this differential equation, the known form of the intrinsic equation of a parabola is verified.

The paper will be published in full in the Journal, Part II, for 1888.

5. *The Geometrical Interpretation of Monge's Differential Equation to all Conics.—By* Babu Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of the author in the present paper has been to establish the true geometric interpretation of the Mongian equation, recently discovered by him. The paper is divided into two sections, of which the first contains an historical introduction, in which a rapid survey is taken of the past history and present condition of the problem; the review begins with an account of Monge's original paper; Boole's statement that in the case of the Mongian equation our powers of geometrical interpretation fail, is next noticed; and, lastly, the reasons for rejecting the interpretations of Cunningham and Sylvester, are summarised.

The second section gives the geometrical interpretation of the Mongian equation; the most general expression for the radius of curvature at any point of the aberrancy curve (which is the curve-locus of the centre of aberrancy) of any given curve, is first calculated by means of the formulæ given in the author's paper on the Differential Equation of all Parabolas, of which an abstract will be found above. As an immediate consequence of this formula, it is deduced that the true

geometric interpretation of Monge's differential equation to all conics is that *the radius of curvature of the aberrancy curve vanishes at every point of every conic.* This geometrical interpretation satisfies all the tests which every true geometrical interpretation ought to satisfy, and, it is believed, we have at length got here the true interpretation which has been sought for by mathematicians during the last thirty years, ever since Boole wrote his now famous lines.

The paper will be published in full in the Journal, Part II, for 1888.

6. *Notes on Indian* Rhynchota, Heteroptera, No. 5.—*By* E. F. T. ATKINSON, ESQ., B. A.

7. *New Indian* Rhynchota.—*By* E. F. T. ATKINSON, ESQ., B. A.

These papers will be published in full in the Journal, Part II.

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The following additions have been made to the Library since the meeting held in May 1888.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JULY, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 4th July 1888, at 9-15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present: Nawab Abdul Latif Bahádur, C. I. E., H. Beveridge, Esq., E. C. Cotes, Esq., E. Gay, Esq., Asutosh Gupta, Esq., A. Hogg, Esq., E. J. Jones, Esq., Dr. W. King, L. de Nicéville, Esq., R. D. Oldham, Esq., A. Pedler, Esq., H. M. Percival, Esq., T. A. Pope, Esq., D. Waldie, Esq.

The Minutes of the last meeting were read and confirmed.

Fifteen presentations were announced, details of which are given in the Library List appended.

The following gentleman, duly proposed and seconded at the meeting held in May, was ballotted for and elected an Ordinary Member at the June meeting.

Babu Peary Mohun Roy.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members.

Lieut. Eaton W. Petley, R. N., F. R. G. S.
Babu Kiranchandra Roy.

The following gentlemen are candidates for election at the next meeting:

Babu Rajanikánta Gupta, proposed by Pandit H. P. Shástri, seconded by H. M. Percival, Esq.

Nawab Syud Mahomed Zainool Abideen Khán Bahádur Feroze Jung, (Nizamut Family,) Moorshedabad, proposed by Nawab Abdul Latif Bahádur, C. I. E., seconded by H. Beveridge, Esq.

The SECRETARY reported the death of the following member:
J. Hart, Esq.

The PRESIDENT said that Members of the Society would be greatly gratified to learn that the late President, Mr. E. T. Atkinson, had been unanimously elected an Honorary Member of the Royal Imperial Hungarian Academy, both as President of the Society and in recognition of his valuable literary and scientific labours connected with the Gazetteer of the N. W. Provinces and researches into Indian Entomology. The Hungarian Academy has been in correspondence with the Asiatic Society for many years, and the late Mr. Arthur Grote, who was one of our most devoted Presidents, was also an Honorary Member of the Academy.

The PRESIDENT further announced that intimation had been received from the Geographical Society of Paris of their intention to hold a Geographical Congress in the month of August during the Exhibition in that city next year.

Mr. DUBERN exhibited a new method of illuminating for the microscope (postponed from last meeting).

The GENERAL SECRETARY read the following description by Mr. W. H. P. Driver, of Ranchi, of a peculiar custom amongst the aboriginal tribes of those parts, called "Era Sendra," or 'women's hunt':—

"We have just witnessed a peculiar custom of the people of these parts. It is called the "Era Sendra" or 'women's hunt,' and on this occasion the expulsion of the cholera demon was its purpose.

"It is an ancient custom, amongst the aboriginal tribes, that when any great calamity, which they cannot cope with, overtakes the land, the women dress themselves up in men's clothes, arm themselves with weapons, and go out to hunt.

"They do not, however, take to the jungles in quest of game, but visit the nearest villages lying to the east of them, when they hunt the pigs and fowls, and everything they kill is their legitimate spoil. They also levy "blackmail" from the heads of the villages for the purchase of liquor. The owners of the pigs and fowls cannot prevent their killing and taking away their property, but the headmen generally compromise matters by giving the visitors a pig as well as some pice '*pour boire*.'

"Towards evening the Shikar party retire to some neighbouring stream, where they cook and eat the meat, and drink the liquor which, thanks to a benevolent Government, is always handy. They eat neither rice nor anything else at this meal. After supping they bathe in the stream and then return home.

"On such occasions no men are allowed to accompany the women, who, for the time being, conduct themselves in a very masterful and masculine fashion.

"They are decked out with pagris, coats and all the finery they can borrow from their husbands and sweethearts, and they flourish their spears, axes and sticks, beat their 'nageras,' (iron drums) shout, sing hunting songs, and dance the Sendra and Kharia just as the men do. The ceremony commences in the west and each village that has been visited goes out on a similar excursion to its neighbours, but always to the east. By this means it is supposed that the evil spirit is safely conducted out of the district, without offending its dignity.

"There is one village near Ranchi which is a notable exception. Its title is 'Mahadaiva,' *i. e.*, devoted to Mahadev, and there the amazonian huntresses are not allowed to enter, as it is supposed to be under the special protection of its patron saint. Were cholera to appear in the 'Mahadaiva' village, it would be because Mahadev had been offended, and he would have to be propitiated before it could disappear."

Babu Asutosh Mukhopádhyay read the following extract from a letter on Monge's Differential Equation to all Conics, written (20th June 1888) to him by G. H. Stuart, Esq., M. A., Principal and Professor of Mathematics in the Madras Presidency College.

"I have some recollection of seeing a paper on the general differential equation to a conic in one of the mathematical journals, and I have postponed my reply until I could give you the reference, but I cannot find it. The substance of the paper was that for the general conic, if ρ be the radius of curvature, and ψ its inclination to a fixed line, the general differential equation can, by the relation

$$\rho = \frac{\left\{1+\left(\frac{dy}{dx}\right)^2\right\}^{\frac{3}{2}}}{\frac{d^2y}{dx^2}},$$

be transformed into

$$\rho^2\frac{d^3\rho}{d\psi^3} - 5\rho\frac{d\rho}{d\psi}\frac{d^2\rho}{d\psi^2} + \frac{40}{9}\left(\frac{d\rho}{d\psi}\right)^3 + 4\rho^2\frac{d\rho}{d\psi} = 0;$$

and if ρ_1, ρ_2, ρ_3, ... be the radii of curvature at the corresponding points of the 1st, 2nd, 3rd, ... evolutes, so that

$$\rho_1 = \frac{d\rho}{d\psi},\ \rho_2 = \frac{d\rho_1}{d\psi},\ \rho_3 = \frac{d\rho_2}{d\psi},\ \&c.\ \ldots\ldots,$$

this equation becomes

$$\rho^2\rho_3 - 5\rho_1\rho_2\rho_3 + \frac{40}{9}\rho_1^3 + 4\rho^2\rho_1 = 0,$$

which is a geometrical relation, being an equation between the volumes contained by certain lines belonging to the curve.

For the parabola, the equation becomes

$$3\rho \frac{d^2\rho}{d\psi^2} - 4\left(\frac{d\rho}{d\psi}\right)^2 = 9\rho^2,$$

and this can be written

$$9\rho^2 + 4\rho_1^2 - 3\rho\rho_2 = 0$$

which is again a geometrical relation involving the rectangles contained by certain lines belonging to the figure.

These are probably the best geometrical interpretations that can be given.

The above equation to parabolas can be written

$$\frac{d^2}{d\psi^2}\left(\rho^{-\frac{1}{3}}\right) + \rho^{-\frac{1}{3}} = 0$$

which leads at once to the ordinary formula

$$\rho = \frac{2a}{\sin^3\psi}.$$

Similarly the general equation to the conic can be written

$$\left(\frac{d^2}{d\psi^2} + 4\right)\frac{d}{d\psi}.\ \rho^{-\frac{1}{3}} = 0$$

which leads to the ordinary value for ρ, *viz.*,

$$\frac{1}{\rho^2} = \frac{(a^2\cos^2\psi + b^2\sin^2\psi)^3}{a^4b^4},$$

or,

$$\rho = \frac{a^2b^2}{p^3},$$

if the constants of integration be suitably determined."

Babu Asutosh Mukhopádhyay then made the following remarks:

"I have thought it proper to lay before the Society Prof. Stuart's interesting remarks on the Mongian Equation, as I believe they are valuable and ought to be preserved: it is rather unfortunate that he cannot give the name of the author of the paper to which he refers, nor that of the Journal in which it appeared. The only paper on the subject which I can find has anything to do with Prof. Stuart's remarks is Transon's *Recherches sur la Courbure des Lignes et des Surfaces* (*Liouville, Journal de Mathematiques*, Ser. I, t. VI, 1841, pp. 191—208); the equation to all parabolas

$$9\rho^2 + 4\rho_1^2 - 3\rho\rho_2 = 0$$

which Prof. Stuart gives, is on page 197; but I am not quite sure that Transon's paper is the one to which Prof. Stuart refers; his remarks refer to my first paper on the Mongian Equation (*Journal*, A. S. B. 1887, Vol. LVI, Part II, pp. 134—145), and, when he wrote his letter, he was,

of course, not aware of my second paper which was read at the last meeting of the Society; I need not, however, refer further to the results of Transon's paper, as by analysing and extending them, I have already given the geometric interpretation of the differential equations of all parabolas and conics. (See pp. 156—158 *ante.*)

"Since Prof. Stuart attempts to give a new geometrical interpretation of the Mongian Equation, he appears to accept implicitly my view that Prof. Sylvester's interpretation is out of mark as failing to give a property true of all conics. Prof. Stuart's interpretation certainly satisfies the tests which every true geometrical interpretation ought to satisfy, *viz.*, it gives a property which is adequately represented by the differential equation to be interpreted, and it leads to a geometrical quantity which vanishes at every point of every conic; and, the only objection which can possibly be taken to this interpretation is, that the quantity which is analytically represented by

$$\rho^2\rho_3 - 5\rho_1\rho_2\rho_3 + \frac{40}{9}\rho_1^3 + 4\rho^2\rho_1 = 0$$

and which involves the radius of curvature at any point of a conic and the radii of curvature at the corresponding points of its first, second and third evolutes, does not admit of being expressed in language; in fact, we do not know how to construct geometrically the solid, the vanishing of the volume of which is the geometrical meaning of the equation given above; the interpretation, in fact, is only semi-geometrical."

The following paper was read:

Ruins and Antiquities of Rámpál.—*By* Asutosh Gupta, Esq., C. S.

The paper will be published in the Journal, Part I.

Library.

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

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Magnetical and Meteorological Observations made at the Government Observatory, Bombay in 1886. 4to., Bombay, 1886.

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Agreements between the British and Persian Governments for prolonging until January 31, 1905, the Conventions between Her Majesty and the Shah of Persia of April 2, 1868, and December 2, 1872, relative to Telegraphic Communication between Europe and India-Persia. No. 1 (1888). Fcp., London, 1888.

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The Fodder Grasses of Northern India, by J. F. Duthie, B. A., F. L. S. 8vo., Roorkee, 1888.

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MARINE SURVEY OF INDIA, POONA.

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———. Journal des Savants,—Avril, 1888.
———. Revue Critique,—Tome XXV, Nos. 14—18.

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———. Revue Scientifique,—Tome XLI, Nos. 20—23.

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DAWSON, SIR J. WILLIAM, C. M. G., LL. D., F. R. S. The Geological History of Plants. With illustrations. (The International Scientific Series, Vol. LXIII). 12mo. London, 1888.

GODWIN-AUSTEN, LT.-COL. H. H. Land and Freshwater Mollusca of India, Part VI, April, 1888. 8vo. London, 1888.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR AUGUST, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 1st August, 1888, at 9-15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present:—

Nawab Abdul Latif Bahádur, C. I. E., E. F. T. Atkinson, Esq., H. Beveridge, Esq., E. C. Cotes, Esq., S. R. Elson, Esq., E. Gay, Esq., Dr. Hoernle, A. Hogg, Esq., Dr. W. King, Babu Asutosh Mukhopádhyáy, L. de Nicéville, Esq., H. M. Percival, Esq., W. L. Sclater, Esq., J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

Twenty-nine presentations were announced, details of which are given in the Library List appended.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members:

Nawáb Syud Mahomed Zainool Abideen Khán Bahádur Feroze Jung (Nizámut Family), Murshedábád.

Bábu Rajanikánta Gupta.

The following gentlemen are candidates for election at the next meeting:—

Bábu Káli Prasanna Sen Gupta, proposed by Bábu Krishna Gopál Bhakta, seconded by Bábu Haricharan Basu.

Bábu Upendra Chandra Rái, Zamindar of Naráil, Zillah Jessore, proposed by Nawab Abdul Latif Bahádur, seconded by the Hon. Dr. Mahendralál Sarkár.

The PRESIDENT announced that intimation had been received from the Secretary of State that Her Most Gracious Majesty the Queen, Empress of India, had been pleased to accept the Address presented by the Asiatic Society of Bengal on the occasion of Her Majesty's Jubilee.

The SECRETARY read the following notice from the American Meteorological Journal Company dated June 1888, offering prizes for the best essays on Tornadoes.

PRIZE STUDIES OF TORNADOES.

The *American Meteorological Journal*, desiring to direct the attention of students to tornadoes, in hopes that valuable results may be obtained, offers the following prizes:

For the best original essay on tornadoes or description of a tornado, $200 will be given.

For the second best, $50.

And among those worthy of special mention $50 will be divided.

The essays must be sent to either of the editors, Professor Harrington, Astronomical Observatory, Ann Arbor, Michigan, or A. Lawrence Rotch, Blue Hill, Meteorological Observatory, Readville, Mass., U. S. A., before the first day of July, 1889. They must be signed by a *nom de plume*, and be accompanied by a sealed envelope addressed with same *nom de plume* and enclosing the real name and address of the author. Three independent and capable judges will be selected to award the prizes; and the papers receiving them will be the property of the Journal offering the prizes. A circular giving fuller details can be obtained by application to Professor Harrington.

Mr. COTES exhibited a zoological collection illustrative of Indian Sericulture, and made the following remarks thereon:

Fourteen collections, illustrative of Indian silk producing Moths, have been prepared in the Indian Museum for distribution to various Museums and other institutions in Europe and India. The species illustrated are the ones which actually spin the various kinds of silk that are produced commercially in India, (that is to say, the different mulberry silk worms, the Tusser, the Eri, and the Muga,) and also several wild species, which are not used at present for commercial purposes but which, nevertheless, all spin silk, in some cases of excellent quality.

These collections do not by any means contain representatives of all the silk producing moths of India, but they contain all the more important species, and are as complete as the material available allowed.

In cases where it was possible to do so, specimens have been given

illustrative of all the different stages of the silk insects from the egg to the moths, also of their cocoons and raw silk.

The following are the species contained in the collections:

BOMBYX MORI.

The "Annual" or "Cashmere" worm.

The common mulberry feeding silk worm, reared in Japan, China, Bokara, Cashmere, Afghanistan, Persia, South Russia, Turkey, Egypt, Algeria, Italy, France, Spain, United States of America, and to a small extent in the Punjab, and North Western Provinces of India.

BOMBYX FORTUNATUS.

"Desi" or "Chota Polo."

A small mulberry feeding multivoltine silk worm, largely reared in Bengal, where it yields the principal cold weather crop of cocoons.

BOMBYX CRŒSI.

"Nistry" or "Madrassee."

A small multivoltine mulberry feeding silk worm, largely reared in Bengal, where it yields the principal hot season crop of cocoons.

BOMBYX ARRACANENSIS.

"Nya Paw."

A multivoltine mulberry feeding silk worm, largely reared in Arracan and Burma.

BOMBYX TEXTOR.

"Boropolo" or "Pat Major."

An annual mulberry feeding silk worm, recorded from Bengal and China; its cultivation seems to be dying out in India.

BOMBYX SINENSIS.

"Sina" or "Chota Pat."

A small multivoltine mulberry feeding silk worm, recorded from Bengal. Its silk is inferior to that of the "Desi" and "Madrassee," and its cultivation is said to be dying out.

BOMBYX MERIDIONALIS.

This is probably only a variety of the "Chota Pat;" it is reared in Mysore and the Madras presidency.

THEOPHILA HUTTONI.

A wild silk worm found feeding on indigenous mulberry trees in the North Western Himalayas. It has not been found possible to rear these

worms successfully in captivity and the silk is not made use of commercially at present. The worm is bivoltine in Mussooree.

ANTHERÆA MYLITTA.

The "Tusser" worm.

A semi-domesticated bivoltine silk worm, largely reared in many parts of India in the open air upon various trees, amongst which are: The Daiyeti (*Lagerstræmia indica*); The Bher (*Zizyphus jujuba*); The Karinda (*Carissa carandus*); The Saj tree (*Terminalia tomentosa*). The cocoon can be reeled and yields a large amount of valuable silk which is remarkable for its strength and durability. The silk is largely exported in the form of locally woven cloth, reeled silk and wasto, and forms a considerable item of trade.

ANTHERÆA ASSAMA.

"*Mooga.*"

A semi-domesticated multivoltine silk worm, largely reared in Assam in the open air upon the Sum tree (*Machilus odoratissima*); The Suálu (*Tetranthera monopetala*), and other forest trees. The cocoon can be reeled and yields a valuable silk, in which there is a considerable trade.

ATTACUS RICINI.

"*Eri*" *silk worm.*

A multivoltine silk worm which is domesticated in Assam, Cachar, and Northern Bengal, it feeds upon the Castor oil plant and produces a valuable silk. The cocoon cannot be reeled, but the silk is carded, and there is a considerable trade in it in the forms of woven silk, "Waste" and Yarn.

ATTACUS ATLAS.

A wild silk worm, found in many parts of India, besides Burma, Ceylon, Java, China, and other parts of Southern Asia. It feeds upon a large number of different plants, but is not cultivated for its silk, which, however, is said to have a considerable market value when obtained in sufficient quantities.

CRICULA TRIFENESTRATA.

The "Amluri" or Mango silk worm.

A wild silk worm, recorded from many parts of India, and Burma, and also from Java. The cocoons are found in masses upon mango, Sum, and other trees, they cannot be reeled and are of but little value.

RHODIA NEWERA.

A wild silk worm found in Sikkim and Nepal upon a species of weeping willow. This silk is not made use of in any way.

ACTIAS SELENE.

A wild silk worm found in many parts of India, besides Ceylon and China. No use is made of its silk.

The PHILOLOGICAL SECRETARY read the following descriptive list, drawn up by the Pandit of the Society, of the translations of the Puráṇas, made under the supervision of the late Dr. H. H. Wilson, now in the Society's Library :—

Márkaṇḍeya Puráṇa.

Index and Translation.

Chapters 1 to 117, omitting chapters 3, 7—9, 13—15, 18—39, 42—51, 53, 56—86, 90—94.

