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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

EDITED BY

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THE HONORARY SECRETARIES,

JANUARY TO DECEMBER,

1890.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For January, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 1st January, 1890, at 9 P. M.

Colonel J. Waterhouse, President, in the chair.

The following members were present:

Bábú Saratchandra Dás, S. R. Elson, Esq., Bábú Bhupendra Sri Ghosha, Dr. Hoernle, W. A. Lee, Esq., C. Little, Esq., Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq.

The minutes of the last meeting were read and confirmed.

Sixteen 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.

Thakur Suraj Buhksh Singh.

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

A. Venis, Esq., M. A., Professor, Queen's College, Benares, proposed by Dr. G. Thibaut, seconded by Dr. Hoernle.

A. Goodeve Chuckerbutty, Esq., B. C. S., proposed by J. Crawfurd, Esq., seconded by C. Little, Esq.

The Secretary reported the death of Colonel Sir Henry Yule, R. E., K. C. I. E., an Honorary Member of the Society.

The following gentleman has expressed a wish to withdraw from the Society.

J. W. Chambers, Esq.

Bábú Saratchandra Dás exhibited two Tibetan ornaments of soap-stone, with carved representation of the Tibetan signs of the Zodiac, and gave a descriptive account of the Zodiac. (With a plate.)

THE ORIGIN OF THE WORLD.

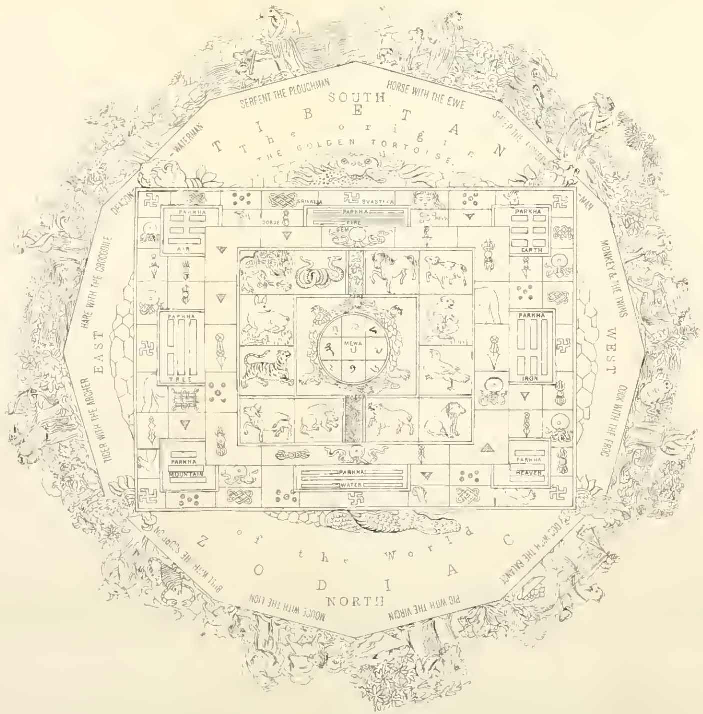
AND

the art of divination and the signs of the zodiac of the Tibetans.

Text.

༄༅། །དང་པོ་ཅི་ཡང་མེད་པ་ཡིས། ཡེ་ཡོད་གནས་པའི་རུས་སྦལ་ཞེས།
དུས་གསུམ་སངས་རྒྱས་ཐམས་ཅད་ཀྱང་། གནས་པའི་རུས་སྦལ་དེ་ལས་བྱུང་།
ཁམས་གསུམ་སེམས་ཅན་ཐམས་ཅད་ཀྱང་། རུས་པའི་དེ་ཡི་ཆ་ལས་སྲིད།
དུས་གསུམ་འདུ་འབྲལ་མེད་པར་གནས། །མགོ་མཇུག་འདིར་བལྟ་མང་པར་གནས།
གནས་པའི་རུས་སྦལ་ཁ་རླངས་ལས། འབྱུང་བ་རླུང་གི་དཀྱིལ་འཁོར་བདུན།
དལ་བུའི་དཀྱིལ་འཁོར་ལྗོང་གུ་ཆགས། དེ་ལས་རྡོ་རྗེ་རྒྱ་གྲམ་ཆགས།
དེ་ཡི་རུས་སྦལ་ཁ་ཆུ་ལས། ཆུ་ཡི་དཀྱིལ་འཁོར་གྲུབ་པར་བཤད།
དེ་སྟེང་རུས་སྦལ་ཤ་ལས་ནི། ལྷུན་པོ་རི་མཆོག་གླིང་ཕྲན་དང་།
གསེར་གྱི་ས་གཞི་བཅས་པ་དང་། བ་སྤུ་རྩི་ཤིང་ཚུལ་དུ་ཆགས།
མགོ་བོ་ལྷོར་བསྟན་མཇུག་མ་བྱང་། ཡན་ལག་མཚམས་བཞིར་གནས་པའོ།
དེ་ཡི་གདུང་རྒྱབ་དཀར་པོ་ལས། ཁིན་པ་གོད་བུ་གནམ་དུ་སྲིད།
དེ་ལས་ལྷ་ཡི་འཇིག་རྟེན་ནི། སྐྱེ་མཆེད་སུ་བཞི་གཙང་རིགས་ལྷ།
ལྷ་ཆེན་ཚངས་པ་ལ་སོགས་པ། སྟེང་དུ་ལྷ་ཡི་རྒྱལ་ཁམས་སྲིད།
དེ་འོག་རི་རབ་ཆེན་པོའི་སྟེང་། སུམ་ཙུ་རྩ་གསུམ་ལྷ་རྣམས་དང་།

PLATE I.



THE TIBETAN-ZODIAC.

གཞན་འཕྲུལ་དབང་བྱེད་ལྷ་རྣམས་སྲིད། རི་རབ་ཆེན་པོའི་སྐེད་པ་ལ།
རྒྱལ་ཆེན་རིགས་བཞིའི་ལྷ་རྣམས་དང་། ཉི་ཟླ་གཟའ་སྐར་ཐམས་ཅད་སྲིད།
རུས་སྦལ་མིག་ལས་ཉི་ཟླ་དང་། ཀོན་གྱི་སྒྲ་ལས་འབྲུག་སྐད་དེ།
ལྕེ་བཀྱིང་བ་ལས་གློག་འོད་འཆར། དེ་ལས་ཐོག་དང་སེར་བ་བྱུང་།
དབུགས་ལས་རླུང་དང་དོན་སྙིང་ལྔར། ཕྱི་ཡི་འབྱུང་བ་ལྔ་ཡང་བྱུང་།
ལུས་འགུལ་བ་ལས་ས་གཡོས་སྲིད། རུས་སྦལ་ལྟོ་བ་སེར་པོ་ལས།
ཁྲོན་མ་གོན་མོ་ས་རུ་སྲིད། ཀླུ་ཡི་འཇིག་རྟེན་འོག་དུ་གྲུབ། (Vaidûrya Karpo.)

Translation.

In the beginning, what existed from eternity, in nothingness, was called the Tortoise. The Buddhas of the past, present and future sprang out of him. The three worlds, and all the animal beings also, originated from that eternal tortoise. Time, without the distinction of past, present, and future, was in him and the whole universe rested between his head and tail. From the vapour of his mouth arose the seven atmospheric strata (which encompass the earth), and gradually the sphere of azure space, and thereafter *Swastika*, the emblem of the divine cross, were formed.

From the saliva of that primeval tortoise sprang forth the oceans; and from his flesh were formed the lofty mountains, the islands, and the great continents having trees for their hair.

His head pointed to the south, his tail to the north and his four limbs stretched towards the four corners of the world. His white back shaped the old father heaven, called *Khen*, wherein rested the *Devaloka* (celestial regions) with the mansions of the gods :–Mahádeva, Brahma, and angels of pure habits, who possessed the fourfold organs of sense. The celestial regions were formed above, and *Rirab*, the sublime mountain, stood below, holding the mansions of the thirty-three *Devas* and of the gods of the *Paranirmánaratay*a on its top. On the flanks of *Rirab*, there resided the four guardian spirit-kings of the world, together with the sun and moon, the planets and stars. The sun and moon sprang from the eyes of the great tortoise. From the sound of his throat issued the dragon's peal of thunder and from his outstretched tongue flashed forth lightning which produced thunderbolts and hailstorms. From his breath originated the wind, the five internal essences, and the five physical elements. When he shook his body there was earthquake.

From the yellow belly of the tortoise sprang the old mother earth, called *Khon*, whose bowels held *nágaloka*, the nether world.

Explanations.

The heaven and earth united together at the horizon and gave birth to three sons and three daughters :—

1st son	was called	*Gin*,	which means	mountain.
2nd son	,,	*Dva*	,,	iron.
3rd son	,,	*Kham*	,,	water.
1st daughter	was called	*Sson*,	which means	wind.
2nd daughter	,,	*Li*	,,	fire.
3rd daughter	,,	*Ssin*	,,	tree.

Hence sprang forth the eight great elements of this world *viz.* :—Heaven, earth, mountain, iron, water, wind, fire and tree, which were called "Parkha *b*rgya*d*" and believed by the Tibetans to be the most potent factors of human destiny.

The Tibetans evidently derived their knowledge of the origin of the world from the Chinese, who believed that heaven was the father, and earth the mother of the universe, though the latter may have had a different version of the story of the great tortoise.

The idea that the great tortoise was the primeval source from which the first parents—heaven and earth,—originated was probably conceived from the semi-spherical appearance of the heaven, which appeared to the unthinking herdsmen of Tibet as resting on the earth at the horizon, and these, when combined together, resembled the body of a tortoise—a moving house with life inside.

The earth was, therefore, called Sa-*g*shi, or the terrestrial basis.

The art of divination is said to have been first discovered by the Chinese from some curious figures which existed on the breast of a certain yellow tortoise captured in the river of Honan. Whatever may be the Chinese mode and arrangement for calculating and drawing the fortunes of individuals from these marks, thus far it is certain, that the Tibetans have shaped *Nag-tse*, their own art of divination, with Chinese materials, obtained from the archives of the great Tang dynasty, to suit their peculiar superstition, and borrowed religion which they had obtained from India at the same period.

The manner in which they ascertain the auspicious and inauspicious periods of time, and directions for the purpose of setting out on a journey, and also for making offerings to gods and demons, is very simple.

In the figures described on the breast of the great tortoise, which is supposed to lie upon its back, there are eighty-nine mansions, inclusive of the central square which encloses the little tortoise.

These eighty-nine mansions are divided as follows—

Eight *Parkha*, or factors of luck, which are distinguished by the technical names of *Khen*, *Khon*, *Gin*, *Dva*, *Kham*, *Sson*, *Li*, and *Ssin*, are supposed to exist at the eight points of the compass, beginning with the south which is always placed at the top.

A particular *Parkha* is supposed to belong to every individual in every particular year, which may be determined by counting, in rotation, from right to left, always beginning with the top *Parkha* called Li 1.

For instance a person aged 5, 13, 21, 29, 37 or 45 will have *kham* for his *parkha* in the present year 1890, another individual aged 4, 12, 20, 28, 36, 44, 52, will have *khen* for his *parkha* in the year 1890.

Each of these *parkha* is surrounded by eight sub-mansions situated in eight directions round it, which are supposed to contain four auspicious and four inauspicious articles—*Svastika* (sacred emblem of cross), a gem, *Dorje* (thunderbolt), *S'ṛívatsa* (the emblem of love), and a human limb, five circles, symbolical of five devils, a wedge and a club, respectively. When one has to start on a journey or expedition, he should avoid the directions of the four inauspicious mansions. If he has to propitiate any evil spirit he should throw the offerings intended for him towards the inauspicious directions. If he has to worship a friendly spirit or tutelary deity he should place his offerings towards the mansion which contains one of the five auspicious objects.

The sixteen mansions that surround the central square of the figure, are occupied by the four principal elements of the Tibetans,—fire, iron, water and air. They are placed at the four cardinal points of the compass, and have the twelve signs:—mouse, ox, tiger, hare, dragon, serpent, horse, sheep, monkey, cock, dog, and pig—called *Lokhor chuñi*, or the animals by which the years of the cycle of twelve years are designated.

The little tortoise (which is placed at the centre) represents the great tortoise in his celestial form. The nine divisions marked as, 1, 2, 3, 4, 5, 6, 7, 8, 9, are called *s*me-wa *d*gu or the nine passages of exit. They are supposed to contain five spiritual beings in each, be they gods or demons—and are used to ascertain the state of existence an individual had in past, or will have in future life.

The system of astronomy and chronology formed on the Indian principle is called "*Kar-tsi.*" Astrological calculations, especially the black art, and the mode of reckoning years, in the Chinese manner, are denominated by the Tibetans as "*Nak-tsi.*"

The most common method of reckoning time among the people at large in Tibet, generally in calculating the years or in determining the

age of individuals, is the cycle of twelve years, in which each year is denominated from a certain animal of the twelve signs in the following order:

1.	Tag-lo (tiger-year).	2.	Yo-lo (hare-year).
3.	Dug-lo (dragon-year).	4.	Dul-lo (serpent-year).
5.	Ta-lo (horse-year).	6.	Lug-lo (sheep-year).
7.	Te-lo (monkey-year).	8.	Chya-lo (cock year).
9.	Khyi-lo (dog-year).	10.	Phag-lo-(pig-year).
11.	Chi-lo (mouse-year).	12.	Lang-lo-(ox-year).

These twelve signs, in combination with the twelve signs of the zodiac, are also employed in reckoning the twelve months of the year. Thus the new year of the Tibetans commences with the *Tiger* and is called *Horda-tang-po.* The common saying with the people is *Horda-tang-po Tag-gi-da*, the first month of the year is Tiger's-month.

Chyi-da-rá-wá (the Spring season).

First month	Tag-gi-da-wa	(tiger-month).
Middle ,,	Yo-gi-da-wa	(hare-month).
Last ,,	Dug-ki-da-wa	(dragon-month).

Yar-ra-wa (Summer season).

4th month is	Dul-ki-da-wa	(serpent-month).
5th ,,	Ta-da-wa	(horse-month).
6th ,,	Lug-da-wa	(sheep-month).

Ton-ra-wa (Autumn Season).

7th ,,	Tel-da-wa	(monkey-month).
8th ,,	Chya-da-wa	(cock-month).
9th ,,	Khyi-da-wa	(dog-month).

Gun-da-rawa (Winter season).

10th ,,	Phag-da-wa	(pig-month).
11th ,,	Chi-da-wa	(mouse-month).
12th ,,	Lang-da-wa	(ox-month).

These signs are also used in reckoning every two hours of the day called "*Du-chhoi*" commencing from the dawn called "*Thorang.*" The time between 3 to 5 A. M. is called the hours of the Tiger.

The time of the hours of the break of day is called *Nam lang* and that of *Nima shar*, is called the hours of the hare which is really the beginning of the day. The dawn consequently comes at the end of these twelve divisions. They are as follows:

1.	Nam-lang, daybreak. "Yo"-hare	2.	Ñimashar, sun-rise. Dug, dragon.

3. Ñi-toi, morning.
   (Dul-serpent).
4. Ñi-chhe, noon.
   Ta, horse.
5. Chhe-yol, afternoon.
   Lug, sheep.
6. Ñi-myur, evening.
   Tel, monkey.
7. Ni-nub, sunset.
   Chya, cock.
8. Sa-soi, dusk.
   Khyi, dog.
9. Soi-khor, fore-night or what is called the devil's hour.
   Phag, pig.
10. Nam-chhe, midnight.
    Chi-wa, mouse.
11. Chhe-yol, after-night.
    Lang, ox.
12. Thorang, the dawn.
    Tag, tiger.

The days of the month are also reckoned by means of these twelve signs, which occur in rotation.

These twelve signs are also supposed to preside over the twelve directions or *Chhog-chuñi*, which correspond with the twelve points of the compass.

These twelve signs are of the utmost importance to the astrologer in determining the auspicious hours, directions, and conjunctions of the *Nakshatras*, or stars for marriage, and in reckoning the age and period of longevity of individuals.

The Philological Secretary exhibited a forged silver Ramtinki presented to the Society by Rájá Sivaprasád of Benares, through Rájá Rájendralála Mitra.

Dr. Hoernle observed that the coin was undoubtedly a forgery, the surface showing clear traces of the rough surface of the mould in which it was cast. The obverse showed four figures in a line, placed on a platform, on the left Ráma seated on a throne, beside him Sitá, Lakshman, and an attendant holding an umbrella, all three standing; round the margin the legend राम जी जानकी जी लछमन जी. The Reverse showed the figure of Hanumán, carrying a club and standing on a platform; by his side, to the right and left, two plants; round the margin the legend हनुमान जी. The legends are in modern Nágarí character and distinctly legible. The original gold coin must have been a modern piece.

The following papers were read—

1. *Natural History notes from H. M.'s Indian Marine Survey Steamer "Investigator," Commander* Alfred Carpenter, R. N., D. S. O. *Commanding,—No.* 14. *Observations on the gestation of some Sharks and Rays.—By* A. Alcock, M. B., *Surgeon Naturalist to the Marine Survey.*

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

2. *Note on the Barisál Guns, the existence of volcanic vents in the direction of those sounds.—By* H. James Rainey.

I find that Mr. Manson, in his letter embodied in *extenso* in the Sub-Committee's initial Report on the aforesaid curious phenomena, states :—

"At page 8 of the pamphlet of Col. Waterhouse I see a mistake made by Mr. Rainey there quoted concerning an '*active volcanic train*' which is supposed to run up and down this coast. There is nothing volcanic anywhere near, but no doubt Mr. Rainey is thinking of the burning springs in the Sita Kund range, and the so-called Mud Volcanoes of Ramri and Cheduba. These are nothing but the escape of marsh gas," etc.

In one of my papers on the 'Barisál Guns,' communicated to the Society as far back as twenty years ago I think,* which in fact elicited the first regular discussion on the subject, I believe I stated that, "an active volcanic train" ran along the eastern coast of the Bay of Bengal, chiefly based on information derived from a Geological Map published, if I remember rightly, in Dr. M'Clelland's Cal. Jour. Nat. His. This statement is substantially correct, and it is evident that Mr. Manson is not aware of the fact, well-known to Geologists, that the 'great Sunda group of volcanic vents,' starting from the eastern islands there, passes through Java and Sumatra, and extends northward as far as Chittagong.

The fact of Mr. Manson designating the veritable mud volcanoes of Ramri and Cheduba as "so-called Mud Volcanoes," shews that, he considers *steam* mud volcanoes as 'true' mud volcanoes, and '*gas*' mud volcanoes as 'pseudo' mud volcanoes, which is a distinction not recognised by the general body of Geologists. *These* mud volcanoes are by no means insignificant, as they are subject to fiery paroxysmal eruptions, generally synchronous with seismic phenomena, when the flames rise to the height of several hundred feet, probably due to the presence of volatile liquid petroleum hydrocarbons. But, whether the ejecting force is altogether different gases,—not solely marsh gas, or both *gases* and *steam* combined,—has not been conclusively established, as stated by Mr. Mallet in his Report on these mud volcanoes. *Vide Records.*, G. S. I., Pt. II, 1878, p. 205.

* I may here state that, I am labouring under the disadvantage of writing merely from memory and without the aid of books of reference, owing to the destruction by fire of my rather extensive Library of works on India, and all my manuscript notes on Natural History and other subjects, including my observations on the 'Barisál Guns' and deductions drawn therefrom, extending over a period of nearly a quarter of a century.

The "*burning springs*" of, what Mr. Manson calls, "the Sita Kund range,'' is probably not produced by marsh gas, but most likely, as suggested by the learned Director of the Geological Survey of India with regard to the "Sita Kund" near Monghyr, to "deep seated thermo-dynamic action." As regards the designation "Sita Kund," I may explain that, it is a sort of generic term applied to all natural hot springs in India, and it is derived from a well-known episode chronicled in the great Sanskrit Epic, "the Ramayana:" on the rescue of Sita from the clutches of Ravana, king of Lanka (Ceylon), her consort Rama jealous of her honour, caused her to undergo the ordeal of fire and to prove her chastity, after which she performed her ablution in a spring, which thenceforth became a hot spring.

I may add that I have no desire to impugn the correctness of the conclusion arrived at by the Sub-Committee,—"that there is no evidence in favour of volcanic action having caused the sounds;" and the scientific reputation of Colonel Waterhouse, the Rev. Father Lafont and Mr. Pedler, who are among the members of the Sub-Committee, is a sufficient guarantee that the enquiry will be carefully and cautiously conducted on strictly scientific lines. Bnt, I would suggest that, before finally discarding *in toto* all considerations of volcanic agency, sub-marine or otherwise, it might be worth while to enquire if similar sounds are heard any where in the proximity of mud volcanoes intimately associated with petroleum beds, scattered in various parts of the globe. I have read in some book, I think in a magazine, published in the beginning of the present century, that somewhat similar sounds are heard somewhere in China, and have been traced to subterranean origin. The mud volcanoes of Java are said to *explode most violently during the rainy season*, and though Mr. Mallet found the contrary to be the case as regards Rámri and Cheduba, in one of his Reports, yet it was admittedly on insufficient data. Captain Hannay, quoted by Mr. Mallet, writing of a gas mud volcano connected with petroleum beds in Upper Assam, in Jour. As Soc., B., 1845, says:—

"This is indeed a strange looking place, and I am told by the Singphos that at times there is an internal noise as of distant thunder, when it bursts forth suddenly, with a loud report, and then for a time subsides."

If sub-marine volcanic action produces explosions on the coast, would the sounds be readily carried inland along the course of the rivers that discharge themselves into the Bay? Of course this is put forward as nothing more than a mere suggestion, and not advanced as an attempt to build any particular theory as to the sounds being of volcanic origin.

Note by DR. W. KING.

The cause of the Barisál Guns still remains a mystery, and a not unnatural tendency in the enquiry has been to fall back on the line of active and partially quiescent volcanic vents occurring along the eastern coast of the Bay of Bengal, as possibly exhibiting phenomena which might account for these sounds. Any way, Mr. Rainey made no mistake in referring to "an active volcanic train" along the Arracan Coast; because the mud exhibitions in the form of cones raised partly by ejections of mud and other materials, with accompanying discharges of steam and luminous gas, must be classed in the category of volcanoes: while the evidence seems clear that they have extended as far northwards as Chittagong.

Whether, however, the sounds accompanying certain features of this line of volcanic action have anything to do with the Barisál Gun sounds or echoes is so far extremely questionable: still a possible connection should not be let fall out of the discussion, and Mr. Rainey's suggestion as to enquiry regarding sound accompaniment of volcanic phenomena in other regions might be kept in view.

The sounds reported so far as accompanying the paroxysmal discharges of the Arracan foci are not, however, so much explosive as rumbling or thunder-like; which may be attributable to the escape of the conjested material or gases through vents already existing. It is, however, a question with me whether explosive sounds might not arise from the bursting forth of confined gases through sudden openings in a less active, though not necessarily less cumulative, region of this line of vulcanicity; which region might lie to northward, or even northwestwards of Chittagong. At the same time, the Barisál Guns are perhaps too numerous and apparently rather too much confined to the south central part of the Delta, to fall in with this last suggestion.

Mr. W. A. Lee suggested that Seismograph observations should be taken to decide whether the Barisál guns accompany earth tremors, or not.

LIBRARY.

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University, Circulars. Vol. IX, No. 76.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—Notulen. Deel XXVII, Aflevering, 3.

——. ——. Tijdschrift voor Indische Taal-, Land-en Volkenkunde. Deel XXXIII, Aflevering 3 and 4.

Bombay. The Indian Antiquary. Vol. XVIII, Part CCXXIII, July 1889.

Calcutta. Geological Survey of India,—Records. Vol. XXII, Part 4.

——. Indian Engineering. Vol. VI, Nos. 23—26.

——. Photographic Society of India,—Journal, Vol. II, No. 6, December, 1889.

Havre. Société de Géographie Commerciale du Havre,—Bulletin. Septembre—Octobre, 1889.

Ithaca. Cornell University,—Library Bulletin. Vol. II, No. 2.

Kiew. Société des Naturalistes de Kiew.—Mémoires. Tome X. Livrais 1, 1889.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Abhandlungen, Band IX, Heft. 3.

——. ——. Zeitschrift. Band. XLIII, Heft. 3.

London. Nature.—Vol. XLI, Nos. 1047—1050, and Index to Vol. XL.

——. The Academy.—Nos. 916—919.

——. The Athenæum.—Nos. 3239—3241.

Mendon. The American Antiquarian and Oriental Journal,—Vol. XI, No. 6.

Mexico. Informes y Documentos relativos á Commercio Interior y Exterior Agricultura, Menería é Industrias. No. 49, Julio, 1889.

Paris. La Société D'Géographie,—Compte Rendu des Seances. Nos. 13 et 14, 1889.

BOOKS AND PAMPHLETS,

presented by the Authors, Translators, &c.

PETIT, HON, FRAMJEE DINSHAW. Travels in Europe, America, Japan and China, being a compilation in the Guzrati language, of brief

notes taken of his voyage to these places from April to November, 1887. 8vo. Bombay, 1889.

ROY, PROTAP CHANDRA, C. I. E. The Mahábhárata, translated into English prose, Part 55. 8vo. Calcutta, 1889.

MISCELLANEOUS PRESENTATIONS.

Nederlandsch-Indisch Plakaatboek, 1602—1811, door Mr. J. A. Van der Chijs. Deel VI, 1750—1754. 8vo. Batavia, 1889.

BATAVIAASCH GENOOTSCHAP VAN KUNSTEN EN WETENSCHAPPEN, BATAVIA.

Report on the Administration of the Central Provinces for the year 1888-89. Fcp. Nagpur, 1889.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Catalogue of the Sanskrit Manuscripts in the Library of the India Office, Part II.—Sanscrit Literature: A. Scientific and Technical Literature, I. Grammar, Lexicography, Prosody, Music. By Julius Eggeling, Ph. D. 4to. London, 1889.

Comparative Dictionary of the Bihárí Language. Part II, Compiled by A. F. Rudolf Hoernle and George A. Grierson. 4to. Calcutta, 1889.

Report on the Land Revenue Administration of the Lower Provinces, for the official year 1888-89. Fcp. Calcutta, 1889.

Report on the Police of the Lower Provinces of the Bengal Presidency for the year 1888. Fcp. Calcutta, 1889.

Resolution reviewing the Reports on the Working of Municipalities in Bengal during the year 1888-89. Fcp. Calcutta, 1889.

GOVERNMENT OF BENGAL.

Report on the Administration of the Meteorological Department of the Government of India in 1888-89. Fcp. Calcutta, 1889.

GOVERNMENT OF INDIA, METEOR. DEPARTMENT.

Annual Returns of the Civil Hospitals and Dispensaries in the Madras Presidency, for the year 1888. Fcp. Madras, 1889.

GOVERNMENT OF MADRAS.

Monograph of Wood Manufactures in the Punjab, 1887-88. Fcp. Lahore, 1889.

GOVERNMENT OF PUNJAB.

Annales del Ministerio de Fomento de la Republica Mexicana. Tome. VIII. 8vo. México, 1887,

Estudios de Meteorología Comparada por Mariano Bárcena y Miguel Pérez. Tome, I. 8vo. México, 1885.

OBSERVATORIO METEOROLÓGICO, MEXICO.

Proceedings and Transactions of the Royal Society of Canada for the year 1888, Vol. VI. 8vo. Montreal, 1889.

ROYAL SOCIETY OF CANADA.

Tide Tables for the Indian Ports for the year 1890 (also January 1891), by Lt.-Colonel M. W. Rogers, R. E., and E. Roberts, F. R. A. S., F. S. S. 8vo. London, 1889.

SURVEY OF INDIA, TIDAL AND LEVELLING OPERATIONS.

PERIODICALS PURCHASED.

Calcutta. Indian Medical Gazette.—Vol. XXIV, No. 11, November, 1889.

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

Leipzig. Annalen der Physik und Chemie.—Band XXXVIII. Heft 4.

London. The Chemical News,—Vol. LIX, No. 1561 and Nos. 1565-67.

———. The Nineteenth Century,—Vol. XXVI, No. 154, December, 1889.

———. The Society of Arts,—Journal, Vol. XXXVII, No. 1927 and Nos. 1931—1933.

Paris. Revue Scientifique.—Tome XLIV, Nos. 20—23.

BOOKS PURCHASED,

ROSENZWEIG, VINCENZ RITTER VON. Der Diwan des Grossen Lyrischen Dichters Hafis in Persischen original herausgegeben ins dentsche metrisch übersetzt, und mit Anmerkungen Versehen. Bands I and II. 8vo. Wien, 1858 and 1863.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For February, 1890.

The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th February 1890, at 9 P. M.

Colonel J. Waterhouse, President, in the Chair.

The following members were present:

Dr. J. R. Adie, E. T. Atkinson, Esq., H. Beveridge, Esq., I. C. Bose, Esq., W. B. Colville, Esq., E. C. Cotes, Esq., W. R. Criper, Esq., Bábú Saratchandra Dás, Bábú Rajanikánta Gupta, Dr. Hoernle, A. Hogg, Esq., Prince Jahán Qadr Muhammad Wáhid Alí Bahádur, W. A. Lee, Esq., C. Little, Esq., Kumár Rameshwár Maliáh, Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., J. D. Nimmo, Esq., M. H. Oung, Esq., H. M. Rustomjee, Esq., Pandit Haraprasád Shástri, Capt. R. C. Temple, J. Wood-Mason, Esq.

Visitors:—C. H. M. Rustomjee, Esq., Lama Phun tshogs *D* Wañ *l*dan.

According to the Bye-Laws of the Society, the President ordered the Voting papers to be distributed for the election of Office-Bearers and Members of Council for 1890, and appointed Messrs. de Nicéville and Criper to be Scrutineers.

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

Annual Report for 1889.

The Council of the Asiatic Society 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 36 gentlemen were elected Ordinary Members of the Society, 13 members withdrew, 7 died, 12 were removed from the list under Rule 40, being more than 3 years absent from India; the election of one member was cancelled by request, as he was contemplating an early return to Europe, and one member was struck off on account of non-payment of his admission fee, by which his election became void under Rule 9: of the 36 members elected 4 were old members who rejoined. The total number of members at the close of 1889 was thus 307 against 305 at the end of the preceding year: of these 108 were Resident, 135 Non-Resident, 13 Foreign, 22 Life, 27 absent from India, and 2 special Non-Subscribing members, as shown in the following table, which also gives the fluctuations in the number of ordinary members during the past six years.

Year.	Paying.				Non-Paying.				Grand Total.
	Resident.	Non-Resident.	Foreign.	Total.	Life.	Absent.	Special Non-Subscribing.	Total.	
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
1888 ...	98	136	15	249	20	34	2	56	305
1889 ...	108	135	13	256	22	27	2	51	307

The seven Ordinary Members the loss of whom by death during the year we have to regret, were Mr. Otto Möller, Shams-ul-Ulma Maulvi Kabir-ud-din Ahmad, Khán Bahádur, Hon. Ráo Sáhib Visvanáth Náráyana Mandlik, C. S. I., Mahárájá Isvariprasád Singh, C. S. I., of Benares, Dr. D. Waldie, Dr. Francis Day, and Mr. E. J. Jones.

There was one death amongst the Special Honorary Centenary Members, and two among the Honorary Members; *viz.*, Dr. James Prescott Joule of the former, and Professor William Wright, LL. D., of Cambridge, and Colonel Sir Henry Yule, R. E., K. C. S. I., C. B., of the latter. Their numbers now stand at 5 and 25 respectively; so that the list of Honorary Members is now at its normal strength.

There were no casualties among the Corresponding Members and Associate Members, their numbers remaining at 7 and 8 respectively, as last year.

Two members compounded for their subscription as Resident Members, *viz.*, R. D. Mehta, Esq., and J. D. Nimmo, Esq.

Indian Museum.

No presentations were made over to the Indian Museum.

Rájá Rájendralála Mitra, LL. D., C. I. E., having been obliged to resign his post as a Trustee on behalf of the Society on account of ill health, Mr. C. Little was appointed in his place.

The other Trustees on behalf of the Society were—

Dr. A. F. R. Hoernle.
E. Gay, Esq.
A. Pedler, Esq.
Dr. D. D. Cunningham.

Finance.

The accounts are shown in the appendix under the usual heads.

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

The Budget for 1889 was estimated at the following figures—Receipts Rs. 14,000; Expenditure Rs. 15,757 (Ordinary Rs. 13,920, Extraordinary Rs. 1,837). Taking into account only the ordinary items of Receipts and Expenditure for the year 1889, the actuals have been, Receipts Rs. 13,539 and Expenditure Rs. 12,871, showing a balance in favour of the Society of Rs. 768; but against this small balance there has been an extraordinary expenditure of Rs. 1,850, mainly on account of the balance due for repairs to the Society's premises; and Messrs. Trübner's account for books, &c., supplied has also to be considered. The invoices received during 1889 amount to £107-12-2, from which there will be some set off on account of sales of publications. The total expenditure of the year has therefore been considerably more than the income.

Messrs. Trübner's previous invoices for 1888, not yet paid, amount to about £294, so that allowing the very favourable estimate of about £100 as a set off on account of sales of publications, there are now some £300 due to Messrs. Trübner and Co., a portion of which must be paid during the year.

The fact is therefore evident that the ordinary income of the Society is not sufficient to meet present expenditure, and that measures must be taken to reduce the expenditure within the limits of income. To be constantly meeting expenditure from capital must seriously cripple the permanent income of the Society before long.

The total receipts in 1889 have been Rs. 13,539 against an estimate of Rs. 14,000. There has been a slight falling off in subscriptions, also

in the income derived from investments, and, in the absence of Messrs. Trübner's account for 1888, the income derived from the sale of publications cannot be fully given.

Under *Subscriptions*, the estimate was Rs. 7,300 and Rs. 7,263 were received, besides Rs. 810, on account of Compounding fees, and Rs. 928 Admission fees, which have to be invested and do not form part of the working income of the year. Under sale of *Publications* the estimate was Rs. 400, but only Rs. 46 can be credited under this head, as explained above. Under *Interest on Investments* Rs. 6,200 were estimated, but only Rs. 6,169 received, the difference being due to Income Tax deductions.

The *Miscellaneous Receipts* were only Rs. 61 against an estimate of Rs. 100.

The *Ordinary Expenditure* was estimated at Rs. 13,920, but the amount paid out was only Rs. 12,871. The principal items in excess were *Salaries* (due to an under estimate), *Commission*, and *Municipal Taxes*, owing to an increase in the rates, and the house rate for 5 quarters being paid during the year.

The actual expenditure on the Journal and Proceedings has been as follows :—

Journal	*Part I.*—	Rs.	1,092
	Part II.—	,,	3,007
Proceedings—		,,	878
	Total	Rs.	4,977

but a bill for £176-18-2, for plates illustrating the Journal Part II for 1888 is still due to Messrs. Trübner and Co., and should have been paid during the year had the Agent's accounts for 1888 been received. There are other later bills of Messrs. Trübner, and Messrs. West Newman and Co., to be paid also on account of plates for Journal, Part II, amounting £62-8-4. The expenditure on this part of the Journal will have to be curtailed for the present.

The Budget Estimate of ordinary Receipts and Expenditure for 1890 does not differ materially from that for 1889, but both have been set at slightly reduced figures. The probable ordinary receipts are estimated at Rs. 13,900, and the expenditure at Rs. 13,840. On the receipt side the estimate under the head of *Subscriptions* has been left at the same amount as last year. The amount to be recovered by *Sale of Publications* has also been left at Rs. 400, as it is estimated that Trübner's account sales should show an average of about £30. It is probable also that the receipts under this head will be still larger on

account of sale proceeds of the extra number of the Journal, Part I, containing Mr. Grierson's "Modern Vernacular Literature of Hindustan," but at present it is not possible to estimate how much this will be. The item of Rs. 6,100 allowed for interest is calculated on the actual present investment.

On the expenditure side, the changes are on the whole slight. *Salaries* show an increase of Rs. 170, partly due to an under estimate last year, *Municipal Taxes* also show an increase owing to the increased rate of assessments. Reductions have been made of Rs. 50, in *Postage*, Rs. 50 for *Binding*, Rs. 200 for *Journals*, and Rs. 100 for *Proceedings*.

Beyond the Auditors fee it is not anticipated that there will be any extraordinary expenditure this year, except that it may be necessary to draw upon capital again to pay off some of Messrs. Trübner's outstandings.

The details of the Budget Estimate are as follows:—

RECEIPTS.

Subscriptions	Rs.	7,300	0	0
Sale of Publications	...	400	0	0
Interest on Investments	...	6,100	0	0
Miscellaneous	...	100	0	0
Total	...	13,900	0	0

EXPENDITURE.

Salaries	Rs.	4,390	0	0
Commission	...	400	0	0
Stationery	...	100	0	0
Lighting	...	80	0	0
Petty Repairs	...	10	0	0
Municipal Taxes	...	819	0	0
Postage	...	600	0	0
Freight	...	10	0	0
Meeting	...	90	0	0
Contingencies	...	150	0	0
Books	...	1,610	0	0
Local Periodicals	...	31	0	0
Binding	...	450	0	0
Carried over	...	8,740	0	0

Brought forward Rs.	8,740	0	0
Journal, Part I ... ... }	4,000	0	0
Journal, Part II ... ... }			
Proceedings	900	0	0
Printing Circulars	100	0	0
Total ...	13,740	0	0
Auditors fee ... ... Rs.	100	0	0
Grand Total ...	13,840	0	0

Messrs. Trübner and Co.'s delay in sending in their accounts for 1888 has rendered it impossible to complete the account for the past year, and to frame a proper estimate for the current year.

The amount of the invested funds now belonging to the Society is Rs. 1,35,400.

London Agency.

Messrs. Trübner's account with the Society for 1888 not having been received no correct information can be furnished as to the amount of the balance due to them, or the receipts from sale of publications effected during the year.

The numbers of copies of parts of the Journals, of the Proceedings, and of the Bibliotheca Indica sent to Messrs. Trübner and Co. during 1889 for sale were 362, 182, and 1,006 respectively, valued at Rs. 1,020.

Nine invoices of books purchased, and of publications of various Societies sent in exchange, were received during the year. The value of books purchased amounted to £107-12-2.

A remittance of £109-19-7 was made to the Agents at the beginning of the year in payment of the balance of their account for 1887.

Library.

The total number of printed volumes, or parts of volumes, added to the Library during the year was 2,098, of which 784 were purchased and 1,314 presented.

The Catalogue of the Tibetan Manuscripts has been printed, and that of the Persian works in the Oriental Library is advancing towards completion.

Publications.

Ten numbers of the Proceedings were published during the year, containing 278 pages of letter press : two numbers of the Journal, Part

I, containing 105 pages of letter press, 6 plates, and a synchronistic table of the reigns of the early Guptas, their contemporaries, and their immediate successors, also an extra number for 1888, consisting of 205 pages, with 3 plates, being Mr. Grierson's History of the Modern Vernacular Literature of Hindustan; of the Journal, Part II, there were four numbers, containing 440 pages of letter press, with 21 plates, and a supplement (No. 2) containing 15 pages of Colonel Waterhouse's Tables of Metric weights and measures; one number of the Journal for 1888 was also issued, comprising 124 pages of letter press, with 14 plates.

Building.

The Society's house and out offices having so lately undergone thorough repairs, the only expenditure incurred was a small amount of Rs. 8-8 for stopping a leak in one of the gas pipes damaged by workmen in the course of the repairs.

Coin Cabinet.

During the year 111 coins were added to the Cabinet, of which 8 were of gold, 66 of silver, 27 of copper, and 10 of mixed copper and silver. 70 of these coins were acquired under the Treasure Trove Act. The remainder were presentations, 29 being presented by the Bombay Government under the Treasure Trove Act, 11 by Mr. V. A. Smith, and one by Mr. W. Sandford. They comprise 62 Mughal, 23 Paṭhán, 14 Málwá, 5 Kábul, 3 Hun, 2 Varáha, 1 Gadhiya and 1 Persian coins. They all belong to well-known types, and detailed notices of them will be found in the Society's Proceedings for February, August and November.

Office of the Secretaries.

Mr. J. Wood-Mason, Vice-President, edited the Journal, Part II, and Dr. Hoernle continued as Philological Secretary during the year. The duties of the General Secretary were carried on by Dr. Hoernle until March, when Mr. Little took over charge of the office.

Dr. W. King was in charge of the Treasurership throughout the year.

Mr. H. Ronaldson continued as Assistant Secretary during the year.

Mr. J. H. Elliott was the Assistant Librarian until October, when he was granted leave of absence for six months without pay, and Bábú Haranchandra Gupta, B. A. was appointed to act in his place; the posts of Cashier, Pandit, and Copyist, were held throughout the year by the permanent incumbents, Bábú Nritiya Gopal Bose, Pandit Hari Mohan Vidyábhúshan, and Bábú Joges Chandra Chatterji respectively.

Bibliotheca Indica.

Thirty-five fasciculi were published during the year, of which six were in the Arabic-Persian, twenty-seven in the Sanskrit, and two in the Tibetan series. They belong to twenty-one different works, of which four are in the Arabic-Persian, fifteen in the Sanskrit, and two in the Tibetan series. There was one new publication, the *Tuzuk-i-Jehángírí*, in the first series, and two in the second series, *viz.*, *Márkaṇḍeya Puráṇa* and *Bṛihad-devatá:* no new works were taken up in the Tibetan series. All these three works had been sanctioned for publication some years ago, but had not been hitherto commenced. On the other hand four works have been completed during the year, *viz.*, two in the Arabic-Persian, and two in the Sanskrit series. The former are the *Iṣábáh* and the *Muntakhabu-t-Tawáríkh*, the latter are *Manutika Sangraha*, and the *Sámkhyá Sútra Vṛitti.* To these may be added four works which were completed in the preceeding year, *viz.*, the *Zafarnámah* in the Arabic-Persian series,and the *Ashṭasáhasriká Prajñá Páramitá*, the *Kála Mádhava*, and the *Váyu Puráṇa* in the Sanskrit series.

In the Annual Report for the preceding year (p. 29) it was stated that 50 fasciculi had been estimated as the annual out-turn for the ensuing year, at a probable cost of Rs. 18,800: the actual out-turn has been 35 fasciculi, as stated above. The expenditure out of the Oriental Publication Fund during the year amounted to Rs. 15,983, which includes printing charges for 44 fasciculi and editing charges for 36 fasciculi, and gives an average of Rs. 399 for each fasciculus. For the year 1890 the out-turn may be reckoned at 44 fasciculi. These, at the average rate of Rs. 377 of the past two years, will cost Rs. 16,588. The average annual income, calculated on the receipts of the last five years, is Rs. 12,912, which gives an excess of estimated expenditure over average income of Rs. 3,676, towards meeting which there is a balance of Rs. 3,695. At the end of the current year this balance will be practically used up, it being reduced to Rs. 19. It will therefore be impossible to devote, as it had at one time been contemplated, the sum of Rs. 3,000 out of the balance, for the purchase of a set of the Tibetan work "Tan-gyur," in block print. Nor will it be possible to sanction any new works to be published in the Bibliotheca Indica until a considerable portion of the works already sanctioned, is completed.

Dr. A. Chatterji has been appointed to continue the translation of the "*Suśruta*," Dr. R. Sen, who had undertaken the work, having been obliged to resign on account of the pressure of his official duties.

It has been decided to abandon the further publication of the Prithví Ráj Rásau, the work not being historical, and there being grave

doubts as to its genuineness as a bardic composition, and it is also being published privately by a Pandit of Udayapur.

Maulvi Abdul Rahim having been obliged to resign the editorship of the *Ma'ásir-ul-Umárá* owing to ill health, Maulvi Mirza Ashraf Ali was appointed to carry on the work.

Of the following works of which fasciculi had appeared in previous years, no fasciculi were published during the year under review.

1. Tabaqát-i-Náṣirí, (Index of persons and places); 2, Prákṛita Lakshaṇa (English translation and Notes); 3, Kátantra (introduction); 4, Suśruta Samhitá (English translation); 5, Ápastamba S'rauta Sútra (Text); 6, Manu Ṭíká Sangraha (Text); 7, Lalita Vistara (English translation).

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

1. Prákṛitádhyáya (Text and translation); 2, Charaka (English translation, with Notes); 3, Naqaid-ul-Farazdaq-Jerir (Text with English translations in prose and verse); 4, Kála Viveka (Text); 5, Vedánta Sútra, Commentaries on, (Text); (two of these *viz.* Anubháshyam and S'ríbháshyam, have been commenced); 6, Yoginí Tantra (Text); 7, Karaṇa Grantha (Text); 8, Muntakhabu-t-Táwaríkh, Vol. I, (English translation); 9, Táj-ul-Maásir (Text); 10, Táríkh-i-Wassaf (Text); 11, Tarikh-i-Yámini (English translation, with Notes); 12, Jñátádharmakathá and Vipáka Sútra (Text); 13, Saddharma Puṇḍaríka (Text); 14, Al Tabrizi's Commentary (Text); 15, Svayambhú Puráṇa (Text); 16, Baudháyaníya S'rauta Sútra, and Hiraṇyakeśí S'rauta Sútra (Text); 17, Áín-i-Akbarí (English translation); 18, Riázu-s-Salátín (Text and English translation); 19, Nyáyavindu Ṭíká (Text in Sanskrit and Tibetan); 20, Bhaṭṭopala's Commentary on Varáha Mihira's Bṛihat Samhitá.

No new works were sanctioned for publication during the year.

The following is a descriptive list of the publications issued during 1889.

A. *Arabic-Persian Series.*

1. Iṣábáh, or the Biographical Dictionary of Persons who knew Muḥammad. It was compiled by Shaikh Ṣahábu-d-dín Abu-l-Fazl Aḥmad during the first half of the 9th century of the Muhammadan era with the object of giving more or less detailed accounts of the *Ṣiḥábís*, *i. e.*, those who received their faith directly from their Prophet and are therefore considered men of superior sanctity than the *Tábi'ís* who received their faith second hand from the Ṣibábís. It contains

accounts of 20,811 persons. The work has come to a close. This completes the Old Series of the Bibliotheca Indica publications. The edition was commenced in the year 1852 by the late Maulvi Muhammad Wajih. The present editor, the distinguished Maulvi Abdul Hai, has added a short English preface which contains much interesting information. No 262, old Series, Vol. III, Fasc. XV. Total *one* fasciculus.

2. Ma'ásúr-ul-Umará, or Memoirs of Nobles, compiled by Nawáb Samsámu-d-Daulah Sháh Nawáz Khán who flourished during the first half of the 18th century and was in a position to speak with authority on the subject of the Mughal Court. It contains biographical accounts of the Umarás of the Mughal Court from the establishment of Mughal rule in India. Nos. 704, 708, 713. Vol. II, Fasc. VI, VII, VIII. Total *three* fasciculi. These complete the second volume.

3. Muntakhabu-t-Tawáríkh, by 'Abdu-l-Qádir Bin Malik Sháh, otherwise called Al Badáúní, translated into English by the Rev. W. H. Lowe, M. A. of the Cambridge University. The translation of the second volume only was undertaken, and it has now been brought to a close under the supervision of Professor E. B. Cowell. It contains an elaborate account of the Court of Akbar by one who had little sympathy with the new religious ideas of the Emperor. No. 721. Vol. II, Fasc. V. Total *one* fasciculus.

Tuzuk-i-Jahángírí. The autobiography of Emperor Jahángír. The Imperial author gives an account of his own reign from the day of his accession to the throne with the utmost ease and fluency and without vanity. Translated by the Rev. W. H. Lowe of the Cambridge University. No. 718. Fasc. I. Total *one* fasciculus.

B. *Sanskrit Series.*

Advaita Brahma Siddhi, of Sadánanda Yati of Káshmír, a disciple of Brahmánanda, the commentator of the Advaita Siddhi of Madhusúdana Saraswatí, on the model of which it is written. Edited by Pandit Váman S'ástrí Upádhyáya, with notes and explanations in Sanskrit. The chapters of the work are called *Mudgaraprahára*, or blows with a club on the head of the writer's opponents. No. 715. Fasc. III. Total *one* fasciculus.

2. Bṛihad Dharma Puráṇa, one of the latest works of the Puránic literature, edited by Pandit Haraprasád S'ástrí. It contains the Puránic explanation of the caste system. No. 703. Fasc. II. Total *one* fasciculus.

3. Bṛihad-devatá, edited by Rájá Rájendralála Mitra, LL. D., C. I. E., is an important work bearing on the elucidation of the Vedic texts. It is a metrical work giving the devatá or the deity praised,

i. e., the subject matter of the *súktas* and *ṛiks* of the Ṛig-Veda. No. 722. Fasc. I. Total *one* fasciculus.

4. Chaturvarga Chintámaṇi, by Hemádri, belonging to the Yádava Court of Deva Giri in the Deccan, composed about a century before the Muhammadan conquest of that part of India, is a comprehensive compilation of Hindú rituals. Any work quoted in this is presumably older than the thirteenth century, and the works quoted being very numerous, it affords a safe criterion for distinguishing works written before the Muhammadan conquest. Edited by Pandits Yogeśvara Smṛitiratna and Kámákhyá Nátha Tarkavágíśa. Nos. 702, 709 and 734. Vol. III, Part II, Fasc. II, III, IV. Total *one* fasciculus.

5. Kúrma-puráṇa, a System of Hindú Mythology and tradition, written in the Vaishṇava interest, edited by Bábú Nilmaṇi Mukhopadhyáya, M. A., Professor of Sanskrit, Presidency College. No. 699. Vol. I, Fasc. VIII. Total *one* fasciculus.

6. Madana Párijáta, edited by Pandit Madhusúdana Smṛitiratna, Professor, Sanskrit College, is a digest of Hindú Law, belonging to a period subsequent to Hemádri, to whom the author acknowledges his obligations. Nos. 705 and 712. Fasc. V and VI. Total *two* fasciculi.

7. Márkaṇḍeya Puráṇa, translated into English from the Society's edition of the text, with Notes, by Mr. F. E. Pargiter, B. A. The work belongs to the early period of Puránic development and is written with the object of promulgating the worship of S'akti. It contains the *Chandí*, the standard work of S'ákta worship, recited in every S'ákta household of India. Nos. 700 and 706. Fasc. I and II. Total *two* fasciculi.

8. Nirukta of Yáska, the most important work on Vedic philology in Ancient India, edited by Pandit Satyavrata Sámáśramí. The text has been already completed with two of the best commentaries. The editor is now engaged with the indices and the preface. The subjects treated in the preface, which is in Sanskrit, are—What is Nirukta? What is the Veda? What is Yáska's age? Is he a Ṛishi or not? and so forth. Nos. 711 and 723. Vol. IV, Fasc. VI and VII. Total *two* fasciculi.

9. Nyáya Kusumánjali, edited by Mahámahopádhyáy Chandrakánta Tarkálankára, is the prose work of Udayana, surnamed the A'chárya, whose controversies with the Bauddhas are traditionally said to have led to their final expulsion from India. His works belong to the Nyáya school of Hindú philosophy, and are directed principally against the Buddhists. The work is accompanied with a commentary, entitled *Prakáśa*, which again is copiously illustrated by extracts from a gloss entitled *Makaranda*. No. 725. Vol. I, Fasc. III. Total *one* fasciculus.

10. Parásara Smriti, by the same Mahámahopádhyáya, is accompanied with the commentary of Mádhavácharya. Volume I, treating of the *A'chára Káṇḍa*, has come to a close. The editor is now engaged with Volume II, the Práyaśchitta Káṇḍa. The first volume has been issued without indices, which will be supplied at the end of the second volume. Nos. 717, 720, 727. Vol. I, Fasc. VIII. Vol. II, Fasc. I and II. Total *three* fasciculi.

11. Sámkhyá Sútra Vṛitti, edited by Dr. Richard Garbe, Professor of Sanskrit in the University of Königsberg, was completed with indices. It contains the text in red type, Aniruddha's commentary, extracts from Mahádeva's commentary and footnotes, all in black type. The text having been completed the editor is now engaged in publishing an English translation. Nos. 724 and 731. Fasc. III and IV. Total *two* fasciculi.

12. Sámkháyana S'rauta Sútra, edited by Dr. Alfred Hillebrandt, Professor of Sanskrit in the University, Breslau. The first volume was issued last year with many indices and a preface. The editor is now engaged in publishing the commentaries of the work in a second volume. Nos. 716 and 732. Vol. I, Fasc. VII, Vol. II, Fasc. I. Total *two* fasciculi.

13. Varáha Puráṇa, edited by Pandit Hṛishikeśa S'ástrí, is a Puráṇa written with the view of furthering the cause of Vaishṇava worship. The story is told to the goddess Earth by the Great Boar, an incarnation of Vishṇu, while raising her from the midst of primordial water in which she had sank during the great flood. Nos. 710, 714, 719, 726, 733. Fasc. IX, X, XI and XII, XIII. Total *five* fasciculi.

14. Tattva Chintámaṇi, edited by Pandit Kámákhyánátha Tarkavágíśa, with the commentary of Mathuránátha, is the standard work of Nyáya philosophy in the schools of Mithilá and Navadvípa. The second volume, with which the editor is now engaged, treats of the chapter on Inference. No. 707. Vol. II, Fasc. II. Total *one* fasciculus.

Tibetan Series.

1. Sher-Phyin, edited by Babu Pratápa Chandra Ghosha, is a literal translation in the Tibetan of the S'ata Sáhasriká Prajñá Páramitá, otherwise called the Rakshá Bhagavatí, the extent of which is estimated at 100,000 ślokas of 32 letters each. The work is written in prose, and contains so much repetition of the same matter, in words as well as in sentiments, that the editor has been obliged to omit them, giving only the catch-words of the matter repeated. The hundred thousand ślokas will not, it is expected, take so many fasciculi as the bulk of the MSS. would indicate. No. 729. Vol. I, Fasc. II. Total *one* fasciculus.

2. Avadána Kalpalatá, by Kshemendra, a voluminous Hindú writer of Káshmír, in standard Sanskrit as opposed to the verbose and ungrammatical style of the Buddhists, is being issued with its literal Tibetan translation, *R*togs *b*rjod *d*pag *b*sam *h*kri sin̂, under the joint editorship of Bábú Sarat Chandra Dás, C. I. E. and Pandit Harimohan Vidyábhúshan, Oriental Librarian to the Asiatic Society. No. 730. Vol. I, Fasc. II. Total *one* fasciculus.

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.
* ———— :—Koninklijke Akademie van Wetenschappen.
* Angers :—Société d' E'tudes Scientifiques d' Angers.
* Baltimore :—Johns Hopkins University.
* Batavia :—Society of Arts and Sciences.
* ———— :—Kon Natuurkundige Vereeniging in Nederlandsch-Indië.
* Berlin :—Gesellschaft Naturforschende Freunde zu Berlin.
* ———— :—Royal Academy of Sciences.
§ ———— :—Entomologische 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 Linnéenne.

* Brisbane :—Royal Society of Queensland.
§ ——— :—Royal Geographical Society of Australasia, Queensland Branch.
† 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.
* ——— :—Société Royale des Sciences de Liège.
§ Buda Pest :—Royal Hungarian Academy of Sciences.
* Buenos Ayres :—National Museum.
* ——— :—Academia Nacional de Ciencias de la Republica Argentina.
* Calcutta :—Agri-Horticultural Society of India.
* ——— :—Geological Survey of India.
* ——— :—Editor, Englishman.
* ——— :—Editor, Hindoo Patriot.
* ——— :—Editor, Indian Daily News.
§ ——— :—Editor, Indian Engineering.
§ ——— :—Editor, Indian Mirror.
* ——— :—Indian Meteorological Reporter.
* ——— :—Indian Museum.
† ——— :—Mahommedan Literary Society.
§ ——— :—Photographic Society of India.
† ——— :—Public Library.
* ——— :—Survey of India.
* ——— :—Tuttobodhini Shova.
† ——— :—University Library.
† Cambridge :—University Library.
* Cassel :—Der Verein für Naturkunde.
* Cherbourg :—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 :—Trigonometrical Branch, Survey of India.
* Dorpat :—Naturforscher-Gesellschaft der Universität.
* Dresden :—Entomologischen Vereins "Iris."
* Dublin :—Royal Dublin Society.
* ——— :—Royal Irish Society.

§ Dublin :—Geological Society of Dublin.
* Edinburgh :—Royal Society.
* ———— :—Royal Physical Society.
* ———— :—Scottish Geographical Society.
§ ———— :—Botanical Society.
* Florence :—Società Italiana di Anthropologia, Etnologia e Psicologia Comparata.
* ———— :—Società Africana d' Italia.
* Frankfurt :—Senckenbergische Naturforschende Gesellschaft.
* ———— :—Naturwissenschaftlichen Vereins des Regierungsbezirks.
* 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.
* Halle :—Deutsche Morgenländische Gesellschaft.
† ———— :—Kaiserlichen 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.
§ Jassy :—Societătiĭ Stüntifice Literare.
† Kiev :—Société des Naturalistes.
* Königsberg :—Die physikalische-Oekonomische Gesellschaft.
* Lahore :—Editor, Civil and Military Gazette.
* ———— :—Agricultural Society.
* Leipzig :—Deutsche Morgenländische Gesellschaft.
* Leyden :—Royal Herbarium.
* Liége :—Société Géologique de Belgique.
* ———— :—Société des Sciences.
* Liverpool :—Literary and Philosophical Society.
* London :—Anthropological Institute.
* ———— :—British Museum.
* ———— :—Editor, Academy.
* ———— :—Editor, Athenæum.
* ———— :—Editor, Nature.
* ———— :—Geological Society.
* ———— :—Institution of Civil Engineers.

* London :—Institution of Electrical Engineers.
* ——— :—Institution of Mechanical Engineers.
* ——— :—Linnean Society.
* ——— :—Royal Asiatic Society of Great Britain and Ireland.
* ——— :—Royal Astronomical Society.
* ——— :—Royal Geographical Society.
* ——— :—Royal Institution of Great Britain.
* ——— :—Royal Microscopical Society.
* ——— :—Royal Society.
* ——— :—Statistical Society.
* ——— :—Zoological Society.
* Lyons :—La Société d' Agriculture, d' Histoire Naturelle et des Arts Utiles.
† ——— :—Muséum d' Histoire Naturelle.
* ——— :—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".
§ ——— ;—Observatorio Meteorológico-Magnético Central.
§ ——— :—Estados Unidos Mexicanos.
* Moscow :—Société Imperiale des Naturalistes.
* ——— :—Imperial Society of Amateurs of Natural Sciences, Anthropology and Ethnology.
* Munich :—K. Bayerische Akademie der Wissenschaften.
* ——— :—Editor, Repertorium der Physik.
* Naples :—Società 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 :—Société de Géographie.
* ——— :—Société d' Anthropologie
* ——— :—Société Asiatique.
* ——— :—Musée Guimet.
* ——— :—National Library.

* Paris :—Société Zoologique.
* Philadelphia :—Academy of Natural Sciences.
§ ———— :—American Philosophical Society.
* ———— :—Journal of Comparative Medicine and Surgery.
* Pisa ;—Società Toscana di Scienze Naturali.
§ Prague :—K. K. Sternwarte.
§ Rio de Janeiro :—Museo Nacional.
* ———— :—Imperial Observatorio.
§ Rome :—Società degli Spettroscopisti Italiani.
§ —— :—R. Accademia dei Lincei.
§ Roorkee :—Indian Forester.
* St. Petersburgh :—Comité Géologique.
* ———— :—Imperial Library.
* ———— :—Russian Geographical Society.
* ———— :—Académie Impériale des Sciences.
* ———— :—Jardin Impériale de Botanique.
* San Franciso :—Californian Academy of Arts and Sciences.
* Santiago :—Deutsche Wissenchaftliche Vereines.
* Schaffhausen :—Swiss Entomological Society.
* Shanghai :—China Branch, Royal Asiatic Society.
* Simla :—United Service Institution of India.
* Stettin :—Entomological Society.
* Stockholm :—Entomologische Tidskrift.
* ———— :—Royal Swedish Academy of Sciences.
* Sydney :—Royal Society of New South Wales.
* ——— :—Linnean Society of New South Wales.
* Toronto :—Canadian Institute.
* Tokyo :—Imperial University of Japan.
* Trenton, N. J.—Trenton Natural History Society.
* Trieste :—Società Adriatica di Scienze Naturali.
* Turin :—Reale Accademia delle Scienze.
* ——— :—Osservatio Regia Universita,
† Ulwar :—Ulwar Library.
* Vienna :—Anthropologische Gesellschaft.
§ ——— :—K. K. Central-anstalt für Meteorologie und Erdmagnetismus
* ——— :—K. K. Akademie der Wissenschaften.
* ——— :—K. K. Geologische Reichsanstalt.
* ——— :—K. K. Naturhistoriche Hofmuseums.
* ——— :—K. K. Zoologisch-Botanische Gesellschaft.
* ——— :—Ornithologische Verein.
* Washington :—Commissioners of the Department of Agriculture.
* ———— :—Philosophical Society.

* Washington :—Smithsonian Institution.
* ———— :—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 Council Proceedings during 1889.

January 31st, Ordinary Meeting.

An application from the Geographical Society of Berlin for an exchange of publications was declined.

It was ordered that Part I of the Society's Journal should be continued to the Geographical Society of Paris.

Intimation was received from the Royal Academy of Sciences, Turin, that the competition for the seventh Bressa prize of the value of 12,000 Italian lire commenced on 1st January 1887 and would close on 31st December 1890, to be awarded to the scientific author or inventor of any nationality who should have made the most important and useful discovery, or published the most valuable work on Physical and Experimental Science, Natural History, Mathematics, Chemistry, Physiology and Pathology, as well as Geology, History, Geography and Statistics.

The name of Pandit Chandrakánta Tarkálankára was added to the list of distinguished persons who receive the Bibliotheca Indica, in recognition of the services he has rendered to Sanskrit literature.

Read a letter from the Government of India, Home Department, received through the Government of Bengal, requesting that a report on the progress made in the search for Sanskrit Manuscripts should be submitted after three years.

Sanction was accorded for the purchase of a copy of an annotated edition of the Padma Purána which was being published by the Hon. Ráo Sáheb Vishvanáth Náráyana Mandlik.

On an application from the Trustees, Indian Museum, enquiring whether the Society would publish a list of Oriental *Cicindelidæ*, compiled by Mr. E. T. Atkinson, as well as other lists on the same plan from time to time, it was decided to publish them as a Supplement to the Journal, Part II, and to supply the Trustees with 100 copies of each list on payment.

An application from the Bengal Telephone Company for permission to attach a stay for a telephone post to the wall of the Society's compound in Park Street, was referred to the Visiting Committee.

Permission was given to the Microscopical Society to hold a Conversazione in the Society's rooms about the middle of next month.

On the recommendation of the Philological Secretary the Society's Pandit was authorized to be paid for his services in editing the Sanskrit text of the "*Avadana Kalpalata*," the rate of remuneration being referred to the Philological Committee.

February 28th, Ordinary Meeting.

An application from Lieut.-Col. Court to subscribe to a translation of the Bústán of Sádí, which he proposed publishing, was declined.

Mr. G. G. Palmer was allowed the loan of the two paintings, "Cupid asleep on a cloud," and "Sir William Jones," for the purpose of making a copy of them, he having promised to clean and varnish the paintings previous to returning them.

Messrs. Meugens and King were appointed Auditors of the Society's accounts for the present year.

Permission was granted to Mr. R. Knight to consult the Society's library for the collection of information in connection with a history of the Indian press which he was engaged in writing.

Major H. G. Raverty was asked, in reply to a reference, to send his paper on the changes in the courses of the Indus and the Punjab rivers for publication in the Journal, and informed that the indexes to his translation of the *Tabaqát-i-Násirí* were in preparation, and, if necessary, would be submitted to him before publication.

Mr. C. Little was appointed General Secretary, Dr. Hoernle, who had been conducting the duties, having resigned.

Dr. J. Burgess was allowed to purchase some volumes of the Society's Journal from 1854 to 1863, of which there were 5 or more copies in stock, in order to complete his set.

A proposal by the President that the Finance Committee should be termed the Finance and Visiting Committee, and meet monthly on the Monday before the Council meeting, was approved.

The several Committees for 1890 were appointed.

On the recommendation of the Philological Committee remuneration at the rate of Rs. 1/8 per page was sanctioned to the Society's Pandit for editing the Sanskrit portion of the *Avadána Kalpalatá* under publication in the Bibliotheca Indica.

The Visiting Committee having reported that there appeared to be no objection to affix a stay for a telephone post belonging to the Bengal

Telephone Company to the wall of the Society's componnd, the necessary permission was granted.

March 28th, Ordinary Meeting.

The thanks of the Council were conveyed to Mr. T. R. Munro for his presentation to the Society of two enlarged photographs of plans Calcutta; one, taken in 1723 or 1724, showing the palisaded enclosure within which the Christian community resided, and the other taken from a survey made in 1753 by Lieutenant Wills, in command of the Artillery in Bengal.

An application from the Ungarischer Karpathen Verein for an exchange of publications was referred to the Natural History Secretary.

It was resolved on a letter from Count Landberg, asking the Society to delegate some of its members to the 8th International Congress of Orientalists to be held at Stockholm and Christiania in September next, that Mons. E. Senart should be invited to represent the Society.

Authority was given to sell from the reserve stock of the Bibliotheca Indica publications certain Sanskrit works applied for by Dr. Lanman, Professor of Sanskrit in Harvard College, Cambridge, U. S. A.

It was decided on a proposal made by the President, to issue as a Supplement to Part II of the Journal, a set of Metric Tables prepared for the use of the Survey of India offices, provided the sanction of Government could be obtained to the publication by the Society.

The Secretary of the Theosophical Publication Fund Society at Bombay having agreed to accept the conditions laid down by Dr. Mitra for permission to reprint his translation of Patanjali's *Yoga Sutra*, was informed that the required permission would be given on receipt of an agreement duly signed.

April 25th, Ordinary Meeting.

An exchange of publications with the Society of Naturalists, Kiev, was sanctioncd.

An offer from Maulavi Sakhawut Hossein to make an Urdu translation of Beale's Oriental Biography, if the Society would publish the work at its own cost, was declined.

Dr. A. Crombie was appointed a Member of the Council in place of the Hon. A. Wilson, resigned, in consequence of leaving India on furlough.

A presentation was announced from Mr. J. T. Gladstone of a photograph of the palm tree (*Corypha*, sp. inc.) flowering in the Society's grounds.

Mr. F. E. Pargiter was informed, in reply to an application that two Manuscripts of the *Markaṇḍeya Puráṇa* might be consulted and a list of the various readings of importance be noted, that the Society would endeavour to get the Manuscripts, but that he must make his own arrangements for collating them.

On the report of the Library Committee an offer of Rs. 40 was made for a copy of Seebohm's work on Snipės, Plovers and Sandpipers offered to the Society. The offer was accepted.

It was decided, on a suggestion by the President, that a footnote should be added to the investment account showing the different funds to which the investments appertained.

A copy of a Catalogue of Sanskrit Manuscripts to be sold by auction at Allahabad was referred to Dr. Rájendralála Mitra.

May 30th, Ordinary Meeting.

An application from the Academy of Sciences, Cracow, for an exchange of publications was declined.

In reply to an enquiry by the Deputy Commissioner of Hurdui whether the Society could give a donation of its publications to the Colvin Library lately opened at that station, it was ordered that a list of the publications in the Bibliotheca Indica should be forwarded to ascertain whether it contained any books that would be likely to be useful.

A letter from Mr. F. E. Pargiter reporting that an old Muhammadan resident of Maldah, had written an interesting account of that district, with its ruins at Gaur and Panduah, and collected a number of rubbings of the inscriptions there, was referred to the Philological Committee.

On the report of the Natural History Secretary, the application from the Ungarische Karpathen Verein for an exchange of publications was declined.

An application was made to the Government of Bengal to place the name of the Strasburg University Library on the list of Institutions to whom the Notices of Sanskrit Manuscripts are presented.

The loan from the library of Keith Johnston's Physical Atlas was authorized to a member for one week.

June 27th, Ordinary Meeting.

Read a letter from the Secretary, Theosophical Publication Fund Society, Bombay, stating that the intention of reprinting Dr. Rajendralála Mitra's translation of Patanjali's Yoga Sutra had been given up, and that a new translation of the work would be made for publication by the Society.

An offer for the sale to the Society of a rare collection of Indian views in water colours by Indian artists, was declined.

It was decided on the report of the Philological Committee, with reference to a proposal to place on record a resolution expressive of the great loss the Society has sustained by the death of the late Hon. Ráo Sáhib V. N. Mandlik, C. S. I., of Bombay, that the usual notice should be taken in the annual report.

In order to ascertain whether the report written by an old Mahomedan resident of Maldah contained any fresh valuable matter relating to the ruins at Gaur and Pandooah, it was resolved, on the recommendation of the Philological Committee, that the report should be obtained for examination.

A copy of the continuation of Hewitson's "Exotic Butterflies," now publishing in parts, was subscribed for.

An application from the Société Neuchateloise de Géographie for an exchange of publications, was declined.

August 1st, Ordinary Meeting.

In compliance with a request made by the Government of Bengal a complete set of the notices of Sanskrit Manuscripts prepared by Dr. Rajendralála Mitra was supplied to the Library of the Indian Institute at Oxford.

Enquiries were ordered to be made as to the cost of a complete set of the Muybridge Photographs of animal locomotion, and of the sets of 100 plates, with reference to suggestions for purchasing a copy of the work for the Society's library.

A list of the names of the governing body of the Society was ordered to be filed annually with the Registrar of Joint Stock Companies in order to meet the requirements of Act XXI of 1860.

Mr. Beames was elected a Member of the Council in the vacancy caused by the death of Dr. Waldie.

August 29th, Ordinary Meeting.

An intimation was received from the Johns Hopkins University, Baltimore, that the Asiatic Society had been placed on the list of Libraries to receive the printed "Theses," or Dissertations, accepted for the degree of Doctor of Philosophy at the University.

In reply to a representation from the Trustees, Indian Museum, Dr. Rajendralála Mitra explained that his non-attendance at any of the meetings of the Trustees for the past twelve months had been due to his serious illness. Leave of absence was granted to Dr. Mitra till November, and he promised to resign his Trusteeship in December in the event of not being then able to discharge his duties as a Trustee.

Read a letter from the Government of Bengal conveying the cor-

dial approval of the Lieutenant-Governor as to the manner in which the Government Grants-in-aid of the Oriental Publication Fund, and the Conservation of Sanskrit Manuscript Fund had been administered during the year 1888.

A letter from Monsieur A. Suchetet asking to be furnished with the names of Naturalists belonging to the Society, and others, to whom he could address enquiries concerning hybridity of birds, reptiles insects, &c., was referred to the Natural History Secretary for disposal.

A proposal from the Trustees, Indian Museum, to accept an offer made by Baron de Selys Longchamps to compile a catalogue of the *Odonata*, to be issued as a Supplement to Part II of the Journal, was approved, the Trustees agreeing to pay for the separate copies to be supplied to them. The catalogue to be distributed only to those members who ask for it.

It was resolved on the recommendation of Dr. Rajendralála Mitra, supported by the Philological Committee, that Dr. Agornath Chatterjee should be appointed to translate the *Susruta*, the present Editor, Dr. R. Sen, having been obliged to resign in consequence of the pressure of official duties. Dr. Chatterjee was informed that he would be required to engage a Vaidya Pandit to assist him in the work, whose name must be submitted to the Council for approval, and that he would be allowed remuneration at the maximum rate of Rs. 3 per page to enable him to secure the services of a really efficient person.

The loan from the Society's Library of two books on Buddhism was sanctioned to Dr. Karl Marz, of the Moravian Mission in Leh, a Tibetan scholar; also that he should be presented with a copy of each fasciculus of the Society's Tibetan publications in the Bibliotheca Indica.

Read the prospectus of a work named the "Hellenistichen Reliefbilder," in course of publication, to cost about £11 : it was decided that the work was too expensive for purchase.

September 26th, Ordinary Meeting.

An application from the Librarian of the Natural Science Association of Frankfurt a, Oder to be furnished with a copy of the *Journal* in addition to the *Proceedings*, was declined.

An exchange of publications from 1881 was sanctioned with the American Museum of Natural History, New York, the Journal, Part II, being given for the Museum Bulletins and Annual Reports.

A proposal to purchase a copy of a work on "American Spiders and their spinning work" was referred to the Library Committee.

Remuneration at the rate of Rs. 2/8 per page was sanctioned to Mr.

F. E. Pargiter for his translation of the *Markaṇḍeya Puráṇa*, publishing in the Bibliotheca Indica.

The question of the cost of publishing Mr. Grierson's history of the "Modern Vernacular Literature of Hindustan" was referred to the Finance Committee.

It having been reported to the Council that the tomb of the late Mr. Blochmann in the Circular Road Cemetery was in a dilapidated state and would cost Rs. 32 to restore to its original condition, Dr. Hoernle was asked to see the tomb, and in case of repairs being necessary to issue the necessary orders up to that amount.

October 31st, Ordinary Meeting.

The Principal of the Agra College having applied for the return of the Manuscript of the *Prithi Raj Rásáu*, by Chand, it was decided on the recommendation of the Philological Secretary to discontinue the further publication of the work in the *Bibliotheca Indica*, it not being historical, and there being grave doubts of its genuineness as a bardic composition.

The prospectus of the Muybridge photographs of animal locomotion having been considered by the Council, it was decided not to purchase any of them for the library.

The purchase of a copy of the work on American Spiders and their Spinning work was sanctioned on recommendation of the Library Committee.

Maulvi Abdul Rahim having been obliged to resign the editorship of the "Maásir-ul-Umara" on account of ill health, Maulvi Mirza Ashraf Ali, 1st Persian Teacher of the Calcutta Madrassa, was appointed to carry on the work.

An exchange of publications with the Queensland Branch of the Royal Geographical Society of Australasia was declined.

November 28th, Ordinary Meeting.

An application from the Natural History Association of Bonn, on the Rhine, for an exchange of publications, was declined.

The presentation of some of the publications of the *Bibliotheca Indica* was sanctioned to the Colvin Library at Hardui.

Dr. Rájendralála Mitra resigned his place as a representative of the Asiatic Society on the Board of Trustees of the Indian Museum.

Dr. Agornath Chatterjee was informed in reply to a request that he might be allowed to consult all the leading Vaidya Pandits in the translation of the "Susruta," instead of being confined to the entertainment of a single Vaidya Pandit, that the Council could not recede from

their condition that the Editor should employ a Vaidya Pandit, whose name must be submitted for approval.

Bábú Haran Chandra Gupta was appointed to act as Assistant Librarian during the absence on leave of Mr. J. H. Elliott.

The lists of Office Bearers and Members of Council for 1890 were ordered to be circulated to the Members of Council.

December 19th, Ordinary Meeting.

On the application of Pandit Chandrakánta Tarkálankára, the loan of a Manuscript of the Parásara Madhava-Vyavahara-kanda was obtained from the Benares College, to assist him in editing the Parásara Madhava for the Bibliotheca Indica.

A Catalogue drawn up by Dr. Hoernle of a collection of coins formed by Captain De Læssoe in Central Asia, submitted by the Trustees of the Indian Museum, was accepted for publication as a supplement to the Journal, Part I, the Trustees contributing two-thirds of the whole cost of printing, in return for 150 separate copies.

The lists of Office Bearers and Members of Council for the ensuing year were approved.

Mr. C. Little was appointed a Trustee of the Indian Museum on behalf of the Asiatic Society in the vacancy caused by the resignation of Dr. Rájendralála Mitra.

The Report having been read the PRESIDENT invited the meeting to put any questions or to 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.

ADDRESS.

It is unnecessary for me to say much more regarding the working of the Society after the report which has just been read. It is satisfactory to note that our member list showed a small increase and that the publications of the year have been unusually voluminous and, in point of interest and variety of the subjects treated on, compare favourably with those of previous years. Also that the Catalogue of Tibetan MSS. has been published and that of the Persian works in the Library is approaching completion. The year has necessarily been one of quiet and, as far as possible, of economy, in order to allow our finances to recover

from the heavy expenditure of the previous year. We have good reason to be proud of the volumes forming our *Journal* for the past year and they bear the strongest testimony to the energy and industry of the editors and to the recognised value of the *Journal* as a medium of publishing the work of our members; but as we were hardly prepared for so heavy an expenditure on plates in bringing out those published during the last two years, coming so soon after the repairs to our building had exhausted our temporary reserve fund, some curtailment in this respect will be necessary to clear off our liabilities on this head. As I remarked last year, the ordinary income is scarcely sufficient to meet our annual requirements, and unless we desire to see our permanent vested fund dwindling steadily down, we must endeavour to keep our expenses well within our income, however much we may regret the necessity, and the consequent limitation of our publications and other useful work. There is no immediate pressure, but in order to guard, if possible, against a contingency that seems likely to occur if it is not checked at once, I think it my duty to give this word of warning, and I would very earnestly impress upon our members the necessity of increasing the resources of the Society and of prompt payment of their subscriptions. There is, I am sorry to say, always a very large outstanding on this account which causes great inconvenience and loss.

I much regret that an unusually heavy pressure of work in connection with the new Photographic and Lithographic Office buildings and the removal of the offices into them, as well as failing health, which obliged me to take a short change to Europe for three months, have made it impossible for me to devote so much time as I could have wished to the affairs of the Society, or to do all that I had hoped to have done during my Presidentship.

I have again to very warmly acknowledge the assistance given me by the office-bearers in carrying on the affairs of the Society and by our late President, Mr. Atkinson, who kindly acted for me during my absence. I would remind you that the valuable services of our officers are given to the Society voluntarily and at the sacrifice of their private time and leisure, and I would ask you for a very hearty vote of thanks to Mr. Wood-Mason, who, as Vice-President, continues to give the Society the benefit of his labours and long experience in editing the Natural History and Physical Science part of the *Journal;* to our Honorary Secretaries, Dr. Hoernle, who continues so ably to carry on the work connected with the Philological and Historical part of our *Journal*, and Mr. Little, the General Secretary and editor of the *Proceedings*; and to our Treasurer, Dr. W. King. (*The vote was passed unanimously.*) I would also say a word in praise of the zeal and industry of Mr. Ronaldson, our Assistant Secretary, and of the subordinate staff.

Obituary. I grieve to say that the hand of death has removed from among us many of our valued Honorary and Ordinary Members during the year.

Among the Honorary Members :—Colonel SIR HENRY YULE, R. E. K. C. S. I., C. B., joined the Society as an Ordinary Member on the 2nd July 1856, and was elected an Honorary Member in April 1876. He contributed several papers to the *Journal*, including "Notes on the Kasia Hills and People," and "an account of the ancient Buddhist remains at Pagan." In 1855 he was attached to Sir A. Phayre's mission to the Court of Ava and wrote a very valuable and graphic account of it. The Map of Burma which accompanied it was until quite recently almost the standard map of that country. He retired in 1862 and devoted his leisure to geographical and philological studies, resulting in his publishing several valuable works, the first of which was "Cathay and the way thither," an account of the attempts to reach China overland during the Middle Ages. This was followed by his well-known scholarly edition of the "Book of Ser Marco Polo." In 1886 he brought out a "Glossary of Anglo-Indian Terms," which was commenced in connection with Dr. Burnell, and is sometimes known as "Hobson Jobson." His last work was illustrating and annotating the "Diary of William Hedges," a work which contains much that is interesting regarding the early history of Calcutta and other early English settlements in India, and the third and last volume of which was published last year by the Hakluyt Society, of which he was for a long while President.

Nominated a life member of the India Council in 1875 he did much to encourage geographical work in this country, both officially and privately, by his readiness to assist any one interested in such work by kindly help and support, as I can personally testify. I think I shall only faintly express the general sentiment when I say that in Sir Henry Yule, Indian, though I ought more properly perhaps to say Asiatic, Geography has lost one of its best friends and most able exponents.

DR. WILLIAM WRIGHT, Fellow of Queen's College, Cambridge, and Sir Thos. Adams' Professor of Arabic died on the 22nd May. He was elected an Honorary Member in December 1881, and enjoyed a cosmopolitan reputation as an Arabic scholar. Among his works may be cited an Arabic Dictionary; *Opuscula Arabica*, collected from the MSS. in the University of Leyden, and the "*Kamil*" of El-Mubarrad. He had lately been preparing for the press the "*Dewan*", of Jarir, and the "*Nakaid*", of Jarir and al-Tarazdak.

A man of genial nature and sterling character, always ready to assist his brother Orientalists, his loss is severely felt not only at Cambridge, where he was best known, but universally.

Dr. J. Prescott Joule, F. R. S. who died in October last, was elected a special Honorary Member on the occasion of the Centenary of the Society in 1884. An expert and persevering experimentalist, he discovered, in 1841, the mechanical equivalent of heat, from which he deduced the law of the conservation of energy, and that energy is in the same degree as indestructible and uncreatable as matter. This law, now universally recognised, has worked a revolution in science and led to many important discoveries in thermo-dynamics, electro-dynamics and the dynamical theory of gases, as well as in biology. He was for many years closely connected with the Literary and Philosophical Society of Manchester as Secretary, Vice-President and President.

Among the Ordinary Members—

Dr. Francis Day, C. I. E., was elected a member of the Society in April 1869, and is best known as the leading authority on ichthyology and fish culture generally, though more particularly in connection with the fish and fisheries of this country. His '*Fishes of Malabar*' appeared in 1865, and in 1875 he commenced the publication of his great work on the "*Fishes of India*", which was completed in 1878, though a supplement was published last year. At the time of his death Dr. Day had completed the MSS. of two volumes on the "*Fishes of India*" to form part of the new "*Fauna of British India*" now being brought out under Dr. W. T. Blanford's supervision. These volumes have both been lately published. Dr. Day contributed several papers to our *Journal* and *Proceedings*, the principal being his "Monograph of the Indian *Cyprinidæ*" and "Notes on Fish collected by Dr. Stoliczka in Kachh." He died on the 10th July, at Cheltenham.

Dr. D. Waldie was elected an Ordinary Member in November 1865, and at the time of his death was a member of our Council. He had a considerable share in the discovery of the use of chloroform as an anæsthetic, and was a sound chemist. He contributed several papers to our *Journal* and *Proceedings*, chiefly connected with the effective filtration of the Calcutta water supply.

Mr. E. J. Jones, Deputy Superintendent of the Geological Survey, who died on the 15th October last, was elected an Ordinary Member in August 1884 and contributed papers to the *Proceedings* "on some nodular stones from the Bay of Bengal." He was a member of the Physical Science and Natural History Committees and promised to be a very useful member of the Society. His premature death is much to be regretted.

Mr. Otto Christian Rehling Möller was elected an Ordinary Member in December 1883. He was born at Copenhagen in January 1848, and was educated as a Civil Engineer. After being employed

for some years in the construction of the Danish railways, he came to India in December 1876, and took up the management of a tea-garden in the Sikkim Terai, but owing to ill-health he took the appointment of first assistant on the Tukvar tea estate near Darjeeling. In Europe, he had devoted much of his leisure to the study of Birds' eggs and Lepidoptera; in India he followed with ardour the same pursuits and in addition made a large collection of bird skins. He sent numerous notes on the nidification of Indian birds to Mr. Allan Hume, which will be found spread over the latter's works on the Avi-fauna of India. He made the most extensive collection ever got together of the Lepidoptera of Sikkim and Bhutan, of which the rhopalcerous portions alone numbered nearly 600 species. In conjunction with Mr. J. H. Elwes, he wrote a paper on the Butterflies of Sikkim, published in the *Transactions of the Entomological Society of London*, for 1888. He died on January 25th, 1889, at the early age of 41.

Shams-ul-Ulama Maulvi Kabir-ud-din Ahmad Khán Bahádúr was first elected an ordinary member in June 1869, and had long been connected with the work of the Society in the *Bibliotheca Indica.* He was for many years Resident Munshi and Assistant Examiner of the Central Madrassa Examinations, and was afterwards appointed Munshi to the General Board of Examiners, which post he held till he died. He was one of the Persian Editors of the *Bibliotheca Indica* for upwards of twenty years. He also started a press and published a large number of Arabic and Persian works. He was made Khán Bahádúr in 1875, and the title of Shams-ul-Ulama was conferred on him a year or two ago.

Maharája Isvariprashád Singh, C. S. I., of Benares, was one of the oldest members of our Society, having been elected an ordinary member in 1853.

The Hon. Rao Sahib Visvanath Narayana Mandlik, C. S. I. was elected a member in May 1880. He was best known for his '*Commentaries on the Institutes of Manu*,' and did not contribute to the Society's *Journal* or *Proceedings.*

Annual Review.