This is a paraphrastic translation, except a few chapters extracts from which have been translated. No notes have been added to it. The contents of a few of the chapters of the translation do not agree with those of the text. The translation is neither complete nor perfect. The text of this Puráṇa edited by Rev. K. M. Banerjee ends at chapter 137. Rev. K. M. Banerjee also published this translation with improvements up to verse No. 21 of the 8th chapter, in the year 1851.

Linga Puráṇa.

Index and Translation.

Púrva Khaṇḍa, chapters ... 1—105.
Uttara Khaṇḍa „ ... 5—17.
The translation is not a consecutive one.

Kúrma Puráṇa.

Preliminary Observations, Index and Translation. Púrva Khaṇḍa, Chapters 1—53, omitting chapters 3—6, 10, 11, 13—18, 25—27, 38—40, 44, 50. Uttara Khaṇḍa, chapter first only.

The Uttara Khaṇḍa is incomplete, the text being complete in 46 chapters. The translation contains an appendix.

Brahmáṇḍa Puráṇa.

Index and Translation.

Púrva Khaṇḍa, chapters ... 1—100.
Uttara Khaṇḍa „ ... 1—33.
Translation neither complete nor consecutive.

Siva Puráṇa.

Index and Translation.

Púrva Khaṇḍa, chapters ... 1—56.
Uttara Khaṇḍa „ ... 1—36.
The translation is not a consecutive one.

Bṛihannáradíya Puráṇa.

Preliminary observations, Index and Translation. Chapters 1—38, omitting chapters 2, 6, 7, 9, 10, 12—37.

Ádi Puráṇa.

Index, Introductory Observations and Translation. Chapters 1—25, omitting chapters 3—9, 11—22, 24. The MS. is slightly damaged by worms.

Padma Puráṇa—Svarga Khaṇḍa.

Index and Translation. Chapters 1—39, omitting chapters 8, 9, 16—22, 24, 27, 28, 30, 31, 33—36.

Padma Puráṇa—Sṛishṭi Khaṇḍa.

Index and Translation.

Chapters 1—45, omitting chapters 4, 6, 8, 11, 18, 20, 21, 23—28, 31 36, 38, 43, 44.

Padma Puráṇa—Bhúmi Khaṇḍa.

Index and Translation. Chapters 1—131.

The translation is not a consecutive one.

Padma Puráṇa—Páṭúla Khaṇḍa.

Index and Translation.

Chapters 1—102, omitting chapters 5, 6, 8, 9, 11—33, 36—39, 42—64, 81—95.

Váyu Puráṇa.

Introductory remarks, Index and Translation.

Chapters 1—54.

Translation neither consecutive nor complete. The text published by Dr. Mitra contains 61 Chapters in the Púrva Khaṇḍa and 14 in the Uttara Khaṇḍa (incomplete).

Vishṇu Puráṇa.

Vols. I and II. We have also a duplicate copy of the first Vol. of this translation. It was published by Dr. Wilson in 1839.

Náradíya Puráṇa.

Index and Translation.

1st Part, chapters 1—18, omitting chapters 2, 4—12, 15—17. 2nd part, chapters 8—38.

Káliká Puráṇa.

Index and Translation. Chapters 1—98, omitting chapters 7, 14, 15, 19, 21, 22, 25—27, 32—35, 42—51, 54—58, 65—71, 75—86, 92—96.

Brahma Vaivarta Puráṇa—Brahma Khaṇḍa.

Index, Introductory Observations and Translation.

Chapters 1—29. The translation is not a consecutive one.

Brahma Vaivarta Puráṇa—Prakṛiti Khaṇḍa.

Index and Translation.

Chapters 1—62, omitting chapters, 3—8, 10, 14—17, 19—31, 33, 34, 36—44, 47—53, 57—61.

Brahma Vaivarta Puráṇa—Ganeśa Khaṇḍa.

Index and Translation.

Chapters 1—46, omitting chapters 5, 6, 9, 10, 14—18, 20, 22—25, 33, 39—42.

Brahma Vaivarta Puráṇa—Krishṇa-janmakathá. 2 Vols.

Index and Translation.

Chapters 1—132. The translation is not a consecutive one.

All the MSS. in the list are paraphrastic translations. In a few places merely extracts from the texts have been translated. No notes have been added to these translations.

The Philological Secretary read reports on the following finds of Treasure Trove Coins :

Report on 24 old silver treasure trove coins, forwarded by the Collector of Sarun, with his No. 328G, dated the $\frac{24}{5}$th May 1888.

1. The Collector's letter does not specify the locality where the coins were found.

2. They are Rupees of the following Emperors of Delhi :

	No. of specimen
I. Muḥammad Sháh, A. H. 1131—1161 = A. D. 1719—1748; type; *Bádsháh Ghází;* Mint. 'Aẓímábád; dates: 1138, 7 and 1154, 23	2
II. 'Alamgír Zání, A. H. 1167—1173 = A. D. 1754—1759; type: *Bádsháh Ghází;* Mint and date, illegible	1
III. 'Alam Sháh, A. H. 1173—1221 = A. D. 1159—1806; symbol, on obverse: fish; Mint: Muḥammadábád: Benares; dates; 1196[2], 24—1203, 31—1205, 32—1206, 34—1207[2], 35—1208, 36—1209, 37—1210[2], 38—1212, 39—1214[2], 41 and 42—1216[2], 43 and 44—1217[3], 44 and 45—1219, 47—1220, 47	21
Total...	24

Report on 72 coins forwarded by the Deputy Commissioner of Rohtak, with his No. 463, dated 23rd April 1888.

1. The coins are stated to have been found in a field of the village of Ghilour in the Gohánà Tahsíl. They are 72 in number.

2. They all belong to the reign of the emperor Sháh 'Alam, who reigned from A. H. 1173—1221 = A. D. 1759—1806. They are all dated in the regnal year only, *viz.*, in the 40th year, which would be A. H. 1213 or A. D. 1798; and all were minted in Farrukhábád, apparently, to judge from the fashion of the coins, under English orders. They are of two kinds, 39 have a broad raised margin, with a smooth edge; and 43 have a hardly distinguishable margin, with a milled (or serrated) edge.

Report on 137 old coins, forwarded by the Deputy Commissioner of Sialkot, with his No. 1045, dated the 19th June, 1888.

1. These coins were found in two sets of 57 and 80 pieces respectively. The first set of 57 pieces is stated to have been found in the wall of a house in the Mauza Adowar of the Tahsíl Daska, and are described to be of an admixture of copper and silver. The second set of 80 coins is stated to have been found in a field, but the locality is not further specified, though perhaps the same Mauza and Tahsíl are intended. The two sets are stated to have been found as long ago as the 1st November, 1886 and 26th June, 1885 respectively.

2. The first set of coins belongs to a class of which numerous varieties have been found at various times. It is commonly known as 'Indo-Scythian,' and several varieties of it have been described, especially by the late Mr. E. Thomas, in the *Indian Antiquary*, Vol. XII, p. 6. Of the particular variety to which the coins under report belong the first specimen appears to have been found, along with a number of other coins of different classes, in the relic casket of the celebrated tope of Manikyála, when it was opened by General Ventura in 1830, (as described in the IIIrd volume of the *Journal of the Asiatic Society of Bengal*). James Prinsep, who examined the find at that time, failed to identify that specimen; but it was identified by General Sir A. Cunningham, in 1854, from two duplicates in his possession, as belonging to king Yaśovarman of Kanauj (see *Journal As. Soc. Beng.*, Vol. XXIII, p. 700), who must have reigned early in the 8th century A. D. This identification, so far as the name is concerned, is confirmed by the coins under report, among which there are two good specimens, giving every letter of the name in perfect condition. The age of these coins it was thought, could be determined from the fact, that among the coins found together with the Manikyála specimen, there was a so-called 'Sassanian coin,' one of 'Abdulláh bin Házim, Governor of

Khorásán, struck at Merw in A. H. 66, or A. D. 685-6, (see Prinsep's *Indian Antiquities*, ed. E. Thomas, Vol. I, p. 94). The only king, named Yaśovarman, who is known to have lived about this time, is he of Kanauj, the contemporary and rival of king Lalitáditya of Kashmír, who is calculated to have reigned from A. D. 719—756 (see *Göttingische Gelehrte Anzeigen*, 1888, p. 70). These two kings, according to the Kashmírian chronicle Rájataranginí, were at war with one another; and it was assumed that king Yaśovarman might have carried his arms victoriously so far west as the Panjáb and Kashmír. On that occasion, it was thought, the coins which bear Yaśovarman's name might have been struck. For they, and all coins of that class, belong to the extreme north-west of India. To my mind, there are some objections to this ascription of the Yaśovarman coins. In the first place, according to the Rájataranginí, which tells us of the war between the two kings (in the 4th Book), it was Lalitáditya of Kashmír who invaded the kingdom of Kanauj, and not Yaśovarman of Kanauj conquering Kashmír. This, therefore, affords no ground for assuming that Yaśovarman issued coins in the extreme north-west of India. It is true that the Prákrit poem called the *Gaüdaváho*, lately edited by Sh. P. Paṇḍit, also alludes to expeditions of king Yaśovarman of Kanauj into the North-west (to Thanesar in the Punjáb, and against the Párasíkas). But vague statements in a poem which, in the form now preserved, makes no pretence to being a historical narration, cannot for a moment be pitted against the direct statements of a professedly historical work, possessing an admittedly general trustworthiness; (see the editor's Introduction, pp. XXVII, XXVIII, LXXII, LXXIII). In the second place, among the coins found with the Yaśovarman coin in the Manikyála tope, there was also a coin of Huvishka who reigned in the 2nd century A. D.; and there seems no cogent reason why the age of the Yaśovarman coin should be determined by its juxtaposition to the Sassanian coin rather than the Huvishka coin. In the third place, the general appearance of the Indo-Scythian coins of this class makes it probable that they are of a much older date, and are the last crude and deteriorated representatives of a type (the so-called "Ardokro" type), which commenced with the great Indo-Scythian kings Kanishka and Huvishka of the two first centuries A. D. In the fourth place, the form of the orthography and inflection of the name, which is that peculiar to the ancient North Western Prákrit, points to a very much earlier date. Under these circumstances I would suggest as a more probable view, that the Yaśovarman of the coin may be identical with a Yaśovarman (or Yaśodharman), who reigned early in the sixth century (about 532 A. D.), and who has recorded his exploits in three pillar-

inscriptions (see *Indian Antiquary*, Vol. XV, pp. 222, 253, 257). From these it is seen, that he was "a powerful king, whose dominions included the whole of the northern part of India, from the river Brahmaputra to the Western ocean, and from the Himálayas to the mountain Mahendra (in the South), who possessed countries which not even the Guptas and Húṇas could subdue; and to whom homage was done by even the famous king Mihirakula" of Kashmír (*ibid.*, p. 255). This would seem to imply that at one time Kashmír had been conquered by this Yaśovarman. In any case the statement affords some support for attributing to him the coins under review bearing his name. It may perhaps be worth noting, that there is nothing in the three inscriptions found in Málvá which absolutely proves that that country was the original dominion of Yaśovarman. The inscriptions show clearly, that he was a person of no known lineage, but originally an obscure 'tribal chieftain' (*jinendra* or *narádhipati*), who succeeded in conquering the countries around him and thus founding an empire and a family,—possibly of no long duration. On doing so, he changed his name to Vishṇuvardhana, and assumed the imperial titles *rájádhirája* and *parameśvara*. He may have been one of the Indo-Scythian chieftains of the Panjáb, and by the pillars which bear his inscriptions he may have marked the southern extent of his victories, and the place where he transferred his capital. It is true in the inscriptions his name is spelled Yaśodharman; but the two letters *dh* and *v* are not unfrequently confounded, and there are other well-known examples of words which are found spelled both with *dh* and *v*.

The name of the king, as given on the reverse, is worth noting. It reads *Śrí-Yaśovarmaṃ*. There is a distinct anusvára(*ṃ*) over the final akshara *rma*. The orthography and inflection of the name distinctly belong to the language which may be defined as the literary form of the North-Western Prákrit (the so-called Gáthá dialect), a partial sanskritisation of the vernacular Prákrit. *Yaśovarmaṃ*, which in other respects agrees with Sanskrit usages, has the Prákrit nominative singular masculine termination *aṃ*, instead of the regular Sanskrit termination *má*. The termination *aṃ* is here formed after the analogy of such words as *bhágavaṃ*, *arahaṃ*, etc. An exact parallel, made after the same analogy, is the nominative singular masculine form *sihiṃ* (for Sanskrit *śikhí*), quoted in E. Müller's *Beiträge zur Grammatik des Jaina Prákrit*, p. 51. It is also worth noting, that in the old Śaurasení Prákrit (according to Hemachandra, IV, 264) the vocative singular of words of this class may end in *aṃ*; *e. g.*, *bho ráyaṃ* 'O king' (of *rájá*), *bho viayavammaṃ* 'O Vijaya-varma' (of *vijaya-varmá*); and the wording of Hemachandra's rule IV, 265 is sufficiently

vague to allow perhaps exceptional forms like nominative singular *vammaṃ*. The selection of his examples shows that the facts to which he refers were not peculiar to the Śaurasení, but rather to the old Prákrit of the Jains generally. The downward limit of the period during which that old Prákrit language was in use is not distinctly fixed. It was certainly current in the three or four first centuries of the Christian era, but was gradually being displaced by the Sanskrit. It may have lingered on later; but on the whole the evidence of the language and of the general appearance of these coins seem to me rather to favour the idea, that the Yaśovarman of these coins is none of the kings as yet known to us by that name, but that he is an otherwise unknown Scythian tribal chieftain, of a very early period of our era (say, of the 3rd or 4th century).

Obverse: Crude figure of king, standing to front, right arm (in wide sleeve) pointing downwards to fire-altar; left hand supporting spear or standard. The whole I take to be a very crude imitation of the obverse of good Indo-Scythian coins (*e. g.*, of Kanishka). *Legend:* under left arm: किद *kida;* outside spear क *ka.* The 'fire-altar' looks exceedingly like the akshara कं *kaṃ*, and possibly that may be the intention, the akshara forming part of the legend; though, from the general circumstances of these and similar coins, it seems more probable that the resemblance is merely accidental, owing to the crudeness of the imitation of a misunderstood symbol.

Reverse: Crude female figure sitting on throne, holding cornucopiae in left and scroll in right hand; the whole being an extremely crude imitation of the reverse of Vasudeva's *Ardokro* coins; the throne on which the female sits has almost entirely disappeared in the present coins, the only indication of it that is left is the horizontal line projecting on both sides of the waist. *Legend:* along the right hand margin श्री यशोव *śrí Yaśova;* on the left side in the lower field र्मं *rmaṃ;* the whole being श्री यशोवर्मं *śrí Yaśovarmaṃ.* The two portions of the legend do not run in the same direction.

Messrs. Hamilton & Co., Jewellers, of Calcutta, have kindly tested the coins at my request. They state that they are made of bronze, and weigh 115 grains each.

Obverses. Reverses.

3. The second set of coins consists of 80 Rupees, 79 of which belong to the following emperors of Dehlí :—

	No. of specimen.
I. Aurangzíb, A. H. 1068—1118 = A. D. 1658—1707; mint and date illegible; regnal year 15	1
II. Bahádur Sháh, A. H. 1118—1124 = A. D. 1707—1712; mint: Dáru-s-salṭanat Láhor; date: 1120, 2	1
III. Farrukhsiya'r, A. H. 1124—1131 = A. D. 1712—1719; mints: Mustaqiru-l-khiláfat Akbarábád and Dáru-l-khiláfat Sháhjahánábád; dates: 1131, 7 and —, 5	2
IV. Muḥammad Sháh, A.H. 1131—1161 = 1719—1748;	
a, type: *Ṣáḥib Qirán;* mint of all: Dáru-l-khiláfat Sháhjahánábád; legible dates 1133, 1136, 1146, 1149, 1153	18
b, type: *Bádsháh Ghází;* mint of all, except one, Dár-s-salṭanat Láhor, of one, Multán; legible dates: 1134, 1144, 1148, 1152, 1157, 1158	57

The remaining coin of the second set belongs to the Sikh Rájá Ranjit Singh, dated Samvat 1885 (=1828 A. D.) and struck at Amritsar. It is, however, a forgery, being copper silvered over.

The following papers were read:

1. *On the Mother of Jehángír.*—*By* Mahámahopádhyáyá Kavirája Shyámal Dás, M. R. A. S., F. R. H. S.

2. *Note on the Arthúwá (Sanskrit) Inscription.*—*By* Mahámahopádhyáyá Kavirája Shyámal Dás, M. R. A. S., F. R. H. S., (with an ink impression).

These papers will be published in full in the Journal, Part I.

3. *Some Applications of Elliptic Functions to Problems of Mean Values.*—*By* Babu Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The present paper is occupied with the discussion of some problems of geometric mean values, which are chiefly interesting from the mode in which the applications of elliptic fnnctions simplify the calculations. The paper is divided into six sections, of which the first gives an expression for the area common to an ellipse and a concentric circle intersecting it; the result is expressed as the sum of two inverse-sine-functions. The second section discusses the average value of the area common to an ellipse and a concentric circle of variable radius which

always intersects it; the result is expressed in terms of the perimeter of the ellipse, and, therefore, involves the complete elliptic integral of the second kind with the eccentricity for modulus. In the third section is obtained an expression for the angle of intersection of the circle and the ellipse. The fourth section furnishes the mean value of this angle of intersection; the result is found to depend on two complete elliptic integrals of the first and third kind, with the eccentricity for the modulus; the parameter is easily found to be the square of the tangent of the angle which the line joining a focus with an extremity of the minor axis, makes with that axis. The fifth section contains the calculation of the mean value of the acute angle included between the lines joining the opposite corners of the curvilinear quadrilateral formed by the intersection of the ellipse with the concentric circle of variable radius; the result involves the complete elliptic integral of the first kind with the eccentricity for modulus, and is also shown to be expressible in terms of the axes and the differential co-efficient of the perimeter with respect to the eccentricity. The sixth and last section gives the average length of the arc of the circle intercepted by the ellipse; the mean value is found to vary as the minor axis.

The paper will be published in full in the Journal, Part II for 1888.

Library.

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

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presented by the respective Societies and Editors.

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Geneva. La Société de Physique et d' Histoire Naturelle.—Mémoires, Tome XXIX, 2e partie, 1886-87.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR NOVEMBER, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th November, 1888, at 9 P. M.

E. F. T. ATKINSON, ESQ., C. S., Vice-President, in the Chair.

The following Members were present:

Nawáb Abdul Latif Bahádur, C. I. E., H. Beveridge, Esq., Babu Gaurdás Bysáck, E. C. Cotes, Esq., W. L. Criper, Esq., E. Gay, Esq., Dr. Hoernle, A. Hogg, Esq., T. W. H. Hughes, Esq., E. J. Jones, Esq., Dr. W. King, F. R. Mallet, Esq., W. H. Miles, Esq., Babu Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., H. M. Percival, Esq., Dr. Prasanna Kumár Ráy, Babu Kiran Chandra Ráy, W. L. Sclater, Esq., D. Waldie, Esq.

The Minutes of the last meeting were read and confirmed.

One hundred and twenty-two presentations were announced, details of which are given in the Library List appended.

The SECRETARY reported that the following gentlemen had been elected ordinary members of the Society by the Council during the recess, in accordance with Rule 7.

Babu Káli Prasanna Sen Gupta.
Babu Upendra Chandra Ráy.
Brigadier-General Henry Collett, C. B., F. L. S.

The elections were confirmed by the meeting.

The following gentleman is a candidate for re-election at the next meeting:—

W. Crooke, Esq., C. S., proposed by M. S. Howell, Esq., C. S., seconded by W. Grierson Jackson, Esq., C. S.

The following gentlemen have intimated their wish to withdraw from the Society:

Major H. H. Cole, R. E.
R. C. Laughlin, Esq.
Capt. E. R. Shopland, I. M.
Capt. R. H. C. Tufnell, M. S. C.

The SECRETARY reported the death of the following members:

J. MacDonald, Esq., C. E.
Surgeon-Major J. J. Monteath.

The CHAIRMAN announced that A. P. Pennell, Esq., C. S., had compounded his subscription as a non-Resident member by the payment in a single sum of Rs. 300.

The CHAIRMAN announced that in consequence of the 4½ per cent. loan of 1870 having been paid off by the Government of India, the investment of Rs. 10,000, belonging to the Society in that loan had been transferred to the 4 per cent. loan of 1865.

Also, that on the recommendation of the Finance Committee the Council had sanctioned the sale of Government Securities in the 4 per cent. loan of the nominal value of Rs. 5,000 for payment of bills on account of the O. P. Fund.

DR. W. KING read the following letters:—

Ancient Stone Implements in India.—By V. BALL, M. A., F. R. S.

To the Secretary of the Asiatic Society of Bengal.

SIR,

Having recently read Mr. R. B. Foote's paper entitled "*Notes on some recent Neolithic and Palæolithic finds in South India,*" I believe it to be desirable in the interest of the history of the discovery of stone implements in India to invite the special attention of the Society to certain statements which it contains.

In section 4 of his paper Mr. Foote introduces me to his readers. I sincerely hope, as it is but a few years since I had the honour of occupying the posts of Treasurer and Natural History Secretary of the Society, that there was no real necessity for his doing so. He then proceeds to charge me with not having given him full credit in my paper* for his discoveries. That it was my desire to do so will, I think, be admitted by any one who takes the trouble to refer to the paper itself, wherein I specifically mention Mr. Foote's work at some length. My

* "*On the Forms and Geographical Distribution of Ancient Stone Implements in India.* Proc. Roy. Irish Acad., 1879."

whole object having been to give a comprehensive review of all that had been published on the subject, any omission of recorded finds was accidental. I was well acquainted with all Mr. Foote's principal papers, and if I was unaware of what he describes as his 'various references' to neolithic implements and his letter to the Geological Magazine, I can only regret that he omitted to state his facts, when he had the opportunity of doing so, in a more distinct, not to say accessible, form.

The charge against me of not having known of these 'various references' and letter come strangely from a gentleman who confesses (p. 263) that my paper was unknown to him* for more than six years after its publication, although, with the exception of an earlier edition of it published in the *Proceedings* in 1867, it is, I believe, the only paper which deals with the subject of the distribution of stone implements in India as a whole, and it has been referred to by various writers in Europe, India and America.

My attempt to group the facts and construct a map based upon all the information both published and unpublished, which was known to me at the time, had, I venture to think, certain strong arguments in its favour, although subsequent discoveries were sure to necessitate a modification of the boundaries as then indicated.

Such colonies of 'Neolothic' workers as those, of which the traces have been recently described by Mr. Foote, may very well have been offshoots from the many areas of distribution, and while by no means anxious to urge my theory in opposition to well authenticated facts, nor to press its survival if it should be proved that it ought to give place to another, still as regards India generally I fail to see that Mr. Foote offers anything in exchange for it. It is indeed, I think, to be regretted that his long devotion to the subject and the great opportunities he has enjoyed have not been more productive of conclusive generalisations as to the relations between the different classes of implements.

If Mr. Foote had been as well acquainted with the general literature of the subject as might reasonably be expected, he could hardly have claimed (p. 277) for the "discovery of the Palæolithic quartzite implements of Palavaran and the Attrampakkam nullah," that it "really started prehistoric research in this country."

It is surely both a narrow and a novel use of a term to limit '*prehistoric research*' to the discovery of stone implements and the inferences to be derived therefrom. I fancy there must have been Archæologists in India who before that period believed they were engaged in prehistoric research, though they may have known nothing what-

* A copy was sent to Mr. Foote but must have gone astray in the post.

ever about stone implements, so that Mr. Foote's assumption seems on this ground alone to be hardly justified. But as regards the question of priority, with reference to the observation and discovery of stone implements in India, it is one which it is perhaps impossible to decide. As early as the year 1845 Capt. Abbott* described certain agate splinters which were found on the banks of the river Narbada, under circumstances which we can now recognise as indicating a probably human origin for them. Again in 1847 flint flakes found in the Circar Warungul† attracted attention, but as I have no means of referring to this latter case, I cannot say whether a human origin was suggested for them.

In reference to 'Neolithic' (*i. e.*, polished) implements, the first recorded discoveries in India were by Mr. H. P. Le Mesurier in Bandelkhand in the year 1861, and by Mr. Theobald in 1862, and to them therefore due priority should undoubtedly be accorded.

As to the style of Mr. Foote's comments, it being so purely a matter of taste, I have nothing to say, being quite content to leave it to the judgment of readers of his paper. During the long period from 1867, when my paper first appeared, to 1887 when Mr. Foote's paper was published, there was more than time for correction of any omission which existed in the former. None had been made, however, in 1878, when I went to press with a second edition, and when the Manual of the Geology of India was printed, these discoveries of Mr. Foote's were unknown to others as well as to myself. I am therefore led to the conclusion that the chief offender in the matter was Mr. Foote himself, but at the same time I must add that had these particular finds been well-known and fully considered, they would not have very materially affected my conclusions as to the general features of the then ascertained geographical distribution of ancient stone implements in India.

DUBLIN,
24th July, 1888.

Yours, &c.
V. BALL.

From R. BRUCE FOOTE, ESQ., *in reply to the foregoing.*
Remarks on MR. V. BALL'S *note.*

Through the courtesy of the NATURAL HISTORY SECRETARY I am enabled to reply to a note by MR. VAL. BALL, F. R. S. on my "Notes on some Recent Neolithic and Palæolithic Finds in South India," read before the Society on the 3rd August, 1887. I am glad of this opportunity, as Mr. Ball accuses me of having charged him with unfairness in failing to give me full credit for my discoveries, in his paper "On

* J. A. S. B. XIV, p. 756.
† Madras Jour. of Lit. and Sc. Vol. XV, p. 223.

the Forms and Geographical Distribution of Ancient Stone Implements in India," (Proceedings, Roy. Irish Acad., 1879.)

It is quite true that I charged him with not giving me full credit for my discoveries, but I nowhere called in question his intention to do me full justice in the matter. I simply pointed out several omissions on his part to make himself acquainted with prehistoric facts relating to South India published by me at different times, and which omissions were, to say the least, unfortunate for a writer dealing in an ex-cathedra style with the whole literature on the subject.

In the tabular list of "Localities in India where stone implements have been discovered" given in his paper just quoted, he gives me credit for the discovery of a ring-stone, but omits to quote a celt which I mentioned in the same note to a paper I published in the Journal of the Madras Literary Society for 1866.* This celt I found in 1864 and made it known in 1865, when I had fifty copies of the paper in question struck off, nearly a year before the regular publication of the Journal, and distributed among the leading Geologists and Archæologists in England.

I do not refer to Mr. Ball's paper in the Proceedings of the B. A. S. for 1867, as I have been unable to get sight of it since reading his note which I am now replying to.

When an author who claims to be a great authority on any subject (as Mr. Ball distinctly does in the matter of Indian Prehistoric Stone Implements) brings out a second edition of a work, or part of a work, on such a subject the public has a very distinct right to expect such second edition should be fully up to date, and it was Mr. Ball's failure in this respect that obliged me to draw attention to his omissions. They were the following:

1. He repeated in the list to his paper read to the Royal Irish Academy the omission of any mention of the celt above referred to.

2. He failed to notice a paper I read to the International Prehistoric Congress at Norwich in 1868, and which was published in the Congress volume the next year. In this paper I referred† pointedly to my first celt and ring-stone when speaking of the relations between the Indian palæolithic and neolithic stone-workers, and also mentioned a second very perfect celt I had found near Nellore in 1866.

3. Mr. Ball also overlooked my letter to the Geological Magazine (in 1873) on the subject of the late Mr. W. Fraser's discoveries of neolithic centres at Bellary, and some similar finds of my own in that region.

* See second part of footnote (2), page 10.

† *Vide* Transactions of the International Congress of Prehistoric Archæology, Norwich, 1868. Longmans, London, 1869, p. 236.

Surely Mr. Ball cannot be in earnest when he writes of a paper published in the Annual Volume of a great Archæological Congress like that of Norwich, and of a letter in the pages of the Geological Magazine, as not being published in distinct and accessible forms. In what publications could they have appeared more fitting ?

4. *The last of my charges Mr. Ball has in his note passed by in silence ! ! !* I referred to the collection of palæolithic and neolithic implements I exhibited at the Vienna Exhibition in 1873. The collection contained about a dozen neolithic celts, besides corn-crushers, mealing-stones and pounders, all distinctly labelled and shown conspicuously in the Indian Gallery.

Believing Mr. Ball to be much interested in such antiquities, and being justly rather proud of my collection, I showed it him *myself* shortly after his arrival in Vienna. After my departure for India the collection remained till the close of the Exhibition in the charge of my friend Dr. Wm. King (the present Director of the Geological Survey of India), so that Mr. Ball had some four months' time in Vienna in which to examine the specimens more closely had it so pleased him. But not only this, the collection which I presented to the Geological Museum in Calcutta was on show there for many years after : here again, however, Mr. Ball ignored, or overlooked, the neolithic specimens, and worked out his startling theory based on the imaginary occurrence of only one celt found in Coorg.

That Mr. Ball's paper in the Proceedings of the Royal Irish Academy did not become known to me for six years after its publication I much regret, but it was nothing remarkable, as that gentleman must himself know after a lengthened residence in India. It is impossible for a private individual with limited means to take in every scientific serial going, however much he might wish so to do. The publication was one I never saw, and no one drew my attention to Mr. Ball's paper. I regret the fact most certainly, but cannot take any blame to myself about it. The copy of his paper he sent me I never received, and he never asked me, or wrote to me, for any information about South Indian prehistorics; had he done so, I could, even as early as 1878, have given him so many facts bearing on the distribution of neolithic implements, that he would probably have been saved committing himself to his ill-founded theory regarding the supposed low state of developement of the Dravidian tribes in South India.

Mr. Ball is angry with me and holds that I am the chief offender in the whole matter, because I did not long since write and point out his omission to notice the priority of my first celt. I ought perhaps to have done so, and certainly should have, had it occurred to me that such a

grand ethnographic theory could have been based by any man on such purely negative evidence as his belief in the occurrence of only one specimen of a polished celt in the Peninsula. Why he should be angry at all I don't quite see, for he winds up his note in a most self-contented spirit by the remark: "At the same time I must add that had these particular finds (which he had overlooked or forgotten) been well known and fully considered, they would not have very materially affected my conclusions as to the general features of the then ascertained Geographical Distribution of ancient stone implements in India." I daresay not! for even now he is strongly inclined to back up his theory and to regard the neolithic settlements of the Peninsula as only "offshoots from the Main Areas of distribution." By the Main Areas of distribution he doubtless means the province which he has shown by a grey tint in the map illustrating his paper, and yet in his list of localities for neolithic finds, he does not quote a single instance of the connection of such finds with any locality known to have been inhabited by the people that made the polished implements, much less does he point out the connection of the implements with centres of their manufacture, or mention localities where other articles for domestic use, or for purposes of ornament, have also been found in intimate and unmistakable association with the celts. All the celts enumerated in his list (with one doubtful exception) were found either casually on the surface or else arranged in temples around Mahadevs (Lingams, Phalli), positions which throw not the faintest light on their origin or local derivation.

It would certainly appear to me that the region in which the localities inhabited by the celt-makers are distributed in considerable numbers, and traces of the manufacture of celts and the very various other implements used by the same people abound, should rather be regarded as the main area of distribution.

In my paper I enumerated over 40 localities inhabited by the celt-makers, and I can now add 16 more to my list; several of them of great importance, besides many fresh places in which casual finds have been made by myself or others. Within the last few months celts have been found in Malabar, on the West Coast (by Henry Gompertz, Esq., Deputy Superintendent, Madras Survey) and near Chingleput (by the Rev. A. Andrew.)

On the question of priority of neolithic finds, I have only claimed priority for my finds in South India. The agate flakes found by Captain Abbott in 1845, in the banks of the Nerbudda, were not regarded by him as of human origin, and the flint flakes found in the Circar Warangal in the Nizam's Dominions, in 1847, are so briefly al-

luded to, that it is quite impossible to be certain as to their real nature so neither of these finds required any notice at my hands. Mr. Le Mesurier's and Mr. Theobald's discoveries of celts in Bandelkhand do not belong to South India, so I should never have dreamt of claiming priority over them, even had I not known that they were made prior to mine by four and three years respectively.

The expression used by me when I said that the discovery of palæolithic quartzite implements in the lateritic formations near Madras "really started prehistoric research in this country" was hardly too strong, for it attracted the attention of scores of observers where there had been none before, just as the recognition of Boucher de Perthes' merit in discovering the flint implements of the Somme valley was really the day-break in Europe of Prehistoric Archæology as now understood.

Mr. Ball thinks I have offered nothing in exchange for his theory! I think I have offered a number of important facts which abundantly show how utterly baseless and untenable it was. The great discoveries since made he loftily passes by with the remark that it is to be regretted that my long devotion to the subject, and the great opportunities I have enjoyed "have not been more productive of conclusive generalizations as to the relations between the different classes of implements"! Here I would only remark that the paper he criticises contains two very important generalizations: firstly, that the makers of the cores and flakes were a neolithic people, to wit the celt-workers themselves! Secondly, that the later *polished stone period* overlaps the beginning of the *iron period;* the early iron-workers being the lineal descendants of the celt-makers, and to some extent celt-makers themselves. To these I will add a third and fourth generalization, namely, that the early iron-workers were the stock from which sprang the Dravidian tribes at present inhabiting the Peninsula, and (fourthly) that no evidence has yet been obtained which can safely connect the chipped stone folk with the makers of polished celts. There is then no ground for assuming, as Mr. Ball did, "that the Dravidians who came from the North-West" may have been the people who manufactured the flakes and cores of North-Western and Central India "and who afterwards, when they had pushed off the Dekan basalt further south, took to making the chipped quartzite axes from a material which then became more accessible to them."* The fact is the early Dravidians appear first as a neolithic, not as a palæolithic people, and had by the beginning of the iron period attained to considerable proficiency in the manufacture of stone implements in great variety, of pottery of considerable elegance of shape and fineness of material, and lastly of articles of ornament such as necklaces

* *Loc. cit.*, p. 413.

of beads and bangles made of sections of chauk shells (*Mazza rapa*). Their possession of lapis lazuli and chauk shells alone proves that they must have had commercial relations with very distant peoples from the extreme North-West to the extremo South of India.

CAMP, ADONI, R. BRUCE FOOTE.
26th November, 1888.

The NATURAL HISTORY SECRETARY read the following letter:

S. M. E. Chatham, England, 10th August, 1888.

SIR,

In a footnote on p. 74 of Proceedings Asiatic Society of Bengal for 1888, Babu Asutosh Mukhopádhyáy complains that a certain solution of Monge's differential equation of a conic, published by him in the Journal, Asiatic Society of Bengal, vol. LVI, p. 138 (issued in India in November 1887) has been *reproduced* by me in the "Messenger of Mathematics" for January 1888; and he complains that it is "reproduced of course without acknowledgment that it had been given before" (by him).

The facts are that my paper was in my Editor's hands either in 1886 or *early* in 1887, and was in type and out of my hands about December 1887, (although the latter part of it containing the solution in question appears in the Number for January 1888).

These facts can be verified by application to the Editor.

I deny therefore that any part of my Paper is in any sense a *reproduction*, and I submit that the imputation of *reproduction of course without acknowledgment* was unjustifiable.

I shall show in another place that the results which I published eleven years ago, which are held up in the Paper quoted at great length (10 pages) as *irrelevant, totally erroneous*, &c., are not quite so absurd as therein depicted.

Yours faithfully,
ALLAN CUNNINGHAM, LT.-COL., R. E.

BABU ASUTOSH MUKHOPÁDHYÁY made the following remarks in reply thereto.

GENTLEMEN,

A question of priority is always so delicate a matter that I would willingly keep myself aloof from it, only if it were possible; but as Lt.-Col. Cunningham is evidently anxious to see the matter discussed, I cannot honestly keep back, specially as I feel that the remarks to which he takes objection, were not only perfectly justifiable at the time they were written, but remain so up to the present

moment. Let us see, then, what the plain facts of the case are. In the first place we find that the Mongian equation, though first given about eighty years ago, remained for a long series of years unsolved in any direct and elementary way. You will remember that in July 1887, I read a paper before our Society, in which I gave, I believe for the first time, among other things, a direct elementary solution of the Mongian equation; this paper, read in July, was published on the 2nd November 1887, though in the preceding August I had distributed to my friends both here and in England, the extra copies of the paper with which I had been furnished by the Society. Now, in April last I found that in the February Number of the *Messenger of Mathematics* (which had been published in Cambridge in March) there was a paper by Col. Cunningham giving exactly the same solution of the Mongian equation as had been given before by me, and the transformation not only appeared in the Colonel's paper, but it appeared without any acknowledgement that it had been given before; I, therefore, put a note in our February Proceedings (which were then passing through the press), calling attention to this point; in this note I stated that my transformation was reproduced in the *Messenger* without any acknowledgement, though Col. Cunningham was fully acquainted with my paper at the date of *publication* of his article. Of course, as I had expected, he takes objection to this remark, and tries to explain it away; but, gentlemen, I will presently show you that it is impossible to escape. We have, then, the two facts that my paper was published in Calcutta in November and his in Cambridge four months later. Of course, these two facts taken together prove nothing; for he being in England and not a member of our Society, it does not follow that he had an opportunity of seeing my paper before his article was published. You will, therefore, expect me to produce some direct evidence on the point, and under ordinary circumstances, it would be impossible for me to do so. But, gentlemen, in this case, the Colonel himself has been good enough to furnish us with a very satisfactory evidence. If you refer to the February Number of our Proceedings, you will find on page 73, a letter from Col. Cunningham, in which he criticizes that very paper of mine on the Mongian equation which contains the transformation in question; and you will see that his letter was written on the 29th December 1887; it follows, therefore, that in December 1887, that is to say, two clear months before the date of publication of his paper, he had studied my memoir. This, then, substantiates the statement I made; how is it, I ask, that knowing my solution in December, he published the same thing in February, without the slightest acknowledgement that it had been given before by me.

It does not at all improve matters by saying that his paper was written before he had seen my solution; there may or may not be evidence of that; and you will also notice that even if it be shown that his paper was written before he had seen mine, that would be no proof whatever that the particular portion which contains the solution in question, formed any part of the paper as originally written. At any rate, from what I have shown, there cannot be the slightest doubt that at least two months before his paper was *published*, the Colonel had seen mine, and yet allowed his paper to appear just as if he had never heard of my solution. I think, therefore, that the remarks I made are perfectly justifiable, and though they are probably severe, I see no reason to withdraw them.

The PHILOLOGICAL SECRETARY read the following reports on finds of old Treasure Trove Coins:

I. Report on five ancient copper coins, forwarded by the Deputy Commissioner of Rawal Pindi, with his No. 2063G, dated the 19th July, 1888.