I propose now, as last year, to place before you a brief review of the progress of Science and Oriental Literature and Philology in India and its nearer borderlands during the year, so far as I have been able, under the difficulties already mentioned, to collect them. I had, indeed at one time lately felt myself obliged, owing to press of work, to give up the idea of giving you an address in this form; but as I felt that it was most desirable, if possible, to keep up the sequence of these annual reviews I have endeavoured to do what I could, and trust that you will excuse any shortcomings.

At the same time I must confess that the task imposed upon our Presidents of giving an annual address is, as Mr. Medlicott remarked in his very practical address as President ten years ago, somewhat more or less of an incubus. Coming as it does at the busy season of the year, it is really very difficult to find time to put together anything like satisfactory resumé of the literary and scientific work of the year and for the same reason, one feels disinclined to ask one's friends to share the labour, though I must gratefully acknowledge the kind assistance I have received in preparing my address last year and again this year.

During the year steady and active progress seems to have been made in India in all branches of the subjects falling within our ordinary scope, though there is nothing exceptional to record. As usual, we have to look to the scientific departments of Government for the principal additions to our knowledge of Indian geography, geology and mineralogy, meteorology, botany (scientific and economic), chemistry, archæology, biology and, to a very great extent, of zoology, which seems to be the one subject that appeals more than any other to the private worker. It is satisfactory to note the increasingly practical and remunerative tendency of the work done in the Government scientific departments, though pure science is by no means neglected. There are few countries where so much scientific work is done by Government as in India, as evidenced by the many valuable publications that are yearly brought out in the branches of science above enumerated. When we contrast the state of Indian scientific literature now with what it was when I joined the service some 30 years ago, the value and amount of the work of this kind done by the Government will be clearly seen. There were then no Archæological Surveys, no Meteorological Department, no Scientific Annals of any kind except, I believe, the Records of the Geological Survey, and the Reports of the Great Trigonometrical Survey. The principal Museum in the country was our own, and most of the scientific work done was by members of our Society. As I remarked last year, it is in many ways an advantage that scientific work in India should be centralised in departments under Government, still it is to be regretted that there are not more private workers in the field. I have been very much struck in going through the scientific literature of the year to see how little attention seems to be paid to India as a field for scientific work, especially considering the comparatively large number of travellers and visitors who now come to this country and often spend some time here. Of scientific works, either in English on the vernaculars, by native authors, there appear to be few or none beyond elementary school books. I am glad, however, to hear that more

attention is being paid to scientific pursuits among the natives of this country, though it must naturally be long before the scientific habit of investigation can be fully developed among them. Three Bengali students have just passed the M. A. examination in Zoology, and one in Geology. This is encouraging, and it is to be hoped that in time they will do good original work, and that their example will be followed by others.

The opening of Technical Institutes in the Bombay Presidency and the Punjab is also an encouraging sign of advance, though I feel some doubt as to whether such Institutes are really the best means of thoroughly teaching handicrafts, and whether some such arrangement as appears to be followed in Europe of special schools attached to various guilds, would not be more successful. I speak, however, with an imperfect knowledge of the subject. The great thing, it seems to me, is to teach the youngster the use of his hands and eyes, and when this is once attained, the further development can be left to work itself out. A good training of the eye in drawing and of the hands in simple carpentry and smith's work would instil a habit of observation and exactness and be a very good foundation to begin upon for subsequent technical or scientific education.

Our Society.

Of our *Journal*, Part I, devoted to philology, antiquities and literature, two parts only were published during the year, with 6 plates. Mr. Grierson's valuable essay on the Modern Vernacular Literature of Hindustan, which was noticed in last year's address, has been published, after considerable revision, as a special number of the *Journal*, Part I, for 1888. Special attention may be drawn to the joint paper in No. 2 by Mr. V. A. Smith and Dr. Hoernle on the inscribed seal of Kumára Gupta II, which is accompanied by a synchronistic table of the reigns of the Early Guptas and their contemporaries and immediate successors, and is illustrated by an excellent collotype plate. There are two papers on coins by Mr. Oliver and Dr. Hoernle ; a paper on the Antiquities of Rampál, by Mr. Asutosh Gupta ; our whilom guest, Mr. Lanman, has contributed a note on the Namuchi-myth, and Babu Sarat Chandra Das, C. I. E. has given an account of the life of Sumpa Khan-po, the author of the Rehumig.

The *Journal*, Part II, No. 4, of 1888, contains 9 papers, illustrated by 14 plates, including 3 coloured ones of butterflies illustrating Mr. de Nicéville's paper on new or little known Butterflies from the Indian Region, and 6 to Mr. Blanford's List of Himalayan Ferns from about Simla. Babu Asutosh Mukhopadhyay contributes a paper on the Dif-

ferential Equation of all Parabolas. There are two other Entomological papers, one by Mr. E. T. Atkinson on Indian *Rhynchota*, and on the Butterflies of the Nilgiri District, by Mr. G. F. Hampson. Mr. S. A. Hill has a note on the Psychrometer and the condensing Hygrometer. Mr. Anderson describes a new ciliate Infusorian. General Collett, C. B. contributes a paper on the geological structure of the Myelat district in Burma, and Mr. Wood-Mason has a note on some objects found by Mr. Driver in a neolithic settlement in Chútia Nágpur.

The volume for 1889, of which four numbers and two supplements have already been published, contains no less than 23 papers, illustrated by 23 plates. Our Vice-President, Mr. E. T. Atkinson, C. I. E., contributes several valuable entomological papers which will be noticed hereafter, and the Supplement No. 1, with 199 pages of letterpress, is devoted to his two Catalogues of the order *Coleoptera*, family *Cincindelidæ*, and of the order *Rhynchota*, sub-order *Hemiptera—Heteroptera*, family *Capsidæ*. These Catalogues form part of a proposed complete "Catalogue of the Insecta of the Oriental Region." The remaining papers deal with many branches of science: Mr. Hill has given a very full account of the Tornadoes and Hailstorms of April and May 1888 in the Doab and Rohilkhand. Babu Asutosh Mukhopadhyay contributes three papers on pure Mathematics—"On some applications of Elliptic Functions to problems of mean values" and on the "Geometric Interpretation of Monge's Differential Equation to all Conics." Our Vice-President, Mr. Wood-Mason, has a short notice of a neolithic Celt from Jashpur in the Chútia Nágpur District, besides a paper on the Ethiopian and Oriental representatives of the Mantodean sub-family *Vatidæ*. Dr. Alcock has given us a continuation of the valuable papers on the results of the cruises of the Indian Marine Survey Steamer "Investigator" under Commander Carpenter, R. N., including an important paper on the Fishes of the Bay of Bengal. Of Botanical papers there are three—one by Dr. G. King, C. I. E., F. R. S., on the Flora of the Malayan Peninsula; Dr. A. Barclay gives a list of the *Uredineæ* of Simla, and Dr. Prain describes some new species of *Pedicularis*. Mr. A. Pedler gives a paper on the Volatility of Mercury and its compounds, and Mr. Anderson a note on Indian *Rotifers*.

The second supplement is a reprint of some Tables of Metric Weights and Measures, prepared by myself with the assistance of Mr. T. A. Pope, and revised by Mr. W. H. Cole, M. A., at the Survey of India Office, Dehra Dun. They were mainly intended for use in my own office, but as they appeared likely to be useful for general purposes, they have been published separately, and Colonel Thuillier, the Surveyor General, was kind enough to obtain the permission of Government to their being printed as a supplement to the Society's *Journal* before the type was broken up.

Of the *Proceedings*, edited by the General Secretary, Mr. Little, 10 numbers have been published. They contain, besides the interesting reports on coins by Dr. Hoernle, several short papers, among which may be noted Mr. W. L. Sclater's on a collection of Mammals from Sháhpur in the Panjab; a note on the use of Alizarin Blue in photographing the red end of the Spectrum and of the new dye Rhodamine for orthochromatic photography; notes on Jay Mangalagarh, by Mr. Asutosh Gupta, C. S., and on three new Hemoptera by M. L. Lathiery.

Bibliotheca Indica. Good progress has been made in the publication of the works in hand in the Arabic and Persian, the Sanskrit and the Tibetan series of the *Bibliotheca Indica.* Three new publications have been taken in hand, *viz.*,—the *Tazuk-i-Jehángírí*, in the Arabic-Persian, and the *Márkaṇḍeya Puráṇa* and *Bṛihad-devata* in the Sanskrit. The *Içábáh* and the *Muntakhabu-t-Tawáríkh*, in the Arabic-Persian series, and the *Manu Ṭíká Sangraha* and *Sámkhyá Sútra Vritti*, in the Sanskrit series, have been completed.

Barrisal Guns. The Sub-Committee of the Society which was appointed in the previous year to investigate the causes of the mysterious sounds known as Barrisal guns have submitted their report which was published in the *Proceedings* for August. The Committee are of opinion that the evidence is very strongly in favour of the sounds being closely connected with the river banks. Mr. Manson's theory of echoes from the river banks is supported by strong circumstantial evidence, and explains many peculiarities noticed in connection with the sounds; it at least deserves, therefore, that efforts should be made to disprove it. By thus narrowing the enquiry it is more likely that some definite result may be arrived at. Great credit is due to Mr. Little, our General Secretary, for the labour he has devoted to this investigation and the working out of the various observations. It is to be hoped that further attention may be paid to the subject by skilled observers, and that we may now be able to ascertain something more definite as to the actual origin of the sounds.

Other Societies and Institutions.

Microscopical Society. This Society has just published its second annual report and appears to be making good progress under the Presidentship of Mr. Wood-Mason. Considerable additions have been made to the Society's cabinet and a very complete gas microscope has been presented to the Society by Sir Henry S. Cunningham. Many interesting papers have been read at the meetings. Among them—a note on the sound-producing organs of Crustacea, with special reference to those of the *Stomatopoda*, by the President. Descriptions of new microscopic ap-

paratus, by Mr. E. J. Jones, late Vice-President. On a species of *Podophrya* found in water from the "Triangular Tank" in Park Street, by Mr. W. J. Simmons, the Secretary. On some Floscules found in Calcutta tank-water and Notes on Indian Rotifers, by our member Mr. H. H. Anderson. The latter paper has been published in our *Journal.*

The Bombay Natural History Society, continues to flourish and increase its sphere of usefulness. When in Bombay last December, I was much pleased with the admirable little Museum of natural history curiosities the Society has got together under the care of Mr. Phipson, the energetic Secretary, who was kind enough to point out to me the principal objects of interest. Four numbers of the Journal have been published during the year containing several interesting papers which will be noticed under their respective heads. Among them may be specially mentioned Lieut. H. E. Barnes' papers on Nesting in Western India, illustrated with 3 coloured plates. Mr. Oates' paper on Indian and Burmese Scorpions, also illustrated with a plate. Mr. de Nicéville's on new and little known Butterflies from the Indian Region, with two coloured plates. A note on man-eating Tigers, by Mr. Reginald Gilbert, and Mrs. J. C. Lisboa's short notes on the Odoriferous Grasses of India and Ceylon.

Bombay Branch of the Royal Asiatic Society. From the last published report this Society appears to be doing well and the member list is increasing. Papers have been read at the meetings by Mr. J. J. Modi—"The Karun River opened to trade by the Persian Government;" by Dr. P. Peterson, "Nyayabindhu of Dharmotavra, a Buddhist work on Logic;" by the Hon'ble Mr. Justice K. T. Telang, C. I. E., "The date of Puranawarma and Sankaracharya." Dr. Peterson has been obliged to resign the Secretaryship after holding it for 6 years and is succeeded by Mr. Yajnik.

Turning now to the work done by our Indian Museum and kindred Institutions, it is satisfactory to observe that the various Museums in different parts of India seem to be exerting a great educational influence on the teeming masses in this country. It is reported more than once that the native visitors to the Museums are commencing to take a really intelligent interest in the collections and do not come only as mere sight-seers. Mr. Thurston, the Superintendent of the Madras Museum, has estimated the cost-rate of each visitor to the Museum to be between 1 and 2 annas, and following up the same idea and applying it to different other Museums in various parts of India, it is somewhat remarkable to find how close the cost-rates are for all of them, and at what a very small cost per visitor these Museums are maintained. In most cases it is little over an anna, or about one penny a head.

It may not be out of place to note the importance of the work of provincial and local Museums being confined, as far as possible, to the complete illustration of the products of their own particular provinces or localities. This should be their primary object, in order that students desirous of consulting the collections may at once feel sure that the exhibits belong to that locality, and to no other. This system, no doubt, entails some loss of educational power, but if objects from other localities are admitted, their place of production or origin should be very distinctly marked upon them and, if possible, they should be kept quite apart from the local collections.

Indian Museum. This great institution, with which our Society is so intimately connected, continues its work in the directions which have been noticed in previous addresses from this chair. You will be glad to hear that the new extension in Sudder Street, for the accommodation of the Ethnological, Economic and Art collections, taken over from the Government of Bengal, is making rapid progress towards completion, and, it is hoped, may be ready for the reception of the collections in the course of a few months.

The Museum was visited during the year 1888-89 by 393,311 persons, at a cost-rate per person of about 2·6 annas, inclusive of the Economic Section.

The publications issued by the Trustees during the year have been almost exclusively entomological and include Part I. of a *Monograph of Oriental Cicadidæ*, by Mr. W. L. Distant. This work is illustrated by plates which will be of service to workers in India in the determination of their collections, while the account that is given of each species is intended to dispense with the tedious references to obscure publications hitherto required in studying this group of insects. The part deals with 28 species.

The first part of a "*Catalogue of the Mantodea*," by Mr. Wood-Mason, has been issued. This work, which deals with 87 species, is illustrated with numerous woodcuts, and includes the results of the attention which its writer has for many years devoted to this small but interesting family of *Orthoptera*. The second part is making good progress.

The *Catalogue of the Moths of India*, by Mr. E. C. Cotes and Col. Swinhoe, noticed in the addresses of the past two years, has at length been completed with the issue of parts V, VI and VII. with Index, which have appeared during the year. This Catalogue gives the synonymy and geographical distribution, so far as it is known, of the Moths that have been described as occurring in India and Ceylon. It includes some 5000 species and is a valuable contribution to Indian Entomology.

Mr. de Nicéville has continued his work on the *Butterflies of India*, of which volume III, containing the *Lycænidæ*, has just been published.

To facilitate the study of Indian Entomology, the publication has been commenced, in our *Journal* of a series of Catalogues of the various groups of Oriental *Insecta*. Two of these Catalogues, comprising the *Cicindelidæ* and *Capsidæ*, have been compiled by our late President, Mr. E. T. Atkinson, C. I. E., and published as a Supplement to Part II. of the *Journal*. Mr. Atkinson's work has been taken as the model upon which the catalogues of other groups are to be constructed as entomologists can be found to undertake them. Mr. Atkinson has also commenced a similar catalogue of *Carabidæ*, while progress has been made with the catalogues of the *Orthoptera*, *Neuroptera*, and *Diptera*, undertaken by Dr. Henri de Saussure, Mons. le Baron de Selys Longchamps, and Mons. J. Bigot respectively, whilst Mr. Cameron's "*Catalogue of the Oriental* Hymenoptera" provides for that group.

Progress has been made with the classification of the general entomological collections of the Indian Museum, where large numbers of fresh specimens have been received and their determination in many cases effected with the aid of entomologists in different parts of the world. The object kept in view has been the formation of a complete and reliably identified series of Indian Insects, which shall be available for reference, so as to reduce the difficulty which has hitherto existed in obtaining the identification of species. An appeal has been made by Mr. Atkinson, as Chairman of the Trustees, to entomologists in Europe to assist in the determination of the unnamed portion of the Museum collections. A large number of English and foreign entomologists have agreed to work out certain groups, but aid is still required for portions of the *Neuroptera*, the *Pseudo-neuroptera*, and a few families of the *Coleoptera*, which it is hoped may be forthcoming.

I last year noticed that the special attention of the Trustees had been given to the investigation of insect pests destructive to crops, and that arrangements had been made for systematic work on Indian Economic Entomology. Further progress has been made, under the editorship of Mr. E. C. Cotes, who has devoted himself most zealously to this question, not only in the investigation of the species which are of economic importance as pests destructive to crops, but also to those which are producers of articles of commercial value, such as silk and lac. These practical applications of scientific entomology have been conducted by Mr. Cotes in cooperation with the Agricultural and Forest officers of the Government and with the aid which has been freely afforded by planters and other private persons in different parts of the country. The information collected is being published in a new

periodical entitled "*Indian Museum Notes,*" which has taken the place of the "*Notes on Economic Entomology,*" mentioned in my address last year, of which only two numbers appeared.

Two numbers of the new periodical, with notes on a large series of economic insects, have already appeared, and further numbers, including detailed reports on Indian silk insects and locusts, by Mr. Cotes, and on the mosquito blight on tea and the ravages of Aphides in orchards, by Mr. E. T. Atkinson, are in progress. The periodical is illustrated with heliogravure plates taken from the original pencil drawings by the Museum artists. It is distributed to those who assist in the investigation, and a medium of communication is thus established between workers in different localities. The investigation is a large and complicated one, but it is gratifying to know that steady progress is being made by the determination of most of the important species, while information is accumulating on the subject of their life-histories. In this work all can help, and with the general recognition of the importance of the subject, both as a means of counteracting the ravages of injurious pests and of stimulating the production of valuable economic products, as well as by the introduction of entomological teaching into the courses of study at Cooper's Hill and the Forest School at Dehra Dún, the number of those who take an intelligent interest in the subject is gradually increasing in different parts of India. It should be mentioned that the whole expenditure connected with this publication is borne by the Government of India in the Revenue and Agricultural Department.

A new Catalogue of the Books in the Museum Library compiled, under Mr. Wood-Mason's direction, by Mr. R. L. Chapman, has just been issued. It contains several new features, especially in the way of copious cross-references. The bulk of the books is naturally zoological and the catalogue will be found of great value by students other than those consulting the Library.

Mr. W. L. Sclater, the Deputy Superintendent, is continuing the *Catalogue of Mammals*, commenced by Dr. Anderson, referred to in last year's Address.

During the year a taxidermist has been employed to travel in various parts of the country with the object of teaching persons interested in zoology to prepare skins, on condition that they collect for the Museum; in the hope that in this way a number of collectors will be spread all over the country and the Museum collections enriched. The scheme was initiated by the Revenue and Agricultnral Department of the Government of India, and has, I am glad to say, worked well under the immediate superintendence of Mr. Sclater. Many new specimens have been received in the Museum collected by the

travelling taxidermists or contributed by gentlemen who have had the benefit of their teaching or services.

Under the energetic supervision of Dr. Alcock, the naturalist to the Marine Survey, the dredging operations carried out in connection with the Survey work of the Indian Marine Survey Steamer "Investigator," under Commander Alfred Carpenter, R. N., continue to bring in good harvests of results for the benefit of the Indian Museum and also of our *Journal.* Dr. Alcock has worked out the Fishes of the Bay of Bengal which had been brought together since the commencement of the Survey, and has published the results in two papers in our *Journal* and one in the *Annals and Magazine of Natural History,* which will be duly noticed hereafter. Dr. Alcock's investigations shew that the Museum collection of deep-sea Fishes is probably rivalled only by the great collections in the British Museum and United States National Museum.

In the last published Report of the Trustees, 1888-1889, many very important contributions to the collections of Marine Zoology made by the Survey are noted by Mr. Wood-Mason, besides others in the Invertebrate and Vertebrate collections, among which may be specially mentioned Dr. J. Scully's donation of no less than 2,765 skins of Birds, nearly all collected by himself in Turkistan, Nepal and Gilgit, and of about 200 specimens of Mammals collected in the same regions.

The Journal of the Linnean Society, Vol. XXI, contains a further instalment of the Reports on the collections made in the Mergui Archipelago for the Trustees by Dr. J. Anderson, F. R. S., and this completes the work. The reports include *Pennatulida,* by Professor A. M. Marshall, F. R. S., and Dr. G. Herbert Fowler; the *Myriopoda,* by Mr. R. J. Pocock; the *Comatulæ,* by Dr. P. H. Carpenter, F. R. S.; the *Echinoidea,* by Professor P. Martin Duncan, F. R. S., and Mr. W. P. Sladen; the *Asteroidea* by Mr. W. P. Sladen; *Mammals, Reptiles* and *Batrachians* by Dr. J. Anderson, F. R. S. These will all be further noticed hereafter under "*Zoology.*"

The Economic Section has made good progress and much useful work has been done towards making a type collection of the most important economic products. It is, however, difficult to do much in this or other directions till the completion of the new buildings in Sudder Street. At the instance of the Government of India in the Revenue and Agricultural Department, an important collection of Indian Fibres has been undertaken. It is intended to distribute the specimens to the Imperial Institute and to various institutions in England.

The Lucknow Museum. Under charge of Dr. A. Führer this Museum has made good progress during 1888-89. Large additions, chiefly zoo-

logical, were made to the collections; among them, a nearly complete collection of the avi-fauna of the Himalayas, from Masuri, Darjiling and Native Sikkim; a fairly representative collection of sea-fishes and marine invertebrates, and a collection of the moths and butterflies of the Kumaon Hills. Dr. Führer reports that the country people, who come in crowds, display a real and intelligent interest in the zoological collections.

In the Art section, also, several additions have been made to the collections, the greatest care being exercised to procure good old specimens of indigenous art-work and ornament, in order to keep up the standard by letting the native artist see only *chefs d'œuvres* of his art. The archæological collections and coin cabinet have also received some important additions which will be noticed hereafter.

A valuable collection of fossils and other remains found at Benares during the sinking of the "wells" for the piers of the Dufferin Bridge have been presented to the Museum.

The publications of the Museum comprise a collection of the Proceedings of the Committee of Management from 1883 to 1888, with the Curator's monthly reports, and accompanied by a short history of the Museum, which has just been published. The revised editions of the Catalogue of Birds and the Coin Catalogue were in the press. A descriptive essay on the Pathán and Mogul Coinage of the Sultans of Delhi, based on the Museum collection, has been published in Urdu by Munshi Chhoti Lal.

The Museum was visited by 206,628 persons during the year, the cost per visitor admitted being about 1·1 anna.

Government Central Museum, Madras. From the Report of Mr. Edgar Thurston, the Superintendent, for 1888-89—it appears that the Museum was visited by 337,801 persons, or a much larger number of visitors than in any previous year, and the actual cost per visitor was nearly 1·25 anna. The "*Catalogue of Batrachians of South India*," referred to last year, was issued, and the "*History of the Coinage of the East India Company*" was in the press. Lists of the Butterflies of South India and of the Eggs of Indian birds contained in the Museum were printed for distribution. Several rare coins were acquired and are noticed elsewhere. A Catalogue of the Mineralogical collections and of Meteorites recorded to have fallen in Southern India, prepared by Mr. Bosworth Smith, was in the press. The Archæological collections received many valuable additions from Mr. A. Rea, of the Archæological Survey of Southern India, including a quantity of pottery from cairns and cromlechs and sculptures from Amrávati and other Buddhist sites.

A report on a second collection of Sponges made by Mr. Thurston in the Gulf of Manaar was published by Mr. Arthur Dendy, in the *Annals and Magazine of Natural History.* Fourteen of the twenty-four determinable species forming the collection are new. In Mr. Thurston's report a list is given of butterflies, mostly from the Nilgiris, added during the year, the numbering corresponding with Mr. Hampson's monograph published in our *Journal* for 1888; also lists of Birds and of Eggs of Indian birds. A specimen of *Rhinodon,* measuring 20 feet in length, was cast on shore at Madras and has been added to the Museum.

Mr. Thurston has now in the press and nearly ready for issue "*Notes on the Pearl and Chank Fisheries and Marine Fauna of the Gulf of Manaar,*" dealing with the Tuticorin Pearl Fishery; Pearls from *Mytilus smaragdinus* and *Placuna placenta;* the Tuticorin Chank Fishery; the Ceylon Pearl Fishery; Rameswaram Island; Marine Fauna of the Gulf of Manaar.

The Jeypore Museum. From a memorandum with which Dr. Hendley, the Secretary, has kindly favoured me on the progress of the Jeypore Museum during the past year, it appears that the Museum has been visited by about 237,501 persons during the year, or some 10,000 more than the year before. The visitors are observed to begin to show a more intelligent interest in the exhibits, and to study them instead of regarding them merely as curiosities. On one night in the week the rooms are illuminated with gas, and arrangements are also made for reserving admission to purdah women on special application.

The building has been completed during the year. A series of 14 portraits in distemper of the Maharajahs of Jeypore since the time of Baber has been completed and adorns the entrance-hall of the Museum.

New exhibits to the extent of Rs. 7,250 have been purchased and include typical collections of Indian shells and of Indian insects. Models illustrating the anatomy and physiology of the horse and of its dentition have been procured from Paris and are of use in teaching native farriers. A similar model of a man has been added and others illustrative of comparative anatomy and zoology are expected shortly. Specimens of artificial flowers, careful studies of nature by Miss C. Janch, of Breslau, have been added in the Botanical Section, also relief maps, models of Indian snakes, and of the head of a cobra dissected to shew the poisonous glands and fangs. Analyses of 28 kinds of Indian foods and beverages are also illustrated.

The total expenditure for 1889, all of which has been met by the the Durbar, has amounted to Rs. 17,549, so that the cost-rate per visitor has been about 1·14 anna.

Dr. Hendley has published an illustrated work on "Ulwar and its Art Treasures.

Colombo Museum. I learn from Mr. Haly that the only subject likely to be of interest is the acquisition of a skeleton of a whale found on the shores of the Gulf of Manaar. Unfortunately it is not complete, the jaw-bones being missing, but it is hoped that they may yet be recovered. It seems to have been killed by a steamer, from the damage done to the head. It is evidently one of the *Physeteridæ*, Cachalots or Spermaceti Whales, and is a high-finned Cachalot. This find is of great importance because only one high-finned Cachalot, is known, *viz.*, *Physeter turio*, Linn.; and that only from a description by Sibbald of one that came into the Frith of Forth in 1859. There are no bones of any animal of this species in any Museum in the world, so that the present find may probably be what Dr. Gray called "the great desideratum of Zoology," an almost complete skeleton of *Physeter turio*. If it is not this, it must be entirely new to science.

Royal Botanic Garden Calcutta. The chief improvement effected within the year 1888-89, was the extension and completion of the Palm House, which now forms a magnificent conservatory in the form of an octagon, the length of each side being 85 feet and the diameter of the whole 210 feet. The approaches to the garden have been much improved by the continuation of the road along the river bank from Howrah, which, when completed, will afford a pleasant and convenient means of reaching the garden. A commodious landing-stage has also been constructed at the river gate.

The Herbarium collections have received considerable accessions, including a large collection from the Shan Hills, received from Brigadier-General H. Collett, C. B. From Kew, a third set of Mr. C. B. Clarke's extensive collections in the Eastern Frontier countries, made during his last visit to India, has been received. The value of the collection is greatly enhanced by each specimen being accompanied by a note in Mr. Clarke's own hand. A large number of specimens were received from the Perak Museum, also a set of the Dipterocarps of Penang from Mr. Curtis of the Forest Department of the Straits Settlements. Some interesting specimens from the N. W. Himalayas were received from Mr. Duthie.

Zoological Garden Calcutta. From the last report of this garden for 1888-89, it is satisfactory to learn that it continues to thrive and be a great source of amusement and instruction to the Calcutta public, as well as to the large number of strangers who flock to Calcutta. The income from visitors showed a large increase. During the year the new lying-in den for the lioness was built, and the new sheltered bird-house, referred to in

last year's address, has been completed. The report notices the educational influence the gardens are beginning to have. In a recently published Bengali book on nursery education, the author gives a discussion on the instinct and habits of animals, as they may be studied in the course of a visit to the garden, with a view to stimulating the faculty of observation in the youthful mind.

Oriental History, Literature and Linguistic Studies.

The year seems to have been particularly fruitful in the results of literary activity and antiquarian research in this country. Greater attention also seems to be paid to Oriental literature in Europe than formerly, and as the first of Asiatic Societies founded for investigation within the limits of Asia, we must welcome the efforts now being made in London to extend the knowledge of Oriental Studies and Literature by the establishment of the School of Modern Oriental Studies connected with the Imperial Institute in union with University College and King's College, London, of which the inaugural Address was delivered by Professor Max Müller last month. Similar schools have already been established in Russia, France, Austria and Germany, and their success has no doubt led to the institution of the present school in London. It is, of course, of high importance that men destined for an Eastern career should, if possible, receive some preliminary training and knowledge of the languages and people of the countries in which their future lot is to be cast. The East India Company fully recognised this, and as an *alumnus* of one of their training colleges, I must acknowledge with grateful pride the advantages I derived from my early training there. But after all, the best and most valuable knowledge is that acquired by practical experience and life, and as we go on we find that much of our preliminary teaching has to be unlearnt or is useless. The best of schools for India is India itself, and to this may be attributed the fact that the want of an Oriental training-school has not been felt so much in England as in other countries. That such institutions are of use is undoubted, but we must not, I think, expect too much from them.

The eighth International Congress of Orientalists, held at Stockholm and Christiania, in September last, under the presidentship of His Majesty, King Oscar II, of Sweden and Norway, seems to have been a well attended and successful one. It may be noted that Norway is the fatherland of many distinguished oriental scholars of whom Lassen, Holmböe and Skrefsrud are perhaps best known in connection with India. It was hoped that Mr. Grierson would have been able to attend on the Society's behalf, and Mons. Senart was also asked to represent the Society, but was unable to be present. A full account of the meeting

has been given in *Trübner's Record*, and among the papers of particular interest to us in India may be cited—Professor Jolly's on the Law Code of Hárita: Professor Oldenberg's on the Upanishads: Mr. Johannson's on the Sháhbázgaṛhí version of Aśoka's Edicts; Professor Bühler's on the Mansehra version of the 13th Edict of Aśoka; Professor Leumann's on the Ávaśyaka commentaries of Jain literature: Professor Peterson's on the Nyáyavindu-ṭíká, an ancient Buddhist work on logic. Dr. Burgess read a paper on Archæological researches in India. A proposition by Professor Kuhn in favour of a scientific investigation of the languages spoken on the N.-W. Frontier of India was adopted.

The State Council of Kashmir has sanctioned the publication of a systematic catalogne of the Maháràja's collection of Sanskrit MSS. at Jammu, under the editorship of Dr. Aurel Stein, Principal of the Oriental College, Lahore. This collection was mainly formed by the late Mahárájah Ranbír Sing and contains over 4000 works; among them a very considerable number of Sanskrit MSS. It is preserved in the Raghunáth Temple, at Jammu, and has never previously been explored by a European scholar.

Dr. Stein has also been engaged in researches relating to the *Rájataranginí* of Kalhana, the Royal Chronicle of Kashmir, with a view to a new edition of this work. Dr. Stein has been able to secure the *Codex Archetypus* of all extant Kashmir MSS. of the *Rájataranginí*, written in the 17th century.

The most important paper of historical interest in our *Journal*, Part I, is a joint paper by Mr. V. A. Smith and Dr. Hoernle giving a description and reading of an inscribed seal of Kumára Gupta II. A photocollotype plate of the seal to full size accompanies the paper. The seal was found at Bhitarí, in the Ghਾázipur district N.-W. P., and is made of a mixture of about 63 parts of copper to 36 of silver. Dr. Hoernle has discovered that this seal is of far greater importance than was at first supposed, because it is of a Kumára Gupta II.; the inscription on it gives for the first time a genealogy of the early Gupta dynasty that enumerates nine generations instead of only the seven hitherto known, and this genealogy throws light upon many unsolved problems regarding the early Gupta coinage and the general course of Indian history during the period of the dissolution of the Gupta empire. Dr. Hoernle has illnstrated his remarks on the latter subject by the addition of a synchronistic table of the reigns of the early Guptas, their contemporaries and successors. This paper certainly forms a very valuable and important contribution to early Indian history.

Bábú Saratchandra Dás, C. I. E., has contributed an interesting

paper on the Life of Sumpa Khan-po, the author of the Re*h*umig, a Tibetan chronological table, comprising 12 Vṛihaspati cycles of 60 years, each commencing with A. D. 1026 and ending in A. D. 1745. A translation of this table is given in the paper. He has edited Fasciculus No. 2 of the *Avadána Kalpalatá* which has been issued in the *Bibliotheca Indica,* also for the same series, the Tibetan work *Pagsan T'hi Shing,* in prose, which will appear shortly.

Mr. Grierson's valuable paper on Modern Vernacular Literature in Hindustan, noticed in last year's Address, has been much enlarged and published in book-form with collotype illustrations, as a special number of the *Journal,* Part I, for 1888. The Society is to be congratulated on having secured such an interesting and important work. From the scheme of the work the vernacular languages dealt with only include roughly, Máṛwáṛí, Hindí and Bihárí, with their respective dialects and subdialects; consequently Sanskrit, Prákrit, Arabic, Persian and Urdú works are excluded.

At the March meeting Bábú Gaur Dás Bysack read an interesting paper on a Buddhistic Monastery at Bhoṭ Bágán (Howrah), on two Tibetan MSS. found there, and on Púran Gir Gosain, the founder of the monastery.

At the same meeting Mr. T. Munro exhibited some plans of old Calcutta, and read a note on the Founder and founding of Calcutta.

Mr. V. A. Smith has presented a very valuable and suggestive paper on Græco-Roman influence on the civilisation of Ancient India. In this paper, which is now in course of publication, the author endeavours to trace the working on Indian soil of Greek ideas which resulted from the invasion of Alexander the Great, and which, though traceable in the fields of religion, poetry, science and philosophy, is most obvious in the domains of architecture and sculpture, with which the essay chiefly deals. Mr. W. H. P. Driver's paper on a tradition of Lohardugga also awaits publication.

The works published in our *Bibliotheca Indica* have already been noticed.

The Indian Antiquary, as usual, contains a large number of papers and notes of historical interest. Among which may be noted Dr. E. Hultzsch's collection of extracts from Kalhana's *Rájataranginí.* Those from the 1st Taranga treat of the dynasty of Gonanda III, and a list is given of 24 kings of this dynasty.

Pandit Natesa Sastri, continues his papers on Southern Indian Folklore, as does Putlibai D. H. Wadia his series on Folklore in Western India, and Taw Sein Ko commences a series on Folklore in Burma.

Professor Kielhorn, C. I. E., has a paper on the 60-year cycle of

Jupiter, and Mr. Fleet has a note on the same subject, as well as on the Coins and History of Toramáṇa. In a paper on the country of Malakolta Dr. Hultzsch shows that this country is most probably Southern India beyond the Káverí River. Dr. R. Schram gives a series of Tables for the conversion of Indian dates, which will be found of service in converting dates of our own calendar, or of the Hindú lunar-solar year or solar year into days of the Indian period and *vice versâ.*

Mr. J. F. Fleet, C. I. E., continues his notes on the calculation of Hindú dates.

The *Journal of the Bombay Branch of the Royal Asiatic Society,* contains papers on a new Edict of A'soka, by Mons. E. Sénart; on Nyáyabíndhutíká of Dharmotara, by Dr. Peterson; Púrṇavarma and S'ankarácházya, by the Hon. K. T. Telang; the Epoch of the Gupta era and Phonology of the Vernaculars of Northern India, by Dr. R. G. Bhandakar.

The *Madras Journal of Literature and Science,* for the session 1888-89, contains several interesting papers. The most important is the second part of Dr. Oppert's exhaustive paper "On the Original Inhabitants of Bharatavarṣa, or India," in which he deals with the *Gauḍians,* a term he derives from the root *ko,* mountain. An account is given of the more important sections of the *Gauḍian* population whose identification offered the least difficulty and who have from time immemorial occupied an acknowledged position among the inhabitants of India. The tribes specially treated of are the Kolis, Gaulis, Kulindas, Kois, Konds, Kands, Gonds, Kodagas, Todas, Kotas, Kuruvas, Kurubas or Kurumbas. The work is copiously annotated and will be very valuable to students of early life and language in India. The Rev. G. M. Rae gives a full investigation of the Legend of St. Thomas and comes to the conclusion that there is no evidence that St. Thomas ever did visit India, and that the traditions relating to him have their origin in the Persian founders of the Church of Malabar. M. Sethagiri Sastri has investigated the Etymology of some Mythological Names. Mrs. L. Fletcher gives a brief account of the life and travels in Southern India of Abu 'Abdulláh Muḥammad, or, as he is commonly known, Ibn Batutah, in Southern India, with a note by Mr. L. White King and Captain Tufnell on the coins of the kings mentioned by him.

Mr. E. Rehatsek has contributed to the *Journal of the Anthropological Society of Bombay* an interesting paper on Hindú Civilisation in the Far East, as represented by architectural monuments and inscriptions, dealing with the most recent discoveries of monuments and inscriptions in Cambodia and Southern Annam, made by M. Aymonnier.

In the *Journal of the Royal Asiatic Society,* Mr. Cecil Bendall

gives an account of the *Tantrákhyána*, a collection of Indian Folklore, from a unique Sanskrit MS. Its date is Nepal Samvat 604, or A. D. 1484, and it is closely allied to the *Panchatantra*, and is largely founded on tales in that collection. Mr. Bendall also contributes some notes on a collection of MSS. obtained by Dr. Gimlette at Kathmándu, now at Cambridge and the British Museum. Dr. Wenzel contributes to the same journal a paper on a Játaka tale from the Tibetan, forming the 6th chapter of a history of Tibet called *Rgyal-rabs-gsal-vai-melon* and corresponding to the *Valáhassa Játaka*. The history is the work of the 17th century A. D.

The *Journal of the American Oriental Society*, contains a long and interesting paper by Mr. E. W. Hopkins on the social and military position of the Kuling caste in ancient India as represented by the Sanskrit epic.

In the *Journal Asiatique*, M. Ryanon Fujishima has given a translation of two chapters from the memoirs of I-tsing, one of the Chinese pilgrims, on his Travels to India. The chapters translated are 33 and 34 of the *Nan-hai-khi-koueï-neï-fa-tchouen* (Histoire de la loi interieure envoyée de la mer du Sud) written by I-tsing in the countries of the South Sea, where he lived several years after his return from the voyage he made in India with the object of studying the Buddhist doctrine and of bringing back the books containing it. The work is much more difficult to translate than Fa Hian or Hiouen Tsïang, and has never yet been published in any European language. The two chapters translated are entitled "the Service of Song" (Le Rite des Cantiques) and "The teaching of the Western Countries" (l' Enseignement des Pays Occidentaux). A short account of the life of I-tsing is also given, and in a subsequent paper the author gives an index of the Sanskrit-Chinese words occurring in the two chapters translated.

This Journal also contains part of M. Abel Bergaigne's "*Histoire de la Liturgie Vedique*," which the author was finishing for the press when he died.

In a paper, in the *Revue Linguistique*, on ancient Tamul Literature, Mons. Julien Vinson gives an account of the *Sindámaní*, one of the principal Tamul works of the first period, though largely borrowed from Jain and Sanskrit works. Translations of extracts from it are also given.

In the *Journal des Savants*, Mons. Barthelemy de St. Hilaire treats at length on Hindú Legislation, in a series of reviews of Dr. Bühler's "Laws of Manu" and "the Sacred Laws of the Aryas" and Mons. Jolly's "Institutes of Vishnu."

Professor Hermann Jacobi contributes to the *Vienna Oriental Journal*

a paper on Bháravi and Mágha, in which he endeavours to trace the relation between these great poets, by attentive study of their works *Kirátárjuníya* and the *S'iśupálavadha.* Professor Hillebrandt, gives in the same journal the first part, on the word *purandhi*, of a series of papers entitled *Vedica.* There is also a Catalogue of the Zand and Pahlavi MSS. belonging to K͟hán Bahádur Dr. Hoshangi J. Ásá, Sirdár of the 1st class, Dastúr of the Parsis of the Deccan.

The *Giornale della Societa Asiatica Italiana*, Vol. III, 1889, contains a paper on Persian poetry anterior to Firdusi, by Italio Pizzi. On the *A'ryáchalaguhya dháraṇí Sútra*, by C. Puini. A paper on the Jain story of king Pápabuddhi and his minister Dharmabuddhi, giving Sanskrit text and translation; by E. Lovarini. On some Italian words believed to be of Oriental origin, such as *amuleto*, *bagaglio*, etc., by F. Lasinio.

In the *Zeitschrift der Vergleichenden Sprachforschung*, 1889, (Journal for Comparative Linguistics), is a paper by Prof. Leumann on the Accentuation of the *S'aptapatha Bráhmaṇa.*

Professor A. Weber's paper "Über die Samyaktvakaumudí, eine eventualiter mit Tausend und eine Nacht auf gleiche Quelle zurückgehende indische Erzählung," published in the *Sitzungsberichte der Königl. Preussischen Akademie der Wissenschaften*, may be of interest to students of folklore.

Among the works of philological interest published during the year may be noticed :—

The 2nd edition of W. D. Whitney's Sanskrit Grammar. Kittel's Canarese Dictionary, published by the Basle Mission Press, Cannanore. A second edition of *S'abdakalpadruma*, a new edition of the great Sanskrit Encyclopædia—published by the brothers Barada Prasad and Hari Charan Basu. An Arabic-English Dictionary, by A. H. Salmoné. Dr. Leitner's Hunza and Nagyr Hand-book, Part I. Prof. Eggeling's Catalogue of the Sanskrit MSS. in the Library of the India Office. Part II, Sanskrit Grammar, Lexicography, Prosody and Music. Prof. R. Garbe's English translation, with notes, of the *Saṃkhya-pravachana-bháshya*, the commentary of Vijñána-bhikshu to the *Saṃkhya Sútras.*

Part II of the *Comparative Dictionary of the Bihárí Language*, compiled by Dr. Hoernle and Mr. Grierson has appeared. The authors apologise for the long delay, due to various causes, that has occurred in issuing this part, but it will be none the less welcome to students.

Mr. Grierson has also contributed a paper "on selected specimens of the Bihárí Language" to the *Journal of the German Oriental Society.*

Vernacular Literature. The most complete review of current literature in this country is given in the "Reports on the Publications issued

and registered in the several Provinces of India," and from them a very fair insight may be gained as to literary progress in India and the direction it is taking. The report for 1888 has just been issued, and though it throws us rather back, it may not be uninteresting to give a brief abstract of it.

Bengal. In Bengal 2,693 works were registered, of which 365 were English, 1,713 in provincial vernaculars, 214 in Indian classical languages and 401 in more than one language. Mr. C. H. Tawney, in presenting the report of the Bengal Library, remarks on the remarkable paucity of historical works, and on the utterly uncritical character of most of the many religious works published. Fiction and poetry flourish, as they have ever done; though it is doubtful whether the form or substance of Indian fiction has been improved by our occupation of the country. It is decidedly discouraging to find that, in the opinion of one who has had so much experience in education as Mr. Tawney, English education has not influenced the Bengali mind to any perceptible depth. He says—"The influence of English science is difficult to trace in the report. Philology keeps in the old groove and medicine seems to be trying to return to it."