These coins are stated to have been found in the Rawal Pindi District, without any further specification. Two of them are entirely illegible, every trace of figures or letters being obliterated. The three others are in indifferent condition, but sufficient traces of the impressions remain to identify them as Indo-Scythian; *viz.*,

1, a large copper coin of Hoerki (Kenorano), as figured in *Ariana Antiqua*, Pl. XIII, fig. 10.

2, a small copper coin of Kanerki, as figured in *Ariana Antiqua*, Pl. XI, fig. 20.

3, a small copper coin; uncertain; on obverse, traces of a standing figure; on reverse, traces of an enthroned figure. It may possibly be a Bactrian, with an enthroned Zeus on the reverse.

II. Report on 99 old silver treasure trove coins, forwarded by the Collector of Sarun with his No. 778G, dated 11th August, 1888.

These coins are stated to have been found in the village Usrí, Police outpost Bathuniyá, Police station Sewan, Subdivision Sewan, on the 25th June 1885. Their value is estimated at Rs. 105-3.

They are rupees of the following Mughal Emperors:

	No. of specimens.
1, SHÁH JAHÁN, 1037-1068 A. H. = 1627-1658 A. D., of the two-square-areas type, dates and mints illegible	2

		No. of specimens.
2,	Aurangzi'b, 1068—1118 A. H. = 1658—1707 A. D., legible dates 1093, 1099, 1102, 1103, 1109, 1110, legible mints: Súrat, Multán, Bíjápur; one has Dáru-l-Khair Ajmír, 1110	14
3,	Bahádur Sháh, 1118—1124 A. H. = 1707—1712, A. D., legible dates 1123, 1124; legible mints: 'Aẓímábád, Lakhnaú	5
4,	Jahándár Sháh, 1124 = 1712 A. D., indifferent specimen, date 1124, mint Lakhnaú ...	1
5,	Farrukh Siyar, 1124—1131, A. H. = 1712—1719, A. D., legible dates 1125, 1126, 1129, 1130, legible mints: Murshidábád, Etáwá, Láhor, Farrukhábád, Dáru-l-khiláfat Sháh Jahánábád, Kambáyat, Súrat, 4 have Mustaqaru-l-mulk 'Aẓímábád	24
6,	Muḥammad Sháh, 1131—1161 A. H. = 1719—1748, A. D.	
	a, type *Ṣáḥib Qirán*, date illegible, mint Dáru-l-khiláfat Sháh Jahánábád	2
	b, type *Bádsháh Ghází*, various dates, mint mostly 'Aẓímábád, Gwáliyar	42
7,	Sháh 'Álam, 1175—1221 A. H. = 1759—1806 A. D., dates illegible, mint Lakhnaú	6
8,	Akbar II., 1221—1253 A. H. = 1806—1837 A. D., mint illegible, date (on one) 1253, regnal 34 (inconsistent), with the Bhartpur 'dagger' ...	4
	Total ...	99

III. Report on 375 silver coins, forwarded by the Deputy Commissioner of Wardah with his No. 4759, dated 14th September, 1888.

Together with the coins were forwarded a so-called *Ta'wíẓ*, of silver, and a small gold plate with the figures of Jagannáth.

In a subsequent communication of the Deputy Commissioner, dated the 29th September, 1888, it was stated that the whole treasure had been found in Mauza Anjhí, Tahsíl Wardha, in digging an old wall standing on the site of a house which belonged to the finder. The latter asserted that it had been buried by his grandfather, and that his father had been aware of it, but did not know the particular spot where it had been hidden.

The coins were received divided into four separated portions; *viz.*, 1, Rs. 102, called "Nagpuri"; 2, Rs. 178 called "Modhoshai"; 3, Rs. 85 called "Chandapuri," and 4, Rs. 10 called "Sabjí." With the last named portion were enclosed the silver *Ta'wíz* and the gold plate.

On examination the coins proved to be Rupees of the following Mughal Sulṭáns of Dehlí:—

	No. of specimens.
1, Aurangzíb, 1068—1118 A. H. = 1658—1707 A. D., mints: Súrat, Akbarábád; dates 1068, 1093, 1113	3
2, Farrukh Siyar, 1124—1131 A. H. = 1712—1719 A. D., mint and date illegible; a bad specimen.	1
3, Muḥammad Sháh 1131 — 1161 A. H. = 1719 — 1748 A. D.,	
a, *Imperial Mintages*:—Muḥammadábád (Benares), Dáru-s-Salṭanat Sháhjahánábád, Arkát; legible dates 1131, 1140, 1152, ...	7
b, *Provincial Mintages*:—Old Nágpúrí Rupee, marked with the symbol ʁ (see Prinsep's Indian Antiquities, Useful Tables, pp. 66, 68, footnotes); said to be struck at the Chandra and Hingan Ghát mints; but the mint named on the coins themselves is Súrat, which is fully legible on about half a dozen specimens, though on most of the others no more than the final *t* is visible (see *ibid*, p. 66, No. 10); no date visible on any. On the packets, in which they were received, 56 were marked as "Madhoshai," and 85 as "Chandapuri"	139
4, Aḥmad Sháh Bahádur, 1161—1167 A. H. = 1748—1754 A. D.,	
a, *Imperial Mintages*:—Katak; no dates legible, except 116*, and 117* on reverse of two coins. On the packet in which they were received, they were marked as "Madhoshai and "Nagpuri" ...	121
b, *Provincial Mintages*:—New Nágpurí Rupee, marked by a flag, (see *ibid.*, p. 68)	16
do., marked by number 9 over flag.....	78
do., Jeswant Ráo's, marked by cross + ...	2
do., do., marked by the symbol V	3
On packet marked as "Nagpuri."	

	No. of specimens.
5, 'Álamgi'r Ṣáni', 1167—1173 A. H. = 1754—1759 A. D., Madras Rupee, marked by ψ	1
6, Sháh 'A'lam, 1175—1221 A. H. = 1759—1806 A. D.,	
a, *Imperial Mintages:* mint illegible; legible date 1200	2
b, *Provincial Mintages:* New Nágpurí, marked by crescent ◡ (see *ibid.*, p. 68), dated 1190	1
do., Indor Rupee, marked by faced solar disk, date 1180, mint Mulhárnagar	1
Total...	375

The *Ta'wíẓ* (تعويذ) or 'amulet-holder' is a small box in the form of an octagonal cylinder with domed extremities, about $3\frac{1}{2}$ by $1\frac{1}{4}$ inches. It has two ornamental rings attached near to the two ends for the passage of a string by which it may be worn. On the side it is provided with a large square opening reaching over nearly three of its eight faces, and covered by a lid, moveable on a hinge and furnished with a thick knobby handle. The hinge, however, is broken. It is strongly made of silver, and weighs nine tolas.

The other object is a very thin gold plate, embosed with three very rudely made standing figures, apparently representing Jagannáth (Kṛishṇa), his brother Balarám and his sister Subhadrá. It is fixed to an equally thin silver plate with its ends turned over, so as to form a frame round the images. The whole measures $1\frac{1}{4}$ inch square, and weighs rather more than $\frac{1}{4}$ tola. It can easily be inserted in the amulet-holder, and may be the amulet belonging to it.

IV. Report on 498 old coins, forwarded by the Officiating Deputy Commissioner of Sháhpur, with his No. 836, dated 3rd October, 1888.

These coins are stated to have been found in ploughing a field near the village of Chitta in the salt range in the district of Sháhpur. They were enclosed in an earthen vessel, which came to pieces when taken out of the ground. The whole of the coins, with the exception of one, belong to Saifu-d-dín Ḥasan Qurlagh, who was one of the leading generals of *Jalálu-d-dín Mankbarnin*, the last of the Kházrizmian Kings, in the beginning of the 13th century A. D. See Thomas' *Chronicles of the Pathan Kings of Delhi*, pp. 85, 92, where, on p. 96, these coins are

described. They belong to the well-known type of 'Horseman and Bull' coins. On the obverse they show a horseman with the legend *Śrí Hamíraḥ*, and, on the reverse, a recumbent humped bull, with the legend *Śrí Hasaṇa Kuralaka*, both legends in Nágarí characters. Most specimens of these coins have the reverse legend only in the curtailed state of *Kurala*. In the present collection, however, there are several which distinctly exhibit the full reading *Kuralaka*.*

The one exception, above referred to, appears to be a coin of the Sulṭán SHAMSU-D-DI'N ILTIMISH, of the same 'horseman and bull' type. The name, however, on the reverse legend is too fragmentary to be confidently identified.

All these coins are common enough. They are made of a mixture of copper and silver, the former predominating.

V. Report on 62 ancient coins forwarded by the Collector of Bijnor, with his No. $\frac{1707}{\text{XII, 622}}$ dated 17th August, 1888, and his No. $\frac{1921}{\text{XII, 622}}$ dated 26th September, 1888.

The find-place of these coins is not specified, it being merely stated that the coins "were found buried in this district" (Bijnor). One of the coins was received in a broken state, it being stated, that the coin "was broken by the police to test the metal."

The coins belong to what is called "the Indo-Scythian class" of coins. They have been described by the late Mr. E. Thomas in the *Indian Antiquary*, volume XII, p. 6, and belong to the sub-class of what Mr. Thomas has called the "Kushan Branch" of the Indo-Scythian tribes. They are figured in the *Ariana Antiqua*, plate XVIII, figs. 27, 28. They show on the obverse, the figure of the king standing as usual, under his left arm *kida* or *kidu*, beyond the spear *kɪsha* (with traces of a third letter *ṇa*), beside the small altar *kshaṇaṃ* (or *kshaṃṇa*; there is a distinct dot or anusvára, generally below, but occasionally beside, the *ṇa*). On the reverse, they show a seated female figure, as usual. Over her head is a distinct crescent, either let into the dotted margin or immediately below it (as in Prinsep's *Indian Antiquities*, vol. I, pl. XXIII, fig. 13). The monogram (quite distinct on some examples) is generally 𑀫, or occasionally 𑀭, neither of which is given in Wilson's list in the *Ariana Antiqua*. On the right hand margin there are two (in some specimens apparently three) letters which in the most distinct cases seem to read *sala*.

* See Dr. Hoernle's paper on "*Some new or rare Muhammadan and Hindí coins*," and Plate IV, in the Journal, As. Soc. Beng., vol. LVIII, Part I.

The following papers were read:

1. *On certain features in the Geological Structure of the Myelat District of the Southern Shan States in Upper Burmah as affecting the drainage of the country.*—*By* Brigadier General Collett, C. B. *Communicated by* Dr. D. D. Cunningham.

2. *The Psychrometer and the condensing Hygrometer.*—*By* S. A. Hill, Esq., B. Sc., Meteorological Reporter to the Government of the N. W. Provinces and Oudh.

[Received October 12th.]

(Abstract.)

After a description of Regnault's condensing hygrometer and a justification of the assumption that the thermometer immersed in the ether has sensibly the same temperature as the surface on which the dew is deposited, the author goes on to discuss the results of an extensive series of comparative observations of the two instruments made by him this year, together with those of a shorter series made in 1881. Amongst the observations are some made under extreme conditions of heat and dryness, the dew point in one instance having been 74·5 degrees below the temperature of the air.

The conclusion arrived at is that it is unlikely that Regnault's modification of August's formula for reducing psychrometric observations will be improved upon; but that whilst the formula gives results which approximate very closely to the truth when the air round the thermometer is stirred by a moderate wind, the deduced humidity is considerably too high in a calm state of the atmosphere.

It is incidentally proved also that any method of reduction which assumes that the indications of the psychrometer are independent of barometric pressure, as do Glaisher's factors and a table recently constructed by Hazen, must give erroneous results except at places situated near sea-level.

3. Anopolophrya æolosomotis, *a new Ciliate Infusorian parasitic in the alimentary canal of* Æolosome chlorostictum.—*By* Henry H. Anderson, Esq.

4. *Some new forms of* Euplotes *found in Calcutta Tanks.*—*By* Henry H. Anderson, Esq. Communicated by the Microscopical Society.

5. *The Butterflies of the Nilgiri District, South India.*—*By* G. F. Hampson, Esq., B. A., Exeter Coll., Oxford. *Communicated by* The Superintendent of the Indian Museum.

6. Pseudopulvinaria Sikkimensis, *a new genus and species of* Coccidae *from Sikkim.*—*By* E. T. Atkinson, Esq., B. A.

7. *The Tornadoes and Hailstorms of last April and May in the Doab and Rohilkhand.*—*By* S. A. Hill, Esq., B. Sc., Meteorological Reporter to the Government of the N. W. Provinces and Oudh.

[Received October 6th.]

(Abstract.)

An account of the violent tornadoes and hailstorms which visited Moradabad and other places on the 30th April 1888, and of the storms at Delhi and *Tilhar* on the following day. The paper gives as complete an account of the times of occurrence and course of these storms as can be made out from the reports obtained from district officers and others, also of the destruction of life and property occasioned by the wind, and especially by the hail, which accompanied them. It then goes on to show that, whilst the conditions likely to generate such storms are not readily terminable from pressure and wind charts at or near sea-level, these conditions are probably explicable by the distribution of pressure at the cloud-level, and that, on the days when the storms occurred, the vertical distribution both of temperature and water vapour was very anomalous.

The paper contains appendices giving the local reports of the storms, with charts.

8. *Some applications of Ellipic Functions to problems of mean values* (second paper).—*By* Babu Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The problem of determining the average area common to an ellipse and a concentric circle of variable radius always intersecting it, was, among other questions, discussed in the author's first paper on "Some Applications of Elliptic Functions to Problems of Mean Values," an abstract of which has been given before (p. 184 *ante*); the present paper is devoted to a discussion of the corresponding space analogue, *viz.*, to determine the average volume common to an ellipsoid and a concentric sphere of variable radius always intersecting it. The paper is divided into six sections, of which the first is introductory; it is pointed out that there are two distinct cases according as four, or only two, of the vertices of the ellipsoid are external to the sphere; these two cases correspond to the two cases of the radius of the sphere lying between the middle and the shortest axis, and between the middle and the longest axis of the ellipsoid. The next four sections contain a detailed examination of the first case; the second section gives an expression for the common volume and the third section calculates the mean value sought; the result is expressed in terms of Jacobi's func-

tions and an elliptic integral. In the fourth section, this integral is represented geometrically by the surface of the reciprocal ellipsoid. The fifth section shows how the expression for the common volume may be reduced to the canonical form of elliptic integrals, and it is then pointed out how this, coupled with the results obtained in the previous sections, gives a remarkable relation connecting four definite integrals. The sixth and last section contains a discussion of the case when only two of the vertices of the ellipsoid are exterior to the intersecting sphere; it is pointed out that it is not necessary to repeat the previous calculation for the present case, inasmuch as by an immediate application of Dr. Catalan's transformation, it may be made to depend on the preceding one.

These papers will be published in full in the Journal, Part II.

9. *Coins of the Muhammadan kings of Gujarát.* (With 3 plates.)—*By* E. E. Oliver, Esq.

10. *Report on Archæological excavations in Bijnour, N. W. Provinces.* (With exhibits).—*By* A. Macaulay Markham, Esq., C. S., F. R. G. S., F. Z. S.

11. *The Coins of the Chaghatai Mughals.* (With 4 plates).—*By* E. E. Oliver, Esq.

12. *Notes on the Aboriginal tribes of the Paháriyá Kariyás, and the Koroás.*—*By* W. H. P. Driver, Esq.

13. *A Chhatísgarhí Grammar in Hindí by* Mr. Hi'ra Lál Kavyopádhyáya, *Head Master of the A. V. School, Dhantari, Raipur, C. P. Translated into English by* G. A. Grierson, Esq., C. S.

These papers will be published in full in the Journal, Part I.

Library.

The following additions have been made to the Library since the Meeting held in August last.

Transactions, Proceedings and Journals,

presented by the respective Societies and Editors.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—Notulen, Deel XXVI, Aflevering 1 und 2.

———. ———. Tijdschrift voor Indische Taal,-Land-en Volkenkunde, Deel XXXII, Aflevering 4.

Batavia. Bataviaasch Verhandelingen, Deel XLV, Aflevering 2.

Berlin. Der Königlich Preussischen Akademie der Wissenschaften zu Berlin,—Sitzungsberichte, 1—20, 1888.

Bombay. Bombay Natural History Society,—Journal, Vol. III, No. 3.

———. The Indian Antiquary,—Vol, XVI, Part 203, December 1887; Vol. XVII, Parts 209 and 210, June and July, 1888.

Brisbane. Royal Society of Queensland,—Proceedings, Vol. V, Parts 1 and 2.

Brussels. Musée Royal d'Histoire Naturelle de Belgique,—Annales, Tomes XIV et XV.

———. La Société Entomologique de Belgique,—Annales, Table Générale, I—XXX.

———. La Société Royal Malacologique de Belgique,—Procès-Verbal, 3 Juillet—3 Décembre, 1887.

Budapest. La Société Hongroise de Géographie,—Bulletin, Tome XVI, Fasc 5 et 6.

Buenos Aires. La Academia Nacional de Ciencias en Córdoba,—Boletin, Tomo X, Entrega 2 .

Calcutta. Geological Survey of India,—Records, Vol. XXI, Part 3.

———. Indian Engineer,—Vol. V, Nos. 16—24; and Vol. VI, Nos. 1—5.

———. Indian Engineering,—Vol. IV, Nos. 5—17, and Index to Vol. III.

———. Indian Meteorological Memoirs,—Vol. III, Parts 3 and 4.

———. Meteorological Observations recorded at seven stations in India, corrected and reduced, May and June, 1888.

Chicago, Ill. The American Antiquarian and Oriental Journal, Vol. X, Nos. 4 and 5, July and September, 1888.

Copenhagen. K. Nordiske Oldskrift-Selskab,—Aarboger, (II Raekke), 3 Bind, 3 Hefte.

Dublin. Royal Dublin Society,—Scientific Proceedings, Vol. V, Parts 7 and 8; and Vol. VI, Parts 1 and 2.

———. ———. Scientific Transactions, Vol. III, No. XIV; and Vol. IV, No. 1.

Edinburgh. Royal Society of Edinburgh,—Proceedings, Vols. XIII and XIV.

———. ———. Transactions, Vol. XXX, Part 4; Vol. XXXI; Vol. XXXII, Part 4; and Vol. XXXIII, Parts 1 and 2.

———. The Scottish Geographical Society.—Magazine, Vol. IV, Nos. 7—9, July—September, 1888.

Florence. La Sociéta Africana d'Italia,—Bullettino, Tome IV, Fasc. 5° et 6°.

Frankfort. a/M. Der Senckenbergischen Naturforschenden Gesellschaft,—Abhandlungen, Band XV, Heft 2.

Frankfort. a/O. Des Naturwissenschaftlichen Vereins des Reg.-Bez. Frankfurt,—Monatliche Mittheilungen aus dem Gesammtgebiete der Naturwissenschaften, 5 Jahrgang, Nrn 11 und 12.

———. Societatum Litterae,—2 Jahrg, Nos. 3 and 4.

Genoa. Museo Civico di Storia Naturale di Genova,—Annali, Tome II—V.

Hamburg. Naturhistorisches Museum zu Hamburg,—Bericht, 1887.

Havre. Société de Géographie Commerciale du Havre,—Bulletin, Mai—Juin, 1888.

Ithaca. Cornell University,—Library Bulletin, Vol. II, No. 7.

Königsberg. Der Physikalisch-Oekonomischen Gesellschaft zu Königsberg,—Schriften, Jahrgang XXVIII.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLII, Heft 2.

London. Anthropological Institute of Great Britain and Ireland,—Journal, Vol. XVIII, No. 1, August, 1888.

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———. Institution of Civil Engineers,—Minutes of Proceedings, Vol. XCIII.

———. Institution of Mechanical Engineers,—Proceedings, May, 1888.

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Report of the British Association for the advancement of Science, for the year 1887. 8vo. London, 1888.

Report of the Scientific Results of the Voyage of H. M'S. "Challenger" Zoology. Text, Vols. XXIV—XXVI, and Plates Vol. XXIV. 4to. London, 1888.

Sabdakalpadruma, Vol. II, Nos. 24 and 25 and Vol. III, No. 3. 4to. Calcutta, 1888.

Taittiriya Sanhita. Edited by Pandits Rájárám Shástri and Sivarám Sarmá. 8vo. Bombay, 1888.

TRENCKNER, V. The Majjhima-Nikāya, Vol. I (Pali Text Society). 8vo. London, 1888.

Vishnu Puráṇa. Edited by Pandit Krishna Shástri. Rl. 4to. Bombay, 1887.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR DECEMBER, 1888.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 5th of December 1888, at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present :—

E. T. Atkinson, Esq., H. Beveridge, Esq., Bábú Gaurdás Bysack, Bábú Sarat Chandra Dás, E. Gay, Esq., Dr. Hoernle, Dr. W. King, T. R. Mallet, Esq., Bábú Asutosh Mukhopádhyáya, A. M. Nash, Esq., L. de Nicéville, Esq., Kumár Upendra Chandra Ráy, D. Waldie, Esq., J. Westland, Esq.

The minutes of the last meeting were read and confirmed.

Thirty-nine presentations were announced, details of which are given in the Library List appended.

The following gentleman, duly proposed and seconded at the last meeting of the Society, was ballotted for and re-elected an Ordinary Member :

W. Crooke, Esq., C. S.

The following gentlemen are candidates for election at the next meeting :—

Bábú Jogendra Chandra Ghose, M. A., B. L., Vakil, High Court, proposed by H. Beveridge, Esq., seconded by Dr. P. K. Ráy.

G. C. Dudgeon, Esq., Mumfick Lebong Tea Company, Darjeeling, proposed by L. de Niceville, Esq., seconded by J. Wood-Mason, Esq.

Kumár Rameswar Maliáh, of Searsole, (for re-election) proposed by Bábú Gaurdás Bysáck, seconded by Lieut.-Col. J. Waterhouse.

The following gentlemen have intimated their wish to withdraw from the Society:

Lieut.-Genl. G. G. Pearse, R. H. A., C. B.
W. Fiddian, Esq., C. S.

The President announced that Mr. Pedler had been obliged to resign the post of Treasurer on account of ill-health, and that the duties had been taken up by Dr. W. King;

also that the Council had with much pleasure accepted the invitation of the Microscopical Society that the President of the Asiatic Society should be an Honorary Member of their Society.

Bábú Sarat Chandra Dás exhibited some Tibetan MSS., one written in letters of gold, of the Bodhipathapradípa, by Dípámkara Śríjñána, the celebrated Buddhist Pandit of Bengal, who visited Tibet in 1038 A. D. (postponed from last meeting).

Mr. E. T. Atkinson exhibited a Tibetan Map, painted on cloth, of Sikkim and adjacent parts of Tibet, including the Chúmbí valley, and Phari, &c., obtained from the Tibetan camp.

The Philological Secretary read a report on a find of 477 gold mohurs, forwarded by the Deputy Commissioner of Hoshangábád with his letters No. 2612, 2955, and 3588, dated respectively 7th July 1888, 28th July 1888 and 12th September 1888.

1. The coins are stated to have been found in a field, in the Soháǵpur Táḥsíl of the Hoshangábád district, by some ploughmen, while ploughing.

2. On examination 25 of the coins were found to be forgeries. Twenty one of these show on both faces a few illegible scrawls, some of which appear to be attempts at imitating Persian letters, while others seem to be a very crude imitation of the fish symbol on some of Sháh 'Álam's coinage; this is the only clue to their possible age. The other four are forgeries of Aurangzíb's and Farrukh Siyar's mohurs. I have had them tested by Messrs. Cooke and Kelvey, Jewellers of Calcutta, who pronounce them to be silver gilt and worth about 8 annas each.

3. The other coins numbering 452 are genuine and belong to the following emperors of Dehlí:

Serial Nos.	Names of Sulṭán.	No. of specimens.	Description of coin.	Frequency.
1	Ghiyáṣu-d-dín Balban 1265-87 A. D.	1	Chron. No. 111, p. 134; mint Dehlí (?), date 667.	Rare.
2	Muizzu-d-dín Kaiqubád 1287-90 A. D.	1	Chron. No. 116, p. 141; mint Dehlí; date 688.	Rare.
3	Jalálu-d-dín Fírúz 1290-1295 A. D.	1	Chron. No. 120, p. 144; mint Dehlí; date 691.	Very rare (unique in Chron).
4-11	'Aláu-d-dín Muḥammad 1295-1315 A. D.	8	Chron. No. 134, p. 171; mint Deogír; date 712^1, 714^1, illegible 6.	Very rare (in gold).
12-44	do.	33	Chron. No. 133, p. 171; mint Dáru-l-Islám; dates 697^1, 703^3, 704^3, 705^1, 706^1, 707^2, 710^1, 711^3, 712^4, 713^3, 714^3, illegible 11.	Very rare (in gold).
45-394	do.	350	Chron. No. 130 (large, broad) and Chron. No. 131 (small, thick), 2 varieties. Mint Dehlí; dates 696^{12}, 697^1, 698^4, 699^4, 700^5, 701^{10} 702^9, 703^4, 704^{23}, 705^{10}, 706^4, 707^2, 708^3, 709^{14}, 710^{11}, 711^{18}, 712^{14}, 713^{16}, 714^4, 715^4, illegible 175.	Not uncommon.
395-397	Ghiyáṣu-d-dín Tughlaq 1320-1325 A. D.	3	Chron. No. 159, p. 190; mint Dehlí; dates 724, 727, illegible 1.	Not common.

Serial No.	Names of Sulṭán.	No. of specimens.	Description of coin.	Frequency.
398-399	Muḥammad bin Tughlaq 1325-1351 A. D.	2	Chron. No. 171, p. 207; mint Dehlí; dates 726, 727.	Not common.
400-401	do.	2	Chron. No. 172, p. 208; mint Dehlí; date 725.	Very rare (in gold, unique in Chron.)
402	Muḥammad bin Tughlaq 1325-1351 A. D.	1	Chron. No. 174, p. 209, also J. A. S. B., LII, p. 62; mint Deogír, date 727.	Rare.
403	do.	1	Chron. No. 175, p. 210; mint Sulṭánpur; date 729.	Very rare.
404	do.	1	Chron. No. 176, p. 211; mint Dehlí; date 736.	Not uncommon.
405-408	do	4	Chron. No. 179, p. 213; no mint; dates 733^{2}, 734^{2}.	Very rare (unique in Chron.)
409-412	do.	4	Chron. No. 212, p. 259; mint Dehlí; dates 741^{1}, 743^{2}, 744^{1}.	Rare.
413-420	do.	8	Chron. No. 213, p. 259; no mint or date.	Not common.
421	do.	1	Compare Chron. No. 218, p. 260 (copper only); no mint or date.	Unique (in gold).
422-424	Fírúz Sháh 1351-1388 A. D.	3	Chron. No. 223, p. 274; no mint or date.	Very rare.

Serial No.	Names of Sulṭán.	No. of specimens.	Description of coin.	Frequency.
425-429	do.	5	Chron. No. 224, p. 274; mint Dehlí; date 765, illegible 4.	Rare.
430-439	do.	10	Chron. No. 225, p. 275; no mint or date.	Very rare.
440	do.	1	Chron. No. 226, p. 275; mint Dehlí; date 766.	Very rare (unique in Chron.)
441-442	Fírúz Sháh and Fatḥ Khán 1358-1374 A. D.	2	Chron. 240, p. 298; mint Sulṭánpur (?); date [76]1, illegible 2.	Very rare.
443-444	Fírúz Sháh and Ẓafar 1374.	2	Chron. No. 245, p. 300, also J. A. S. B. XL, p. 160; mint and date lost.	Very rare (unique in Chron).
445-446	Ghiyáṣu-d-dín Tughlaq II 1388 A. D.	2	Not in Chron.; Mint Dehlí, date 791; illegible 1; (both new varieties).	Unique.
447	Abú Bakr bin Ẓafar 1388-89.	1	Not in Chron.; mint and date lost.	Unique.
448	Muḥammad bin Fírúz 1389-92 A. D.	1	Chron. No. 263, p. 308, also J. A. S. B. XLV, p. 291; no mint or date.	Very rare.
449-450	Maḥmúd bin Muḥammad bin Fírúz 1392-12 A. D.	2	J. A. S. B. XLIV, p. 127 and LII, p. 213 (with Muẓaffar); no mint or date.	Very rare (only 3 others).

Serial No.	Names of Sulṭán.	No. of spec.	Description of coin.	Frequency.
451	Maḥmúd bin Muhammad bin Tughlaq, 1351 A. D.	1	J. A. S. B. XLIII, p. 97, and XLIX, p. 211, No. 9; no mint or date.	Very rare (only 3 others.)
452	Sikandar Sháh bin Ilyás, of Bengal, 1351-1389 A. D.	1	Compare J. A. S. B. XXXII, p. 64, No. 2 (silver only).	Unique (in gold.)
			Forgeries.	
453-454	Aurangzíb 1658-1707 A. D.	2	Similar to Marsden's DCCCLXXXIV; mint Súrat; date lost.	
455-456	Farrukh Siyar 1712-19 A. D.	2	Mint Etáwá (?); date [112]8, regn. 5.	
457-477	Perhaps Sháh 'Álam.	21	Unintelligible scrawls.	

The following papers were read.

1. *Note on a Bicircular Quartic.*—*By* Babu Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of this note is to point out the relation between the different modes of generating a limaçon, *viz.*, as the pedal of a circle, as the locus of a point such that its power with respect to a given circle is in a fixed ratio to its distance from the extremity of a fixed diameter, and as the envelope of a circle whose centre moves on a given circle and which passes through a given point. The inverse and spare analogue of the curve are also considered.

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

2. *On some new or rare Muhammadan and Hindú coins.*—*By* Dr. A. F. Rudolf Hoernle.

The paper will be published in the Journal, Part I.

Library.

The following additions have been made to the Library since the Meeting held in November last.

Transactions, Proceedings and Journals,

presented by the respective Societies and Editors.

Bombay. The Indian Antiquary,—Vol. XVII, Part 213, October, 1888.

Calcutta. Indian Meteorological Memoirs,—Vol. IV, Part 5.

———. Indian Engineering,—Vol. IV, Nos. 19—22.

———. Meteorological Observations recorded at seven stations in India, corrected and reduced,—July, 1888.

———. The Indian Engineer,—Vol. VI, Nos. 6—9, and Index to Vol. V.

Christiania. Videnskabs-Selskabet i Christiania,—Forhandlinger, Aar. 1887.

Dresden. Königliches Ethnographisches Museum zu Dresden,—I. Bilderschriften des Ostindischen Archipels und der Südsee.

———. ———. II. Jadeit-und Nephrit-Objecte. A. Amerika und Europa.

———. ———. III. Jadeit-und Nephrit-Objecte. B. Asien, Oceanien und Afrika.

———. ———. IV. Alterthümer aus dem Ostindischen Archipel.

———. ———. V. Seltene Waffen aus Afrika, Asien und Amerika.

———. ———. VI. Holz-und Bambus-Geräthe aus Nord West Neu Guinea.

———. Königl. Zoologisches und Anthropologisch-Ethnographisches Museum zu Dresden,—Abhandlungen und Berichte. 1886—87.

———. K. Zoologisches Museum zu Dresden,—Abbildungen von Vogel-Skeleten,—Lieferung I—XI.

———. ———. Mittheilungen, Heft 1—3.

Dublin. Royal Geological Society of Ireland,—Journal, Vol. VII, Part, 2.

Edinburgh. The Scottish Geographical Society,—Magazine, Vol. IV, No. 10, October, 1888.

Frankfurt, a. M. Die Senckenbergische Naturforschende Gesellschaft in Frankfurt am Main,—Bericht, 1888.

The Hague. Koninklijk Instituut voor de Taal,-Land-en Volkenkunde van Nederlandsch-Indië,—Bijdragen tot de Taal,- Land-en Volkenkunde van Nederlandsch-Indië, 5e Volgr, Deel III, Aflevering, 4.

Havre. Société de Géographie Commerciale du Havre,—Bulletin, Juillet-Août, 1888.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band, XLII, Heft, 3.

London. Institution of Civil Engineers,—Minutes of Proceedings, Vol. XCIV and Brief Subject Index Vols. LIX—XCIV.

———. Nature,—Vol. XXXIX, Nos. 990—993.

———. Royal Asiatic Society of Great Britain and Ireland,—Journal, Vol. XX, Part 3, July, 1888.

———. Royal Geographical Society,—Proceedings, Vol. X, No. 10, October, 1888.

———. Royal Society of London,—Exchange list of duplicates and deficiencies.

———. Philosophical Transactions, Vol. CLXXVIII, A and B.

———. List of Fellows, 30th November, 1887.

———. The Academy,—Nos. 859—862.

———. The Athenæum,—Nos. 3182—3185.

Lyon. La Société D'Anthropologie de Lyon,—Bulletin, Tome VI et Tome VII, Nos. 1 et 2.

Melbourne. Royal Society of Victoria,—Transactions and Proceedings, Vol. XXIV, Parts 1 and 2.

Mexico. La Sociedad Cientifica "Antonio Alzate,"—Memorias, Tomo II, Nos. 2 et 3.

Paris. La Société D'Anthropologie de Paris,—Bulletin, Tome XI (III^{e} série), Nos. 1 et 2.

———. La Société Zoologique de France,—Bulletin, Tome XIII, No. 7.

———. ———. Mémoires, Tome I, Part 4.

———. Musée Guimet,—Annales, Tome XIV.

———. ———. Revue de l'Histoire des Religions, Tome XVII, Nos. 1 et 2.

Philadelphia. The Journal of Comparative Medicine and Surgery, Vol. IX, No. 4.

Rome. La Società degli Spettroscopisti Italiani,—Memorie, Vol. XVII, Dispensa 9.

St. Petersburg. L' Académie Impériale des Sciences de St. Pétersbourg, —Bulletin, Tome. XXXII, No. 2.

———. ———. Mémoires, Tome XXVI, Nos. 1 et 2.

———. La Société Impériale Russe de Géographie,—Journal, 1887.

———. ———. Proceedings, XXIV, No. 2.

Stettin. Entomologischer Verein zu Stettin,—Entomologische Zeitung, —Jahrgang, XLIX, Nrn. 7—9.

Turin. La R. Accademia delle Scienze di Torino,—Atti, Vol. XXIII, Disp. 13—15.

Vienna. Der K. K. Geologischen Reichsanstalt,—Verhandlungen, No. 13, 1888.

Zagreb. Hrvatskoga Arkeologickoga Druztva,—Viestnik, Godina. X, Br. 4.

Books and Pamphlets,

presented by the Authors, Translators, &c.

Beglar, J. D. Report of the Archæological Survey of Bengal for 1888. 8vo. Calcutta, 1888.

Blanford, W. T. Note sur la classification des Roches de l'Inde Britannique (Extrait du Compte Rendu de la troisiéme session du Congrès Géologique International, Berlin 1885). 8vo. Berlin, 1885.

Roy, Protab Chandra. The Mahabharata, translated into English Prose, Part XLIV. 8vo. Calcutta, 1888.

Sachau, Eduard. Indo-Arabische Studien zur Aussprache und Geschichte des Indischen in der Ersten Hälfte des XI. Jahrhunderts. (Aus den Abhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin vom Jahre 1888). 4to. Berlin, 1888.

Miscellaneous Presentations.

Catalogue of the Fossil Reptilia and Amphibia in the British Museum (Natural History), Part I containing the orders Ornithosauria, Crocodilia, Dinosauria, Squamata, Rhynchocephalia, and Proterosauria. By Richard Lydekker, B. A., F. G. S., etc. 8vo. London, 1888.

Catalogue of the Passeriformes, or Perching Birds, in the collection of the British Museum, Vol. XIV. Oligomyodæ, or the families Tyrannidæ, Oxyrhamphidae, Pipridae, Contingidae, Phytotomidae, Philepittidae, Pittidae, Xenicidae, and Eurylaemidae. By Philip Lutley Sclater. 8vo. London, 1888.

British Museum, London.

Report on the Railway-Borne Traffic of the Central Provinces for the year 1887-88. Fcp. Nagpur, 1888.

Chief Commissioner, Central Provinces.

Antinoos eine kunstarchäologische Untersuchung von Dr. L. Dietrichson. 8vo. Christiania, 1884.

Catuls Digtning belyst i forhold til den tidligere græske og latinske litteratur af A. B. Drachmann. 8vo. Copenhagen, 1887.

Catul's Digtning oplyst i dens sammenhæng med den tidligere græske og latinske literatur af L. B. Stenersen. 8vo. Christiania, 1887.

Guderne hos Vergil. Bidrag til belysning af Aeneidens komposition af A. B. Drachmann. 8vo Copenhagen, 1887.

Joannis Agricolae Islebiensis Apophthegmata nonnulla nunc primum edidit Dr. Ludovicus Daae. 4to. Christiania, 1886.

Viridarium Norvegicum. Norges Væxtrige. Et bidrag til Nord-Europas natur-og culturhistorie af Dr. F. C. Schübeler. 1ste Band 2det Hefte og 2det Band 1ste og 2det Hefte. 4to. Christiania, 1888.

Om Humanisten og Satirikeren Johan Lauremberg af Dr. Ludvig Daae. 8vo. Christiania, 1884.

Udsigt over den Romerske Satires Forskjellige Arter og deres oprindelse af L. B. Stenersen. 8vo. Christiania, 1887.

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Catalogue of Canadian Plants. By John Macoun, M. A., F. L. S., F. R. S. C. Part IV,—Endogens. 8vo. Montreal, 1888.

GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.

Report on the Administration of the Salt Department for the year 1887-88. Fcp. Calcutta, 1888.

Report on the Calcutta Medical Institutions for the year 1887. By A. Hilson, Esq., M. D., Offg. Inspector-General of Civil Hospitals, Bengal. Fcp. Calcutta, 1888.

Report on the Legal Affairs of the Bengal Government for the year 1887-88. Fcp. Calcutta, 1888.

The Indian Forester, Vol. XIV, Nos. 9 and 10, September and October, 1888. 8vo. Boorkee, 1888.

GOVERNMENT OF BENGAL.

Coins. Catalogue No. 2. Roman, Indo-Portuguese, and Ceylon. By Edgar Thurston, Superintendent, Madras Central Museum. 8vo. Madras, 1888.

GOVERNMENT CENTRAL MUSEUM, MADRAS.

Copy of the Despatch from the Secretary of State for India conveying the Resolution of the House of Commons, dated the 5th day of June 1888, with respect to Contagious Diseases Acts and Regulations in India. Fcp. London, 1888.

Copy of Letter from the Registrar of the Nizamut Adawlut to the Secretary to the Government of Bengal, No. 351, dated the 29th day of June 1859, containing the Judgment of the Court in the cases of certain prisoners sentenced to imprisonment by Mr. Taylor, in connection with the riots at Patna on the 3rd day of July 1857. Fcp. London, 1888.