In Arts, 68 works have been published, of which 31 are English. They are mostly educational treatises on mensuration. One of the most favourite subjects in this section, all over India, is Music. A work by Nanda Kumar Mukherji, dealing with the harmonic music of the Hindús, is noted by the Librarian. Biographies are not numerous, but they include lives of President Garfield, Martin Luther and of Harish Chandra Mukherji, the first editor of the *Hindu Patriot.* Dramatic literature flourishes, but is nearly all utterly bad and immoral; though mythological dramas and melodramas continue to be written, and it is curious to remark, as an unexpected union of Church and Stage, that a devotional feeling for Hari, or Vishnu, has taken entire possession of the native stage in Calcutta. In Fiction, 126 works were registered, of which 120 were in provincial vernacular. A tendency is noted on the part of the native authors of the present day to show an affectionate appreciation of everything Indian and to write regretfully of the former happy state of things which is passing away under the influence of Western civilisation; and no doubt here, as elsewhere, there is much to be said for the old quiet studious days, as opposed to the ever-restless 'progress' of the present day. Two works of fiction of more than average merit are noticed as written by Hindú ladies—the '*Hughlir Imambárí*," by Swarna Kumári Devi, and the *Lalaná Mukur*, by an unknown authoress, which gives a somewhat realistic picture of life in a great Hindu zemindar's family in the Mofussil.

In History and Geography, 115 works were registered, of which 34 were English. They include the first instalment of a History of Sanskrit Literature from the Vedic period to the present day, by Babu Troilokya Nath Bhattácháryya, which seems likely to be valuable, and an elaborate account, in a work entitled *Bhárat Prasanga*, by Rájani Kanta Gupta, of the English occupation of Bengal. A history of the Náráyangaṛh family, of Midnapur, for the last 900 years, is a valuable contribution to the local history of the Lower Provinces. Books on Languages are, after Religion, the most numerous, 582 having been registered, of which 86 were in English; but a very large proportion are educational and too many are 'Keys' for examinations, the growth of which is remarked and deprecated in all the reports. The new edition of Barat's Bengali and English Dictionary made good progress, A Bengali-Garo Dictionary, by the Rev. M. Ramkhe is also noted.

Law books in English or Bengali were few. An edition, in Sanskrit, of *Madana-Párijáta*, by Pandit Madhusudana Smritiratna, is the most important. In Medicine, 149 works were registered of which only 3 were English. They are unimportant, except in so far that they show a tendency to revive the Ayurvedic treatment, as most suitable for natives of India. Songs here, as in other parts of India, and, indeed, all over the world, form a very large portion of the popular literature, and large numbers of collections of them were received of all kinds, religious and secular. The year was rich in miscellaneous works by female writers, one of which *Ushácliná*, by Swarnamáyí Gupta, a collection of essays on society, education &c., is specially noticeable.

Sanskrit and philosophic literature received a good deal of attention during the year, and there is marked evidence of a revival of literary activity among the pandits of this country. The poetical literature of the year was very meagre.

Of the non-educational works, religious treatises are by far the most numerous, 604 having been registered. They show considerable variety and richness. It is noticeable that several native Christian writers endeavour to show that the Hindús are a section of the great Israelite race, and that their rites and ceremonies are counterparts of Jewish festivals. Others again, consider them to be derived from a Christian origin. One of the most important works of the year was Bábú B. C. Chatterji's *Dharmatattwa* in which an attempt has been made to bring about a union between Eastern and Western ideas of education, culture and religion, and to give the younger generation a system on which to base their moral conduct and a faith that suits their intellectual training, in place of the moral and intellectual chaos which has followed the influence of Western ideas and teaching among the educated classes in Bengal. Science was unfortunately represented only by school books.

Pandit Haraprasád Shastri, the Librarian of the Bengal Library, who has compiled this very interesting report, considers that the literary activity of the periodical press in Bengal runs in cycles of seven or eight years and that the present is one of unwonted activity.

Bombay. In the Bombay Presidency, 1,398 books and 526 periodicals were registered during the year; of these 693 are Gujaráti; 443 Maráṭhí; 205 English; 174 Sanskrit. It is remarkable to notice that in the Western Presidency, Poetry bears the palm, the number of works devoted to Religion being comparatively small as compared with Bengal. Language takes a high place as to number, but the works under this head are chiefly school-books, and the same as regards those under Science. The English books do not require any particular comment.

Of ordinary literature in Maráṭhí there is not much to be said. In Medicine, Mr. Vásudeo Chintáman Bápat appears to be doing good work by making known a great deal of valuable information regarding the medicinal plants of India, their uses and properties. His latest work, the *Sushena Chikitsá*, is highly commended by Dr. Dymock. The poetical works are mostly reprints of entire old Prákrit works, some of them beautifully printed. In Science the works published are all school books, either mathematical or small geographical tracts treating of parts of the Bombay Presidency.

The Gujarátí publications seem to be on a higher standard and to have more general interest than the Maráṭhí. In Arts, I note treatises on cotton-ginning and screw-cutting, and five works on music. Of dramatic works and novels many treat on social subjects, such as the evils of infant marriages, and of marriages between persons of disproportionate ages; the desirability of widow marriages and of marriages of affection and mutual selection; the tyranny of step-mothers and of mothers in law; the bad consequences of vice and happiness of virtue. The historical works sing the praises of Rájpút heroes and heroines in defending their religion and land against the Muhammadan Emperors of Delhi. Among translations of English works are *Don Quixote*, Shakespeare's *Cymbeline*, and *Valentine Vox*. *Irávati* is noted as the best Gujarátí novel of the year and is based on historical incidents.

The historical works, other than school-books, include two histories of the ancient Parsis.

The miscellaneous publications include a translation of *Self-Help* and an adaptation of an English work, *How to make Money*, also treatises on mesmerism. In Philosophy, the *Subodha Patriká Rájáyoga* and the *Bhávártha Prakasha* are noted, and there are two well written works of Travels.

The number of Urdú books shews a marked decrease, while those in Hindí are nearly doubled, but many are reprints and translations.

The works in Marvárí, in poetry or prose, nearly all appertain to the Jain religion. The Kanarese publications are unimportant. Of four works in the Bráj dialect, three are versions of the *Rámáyana* of Tulsi Dás. A large number of Sanskrit works were registered, chiefly reprints.

Mr. Vyankatrao Ramchandra continues to produce his series of Maráṭhí translations of the *Commentaries on the Upanishad*, with the original Sanskrit text and commentaries. The other bilingual publications are chiefly of a religious and controversial tendency.

Among the Maráṭhí periodicals the *Shilpa Kálá Vidnyá* gives useful information on mechanical and other arts and industries. The *Nure Elam* is a literary and scientific periodical. The *Stríbodha* is contributed to by Parsi ladies and contains tales and general information. Two periodicals are published in Sanskrit containing unpublished poems by old Sanskrit poets—the *Kávya Málá* and the *Granth Ratna Málá*.

Mr. G. M. Sathe, the Registrar of native publications, who has drawn up the report, concludes with some very pertinent and valuable general remarks in which he gives the reasons for the paucity of books under the heads of *Arts*, *Biography*, *History*, *Politics* and *Science*, which, I regret, space does not allow me to quote. With regard to works on Arts, the work-men are illiterate and as most of their callings are hereditary, they learn from their fathers and families, and do not require to read or write books for instruction. With regard to Science the best books are in English, and as there is an abundance of such books and instruction is imparted in that language, students make themselves acquainted with it and do not read or write books in the vernacular, so that there is practically no demand for such works.

Mr. Sathé does not consider that vernacular literature is making satisfactory progress.

Madras.—In the Madras Presidency, the number of works registered was 1,169, of which 258 were in English or European languages, 735 in local vernaculars, 74 in classical Indian languages and 102 in more than one language. Increased activity in original writing is indicated, and Sanskrit and other classical languages are regaining their former ascendancy. Mr. R. V. Krishnama Chariar, the Registrar of books, explains the want of vernacular works on native arts on much the same grounds as the Bombay reporter, but seems to think that practical books on art will be created as soon as industrial or technical education, suited to the skill and talents of the country, shows the way.

In Arts, treatises are noted on fireworks; on native music and the symbolic movements of the hands and fingers in dancing; cookery; needlework, and examination of precious stones.

The dramatic publications include a Maráṭhí version of Shakes-

peare's *Midsummer's Night's Dream.* It does not appear in any of the Reports whether these translations of Shakespeare are for literary or dramatic purposes, or are merely 'cribs' for examinations.

An enlarged edition of an English-Tamil Dictionary, originally compiled by some missionaries in Ceylon, has been published with nearly 37,000 words more. Mr. Sitarama Charlu's *Supplement to the Telegu Grammar* will be valuable to teachers. The poetical works contain few original poems of real merit. Some of the songs are remarkable for their melody, sweetness and simplicity and the homeliness of their tune and language, the purity of their sentiment and the aptness of their similes. The number of religious works is very high, and amounts to about 42 per cent. of the total number of works registered.

Science is, as usual, only represented by school-books.

Mr. Grigg, the Director of Public Instruction, remarks, as has been done in other Presidencies and Provinces, that the evil of publishing 'Keys' and other helps for examinations seems to gain ground yearly; that a general taste for vernacular prose literature seems gradually to be arising among some classes; that there is an eager desire on the part of educated people for social and religious reforms; that Muhammadan authors are increasing in number; and that the people appreciate more and more the education of their women.

N.-W. Provinces and Oudh.—1,362 works were registered during the year in the N.-W. Provinces and Oudh, but the Hon. Mr. White's report gives little or no information as to the contents or value of the works selected under various heads as noticeable. The number of translations from English and other languages seems very large, and includes *Hamlet*, *Much Ado about Nothing*, and *The Comedy of Errors*, as well as an English Novel,—*My First and Last*, and Sir W. Scott's *Progress of Civilisation.*

Books in Urdú, Hindí, Arabic and Persian show an increase, but Sanskrit a falling off. Most of the best works are in Urdú. 382 works were published on *Religion;* 273 on *Language;* 163 *Miscellaneous;* 120 on *Poetry;* 77 on *Medicine;* 71 *Fiction*, and all these heads show an increase, while *Science* shows a considerable decrease. The greatest number of publications has issued from Lucknow, and shows a large increase over last year. More than half have been published by Munshí Newal Kishore, C. I. E.

Punjab.—From the report of Lala Rám Kishan, the Registrar, it appears that 2, 301 works were registered during 1888, which is a large increase over the previous year, and the year was conspicuous for literary activity. The majority of the publications is in Urdú, but works in Punjábí, the language of the Sikhs, show a great increase, which indicates the intellectual advance of that community. In Sindhí there is also a large increase.

By far the largest number of the works published are poetical, of which there were 680 594; were on *Religion;* 308 *Miscellaneous;* 278 on *Language*; 110 on *Medicine;* 87 on *Science;* 74 on *Law.* The *Drama* only shows 69 and *Fiction* 39. Arts, Biography, Politics, Philosophy, Voyages and Travels, are comparatively neglected. The proportion of Medical periodicals seems very large, and there is a great demand for them owing to the extension of the European mode of treatment.

Of the works under Drama and Fiction, only a small proportion are original, and those cited as the best deal with social questions.

Among the historical works may be noted the *'Umdat ut Tawáríkh*, by Lála Sohan Lal of Lahore, a voluminous Persian work giving a history of Sardárs Charat Singh and Mahán Singh, and a diary of the reign of Mahárája Ranjít Singh. It is being published in parts by Lála Harbhagwán Dás, grandson of the author.

The works on Science include a treatise on Book-keeping, as practised by native bankers, and an Engineering Pocket-Book, by Rai Bahádur Gunga Rám, intended for the use of subdivisional officers of of the P. W. D., workmen and contractors.

In the other minor Provinces of India, literature seems to be in a very backward state.

In the *Central Provinces* only one work in Maráṭhí and four in Hindí were registered. In *Assam* only 25 works were registered, or more than double the figure of the previous year; of these 17 are educational, four on Religion, three on Poetry and one on Science. In *Burma* only 81 publications were registered, against 142 of the previous year. Twelve are in English, 51 in Burmese, five in Páli and Burmese, five in Karen and two in Shan. The majority of the works are religious.

In *Mysore* the total number of publications was 128, of which none were in English, 70 were in Kannaḍa, two in Telugu, 30 in Sanskrit, and 26 in more than one language, chiefly Sanskrit and Kannaḍa. Thirty-seven come under *Religion*, 25 under *Language*, 11 under *Poetry*.

In *Hyderabad* (*Berar*) only 14 works were registered (13 Maráthi and one English). They include two educational periodicals for the use of teachers. In Ajmere-Marwára only three works were registered, one of them being a translation, in Hindí, of a "Driver and Fireman's Companion and Handbook."

Numismatics.

As usual, a very large number of coins, upwards of 3200, have come to the Society for report, under the provisions of the Treasure Trove Act, and have been examined by Dr. Hoernle and reported on by him in the "*Proceedings.*" Among the most important may be noticed the set of 175

old silver coins of the so-called Indo-Sassanian class, which are described in the August *Proceedings.* They are particularly interesting, because from their close imitation of the real Sassanian coins of Fírúz I (479-486 A. D.) it becomes probable that they represent an issue of Toramáṇa, the well-known leader of the Hunnic invasion of Persia and India in the last quarter of the 5th century.

Among the additions to the Coin Cabinet of the Indian Museum the collection of Central Asiatic coins, made by Capt. de Lassoë and presented by the Government of India, deserve special notice. It consists of 2486 coins (*viz.*, 41 gold, 158 silver, 487 copper and 1800 of mixed metal). From the numerous duplicates among them, selections have been presented to the Lahore Museum and the British Museum. The collection was rich in very rare coins; not a few varieties were quite new, and some coins may even be unique. Among the new varieties may be especially mentioned several of 'Aláu-d-dín Muḥammad bin Takash, the Sháh Khwarizm. They are of mixed metal, and show on the obverse the Sháh mounted on a horse or an elephant, with or without a lance; the reverse bearing his name and titles. A full descriptive catalogue, based on a preliminary examination by Mr. Ch. J. Rodgers, will shortly be published by Dr. Hoernle as a supplement to the Society's *Journal.*

Part I of our *Journal* contains two very interesting papers on coins.

Mr. E. E. Oliver gives a paper on the Coins of the Muhammadan Kings of Gujarát (illustrated with three plates), and describes several hitherto undescribed coins which he found in a collection belonging to Mr. Furdoonjee of Bombay.

Dr. Hoernle describes some new or rare Muhammadan and Hindú coins found in the Hoshungabad District. The most important of the "Paṭhán" coins are a coin of Muhammad bin-Taghlaq; two gold coins of Ghiyáṣu-d-din Taghlaq II, of different types; a gold coin of Abú Bakr who reigned from 791 to 792 A. H.; a gold coin of Sikandar bin Ilyás, of Bengal, all of which are figured and believed to be unique.

Two gold coins, from Khajuraha, of the Chandel type, one of which is attributed by Dr. Hoernle to Víra Varma or Bála Varma, and the other to Paramárddi Deva, are also believed to be unique.

The Lucknow Museum has received one unique gold Gupta coin of Vírasena Kramáditya, bull type, besides other gold, silver and copper coins.

In the Madras Museum the most important additions of coins have been 15 aurei, of Tiberius, Vespasian, Hadrian, Antoninus Pius, Faustina senior, Marcus Aurelius, Commodus. These were found by a native while digging in the old Fort of Vinukonda, and as he concealed them, they became forfeit.

Mr. Edgar Thurston, Director of the Central Museum, Madras, has brought out No. 3 of his *Catalogues of Coins in the Madras Museum*, comprising the Sultans of Delhi. It consists of an enumeration of 314 coins of various Sultans in chronological order, with references to Thomas' *Chronicles of the Paṭhan Kings of Delhi*, the British Museum "*Catalogue of the coins of the Sultans of Delhi*" and articles by Mr. C. J. Rodgers, in the *Journal* and *Proceedings* of our Society and in the *Indian Antiquary*.

Mr. Thurston's "*History of the Coinage of the East India Company in the Indian Peninsula, and Catalogue of Coins in the Madras Museum*," with 20 plates, is nearly ready and will appear almost at once.

The *Madras Journal of Literature and Science* contains a paper, by T. M. Rangachari and T. Desikachari, giving an account of the silver and copper Indo-Danish coins issued from the Tranquebar Mint under the Kings of Denmark, from Fred. III, A. D. 1648 to Fred. VI, A. D. 1819. Papers have also been read before the Madras Literary Society by Mr. T. M. Scott on Symbolism on Indian Coins, Part I. "Punch marked," and by the Rev. J. E. Tracy on the Coins of the Sethupatis.

A "Catalogue of Mysore Coins in the collection of the Government Museum, Bangalore," by Capt. R. H. C. Tufnell, M. S. C., illustrated by five collotype plates, has been published under instructions from the Government of H. H. the Maharajah of Mysore.

Mr. L. Dames has contributed to the *Numismatic Chronicle* a valuable paper on the Coins of the Durránis, from Timur Sháh's accession, in A. D. 1773, to their final expulsion from Cabul by the Bárakzais in A. D. 1842.

Among the coin-papers in the *Indian Antiquary* may be noted Mr. J. F. Fleet's on the Coins and History of Toramáṇa, in which he fixes the approximate date of A. D. 460 for the commencement of the reign of that king, at his own capital in the Panjáb; a short note on the Bodleian collection of coins by Mr. J. A. Smith, who has also described the Gupta coins of the collection in a paper entitled, "The Coinage of the Early or Imperial Gupta Dynasty of Northern India," published in the *Journal of the Royal Asiatic Society;* also Dr. Hultzsch's paper on the names of the coins of Tipu Sultán.

A paper has lately been read by Mr. T. J. Symonds before the Anthropological Society of Bombay, on some Indo-French and Indo-Dutch coins struck at Pondicherry and at Negapatam and Pulicat.

Archæology.

A few papers of Archæological interest appear in our *Journal* and *Proceedings*.

Mr. Asutosh Gupta has contributed some notes on the ruins of Jay

Mangala Gaṛh, in the Monghyr District, which appears to have been a large ancient city. Two Buddhist copper coins were found there.

Mr. Gupta has also given an account of the ruins and antiquities of Rámpál, near Munshiganj, in the Dacca District, formerly the seat of the old Sen kings of Bengal, notably of Bállál Sen, the founder of Kulinism in Bengal.

The work of the Archæological Survey has made good progress during the year, though it is to be feared that the retirement of the Director, Dr. James Burgess, C. I. E., may check the advancement of this important work. I believe, however, that good arrangements have been made for carrying on the surveys now in progress, and that Dr. Burgess will continue to edit the Reports.

The first volume of the new series of Reports brought out in India under Dr. Burgess' superintendence, of the Archæological Surveys in the N.-W. Provinces and Oudh, containing Dr. Führer's Report on the Sharqí Architecture of Jaunpur, which was alluded to in last year's address as under preparation, has been published. It is a very valuable contribution to the history of Muhammadan architecture, and in point of get up may fairly be said to compare well with similar publications printed in Europe.

In a valuable paper read before the International Congress of Orientalists held at Stockholm, Dr. Burgess has given an account of the rise and progress of Archæological studies in this country and of the work of the Archæological Surveys in Northern, Western and Southern India, and the publication of the results so far as issued. The materials on hand are very considerable and most important, and four volumes could be put in hand at once, were the means forthcoming, as it may be hoped they will be. From the paper it appears that with Dr. Burgess' retirement, the five survey circles for all India are to be reduced to three, under properly qualified Surveyors, with one or two specialists for epigraphy. The munificent aid rendered by the Mahárájas of Baroda and Jeypore in bringing out illustrated works on the architectural remains in their territories, is specially noticed and the hope expressed that others may follow their good example.

The Archæological Survey party in Western India, under Mr. H. Cousens, having completed the survey of Bíjápur, moved to Pálitána, in Kathiawáḍ, and completed the survey of the Jaina temples which crown the sacred hill of Satrunjaya. There is very little that can be called ancient, but the vast congregation of temples and shrines, which crown the hill makes the place unique and worthy of attention. The whole ritual of Jaina worship may be seen on the hill, and a complete knowledge of its iconography can be gained by a close inspection of its

hundreds of images. During January and February last, a Buddhist stúpa, situated in the forest near Junagaḍh, was opened by the Junagaḍh authorities under the guidance of Mr. James Campbell, C. S., and the searchers were rewarded by the discovery, about the middle of the mound, of the relic with its enclosing caskets of stone, copper, silver and gold. The nature of the relic has not been decided—it is a small chip, or flake, about $\frac{3}{8}$ of an inch long by $\frac{1}{4}$ inch broad, of some brown hard substance which closely resembles stone that has been under the action of fire. No inscription or coin was found that might have thrown some light on it; but fragments of a Buddhist rail and umbrella in stone were unearthed during the excavation. Mr. Cousens has favoured me with a copy of the Report on this find, which, I hope, will be published in the *Journal.* A considerable number of drawings, photographs and facsimiles of inscriptions were made during the field season.

The Guide-book to the Ruins of Bíjápur, by Mr. Cousens, to which reference was made last year, has been published and is a handsomely got up little volume, which will be of great assistance to visitors to the ruins and to archæological students.

The party is now in Gujarát visiting outlying parts of the Baroda territory, in order to complete the material required for a second volume on the antiquarian remains in H. H. the Gaikwaḍs dominions.

A volume on the Chalukyan remains in the Kanarese country is now almost ready for the press, and the full accounts of Bíjápur and Satrunjáya are to follow, they being now in hand.

The Rev. J. E. Abbot has quite recently discovered twenty-three ancient Buddhist Caves at Nadsur, eight miles to the north of Nenavali, about 20 miles south of Khandalla, in the Konkan. These caves have apparently never before been visited by any European and are unknown to scholars. They are cut in a rocky scarp about 800 feet above the villages of Nadsur and Thanal, facing the west, and are probably as old as the Christian era, though in a state of perfect preservation.

Archæological Survey, Southern India. During the last field season the party under Mr. A. Rea, after visiting Pulicat, Nellore, and Juvaludinne, resumed excavation at the Franguladinne stúpa, near Pedda Ganjam, as noted last year. Proceeding thence, to Chezarla, some very important and interesting remains of the early Buddhist period were discovered. These include some important inscriptions on marble and a Buddhist structural chaitya, the largest and most complete of the four yet found in India, of which three were discovered by Mr. Rea. The temple is quite complete and is used for worship by the Hindús. Some remains were inspected at Kamapalle and some mounds at Panidem. At Garikipad Agraharam a mound was

excavated, and an early Buddhist stúpa was found, with a large number of archaic marble sculptures. It is one of the most ancient as yet discovered in the Madras Presidency, dating from about, or before, the Christian era. After visiting an old mound at Ochchampet, Mr. Rea returned to Amrávatí and resumed excavations at the stúpa. Remains of outlying buildings in connection with the great stúpa were dug out, and a number of other marble sculptures, relic caskets, coins and other objects found.

From Amrávatí—Odlamanu, Vaikanthapuram and Pedda Naddur were visited, and at each place unknown Buddhist remains were found on the hills. On a hill at the latter place, a most important discovery was made of the stúpa and monastery which is mentioned by Hiuen Tsiang as being near Amrávatí and has hitherto been sought for in vain by archæologists.

Excavation was then resumed at Guntupalle. Some sculptured relics and a miscellaneous collection of objects were found. An excavation in one of the largest of the mounds brought to light a large and very complete Buddhist chaitya with some unusual arrangements of plan and some curious brickwork in its construction. Some marble statues were found in it. It is a very important addition to the few Buddhist structural temples which have as yet been discovered.

It is satisfactory to know that measures are being taken for the proper conservancy of the interesting remains in the Krishna District and a very complete report of them is under preparation. The mounds have been catalogued and orders issued for their conservation.

In the *Madras Journal of Literature and Science*, the Rev. J. R. Hutchinson gives an account, in a paper entitled *Páṇḍavúla Metta*, of the ruins situated on a hill of the Saitada range, in the neighbourhood of Chicacole, known as *Pancha-Páṇḍavúla-Niveśasthána*, or the "Habitat of the Panch-Pandavas." They consist of a gigantic cromlech and other smaller ones, all with the peculiarity of being surrounded with circular holes cut into the solid rock to a depth of about 10 inches. The holes are of three sizes, 12, 8 and 6 inches in diameter, and are always arranged in oblong circular or elliptical figures facing either east or south.

The Architectural section of the Archæological Survey, North-Western Provinces and Oudh Circle, under Mr. E. W. Smith, from January to April 1889, made a complete survey, including plans, elevations, sections and details; (1) at Orchhá, near Jhánsí, of the splendid temple of Chaturbhuj, Bír Singh Déo's tomb, the fine massive entrance gates leading to the palace, and a fine báoli on the banks of the Betwá, as well as of another at Charḍvárí, four miles distant from the city; (2) at Lalitpúr, of the Bánsá Masjid, part of an old Hindú temple; (3) at

Déogaṛh on the Betwá, in the Lalitpúr district, of the Gupta temple in the plain below the fort, and the extensive group of Jaina temples inside the deserted fort.

Since October 1889, the Architectural section has been at Faṭhpúr Síkrí, and has at present fully illustrated the Panch Mahal, Miriyám's Koṭhí, and the Diwán-í-Khás.

Dr. Führer, after having closed in the middle of February 1889, his excavations at Mathurá, which yielded, amongst other valuable relics, some very important Jaina inscriptions of the Indo-Scythian period, joined the Architectural section and visited the Lalitpúr District. A careful search along the banks of the Betwá at Déogaṛh, brought to light several Gupta rock-inscriptions, hitherto unknown.

In the beginning of November, he started on a tour through the Farrukhábád, Mainpurí, Ágrá and Mathurá districts, and is at present engaged in a complete excavation of the Kankálí Tílá at Mathurá. To the east of the Svetámbara temple of the first century, whose foundations were disclosed last year, Dr. Führer unearthed a well-preserved brick stúpa of 18½ feet diameter, some 25 feet below the present surface of the soil. This stúpa—it appears from an inscription found on the spot—is the relic stúpa which was standing inside the Upagupta monastery, mentioned by Hiuen Tsiang.

Vol. I of the Reports of the Archæological Surveys in the N. W. P. and Oudh.—"The Sharqí Architecture of Jaunpúr," already noticed, was issued in August last; Vol. II.—"The Monumental Antiquities and Inscriptions in the North-Western Provinces and Oudh," will be published in March next; Vol. III.—"The Chandella Architecture of Bandelkhand," is in the press.

Burma.—Dr. Forchhammer has given an account, in *Trübner's Record,* of his exploration of the Ruins of Pagan, in Burma, in the cold season of 1888-89. One inscription he found, bore the date *Sakkaraj* 550 (A. D. 1188), but he has also found older records. He has identified the caves and temples in which the chapter of five priests resided on returning from their ten years' visit to Ceylon (A. D. 1171). He prepared a map of the ruins on the scale of 12 inches to a mile, including the whole of Old Pagan, and considerably more than Major Hobday's map.

Epigraphy.

Parts III and IV of Dr. Burgess' new publication *Epigraphia Indica* have appeared.

In part III, the two Praśastis of Báijnáth, by Dr. Bühler, are concluded, and there are two other papers by the same author, *viz.*: "The

Jaina inscription on the Temple of Báijnáth at Kiragráma," and "Inscription on an image of Párśvanátha, in Kangra." Professor Kielhorn, C. I. E., contributes papers on eight inscriptions from Khajuraho. Dr. Hultzsch describes two inscriptions from Gwalior. A plate is given of the 12th edict of Asoka from Sháhbáz Gaṛhí.

Part IV contains seven papers and four plates.

Dr. Hultzsch's paper, noted above, is concluded. Professor Kielhorn gives an account of the Siyaḍoṇí stone inscription, which was first mentioned in our *Journal*, Vol. XXXI, by Professor Fitz-Edward Hall, as a "huge inscription" from some part of Gwalior of which a transcript had been made over to him by General Cunningham." In 1887 Dr. Burgess discovered this inscription about 10 miles from Lalitpur. Although no definite date is given on the inscription, Dr. Kielhorn has been able to deduce from it the names of four kings of Mahodaya or Kanyakubja, with their known dates, *viz.*,

Bhoja, succeeded by Mahendrapála, A. D. 903-4 and 937-8.

Kshitipála, succeeded by Devapála, 948-49.

Professor Kielhorn also gives a description, with text, of the inscription found at Kudárkoṭ, in the Itáwá District, North-Western Provinces, now in the Lucknow Museum. The paper is accompanied by a photolithographed facsimile. Also of two Chandella inscriptions, and of a fragment of an inscription from Jhánsí.

Dr. Bühler gives descriptions of the Peheva inscription from the Temple of Garíbnáth, in the Karnál District, edited from a paper impression furnished by Mr. C. J. Rodgers. Dr. Bühler has also edited the Kangra *Jválamukhi Praśasti* from the temple of Bhavání, in Bhawan, a suburb of Koṭ Kángrá.

The third volume of the *Corpus Inscriptionum Indicarum*, to which allusion was made in last year's address, has appeared and contains an account of the Inscriptions of the early Gupta Kings and their successors, by J. F. Fleet, Esq., C.I.E. Both in point of exhaustiveness and accuracy it is a model of what a work of this kind should be. It is furnished with 45 photolithographic facsimile plates, prepared in the well-known establishment of Mr. W. Griggs, at Peckham. A particularly valuable feature of the book is Mr. Fleet's 'Introduction,' which takes up more than one third of the volume and exhaustively discusses, among other things, the much-debated question of the epoch of the Gupta era. This, Mr. Fleet now shows conclusively, must be the year 319-320 A.D., equivalent to S'aka Samvat 241 expired.

In the *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, Dr. Bühler, in a paper entitled "Die Mansehra Version der Felsenedicte Aśoka's," gives the text of 12 edicts, in Roman and Sanskrit characters, with comments and comparisons with Dr. Senart's and other versions.'

Dr. Bühler also contributes to the *Vienna Oriental Journal* a second paper on further proofs for the authenticity of the Jaina tradition, founded on four new Jaina inscriptions from the Kankálí Tíla, at Mathurá, found by Dr. Führer.

In carrying out the excavations, Dr. Führer found epigraphic proof that the temple buried under the mound belonged to the Swetámbaras, as well as various votive inscriptions showing the well-known characters of the curious mixed dialect of the Indo-Scythians. The inscriptions now edited are four of the latter description, which mention the ancient Jaina Gaṇas, Kulas and S'ákhás, and are dated No. 1, Samvat 22, or A.D. 100; No. 2, S. 84, or A.D. 162; and No. 3, S. 95, or A.D. 173. Also an undated fragment containing the name of the Váraṇa *Gaṇa*, and further mentioning one of its branches the Aryyakaniyasika *Kula*. Transcripts and translations are given.

The *Indian Antiquary* contains a large number of papers of epigraphic interest.

The Editor, Mr. J. F. Fleet, C. I. E., continues his series of papers on Sanskrit and old Kanarese Inscriptions, dealing principally with copper-plate grants from Vizágapatam. He has also notes on the Kurtakoṭí spurious grant of Vikramáditya I, S'aka-Samvat 532, and on the Mahákúṭa inscription of Bappuvarasa, S'aka-Samvat 856.

Professor Kielhorn, C. I., E., has a paper on the copper-plate grant of Trilochanapála, the (Vikrama) year 1084, belonging to our Society, edited from an ink impression made by Mr. Fleet. This inscription was noticed in the 17th volume of the *Asiatic Researches*, but apparently has never been previously published. It was found at Jhánsi. The same author has also papers on the Benares College copper-plate grant of Jayachchandra, the (Vikrama) year 1232. On the Sírpur Stone Inscription of Siva Gupta. Inscriptions of the kings of Chedi, and on Chandella Inscriptions. Mr. J. A. Smith describes a dated Græco-Buddhist statue of Buddha found at Hashtnagar, in the Peshawar District. Dr. Bühler gives the text and translation of the Bagamrá Grant of Nikumbhallasakti. Mr. F. S. Growse describes an ancient inscribed terracotta seal found at Bulandshahr. Mr. Grierson continues his translations of Dr. E. Senart's papers on the Inscriptions of Piyadási.

Geography and Surveys.

During the past year steady progress has been made in carrying on the various operations of the Survey of India in its various branches, both within and beyond our frontiers, and although there are no great achievements or discoveries to record, a good amount of useful work has been done and large tracts of new country brought under Survey.

The operations in connection with the military expeditions in Upper Burma and the Eastern Frontier are important as paving the way for further explorations into the unknown country lying towards south-eastern Tibet and containing the upper waters of the great rivers of Burma, Siam and China from the Brahmaputra to the Yang-tse Kiang.

In Central Asia, Turkestan, the Pamirs and Western Tibet, foreign explorers have been particularly active, and a great deal of valuable geographical information has been acquired, though nothing very specially important has as yet been published.

I have already referred to the loss that Indian geography has suffered by the death of Sir Henry Yule, and it is indeed a serious one. Though apparently not taking any very prominent part in working out the great problems of Asiatic geography, his vast range of knowledge and his peculiar power of geographical intuition enabled him to advise and suggest ways of attacking them for others to carry out, and this he was always ready to do.*

It is a great pleasure to me to note that the Gill medal of the Royal Geographical Society has been awarded to Mr. M. J. Ogle, of the Survey of India Department, for his excellent survey work in Eastern Assam, in Manipur, and in Northern and Western Burma, partly with Colonel Woodthorpe, C. B., and partly independently.

Geographical Exploration and Surveys.—Lushai Hills. A small Survey party accompanied the expedition to the Lushai Hills which took place in the cold season of 1888-89. The area of new country mapped on the $\frac{1}{4}$-inch scale amounted to 540 square miles, besides about 210 square miles roughly reconnoitred from long distances. The line of march taken by the troops from Demagiri to Lungleh was laid down by plane-table traverse and measured 43 miles. The work done, though not great in quantity, yields a fair amount of new knowledge of the country. The principal fact ascertained is that there is no large stream or main feeder to the Kaladan River between the Blue Mountain (Mal Selai Mon) and Darjow Klang, as shewn in the old map of the country. The principal stream flows much further north, between Aitur Klang and Maliam Púi Klang. The Matt river joins the Kaladan further south than is shown in the old map. The sites of several new villages have been laid down and the positions of others corrected. Survey parties are also accompanying the columns of the Chin-Lushai Expeditionary Forces now operating in these hills,

* I may mention that very complete and appreciative accounts of Sir Henry Yule's geographical work have appeared in the *Proceedings* of the Royal Geographical Society and of the French *Société de Géographie.*

and it is hoped that a large extent of new country will come under observation.

Upper Burma. The reconnaissance survey of Upper Burma, (which was commenced immediately after the annexation of the country by a party working under the orders of Major Hobday,) has been steadily pushed on during the past year. All the military expeditions which were organised during the year were accompanied by one or more of the officers and surveyors attached to the party, and the total area mapped on the $\frac{1}{4}$ inch scale amounted to 20,510 square miles, of which the greater portion lies in the Shan States, and Bhamo District.

An outbreak in the South Theinni State led to the despatch of an expedition to Maingye, the capital, and during the military operations which ensued Major Hobday was enable to traverse much new ground between Mogok and Thibau, and beyond Lolin towards Tangyan, which is within a mile of the Salwín. The triangulation was much strengthened and eventually connected with that done by Captain Jackson last season between Mandalay and Maingye.

Later in the season an expedition against the Ponkan Kachins, a tribe living in the hills south-east of Bhamo, enabled Major Hobday to complete the circuit of triangulation brought from Mandalay across the Shan States to the Salwín river, round to Bhamo and thence down the valley of the Irawádí.

Captain Jackson, with a sub-surveyor, accompanied the Karen Field Force from Mobyé to Sawlon, including reconnaissances to Yonathit and Baw liké, and subsequently succeeded in completing the detail survey of the Myelat from Pekon to Baw and extended the survey to Yotsauk and northwards, returning by the eastern road to the Enlé valley. He then completed the survey of the small states of Kyauktat and Bawzein.

The country traversed by the Chin Field Force was also surveyed, and a large area of useful and interesting geography of the distant regions inhabited by the Kachin tribes was obtained by Mr. Ogle during the Mogoung Expedition. Surveys were also carried on in the Myingyan, Sagaing, Nimbu and Ruby Mines Districts.

This year's operations in Upper Burma bring the total area mapped on the quarter-inch scale, since the annexation of the country, up to 52,290 square miles; and the credit for this large result is due to the untiring energy and zeal of Major Hobday and Captain Jackson.

Captain Jackson, Mr. Ogle and Mr. Doran are now accompanying the Commission for settling the boundary between Siam and Burma, under Mr. Ney Elias, and it is hoped that a good deal of new country in this direction will be explored and mapped. The country is most difficult and unhealthy, but the people seem friendly and willing to assist.

Trigonometrical Branch.—During the year the laying out of a principal series of triangulation in Upper Burma on the meridian of 96° 30′ was commenced, but no final work on the series was obtained. In addition to this work, the same party carried on operations for fixing beacons along the Burma coast for the Marine Department, points suitable by their conspicuous appearance being selected and their position determined.

Tidal and Levelling operations.—The recording of the tidal curves by means of self-registering tide-guages, their reduction and the publication of predicted heights have been continued, and tidal observations have been carried on during the year at various stations round the coast of India and Burma and at Aden and Port Blair.

In connection with the Tidal Observations, it is interesting to observe that in a paper by Dr. G. H. Darwin, F.R.S., in the *Proceedings of the Royal Society*, it is pointed out that variation in the sun's temperature may possibly be a cause of variation in the mean-sea-level, and, if so, a periodicity with a period of 10 or 11 years may be expected. Observations at Karachi, show that there was a minimum of sea-level in 1872, and again in 1882, but these observations are clearly insufficient to do more than raise the question.

Dr. Darwin speaks in the highest terms of the Indian observations, and it is to be hoped that as time goes on it will be possible to prove the correctness of the theory he now puts forward, by the observations at some of the permanent stations.

A comparison of tide-registers at Karáchi with those at Sydney, N. S. Wales, shows that the variation of mean-sea-level occurs simultaneously at both these ports, but is more noticeable at the latter one. Endeavours are being made to establish a tidal observatory on the Island of Minicoy, as being especially valuable for the study of the oceanic tides, undisturbed by coast influences.

Spirit-levelling operations were carried on during the year from the Bangalore base to Mangalore, and from Bidar to Hyderabad (Deccan).

Latitude operations.—It found was necessary, owing to paucity of officers, to abandon temporarily the electro-telegraphic longitude operations, which require two trained officers to superintend them, in favour of the latitude operations for which only one is necessary. Seven stations were observed, situated between the latitudes of 19° 49′, and 16° 26′, and near the meridian of 80°. It is worthy of note that at six out of the seven stations the same excess of geodetic over astronomical latitude still appears as in the previous year, averaging nearly 6″. In other words a deflection of the plumb-line to the north is in operation through-

out the whole of the region where the observations have been made, the effect being that the plumb-line deviates from the normal to the theoretical spheroid at the stations occupied. Evidence of this kind is gradually being collected which will, when the whole scheme of the Trigonometrical Survey is completed, be all discussed simultaneously, and will without doubt enlarge immensely our knowledge of this abstruse question of local attraction, and may also not improbably lead to some amendment in the adopted elements of the earth's figure.

Solar Photography.—The two photo-heliographs at the Trigonometrical Branch Office at Dehra-Dun, one giving eight-inch pictures and the other 12-inch, have been employed, as usual, during the year in recording the spots and faculæ visible on the face of the sun. Two negatives have been taken with the smaller instrument on each day that the sun was visible, the larger instrument being only used for recording special phenomena. 656 silver prints of the 8-inch and 13 of the 12-inch photographs were prepared and despatched to the India Office for comparison with, and completion of, the Greenwich observations. The sun-spot minimum still continues and is abnormal in its duration.

Topographical Surveys.—In addition to the reconnaissance surveys described above, topographical operations have been continued in Baluchistan, the Himalayas and in the Gujarat district and the South Mahratta country, Bombay. Forest surveys were carried on in the Hoshungabad and Betúl districts, Central Provinces; the Satára, Nasik, Poona and North Kanara districts, Bombay; the Madura, Tinnevelly and Salem districts, Madras; and the Prome, Tounghoo, and Thayetmyo districts, Burmah.

Cadastral Surveys.—Cadastral Survey operations have been continued in the Biláspur District, Central Provinces; in various Government and Wards' Estates in Bengal; in the Tarái, N.-W. Provinces; in the Nowgong and Sibságar districts, Assam and in the Thongwa district, Burma. The Cadastral Surveys of Gorakhpur and Basti districts of the N.-W. Provinces were completed during the year, and new surveys were instituted in the Jalpáigúri and Chittagong districts and the Burdwan Khás Mehals, Bengal, as well as in the Jhánsi district N.-W. Provinces. Traverse surveys were executed by six parties in various districts in the Punjáb and Central Provinces.

The report of the Explorations in Sikkim, Bhután and Tibet, noticed in last year's address, has been published and contains the detailed accounts of the journeys of five explorers :—

(1). An account of the Lower Tsangpo, by the Mongolian Lama Serap Gyatsho, 1856-68.

(2). Narrative of a journey from Darjíling to Gyala Sindong, Tsári, and the Lower Tsangpo, by K. P., in 1880-84.

(3). Explorations in Tibet by Láma U. G., in 1883. The Láma started from Darjíling and went to Lhassa *viâ* the Donkya Pass, Shigatse and the Yamdok Tso Lake, returning *viâ* the Bam Tso Lake, Tangha Pass and Chumbi Valley.

(4.) Explorations in Sikkim, Bhutan and Tibet, by R. N., in 1885 86. He gained a good deal of information about Bhutan.

(5.) Exploration in Tibet and Bhutan, by P. A., in 1885-86. He accompanied R. N. and has contributed the route along the range to the west of the Wong-chha to the vicinity of Baxa Duar.

The volume is a very valuable contribution to the knowledge of these little-known regions and a testimony to the arduous labours of these intrepid explorers.

The appendices to the General Report on the operations of the Survey of India Department, for 1887-88, contain much interesting information on the Electro-telegraphic Longitude operations carried on by Colonels G. Strahan and W. J. Heaviside, R. E.; on the Tidal observations, by Col. M. W. Rogers, R. E., including values of the Tidal Constants for various Stations; a very interesting account, by Capt. H. M. Jackson, R. E., of the Survey operations in the Southern Shán States, containing a good deal of information about the country and people; also a note by Col. H. C. B. Tanner on Trans-Himalayan geography, in which he discusses our present knowledge of Nepal geography, and of the geography of Bhutan and Assam and the settlement of the much-vexed question of the course of the Sangpo river.

Publishing Offices. During the year the Photographic and Lithographic Offices, which have hitherto been accommodated in three different private houses, were brought together in a handsome new building, No. 14 Wood Street, and the whole of the Survey of India Offices are now housed in a suitable and efficient manner. As usual, a very large number of maps and various other subjects have been produced during the year by lithography and photography. A new edition of the map of India on the scale of 32 miles to the inch, which was much wanted, has been published and a third edition is in hand. A new general map of Burma, on the same scale, has also been completed. New Railway maps have been prepared. The helio-gravure process is making good progress and is being largely utilised in various ways.

Trans.-Frontier and other Geographical work. The year has been comparatively uneventful in geographical work in the countries bordering India, though several parties of explorers have been busily engaged about the Pamir and eastwards towards Tibet.

French Cochin-China, &c. The *Proceedings of the French Geographical Society* contain an account of the results of the mission of Mr. Taupin

in Lower Laos, in 1888. He studied the language and written works hitherto almost unknown. He surveyed over 600 miles of roads and rivers, and made several corrections on the maps. He found the climate suitable for the growth of European vegetables, and believes that coffee, cocoa, pepper and even the vine, would do there well, the climate being drier than Lower Cochin-China.

Father Guesdon has prepared a general map of Cambodia, also a Dictionary of French and Cambodian.

M. Pavie, who has for three years been exploring the north of Siam and the Laotian provinces, with the object of finding the easiest route from these regions to the sea, has discovered a route, that can be traversed in nine days—four in boat and five on horseback, thus connecting the commercial centres in Siam with the French possessions in Tonquin.

Several interesting works have been published regarding these French possessions in Further Asia—among them—Mons. J. L. de Lanessan's "*L' Indo-Chine Francaise*," which gives a useful general account of the French possessions in Cochin-China, Cambodia, Annam and Tonquin, and more particularly of the expedition sent for rectifying the boundary between Annam and Siam. Mons. J. Silvestre's "*L' Empire d' Annam et le peuple Annamite*," with map; Mons. Paul Brandas' "*Le haut Mekong ou le Laos ouvert*," with new maps.

A new map of French Cochin China, prepared by Commandant Al. Koch, has been published on the scale of 1 : 400,000, or about 5·5 geographical miles to the inch.

Burma and Siam. Mr. Holt S. Hallett has published under the title of "*A Thousand Miles on an Elephant in the Shan States*," an account of his journeys in Burmah, Siam, and the Shan States, in search of the best railway route between Burmah, China, and Siam. The work is well illustrated with maps of Southern China, and Indo-China, showing the railway lines projected by English and French engineers between Burma and China and from the Shan States to Tonquin. Mr. Hallett has contributed a good deal that is new to the geography of this little known region and to our information regarding it.

The Asiatic Quarterly Review contains papers by Major-General A. R. Macmahon on Karenni and the Red Karens, and by Mr. J. G. Scott on the British Shan States.

Upper Burma and S. E. Frontier. The *Proceedings of the Royal Geographical Society* contain a very valuable and interesting paper by Colonel R. G. Woodthorpe, R. E., C. B., on his exploration on the Chindwin River in Upper Burma, in which he gives an account of the whole tract beetween Manipur, the Kubo valley, and down the Chindwin River to Alôn. The paper is illustrated by a map.

With reference to the question of the hydrography of S. E., Tibet, which was briefly discussed in last year's address, I may note that Mr. Needham writes in the *Proc. R. G. S.*, that the idea that the source of the Dibong lies very far north of Sadiya is erroneous, and that from information he has received from many Mishmis, the source is near the Tibetan town of Alüpo, which lies on the northern slope of a high range known as Taseni and about 11 marches, or some 130 to 140 miles, from Nízámghát.

In the "*Transactions and Proceedings of the Royal Geographical Society of Australasia*" Mr. G. S. Streeter has given an interesting sketch of the country and people and of the mineral and vegetable products of the tract of country in the vicinity of the Ruby Mines and Northern Shan States.

Tibet. The impenetrable has ever an irresistible attraction, and Lhassa is more than ever the *point de mire* of ardent explorers. At least three parties have been on their way towards it during the year, but, so far as present information goes, without success; though it may be noted that rumours were current in the Eastern parts of Tibet that the Russians had reached Lhassa in February last, but of the fact there has been no confirmation.

The journey of which we have fullest accounts, is that undertaken by Mr. W. W. Rockhill, formerly Secretary to the American Legation in Pekin, who set out from that place in December 1888 and has given a short but interesting narrative of his travels up to August last, which will be found in the *Proc. R. G. S.* for December last. He travelled disguised as a pilgrim in Tibetan dress and explored some new country about the Kuen Lun Range, in the neighbourhood of the Arumye-Kor Pass, near the Tosu Nor, and the Nomorau Ala Pass, near the Alang Nor. At Barong Dsassak he heard that the Russian expedition to Tibet had reached Lhassa and decided to go through East Tibet *viâ* Chamdo, Batáng and Litang. At Jye Kundo (Kegido of Pandit A. K.), his troubles with the Lamas commenced, and he had to abandon his luggage and make for Tachienlu, and thence to Chungking in Ssuchuan. He made surveys of all routes and has apparently gained a considerable amount of knowledge of hitherto unexplored country, where his route diverged from those followed by Prjevalski or the Pundit A. K. It is satisfactory to find that he speaks in high terms of the correctness of the latter's survey, though he finds fault with his spelling of names of places. It is to be hoped that the fuller account of his travels, which he offers to the Royal Geographical Society, may be given hereafter.

From *Globus* we learn that Joseph Martin left Pekin for Lanchow and Sin-ning, with the intention of reaching Tibet, *viâ* the Kuku Nor.

The object of his journey is to make observations on the physical geography and geology of the tract.

Mons Dutreuil de Rhins has lately brought out a work entitled "Asie Centrale." It comprises a volume of text and an atlas of 23 maps, besides a general map of the true Central Asia, *i e.*, Thibet and the adjacent regions, from Lake Lob Nor to British India, and from Kashgaria to the western provinces of China, between the latitudes of 27° and 41° north, and longitudes 78° and 102° east of Paris. The author professes to have reconstituted the cartography of Central Asia by making a fresh critical analysis of all the original documents ancient and modern, European and Chinese.

The Abbé Desgodins, who was for so many years at Bathang, has returned to France and has taken with him the MS. of a great Dictionary of the Tibetan language, in which the meaning of each word is given in English, French and Latin. He has worked at it for the last 25 years and now proposes to have it printed in France.

Turkestan and Central Asia. There has been unwonted activity in exploring in the neighbourhood of the Pamir and other parts of Central Asia during the year. At least three Russian expeditions, one Austrian and one French were so engaged, besides private and official explorers from our own side.

The principal of the Russian expeditions was that which was to have started for Tibet in 1888 under Prjevalski, and after his death was placed under charge of his companion, Colonel Pevtzoff. The expedition, composed of Col. Pevtzoff and two other companions of Prjevalski, Lieuts. Roborovsky and Kozloff, left Prjevalsk (Karakol) about the middle of May last, crossed the Tian Shan by the Baraskaunski and Bedel Passes and then made their way by the Dungaret-ma Pass to the Yarkand River by a route hitherto untraversed by any European. They found the Sart inhabitants friendly. This type shows an Aryan descent and both men and women are good looking. From the Yarkand River they went to Aksak Moral. In the desert of Takla Maklan to the right bank of the Yarkand River, they found many buried remains of ancient cities. They reached Yarkand on the 3rd July, where the geologist, M. Bogdanovitch, joined them, and then went on to Khotan and Nia, where they propose to winter and in the spring to go into Tibet over the Toguz Daban Range, by a pass discovered by M. Roborovsky, at Youngilik-Khanym, leading to a desolate and uninhabited plateau at 12,000 feet elevation but well watered and cultivated more to the south. This pass is about 80 miles to the east of the pass across the Kuen Lun Mts. from Southern Khotan to Lake Zashi Kul. The expedition has already collected a good many new geographical and ethnographical

particulars about Kashgaria, besides astronomical and magnetic observations and topographical surveys over an itinerary of nearly 1,100 miles. M. Bogdanovitch has explored geologically the valleys of the Raskem, or Yarkand, River and of its affluent the Tiznaf, and also the the country in the neighbourhood of the Mustagh Ata, or Tagharma mountains, west of Yarkand.

Petermann's Mittheilungen contains a full account of Prjevalski's fourth journey in Central Asia, by Dr. Carl Diener, of Vienna, with a map showing the course of Prjevalski's four journeys.

Captain Grombtchevski, whose exploration over the Pamir to Kanjut was noticed in last year's address, left Margilan on the 13th July last on another expedition to the south of the Hindu Kush. He passed through Karategin and Darwaz to Kila Khumb on the upper Oxus, intending to proceed to Shignan and Lake Shewa, if possible, and then to Kafiristan. After following the course of the Panjah to the junction of the Wanj River, he explored the valley of the latter, and then proceeded by the Syr-Artchi Pass to Khin-i-ab, in Wakhán. The passage of the Syr-Artchi was very difficult over more than 7 miles of ice, and at the commencement of September deep snow covered the country. Being refused admission into Afghanistan, he decided upon marching towards the sources of the Ak-Su and the Taghdumbash Pamir, where he arranged for crossing the Ili-su-Pass to the valley of the river Raskem. In October he was at Kaindyn Aouzy, on the Ili-Su, and proposed to visit the sources of the Raskem river, in the Karakoram Mountains, and thence explore the basin of the upper Khotan river. He claims to have discovered two new passes, the Kilinj and the Kadarpur, the first is, however, well known, having been visited by Col. Woodthorpe.

Another important Russian exploring party is that under M. Grum-Grjimailo, who started from Vernyi, in April last, in company with his brother, to explore the Eastern Tian Shan, where he will endeavour to connect Prjevalski's surveys with those of Potanin and also complete the botanical and zoological work of Prjevalski and other travellers in this part of Central Asia. From the Tian Shan, he was to travel by way of Turfán to Lake Lob Nor and thence explore the Altyn Tág range. The latest accounts from these explorers inform us that they have found that the existing maps of the Eastern Tian Shan are quite incorrect. They have gathered very rich collections of vertebrates and insects. It may be of interest to Indian meteorologists that the spring was very late in Dzungaria, and that in the month of May, the lower limit of snows on the Ala Tau range, in the latitude of 43° N., was 7,874 feet. The winter of 1888-89 in Trans-Caspia is said to have been unusually severe. M. Bogdanovitch reports heavy rain and floods, in May and June last, in the mountains to the west of Yarkand.

Mons. Bonvalot, whose account of his expedition to the Pamir was noticed last year, is again in Central Asia, in company with Prince Henry of Orleans, and wrote from Kuldja, last September, that he was starting for Lob-Nor with the intention of crossing the Tsaidama and going by the Mur-Usu to reach Bathang, and thence, if all went well, they would go towards Yunnan and Tonquin. From later accounts received from Kurla, near Lake Bagratch-Kul in Eastern Turkestan, the party had been joined by M. de Decken, a Belgian missionary, from Kuldja. From Lob-Nor they proposed to make for the upper Yang-tse-kiang. They had already made good collections of birds and mammals.

Major Cumberland and Lieut. Bower have been travelling towards Yarkand, Marálbáshi and the Pamirs.

The Austrian traveller, Dr. J. Troll, passed last winter in Chinese Turkestan and made a journey to Khotan in May last, and thence crossed the Karakoram into Ladak.

M. Dauvergne, of Srinagar, has made a remarkable journey along the northern slopes of the Hindu Kush, to the Taghdumbash and Baroghil Pass, and thence, along a hitherto unexplored path by the Gazkul, or Karambar Sar, to Gakuch, on the Gilgit River. He finds that instead of one lake there are two, the Gazkul and the Karambar Sar, separated by a narrow rocky watershed. From the former, the Yárkhun river flows and from the latter the Karambar or Ashkaman River.

Kanjút and Hunza have been visited by the British Political Agent, Capt. Durand, and Lieut. Manners Smith.

The Founder's Medal of the Royal Geographical Society has been awarded to Mr. A. D. Carey, C. S., for his journey through Central Asia in 1886-87.

Captain F. E. Younghusband, whose adventurous journey from China *viâ* the Mustágh Pass to India was noticed in last year's address, has again been exploring in the same regions. He crossed the Karakoram Pass and turning to the west explored in the neighbourhood of the two Mustagh Passes. He then went northwards to the Yarkand River, and thence to the Taghdumbash Pamir where he met Grombtchevski, the Russian explorer. He examined the hill country to the south and the Khunjarab Pass, and then crossing the main range by the Mintaka Pass, well to the east of the Baroghil, made for Hunza by way of Gircha and Gulmit, and thence returned to India, *viâ* Gilgit and Kashmir.

A new Russian map of the Pamir, on the scale of 1 : 1, 260,000, has been published privately in M. Romanoff's *Memoires des Coleoptéres.*

Among new works on Central Asia that have appeared during the year may be noted V. P. Nalivkine's *Histoire du Khanate de Khokand,* translated from the Russian by Aug. Dozen. It is illustrated with a map, and contains a geographical and ethnographical introduction.

The *Scottish Geographical Magazine* contains a very interesting account of the Andaman Islands and their Inhabitants, by Colonel T. Cadell, V. C., and the *Mitheilungen der K. K. Geographisch Gesellschaft*, of Vienna, gives a paper by Dr. Svoboda on the Nicobar Islands and the Nicobarese, dealing with the geography of the islands and the customs of the people, including a full account of their funeral ceremonies.

Our former valued member and contributor, Mr. V. Ball, has published a translation of Tavernier's "Travels in India," with copious notes, specially relating to the mineralogy of the diamond mines of Golconda and other parts of India.

Marine Surveys.—Commander Carpenter's Report on the Marine Survey of India, which forms Appendix IX of the Annual Administration Report of the Indian Marine for 1888-89, gives a very interesting account of the operations of the survey and of the zoological work connected therewith.

It appears that during the seven years which had elapsed since H. M. I. M. S. "Investigator" made her first surveying trip, she has run some 44,000 miles, and that, inclusive of boat-work, a total of 33,500 miles of close soundings have been run, but as on the 4-inch scale there are 12 to 15 lines of soundings to a square mile, the total linear mileage of survey completed sufficiently for safe navigation round the coast of India is only 1,715 miles out of 5,000, or just one-third.

The work of the season commenced in April in the neighbourhood of the Andamans and about 100 miles west of these islands, a submarine elevation was found of 1,370 fathoms standing a plateau of about 1,700 fathoms, which difference represents a submerged peak, 2,000 feet high. Subsequent investigation shewed a continuation of this ridge or plateau of 1,700 fathoms. Between this ridge and the islands there is a groove or valley of 1,900 to 2,000 fathoms, which appears to stretch up from Acheen; and on the west side of the valley the water appeared to be slightly colder than the normal temperature of those depths.

After recessing at Poona, the party left Bombay in October, and some further soundings made between the Northern Lakadivh banks and the coast bank proved that the Lakadivh group form a chain of peaks rising from a bed of 1,100 fathoms, and are in themselves 6,600 feet above the bottom, or about the height of the Western Ghats in the same latitude. Some of the islands and banks are reported out in position, and will have to be examined. From Colombo, the 'Investigator' proceeded to the Andamans and the soundings round South Sentinel Island were completed. Several fine specimens of the robber crab, "*Birgus latro*," were secured here.

Observations shewed that the little Andaman had to be moved

about $1\frac{1}{2}$ mile to the eastward, and that the Table Island Light was quite correctly placed on the charts.

A course was then laid for False Point, in Orissa, and deep-sea soundings made. A map attached to the report, shews that the Bay of Bengal has a regular decline towards its mouth: the Andaman and Nicobar Range form its eastern boundary (the sea east of the Andamans being a separate basin); the water nearer the coasts is slightly deeper than in the centre; the depth falls off very suddenly from the 100 fathom line off the Sunderbands to the 900 fathom line. The most rapid fall is really from 100 fathoms to 650 fathoms, where the slope is 1 in 13.

A light-house is reported to be much required at the mouth of the Devi River.

It was found that several of the river mouths, *viz.*, False Point, the Jotador River, the Devi River, and the Chilka Lake entrance have all shifted their positions about 3 miles to the north-east, in the last 40 years by the extension of their sandy spits.

A comparison of the soundings in Coconada Bay, with those taken in 1882 shows a similar northerly movement of the estuary, amounting to half a mile in 7 years, or three miles in 42 years. In another 40 years Coconada will be unapproachable by water. The erosion or transfer of sand, by the continuous southerly swell and the predominant southerly wind, are working vast changes along the immediate seaboard, which certain preventive measures may guide and modify, though they will be powerless to arrest them.

In Appendix XII of the same report, Dr. Alcock has given a full and highly interesting account of the zoological operations of the survey from November 1888 to March 1889, at the Andamans and Cocos and on the Orissa coast, with a list of Fishes found off the latter, and also notes on the newly-hatched larval forms of *Thenus orientalis* and *Hippa asiatica;* on the gestation of some Elasmo branch Fishes, and on those Fishes taken off the Orissa coast which are believed to be new.

Dr. Alcock regrets that nothing has hitherto been done by the Survey in the way of botanical collection, but now that the necessaries have been furnished, he proposes to begin.

In another Appendix (XIII) Commander Carpenter gives a memorandum on the unsurveyed condition of portions of the coast line of India and Burma, showing what has been done, what remains to be done and when it might probably be undertaken by the present staff.

Geology.

The work of the Geological Survey of India, under the direction of Dr. William King, has during the last year been mainly devoted to

the practical exploration of mineral products, the call for which, owing to the larger extension of the railway system, the interest evinced by private enterprise, and the desire of the Government of India to place the conditions of the resources of India as clearly as possible before the public, has become most urgent.

Reports of the greatest economic interest and value have been published, in the *Records* of the Survey, on the Auriferous rock series (*Dhárwárs*), and the Diamond exploration in South India, by Mr. Foote; on Tin-mining in Tenasserim, by Mr. Hughes; on Indian steatite and materials for pottery manufacture in the neighbourhood of Jabalpur, by Mr. Mallet, who gives notes of trials of steatite from various parts of India as to capability of being cut into small pieces without breaking and freedom from grit, for the purpose of making gas-burners. The best specimens were from Kurnool, the Anantapur District and Jaipur, but many others were promising. Dr. Noetling has also given a very interesting and valuable Report on the Oil-fields of Yenangzoung, in Burma, in which he shows that under the native system of working the greater part of the oil-bearing sandstone is untouched and the oil industry would not be developed more than it is at present; but if worked according to the European style, by bores, these oil-fields are capable of considerable development in the future, but cannot be expected to compete with American or Russian oil.

The first part of a provisional "Index of the Local Distribution of important Minerals &c. in the Indian Empire" has been compiled by Dr. W. King, the Director of the Survey. Such an Index has been much wanted and will be of great value. It is arranged; first, by Presidencies, Provinces, Agencies, or Native States, in alphabetical order, and gives the mineral products found in each under the heads of important minerals, miscellaneous minerals, gem-stones and quarry-stones.

Professor the Ober-Bergrath, Dr. W. Waagen, of Prag, continues his admirable memoirs on the Salt-range fossils, in the *Palæontologia Indica*, of which Part I, Vol. IV., *Geological Results*, was issued by the Survey in December last. Succeeding parts of this volume will be issued as volumes II and III, are completed, the part now issued having reference mainly to the first volume, The Salt-range geology is, however, continually receiving great attention from explorers and perhaps the most interesting observation yet made is that of Dr. Warth, who was fortunate enough early in the year to make the remarkable discovery of trilobites in the *Neobolus* beds, which had long been looked upon as of Silurian age. Dr. Waagen confirmed the discovery by recognising two determinable species; one a *Conocephalites*, very nearly related to *Con. formosus*, Hartt. from the St. John's group, and the other

probably an *Olenus;* thus giving a lower Cambrian, or by priority, Taconic age to the *Neobolus* beds. Messrs. Middlemiss and Datta have since made considerable additions to this lowest palæozoic fauna, recognising two fossiliferous zones in the upper of which a decidedly clearer and somewhat larger form of *Conocephalites* occurs.

Mr. Griesbach, on his return from deputation with the Amir of Cabul, in July last, reports that during his journey up the Logar Valley to the Khurd Kabul Valley, he recognised at least three horizons: the Rhætic, with *Lithodendron* (in Kharwár); the Upper Jurassic (or possibly Neocomian) plant-beds (near the Shutargárdan), and well developed nummulitics (in Kharwár and Shilgar).

Mr. Middlemiss has completed his memoirs on the Physical Geology of the Sub-Himalaya of Garhwal and Kumaon, which will be issued by the Survey almost immediately. It should form an excellent addition to the literature and study of the geology of the outer Himalaya, which was so ably initiated and carried on by Mr. Medlicott, the previous Director of the Survey.

Some interesting new information regarding the geology of the Pamir border-ridge, in the neighbourhood of the Mustágh Ata, or Tagharma Peak, and the adjoining valleys, which had already been explored by Dr. Stoliczka, has been obtained by M. Bogdanovitch, the geologist of the Russian expedition to Tibet under Colonel Pevtzoff. He finds no trace of mountains running north and south on the eastern edge of the great Pamir plateau. The Kashgar mountains are an upheaval of gneisses, metamorphic slates and tertiary deposits running from north-west to south-east. The limestones which Stoliczka supposed to be Triassic, proved to be Devonian. Several very characteristic Upper-Devonian fossils were found, together with the corals described by Stoliczka. The tertiary sandstones are broken through by dolerites of volcanic origin, at the very border of the plateau, on the slope towards Kashgaria.

Among the geological papers in our *Journal* may be noted, Mr R. Lydekker's on the Tortoises described as *Chaibassia,* in which he shows that the genus *Chaibassia* should be included in *Nicoria,* and that the one species of the former should be known as *N. tricarinata.* Brigadier-General Collett's very interesting note on the geology of the Myelat District, in Burma, noticed last year, has been published. He draws attention to some curious features in the drainage of the country, by which the streams drain into crater-like holes, from a few feet diameter to areas of 3 or 4 square miles, formed by the washing down of the clays overlying weatherworn limestones into the rock below, so that the country is practically without rivers.

Captain A. W. Stiffe recently read before the Geological Society of London a paper on the Glaciation of parts of the Valleys of the Jhelam and Sind rivers in the Himalayan mountains of Kashmir; in which he gives an account of some observations he made, in 1885, which appeared to indicate signs of former glaciation on a most enormous scale.

Among the books on Indian Geology, published during the year Mr. Medlicott's *Sketch of the Geology of the Punjab* merits notice. Under the heads—Aravali Region; the Plains; the Salt-range and its west extension; the Himalayan district; the Afghan region; the Suleiman range—considerable light is thrown on the geological structure of the whole Punjáb region.

Mr. R. D. Oldham's *Bibliography of Indian Geology*, which should have been noticed in last year's address, is a very valuable aid to the Indian Geologist and meets an urgent want.

I also note a pamphlet by Mons. J. Marcou, on the Taconic in the Salt-range in the Punjab.

A Report by Mr. P. Bosworth-Smith, on the Kolar Gold-field and its extension from Mysore into the Madras Presidency, has been published at Madras.

Meteorology.

There is, on the whole, less to record on the work of the Meteorological Department during the past year than during the previous two years.

The most important event was the retirement of the head of the department, Mr. H. F. Blanford, at the end of two years' furlough. Mr. Blanford has been a most active member of the Society for many years and was for some time before he went on furlough in May 1886, President of the Society. His services to the Society have been already fully acknowledged in the annual address of the year.

Mr. Blanford's attention was first directed to the subject of Indian Meteorology by the great Calcutta cyclone of October 1864, of which he and Col. Gastrell drew up a full and interesting account. The storm and subsequent inquiry led to the introduction of a system of storm-signals for the Port of Calcutta and River Hooghly. A Meteorological Committee was formed in 1865 and subsequently this led to the establishment of the Bengal Meteorological Department in 1867, and Mr. Blanford was appointed head of that department as Meteorological Reporter to the Government of Bengal. He wrote a series of valuable annual reports on the Meteorology of Bengal and various papers on meteorological matters, some of which were published in the *Transactions of the Royal Society* and others in the *Journal* of our Society.

His experience soon showed him that the system of independent provincial Meteorological Departments was very unscientific and that rapid progress in the investigation of the Meteorology of India could only be made by combining the provincial departments into a single system. In that way only could the Meteorology of India be dealt with and studied as a whole. His efforts in this direction finally brought forth fruit. In 1875, he was asked by the Government of India to report upon the provincial systems and to propose a scheme for their unification and the establishment of a Meteorological Department for the whole of India. He submitted the report called for, in July 1875, and the scheme he proposed was adopted. He was appointed Meteorological Reporter to the Government of India, in order that the scheme he proposed might be carried out, and the objects realized in the most effective manner. From that time to the date of his retirement he laboured most earnestly and energetically to realize his idea of a thoroughly efficient department which should deal with the Meteorology of India from a practical as well as a scientific stand-point. The storm-signal duties of the department were rapidly extended and before the termination of his service, a system was in force for warning all the more important ports of the Empire. Daily reports for the whole of India, similar to those published by Meteorological Bureaus in Europe, are, as a result of his labours, issued at Simla, and local reports at Calcutta and Bombay, to give early weather information to the mercantile and seafaring communities of these two ports. A valuable series of annual reports dealing with the Meteorology of India as a whole, and of monographs on various Indian Meteorological subjects, in the "*Indian Meteorological Memoirs*," have been published during this period. Probably the most valuable of all is the monograph on the "Rainfall of India," based on the whole of the available information up to date. Since his retirement he has written a very valuable popular treatise on the "Climates and weather of India." It is based on the whole of the materials and researches of the department to the time of his retirement. It is not only very interesting reading, but gives later and more complete information on Indian Meteorology than is to be found elsewhere. It will, it is to be hoped, awake a livelier interest in the problems of Indian Meteorology amongst European meteorologists and induce them to assist investigations. The number of scientific meteorologists engaged in the investigation of the problems of the weather of Western Europe (no larger than India) are to be numbered probably by hundreds, whilst it is doubtful whether there are as many as a dozen who devote themselves to the elucidation of the meteorological problems of India.

An important feature of the work of the year 1889 in Meteorology

in India was the permanent introduction of the series of changes which were referred to in last year's address as being in part tried temporarily. The following is a brief summary of these changes :—

1*st.*—The substitution of 8 A. M. for 10 A. M. as the chief hour of observation in India.

2*nd.*—The introduction of a uniform system of registering rainfall throughout India and the adoption of the same hour, *viz.*, 8 A. M., at all the revenue rainfall recording stations.

3*rd.*—Greater prominence to observations during storms. This is effected by assigning separate and special payments for these observations, the amount being determined by the value of the observations.

4*th.*—Increased inspections by the employment of Native Inspectors. Their services are especially utilized for inspection during the hot weather and rains. They are also employed to train new observers or observers imperfectly aquainted with their work and to inspect any observatory, the observations of which from some cause or other become vitiated by frequent or constant error, the nature of which it is impossible to determine by correspondence with the Superintendent.

5*th.*—The systematic and regular collection of meteorological data respecting the Arabian Sea and Bay of Bengal from ships entering the ports of Bombay and Calcutta, with a view to the publication, for a period of two years at least, of daily charts of the whole Indian land and sea area.

6*th.*—The occasional employment of European meteorologists to discuss completed series of observations such as, for example, forest rainfall data, for a number of years in order to determine the influence of forests on rainfall &c.

These large changes necessitated a number of smaller changes in the work and pay of observers and in the office establishments, but these do not need further notice.

The great majority of these changes were made permanently on the 1st of January 1889, and the remainder during the year.

Another important advance was the commencement of the publication of a daily report and chart at Bombay for the use of the mercantile and seafaring community of that port. This was urged on the Government of India both by the Port Trust and the Chamber of Commerce in the year 1888. Both bodies were consulted as to whether they would contribute to the increased expenditure. The Chamber of Commerce offered a liberal contribution as an experimental measure for one year and the Bombay Government undertook to print the chart and

report at the Secretariat press. This local assistance made the publication of a suitable report possible, and practicable, and a report and chart embodying observations from upwards of 40 stations, situated not only in the Bombay Presidency, but in the large wheat and cotton-producing districts in the Central Provinces and North-Western Provinces, which supply these products to Bombay for use or for export, has been issued from May 1889. It has been most useful and is so much appreciated in Bombay that its establishment on a permanent basis next year is practically certain.

Another important step in advance in the practical work of the Department was the adoption of an extended and improved system of storm signals for the Bombay or West coast of India ports. It may, in the first place, be premised that it is evidently more difficult to warn the Bombay than the Bay of Bengal coast. The Bay of Bengal is surrounded on all sides except the south by a battery of observing stations and is of such limited extent that a large cyclonic storm in it always gives certain indications of its existence at the coast stations some time before it reaches land. The Arabian Sea has, so far as the work of the Indian Department is concerned, stations at only one side *viz.*, the east, and it is quite possible for cyclones to form in it and cross to the north or west without giving any indication to the Bombay coast stations. It is hence practically possible to warn steamers at any of the Bay of Bengal ports of the existence of any cyclonic storm they are likely to meet with in the Bay if they leave port. Such a thing is only partially possible for vessels leaving Bombay or Kurrachee, and it has hitherto not been attempted at all. The system adopted was suggested by Sir Henry Morland, Port Officer of Bombay, and is similar to that used to warn British coasts. Its aim is to warn the ports of any approaching storm likely to give a gale to the port and also to intimate to shipping in the ports the position and course of any cyclonic storm in the Arabian Sea, the existence of which is shewn by the coast observations.

Several minor improvements have been effected in the Bengal or Calcutta storm-warning system. Arrangements have been made for obtaining early weather information from the pilot-vessels at the Sandheads. Telegraphic communication to Diamond Island (the most important station for indicating the first existence of storms forming near the Andamans) has been much improved.

Mr. Pedler some time ago drew my attention to the meteorological interest of the fact noticed at the time of Mr. Spencer's first balloon ascent, of his first travelling in a northerly direction and then in a south-easterly, and he has kindly given me the following note on the subject.

"In connection with the subject of Meteorology, it may be mentioned

that there were two balloon ascents made in Calcutta in the year 1889, and the observations made on these occasions point to the fact that extremely valuable information might be obtained from a series of such ascents.

"It is well known that during the hot-weather months, Bengal forms a kind of focus to which three converging wind systems blow. There is the north-westerly current, blowing down the Gangetic valley, which spreads over Behar, parts of Chutia Nagpur &c.; the second is an easterly current blowing down the Assam valley, and the third is the strong southerly current which blows at the head of the Bay of Bengal, and for some distance inland. The strength of these southerly winds, as judged by the wind velocity, is greater in the hot-weather months, when very little rain is brought up by them, than it is in the actual south-west monsoon season, when, as is well-known, extremely heavy rain is brought up by the southerly current. It has been surmised that the southerly winds of the hot-weather months are confined to a shallow belt near the earth's surface and do not extend to considerable altitudes like the south-west monsoon current, and hence, though strong on the surface of the land, they do not penetrate far into the interior of the province of Bengal.

"On the first occasion when Mr. Spencer ascended in his balloon, on 19th March 1889, from the Calcutta Maidan, there was a moderate south south-westerly wind blowing near the surface. The balloon was at first carried rapidly towards the north-north-east, slowly rising also in its course. When the balloon, so far as could be judged, was about 1,500 to 2,000 feet high, it ceased to have any northerly movement, and shortly afterwards drifted very rapidly in a south-easterly direction, proving clearly that there was a strong north-westerly wind-current blowing only a short distance above the earth's surface, say at an altitude of 2,000 to 2,500 feet, notwithstanding the strong southerly current blowing below it.

The second balloon ascent was made by Mr. Spencer accompanied by Lieut. H. J. Coningham, who very kindly consented to take a series of meteorological observations which will be published in the Report of the Meteorology of India for 1888. Mr. Coningham writes in connection with the direction of winds experienced in this ascent as follows:—

"The balloon started with an almost direct southerly wind (*i. e.*, south to north), and continued in this direction until an altitude of about 3,500 feet was reached, when there was a tendency for the balloon to go towards the south-south-east, and above this height there was a north-north-westerly wind blowing; but on coming near the earth again (about 2,800 feet), the balloon took a north-westerly course,

showing that the wind was from south-east, until it reached earth at 6·5 P. M., a few miles to the east of Baraset."

"This would appear to shew that in the middle of April the southerly current was deeper than in the middle of March by about 1,000 feet, and that in April its depth is at least 3,000 feet.

"It is clear, therefore, that a series of balloon ascents, during which proper meteorological observations were made, would yield most valuable results in extending our knowledge of the air-currents in India."

Two papers by Mr. S. A. Hill, Meteorological Reporter to the Government of the N.-W. P., have been published in our *Journal* since my last address. In one of them he gives a number of observations with a Regnault's psychrometer and draws from them the practical conclusion that Regnault's modification of August's psychrometric formula is not likely to be improved upon, and that if we want the dry and wet bulb thermometers to indicate the humidity correctly at times when there is no wind, they ought to be ventilated artificially at the time of observing. The other paper, on the Tornadoes and Hailstorms of April and May 1888, in the Doab and Rohilkhand, was noticed in last year's Address.

At the December meeting, an interesting paper was presented by Mr. J. Eliot on the occasional inversion of the temperature relations between the hills and plains of the Northern India. The paper deals with a peculiar feature of the minimum cold-weather night-temperature in Northern India, which is often higher in the hill-stations than it is in the plains below. The occurrence of the phenomena and its causes are fully entered into by Mr. Eliot. It may briefly be said that a flow of cold air from the hills to the plains after sunset causes a corresponding displacement of warm air towards the hills.

Part VI, Vol. IV of the *Indian Meteorological Memoirs*, is devoted to a very interesting and suggestive paper by Mr. S. A. Hill, on temperature and humidity observations made at Allahabad at various heights above the ground. The principal point proved confirmed the results given in Mr. H. F. Blanford's paper on the temperature at different heights above the ground at Alipore, among which was the very curious fact that for some distance above the ground, the mean temperature of the air increases on ascending instead of decreasing, as it should do under the ordinary course of events. At Allahabad on the average of the whole year, the temperature increases up to about 155 feet from the ground, and the increase amounts to about 1·5° F.

The third chapter of the revised edition of Dr. Loomis' *Contributions to Meteorology* is devoted to a consideration of the mean annual Rainfall for different countries of the globe, and of the conditions

favourable and unfavourable for rainfall. Attached are several excellent maps showing the mean annual rainfall of the whole world and of various countries. The rainfall of India and contiguous countries is fully considered, and tables of rainfall at Cherra Punji, the Khasi Hills and at mountain stations are given.

An elaborate atlas of twenty-two charts, containing the results of observations in the Indian Ocean for the months of December, January and February, published by the Royal Meteorological Institute at Utrecht, is noticed in *Nature.* No less than 51,199 observations have been used in the construction of the wind-chart for December. The atlas includes charts of temperature, currents, atmospheric pressure, specific gravity, rain, and percentages of storms.

Chemistry.

Considering the enormous and almost unworked field for chemical research that lies open in India, it is remarkable that so attractive a science should find so few votaries in this country, so far, at any rate, as may be judged by the paucity of published papers. The idea that a quantity of delicate and expensive apparatus is required, no doubt deters many, and the pursuit is not as yet a sufficiently remunerative one to tempt the chemical students of our Colleges to take it up as a profession. One cannot, however, help contrasting the slow progress in practical science made in this country with the rapid advances made in Japan, and especially in applied chemistry.

The only chemical paper in our *Journal* is by Mr. A. Pedler—on the Volatility of some of the compounds of Mercury and of the metal itself. In it he notices a case of slow distillation of mercury in the tube of a barometer at Buxar (Behar), and points out that with instruments of this kind, on the Kew principle, the sublimation of the mercury would entirely vitiate the accuracy of the reading. He also describes the results of experiments on various mercuric compounds and on the mercurous chloride. He found that mercuric chloride is very decidedly volatile at ordinary air temperatures, but the volatility is increased by the direct action of light. The paper concludes with a word of warning against the indiscriminate use of corrosive sublimate for preserving books and for other similar insecticide and preservative purposes.

From Dr. G. King's last report on the Government Cinchona Plantations in Sikkim, we learn that the new oil-process for making sulphate of quinine, referred to in my last address, was in use throughout the year 1888-89, and no less than 2,191 lbs of that drug were prepared by it. Arrangements have also been made for its application to the manufacture of cinchona febrifuge. The new process is found

to work perfectly; the bark is exhausted of the whole of its alkaloid; and the quinine produced is professionally reported to be as pure in quality and as satisfactory in appearance as quinine of the best European brands. The report contains an interesting note on the process by Mr. C. H. Wood, formerly Government Quinologist, to whom the original conception of it is due.

Pure sulphate of quinine is also manufactured at the Nadavatam Cinchona Plantation in the Nilgiris, by the same process.

The *Monatsh. Chem.* contains papers on the constitution of the Cinchona alkaloids by Z. H. Skraup., H. Schniderschitsch, and J. Würstl.

In the *Comptes Rendus*, Mons. E. Landrin describes his method of analysis of Cinchonas and ascertaining the solubility of their active principles in water, alcohol, and dilute hydrochloric acid.

Mr. David Hooper has published in the *Chemical News*, further notes on the chemistry of Gymnecic acid, the active principle obtained from the leaves of the *Gymnema sylvestre*, which has the peculiar property of destroying the power of the tongue to appreciate sweet substances. He gives it the empirical formula $C_{32}H_{35}O_{12}$. The same acid is contained in other species of *Gymnema; G. hirsuta* contains a considerable quantity and *G. montana* a smaller proportion.

Mr. John Tsawoo White, of Rangoon, has published in the same Journal papers on the estimation of Tea Tannin and on an analysis of Indigo-stem ash."

The *Proceedings of the Royal Society* contain a valuable investigation, by Drs. Sydney Martin and R. N. Wolfenden, into the physiological action of the active principle of the seeds of *Abrus precatorius* (Jequirity); also a paper by Dr. Martin on the toxic action of the albumose from the same seeds.

The authors of the first paper find that the globulin of the seeds of *Abrus* has the same physiological action as the watery extract of the seeds, and as the proteid body 'Abrin' described by Drs. Warden and Waddell. Its poisonous action is completely destroyed by momentarily heating a solution to a temperature of 75° or 80° C, at which the globulin coagulates.

The first author concludes that the *Abrus* poison is of the nature of a ferment attached to the proteids globulin and albumose.

That the proteids develope by contact with living tissue a body or bodies which are poisonous. The poisonous activity of the seeds resides in the two proteids, a paraglobulin, and an albumose, Warden and Waddell's "Abrin" being a mixture of both.

Both of these proteids have practically the same toxic action on the human economy, and their activity is destroyed by moist heat. In

solution the activity of the globulin is destroyed between 75° and 80° C, and of the albumose between 80° and 85° C. Abrus poison resembles snake-poison in the local lesions, in producing a fall of body-temperature, fluidity of the blood and in the effect of heat upon it, but it is less active.

Messrs. K. Hazura and A. Grüssner, have examined castor-oil and have found (*Zeitschrift für angewandte Chemie*) that this oil is not a single compound, as hitherto supposed, but a mixture of two isomeric acids of the composition $C_{18} H_{34} O_3$, one of which, ricinoleic acid, yields on oxidation trioxystearic acid, whilst the other, ricinis oleic acid, is a trioxystearic acid. The proportion of these acids is about one of the former to two of the latter. As no dioxystearic acid has been obtained from the oxidation of the liquid acids of castor-oil, it may be concluded that of all the fatty oils hitherto examined, castor-oil is the only one which contains no oleine.

Messrs. Benedikt, Ehrlich and Ulzer, in the same journal, shew that lac is a substance of the nature of the fats, and by successive oxidations with permanganate is converted almost entirely into azelaic acid and certain inferior fatty acids.

Herr Stillmark has investigated the poisonous principle in castor-oil seeds (*Arbeit. d. pharmakol. Inst. Dorpat.*) and comes to the conclusion that it is an albumenoid body, identical with "β-phytalbumose," separated from the dried juice of the *Carica papaya* by Dr. Sidney Martin and belonging to the class of unformed ferments. This substance, which has been termed 'ricin,' is intensely poisonous and exercises a remarkable power of coagulation of the blood. Experiments were made with seeds of nine other species of *Ricinus* as well as with those of *Croton tiglium* and *Jatropha curus* and in each case similar poisonous albumenoid substances were obtained.

In the *Archives des Sciences Physiques et Naturelles*, Mons. M. C. Græbe has published an account of his examination of Indian yellow (*piuri* or *purree* of this country). From a memorandum drawn up, after personal inspection and enquiry, by Babu T. N. Mukharji, the present Assistant-Curator of the Economic Section of the Indian Museum, quoted by the author, it appears that this substance is obtained from the urine of cows fed on mangoes, and one of the principal seats of the manufacture is Monghyr. As is already well known, the colouring principle of this dye is a compound of euxanthinic acid with magnesium, with some free euxanthone, and several experiments had been made without success to prepare euxanthone by synthesis. The author has, however, by means of a combination of hydroquinone and resorcin succeeded in obtaining an artificial euxanthone, in every respect identical with that obtained from Indian yellow.

The *Journal of the Society of Chemical Industry* contains an interesting account of the Opium industry in the N.-W. Provinces and Oudh, by Dr. P. A. Weir.

In the *Zeitschrift für angewandte Chemie* M. Honig gives a method for the determination of indigotin in commercial indigo, based on the fact that aniline and nitro-benzene in a boiling state are moderate solvents for indigotin, the whole of which under certain conditions may be completely dissolved and crystallised out.

Messrs. J. Bertram and E. Gildemeister have investigated (*Journ. Prakt. Chemie*), betel-oil obtained from the dried leaves of *Piper betle* and found an entirely different phenol from the *Chavicol* obtained by Eykman from the fresh leaves. This phenol the authors call *Betel phenol.* They have also prepared other derivatives.

In the *Chem. Berichte*, E. Jahns has published an investigation of the alkaloids of the Areca nut.

Anthropology and Ethnology.

So far as can be judged from the publications, anthropological science has not made much way in India during the year. The results of the valuable work done by Mr. H. H. Risley, in Bengal, which we hoped to have seen published during the year, have not yet appeared.