Further Papers relating to the case of Mr. W. Taylor, of Patna. Fcp. London, 1888.

Copy of the Report of the Bombay Factory Commission, appointed to consider the working of Factories in the Bombay Presidency, dated the 6th day of January 1885, and of the Resolution of the Government of Bombay thereon. Fcp. London, 1888.

Copy of Resolution of Government of India on State-aided Education. Fcp. London, 1888.

Correspondence regarding the adoption by the States of Rajputana of Reforms in connection with Marriage and Funeral Customs. Fcp. London, 1888.

First and Second Reports from the Select Committee on East India (Hyderabad Deccan Mining Company).

First and Second Reports from the Select Committee on East India (Hyderabad Deccan Mining Company), together with the Proceedings of the Committee, Minutes of evidence, and Appendix. Fcp. London, 1888.

Report of the Royal Commission for the Adelaide Jubilee International Exhibition of 1887. 8vo. London, 1888.

Sáma Veda, Samhitá, with Sáyana's commentary (in Bengali character), with Bengali translation. By Satyavrata Sámaśramí. Parts 45—48. 8vo. Calcutta, 1888.

Selections from the Records of the Government of India, Home Department, No. CCXLVII.—Reports on Publications issued and registered in the several Provinces of British India during the year 1887. Fcp. Calcutta, 1888.

The Indian Antiquary, Vol. XVII, Part 213, October, 1888. 4to Bombay, 1888.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Administration Report of the Government Central Museum for the year 1887-88. Fcp. Madras, 1888.

GOVERNMENT MUSEUM, MADRAS.

Gazetteer of the Punjab, Provincial Volume. 1888-89. 8vo.

GOVERNMENT OF PUNJAB.

Prodromus of the Zoology of Victoria; or figures and descriptions of the living species of all classes of the Victorian Indigenous Animals. By Frederick McCoy. Decade XVI. 8vo. Melbourne, 1888.

GOVERNMENT OF VICTORIA.

Práchin Shodh Sangrah. Compiled by Vajeshankar Govrishankar Ozá Esq. 4to. Bhávnagar, 1888.

HIS HIGHNESS THE MAHARAJA OF BHAVNAGAR.

Results of the Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1886. 4to. London, 1888.

ROYAL OBSERVATARY, GREENWICH.

Tottabodhini Patrika, No. 544. Fcp. Calcutta, 1888.

TOTTABODHINI SABHA.

Periodicals Purchased.

Berlin. Deutsche Litteraturzeitung,—Jahrgang IX, Nrn. 36—39.
———. Journal für die reine und angewandte Mathematik,—Band CIII, Heft, 4.
Calcutta. Stray Feathers,—Vol. XI, Nos. 1—4.
Cassel. Botanisches Centralblatt,—Band XXXV, Heft, 9—12.
Geneva. Archives des Sciences Physiques et Naturelles,—Tome XX, No. 10, Octobre, 1888.
Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Göttingische Gelehrte Anzeigen, Nrn. 18 und 19.
———. ———. Nachrichten, Nrn. 11 und 12.
Leipzig. Annalen der Physik und Chemie,—Band XXXV, Heft, 2 und 3.
———. ———. Beiblätter, Band XII, Stück, 9 und 10.
———. Litterarisches Centralblatt,—Nrn, 37—40, 1888.
Leyden. Internationales Archiv für Ethnographie,—Band I, Heft, V.
London. The Annals and Magazine of Natural History,—Vol. II (sixth series), No. 10, October, 1888.
———. The Chemical News,—Vol. LVIII, Nos. 8—11.
———. The Entomologist,—Vol. XXI, No. 305, October, 1888.
———. The Entomologist's Monthly Magazine,—Vol. XXV, No. 293, October, 1888.
———. The Journal of Botany,—Vol. XXVI, No. 310, October, 1888.
———. The London, Edinburgh, and Dublin Philosophical Magazine,—Vol. XXVI (Fifth series), August, 1888, No. 161, October, 1888.
———. The Messenger of Mathematics,—Vol. XVIII (new series) No. 4.
———. The Nineteenth Century,—Vol. XXIV, No. 141, November, 1888.
———. The Quarterly Journal of pure and applied Mathematics,—Vol. XXIII, No. 91, October, 1888.
———. The Society of Arts,—Journal, Vol. XXXVI, Nos. 1874—1877.
Paris. L' Académie des Sciences,—Comptes Rendus des Séances, Tome CVII, Nos. 10—12.
———. Revue Critique d' Histoire et de Littérature,—Tome XXVI, Nos. 36—39.
———. Revue Scientifique,—Tome XLII (3rd series), Nos. 15—18.
Philadelphia. Manual of Conchology,—Vol. X, No. 2, and Vol. IV, 2nd series, No. 2.

INDEX

TO THE

PROCEEDINGS, ASIATIC SOCIETY OF BENGAL

FOR 1888.

LIST OF MEMBERS

OF THE

ASIATIC SOCIETY OF BENGAL.

ON THE 31ST DECEMBER 1887.

COUNCIL AND OFFICERS FOR 1887.

PRESIDENT.

E. F. T. Atkinson, Esq., B. A., C. S.

VICE-PRESIDENTS.

Rájá Rájendralála Mitra, C.I.E., D.L.
Lt.-Col. J. Waterhouse, B. S. C.
J. Wood-Mason, Esq.

SECRETARIES AND TREASURER.

J. Wood-Mason, Esq.
Dr. A. F. R. Hoernle.
H. M. Percival, Esq., M. A.
A. Pedler, Esq., F. C. S.

OTHER MEMBERS OF COUNCIL.

D. Waldie, Esq., F. C. S.
C. H. Tawney, Esq., M. A.
Babu Pratápchandra Ghosha, B. A.
Hon: Dr. Mahendralál Sarkár, C. I. E.
E. Gay, Esq., M. A.
Pandit Mahámahopádhyáya Maheschandra Nyáyaratna, C. I. E.
H. Beveridge, Esq., C. S.
A. Simson, Esq.
Nawab Abdul Latif Bahadur, C. I. E.
W. King, Esq., B. A., D. Sc.

LIST OF ORDINARY MEMBERS.

R. = Resident. N. R. = Non-Resident. A. = Absent. N. S. = Non-Subscribing.
L. M. = Life Member. F. M. = Foreign Member.

N. B.—Members who have changed their residence since the list was drawn up are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alteration may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the Secretaries.

Members who are about to leave India and do not intend to return are particularly requested to notify to the *Secretaries* whether it is their desire to continue members of the Society; otherwise, in accordance with Rule 40 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.	R.	Abdul-Latíf, C. I. E., Nawab Bahádur. *Calcutta.*
1885 Mar. 4.	R.	Abdur Rahmán, A.F.M., Barrister-at-Law. *Calcutta.*
1860 July 4.	N.R.	Ahmad Khán, Bahádur, Hon. Sayyid, K. C. S. I. *Aligark.*
1872 April 3.	N.R.	Ashán-ullah, Nawáb. *Dacca.*
1860 April 4.	A.	Aitchison, J. E. T., M. D., C. I. E., Secretary to the Surgeon-General, H. M.'s Forces, Bengal. *Europe.*
1884 Mar. 5.	L.M.	Ali, Sir Ali Kadar Syud Hassan, K. C. I. E., Bahadur. *Murshedabad.*
1874 June 3.	R.	Amír Alí, C. I. E., Syud, Barrister-at-Law. *Calcutta.*
1865 Jan. 11.	F.M.	Anderson, John, M. D., F. R. S., F. L. S., Superintendent, Indian Museum. *Europe.*
1884 Sept. 3.	R.	Anderson, J. A. *Calcutta.*
1887 June 1.	R.	Apjohn, J. H., M. I. C. E., P. W. Dept. *Calcutta.*
1887 May 4.	R.	Atkinson, Rev. Augustus W., M. A., Principal, La Martiniere. *Calcutta.*
1871 Sept. 6.	R.	Atkinson, Edwin Felix Thomas, B. A., C. S., Acct.-General, Bengal. *Calcutta.*
1869 Feb. 3.	N.R.	Attar Singh Bahádur, Sirdár, C. I. E., M. U. F., Chief of Bhadour. *Ludiana.*
1870 Feb. 2.	L.M.	Baden-Powell, Baden Henry, C. S., C. I. E., Offg. Judge, Chief Court of the Panjab. *Lahore.*
1862 Feb. 5.	R.	Baisák, Gaurdás. *Calcutta.*
1865 Nov. 7.	N.S.	Ball, Valentine, M. A., F. R. S., F. G. S. *Europe.*

Date of Election.		
1862 Aug. 1.	R.	Barclay, Arthur, M. B., Surgeon Major. Sec. to Surgeon General and Sanitary Commissioner with the Govt. of India. *Calcutta.*
1869 Dec. 1.	L.M.	Barker, R. A., M. D., Civil Surgeon. *Serampore.*
1877 Jan. 17.	N.R.	Barman, Kishor Kumár Rádhá Dev, Juvráj of Hill Tipperah. *Tipperah.*
1885 Nov. 4.	R.	Barman, Dámudar Dás. *Calcutta.*
1885 Aug. 5.	R.	Barnett, John, Bengal Pilot Service. *Calcutta.*
1881 Aug. 3.	N.R.	Barstow, Henry Clements, C. S., Magistrate and Collector. *Cawnpore.*
1886 Jan. 6.	R.	Barnes, Frederick Carnac. *Calcutta.*
1887 Aug. 3.	R.	Basu, Haricharan. *Calcutta.*
1886 June 2.	F.M.	Baumgarten, Casper Wilhelm. *Batavia.*
1873 Feb. 5.	A.	Bayne, R. R., M. R. I. B. A., Chief Engineer's Office, E. I. Railway. *Europe.*
1864 Sept. 7.	N.R.	Beames, John, B. C. S., Commissioner, Bhaugulpur Division. *Bhaugulpur.*
1878 Sept.25.	N.R.	Beighton, T. D., C. S., Offg. Judge. *Dacca.*
1862 Oct. 8.	A.	Bernard, Sir Charles Edward, K. C. S. I., C. S., *Europe.*
1876 Nov.15.	R.	Beveridge, Henry, C. S., District and Sessions Judge. *Alipur.*
1878 Oct. 4.	R.	Bhakta, Krishna Gopál. *Calcutta.*
1879 Mar. 5.	N.R.	Biddulph, Lt.-Col. J., B. S. C. *Deoli.*
1884 Jan. 2.	N.R.	Bidie, G., Brigade-Surgeon, M. B., F. L. S., C. I. E., Supdt., Govt. Central Museum. *Madras.*
1884 Feb. 6.	N.R.	Bigg-Wither, Major A. C., B. A., A. I. C. E. *Quetta.*
1885 Jan. 7.	N.R.	Bignold, T. F., C. S., Dist. and Sessions Judge. *Sooree.*
1885 Mar. 4.	N.R.	Bilgrámi, Syud Ali, B. A., A. R. S. M., F. G. S. *Hyderabad.*
1886 Aug. 4.	N.R.	Bingham, Capt. Charles Thomas, B. S. C., Deputy Conservator of Forests. *Burmah.*
1857 Mar. 4.	L.M.	Blanford, H. F., A. R. S. M., F. R. S., F. G. S. Meteorological Reporter, Govt. of India. *England.*
1859 Aug. 3.	L.M.	Blanford, W. T., A. R. S. M., F. R. S., F. G. S., F. R. G. S., F. Z. S. *London.*
1879 Aug.28.	R.	Blyth, W. D., M. A., LL. D., C. S., Inspector General of Registration. *Calcatta.*
1885 Mar. 4.	N.R.	Bolton, C. W., C. S., Magte. and Collector. *Durbhanga.*
1880 Nov. 3.	N.R.	Bose, Pramatha Náth, B. SC., F. G. S., Geological Survey of India. *Raipur, C. P.*
1876 Nov.15.	A.	Bowie, Major M. M. *Europe.* [*Bankipur.*
1868 Jan. 15.	N.R.	Boxwell, John, C. S., Offg. Commr., Patna Divn.
1876 May 4.	N.R.	Bradshaw, Deputy Surgeon-General A. F., A. M. D. *Rawal Pindi.*
1860 Mar. 7.	L.M.	Brandis, Sir Dietrich, K. C. I. E., C. I. E., PH. D., F. L. S., F. R. S. *Europe.*

Date of Election.		
1887 May 4.	R.	Burál, Nobinchánd, Solicitor. *Calcutta.*
1879 April 2.	R.	Calcutta, The Rt. Rev. the Lord Bishop of. *Calcutta.*
1880 Mar. 3.	N.R.	Carlleyle, A. C., Archæological Survey of India. *Allahabad.*
1881 Feb. 2.	N.R.	Carter, Philip John, Deputy Conservator of Forests. *Rangoon.*
1876 Nov.15.	A.	Cayley, Surgeon-Major H. *Europe.*
1885 April 1.	N.R.	Chambers, J. W. *Narainganj.*
1881 Mar. 2.	A.	Channing, Francis Chorley, B. C. S. *Europe.*
1880 May 5.	N.R.	Chatterji, Tárá Prasáda, Deputy Magte. *Maunbhum.*
1880 Jan. 7.	R.	Chaudhuri, Govinda Kumár. *Calcutta.*
1861 Mar. 1.	N.R.	Chaudhuri, Haranchandra, Zamindar. *Sherpur, Mymensingh.*
1880 Nov. 3.	N.R.	Chaudhuri, Khirod Chandra Rái. Deputy Inspector of Schools, Sonthal Pergunnahs. *Nya Dumka.*
1886 April 7.	N.R.	Chaudhuri, Rádhábállabha. *Sherpur, Mymensingh.*
1885 Feb. 4.	N.R.	Chaudhuri, Rájá Suryakánta, Bahádur. *Mymensingh.*
1885 April 1.	N.R.	Clark, H. Martyn, M. B. *Amritsar.*
1877 Aug.30.	F.M.	Clarke, Major Henry Wilberforce, R. E. *Europe.*
1880 Aug.26.	F.M.	Clerk, Lieut.-Colonel Malcolm G. *Europe.*
1881 May 4.	N.R.	Cockburn, John, Asst. Sub-Depy. Opium Agent. *Karwi, Banda, N. W. P.*
1884 April 2.	N.R.	Cole, Major H. H., R. E. *Mhow.*
1886 Aug.26.	F.M.	Condenhove, Count H., Attaché Austro-Hungarian Legation. *Constantinople.*
1874 Nov. 4.	N.R.	Constable, Archibald, Resident Engineer and Personal Asst. to Chief Engineer, Oudh and Rohilkund Railway. *Lucknow.*
1884 Aug. 6.	R.	Cotes, E. C., Indian Museum. *Calcutta.*
1876 Mar. 1.	N.R.	Crawfurd, James, B. A. C. S., Barrister-at-Law, Offg. District and Sessions Judge. *Nuddea.*
1887 Aug.25.	R.	Criper, William Risdon, F. C. S., F. I. C., A. R. S. M. *Kasipur.*
1877 June 6.	R.	Croft, The Hon. Sir A. W., K. C. I. E., M. A., Director of Public Instruction, Bengal. *Calcutta.*
1874 Mar. 4.	N.R.	Crombie, Alexander, M. D., Civil Surgeon. *Dacca.*
1873 Aug. 6.	A.	Cunningham, David Douglas, Surgeon-Major. Honorary Surgeon to the Viceroy. *Europe.*
1873 Dec. 3.	N.R.	Dames, Mansel Longworth, C. S., Asst. Commissioner. *Dera Ismail Khan.*
1877 June 6.	N.R.	Darbhanga, Sir Luchmessur Sing, K. C. I. E., Bahádur, Mahárájá of. *Darbhanga.*
1865 June 7.	N.R.	Dás, Rájá Jaykrishna, Bahádur, C. S. I. *Bijnor.*
1879 April 7.	N.R.	Dás, Rám Saran, M. A., Secy., Oudh Commercial Bank, Limited. *Fyzabad, Oudh.*
1869 April 7.	F.M.	Day, Dr. Francis, F. L. S., F. Z. S. *Europe.*
1885 May 6.	N.R.	Dé, Kumár Baikuntanáth. *Balasore.*

Date of Election.		
1885 Mar. 4.	R.	Deb, Kumár Nilkrishna, Bahádur. *Calcutta.*
1859 Oct. 6.	N.R.	Delmerick, J. G., Extra Assistant Commissioner. *Mussoorie.*
1887 Oct. 6.	R.	Deva, Kumár Vinaya Khrishna, Bahádur. *Calcutta.*
1862 May 7.	N.R.	Dhanapati Singh Dughar, Raí Bahádur. *Azimganj.*
1877 July 4.	R.	Diler Jang, Nawáb Syad Ashgar Alí, Khan Bahadur, C. S. I. *Calcutta.*
1886 June 2.	R.	Doyle, Patrick, C. E., F. G. S., M. R. A. S. *Calcutta.*
1887 Nov. 2.	N.R.	Driver, Walter Henry Parker. *Ranchi, Lohardugga.*
1879 Feb. 5.	N.R.	Duthie, J. F., Director, Government Botanical Survey, Northern India. *Saharanpur.*
1877 Aug.30.	R.	Dutt, Kedárnáth, Depy. Collector. *Calcutta.*
1870 Mar. 9.	L.M.	Edinburgh, H. R. H. The Duke of. *Europe.*
1863 May 6.	R.	Edgar, John Ware, C. S. I., C. S. Secretary, Government of Bengal. *Calcutta.*
1874 Dec. 2.	A.	Egerton, The Hon. Sir Robert Eyles, K. C. S. I., C. I. E., C. S. *Europe.*
1871 Dec. 2.	R.	Eliot, J., M. A., Meteorological Reporter to the Govt. of Bengal. *Calcutta.*
1886 Jan. 6.	R.	Elson, Samuel R. Bengal Pilot Service. *Calcutta.*
1863 Jan. 15.	N.R.	Fedden, Francis, Deputy Superintendent, Geological Survey of India. *Vizagapatam.*
1876 Jan. 5.	F.M.	Feistmantel, Ottokar, M. D. *Europe.*
1880 April 7.	A.	Fiddian, W., M. A., C. S., *Europe.*
1879 July 2.	R.	Finucane, M., C. S., Director of Agriculture, Bengal. *Calcutta.*
1869 Sept. 1.	A.	Fisher, John Hadden, C. S. *Europe.*
1886 April 7.	F.M.	Fleet, John Faithfull, C. I. E., C. S. *Europe.*
1876 July 5.	N.R	Foulkes, The Rev. Thos. F. L. S., M. R. A. S., F. R. G. S., Chaplain. *Salem, Madras Presy.*
1869 Sept. 1.	A.	Fryer, Colonel G. E., M. S. C. *Europe.*
1880 April 7.	N.R.	Gajapati, Ánanda Rám, K. C. I. E., Rájá of Vizianagram. *Vizianagram.*
1873 Dec. 3.	A.	Gamble, J. S., M. A., Conservator of Forests, Northern Circle, Madras. *Europe.*
1883 Aug. 1.	N.R.	Garga, Kumár Isvariprasád, Zemindar. *Maisádal.*
1859 Aug. 3.	L.M.	Gastrell, Major-General James Eardley. *Europe.*
1867 Dec. 4.	R.	Gay, E., M. A., F. R. A. S., Comptroller-General. *Calcutta.*
1883 Aug.30.	R.	Ghose, Manmohan. *Calcutta.*
1871 May 3.	R.	Ghosha, Káliprasanna. *Calcutta.*
1869 Feb. 3.	R.	Ghosha, Pratápchandra, B. A. *Calcutta.*
1884 Dec. 3.	N.R.	Giles, George M., M. B., F. R. C. S., Surgeon, Naturalist, S. S. "Investigator." *Sandoway.*
1886 Sept.30.	N.R.	Gimlette, George Hart Desmond, Surgeon, Bengal