In our own *Journal* or *Proceedings*, there are but few papers of anthropological or ethnographical interest. In Part II, No. 2, Mr. Wood-Mason has described a neo-lithic celt found near the village of Bagicha, near Jashpur, in the Chota-Nagpore District. Papers on the Savaras and on the Pohiras of the Lohardugga District, by Mr. W. H. P. Driver, were read at the November and December meetings and will be published in the *Journal.*

The *Journal of the Anthropological Society of Bombay*, contains several interesting papers, among which may be cited:—A Note on Anthropology in India, by Mr. H. H. Risley, C. S., in which he points out the lines on which organised anthropological observations in India should run. On Pitárs or Tánks, by Mr. K. Ragunathji. Mr. E. Rehatsek continues his Statistics of Suicides in Bombay, and Mr. J. de Cunha has a note on the same subject. Mr. Kedarnath Basu gives a collection of 232 superstitions in Bengal. Purushotam Balkhrishna Joshi describes the Gondhalis, a class of Maratha bards, and their special dance, the *gondhal*, performed in honour of the goddess Amba Bhavání. Dr. J. G. de Cunha contributes an interesting paper on Amulets. Surgeon Major K. R. Kirtikar gives an account of the ceremonies observed among Hindus during pregnancy and parturition. Lt.-Col. Gunthorpe's note on the Bhande Kumars contains some interesting in-

formation about this wandering tribe of potters who originally came from Guzerat. Mr. F Fawcett describes a curious custom obtaining among the Berulu Kodos, a subsect of the Morasu Vokaligaru, of the Mysore Province, consisting in a symbolical deformation of the right hands of women, in place of the actual amputation of the last phalanges of the third and fourth fingers of the right hand, formerly in vogue, of which and the attendant ceremonies, a full account is given. Until this ceremony has been performed the women are not considered marriageable. The same author contributes a paper on a mode of obsession, which deals with the belief in a part of Bangalore, in the possession of women by the spirits of drowned persons, and another on a custom followed by the Mysore "Gollaválu," shepherd-caste people, of absolutely isolating a parturient woman in a hut by herself for three months. Babu Kedarnath Basu gives an account of the minor Vaishnava sects of Bengal. Mr. H. A. Acworth, B. C. S., has recently read a paper on the worship of the Tulsi plant, *Ocymum sanctum*, the sacred basil.

The *Indian Antiquary* contains papers on Folklore in Southern and Western India and Burma, already referred to; also notes on social customs connected with Pregnancy in Bombay; Death, in Bombay and Kashmir, and with Parturition in Madras.

The *Taprobanian* contains a paper, by Mr. H. Nevill, on Sinhalese Folklore, Nursery rhymes and sayings.

In the *Journal of the Anthropological Institute* Mr. Arthur Thomson has a valuable paper on the osteology of the Veddahs of Ceylon, tending to show that if the Veddahs be not of the same stock as the so-called aborigines of Southern India, they, at least, present very strong points of resemblance, both as regards stature, proportion of limbs, cranial capacity and form of skull. If physical features alone be taken into account, their affinities with the hill-tribes of the Nilgiris and the natives of the Coromandel Coast and of the country near Cape Comorin are fairly well established. Mr. E. H. Man gives a brief account of the Nicobar Islanders and their inhabitants, with evidence for their affinity to the Malays and Burmese. The paper is illustrated with plates. In another very interesting paper, Mr. Man describes the funeral rites and ceremonies of these islanders.

Sir Lepel Griffin has given an account of the Bhils of Central India in the *Asiatic Quarterly Review*.

The *Revue d'Anthropologie* contains the continuation of an interesting paper, by Dr. Seeland, on Kashgaria and the Passes of the Tian Shan, in which he shows that the ethnic type of the Kashgarians is clearly that of a deteriorated mixed race, in which the original Aryan or Turkish character has been nearly obliterated by repeated admixture with different Mongol races.

In the *Mittheilungen der Anthropologischen Gesellschaft in Wien*, in a paper entitled "Ueber tulápurusha der Inder", Dr. M. Haberlandt discusses the practice of *Tulpurusha*, *Tuládhána* or *Tulábhara*, or weighment of royal personages or notabilities against precious metals, or other commodities, for purposes of alms-giving or atonement in cases of sickness &c., formerly and even recently practised in India, both by Hindus and Muhammadans, as well as in other countries.

The *Revue Scientifique* contains an interesting account of the Siah Posh Kafirs and other inhabitants of Chitral, by Mons. G. Capus, in a paper "Les Kafirs et le Kafiristan."

In a paper on the Sonthals of N. E. Bengal, published by Dr. S. Kneeland in the *Bulletin of the Essex Institute*, Salem, Mass., he brings forward evidence pointing to the pro-Malay origin of these tribes.

Professor Dr. Aurel von Török, has described, in the *Internationale Monatschrift für Anatomie und Physiologie*, a new universal *Craniophor*, or machine for measuring skulls, by the aid of which accurate drawings of different sections of the skull can be laid down on paper.

In Mr. Holt S. Hallett's recent work on Burma and Siam, already noticed, he has given a most interesting account of the races found in Indo-China. The aborigines of Lower Indo-China appear to have been Negritos, probably akin to those of the Andaman Islands, and the hills of the Malay Peninsula. Other dwarf races of Negrito origin were met with, belonging to the tribes about Luang Prabang. The Ban Lawa tribes of the Shan States, the Mon race of Lower Burma, and the Chams or Cambodians are mongoloid tribes of a race with Malaysian affinities. This Mon race is represented in Western Bengal and Central India by Kolarian tribes.

Although beyond the limits, I have necessarily confined myself to, it seems desirable to mention a very elaborate work presented to the Society by the author, Signor Elio Modigliani, entitled "Un viaggio a Niás." Niás is an island of some size, lying to the south of Sumatra and the work is an account of the author's travels and scientific exploration. He seems to have paid particular attention to the people of the country and discusses fully their social constitution, the social and domestic position of women, their arts and industries, agriculture and commerce, their superstitions and religious beliefs and language. The work is copiously illustrated with collotype plates of the people and their dwellings and with wood-cuts of their clothing, weapons, domestic utensils &c. Vocabularies in Italian and Nias are also given. Judging from the photographs the inhabitants seem to be of the Malay type, resembling the Nicobarese, but their costumes are much more elaborate. The Zoology of the Island is also discussed and coloured plates are given of birds and other fauna.

Zoology.

During the year unusually large and interesting additions have been made to our knowledge of the Zoology of the Indian, Oriental and Central Asian regions.

In Indian Zoology, the principal event of the year has been the publication of three volumes of the *Fauna of British India, Ceylon and Burmah*, edited by Mr. W. T. Blanford, of which the commencement was referred to in last year's address. The new volumes are:—The first volume of 'Birds,' by Mr. E. W. Oates, and two volumes completing the "Fishes," by the late Dr. F. Day.

The Marine Survey Department, under Commander Carpenter, R. N., has again, by the dredging operations carried out on board the "Investigator" by Dr. Alcock, added greatly to our knowledge of the Marine fauna of the Indian Seas. Papers on this subject have been contributed by Mr. Alcock to our *Journal* and others have appeared in the *Annals and Magazine of Natural History.*

An account of the Zoology of the Afghan Delimitation Commission, by Dr. J. E. T. Aitchison, has been published as Part 3, Vol. V, of the *Transactions of the Linnean Society* (*Zoology*), and is illustrated with two maps and nine plates. The collections have been worked out by various zoologists, as noted hereafter under the different heads.

It is satisfactory to learn that the zoological results of Col. Prjevalsky's travels in Central Asia are being worked out and published. Of the "Mammals," under charge of Dr. Buchner, which forms the first volume, three parts have already been published, and Mr. S. Herzenstein has begun the publication of the "Fishes," which will form the second part of the third volume. The "Birds" have been entrusted to Herr Theodor Pleske. Russian scientific exploring parties have been busily engaged in continuing the zoological investigations commenced by Prjevalsky in Central Asia and it is to be hoped that some results of their labours will soon be forthcoming.

The collections made in Transcaspia by Drs. Walter and Radde are also being worked out and many papers on them have been published.

Mammals.—Mr. W. L. Sclater has described in our *Journal* the head of a stag allied to *Cervus dybowskii*, purchased in the Darjiling Bazar; and if, as seems probable, it came from Tibet it shows that this animal has a very extensive range from Tibet to Ussuri. He has also contributed a paper to our *Proceedings*, on a small collection of Mammals from Sháhpur, in the Punjáb. Several specimens of the somewhat rare bat, described by Dobson as *Scotophilus pallidus*, were contained in the collection.

In the *Journal of the Natural History Society of Bombay*, a paper on Man-eating Tigers, by Mr. R. Gilbert, and a continuation of Mr. J. H. Steel's papers on the Camel may be noticed.

In the *Proceedings of the Zoological Society of London*, Mr. Oldfield Thomas has described a new species of Muntjac (*Cervulus feæ*), obtained by Mr. Fea, the collector of the Genoa Civic Museum on Mt. Mulait, in Tenasserim. Mr. Thomas has also published some preliminary notes on the characters and synonymy of the different species of otter, a subject which has hitherto been in great confusion. Messrs. Beddard and Treves contribute to the same Journal a valuable illustrated paper on the anatomy of *Rhinoceros sumatrensis.*

In the *Annals and Magazine of Natural History* Fr. Sav. Montcelli proposes a modification of the synopsis of the species of the genus *Taphozous* in accordance with the size of the feet instead of the greater or less development of the radio-metacarpal pouch, as proposed by Dobson.

Mr. P. S. Hutchinson has published, in the *Zoologist*, a paper on the suborbital pits of the Indian Antelope.

The Mammals collected by Dr. Aitchison with the Afghan Delimitation Commission have been described by Mr. Oldfield Thomas, in the *Transactions of the Linnean Society*, and comprise 16 species, belonging to 13 genera, the most interesting of which is *Ellobius fuscicapillus*, the original specimens of which were obtained many years ago near Quetta. The geographical range of *Felis tigris* in Afghanistan is extended, as far east and north as Bala Murgháb, and that of the hunting leopard (*Felis jubata*) to the valley of the Hari Rud, while the Egyptian Fox (*Vulpes famelica*) was obtained, as far north and east as Kushk-Rud and Kin in the basin of the Harut River.

Dr. J. Anderson gives an account in the *Journal of the Linnean Society*, of the Mammals collected by him in the Mergui Archipelago. Twenty-three species belonging to nineteen genera are enumerated in this paper. With the exception of two bats, *Emballonura semicaudata* and *Pteropus edulis*, which are new to the Malayan Peninsula, and *Rhizomys erythrogenys*, they are all well-known forms on the neighbouring mainland.

Mr. E. Buchner, the Director of the Zoological Museum at St. Petersburgh, has begun the publication of the zoological results of the travels of Col. Prjevalsky. The work is admirably illustrated by the munificence of the Grand-Duke Nicolai Alexandrowitz, and will give a complete description of the large collections made in Central Asia. The first part contains descriptions of the *Rodents*, which all present the pale buff or drab colour of the pelage, common to mammals and birds inhabiting sandy deserts.

In the *Zoologische Jahrbücher*, Dr. S. Radde and Dr. A. Walter give an elaborate account of the Mammals of the Transcaspian region. Sixty species, referable to thirty-seven genera, are comprised in the list; notes are added on the domesticated mammals of the region, and the Mammal fauna of the country is compared with the species of Mammals recorded from Persia, Afghanistan, North-West Kashmir, and Turkestan.

Birds.—The publications treating of this popular branch of Zoology which have appeared during the year are more than usually numerous and important. Of general works on Ornithology, the first that claims notice is the first volume (556 pages) of Mr. Eugene W. Oates' "Birds" in the "*Fauna of British India*," edited by Mr. W. T. Blanford. In this portion of the work a concise description, brief synonymy and notes on habits and distribution of 556 species of birds are given. The classification adopted by Mr. Oates is wholly in accordance with the latest researches on the anatomy of birds, and is a great improvement on the one adopted by Dr. Jerdon in his well-known work. Mr. Oates begins with the *Passeres* and gives very useful keys to the families, sub-families, genera, and species treated of; some essential notes on anatomy precede the detailed descriptions, and the work is throughout excellently illustrated by wood-cuts mainly illustrating the heads of the typical species, but occasionally full-view pictures of species of the principal groups are given. The limit to the number and size of the volumes allowed to Mr. Oates has obliged him to give only brief notes on the habits and folklore of the different species of Indian birds, but this is decidedly the section in which compression was most allowable. On the whole Mr. Oates must be congratulated on having produced such a satisfactory resumé of the mass of information accumulated about Indian birds since the publication of Dr. Jerdon's work.

Mr. Oates has also published the first volume of a revised edition of Mr. A. O. Hume's "Nests and Eggs of Indian Birds." This is a volume of 397 pages, illustrated with four excellent portraits of famous Indian ornithologists, namely Mr. A. O. Hume, Dr. Jerdon, Mr. Brian Hodgson, and Col. Tickell. The work is mainly a reprint of the original edition, greatly enriched by many notes on nests and eggs which had become available since the original publication. The classification and numbering of the species is precisely the same as in Mr. Oates' general work noticed above, so that the information here supplied to ornithologists admirably supplements the information given in the "Fauna of India" series. When the three volumes of description and the like number treating of nests and eggs are completed, we shall have in moderate compass a source of information on the birds of the Indian

Empire probably unrivalled by that in existence for any other portion of the world of similar extent.

Mr Hume has published another volume of his "Stray Feathers," containing his long-looked-for account of the birds of Manipur and Assam: a completion of this important memoir is promised in the last part that will ever appear of "Stray Feathers."

Mr. Menzbier has commenced the publication of a work entitled "Ornithologie du Turkestan," which is expected to extend to six quarto volumes illustrated by 90 coloured plates. The notes and descriptions in this work are mainly founded on material accumulated by the late N. A. Severtzoff.

Mr. Seebohm has published a handsomely illustrated quarto work on the Family *Charadridæ*, which is characterized by that author's original treatment of his subject, and which necessarily notices many Plovers, Sandpipers and Snipes of interest to Indian Ornithologists.

Mr. F. H. Waterhouse has published "a list of the Genera of Birds" which cannot fail to be of great assistance to every one working at Ornithology, and the third part of the second volume of the "Avifauna of India," by Mr. J. A. Murray, has appeared during the course of the year.

The *Ibis* has, as usual, a large number of articles bearing more or less directly upon Asiatic Ornithology. Mr. Dresser gives notes on the birds of the Transcaspian region, collected by Dr. G. Radde, and describes a new Shrike comprised in the collection, under the name of *Lanius Raddei.* Mr. Ogilvie Grant contributes two papers dealing with revisions of the genera *Platalea*, or Spoonbills, and *Turnix*, or Bustard-quails. Col. Sir O. St. John publishes a paper on the Birds of Southern Afghanistan and Kelat, in which he enumerates 237 species observed by him in the Afghan Province of Kandahar and the British Provinces of Pishin and Thal Chotiali, with Quetta and Kelat proper. In continuation of his notes on the Woodpeckers, Mr. E. Hargitt describes a new species, *Chrysophlegma humii*, from Malacca and Salangore. Mr. Oates gives a note on the European Cuckoo and its Indian allies, and points out how they may be most certainly discriminated. Mr. Seebohm continues his important studies on the classification of birds, and deals with the Ardeino-anserine and Pico-passerine groups of birds. He also furnishes a list of the birds of the Bonin Islands. Messrs. Sharpe and Whitehead have published five parts of a valuable contribution to the Ornithology of Northern Borneo, with illustrations of new species described by Mr. Sharpe. Mr. Whitehead also gives a paper on the birds of Palawan.

In the *Transactions of the Linnean Society*, the Birds of the Afghan Boundary Commission are enumerated by Mr. Sharpe. Only three

species are described as new, and these are figured. They are, a Woodpecker, (*Gecinus gorii*, Hargitt) ; a Sparrow (*Passer yatii*, Sharpe) ; and a Pheasant (*Phasianus principalis*, Sclater). 123 species belonging to 82 genera are catalogued, the birds observed being, with few exceptions, migratory.

In the *Proceedings of the Zoological Society*, Mr. Seebohm communicates a note by Herr Theodor Pleske on examples of *Phasianus shawi*, collected by Prjevalsky in the valley of the Tarim river, and on an example of a new species of Pheasant from Lob-Nor.

In the *Journal of the Bombay Natural History Society*, Lieut. H. E. Barnes publishes four papers on "Nesting in Western India" illustrated with coloured plates. Mr. Newham furnishes notes on the Birds of Quetta, and Mr. J. C. Anderson contributes ornithological matter in his "Sporting rambles about Simla."

Mr. H. Nevill gives notes on *Scops sunia*, Hodgson, and *Scops minutus*, Legge, in the third volume of the "*Taprobanian.*"

Turning now to foreign sources, we have to notice Herr Theodor Pleske's revision of the Avifauna of Turkestan, published in the *Mémoires de l' Académie Impériale de St. Petersburg.* According to this memoir the known species of birds found in Russian Turkestan amounts to 419. The first part of an illustrated quarto work by the same author, entitled "Ornithographica Rossica", has appeared and it contains plates of three species of birds found in India.

In "*Ornis*" Drs. Radde and Walter publish an important contribution to Palæarctic Ornithology entitled "Die Vogels Trans-Caspiens." A few species of birds from Northern India are included in the list of 297 species enumerated, and almost the only novelty is *Lanius raddei* already alluded to, as having been described by Mr. Dresser in the *Ibis.*

Reptiles and Batrachians.—The *Taprobanian* contains notes by Mr. Haly, of the Colombo Museum, on new Ceylon Snakes, *Dendrophis gregorii* and *Odontomus fergusonii.*

The Reptiles and Batrachians collected by Dr. Aitchison with the Afghan Delimitation Commission are described, by Mr. G. A. Boulenger, in the *Transactions of the Linnean Society of London*, and comprise 35 species, including a Tortoise, 21 species of Lizards, of which three are new, and 13 species of Ophidians of which one is new. Among the latter there are fine specimens of the little-known *Naia oxiana*, heretofore only recognised from young and undeveloped specimens. Of *Batrachia*, there are two species—*Rana esculenta* and *Bufo viridis.*

The Reptiles and Batrachians collected by Dr. J. Anderson, F.R.S., in the Mergui Archipelago have been described by him, in the *Journal of the Linnean Society*, and comprise 53 species of *Reptilia* and 12 of

Batrachia. The occurrence of *Crocodilus porosus* in the neighbourhood of almost all the islands is noted. Of the snakes, *Tropidonotus chrysargus*, from Elphinstone Island, and *Dipsas carinata*, from Sullivan Island, are apparently new to the Tenasserim Province. Twenty specimens of *Rana doriæ*, recently described by Boulenger from North Tenasserim, were found on the Islands, and it is probably widely distributed over the province of Tenasserim.

The new edition of Mr. Boulenger's "Catalogue of the Chelonians, Rhynchocephalians and Crocodiles in the British Museum (N. H.)" is mainly devoted to the Chelonians and will be of great use to students of existing and fossil forms.

Mr. Boulenger has also described, in the *Ann. Mus. Civic. di Storia Naturale di Genova*, the *Reptilia* obtained in Burma, north of Tenasserim, by Signor L. Fea, completing the lists of the herpetological collections. The new forms described are *Simotes torquatus*, from Bhamo; *S. planiceps*, from Minhla; new genus *Cyclophiops.—C. doriæ*, from the Kakhyen Hills; *Dendrophis subocularis*, from Bhamo; *Pareas andersonii*, from Bhamo and the Kakhyien Hills A new genus *Azemiops—A. feæ*, from the Kakhien Hills, is very interesting, as its nearest ally is *Dinodipsas*, a snake described by Peters from Puerto Cabello, in Venezuela.

In the *Proceedings of the Zoological Society*, the same author has published a paper on the species of Frogs confounded under the name of *Rhacophorus maculatus:* he shows that several Ceylonese and Indian species have been included under that name and proposes to distinguish as species the three following forms of which the character, synonomy and distribution are given *viz:*—(1) *Rhacophorus leucomystax*, from China, the Himalayas, and Burmese countries; (2) *R. maculatus*, from India and Ceylon and (3) *R. cruciger*, confined to Ceylon.

The British Museum Catalogue of Fossil *Reptilia* and *Amphibia*, Part II., *Ichthyopterygia* and *Sauropterygia*, by our former member Mr. R. Lydekker, contains several Indian and Asiatic forms, and is a valuable addition to knowledge. Mr. Lydekker's paper in our *Journal*, on *Chaibassia*, has already been noticed.

A very important and valuable paper is contributed by Surgeon L. H. Waddell, M. B., to the *Scientific Memoirs of the Medical Officers of the Army in India*, in which he gives the results of some most carefully conducted enquiries into the effect of cobra-poison hypodermically injected upon the snakes themselves from which the poison had been extracted, and also upon other cobras and other kinds of innocent snakes. The experiments demonstrate unequivocally that the cobra is practically, if not wholly, insusceptible to the toxic action of its own venom, whether from the same snake or from another.

Cobra-poison was injected in the same way into other venomous snakes (three specimens of two species of tree-vipers) with the effect that they all died within an hour; and in 16 other trials of cobra-poison on innocent snakes and others on frogs, the result was uniformly fatal.

Dr. Waddell also notes the results obtained by previous enquirers; further discusses the cause of the immunity of snakes from their own poison and puts forward the apparently well-founded hypothesis that it may be attributed to a toleration of the venom, established through frequent imbibition of small quantities of venom in the modified or attenuated forms which it assumes when mixed with salivary and gastric juices and is absorbed through the alimentary canal.

Dr. A. E. Feoktistow contributes to the *Mem. Acad. Imp. Sci. St. Petersburg*, a preliminary paper on the working of snake-poison on animal life.

In the *Bijdragen tot de Dierkunde* of the Royal Zoological Society, Amsterdam, Dr. J. F. Van Bemmelen has given a full account of the anatomy of the throat-regions of the Saurian reptiles, crocodiles, tortoises and snakes.

Fishes.—I have already adverted to the loss which Indian ichthyological science has suffered in the death of our late member Mr. F. Day. Fortunately he had completed the MS. of the work on the *Fishes of India*, forming part of the series of volumes on the "Fauna of British India," now being brought out under the editorship of Mr. W. T. Blanford, and it has recently been published in two volumes. It is an abridgment of the author's larger work bearing the same title, with the additions and alterations published in the supplement to the latter and elsewhere, and is well illustrated with photographic reductions from the plates of the larger work. It contains the characters of over 1,400 species of Fishes belonging to the Indian and Oriental region, comprising forms ranging from the Red Sea to the Pacific, besides a large number of Indian Fresh-water Fishes, and on this account, as well as its portable form, will be of great value to the student of Indian Ichthyology.

The principal contributions to the knowledge of Indian Fishes during the year, have been from the pen of Mr. Alfred Alcock, the Surgeon-Naturalist to the Marine Survey, who seems to be making a special study of the subject. He has contributed to our *Journal*, two papers on Fishes. In the first he gives a list of the shallow-water and deep-sea forms of *Pleuronectidæ*, obtained from the commencement of the survey to date, containing the names of 29 species of which 11 appear to be new, 3 are rare and not previously recorded from Indian waters. In the second paper ten species representing 7 different families are described,

of which seven are new, while the remaining three appear for the first time as Indian Fishes. With one exception they were obtained in depths ranging from 25 to 68 fathoms, generally at the deeper.

Mr. Alcock's report on the natural history work of the 'Investigator' for season 1888-89, already alluded to, contains a list of 95 Fishes found on the Orissa coast, and some interesting information as to the localities in which certain fishes are found. He also gives preliminary notes on the Fishes taken off the Orissa coast which are believed to be new, and on the gestation of some Elasmobranch Fishes (*Trygon bleekeri, Carcharias melanopterus,* the black-finned shark, and *Zygæna blochii,* the long hammer-headed shark). He has contributed to our *Journal* a paper on the same subject, not yet published, containing some interesting and novel observations.

In a paper published in the *Annals and Magazine of Natural History,* "on the Bathybial Fishes of the Bay of Bengal and neighbouring waters, obtained during the seasons 1885 to 1889," Mr. Alcock has given an account of the Hydrography of the Region and a preliminary list of all the Deep-sea Fishes that have been obtained to date by the Marine Survey, with descriptions of the new species.

The 'Fishes' of the Afghan Boundary Delimitation Commission, collected by Dr. Aitchison, have been described by Dr. Günther in the *Transactions of the Linnean Society,* and comprise only seven species belonging to six genera, three of which prove to be new. The most interesting species, owing to its geographical distribution, is *Schizothorax intermedius,* first found by Griffith in the Cabul River, and again by the second Yarkand Mission in the great eastern drainage of Eastern Turkestan at Yangi-Hissar. Dr. Aitchison's specimens were found in the tributaries of the Bala-Murgháb River, which drain to the north and west towards the Caspian. The new species of this genus described by Dr. Günther *(S. raulinsii),* was collected in the Hari Rúd and its tributaries only.

In the *Annals and Mag. Nat. Hist.* Dr. Günther has described a new fish of the characteristically Central Asiatic genus *Diptychus* from the Issik Kul. It was collected by Dr. Lansdell and has been named after him.

Vol. III, part 2 of the "Scientific Results of Prjevalsky's Travels in Central Asia," containing the first part of the 'Fishes,' by S. Herzenstein, has been published in Russian and German. It treats of the *Cyprinidæ,* genus *Nemachilus,* v. Hass, and is illustrated with 8 plates, containing well-executed drawings of many of the species described.

The *Taprobanian,* Vol. III, contains a note by Mr. Haly, of the Colombo Museum, on *Novacula pavo.*

A Catalogue of Fossil Fishes in the British Museum, Part I. *Elasmobranchii,* by H. S. Woodward, has appeared during the year.

In the *Proceedings of the Zoological Society* is an account of some Fishes from Muscat, by Mr. G. H. Boulenger.

Mollusca.—The *Ann. and Mag. of Nat. Hist.* contains a description of a new genus of mollusca from the Indian ocean, parasitic upon an *Echinus;* also an account, by Col. H. H. Godwin-Austen, of a supposed new *Helix* from Tenasserim—*Helix* (*Ægista*) *mitanensis.* Mr. E. A. Smith contributes some notes on the genus *Lobiger*, containing a synonymy of all the described species, and notes on the genus *Melapium.*

In the *Proc. Zool. Soc. Lond.* IV, 1888, Mr. G. B. Sowerby describes 14 new species of shells, chiefly collected by Dr. Hungerford. Three species of *Mitra*, of which two (*M. exquisita* and *M. brionæ*) are new, were found at Port Blair, in the Andaman Islands.

Vol. VIII, No. 13 of Martini and Chemnitz,' *Systematisches Conchylien Cabinet* contains descriptions of *Chama* from the Red Sea and Indian Ocean. In the *Journal of Conchology* Mr. J. Cosmo Melvill has described a new shell, *Coralliophila andamana*, from the Andamans.

In *Spengel's Zoologische Jahrbücher*, IV. 5, Dr. O. Boettger has described the land and fresh-water shells collected by Drs. Radde and Walter in Russian Trans-Caspia and the neighbourhood of the Persian and Afghan Frontiers. 41 species of snails and 6 of bivalve shell-fish are described, of which 18 land and fresh-water snails were found only in N. Persia and not in Trans-Caspia. Among the remaining Trans-Caspian species only two tropical Asiatic forms were found. The author has carefully tabulated the distribution.

Mr. W. Theobald has prepared an "Index of the Genera and Species of Mollusca in the Hand-list of the Indian Museum, Calcutta," which has been printed by the Trustees, and will be of great service to Indian conchologists.

Entomology.—As usual, by far the greater proportion of the zoologcal work of the year has reference to entomology.

The work done in connection with the Indian Museum relating to this subject, has already been noticed.

Our *Journal* contains several valuable entomological contributions. Mr. E. T. Atkinson describes a new species and genus of Coccid (*Pseudopulvinaria sikkimensis*), found at Mungphu on an oak and chestnut trees. He also continues his notes on Indian *Rhynchota, Heteroptera*, and communicates a note by Mons. Lethierry giving descriptions of three new homopterons of the genus *Idiocerus*, found on mango-trees in the neighbourhood of Calcutta. His Catalogues of the Oriental *Cicindelidæ* and *Capsidæ*, published in the Supplement, already noticed, will be of great value to workers in this section. Mr. W. Doherty's notes on Assam Butterflies contain interesting remarks on seasonal dimor-

phism and breeding, with descriptions of several new species, and in another paper he gives a list of 105 species of *Lycænidæ* collected in Lower Tenasserim, with remarks on the classification of the family. Mr. Wood-Mason's paper on the Ethiopian and Oriental representatives of the Mantodean sub-family *Vatidæ* contains descriptions of some new genera and species from the Indian, Himalo and Malayan sub-regions of the Oriental Region.

In the *Journal of the Bombay Natural History Society*, Mr. L. de Nicéville has described some new and little-known Butterflies from the Indian Region, with a revision of the genus *Plesioneura* of Felder and of authors. The paper is illustrated with two coloured plates. Mr. R. C. Wroughton gives an interesting paper on Indian *Hymenoptera*.

The *Transactions of the Entomological Society of London* contain a monograph of the genera of *Micro-lepidoptera* connecting *Tinægeria*, Wlk. with *Eretmocera* Z., by Lord Walsingham. Two new Indian species, *Snellenia coccinea*, from Sikkim, and *S. tarsella*, from Darjiling, are described. Also a valuable paper by Mr. G. A. J. Rothney on Indian Ants, recording many new and interesting observations on different kinds of ants, most of which are to be found in the neighbourhood of Calcutta. Mr. A. G. Butler's synonymic notes on the moths of the earlier genera of *Noctuites*, has reference to many Indian species. Mr. W. F. Kirby notices a few new Indian species of *Scoliidæ* in the collections of the British Museum, including *Scolia unimaculata*, and *S. tyrianthina*, from the Andamans; *Elis rudaba*, from Chaman; *Campsomeris ceylonica*, from Ceylon and Bombay. Mr. H. J. Elwes has a note on an undescribed *Chrysophanus* from the Shan States, Upper Burma, which is remarkable on account of the low elevation and latitude at which it was found. Its nearest ally appears to be *Polyommatus Li*, Oberthur, from W. Szechuen, but no species of the genus is known in the Eastern Himalayas or anywhere in the Eastern tropics. Mr. Elwes also has a paper on a revision of the genus *Argynnis*. Mr. G. T. Baker discusses the distribution of the *Charlonia* group of the genus *Anthocharis*, and Mr. L. de Nicéville notes on a new genus of *Lycænidæ*, and on *Delias sanaca*, Moore, a Western-Himalayan butterfly. Mr. C. J. Gahan describes some new or little-known species of *Glenea*, in the collections of the British Museum, among them several Indian and Burman species. In a note on *Aulacophora* and allied genera, Mr. J. S. Baly criticises Mons. Allard's synopsis of the group.

In the *Proceedings of the Zoological Society of London*, we find papers by the Rev. H. S. Gorham describing new species and a new Indian genus (*Lycocerus*) of Coleoptera of the family *Telephoridæ* from the Indian Museum collections, Tibet and Southern India, and by Mr.

H. W. Bates on new species of the Coleopterons family *Carabidæ*, from Kashmir and Baltistan.

The *Transactions of the Linnean Society* contain descriptions of the Insects collected by Dr. Aitchison with the Afghan Boundary Commission. The *Coleoptera* are described by Mr. C. O Waterhouse, and comprise 50 species, of which 12 are new. The *Diptera*, described by the same, include nine species of which four are undetermined. The *Hymenoptera* and *Orthoptera* are described by Mr. W. F. Kirby. Most of the former exhibit well marked African affinities, several being apparently identical with Algerian insects; 15 species are described, of which four are new, *viz.*, *Ammophila mandibulata*, *Stizus terminus*, *S. tages* and *Crocisa bidentata*, all from the Hari Rúd Valley. The *Orthoptera* also belong principally to distinctly Mediterranean types and few exhibit affinities with the Indian fauna; 18 species are described. A gall insect, *Pemphigus coccus*, fonnd by Dr. Aitchison on *Pistachia vera* is described and figured by Mr. G. B. Buckton.

In the volume for 1888, Lord Walsingham has described a remark able new Indian Pyralid which he terms *Cœnodomus hockingii.*

The *Journal* of the same Society contains papers by Mr. J. S. Baly on new genera and species of *Galerucinæ*, also diagnostic notes on some of the older described species of *Aulacophora*. Most of the species referred to are from the Eastern Archipelago, but some are from India and the Andaman Islands.

In the *Annals and Magazine of Natural History*, Mr. W. L. Distant continues his descriptions of new genera and species of Oriental Cicadidæ, including *Gœana atkinsoni*, *Dundubia amicta* and *D. emantura* from Karwar. Mr. Wood-Mason contributes a monograph, illustrated with woodcuts, of *Phyllothelys*, a curious genus of *Mantodea* peculiar to the Oriental Region.

In the *Entomologist's Monthly Magazine*, Mr. E. E. Green has described two new species of *Lecanium* from Ceylon—*L. viride*, one of the most destructive coffee-pests, and *L. mangiferæ*, which attacks the leaves of the mango tree. Mr. W. L. Distant describes new species of *Coreidæ*, mostly from the collections of the Indian Museum.

The *Mem. and Proc. Manchester Lit. and Phil. Society* contains two papers by Mr. P. Cameron. One entitled " A decade of new *Hymenoptera*," contains a notice of a new Indian species of *Crabronida*—*Rhopalum Buddha*, from Poona; also a new species of *Larrida* from Ceylon, *Piagetia fasciatiipennis*. The other " *Hymenoptera* Orientalis, or contributions to the *Hymenoptera* of the Oriental Zoological Region," notices 29 new species.

The *Notes from the Leyden Museum* contain, as usual, several papers

of interest to Indian entomologists, chiefly by Mr. C. Ritsema, among them a description of a new species of the longicorn genus *Zonopterus*, Hope, *Z. consanguineus*, from the Himalaya, resembling *Z. flavitarsis*. Also "On an overlooked East Indian species of the coleopterous genus *Chelonarium*, Fabr. of the family *Byrrhidæ*." The author shows that *C. villosum* was described by Macleay in 1825 as occurring in Java, while the genus is supposed to be peculiar to America. Mr. Ritsema also describes a new species of the longicorn genus *Pachyteria*, Serv., *P. vandepolli*, from Malacca, and gives preliminary descriptions of new species of the coleopterous genus *Helota*, Macleay. Four new Indian species are described from Darjiling, and a list is given of the 25 hitherto described species of the genus. Mr. W. L. Distant describes new Malayan *Cicadidæ* belonging to the Leyden Museum. There are also many notices of new zoological specimens from the Dutch East Indies.

In the *Tijdschrift voor Entomologie* Mr. Ritsema has a paper entitled "Chronologische Naamlijst der beschreven soorten van de Cerambyciden genera *Zonopterus*, Hope, *Pachyteria*, Serv. en *Aphrodisium*, Thoms," including many species from India and the Oriental Region.

The *Bijdragen tot de Dierkunde* of the Zoological Society of Amsterdam contains a paper by Dr. J. T. Oudemans on *Thysanura* and *Collembola*.

A paper by Dr. G. Horváth, in *Termész Füzeteck*, is a noteworthy contribution to the knowledge of the little-known Hemipterous fauna of the Himalayas and several new species are described.

A very valuable monograph on Bees of the genus *Evania*, by A. Schletterer, appears in the *Annalen des K. K. Naturhistorischen Hof Museums in Wien*, and has references to Indian and Oriental species.

In the *Verhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien*, Messrs. Kohl and Handlirsch give descriptions of several genera of Transcaspian *Hymenoptera* from the neighbourhood of the Murghab, Amu Darya and Askabad. A. Rogenhofer, in a paper on *Lepidoptera* from India and Ceylon, describes a sack-bearing caterpillar found in Ceylon, to which he gives the name *Fumea ? limulus*.

The *Wiener Entomologische Zeitung* contains papers by Dr. G. Horváth, on the *Hemiptera* of Turcomania ; V. von Roder on a new *Timia* f. (*T. pulchra*) from Shahrud ; and Jos. Mik, on some *Ulidinæ* from the Tekke Turcomania.

Dr. C. Fickert's paper, in *Spengel's Zoologische Jahrbücher*, "Ueber die zeichnungsverhaltnisse der Gattung *Ornithoptera*" refers to several Indian and Asiatic species.

In the *Entomologische Nachrichten* Herr Joh. Schmidt has described

two new species of *Hister* (*H. opacus* and *H. infirmus*) from India or borders. Dr. F. Karsch describes new *Aeschnidæ* of the Indo-Australian region.

The *Deutschen Entomologischen Zeitschrift* contains several papers relating to the entomology of the Oriental region, among which may be cited—a description of a new species of *Lucanus* (*L. gracilis*) from Sikkim, and a paper on the *Lucanidæ* of Sumatra, by G. Albers.

Central Asian entomology has been treated on in several papers in the *Horæ Societatis Entomologicæ Rossicæ.* Among them,—A. Semenow's diagnoses of new *Coleoptera* from Central and Eastern Asia; E. König's descriptions of the *Elateridæ* collected by Prjevalsky in Central Asia; descriptions of the Insects collected by Potanin in China and Mongolia by various authors; also papers by B. E. Jokowleff on the *Hemiptera, Heteroptera* and by G. Mayr on the *Formicidæ* from Tibet, collected by Prjevalsky. Mr. A. Wilkins proposes a method of preserving insect cases from the ravages of insects by stretching slips of India-rubber round the line of separation of the box and lid, so as to close it hermetically.

Mons. Ch. Kerreman's monographic essay on the genus *Sternocera:* Eschscholtz, presented to the Entomological Society of Brussels, contains descriptions of several Indian varieties, the Asiatic species being practically confined to India. Several of the species described are from the Indian Museum, Calcutta.

The *Annali del Museo Civico di Storia Naturale di Genova* contains descriptions by various authors of the entomological collections made in Tenasserim and Burma by Signor L. Fea. Mr. J. S. Baly describes the *Hispidæ*, of which three-fourths prove to be new; Sig. K. Gestro, the *Coleoptera*, and he also gives an itinerary; Mons. E. Ollivier, the *Lampyridæ*, or glowworms, including a new species (*Luciola hirticeps*); Mons. A. de Bormans, the *Dermaptera;* Mr. W. L. Distant, the *Cicadidæ;* Mons. A. Leveille, the *Trogositidæ;* Mons. Regimbart, *Dytiscidæ* and *Gyrinidæ;* Mons. A. Grouvelle, the *Cucujidæ;* Mr. G. Lewis the *Histeridæ*, among which a fine *Platysoma* (*P. maculatum*) is remarkable as the first maculate species of the genus discovered; Mons. E. Candeze describes the *Elateridæ.* A very large proportion of all these insects are new to science, and the Genoa Museum is entitled to high credit for the enterprise and completeness with which this new field has been worked.

In the *Annales de la Société Entomologique de France*, Messrs. L. de Joannis and E. L. Ragonnot give descriptions of several new Indian and Oriental species and genera of *Lepidoptera.* Professor G. Macloskie has given an account of the poison-apparatus of the Mosquito in the *American Naturalist.*

Mons. J. B. Géhin's "Catalogue synonomique et systématique des Coléoptéres de la tribu des *Carabides*," with plates by Ch. Haury, may be noticed, but it contains few Oriental species.

As already noticed, the third volume of de Nicéville's "Butterflies of India, Burma and Ceylon" has been published. It deals with the *Lycænidæ* and appears to be almost entirely the work of Mr. de Nicéville himself. It consists of over 500 pages of closely printed matter in small type, and is illustrated by six plates, of which two are coloured. The work represents an immense amount of painstaking labour and will be a welcome aid to Indian entomologists. A fourth volume, dealing with the *Papilionidæ*, is under preparation.

Part VII of "Illustrations of Typical specimens of *Lepidoptera Heterocera* in the collection of the British Museum," by Mr. A. G. Butler, contains an account of a collection of Macro-Lepidoptera Heterocera made in the district of Kangra by the Rev. J. H. Hocking. The number of species amounts to upwards of 780, and a nominal list is given of them, as well as descriptions of new species. The work is illustrated with 18 coloured plates.

The fifth volume of "Mémoires sur les Lepidoptéres," edited by N. M. Romanoff, has been published and contains a complete enumeration and descriptions, by S. Alphéraky, of the 27 species of *Lepidoptera* found in Tibet by Prjevalsky, in 1884-85, and of the Noctuelites of the Pamir, of which 150 are enumerated.

Economic Entomology.—The good progress of the systematic investigation of Indian insect-pests by Mr. E. C. Cotes, under the direction of the Trustees of the Indian Museum, and the establishment of the new "*Indian Museum Notes*," have already been noticed. Two numbers of the *Notes* have been published. No. 1, "Notes on Indian Insect Pests," contains papers by Mr. E. T. Atkinson, on *Rhynchota*, including the Rice-sapper; "chora poka," the larvæ of insects infesting *Sesamum*, from Balasore; Greenbug; *Capsidæ; Jassidæ; Aphidae* and *Coccidæ.* Mr. De Nicéville contributes papers on a butterfly injurious to rice and on a Ceylon Cardamom-pest. Mr. Cotes gives notes on a variety of pests, borers and moths, and on insecticides. No. 2, contains a previously unpublished paper, by the late Dr. E. Becher, on *Trycolyga bombycis* and *Chalcis criculæ*, also several notes by Mr. Cotes on the Bengal silk-worm fly, Sál girder beetle, opium cut worm, coffee-scale and other pests. Mr. E. T. Atkinson contributes further notes on *Rhynchota.*

The *Kew Bulletin*, for 1889, contains a note on Beetles destructive to rice-crops in Burma.

The *Indian Forester* contains an account of the experiments in Silk-rearing conducted at Berhampur under Mr. Nitya Gopal Mukharji,

M. A., and the author deals with the whole question of the different kinds of worms and their diseases.

The Report of the Committee which was formed, in 1888, to investigate the mango-weevil, has been published in the *Journal of the Agri-Horticultural Society of India.* The Committee found no less than four insects, all belonging to widely different orders, which pass their larval existence, or part of it, in the mango.

In the *Bulletin de la Société Zoologique de France*, Dr. R. Blanchard discusses the cause and frequency of double cocoons in different races of the *Bombyx mori.*

Myriopoda.—The *Myriopoda* of the Mergui Archipelago, collected by Dr. J. Anderson for the Trustees of the Indian Museum, have been reported on by Mr. R. I. Pocock, in the *Journal of the Linnean Society.* The *Chilopoda* comprise one new specimen. The *Diplopoda* are of greater interest and all are figured: one new species of *Glomeris;* two of *Paradesmus;* two of *Spirostreptus*, and one of *Spirobolus* are noted.

Mr. Pocock has also described the *Chilopoda* of the Afghan Delimitation Commission, including two species, of which one—*Scolopendra truncaticeps*, is new.

Arachnida.—Mr. E. W. Oates has contributed to our *Journal* a valuable paper on the species of *Thelyphonus*, or whip-scorpions, inhabiting Continental India, Burma, and the Malay Peninsula; and Mons. E. Simon the first part of a study of the Himalayan *Arachnida*, collected by Messrs. Oldham and Wood-Mason, in the collections of the Indian Museum.

The *Journal of the Bombay Natural History Society* contains a paper, by Mr. E. W. Oates, on the Indian and Burmese Scorpions of the genus *Isometrus*, with descriptions of three new species—*I. shoplandi*, found only at Palone in Burma; *I. phipsoni*, from Tenasserim, and *I. assamensis*, from Dhubri.

The *Arachnida* of the Afghan Delimitation Commission have been reported on by Mr. R. I. Pocock, who finds that they are more nearly related to Mediterranean forms than to the fauna of any other area. Six spiders are described, of which three, *viz.*, *Tarantula medica*, found between Tirphul and Meshed; *Nemesia tubifex*, from Gulran; and *Rhax aurea*, found between Hari Rúd and Meshed, are new. The scorpions include *Buthus parthorum*, sp. n., found between Hari Rúd Valley and Meshed, which appears to be allied to Tunisian forms; *Buthus afghanus*, sp. n., from the same neighbourhood, which is closely allied to *B. europæus*, the well-known S. European and N. African form; and *Orthodactylus schneideri* (L. Koch), which also has allies in the Mediterranean area.

Mr. Pocock has also described, in the *Ann. and Mag. Nat. Hist.*, a new species of *Rhax*, found by Lieut. Graeme Batten at Kohat. His notes on scorpions of the genus *Buthus* has also an interest to Indian students of this archaic group of animals.

Mons. E. Simon has described the Arachnida found by Drs. Radde and Walter and A. Conchin, during the years 1886-87, in Central Asia and Turkestan, in the *Verhandl. d. K. K. Zool. Bot. Gesellsch. in Wien;* and, in *Spengel's Zoologische Jahrbücher*, Dr. A. Walter has described the species of *Galeodes* found in the same expedition, comprising seven species of three genera—*Galeodes*, *Rhax*, and a new genus, *Karschia.*

In the *Proceedings of the Zoological Society*, the Rev. O. P. Cambridge describes some new *Araneidæ*, among them *Idiops colletti*, from Meiktila in Burma, collected by General Collett, C. B., whose interesting account of the nests of these spiders is given in the paper. The *planting*, as it were, of the lids of these nests with lichen and pieces of grass resembling those growing round the nests, is specially noticeable.

Crustacea.—The *Crustacea* of the Afghan Delimitation Commission have been described by Mr. Pocock. They comprise only two forms, *Hemilepistus klugii* and *Gammarus pulex*, which appear to have been also found by Dr. Walter among the Trans-Caspian land and fresh-water Crustacea he has described in *Spengel's Zool. Jahrbüch.* He remarks that of Isopods his collection contains only land forms, of which six species are mentioned, and notes that the otherwise so widely distributed fresh-water genus *Asellus* is not found east of the Caspian—also that *Telphusa* finds its extreme northern limit in Turcomania. Dr. J. G. de Man describes a number of new or rare species of *Brachyura* from all parts of the Indo-Pacific ocean region, but not many are from Indian Seas.

Chætopoda.—Dr. A. G. Bourne has described in our *Journal* some Earthworms from Dehra and Mussooree, including a new species, *Typhœus masoni.*

In the *Annals of the Genoa Museum*, Dr. D. Rosa describes certain Indian *Perichætidæ* found by Sig. L. Fea in Burma; including two new species, *P. feæ*, from Tenasserim, and *P. birmanica*, from the Irrawaddy.

Rotifera.—In a paper in our *Journal*, communicated by the Microscopic Society, Mr. H. H. Anderson has given some interesting notes on some of the *Rotifers* inhabiting tanks about Calcutta, including several new species, the most remarkable of which is *R. mento*, which lives in a tube, whether its own or of some other creature the author was unable to discover.

Trematoda and *Nematodea.*—*Spengel's Zool. Jahrbüch.* contains a

description, by Dr. Karl Fiedler, of *Heterotrema sarasinorum*, a new synascidian genus of the family *Distomidæ*, found among the sponges obtained by Drs. P. and F. Sarasin at Trincomali, Ceylon, and in the *Annals of the Genoa Museum*, Dr. L. Camerano has described a new species of *Gordius* found at Bhamo, on the upper Irrawaddy, by Sig. Fea.

Echinodermata.—In the *P. Z. S.*, Professor Jeffrey Bell notes the names of some species of Echinoderms not yet known from the Bay of Bengal, collected by Mr. Thurston, and in a collection by Mr. E. W. Oates from the Gulf of Martaban.

Herr. J. Brock's collections of Ophiurids from the Indian Archipelago have been described by Prof. H. Ludwig, in the *Zeitschrift für Wissenschaftliche Zoologie*, and an account is given of a very remarkable new, probably natatory, form of ophiurid, or brittle-star, found near Amboyna. The most striking peculiarity of it is that each joint of the arm bears a pair of large fins, which can hardly have any other purpose than to confer upon the animal the power of swimming, a mode of locomotion hitherto unknown in the class or even in the phylum to which the animal belongs. In allusion to its probable mode of locomotion it has been appropriately named *Ophiopteron elegans.*

In the *Zoologische Jahrbücher*, Dr. Ludwig also reports on 41 species of Holothurians from the same collection, of which 5 are new. Dr. L. Doderlein gives an account of the *Asteroidea*, *Ophiuroidea*, and *Echinoidea* collected in Ceylon by Drs. P. and F. Sarasin.

The report on the *Echinoidea* collected by Dr. J. Anderson in the Mergui Archipelago, already referred to, contains an account of six species whose association in such a limited area is remarkable; and the fact that the regular echinids all belong to the family *Temnopleuridæ* is especially striking and noteworthy, because in a collection from the Andaman Islands, described by Prof. J. Bell, this family is quite unrepresented. The collection presents other interesting peculiarities and the occurrence in the Indian Ocean proper of the Australian form *Arachnoides placenta* has only once before been recorded.

The *Asteroidea* of the same collection have been described by Mr. W. P. Sladen, who finds that they also are particularly interesting—not only from containing new and rare forms, but because some of the specimens show characteristic variations which indicate the action of special local conditions, which with more plastic types might probably result in new morphological developments. Mr. Sladen also notes the rarity of Andamanese forms in the collection.

Dr. P. H. Carpenter's report on the Mergui *Comatulæ* (Feather Stars) contains an account of five species of *Antedon*, one of which is new, and of a new and remarkable type of *Actinometra*, which was found

to be the host of a parasitic *Myzostoma*, which also infested some of the *Antedon*.

Cœlentera.—Prof. A. M. Marshall and Mr. G. H. Fowler report that the Mergui collection of *Pennatulida* is also an interesting one, containing representatives of five genera and ten species, of which two are new and five others very rare.

In *Spengel's Zoologische Jahrbücher*, Dr. O. Ortmann remarks on some Rock-Corals from the south coast of Ceylon, chiefly from the collection of Prof. Haeckel.

In the *Ann. and Mag. Nat. Hist.*, Mr. Arthur Dendy reports on a second collection of sponges made by Mr. Thurston of the Madras Museum, in the neighbourhood of the Tuticorin pearl-banks and the Gulf of Manaar. It contains 14 new species and two new varieties, among them a new species of *Auletta*, a genus which has hitherto only been found in the Atlantic and Arctic oceans. The author remarks on the value of the colours of living sponges as a means of distinguishing species.

In *Spengel's Zool. Jahrbüch.* there is a valuable paper, by R. von Lendenfeld, on the Horny Sponges.

Protozoa.—*Ramulina parasitica*, a new species of fossil Foraminifera infesting *Orbitolites Mantelli*, from strata on the west bank of the Irrawaddy, just below Thayet Myo, is described by the veteran Indian geologist and zoologist, Mr. H. J. Carter, in the *Annals and Mag. Nat. Hist.*, with comparative observations on the process of reproduction in the *Mycetozoa*, freshwater *Rhizopoda* and *Foraminifera*. The same writer's further observations on Orbigny's genus *Orbitoides*, have also an interest for the Indian zoologist. The same journal contains Mr. H. B. Brady's paper on the Reticularian new genus *Masonella*, with descriptions of two species, from the "Investigator" dredgings in the Bay of Bengal.

I must not omit to mention Prof. Haeckel's grand monograph of the *Radiolaria*, of which Part IV has lately been presented to the Society by the author.

Botany.

Our *Journal* contains several valuable botanical papers. Mr. H. F. Blanford's List of the Ferns of Simla, referred to in last year's address, has been published, with 6 plates, and should prove a useful guide to the Himalayan fern-collector. The list includes 101 species and varieties. Dr. Barclay continues his descriptive list of the *Uredineæ* occurring in the neighbourhood of Simla, and has described sixteen species of *Puccinia* occurring on hosts other than grasses and sedges,

among which three are new, and nine species occurring on grasses and sedges. Dr Prain has contributed the first instalment of a series of papers entitled *Noviciæ Indicæ*, containing diagnoses of some additional species of *Pedicularis* new to India. Dr. G. King's paper on "Materials for a Flora of the Malayan Peninsula" is the first part of a systematic account of the Malayan plants indigenous to British India, including Burma, the Malay Peninsula, the Straits Settlements and the Andaman and Nicobar Islands, and includes the *Ranunculaceæ*, *Magnoliaceæ*, *Menispermaceæ*, *Nymphæaceæ*, *Capparideæ* and *Violaceæ*.

Of the new "Annals of the Royal Botanic Garden, Calcutta" brought out by Dr. King, the two volumes mentioned last year as under preparation have been completed and published. One is an Appendix to Vol. I, dealing with new species of *Ficus* from New Guinea and containing an account of the phenomena of fertilisation in *Ficus Roxburghii*, by Dr. D. D. Cunningham. The volume is illustrated with lithographed plates and a heliogravure plate of *Ficus Roxburghii*, from Dr. Cunningham's photograph. The other, Vol. II, contains descriptions of the species of *Artocarpus*, or Bread-Fruits and Jacks, indigenous to British India, within the geographical limits noted above, and of the Indo-Malayan species of *Quercus* and *Castanopsis*, Oaks and Chestnuts, and is also largely illustrated with lithographed plates.

The principal botanical papers in last year's volume of the *Scientific Memoirs by Medical Officers of the Army of India*, were noticed in my last address. The forthcoming number, now almost ready for issue, will contain papers by Dr. D. Prain on the Laccadive plants collected by Mr. Alcock in the "Investigator," in 1888-89, and by Mr. A. O. Hume, in 1875; by Dr. A. Barclay on the life-history of a Himalayan *Gymnosporangium*, (*G. Cunninghamianum*, n. sp.), on *Pyrus Pashia* and *Cupressus torulosa;* also on a *Chrysomyxa* on *Rhododendron arboreum*, (*C. himalense*, n. sp.); and on the life-history of a Uredine on *Rubia cordifolia* (*Puccinia Collettiana*, n. sp.); also a valuable and important paper, by Dr. D. D. Cunningham, on Milk as a medium for Choleraic Comma-bacilli, in which he shows that milk as ordinarily supplied for consumption in this country, from the high degree to which it is normally contaminated by schizomycetes whose growth is associated with processes of acid fermentation, is not a favourable medium for the development or continued existence of the Comma-bacilli or other schizomycete organisms which require an alkaline or neutral environment. A curious and striking fact brought out in the course of these observations was the difference in the phenomena presented by portions of milk from one and the same sample according to the level in the fluid from which they were taken—and it is shown that specimens

derived from the upper strata have a much greater tendency to undergo acid fermentation and coagulation than those derived from the lower strata.

The *Journal of the Nat. Hist. Soc., Bombay*, contains some interesting notes, by Mrs. J. C. Lisboa, on the odoriferous grasses (*Andropogons*) of India and Ceylon, with a description of a supposed new species (*A. odoratus*), from Lanowli, of which a plate is given. Mr. G. Carstensen contributes a paper on facilitating the study of Botany and proposes the use of a simple English terminology. Mrs. W. E. Hart communicates some notes on Branching Palms, illustrated with two plates.

The Supplement to the late Edmund Boissier's *Flora Orientalis*, published at the end of 1888, contains Dr. Aitchison's additions to the Afghan flora, except the most recent, and a valuable index to all the collector's numbers cited throughout the work.

In the *Journal of the Linnean Society*, Mr. C. B. Clarke has a valuable paper on the Plants of Kohima and Manipur, with descriptions of several new species, illustrated with 44 plates and containing notices of 1,050 species of flowering plants or ferns, or probably less than one-fifth of the flora of the district, traversed from Gola Ghat *viâ* Kohima and Manipur to Cachar.

The *Journal of Botany* contains a systematic and structural account of the genus *Avrainvillea*, Deene, by G. Murray and L. A. Boodle; also a note, by Col. R. H. Beddome, on two new ferns, from the N. W. Himalaya.—*Asplenium* (*Athyrium*) *Duthei*, from Kumaon, 12—13,000 feet; and *A.* (*A*) *Macdonelli*, from Chumba valley, 5,000 feet. Dr. Trimen contributes additions to the Flora of Ceylon, 1885 to 1888.

In the *Acta-Horti-Petropolitani*, are several important papers on Central-Asian botany, among which may be noted, a continuation of C. Winkler's Lists of new *Compositæ* of Turkistan; descriptions, by E. A. Wainio, P. A. Karsten and V. F. Brotherus, of the Turanian plants collected by Dr. Walter and Radde. F. v. Herder gives an account of the geographical distribution of the apetalous plants collected by Dr. Radde, many of which are Indian. Mr. C. J. Maximovicz contributes a memoir of Prjevalsky, with a portrait; and in the *Bulletin de l' Académie Impériale des Sciences de St. Petersburg* he has continued his Diagnoses of new Asiatic plants.

In the *Bihang till Kongl. Svenska Vetensk-Akad. Handlingar*, is a paper by G. Lagerheim on *Desmidiacea* from Bengal, with remarks on the geographical distribution of the order in Asia.

Economic Botany. Under the direction of Sir E. Buck, in the Revenue and Agricultural Department of the Government of India, a

new series of papers relating to Indian Products has been instituted. It is edited by Dr. G. Watt, and Vol. I contains notes on Manilla Hemp; *Adhatoda vasica;* Coix grain or Job's tears; Fodder Grasses, and on several descriptions of Indian Fibres. In No. 2 of Vol. II, an account is given of *Podophyllum emodi*, or the Himalayan Podophyllum, which Dr. Watt found growing in Kulu. Analyses by Drs. Dymock and Hooper have shown that it is capable of yielding 12 per cent. of resin, or podophyllin, whereas the North American plant *P. peltatum*, from which this drug is usually obtained, only yields 4 per cent. The indigenous drug has been found to possess all the medicinal properties of the exotic one and it seems likely therefore that a profitable trade might be carried on in this product if it is obtainable in sufficiently large quantities.

Volumes I and II of the long-expected "Dictionary of the Economic Products of India," prepared by Dr. G. Watt in the Revenue and Agricultural Department of the Government of India, have been completed during the year. The arrangement of the Dictionary is alphabetical and based upon the scientific names of the various products, and in the margin a number for each product or object has been given. The object of these numbers, which commence afresh with each letter of the alphabet, is to serve for reference to type collections in various Museums and also as a convenient clue for correspondence. The Index will contain the European, vernacular and scientific names with references to the type numbers. The work when completed will contain a vast amount of valuable information, brought together in a convenient form, regarding Indian vegetable and other products and cannot fail to be of very great use to commercial and scientific enquirers.

The *Kew Bulletin*, as usual, contains papers relating to vegetable products, either indigenous to this country or suitable for cultivation here; among them—notes on Coca; a memorandum by Mr. Cameron on the fruits of Mysore; on the Persian dye plant *Zalil (Delphinium zalil)*, collected by Dr. Aitchison in Afghanistan; a reprint of an article on Patchouli by Mr. L. Wray, of the Government Museum, Perak, which was published in the *Journal of the Agri-Horticultural Society* in Calcutta; on Flowers of *Calligonum* as an article of food in N.-W. India; Ramie or Rhea; Food-grains of India (*Dendrocalamus strictus*).

In the Report of the Government Botanical Gardens at Saharanpur and Mussoorie, Mr. Gollan, the Superintendent, has given some interesting information regarding the successful acclimatisation of several exotic food and fodder plants—among them, the American "Dewberry;" Persian Date-palms; Malacca apple, (*Eugenia malaccensis*); Otaheite apple (*Spondias dulcis*) and Vines, of which the Black Hamburgh

appears to be the most suitable for general cultivation in India. Some interesting experiments are being made in the gardens with foreign varieties of sugarcane and wheat, and with huskless barley, for malting purposes. The paper-mulberry continues to be found useful for planting on usar and reh-covered tracts. The cultivation of the Mesquit bean (*Prosopis juliflora*) has also been a success, but the Carob bean has not done so well. An improved method of cultivating the Jalap plant has been tried and promises well.

The results of the working of the Government Cinchona plantations in Sikkim have already been noticed. The red-bark trees are being replaced by yellow bark ones, which yield only quinine, and thus the alkaloidal value of the plantations has been very much increased.

The *Indian Forester* contains a number of notes and papers which are of interest in connection with economic botany. From a note by Mr. Gamble it appears that Prof. Beccari of Florence, to whom Sir J. Hooker had entrusted the descriptions of the Indian Palms, has given a list of 6 species of *Phœnix* indigenous to India, while a seventh *P. Sylvestris*, is only admitted as an introduction.

Mr. W. Coldstream's "Grasses of the Southern Punjab" and Dr. Bonavia's "Cultivated Oranges and Lemons of India and Ceylon" are both valuable contributions to Indian Economic Botany.

There are other subjects with which I should have liked to have dealt, as last year, but, owing to the vast extent of the field over which I have had to take you and my desire to show you something more than mere indications of the work done, I have already far more than exceeded the limits I had proposed to set myself, and must perforce bring this review to a close. All imperfect as it necessarily must be, it will serve to show that the workers in the field, both in this country and out of it, have not been inactive, and that considerable and valuable additions have been made to our knowledge of things Indian and Asiatic during the year.*

The time has also come when I must vacate this chair in favour of our friend Mr. Beveridge. He is well-known to you as taking a lively interest in our meetings, and with his extensive literary and historical acquirements I feel sure that the well-being of the Society will be safe in his hands, and that he will do much to further it.

* I have again to record my acknowledgments for the assistance kindly given me by friends and others in preparing this review and passing it through the press—among them:—Dr. A. F. R. Hoernle, Pandit Harí Prasád Sástri, Messrs. E. T. Atkinson, Wood-Mason, Sclater, Cotes, Haly and Thurston, Drs. Hendley and Führer, Colonel Thuillier, R. E., Mr. T. A. Pope, Dr. W. King, Messrs. Eliot and Pedler, Drs. G. King, Scully, Cunningham and Barclay and Mr. H. M. Phipson.

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

President.

H. Beveridge, Esq., C. S.

Vice-Presidents.

Col. J. Waterhouse, B. S. C.
Rájá Rájendralála Mitra, C. I. E., LL. D.
J. Wood-Mason, Esq.

Secretaries and Treasurer.

Dr. A. F. R. Hoernle.
C. Little, Esq., B. A.
W. King, Esq., B. A , D. Sc.

Other Members of Council.

Dr. J. Scully.
Pandit Haraprasád Shástri, M. A.
Dr. D. D. Cunningham.
Hon. Sir A. W. Croft, K. C. I. E., M. A.
Prince Jahán Qadr Muhammad Wáhid Alí, Bahádur.
Bábú Gaurdás Bysack.
Dr. A. Crombie.
E. T. Atkinson, Esq., C. I. E., B. A., C. S.
Bábú Pratápachandra Ghosha, B. A.
Capt J. H. Sadler, S. C.
C. H. Tawney, Esq., M. A.
L de Nicéville, Esq , F. E. S.
W. L Sclater, Esq.

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

H. BEVERIDGE, ESQ., C. S., President, in the chair.

The Minutes of the last meeting were read and confirmed.

Twenty-eight 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 balloted for and elected Ordinary Members:

A. Venis, Esq., M. A.
A. Goodeve Chuckerbutty, Esq., B. C S.

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

Brigade Surgeon J. G. Pilcher, proposed by L. de Nicéville, Esq., seconded by J. Wood-Mason, Esq.

Mahárájá Girijánáth Roy, Dinajpur, proposed by Bábú Gaurdás Bysack, seconded by Colonel J. Waterhouse.

The SECRETARY reported the death of the following member :

Kumár Isvariprasád Garga.

BABU SARATCHANDRA DÁS exhibited a Tibetan drawing of the golden Chaitya of Lhasa.

The following papers were read :—

1. *A descriptive list of the Uredineæ occurring in the neighbourhood of Simla (Western Himalayas), Part III.—By* A. BARCLAY, M. B., *Bengal Medical Service.*

2. *Materials for a Flora of the Malayan Peninsula, Part II.—By* GEORGE KING, C. I. E., M. B., LL. D., F. R. S., F. L. S., *Superintendent of the Royal Botanic Garden, Calcutta.*

3. *Description of a new Genus of Bamboos.—By* J. S. GAMBLE, ESQ., M. A.

These papers will be published in the Journal, Part II.

4. *The account of a Bengali Bráhmana who obtained a high position in the Singhalese Buddhist Hierarchy in the* 11*th Century, A. D.—By* PANDIT HARAPRASÁD S'ÁSTRÍ, M. A.

A short treatise entitled *Bhakti Shataka* was published in 1885, in Ceylon, by F. Gooray. It was sent to me by a friend, Mohattibatte Gunánanda, the high priest of the Dípadattama Vihare in Colombo. The work is a short one of 107 verses. But it is an exceedingly interesting work for a variety of reasons :

(1) It is a Sanskrit work though published in the Singhalese character.

(2) It is a Buddhist work.

(3) It is written in standard Sanskrit and not in that verbose, difficult, obscure and ungrammatical idiom which goes by the name of Buddhist Sanskrit.

(4) It was written by a Bráhmana who became a Buddhist from conviction.

(5) It was written by a Bengali in the eleventh century.

(6) It evidently shows that the Bráhmana was persecuted, and excommunicated for his faith, and that he became a voluntary exile in

Ceylon where a reforming Buddhist king appreciated him, raised him to a high place in the Buddhist hierarchy and conferred on him the title of Bauddhágama Chakravarttí.

I purpose in this paper to give some account of the author.

In the 107th verse he says that he is a good Buddhist, and his title is *Kavibhárati*, that he is a *Kshitisura* or Bráhmana, and that his name is Rámachandra. In the colophon, which generally has some authority, he is described as a devoted worshipper of S'ákya Muni the Lord, a *Bauddhágama Chakravarttí*, *i. e.*, master of the whole range of Buddhist scriptures, a *bhúsura*, *i. e.*, a bráhmana, an *acháryya*, a teacher, and a great pandit, and as a native of Gauṛ.

Sumangala, the disciple of Ráhula, who explains this work by means of a running commentary in the Singhalese Sádhubháshá, commenting upon the word Gauṛadeśiya, says that Gauṛ is a place of great learning where Kávya, Vyákarana, Tarka and other branches of knowledge are extensively cultivated. There is a Ráṛha mandala in Gauṛ and in that mandala there is a Janapada, or locality, named Várendra where the author was born. From this one may be led to conclude that Rámachandra was a Várendra Bráhmana. But no. The Ráṛhi and Várendra Bráhmanas have only five gotras, *viz.*, Sáṇḍilya, Bháradvája, Káśyapa, Vátsya and Sávarna, while Rámachandra is said to be a Bráhmana of the Kátyáyana gotra. Where can we get a Bráhmana of that gotra in Bengal? This is a question not to be answered easily. The Ráṛhíya and Várendra Bráhmans are certainly the most influential in Bengal. But there are two other classes of Bráhmans here, *viz.*, the Páschátyas and the Dakshiṇátyas. The Chief Justice of Lakshana Sena in his well known work the Bráhmaṇa Sarvasva recognizes these two classes also, but names them Páschátya and Utkala. And so these classes are as ancient as the Sena Rájás of Bengal. I will not speak of the Utkalas because they have no Kátyáyana gotra among them. The Páschátyas are settlers from the west either before or after the settlement of the five bráhmans whose descendants the Ráṛhíyas and Várendras claim to be. The Páschátyas are not a homogenous community like the Ráṛhíyas, having settled at and from different parts of the country at different times and from a variety of motives. They do not intermarry with each other, and there are bráhmans of almost all the gotras among them. I have asked many Páschátyas whether they have the Kátyáyana gotra among them. In this part of the country they have not. Some informed me that bráhmans of this gotra will be found in North Bengal, *i. e.*, Várendra Janapada. This appears to be very probable, because the Maithils have this gotra among them. Many Maithils have become incorporated with the Páschátyas. Rámachandra may have been one of these Maithil

Páschátyas who owing to the proximity of Mithilá to Várendra might have settled there from a very ancient time, and owing to Bengal being then a country full of Buddhists, may have conceived a liking for that religion.

The commentator further says in a Sanskrit verse that the Bráhmana Rámachandra Kavibhárati was made *Bauddhágama Chakravarttí* by Rájá Parákram Báhu of Ceylon. The author also says that he wrote the work during the reign of that monarch.

This settles the question of the age of Rámachandra because Parákram Báhu reigned about the middle of the eleventh century and his was a long reign.

His contemporary in Bengal was Ballál Sena the father of Lakshmaṇa Sena whose era was discovered some years ago to be still in use in Mithilá. Ballál is said to be the organizer of the present Bengal Hindu society. He established Kulinism among the Rárhíya and Várendra Bráhmans, he raised the dignity of some of the non-Aryan and semi-Aryan tribes by giving them bráhmans to officiate in their ceremonies. He degraded the wealthy Sonár Beniás and the influential Jogis, and made them something like outcasts. He was the king of a country where Buddhist kings had long held their sway, and where Buddhism was the prevailing religion, and it may be supposed that he did not look upon Buddhism with favour.

It appears to be certain, however, that Rámachandra was excommunicated and persecuted. For why should he otherwise say from Ceylon :—

"Let kings punish, let learned men deride, and let relations forsake me, yet O father Jina, I cannot live a moment without thee ?"

Why otherwise should he say, "Whether I live in heaven or in hell, whether among birds or among the Asuras, whether in the city of ghosts or of men, let my mind remain fixed in thee, for there is no other happiness for me ?"

"You are my father, mother, brother, sister, you are my fast friend in danger, O dear one, you are my lord, my preceptor who imparts to me knowledge as sweet as nectar. You are my wealth, my enjoyment, my pleasure, my affluence, my greatness, my reputation, my knowledge and my life. You are my all, O all-knowing Buddha."

The whole tenor of the verses from 24 to 30 shows that the author was oppressed with a strong feeling of personal injury but that he had resigned himself to his fate, and had determined to suffer even the worst for his faith.

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Books Purchased,

Herklots, G. A., M. D. Qanoon-e-Islam, or the customs of the Mussulmans of India, comprising a full and exact account of the various rites and ceremonies, from the moment of birth, till hour of death, by Jaffar Shurreef. 2nd Edition. 8vo. Madras, 1863.

Report of the Scientific Results of the voyage of H. M. S. " Challenger " —Zoology, Vol, XXXII. 4to. London, 1889.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For March, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th March 1890, at 9 P. M.

H. Beveridge, Esq., C. S., President, in the chair.

The following members were present :—

Bábú Saratchandra Dás, E. Gay, Esq., Bábú Bhupendra Sri Ghosha, Dr. Hoernle, W A. Lee, Esq., R. D. Mehta, Esq., Bábú Asutosh Mukhopádhyáy, Captain R. C. Temple, J. Wood-Mason, Esq.

Visitors—Captain T. E. Younghusband, King's Dragoon Guards. Lama Phun tshogs *D* Wañ *l*dan.

The Minutes of the last meeting were read and confirmed.

Thirty-one 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 balloted for and elected Ordinary Members :—

Brigade Surgeon J. G. Pilcher.
Mahárájá Girjanath Roy, Dinajpur.

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

Philip Lake, Esq , B. A. (Cantab.), proposed by Dr. W. King, seconded by E. C. Cotes, Esq.

F. G. Hickson, Esq., proposed by H. Beveridge, Esq., seconded by Dr. W. King.

Dr. W. H. Solf, proposed by H. Beveridge, Esq., seconded by Dr. Hoernle.

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

Sir John W. Edgar, K. C. I. E., C. S. I.

The President announced that the Council had appointed Messrs. Mengens and King to be Auditors of the Society's Accounts for 1890.

The Secretary read the names of the gentlemen who had been appointed by the Council to serve on the various Committees for the present year.

Finance and Visiting Committee.

E. T. Atkinson, Esq.
Hon. Sir A. W. Croft.
Bábú Pratápachandra Ghosha.
Rájá Rájendralála Mitra.
Captain J. H. Sadler.
Dr. J. Scully.
Pandit Haraprasád Shástri.
Colonel J. Waterhouse.
J. Wood-Mason, Esq.

Library Committee.

Nawáb Abdul Latif, Bahádur.
E. T. Atkinson, Esq.
Bábú Gaurdás Bysack.
Hon. Sir A. W. Croft.
Dr. D. D. Cunningham.
Bábú Pratápachandra Ghosha.
Prince Jahán Qadr Muhammad Wáhid Alí, Bahádur.
J. Mann, Esq.
Rájá Rájendralála Mitra.
Bábú Asutosh Mukhopádhyáy.
Mahámahopádhyáy Pandit Maheśachandra Nyáyaratna.
L. de Nicéville, Esq.
Captain J. H. Sadler.
Hon. Dr. Mahendralál Sarkár.
W. L. Sclater, Esq.
Dr. J. Scully.
Pandit Haraprasád Shástri.
C. H. Tawney, Esq.
Colonel J. Waterhouse.
J. Wood-Mason, Esq.

Philological Committee.

Nawáb Abdul Latif, Bahádur.
E. T. Atkinson, Esq.
J. Beames, Esq.
Bábú Gaurdás Bysack.
Dr. A. Führer.
Bábú Nilmani Mukerji.
Mahámahopádhyáy Pandit Maheśachandra Nyáyaratna.
Captain D. C. Phillott.
Bábú Rájkumár Sarvádhikári.

G. A. Grierson, Esq.
Bábú Pratápachandra Ghosha.
Maulví Kudá Bakhsh Khán, Bahádur.
C. J. Lyall, Esq.
J. Mann, Esq.
Rájá Rájendralála Mitra.
Sir Sayid Ahmad.
Pandit Haraprasád Shástri.
C. H. Tawney, Esq.
Captain R. C. Temple.
Captain J. H. Sadler.
Dr. G. Thibaut.
Colonel A. C. Toker.

Coins Committee.

Dr. A. Führer.
Rájá Rájendralála Mitra.
C. J. Rodgers, Esq.
Dr. J. Scully.
J. H. Rivett-Carnac, Esq.
V. A. Smith, Esq.

History and Archæological Committee.

Hon. Justice Amir Ali.
J. Beames, Esq.
Bábú Gaurdás Bysack.
W. H. P. Driver, Esq.
Dr. A. Führer.
Bábú Pratápachandra Ghosha.
F. S. Growse, Esq.
Mahámahopádhyáya Kaviràja Shyamaldás.
Rájá Rájendralála Mitra.
J. H. Rivett-Carnac, Esq.
Captain R. C. Temple.
J. Wood-Mason, Esq.

Natural History Committee.

Dr. A. W. Alcock.
H. H. Anderson, Esq.
E. T. Atkinson, Esq.
Dr. A. Barclay.
E. C. Cotes, Esq.
Dr. D. D. Cunningham.
J. F. Duthie, Esq.
Dr. G. M. Giles.
Dr. G. 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.
Colonel C. Swinhoe.
Dr. J. H. Tull Walsh.
J. Wood-Mason, Esq.

Physical Science Committee.

Dr. A. W. Alcock.
P. N. Bose, Esq.
Bábú Gaurdás Bysack.
Dr. D. D. Cunningham.
J. Eliot, Esq.
S. R. Elson, Esq.
Dr. G. M. Giles.
Bábú Asutosh Mukhopádhyáy.
Dr. Fritz Noetling.
R. D. Oldham, Esq.
A. Pedler, Esq.
Captain E. W. Petley.
Dr. D. Prain.
Hon. Dr. Mahendralál Sarkár.

S. A. Hill, Esq.
Dr. G. King.
Rev. Father E. Lafont.
J. J. D. La Touche, Esq.
C. S. Middlemiss, Esq.
Dr. J. Scully.
Dr. W. J. Simpson.
Colonel H. Thuillier.
Colonel J. Waterhouse.
J. Wood-Mason, Esq.

The Philological Secretary announced the presentation to the Society by the Government N.-W. Provinces and Oudh of a gold coin of Gungeya Deva.

Captain R. C. Temple, B. S. C. exhibited and explained his collection of past and present Burmese Currency. He also explained and illustrated a peculiar method of Burmese Arithmetic.

The following papers were read :—

1. *Ancient Barbaric Customs among the Hindus.—By* Pudmanav Ghosal. *Communicated by* Dr. Hoernle.

2. *Description of a Dipterous Insect found in Simla on the flower of* Commelyna obliqua, *Barclay.—By* Mons. J. Bigot. *Communicated by* E. T. Atkinson, Esq., C. S.

Ommatius lividipes, ♀ nov. sp.,

Long. 7 mill. ½.

Niger, vix nitens. Antennis, palpis, haustello, et mistace parva, nigris; facie obscure cinerea; pleuris et conis cinereo-pulverulentis; abdomine parce et breviter albido villosulo; halteribus lividis; pedibus flavido-livido, parce nigro-setoso, incisuris tarsorum geniculisque posticis infuscatis; alis omnino hyalinis.

Hab. Simla (on the flower of *Commelyna obliqua*, Barclay.)

3. *Note on the Pupæ of two Indian Butterflies of the subfamily* Nemeobiinæ.—*By* L. de Nice'ville, Esq., F. E. S., C. M. Z. S.

Mr. Samuel H. Scudder in "The Butterflies of the Eastern United States and Canada" (p. 776 *et seq.*) has admirably summed up all that is known regarding the transformations of the butterflies of the subfamily *Nemeobiinæ*, and shews that all the information we possess of the Old World species is confined to the European *Nemeobius lucina*, Linnæus, and to the Asiatic *Abisara prunosa*, Moore. I am now able to supplement this by some particulars of two pupæ of two other species of the subfamily. Mr. G. C. Dudgeon, of Darjiling, procured a single pupa last autumn of *Zemeros flegyas*, Cramer, of which he has communicated to me a water-colour drawing, with the following descrip-

tion:—" Pupa very flat. Head rounded, bifid; abdomen broad in the middle; thorax rounded, flat. Colour pale green marked with blue on the back. Fastened by the tail and round the thorax with a whitish web. Found on a leaf of *Mæsa montana*, D. C." Shortly afterwards Mr. A. V. Knyvett sent me an empty pupa-case of the same species from the same district. From these two sources of information I am able to draw up the following notes.

Mr. Dudgeon's drawing shews the pupa attached to the surface of a leaf, but whether to the upper or underside I am unable to say, though probably the latter. The leaf appears to be rather a small one, and the pupa occupies about the middle third of half the surface between the midrib and one margin of the leaf, the long axis of the pupa being parallel with the midrib, and the head directed towards the apex of the leaf. Mr. Knyvett's example is attached to the underside of a small leaf, and lies between two of the lateral ribs, with the head touching the midrib, the tail directed towards the edge of the leaf. Both pupæ are fixed to the leaf by the cremastral hooks at the end of the abdomen, and by a silken girdle across the body at about the junction of the thorax with the first abdominal segment. To allow the imago to escape, the thorax has split down the dorsal line, but the case covering the abdominal segments remains intact. The pupa is distinctly fusiform in shape, being broadest at about the middle, the abdominal segments rapidly increasing in width to the junction of the second and third (to judge from the empty pupa-case), and then more gradually decreasing to the last, which is bluntly rounded. The whole pupa appears to be much depressed. The wing-cases are very small, and hardly visible from above. The constrictions between the abdominal segments are well marked, and the posterior segments are not turned under as in the typical pupæ of the family *Lycænidæ*. The ventral surface of the pupa is very flat, and lies in close contact with the surface of the leaf. In general shape the pupa is very similar to that of *Abisara prunosa*, Moore, from Ceylon, but the terminal segment of the abdomen (tail) is much blunter (less pointed); it appears, however, to differ widely in not having the surface furnished with long hairs; none being shewn in Mr. Dudgeon's drawing, or mentioned in his description, and none being visible in the empty pupa-case. I may note also that the pupa of the European *N. lucina* appears to be quite naked. The pupa of *Z. flegyas* lies fully exposed on the surface of the leaf, there being no attempt to make a cocoon of any sort. The surface of the leaf on which the pupa lies, and for a little distance around, is covered with a coating of fine white silk evidently spun by the larva before fixing itself in position for pupation.

Of the other pupa I have long possessed a single example from which the imago has escaped, obtained by Colonel G. F. L. Marshall, R. E., at Simla. The species is *Dodona durga*, Kollar, a butterfly which is somewhat similar to *N. lucina* in the imago state. This pupa is also attached to the underside of a small leaf near the tip, the long axis of the pupa being parallel to the midrib, over which it partly lies, with the head directed towards the tip of the leaf. It is fixed in position by the tail, and by a median girth as in *Z. flegyas*, from which it only differs (as far as I can judge from empty shells only) in being less flattened and narrower throughout, the abdominal segments especially being much attenuated and ending almost in a point as in *A. prunosa*. It does not appear to have been covered with hair.

As far as the pupæ go, the Old World species would appear to shew that the subfamily *Nemeobiinæ* would be better placed with the family *Lycænidæ* than with the family *Nymphalidæ*, agreeing with the former also much more closely in the larva stage. But some of the New World *Nemeobiinæ* have the pupæ suspended by the tail only with no median girth, while some of the Old World *Lycænidæ* also (*Poritia hartertii*, Doherty, of which I have seen the empty pupa-case, for instance) have the pupæ similarly suspended, so that the position assumed by the pupa cannot be taken as an infallible guide in defining the families of butterflies. On the ground chiefly of the extreme shortness and hairiness of the forelegs of the Indian species in the imago stage, the much larger average size and stouter build, as well as the invariable presence of a præcostal nervure to the hindwing, I am of opinion that Bates is more correct in placing the subfamily *Nemeobiinæ* with the family *Nymphalidæ* than Scudder is in claiming it as a subfamily coordinate with *Lycæninæ* in a family *Lycænidæ*.

P. S. Since the above was placed in type, I am able to supplement the information regarding the transformations of *Z. flegyas*, by the following description of its larva by Mr. G. C. Dudgeon :—" Larva. Length when full-grown ·75 of an inch. Ovate, extremely flattened, inconspicuous. Coloration pale green, head and anal segment slightly lighter, all the segments laterally rounded, covered with a whitish down, especially at the sides ; an indistinct double longitudinal dorsal darker green line throughout, enclosing a minute orange-red spot on the seventh and eleventh segments ; middle segments more than twice as broad as they are long. Legs pale green, set well beneath the animal, and rather close together. Full grown at the end of March. Feeds on *Mæsa montana*, D. C., as kindly identified by Dr. George King, C. I. E., Superintendent of the Royal Botanic Garden, Calcutta. The larva when about to change into the pupal stage, attaches itself to a patch

of silky web by the last segment to the underside of a leaf of the food-plant, and is girt about the middle with another web. The double dorsal line in the larva becomes rather more bluish before the insect changes."

Six empty pupa-cases, Mr. Dudgeon informs me, have recently been found by him on the food-plant, all attached to the under surface, with the head of the pupa turned towards the apex of the leaf. All were found at 2,000 feet elevation in the Darjiling district, where the butterfly swarms. Another butterfly of the subfamily *Nemeobiinæ*, *Dodona adonira*, Hewitson, probably feeds on *Mæsa chisia* of Don in Darjiling, a pupa having once been found by Mr. A. V. Knyvett on that bush (also one of the plants on which *Z. flegyas* feeds), "attached to the leaf in exactly the same way as is *Z. flegyas*, *i. e.*, by the tail and with a median silken girth."

I append a full description of the pupa of *Z. flegyas* obtained at Badamtam near Darjiling, 3,400 feet elevation above the sea, by Mr. Dudgeon.

Pupa, ·55 to ·70 of an inch long.* Shape fusiform, broadest in the middle, tapering towards both ends, with the anterior end truncate-rounded, distinctly broader than the posterior; the whole pupa extraordinarily flattened, and consequently of very slight depth even in the thickest part; the divisions between the segments well-marked; the posterior segment bluntly rounded; the head also rounded, divided in the middle line at the apex into two lobes by a shallow notch, the sides of which are parallel to one another and at right angles to the bottom; colours light bright yellowish-green throughout, above marked with rich emerald-green narrow lines arranged in an arabesque-like pattern on the two outer thirds, a series of round spots along the middle of the back on the abdomen only, and a subdorsal line on either side interrupted at the segmental constrictions. The under surface is pale yellowish-green throughout, entirely unmarked. Owing to the extremely depressed form of the pupa, the wing-cases are almost entirely invisible from above; they show only by a very narrow emerald-green line on each side of the thorax and two anterior abdominal segments. The whole surface of the pupa is entirely smooth, without any hairs or shagreening whatever. Owing to its beautiful coloration and curious markings this pupa is one of the prettiest I have seen, and far surpasses anything known to me in the family *Lycænidæ*.

* This latter measurement is taken from an empty pupa-case.

LIBRARY.

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

TRANSACTIONS, PROCEEDINGS AND JOURNAL,

presented by the respective Societies and Editors.

Berlin. Der Gelleschaft Naturforscheuder Freunde zu Berlin.—Sitzungsberichte, Jahrgang, 1889.

Brussels. La Société Royale Malacologique de Belgique,—Annales, Tome XXIII.

———. ———. Procès- Verbaux des Séances. July 1888—June 1889.

Calcutta. Indian Engineering. Vol. VII, Nos. 6—9.

Edinburgh. The Scottish Geographical Society,—Magazine, Vol. VI, No. 1, January, 1890.