Date of Election.		
		Medical Service, M. D., M. CH., M. R. C. S., L. S. A., Goona Political Agency. *Central India.*
1861 Feb. 5.	N.S.	Godwin-Austen, Lieut.-Colonel H. H., F. R. S., F. Z. S., F. R. G. S. *Europe.*
1882 May 3.	R.	Golám Sarwar, Maulaví. *Calcutta.*
1881 Mar. 2.	R.	Gosáin, Hem Chunder. *Calcutta.*
1863 Nov. 4.	F.M.	Gowan, Major-General J. Y. *Europe.*
1879 Jan. 8.	R.	Gowan, Major W. E. *Calcutta.*
1877 Nov. 7.	L.M.	Grant, Alexander, M. I. C. E. *Europe.*
1876 Nov. 15.	N.R.	Grierson, George Abraham, C. S. *Gya.*
1885 Dec. 2.	N.R.	Griesbach, C. L., C. I. E., F. G. S., Deputy Superintendent Geological Survey of India.
1861 Sept. 4.	N.R.	Griffin, Sir Lepel Henry, C. S., K. C. S. I., Agent Governor General, Central India. *Indore.*
1861 Feb. 6.	N.R.	Growse, Frederick Salmon, M. A., C. S., C. I. E., Magistrate and Collector. *Fatehgarh, N.-W. P.*
1886 Mar. 3.	N.R.	Gupta Ashootosh, C. S., Assistant Magistrate and Collector. *Munshigunge, Dacca.*
1880 Feb. 4.	N.R.	Gupta, Behárilál, C. S. *Furreedpore.*
1883 June 6.	N.R.	Gurdyál Singh, Sirdár, C. S., Asst. Commissioner, *Dera Ghazi Khan, Panjab.*
1867 July 3.	N.R.	Hacket, Charles Augustus, Deputy Superintendent Geol. Survey of India. *Camp Abu, Rajputana.*
1883 Jan. 3.	N.R.	Harding, Francis Henry, B. A., C. S. *Chittagong.*
1879 Mar. 5.	A.	Harraden, S. *Europe.*
1877 Sep. 27.	R.	Hart, J., Attorney-at-Law. *Calcutta.*
1875 Mar. 3.	N.R.	Hendley, Surgeon Major Thomas Holbein. *Jeypore.*
1883 May 2.	N.R.	Hill, Samuel, Alexander, B. SC., A. R. S. M., F. C. S., Prof. of Physical Science, Muir College and Meteor. Reporter to Govt., N.-W. P. and Oudh. *Allahabad.*
1872 Dec. 5.	R.	Hoernle, Rev. A. F. R., PH. D., Principal of the Calcutta Madrasah. *Calcutta.*
1878 Mar. 6.	N.R.	Hoey, W., C. S. *Etawah.*
1886 June 2.	R.	Hogg, Alexander. *Calcutta.*
1884 Mar. 5.	N.R.	Hooper, John, C. S., Settlement Officer. *Basti, N.-W. P.*
1873 Jan. 2.	L.M.	Houstoun, G. L., F. G. S. *Europe.*
1863 Jan. 15.	N.R.	Howell, Mortimer Sloper, C. S. *Moradabad, N.-W. P.*
1878 Sep. 25.	N.R.	Hughes, G., C. S., Deputy Commissioner. *Jhang.*
1867 Aug. 7.	N.R.	Hughes, T. W. H., A. R. S. M., F. G. S., Superintendent Geol. Survey of India. *Kutni, E. I. R.*
1866 Jan. 17.	A.	Hughes, Major W. G., M. S. C. *Europe.*
1870 Jan. 5.	N.R.	Hume, Allan Octavian, C. B., C. S. *Allahabad.*
1884 May 2.	N.R.	Hussein, Syud, B. A., Secy. to Nizam of Hydorabad's Council.

Date of Election.		
1872 Dec. 4.	F.M.	Ibbetson, Denzil Charles Jelf, C. S., Deputy Commissioner. *Europe.*
1866 Mar. 7.	N.R.	Irvine, William, C. S., Magistrate and Collector. *Ghazipur.*
1884 May 2.	N.R.	Iskander Ali Mirza, Prince. *Murshedabad.*
1880 Dec. 1.	A.	Jackson, William Grierson, B. C. S. *Europe.*
1869 Aug. 4.	R.	Jahán Qadr Muhammad Wáhid Alí, Bahádur, Prince. *Garden Reach, Calcutta.*
1876 July. 5.	A.	Jarrad, Lieut. F. W., R. N., F. R. A. S., Marine Survey Dept. *Europe.*
1879 Mar. 5.	R.	Jarrett, Lt.-Col. H. S., B. S. C., Secy. to the Board of Examiners. *Calcutta.*
1881 Feb. 2.	A.	Jenkins, Major Thomas Morris, M. S. C., Deputy Commissioner. *Europe.*
1862 Mar. 5.	A.	Johnstone, Colonel James William Hope. *Europe.*
1867 Dec. 4.	A.	Johnstone, Col. Sir James, K. C. S. I., C. S. I. *Europe.*
1873 Dec. 3.	N.R.	Johore, H. H. the Mahárájá of, K. C. S. I. *New Johore, Singapore.*
1884 Aug. 6.	R.	Jones, E, J., Geol. Survey of India. *Calcutta.*
1875 Nov. 3.	N.R.	Jones, S. S., B. A., C. S. *Murshedabad.*
1882 Mar. 1.	N.R.	Kennedy, Pringle, M. A. *Mozufferpur.*
1874 Dec. 2.	N.R.	Khudá Baksh, Khán Bahádur, Maulaví. *Bankipur.*
1884 Nov. 5.	A.	Kitts, Eustace John, C. S. *Europe.*
1867 Dec. 4.	R.	King, G. M. B., F. L. S., Supdt., Royal Botanic Garden. *Sibpur.*
1881 Mar. 2.	N.R.	King, Lucas White, B. A., LL. B., C. S., Assistant Agent to the Governor General, Central India. *Indore.*
1862 Jan. 15.	R.	King, W., B. A., D. SC., Director, Geol. Survey of India. *Calcutta.*
1880 Dec. 1.	A.	Kirton, Brigade Surgeon William Henry, F. L. S., Medical Store-Keeper. *Europe.*
1880 Jan. 7.	R.	Kisch, H. M., M. A., C. S. Post Master General, Bengal. *Calcutta.*
1887 May 4.	L.M.	Lanman, Charles R. Corresponding Secretary of the American Oriental Society, Professor of Sanskrit in Harvard College. *Cambridge, Mass. U. S, America.*
1877 Sep. 27.	N.R.	La Touche, James John Digges, B. A., C. S., *Menbu, Upper Burma.*
1881 Feb. 2.	R.	Laughlin, Robert Campbell, Asst. Supdt., Govt. Telegraph Department. *Calcutta.*
1881 Mar. 2.	N.R.	Lee, J. Bridges, M. A., F. G. S., F. C. S., F. Z. S., Barrister-at-Law. *Lahore.*
1880 July 7.	A.	Lewis, Rev. Arthur, B. A., Vice-Principal, St. John's Divinity School. *Europe.*

Date of Election.		
1873 Feb. 5.	A.	Lewis, Timothy Richards, M. B., Special Asst. to the Sanitary Commissioner with the Government of India. *Europe.*
1886 Sep. 30.	N.R.	Luson, Hewling, C. S., Assistant Magistrate. *Shahabad.*
1869 July 7.	N.R.	Lyall, Charles James, B. A., C. S. *Shillong.*
1870 April 7.	L.M.	Lyman, B. Smith. *Philadelphia, Pa., U. S., America.*
1884 Dec. 3.	N.R.	McCabe, R. B., C. S., Deputy Commissioner, Naga Hills. *Assam.*
1868 Dec. 2.	N.R.	Macauliffe, Michael, B. A., C. S., Judicial Assistant Commissioner. *Sialkot.*
1886 June 2.	R.	Macdonald, A., Editor, "Englishman." *Calcutta.*
1880 June 2.	F.M.	MacDonald, James, C. E. *Scotland.*
1884 Mar. 5.	N.R.	Macdonnell, A. P., B. A., C. S., Secy., Govt. of India, Home Dept. *Calcutta.*
1879 Feb. 5.	A.	Macgregor, Major C. R., F. R. G. S., 44th N. I. *Europe.*
1848 April 5.	L.M.	Maclagan, General Robert, R. E., F. R. S. E., F. R. G. S. *Europe.*
1873 Dec. 3.	R.	MacLeod, Surgeon-Major Kenneth, M. D. *Calcutta.*
1880 May 5.	N.R.	MacLeod, Roderick Henry, B. C. S., Asst. Magte. *Kasia, Gorakpur, N.-W. P.*
1881 July 6.	R.	Mahomed Firukh Sháh, Prince. *Calcutta.*
1886 Jan. 6.	N.R.	Mahomed Latif Khán, Sayyid, Khán Bahádur. *Ferozpur, Panjab.*
1882 Aug. 2.	R.	Mahomed Yusoof, Hon. Maulaví. *Calcutta.*
1867 April 3.	R.	Mainwaring, Major-General George Byres, S. C. *Serampur.*
1878 April 3.	A.	Mallet, F. R., F. G. S., F. C. S., Superintendent, Geological Survey of India. *Europe.*
1869 Sept. 1.	R.	Mallik, Yadulál. *Calcutta.*
1880 May 5.	N.R.	Mandlik, The Hon. Ráo Sáhib Visvanáth Náráyana, C. S. I. *Bombay.*
1869 July 7.	N.R.	Markham, Alexander Macaulay, C. S., F. R. G. S., Collector. *Banda.*
1886 Aug. 26.	N.R.	Meade, Capt. Malcolm John, S. C., Assistant Agent, Governor-General. *Rajputana.*
1860 Mar. 7.	A.	Medlicott, H. B., M. A., F. R. S., F. G. S. *England.*
1877 Mar. 7.	N.R.	Medlycott, Rev. Adolphus Edwin, PH. D., Military Chaplain. *Ferozepur, Panjab.*
1886 Mar. 3.	R.	Mehta, Roostumjee Dhunjeebhoy. *Calcutta.*
1884 Nov. 5.	N.R.	Middlemiss, C. S., A. B., Assistant Superintendent, Geological Survey of India. *Chakrata, N.-W. P.*
1871 Sept. 6.	N.R.	Miles, Lieut.-Colonel S. B., S. C., Political Agent. *Udaipur.*
1884 Sept. 3.	R.	Miles, William Harry. *Calcutta.*
1870 July 6.	R.	Miller, A. B., B. A., Barrister-at-Law, Official Assignee. *Calcutta.*

Date of Election.		
1874 May 6.	N.R.	Minchin, F. J. V. *Aska, Ganjam.*
1875 Aug. 4.	A.	Minchin, Colonel, C. C. *Europe.*
1856 Mar. 5.	R.	Mitra, Rájá Rájendralála, LL. D., C. I. E. *Calcutta.*
1876 Dec. 6.	F.M.	Mockler, Lt.-Col. E., British Consul. *Muscat, Persian Gulf.*
1886 May 5.	N.R.	Molesworth, Capt. E. H., Commandant, Police Levy, *Dibrugarh.*
1883 Dec. 12.	N.R.	Möller, Otto Chrestien. *Tukvar, Darjeeling.*
1881 May 4.	N.R.	Molloy, Major Edward, 5th Goorkhas. *Abbottabad, Hazara, Panjab.*
1884 April 2.	R.	Mondy, Edmund F., Civil Engineering Coll. *Sibpur.*
1881 Dec. 7.	N.R.	Monteath, J. J., M. D., Surgeon Major. *Kohima, Naga Hills.*
1864 Nov. 2.	N.R.	Muir, J. W., M. A, C. S. *Mirzapore.*
1879 May 7.	R.	Mukerjea, Bhudeva, C. I. E. *Calcutta.*
1867 Mar. 6.	R.	Mukerjea, Raja, The Hon. Pearimohan, C. S. I., M. A. *Uttarpara.*
1885 July 1.	R.	Mukerjea, Nilmani, Professor, Sanskrit College. *Calcutta.*
1886 May 5.	R.	Mukhopádhyáya, Asutosh, M. A., F. R. A. S., F. R. S. E. *Bhowanipur, Calcutta.*
1887 May 4.	R.	Munro, Thomas R., Port Commissioner's Department. *Calcutta.*
1885 June 3.	N.R.	Naemwoollah, Maulaví, Depy. Magte. *Bulandshahr.*
1887 June 1.	N.R.	Narain, Ráo Govind Ráo. *Allahabad.*
1876 May 4.	R.	Nash, A. M., M. A., Inspector of European Schools, Bengal. *Calcutta.*
1881 Nov. 2.	R.	Nicéville, L. de., F. E. S. *Calcutta.*
1887 April 6.	R.	Noetling, Fritz. Ph. D. Palæontologist to the Geological Survey of India. *Calcutta.*
1869 July 7.	N.R.	Nursing Rao, A. V. *Vizagapatam.*
1885 Feb. 4.	R.	Nyáyaratna, Pandit Mahámahopádhyáya Maheschandra. *Calcutta.*
1879 Aug. 28.	N.R.	Oldham, Brigade-Surgeon C. F., F. R. G. S. *Dharamsalla.*
1883 Dec. 1.	N.R.	Oldham, R. D., A. R. S. M., F. G. S., Deputy Superintendent, Geol. Sur. of India. *Saharanpur.*
1883 Aug. 30.	N.R.	Oliver, Edw. Emmerson, M. I. C. E., Under-Secy. to Govt. Panjab, P. W. D. *Lahore.*
1885 Feb. 4.	N.R.	Oliver, James William, Forest Dept. *Tharrawaddy, Burmah.*
1887 July 6.	R.	Oung, Moung Hla, Financial Department, Government of India. *Calcutta.*
1880 Aug. 4.	L.M.	Pandia, Pandit Mohanláll Vishnuláll, F. T. S., Member and Secy., Royal Council of Meywar. *Udaipur.*
1880 Jan. 7.	N.R.	Pargiter, Frederick E., B. A., C. S. *Jessore.*

Date of Election.		
1880 Jan. 7.	A.	Parry, J. W., C. E., ASSOC. M. I. C. E., Asst. Egineer. *Europe.*
1862 May 7.	L.M.	Partridge, Surgeon-Major Samuel Bowen, M. D. *Europe.*
1871 Dec. 6.	N.R.	Peal, S. E. *Sibsagar, Assam.*
1860 Feb. 1.	F.M.	Pearse, General Geo. Godfrey, C. B., R. H. A., Godfrey House. *Cheltenham, England.*
1873 Aug. 6.	R.	Pedler, Alexander, F. C. S., Professor of Chemistry, Presidency College. *Calcutta.*
1864 Mar. 2.	A.	Pellew, Fleetwood Hugo, C. S. *Europe.*
1865 Sept. 6.	N.R.	Peppé, T. F. *Shahabad.*
1881 Aug.25.	R.	Percival, Hugh Melvile, M. A., Professor, Presidency College. *Calcutta.*
1877 Aug. 1.	N.R.	Peters, C. T., M. B., Surgeon-Major. *Bombay.*
1868 May 6.	N.R.	Peterson, F. W., F. C. S. *Bombay.*
1887 Mar. 2.	R.	Pope, T. A. Assistant Superintendent, Survey of India Department. *Calcutta.*
1881 Feb. 2.	R.	Prideaux, Lieut.-Colonel William Francis, B. S. C. *Calcutta.*
1880 April 7.	N.R.	Rai, Bipina Chandra, B. L. *Rungpore.*
1887 May 4.	R.	Ráy, Prasannakumár, D. Sc., (Lond. and Edin) Professor, Presidency College, Registrar, Calcutta University. *Calcutta.*
1880 Aug. 4.	A.	Reynolds, Herbert William Ward, C. S. *Europe.*
1884 Mar. 5.	N.R.	Risley, H. H., B. A., C. S. *Darjeeling.*
1860 Jan. 3.	N.R.	Rivett-Carnac, John Henry, C. S., C. I. E., F. S. A., Opium Agent. *Ghazipur.*
1878 Sep.25.	A.	Robertson, Rev. J. *Europe.*
1865 Feb. 1.	A.	Robinson, S. H. *Europe.*
1881 Aug.30.	N.R.	Roy, Nanda Kumár. *Giridhi.*
1885 Mar. 4.	R.	Rustomjee, H. M. *Calcutta.*
1880 Sep.30.	A.	Sage, E. M., Asst. Engineer, P. W. D. *Europe.*
1887 June 1.	R.	Sandberg, Rev. Graham, B. A., Barrister-at-Law, Inner Temple, Junior Chaplain, Bengal Establishment. *Calcutta.*
1877 May 2.	N.R.	Sandford, W. *Somastipur, Tirhoot.*
1872 Dec. 4.	R.	Sarasvati, Prannáth, Pandit, M. A., B. L. *Bhowanipur.*
1867 April 3.	R.	Sarkár, The Hon. Dr. Mahendralál, C. I. E. *Calcutta.*
1885 Mar. 4.	R.	Sarvádhikári, Rájakumár. *Calcutta.*
1885 Feb. 4.	R.	Sástri, Haraprasád, M. A. *Calcutta.*
1870 May 4.	A.	Schlich, Dr. W. *Europe.*
1884 April 2.	A.	Scotland, John Parry, C. E., Ex. Engineer. *England.*
1874 July 1.	R.	Scully, Dr. John. *H. M.'s Mint, Calcutta.*
1886 Mar. 3.	N.R.	Sen, Hirálál, Excise Department. *Mozufferpur.*
1885 April 1.	N.R.	Sen, Yadunáth. *Khurda, Puri.*

Date of Election.		
1885 April 1.	R.	Sen, Narendranáth. *Calcutta.*
1879 Jan. 8.	N.R.	Sewell, R., M. C. S. *Madras.*
1879 May 7.	A.	Sheridan, C. J., C. E. *Europe.*
1881 Mar. 2.	N.R.	Shopland, E. R., Indian Marine, Port Officer. *Akyab.*
1882 May 3.	N.R.	Shyamaldáss, Mahámahopádhyáya Kaviráj, Private Secy. to H. H. the Maháráná of Udaipur. *Udaipur.*
1878 April 3.	R.	Simson, A. *Calcutta.*
1887 April 6.	R.	Simpson, Dr. W. J., Health Officer to the Municipal Corporation. *Calcutta.*
1884 Sep. 3.	R.	Singh, Kumár Indrachandra, of Paikparah. *Calcutta.*
1853 Dec. 7.	N.R.	Singh, Mahárájá Isvariprashád, C. S. I. *Benares.*
1885 April 1.	R.	Singh, Kumár Saratchunder. *Calcutta.*
1882 June 7.	N.R.	Singh, Mahárájá Kumár Harendra Kishore. *Bettiah.*
1878 Oct. 4.	N.R.	Singh, Rájá Lachman. *Bulandshahr.*
1882 Aug. 2.	N.R.	Singh, Narain, Rájá Rám. *Khyrah, Monghyr.*
1880 June 2.	N.R.	Singh, Thákur Garuradhawaya Prasád, Rájá of Beswan, Beswan Fort. *Aligarh.*
1859 Aug. 3.	R.	Siñha, Baláichánd. *Calcutta.*
1872 Aug. 5.	N.R.	Skrefsrud, Rev. L. O., Indian Home Mission to the Santháls. *Rampur Hát.*
1885 Nov. 4.	F.M.	Smith, N. F. F. *England.*
1874 June 3.	A.	Smith, Vincent Arthur, C. S., Settlement Officer. *England.*
1887 April 6.	R.	Spring, F. J. E., L. C. E., Mem. Inst. C. E., Under Sec., Govt. of Bengal, P. W. Department. *Calcutta.*
1872 July 3.	N.R.	Stephen, Carr, B. L., Judl. Asst. Commr. *Jullundur Cantonnent.*
1879 Oct. 2.	N.R.	Sterndale, R. A., F. R. G. S., Asst. Commr. of Currency. *Madras.*
1882 May 3.	A.	Stewart, H. E. Sir Donald M., Bart., G. C. B., G. C. S. I. *Europe.*
1876 Aug. 2.	N.R.	St. John, Lieut.-Col. Sir Oliver Beauchamp, R. E., K. C. S. I., Agent, Governor-General. *Baroda.*
1880 Nov. 3.	N.R.	Sturt, Lieut. Robert Ramsay Napier, B. S. C., Panjab Frontier Force. *Kohat.*
1884 Mar. 5.	N.R.	Swinhoe, Lieut.-Col. C., B. S. C., Asst. Comy. Genl. *Poona.*
1864 Aug. 11.	R.	Swinhoe, W., Attorney-at-Law. *Calcutta.*
1880 Nov. 3.	A.	Swynnerton, Rev. Charles. *England.*
1868 June 3.	R.	Tagore, The Hon. Mahárájá Jotendra Mohun, K.C.S.I. *Calcutta.*
1865 Sept. 6.	R.	Tawney, C. H., M. A., Principal, Presidency College. *Calcutta.*
1874 Mar. 4.	A.	Taylor, Commander A. D., late Indian Navy. *Europe.*

Date of Election.		
1884 May 5.	N.R.	Taylor, W. C., Settlement Officer. *Khurda, Orissa.*
1860 May 2.	A.	Temple, Sir R., Bart, K. C. S. I., C. I. E. *Europe.*
1878 June 5.	N.R.	Temple, Capt. R. C., S. C. *Palace, Mandalay, Upper Burma.*
1876 Feb. 2.	A.	Tennant, Major-General James Francis, R. E., F. R. S., C. I. E., Mint Master. *Europe.*
1875 June 2.	N.R.	Thibaut, Dr. G., Principal, Sanskrit College. *Benares.*
1886 Aug. 4.	R.	Thomas, Robert Edmond Skyring. *Calcutta.*
1886 Jan. 6.	N.R.	Thomson, Colonel, W. B., B. S. C. *Kashmir.*
1847 June 2.	L.M.	Thuillier, Major-Genl. Sir Henry Edward Landor, R. A., C. S. I., F. R. S. *Europe.*
1883 June 6.	N.R.	Toker, Lieut.-Col. Alliston Champion, B. S. C., C. B., Sec., Govt. of India, Military Dept. *Calcutta.*
1871 April 5.	F.M.	Trefftz, Oscar. *Europe.*
1861 June 5.	L.M.	Tremlett, James Dyer, M. A., C. S., Judge, Chief Court. *Lahore.*
1872 July 3.	A.	Trevor, Colonel William Spottiswoode, R. E., *Europe.*
1880 Mar. 3.	N.R.	Tufnell, Capt. R. H. C., M. S. C., F. Z. S., 30th M. N. I. *Madras.*
1885 May 6.	R.	Verdeau, Ivan. *Calcutta.*
1886 Sep. 30.	N.R.	Waddell, Dr. Laurence Austine, M. B., Superintendent of Vaccination. *Darjeeling.*
1865 Nov. 1.	R.	Waldie, David, F. C. S. *Calcutta.*
1865 May 3.	R.	Waterhouse, Lt.-Col. James, B. S. C., Dy. Supdt., Survey of India. *Calcutta.*
1887 Oct. 6.	N.R	Watson, Lieut. Edward Yerbury, 5th Madras N. I. *Berhampore, Ganjam.*
1874 July 1.	N.R.	Watt, Dr. George, C. I. E., Reporter on Economic Products. *Calcutta.*
1876 Dec. 6.	R.	Webb, W. T., M. A., Professor, Presidency College. *Calcutta.*
1869 Sept. 1.	N.R.	Westland, Hon. James, C. S., Financial Member of the Governor General's Council. *Calcutta.*
1878 Aug. 29.	A.	Whittall, R., Forest Dept. *Europe.*
1880 Feb. 4.	R.	Wilson, The Hon. Arthur. *Calcutta.*
1878 Mar. 6.	N.R	Wilson, J., C. S., Deputy Commissioner. *Shâhpur, Panjab.*
1870 Jan. 5.	R.	Wood-Mason, James. *Calcutta.*
1873 Aug. 6.	N R.	Woodthorpe, Lieut.-Col. Robert Gossett, R. E., C. B., Deputy Supdt., Survey of India. *Manipur.*

SPECIAL HONORARY CENTENARY MEMBERS.

Date of Election.	
1884 Jan. 15.	James Prescott Joule, Esq., LL. D., F. R. S. *Manchester.*
1884 Jan. 15.	Dr. Ernst Haeckel, Professor in the University of *Jena.*
1884 Jan. 15.	Charles Meldrum, Esq., M. A., F. R. S. *Mauritius.*
1884 Jan. 15.	A. H. Sayce, Esq., Professor of Comp. Philology. *Oxford.*
1884 Jan. 15.	M. Emile Senart, Member of the Institute of France. *Paris.*
1884 Jan. 15.	Sir Monier Monier Williams, *Knt.*, K. C. I. E., C. I. E., M. A., D. C. L., LL. D., Boden Prof. of Sanskrit. *Oxford.*

HONORARY MEMBERS.

1848 Feb. 2.	Sir J. D. Hooker, K. C. S. I., C. B., M. D., D. C. L., F. R. S., F. G. S. *Kew.*
1853 April 6.	Major-General H. C. Rawlinson, K. C. B., D. C. L., F. R. S. *London.*
1858 July 6.	B. H. Hodgson. *Europe.*
1860 Mar. 7.	Professor Max Müller. *Oxford.*
1860 Nov. 7.	Dr. Aloys Sprenger. *Heidelberg.*
1860 Nov. 7.	Dr. Albrecht Weber. *Berlin.*
1868 Feb. 5.	Major-General Sir A. Cunningham, K. C. I. E., C. S. I., C. I. E., R. E. *Europe.*
1868 Feb. 5.	Professor Bápu Deva Sástri. *Benares.*
1872 May 1.	Sir G. B. Airy, K. C. B., M. A., D. C. L., LL. D., F. R. S. *London.*
1872 June 5.	Prof. T. H. Huxley, LL. D., PH. D., F. R. S., F. G. S., F. Z. S., F. L. S. *London.*
1875 Nov. 3.	Dr. O. Böhtlingk. *Leipzig.*
1875 Nov. 3.	Prof. J. O. Westwood. *Oxford.*
1876 April 5.	Col. H. Yule, R. E., C. B. *London.*
1876 April 5.	Dr. Werner Siemens. *Berlin.*
1879 June 4.	Prof. E. B. Cowell, D. C. L. *Cambridge.*
1879 June 4	Dr. A. Günther, V. P. R S. *London.*
1879 June 4.	Dr. J. Janssen. *Paris.*
1879 June 4.	Prof. H. Milne-Edwards. *Paris.*
1879 June 4.	Prof. P. Regnaud. *Lyons.*
1879 June 4.	E. Renan. *Paris.*
1831 Dec. 7.	Professor Hermann L F. Helmholtz. *Berlin.*
1881 Dec. 7.	Dr. Rudolph v. Roth. *Tübingen.*
1881 Dec. 7.	Sir William Thomson, Knt., LL. D., F. R. S., F. R. S. E. *Glasgow.*
1881 Dec. 7.	Professor William Wright, LL. D. *Cambridge.*
1883 Feb. 7.	W. T. Blandford, A. R. S. M., F. R. S., F. G. S., F. R. G. S., F. Z. S. *London.*
1883 Feb. 7.	Alfred Russell Wallace, F. L. S., F. R. G. S. *Godalming.*
1883 Feb. 7.	Prof William Dwight Whitney. *Newhaven, Connecticut, U. S.*

CORRESPONDING MEMBERS.

Date of Election.	
1844 Oct. 2.	Macgowan, Dr. J. *Europe.*
1856 July 2.	Krämer, A. von. *Alexandria.*
1856 „ 2.	Porter, Rev. J. *Belfast.*
1860 Feb. 1.	Baker, The Rev. H. *E. Malabar.*
1861 July 3.	Gösche, Dr. R. *Berlin.*
1862 Mar. 3.	Murray, A., Esq. *London.*
1866 May 7.	Schlagintweit, Prof. E. von. *Berlin.*
1868 Feb. 5.	Holmböe, Prof. *Christiana.*

ASSOCIATE MEMBERS.

1874 April 1.	Lafont, Rev. Fr. E., S. J., C. I. E. *Calcutta.*
1875 Dec. 1.	Bate, Rev. J. D. *Allahabad.*
1875 „ 1.	Maulavi Abdul Hai, Madrasah. *Calcutta.*
1882 June 7.	Giles, Herbert, Esq. *Europe.*
1883 Feb. 7.	Rodgers, C. J. *Amritsar.*
1884 Aug. 6.	Moore, F., F. R. S., F. L. S. *London.*
1885 Dec. 2.	Dr. A. Führer. *Lucknow.*
1886 Dec. 1.	Babu Saratchandra Dás, C. I. E. *Darjeeling.*

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

* *Rule* 40.—After the lapse of 3 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.

The following members will be removed from the next member list of the Society under the operation of the above Rule:

Sir R. Temple.
Brigade Surgeon W. H. Kirton.
Col. J. W. H. Johnstone.
Rev. J. Robertson.
F. H. Pellew, Esq., C. S.
Surgeon Major H. Cayley.
Surgeon Major T. R. Lewis.

LOSS OF MEMBERS DURING 1887.

By Retirement.

Col. Sir E. B. Sladen.
Hon. H. Beverley, C. S.
E. M. Oates, Esq.
R. Gordon, Esq.
D. G. Barkley, Esq., C. S.
Capt. T. Boileau, B. S. C.
Dr. K. G. Sirkar.
Lt.-Col. W. F. Badgley.
Major G. F. Marshall.
Hon. C. T. H. Crosthwaite, C. S.
R. H. Wilson, Esq., C. S.
R. S. Whiteway, Esq., C. S.
Rangalála Mukerji.
A. Cadell, Esq., C. S.
Kumar Debendra Mallik.
J. R. Napier, Esq.

By Death.

Ordinary Members.

Col. G. C. DePrée.
J. C. Douglas, Esq.
T. G. H. Moncrieffe, Esq.
Sir Ashley Eden, C. S.
Dr. Rám Dás Sen.
Lt.-Col. T. C. Plowden.
Babu Girijábhushan Mukerji.
Babu Rakháldás Háldár.

Corresponding Members.

Dr. E. Smith.
J. Tailor, Esq.
J. Neitner, Esq.
Dr. H. Frederick.
R. H. Barnes, Esq.

[APPENDIX.]

ABSTRACT STATEMENT

OF

RECEIPTS AND DISBURSEMENTS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR

THE YEAR 1887.

STATEMENT
Asiatic Society

Dr.

To Establishment.					
Salaries	Rs.	3,899	6	6	
Commission	...	379	7	0	
		4,278	13	6	
To Contingencies.					
Stationery		104	9	6	
Lighting		81	8	0	
Building		2,489	10	0	
Taxes		816	0	0	
Postage		593	13	9	
Freight		15	7	0	
Meetings		102	0	0	
Miscellaneous		122	5	6	
		4,325	5	9	
To Library and Collections.					
Books		1,840	15	5	
Local Periodicals		31	0	0	
Binding		510	9	0	
Coins		6	0	0	
		2,388	8	5	
To Publications.					
Journal, Part I		420	8	3	
Journal, Part II		3,000	10	3	
Proceedings		995	4	6	
		4,416	7	0	
To Printing charges of circulars, receipt forms &c. ...		119	6	0	
To Extraordinary charges Miscellaneous... ...		228	14	9	15,757 7 5
To Personal Account (Writes off and Miscellaneous)		...			244 10 6
To Balance					1,42,735 12 7
	Total Rs....				1,58,737 14 6

Examined and found correct.
Meugens & King,
Public Accountants.
31*st January*, 1888.

No. 1.
of Bengal.

Cr.

By Balance from last Report			Rs. 1,41,492	7 10
By Cash Receipts.				
Publications sold for cash	Rs.	254	5 10	
Interest on Investments	...	6,280	11 7	
Advances recovered	...	6	2 0	
Miscellaneous	...	43	4 6	
Sale Proceeds of a strip of land ...	...	2,116	0 0	
		8,700	7 11	
By Personal Account.				
Admission fees	...	582	0 0	
Subscriptions	..	7,637	0 0	
Sales on Credit	...	205	0 0	
Miscellaneous	...	120	14 9	
		8,544	14 9	
Total Income... ...			17,245	6 8
Total Rs.,			1,58,737	14 6

Alex. Pedler,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

STATEMENT

Oriental Publication Fund in account with

Dr.

To Cash Expenditure.

Printing charges	Rs.	9,490	4	0	
Editing charges	...	5,400	11	0	
Salaries	...	1,276	0	0	
Advertising	...	110	0	0	
Freight	...	52	15	0	
Stationery	...	35	4	0	
Postage	...	553	2	9	
Contingencies	...	18	6	9	
Commission on Collecting Bills ...	...	50	7	10	
		16,987	3	4	
To Personal Account (Writes off and Miscellaneous)		20	4	0	
Total Expenditure	...	...			17,007 7 4
To Balance	...	...			12,368 2 6
	Total Rs.,				29,375 9 10

Examined and found correct.
Meugens & King,
Public Accountants.
31*st January*, 1888.

No. 2.

the Asiatic Society of Bengal.

Cr.

By Balance from last Report			Rs.	16,943 2 6
By Cash Receipts.				
Government allowance	Rs.	9,000 0 0		
Publications sold for Cash	...	744 0 10		
Advances recovered	...	121 3 6		
Interest on Investments	...	440 0 0		
		10,305 4 4		
By Personal Account.				
Sales on Credit	...	2,110 14 3		
Miscellaneous	...	16 4 9		
		2,127 3 0		
Total Income ...	...			12,432 7 4
	Total Rs.,			29,375 9 10

Alex. Pedler,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

STATEMENT

Sanskrit Manuscript Fund in account with

Dr.

To Cash Expenditure.

Salaries	Rs.	1,362	3	0	
Travelling Expenses		409	3	3	
Purchase of MSS.		1,310	15	6	
Copying		9	0	0	
Commission		5	12	0	
Printing		518	0	0	
Postage		14	13	3	
Contingencies		18	7	0	3,648 6 0
To Balance					1,715 5 0
Total Rs.,					5,363 11 0

Examined and found correct.
Meugens & King,
Public Accountants.
31*st January*, 1888.

No. 3.

the Asiatic Society of Bengal.

Cr.

By Balance from last Report	Rs.		2,121 11 0
By Cash Receipts.			
Government allowances	Rs.	3,200 0 0	
Publications sold for cash		9 0 0	
		3,209 0 0	
By Personal Account.			
Publications sold on Credit		33 0 0	
Total Income ...			3,242 0 0
Total Rs.,			5,363 11 0

Alex. Pedler,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

STATEMENT
Personal

Dr.

To Balance from last Report				Rs. 3,907	5 2
To Cash Expenditure.					
Advances for purchase of Sanskrit MSS., postage of books to members				1,161	8 8
To Asiatic Society	8,544	14	9		
To Oriental Publication Fund	2,127	3	0		
To Sans. MSS. Fund	33	0	0	10,705	1 9
Total Rs. ...				15,773	15 7

Examined and found correct.
Meugens & King,
Public Accountants.
31*st January*, 1888.

No. 4.

Account.

Cr.

By Cash Receipts	...	...	Rs.	14,099	5	8		
By Asiatic Society	...	...	...	244	10	6		
By Oriental Publication Fund		...	...	20	4	0	14,364	4	2

By Balances.	Due to the Society.			Due by the Society.					
Members	4,296	2	3	185	9	7			
Subscribers to Publications ...	43	7	6	27	11	6			
Employees ...	280	0	0	250	0	0			
Agents	170	10	6	2,682	14	9			
Miscellaneous ...	55	15	6	290	4	6			
	4,846	3	9	3,436	8	4	...	1,409	11	5
							Total Rs....	15,773	15	7

ALEX. PEDLER,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

STATEMENT
Invest

Dr.

		Nominal.			Actual.		
To Balance from last Report ...	...	Rs. 1,56,300	0	0	1,55,820	9	10
	Total Rs.	1,56,300	0	0	1,55,820	9	10

Examined and found correct.
MEUGENS & KING,
Public Accountants.
31*st January*, 1888.

STATEMENT
Trust

Dr.

To Balance (Servants' Pension Fund) ...	...	...	Rs.	1,111	3	10
		Total Rs....		1,111	3	10

Examined and found correct.
MEUGENS & KING,
Public Accountants.
31*st January*, 1888.

No. 5.

ments.

Cr.

		Nominal.	Actual.
By Balance from last Report ...	...	Rs. 1,56,300 0 0	1,55,820 9 10
	Total	Rs. 1,56,300 0 0	1,55,820 9 10

ALEX.PEDLER,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

No. 6.

Fund.

Cr.

By Balance from last Report ...	...	...	...	Rs. 1,071 3 10
By Interest on Investments	...	...	...	40 0 0
			Total Rs.	1,111 3 10

ALEX. PEDLER,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

STATEMENT
Cash.

Dr.

To Balance from last Report	...	...	...	Rs.	1,900	10	2
RECEIPTS.							
To Asiatic Society	...	...	...	...	...	8,700	7	11
To O. P. Fund	...	...	...	...	...	10,305	4	4
To Sans. MSS., Fund	...	...	...	...	...	3,209	0	0
To Personal Account		...	...	..	...	14,099	5	8
To Trust Fund	...	...	...	...	...	40	0	0
				Total Rs.		38,254	12	1

Examined and found correct.
MEUGENS & KING,
Public Accountants.
31*st January*, 1888.

STATEMENT
Balance

Dr.

To Cash	...	...	...	...	... Rs.	700	2	8
To Personal Account	...	...	...	...	...	1,409	11	5
To Investments	...	...	...	...	...	1,55,820	9	10
					Total Rs.	1,57,930	7	11

Examined and found correct.
MEUGENS & KING,
Public Accountants.
31*st January*, 1888.

No. 7.

Cr.

EXPENDITURE.

By Asiatic Society	...	...	...	...Rs.	15,757	7	5
By O. P. Fund ...	...	...	...	...	16,987	3	4
By Sans. MSS. Fund	...	...	...	...	3,648	6	0
By Personal Account	...	...	...	...	1,161	8	8
By Balance	...	...	...	...	700	2	8
				Total Rs.	38,254	12	1

ALEX. PEDLER,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.

No. 8.

Sheet.

Cr.

By Asiatic Society	...	...	...	... Rs.	1,42,735	12	7
By O. P. Fund ...	...	...	...	...	12,368	2	6
By Sans. MSS. Fund	...	...	...	...	1,715	5	0
By Trust Fund ...	...	...	...	...	1,111	3	10
				Total Rs.	1,57,930	7	11

ALEX. PEDLER,
Honorary Secy. and Treasurer,
Asiatic Society of Bengal.