The Hague. Koninklijk Instituut voor de Taal,- Land-en Volken-kunde van Nederlandsch-Indië,—Bijdragen tot de Taal- Land-en Volkenkunde van Nederlandsch-Indië. Deel V, (5_e Volgr.) Aflevering 1.

Havre. Société de Géographie Commerciale du Havre,—Bulletin, Novembre—Décembre, 1889.

Jassy. Societătaiĭ Stüntifice si Literare din Iasi,—Arhiva, Nos. 2—3, Septemvrie—Decembrie, 1889.

London. Nature. Vol. XLI, Nos. 1056—1058.

———. Royal Astronomical Society,—Monthly Notices, Vol. L, No. 1, November, 1889.

———. Royal Geographical Society,—Proceedings, Vol. XII, No. 1, January, 1890.

———. Royal Microscopical Society,—Journal, Part 6, 1889.

———. Institution of Electrical Engineers,—Journal, Vol. XVIII, No. 83.

———. The Academy. Nos. 925—927.

———. The Athenæum. Nos. 3247—3250.

Mexico. La Sociedad Científica "Antonio Alzate,"—Memorias. Tomo II, Núm 12, Tomo III, Núm 1—2.

Naples. La Società Africana D'Italia,—Bollettino, Tome VIII, Nos. 5—10.

Paris. La Société de Géographie,—Bullettin. Tome X, No. 3.

———. ———. ———. Compte Rendu des Séances de la Commission Centrale, Nos. 1 et 2, 1890.

Paris. La Société Zoologique de France,—Bullettin. Tome XIV, No. 9.

Prague. Der K. K. Sternwarte zu Prag,—Astronomische Beobachtungen, 1885—1887. Appendix zum 46, 47, und 48 Jahrgang.

Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Vol. XXXIII, Disp. 12ª and Indice, Volume XVIII.

Stockholm. Konigliga Svenska Vetenskaps-Akademiens,—Bihang (supplément aux Mémoires),—Vol. IX, Nos. 1—2; Vol. X, Nos. 1—2; Vol. XI, Nos. 1—2; Vol. XII, Nos. 1—4; Vol. XIII, Nos. 1—4.

———. ———. ———. Förteckning (Table des Matières), 1826—1883.

———. ———. ———. Handlingar (Mémoires),—Vol. XX, Nos. 1—2; Vol. XXI, 1—2 and Atlas.

———. ———. ———. Lefnadsteckningar (Biographies des Membres),—Vol. II, No. 3.

———. ———. ———. Meteorologiska Iakttagelser I Sverige. (Observations Météorologiques, Suédoises) Vols. XXII—XXVI, 1880-84.

———. ———. ———. Öfversight (Bulletin),—Vols. XLI—XLV, 1884-88.

St. Petersburg. La Société Impériale Russe de Géographie,—Proceedings. Tome XXV, No. 5.

Taiping. Government of Perak—The Perak Government Gazette,—Vol. III, Nos. 3—5, 1890.

Turin. La R. Accademia delle Scienze di Torino,—Atti Vol. XXV, Disp. 1ª—2ª.

Vienna. Der Anthropologischen Gesellschaft in Wien,—Verhandlungen. Nos. 13—17, 1889.

Books and Pamphlets,

presented by the Authors, Translators &c.

Culin, Stewart. Chinese Games with Dice (Read before the Oriental Club of Philadelphia, March 14th, 1889). 8vo. Philadelphia, 1889.

Cunningham, D. D., M. B., F. R. S., F. L. S. On the Phenomena of Fertilization in *Ficus Roxburghii*, Wall. Fcp. Calcutta, 1889.

Haeckel, Ernst. Monographie die Radiolarien, (Rhizopoda Radiaria) Vierter Theil. Die Phaeodarien oder Cannopyleen Radiolarien. 4to. Berlin, 1888.

————————. Natürliche Schöpfungs-Geschichte. 8vo. Berlin, 1889.

————————. Report on the Deep-Sea Keratosa, (Report on the Scientific results of the Voyage of H. M. S. Challenger, Zoology, Vol. XXXII, Part LXXXII). 4to. London, 1889.

King, George, M. B., LL. D., F. R. S., F. L. S. Annals of the Royal Botanic Garden, Calcutta, Vol. II. The species of Artocarpus indigenous to British India; The Indo-Malayan species of Quercus and Castanopsis. Fcp. Calcutta, 1889.

————. The species of *Ficus* of the Indo-Malayan and Chinese Countries. Appendix. Some new species from New Guinea. Fcp. Calcutta, 1889.

Modigliani, Elio. Un Viaggio A Nías. 8vo. Milano, 1890.

Ráy, Pratáp Chandra, C. I. E. The Mahábhárata, translated into English prose, Part LVI. 8vo. Calcutta, 1889.

Miscellaneous Presentations.

Dagh-Register gehonden int Easteel Batavia vant passerende daer ter plaetse als over geheel Nederlandts-India. Anno 1661, van Mr. J. A. Van Der Chijs. 4to. Batavia, 1889.

Bataviaasch Genootschap van Kunsten en Wetenschappen.

Verzeichniss der Arabischen Handschriften. von W. Ahlwardt. Zweiter Band (Die Handschriften-Verzeichnisse der Königlichen Bibliothek zu Berlin, Achter Band). 4to. Berlin, 1889.

Verzeichniss der Türkischen Handschriften. von Wilhelm Pertsch (Die Handschriften-Verzeichnisse der Königlichen Bibliothek zu Berlin, Sechster Band). 4to. Berlin, 1889.

Der Königlichen Bibliothek zu Berlin.

Returns of the Rail-borne trade of the Central Provinces during the quarter ending 30th September 1889. Fcp. Nagpur, 1890.

Chief Commissioner, Central Provinces.

The Fauna of British India, including Ceylon and Burmah. Fishes, Vol. II. By Francis Day, C. I. E., LL. D. 8vo. London, 1889.

Report on the Administration of Bengal, 1888-89. Relations with Tributary States, and Frontier affairs. Fcp. Calcutta, 1889.

Government of Bengal.

Copies of Government of India Despatch, dated the 22nd day of June 1889, with its enclosures, including Reports by Mr. Tucker: and of Memorial of the Indian Association of Calcutta, dated the 12th day of April 1888, regarding land emigration from Bengal to Assam (in continuation of House of Lords' Return, (No. 14), 5th March, 1889). Fcp. London, 1889.

Correspondence between the India Office, the Government of India, and the Treasury, on the Plate Duties since November 1888. Fcp. London, 1889.

Index to the Reports from the Select Committee on East India (Hyderabad Deccan Mining Company). Fcp. London, 1888.

Report of the Committee appointed to enquire into the Pay, Status, and Conditions of service of Medical Officers of the Army and Navy. Fcp. London, 1889.

Report of the Royal Commission on the Blind, the Deaf and Dumb &c. of the United Kingdom. Fcp. London, 1889.

Selections from the Records of the Government of India, Home Department. No. 263. Reports on Publications issued and registered in the several Provinces of British India during the year 1888. Fcp. Calcutta, 1889.

————. No. 265. Papers relating to Discipline and Moral Training in Schools and Colleges in India. Fcp. Calcutta, 1890.

Statement exhibiting the moral and material progress and condition of India during the year 1887-88 (No. 24). Fcp. London, 1889.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Report on the Administration of the Madras Presidency during the year 1888-89. Fcp. Madras, 1889.

GOVERNMENT OF MADRAS.

Report on the Administration of the N.-W. Provinces and Oudh for the year ending 31st March, 1889. Fcp. Allahabad, 1890.

GOVERNMENT OF THE N.-W. PROVINCES AND OUDH.

Catalogue of the Books in the Library of the Indian Museum, corrected to August, 1887. 8vo Calcutta, 1889.

INDIAN MUSEUM, CALCUTTA.

Memoria presentada al Congreso de la Union por el Secretario de Estado Y del despacho de Fomento, Colonizacion, Industria Y Commercio, de la Republica Mexicana, General Carlos Pacheco. Corresponde á los años Trascurridos de Enero de 1883 á Junio de 1885. Tome III—V, et atlas Tome VI. 4to. Mexico, 1887.

OBSERVATORIO METEOROLOGICO MAGNETICO CENTRAL, MEXICO.

Register of climatic variations from the months of July to December 1889, recorded at the St. Xavier's College Observatory. Sheet, Calcutta, 1890.

ST. XAVIER'S COLLEGE, CALCUTTA.

PERIODICALS PURCHASED.

Berlin. Deutsche Litteraturzeitung,—Jahrgang, X, Nrn. 49—51.

Calcutta. Indian Medical Gazette.—Vol. XXV, No. 1, and Index to Vol. XXIV.

Cassel. Botanisches Centralblatt.—Band XL, Heft 10—12.

Geneva. Archives des Sciences Physiques et Naturelles.—Tome XXIII, No. 1.

Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Göttingische Gelehrte Anzeigen. Nrn. 24—25, 1889.

———. ———. Nachrichten. Nr. 19, 1889.

Leipzig. Annalen der Physik und Chemie, Beiblätter. Band XIV, Stück. 1.

———. Literarisches Centralblatt.—Nrn. 50—52, 1889, und Nr. 1, 1890.

Leyden. Internationales Archiv-für Ethnographie,—Band II, Heft 5.

London. The Annals and Magazine of Natural History,—Vol. V, (6th Series), No. 25, January, 1890.

———. The Chemical News,—Vol. LXI, Nos. 1574—1576.

———. The Entomologist,--Vol. XXIII, No. 320, January, 1890.

———. The London, Edinburgh and Dublin Philosophical Magazine, —Vol. XXIX, No. 176, January, 1889.

———. The Nineteenth Century,—Vol. XXVII, No. 156, February, 1890.

———. The Quarterly Journal of Microscopical Science,—Vol. XXX, (New Series), Part 3, December, 1889.

———. The Society of Arts,—Journal, Vol. XXXVIII, Nos. 1940—1942.

New Haven. The American Journal of Science,—Vol. XXXVIII, (3rd Series), No. 228, December, 1887.

Paris. L' Académie des Sciences,—Comptes Rendus des Séances.—Tome CIX, Nos. 23—26, und Tables de Tome CVIII.

———. Revue Scientifique,—Tome XLV, Nos. 3—6.

———. Revue Critique d' Histoire et de Litterature,—Tome XXVIII, Nos. 49–51.

Books Purchased.

De Nice'ville Lionel. The Butterflies of India, Burmah and Ceylon. Vol. III. 8vo. Calcutta, 1890.

Oppert, Gustav, Ph. D. On the original inhabitants of Bharatavarṣa, or India. Part II. The Gaudians. 8vo. Madras, 1889.

Report on the Scientific results of the voyage of H. M. S. Challenger. Physics and Chemistry,—Vol. II. 4to. London, 1889.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd April 1890, at 9-15 P. M.

J. WOOD-MASON, ESQ., Vice-President, in the Chair.

The following members were present :

Bábú Gaurdás Bysack, E. C. Cotes, Esq., S. R. Elson, Esq., C. L. Griesbach, Esq., Bábú Rajanikánta Gupta, Dr. Hoernle, C. Little, Esq., Kumár Rameswár Maliáh, L. de Nicéville, Esq., Dr. D. Prain, Dr. P. K. Ray, Dr. J. R. Tull Walsh.

Visitor—W. Connan, Esq.

The Minutes of the last meeting were read and confirmed.

Forty-four 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 :

Philip Lake, Esq., B. A. (Cantab).
F. G. Hickson, Esq.
Dr. W. H. Solf.

The following gentlemen have expressed a wish to withdraw from the Society :

Rev. J. Muir Hamilton.
H. H. Anderson, Esq.

The Philological Secretary exhibited two Astrolabes purchased for the Society, and read the following note from Rájá Rájendralála Mitra forwarding the instruments:

"I send herewith two astrolabes which will interest you. They have been purchased by Professor Maheśachandra Nyáyaratna at Allahabad for us at a cost of Rs. 9 only. On referring to the Journal, Vols. X and XI, you will find that the large one is somewhat smaller than the Pottinger plate, but the details are closely similar. I imagine that it is defective, wanting the central pivot and the tubular plumb-line index which were necessary for determining the position of the stars and the use of the plate as an indicator of time. You know well that until very recently captains of native ships, who had no chronometers nor quadrants, depended entirely upon their astrolabes. By men familiar with the handling of the instruments latitudes, longitudes and the progression of the equinoxes were all pretty accurately determined by the use of the astrolabe, and the astronomical and astrological calculations for which it was employed were very various.

"The second instrument is a pocket edition of the first. It is not so elaborate, but much more handy. If you have any Maulvi in the Madrasah, who is familiar with Arabic astronomy, you can get from him a full description of the uses of these instruments. If you should remember the Kotah silver plate which we have in our library, you will find that it differs entirely from the instruments now under notice. Its details do not at all support the theory that the Hindus borrowed their astronomy from the Arabs."

Dr. Hoernle remarked that the larger astrolabe was an Indian one, made in Lahore. A similar astrolabe was described in the Journal, As. Soc. Beng. Vol. X, p. 759.*ff*, by J. Middleton. It was a Persian one, belonging to Major Pottinger, and was brought from Herat. It differed from the present one in size as well as the number of discs. The present astrolabe was about 5½ inches in diameter, and consisted of seven pieces, while Major Pottinger's was about 8 inches in diameter, and apparently consisted of only 5 pieces, with an index piece. The latter was wanting in the present one. As suggested by Rájá R. Mitra, he had given the astrolabes to one of the Madrasah Maulvís for examination by himself and others. But they had been unable to explain its use.

On the interior face of the main piece were engraved two sets of three concentric circles. The middlemost circle of each set was inscribed with the names of the best known towns of India, Persia, and Arabia; the outer and inner circles of each set gave the longitudes

and latitudes of each town. The series of names of the outer set commenced, where the handle was attached to the piece, with Mecca, Medinah, Ṭáif, Jadah, etc., and concluded with Laháwar, Dehlí, Agra, Benares. The series of the inner set contained only Indian names, commencing with Daulatábád, Aḥmadnagar, and ending with Sonárgám, Bangálah, Páuípath (*sic*). On the back of the main piece was inscribed the name of the maker of the astrolabe. The space occupied by this inscription was vacant on Major Pottinger's specimen; it is the small quadrant, shown in J. A. S. B., Vol. X, Plate I, inscribed simply with "*circles of Sumbat.*" The inscription on the present specimen is as follows:

عمل اقل العباد حامد ابن محمد مقیم ابن عیسے ابن الله داد اسطرلابي لاهورے
تحریر فے التاریخ ٤ شهر ذالحجه سنه ١٠٨٧

i. e., the work of the lowest of servants, Hámad, the son of Muḥammad Muqím, the son of 'Isá, the son of Allahdád, the astrolabist of Láhor, dated the 4th of Ẕi-l-Ḥijjah, in the year 1087 (= 1677 A. D.).

The handle of the main piece showed, as part of its trellis work, the name of Muḥammad Sa'íd (محمد سعید)

The following papers were read—

1. *Natural History notes from H. M.'s Indian Marine Survey Steamer "Investigator," Commander* R. F. Hoskyn, R. N., *Commanding*—*No.* 16. *The non-indigenous species of the Andaman Flora.—By* D. Prain.

(Abstract.)

This paper consisted of an enumeration of the palpably introduced species present in the Andaman Flora based on the information given in the Report on the Vegetation of the Andaman Islands by the late Mr. S. Kurz and on that obtained during a brief botanical visit to Port Blair in 1889.

The following method was adopted in presenting the list:

1. Cultivated species and weeds—enumerated together by Mr. Kurz—were dealt with separately.

2. Species (of both kinds) given by Mr. Kurz as present in 1866 (the date of his visit to the Andamans) were taken from an enumeration incorporated in his report—the synonymy being, however, made to conform with that of the Flora of British India.

3. Additional species (of both kinds) present in 1889 were species seen and collected in November of that year.

The list was therefore subdivided into—

1. Species under cultivation or obviously planted in 1866, 123 in all.

II. Species under cultivation, obviously planted, or intentionally introduced seen in 1889, not present in 1866, 42 in all, bringing the total of voluntarily introduced species up to 165.

[The species of these sub-lists consist of;—1,—such as probably never could become naturalised, (these were indicated in the lists as exotic by a distinctive mark); 2,—those that might be expected to hold their own in the struggle for existence if the settlement should happen to be abandoned; and 3,—those that are naturalised in the Andamans now. The second category cannot be limited from the first without individual differences of opinion arising as to its exact components; it is, however, of necessity that from which the third is being steadily recruited.]

III. Species unintentionally introduced prior to 1866, 60 in all; and

IV. Species unintentionally introduced between 1866 and 1889, 44 in all; making a total of involuntarily introduced species up to November 1889 of 104. But 5 of the species present in 1866 were not met with in November 1889, and 3 of those met with being cryptogams were omitted from the calculations which were confined to flowering plants only.

The results indicated by the 4 sub-lists were:—

1,—that, in 1866, 15 intentionally introduced plants and 60 weeds had actually or apparently become established in the Andamans and, though not indigenous plants, had become an integral portion of the Andaman flora.

2,—that, in 1889, 14 more of the plants intentionally introduced but only seen under cultivation in 1866 had become naturalised; that along with them 7 species intentionally introduced during the interval between 1866 and 1889 had begun to appear spontaneously; also that during the same period 41 more weeds (phanerogamic) had become introduced.

3,—that on the other hand one species that was appearing spontaneously in 1866 was only seen cultivated in 1889, and 5 weeds that were seen in 1866 were not met with in 1889. But too great weight was not laid on the latter fact, which might well be the result of the shortness of the 1889 visit (5 days only).

The remaining portion of the paper was occupied with an enquiry into the rate of naturalisation and the nature of the naturalised species;—the results may be briefly stated.

1. The total number both of naturalised and of unintentionally introduced species constantly increases.

2. The rate of naturalisation of intentionally introduced species

has hitherto been lower than that of introduction of unintentionally introduced species.

3. In both cases this rate has been lower for the period of 23 years between 1866 and 1889 than during the 11 seasons prior to 1866 during which a settlement had been in existence at Port Blair.

4. This lower rate for the second period is more apparent than real, and is due as regards naturalized species to the survival of some cultivated species (left to their fate when the early settlement that existed between 1789-92 was abandoned) at the time of the second settlement in 1858,* and as regards weeds to the fact that the greater number of common weeds were necessarily introduced with earliest sowings of grain.

5. That in both cases the rate has now probably become nearly *uniform*, but that whereas for naturalized species it is steady or uniformly *increasing*, for weeds it is probably uniformly *decreasing*.†

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

2. *The Buddhist Remains at Mount Uren in Mungir (Monghyr) district, and identification of the site with a celebrated hermitage of Buddha; illustrated with photographs, facsimile ink impressions of inscriptions, Buddha's footprint, and a map.*—By L. A. Waddell, M. B.

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 March last.

Transactions, Proceedings and Journals,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University,—American Chemical Journal, Vol. XI, Nos. 1—5.

———.———. American Journal of Mathematics, Vol. XI, Nos. 3 and 4.

* In the paper various considerations were advanced which went to shew that such survival must be far less extensive than on *a priori* grounds alone might be expected under the circumstances.

† Dr. King, Superintendent of the Royal Botanic Garden, is at present (April 1890) paying a brief official visit to the Andamans and has kindly undertaken to collect any weeds that may be in flower now which were not in flower in November; it is therefore hoped that before it passes through the press the numbers in this paper may be brought quite up to the date of publication.

Baltimore. Johns Hopkins University,—American Journal of Philology, Vol. IX, No. 4 and Vol. X, No. 1.

———. ———. Circulars, Vol. VIII, Nos. 69—73, Vol. IX, No. 78.

Bombay. Bombay Natural History Society,—Journal, Vol. IV, Nos. 3 and 4.

———. The Indian Antiquary, Vol. XVIII, No. 227 and Vol. XIX, No. 230.

Boston. American Philological Association,—Transactions, Vol. XIX.

Budapest. A Magyar Tudományos Akadémia,—E'rtekezések, Kötet XIV, Szám, 8—10.

———. ———. Ethnologische Mitteilungen aus Ungarn. Jahr I, Heft 3.

———. ———. Nyelvtudományi Közlémények, Kötet XXI, Füzet 1—2.

———. ———. Mathematische und Naturwissenschaftliche Berichte aus Ungarn,—Band VI.

———. ———. Ungarische Revue,—Heft VII—X, 1888, Heft I—III, 1889.

———. ———. L' Académie Nationale Hongroise des Sciences,—Bulletin, Tome XVIII, No. 1.

Calcutta. Geological Survey of India,—Records, Vol. XXIII, Part I.

———. Indian Engineering,—Vol. VII, Nos. 10—12.

———. Photographic Society of India,—Journal, Vol. III, No. 3.

Cassel. Des Vereines für Naturkunde zu Kassel,—Bericht XXXIV—XXXV.

Florence. La Società Africana d' Italia,—Bullettino, Tome V, Fascicolo 8°.

Hamburg. Naturwissenschaftlichen Verein in Hamburg,—Abhandlungen aus dem Gebiete der Naturwissenschaften, Band XI, Heft 1.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLIII, Heft 4.

London. Institution of Electrical Engineers,—Journal, Vol. XIX, No. 84, and Index to Vol. XVIII.

———. Nature,—Vol. XLI, Nos. 1059—1062.

———. The Academy,—Nos. 928—931.

———. The Athenæum,—Nos. 3251—3254.

Mendon, Illinois. The American Antiquarian and Oriental Journal,—Vol. XII, No. I.

Mexico. Estados Unidos Mexicanos,—Informes y Documentos Relativos á Comercio Interior y Exterior Agricultura, Minería é Industrias, No. 51, Setiembre, 1889.

Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, No. 3, 1889.

———. ———. Meteorologische Beobachtungen. Das Jahr 1889, Erste Hälfte.

Naples. La Società Africana D'Italia,—Bollettino, Anno VIII, Fasc. 11—12, Novembre—Decembre 1889.

New York. American Museum of Natural History,—Annual Reports, 1869, 1870, 1872, 1874-75, 1877—1888-89.

———. ———. Bulletin, Vol. I, Nos. 1—8, Vol. II, Nos. 1 and 2.

Paris. La Société de Géographie,—Compte Rendu des Séances de la Commission Centrale,—Nos. 3 ét 4, 1890.

Philadelphia. Academy of Natural Sciences of Philadelphia,—Proceedings, Parts 1 and 2, 1889.

———. The Journal of Comparative Medicine and Veterinary Archives, Vol. XI, No. 2.

Pisa. La Società Toscana di Scienze Naturali,—Memorie, Tome X.

——. ———. ———. Processi Verbali, 7 Luglio 1889, (Tome VI)—17 Novembre 1889, (Tome VII.)

Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Vol. XIX, No. 1.

San Francisco. California Academy of Sciences,—Memoirs, Vol. II, No. 2.

———. ———. Proceedings, Vol. I, Parts 1 and 2.

Sydney. Linnean Society of New South Wales,—Proceedings, Vol. IV, (2nd series,) Part 3.

Taiping. Government of Perak. The Perak Government Gazette,—Vol. III, Nos. 6—8.

Toronto. Canadian Institute,—Proceedings, 3rd series, Vol. VII, No. 1.

Trenton. Trenton Natural History Society,—Journal, Vol. II, No. 1, January, 1889.

Vienna. Der K. K. Geologischen Reichsanstalt,—Jahrbuch. Band XXXIX, Heft 1 und 2.

———. ———. Verhandlungen, No. 18, 1889, Nos. 1 and 2, 1890.

———. Österreichischen Touristen-Club,—Mittheilungen, der Section für Naturkunde. Jahr I, 1889.

Washington. United States Geological Survey,—Bulletin, Nos. 48—53.

Yokohama. Der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens in Tokio,—Mittheilungen, Heft 43, February 1890.

Miscellaneous Presentations.

Catalogue of the Persian, Turkish, Hindûstânî, and Pushtû Manuscripts in the Bodleian Library, Oxford. Part I. The Persian Manuscripts. By Hermann Ethé, Ph. D., Hon. M. A. 4to. Oxford, 1889.

Bodleian Library, Oxford.

North American Fauna, Nos. 1 and 2. 8vo. Washington, 1889.

Department of Agriculture, U. S., Washington.

Annual Report of the Department of Mines, New South Wales, for the year, 1888. Fcp. Sydney, 1889.

Department of Mines, N. S. Wales, Sydney.

Annual Report of the Geological Survey of Pennsylvania for 1887. 8vo. Harrisburg, 1889.

Catalogue of the Museum of the Geological Survey of Pennsylvania, Part III, O. O. O. 8vo. Harrisburg, 1889.

A Dictionary of the Fossils of Pennsylvania and Neighbouring States named in the Reports and Catalogues of the Geological Survey of Pennsylvania, Vol. I, A. to M. P4. 8vo. Harrisburg, 1889.

Geological Survey of Pennsylvania,—Atlas to Northern Anthracite Field, Parts III and IV, A. A.

——-——, Atlas to Reports H. H. and H. H. H., with pamphlet of revision and connection of the semi-bituminous coal section at Wellersburg in Somerset county, Pa. and notes on the Geology of Cambria and Somerset counties.

——-——, South Mountain Map, Sheets C 1, 2, 3, 4; D 2, 3, 4, 5. D 6.

Geological Survey of Pennsylvania.

History of the Coinage of the Territories of the East India Company in the Indian Peninsula: and Catalogue of the Coins in the Madras Museum. By Edgar Thurston. 8vo. Madras, 1890.

Notes on the Pearl and Chank Fisheries and Marine Fauna of the Gulf of Manaar. By Edgar Thurston. 8vo. Madras, 1890.

Government Central Museum, Madras.

Annual Administration Reports of the Forest Department (Southern and Northern Circles), Madras Presidency, for the official year 1888-89. Fcp. Madras, 1889.

Progress Report of the Archæological Survey of Southern India from October, 1889 to January, 1890. By Dr. E. Hultzsch. Fcp. Madras, 1890.

Government of Madras.

Hand-Book of Cyclonic Storms in the Bay of Bengal for the use of Sailors. By John Eliot, M. A. Fcp. Calcutta, 1890.

Report on the Meteorology of India in 1888. By John Eliot, M. A. Fcp. Calcutta, 1890.

GOVERNMENT OF INDIA, METEOR. DEPARTMENT.

Catalogue of Mysore Coins in the collection of the Government Museum, Bangalore. By Captain R. H. Campbell Tufnell, M. S. C , F. Z. S. 8vo. Madras, 1889.

GOVERNMENT MUSEUM, BANGALORE.

A Monograph of Oriental Cicadidæ. By W. L. Distant. Published by order of the Trustees of the Indian Museum. Part II. 4to. London, 1889.

INDIAN MUSEUM.

Johns Hopkins University Studies in Historical and Political Science, Seventh Series, II—III. The Establishment of Municipal Government in San Francisco. By Bernard Moses, Ph. D. 8vo. Baltimore, 1889.

——————. IV. Municipal History of New Orleans. By William W. Howe. 8vo. Baltimore, 1889.

——————. V—VI. English Culture in Virginia. By William P. Trent, M. A. 8vo. Baltimore, 1889.

——————. VII—IX. The River Towns of Connecticut: Wethersfield, Hartford, and Windsor. By Charles M. Andrews. 8vo. Baltimore, 1889.

Dissertations presented for the Degree of Doctor of Philosophy to the Board of University Studies of the Johns Hopkins University:—

The Copulative Conjunctions Que, Et, Atque, in the Inscriptions of the Republic, in Terence, and in Cato. By H. C. Elmer, Ph. D. 8vo. Baltimore, 1887.

A Contribution to the Archæan Geology of Missouri. By Erasmus Haworth, M. S. 8vo. Minneapolis, Minn, 1888.

Paranitro-Sulpho-Benzoic Acid and some of its derivatives. By J. H. Kastle. 8vo. Baltimore, 1888.

Researches on the stability of the Alkyl Bromides. By Felix Lengfeld. 8vo. Baltimore, 1888.

The Atomic Weight of Zinc as determined by the composition of the Oxide. By William M. Burton. 8vo. Baltimore, 1889.

Ortho-Sulpho-Benzoic Acid and some of its derivatives. By A. R. L. Dohme. 8vo. Baltimore, 1889.

On Phthalic Sulphinide and some of its derivatives. By Chas. W. Moulton. 8vo. Baltimore, 1889.

Line Congruences. By W. C. L. Gorton (Reprinted from American Journal of Mathematics, Vol. X, No. 4.) 4to.

Some Effects of Electrically stimulating Ganglion Cells. By C. F. Hodge, (Reprinted from American Journal of Psychology). 8vo. Baltimore, 1889.

Johns Hopkins University, Baltimore.

Memoria presentada Al Congreso de la Union por el Secretario de Estado y del despacho de Fomento, Colonizacion, Industria y Commercio, de la Republica Mexicana, General Carlos Pacheco. Corresponde á los años Trascurridos de Enero de 1883 á Juno de 1885. Tome I—II. 4to. Mexico, 1887.

Observatorio Meteorologico Magnetico Central, Mexico.

Twenty-fifth Annual Report of the Sanitary Commissioner with the Government of India, for 1888. Fcp. Calcutta, 1890.

Sanitary Commissioner to the Govt. of India.

A Grammar of the Arabic Language, translated from the German of Caspari, with numerous additions and corrections. By William Wright. 8vo. London, 1862.

A Grammar of the Persian Language, with a selection of easy extracts for reading; vocabulary and translations. Fourth edition. By Duncan Forbes, A. M. 8vo. London, 1869.

Records of the Gupta Dynasty. By Edward Thomas, F. R. S. Fcp. London, 1876.

A View of the History and Coinage of the Parthians, with descriptive catalogues and tables, and a set of engravings of coins. By John Lindsay. 4to. Cork, 1852.

V. A. Smith, Esq., C. S.

Scientific Memoirs by Medical Officers of the Army of India, Part V, 1890. 4to. Calcutta, 1890.

Surgeon General with the Govt. of India.

Transactions of the Wagner Free Institute of Science of Philadelphia, Vol. II. 8vo. Philadelphia, 1889.

Wagner Free Institute of Science, Philadelphia.

The English Sparrow (Passer Domesticus) in North America, especially in its relations to Agriculture. (U. S. Department of Agriculture, Division of Economic Ornithology and Mammalogy, Bulletin I). By Walter B. Barrows. 8vo. Washington, 1889.

J. M. Rusk, Esq.

Monographs of the United States Geological Survey of Washington, Vol. XIII, Geology of the Quicksilver deposits of the Pacific slope.

By George F. Becker. Vol. XIV, Fossil Fishes and Fossil Plants of the Triassic Rocks of New Jersey and the Connecticut Valley. By John S. Newberry. 4to. Washington, 1888.

UNITED STATES GEOLOGICAL SURVEY, WASHINGTON.

Transactions of the Astronomical Observatory of Yale University, Vol. I, Part II. 4to. New Haven, 1889.

YALE UNIVERSITY, NEW HAVEN.

PERIODICALS PURCHASED.

Calcutta. Indian Medical Gazette,—Vol. XXV, No. 2, February, 1890.
Geneva. Archives des Sciences Physiques et Naturelles,—Tome XXIII, No. 2.
Leeds. The Journal of Conchology,—Vol. VI, No. 4, October, 1889.
Leipzig. Annalen der Physik und Chemie,—Band XXXIX, Heft 2.
———. ———. Beiblätter, Band XIV, Stück 2.
London. The Chemical News,—Vol. LXI, Nos. 1577-1580.
———. The Nineteenth Century,—Vol. XXVII, No. 157, March, 1890.
———. The Society of Arts,—Journal, Vol. XXXVIII, Nos. 1943—1946.
Paris. Revue Scientifique,—Tome XLV, Nos. 7—9.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For May, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th May, 1890, at 9-15 P. M.

H. Beveridge, Esq., C. S., President, in the Chair.

The following members were present:—

Bábú Saratchandra Dás, Prince Jahán Qadr Muhammad Wáhid Alí, Báhadúr, W. H. Miles, Esq., Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., Dr. P. K. Ray, Pandit Haraprasád Shástri, Dr. J. H. Tull Walsh, Colonel J. Waterhouse, J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

Twenty-four presentations were announced, details of which are given in the Library List appended.

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

Robert P. Heilgers, Esq., proposed by C. L. Griesbach, Esq., seconded by J. Wood-Mason, Esq.

Bábú Man Mohan Chakravárti, M. A., B. L., Deputy Magistrate, Puri, proposed by Bábú Asutosh Mukhopádhyáy, seconded by C. Little, Esq.

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

Lieutenant Eaton W. Petley.
R. R. Bayne, Esq.

The Secretary reported the death of the following member—

Dr. N. K. Roy.

The President announced that the Council had sanctioned the following amounts of subscriptions due by members being written off, *viz.*, Dr. J. E. T. Aitchison, Rs. 42. A. C. Carlleyle, Esq., Rs. 78-6-6. Major H. H. Cole, Rs. 68-13-6.

The Philological Secretary read the following reports on finds of Treasure Trove coins.

I. Report on 24 old coins, forwarded by the Deputy Commissioner of Sháhpur, with his No. 134, dated 7th February 1890.

The coins are all of copper of various sizes and weights. They are stated to have been found near the village of Hadáli in the Sháhpur District.

Only three of the coins are recognizable, and even these are in bad preservation. The remainder are worn beyond recognition.

Of the three coins which can be determined, two are Indo-Scythian, of king Kanishka, with the well-known NANA and OKPO reverses; see *Ariana Antiqua*, Pl. XII, figs. 12, 17. The third appears to be a Kashmírí coin of Maḥmúd.

II. Report on 108 old coins, forwarded by the Deputy Commissioner of Sháhpur, with his No. 948, dated the 9th November 1889.

The coins are stated to have been found at Sodhi in the Salt Range.

They are all coins of precisely the same description as another set of 196 coins which were sent for examination some time ago, and have been reported on by me on the 25th Sept. 1889. The two sets were found at the same place, and appear to have belonged to the same treasure. They are small copper (mixed with silver) coins of ths Paṭhán Sulṭán of Delhi, Ghiyáṣu-d-dín, described in Thomas's *Chronicles of the Pathan Kings of Delhi*, p. 135, No. 113 (pl. II, fig. 43).

III. Report on 326 old coins, forwarded by the Subdivisional Officer, Rajmahal, Sonthal Parganahs, with his No. 741, dated 19th December 1889.

In the letter of the Secretary to the Govt. of Bengal, No. $\frac{3857}{225}$ Misc., dated 26th October 1889, and addressed to the Commissioner of the Bhágalpur Division and Santhal Parganahs, with reference to this treasure, it is stated, that the coins were found in September 1889 on the banks of the river Ganges at Begamganj in the Rajmahal Subdivision of the Santhal Parganahs. Together with them were found 49

other coins which were considered to be new and of British mintage, and which accordingly were returned to the finder. But the 326 pieces, now under report, being considered to be old and not of British mintage, were confiscated to Government, and forwarded to the Asiatic Society for examination.

On examination, however, it was found, that these 326 coins, though apparantly of an older description, are nevertheless coins of British mintage. They all belong to the species of the old standard sikká Rupees which were struck by the East India Company in the Calcutta Mint, in the name of Sháh 'Álam, under the regulations in force from 1793-1818. They are distinguished by the oblique milling of their edges, and by showing on the reverse the 19th year of Sháh 'Álam. They have been fully described by Prinsep in his *Useful Tables*, and by Mr. Thurston, Superintendent of the Central Museum, Madras, in his *History of the Coinage* of the *Territories of the East India Company in the Indian Peninsula*, pp. 38-44, where see Plate II.

IV. Report on 100 old silver coins, forwarded by the Deputy Commissioner of Buldana, with his No. 849, dated 28th March 1890.

The Deputy Commissioner states in his No. 2038, dated 23rd July 1889, that a copper vessel containing 560 specimens of a kind of native silver coin was found buried in the earth at Amrápúr, a village in the Buldana District. The coins were estimated to be worth about Rs. 150. One hundred specimens were forwarded to me.

These coins belong to the class commonly designated "Indo-Sassanian." Among the natives they are said to be known as *Gadhiá ká paisá*. They show the crude forms, on the obverse, of a head, and on the reverse, of a fire altar, both imitated from the proper Sassanian coins. Their exact attribution is not yet known. It is probable, however, that they formed a local currency in Western India, after the downfall of the Gupta empire, *i. e.*, after the 6th century A. D. Coins of this description have been found at various times and in more or less large quantities.

V. Report on a gold coin and two gold ringlets, forwarded by the Offg. Collector of Murshidábád, with his No. 2128 G, dated 25th March 1890.

The Offg. Collector states in his No. 1442 G, dated the 19th November 1889, that a little girl, while picking up snails on the side of a public road, found nine gold coins and two gold ringlets. Probably they had been washed out of the soil by the rains, or exposed by other physical causes. Only one of the nine coins could be recovered, the

others having been already melted down, by the time the find became known to the police. This coin and the ringlets have been acquired for Government by the Collector, under sec. 16 of Act VI of 1878, under the Board's sanction No. 68 A of 8th February last; and have been forwarded to me for safe custody.

With reference to the coin and ringlets I may repeat what I wrote to the Collector on the 11th December last. The coin is a barbarous imitation of the coinage of the Indo-Scythian king Vasu Deva; it is cast in a mould, not struck from a die; it is also of short weight (113 grains instead of 120 and upwards). It may not have been intended for a coin, but for an ornament. There can be no question, however, of its being of ancient manufacture. One of the ringlets is of a pattern which is unknown at the present day. (Both coin and ringlets are now deposited in the Indian Museum in Calcutta.)

VI. Report on 40 old silver coins, forwarded by the Offg. Collector of the 24-Perganahs, with his No. 3475 G, dated the 26th March 1890.

The coins are stated to have been found buried in the compound of a house in Rajkolah in Thannah Deyganga, Subdivision Baraset. They are said to weigh 37 tolahs and 9 annas, and to be worth Rs. 32/14.

On examination, I found that they are coins of some of the independent Sulṭáns of Bengal. They are, as usual with coins of this class, disfigured and cut with "shroff-marks," a circumstance which makes their identification sometimes a matter of difficulty. In the present case, the coins belong to the following Sulṭáns :—

No. of specimens.

1, XIVth Sulṭán, Shamsu-d-dín Yúsuf Sháh, son of Bárbak Sháh, 879—886 A. H. = 1474—1481 A. D. There is only one specimen of his coin, as described and figured in Marsden's *Numismata Orientalia*, No. DCCLXXVI; and Journal, Asiat. Soc. Beng., Vol. XV, plate V, No. 14. It is dated [8]83 1

2, XVIIIth Sulṭán, Saifu-d-dín Fírúz Sháh II, 892—895 A. H. =1487—1490 A. D. Only one specimen, as described and figured in J. A. S. Bengal, Vol. XLII, p. 288. It is dated 892, which shows that the Sulṭán's reign must have commenced as early as that year 1

3, XXIst Sulṭán, 'Aláu-d-dín Ḥusain Sháh, 899—927 A. H. =1494—1521 A. D. Of his coinage there are 38 specimens belonging to several varieties; *viz.*,

a. A common variety, described and figured in Marsden's

Numismata Orientalia, No. DCCXCIII. Of this variety there are nine of the date 899 and mint Fatḥábád; fourteen of the date 914 and mint Ḥusainábád; and four of the date 912, mint illegible, total 27

b. A rare variety, described and figured in Marsden's *Num. Orient.*, No. DCCLXXIX; of this there are three specimens, two of date 899, mint Fatḥábád; and one of khazánah 72 (?) 3

c. A rare variety, described and figured in Journal As. Soc. Beng., Vol. XLII, p. 292, plate IX, fig. 9. There are three specimens of this variety, but neither date nor mint legible on any.. 3

d. A new variety, not published. There are two specimens, which read as follows: 2

Obv.	*Rev.*
السلطان العادل	ابن سيد اشرف
علا و الدنيا و الدين	الحسيني خلد الله
ابوالمظفر حسين	ملكه و سلطانه
شاه السلطان	حسيناباد ٨٩٩

e. A new variety, not published. There are two specimens, which read as follows: 2

Obv.	*Rev.*
السلطان العادل	شاه سلطان بن
علا و الدنيا و الدين	حسين الحسيني
ابو المظفر	سيد اشرف ٩٠٤

f. A new variety, not published. There is only one specimen, which reads as follows:

Obv.	*Rev.*
السلطان	لا اله الا الله
العادل الغازي	محمد رسول الله
....	خزانه ٨٩٩
علا و الدنيا و الدين	
ابوالمظفر حسين شاه	
سلطان خلد الله	
ملكه و سلطانه	

The second line is doubtful and the third is illegible ... 1

Total ... 40

The following papers were read :—

1. *Natural History Notes from H. M.'s Indian Marine Survey Steamer "Investigator," Commander* Hoskyn, R. N. *commanding.—No.* 17. *A List of Diamond Island Plants.—By* D. Prain.

(Abstract.)

This paper consisted of an introductory sketch of the vegetation of Diamond Island, off the coast of Arracan, followed by a list of 95 plants collected during a brief visit paid by the writer to the island in November 1889. After the list a tabular view of the distribution of the species was presented, the distribution within Transgangetic India being subdivided as follows :—(*a*) Arracan, Chittagong, Assam ; (*b*) Pegu, Tenasserim, Malay Peninsula ; (*c*) Andamans, Nicobars, Sumatra and Java. This subdivision was found necessary in order to explain the peculiar features of the flora of the island which, owing to the situation, represents very well the area where these three lines of distribution meet and their species intermix. An analytic study of these tables in order to estimate numerically the comparative amounts of the influences of these three adjacent areas concluded the paper. The method adopted consisted in giving the number of species in each of the possible distributional arrangements within these areas, and using these in succession as numerators ; as denominator in each case the number of areas involved was employed ; the addition of the resultant fractions affecting one area yielded a number that appeared to the writer to be indicative of the proportional influence of each area in the composition of the flora of the island. The following results were stated ; the total number of coast species being 20, of inland species being 38.

General.					
1.	Andamans—Nicobar	Influence	$27\frac{5}{6}$,	or	29·29 %.
2.	Pegu—Malayan	ditto	$34\frac{1}{3}$,	or	36·14 %.
3.	Assam—Arracan	ditto	$32\frac{5}{6}$,	or	34·57 %.
			95		100
Inland species.					
1.	Andaman—Nicobar	Inflnence	$9\frac{1}{3}$,	or	24·56 %.
2.	Pegu—Malayan	ditto	$14\frac{5}{6}$,	or	39·03 %.
3.	Assam—Arracan	ditto	$13\frac{5}{6}$,	or	66·41 %.
			38		100
Coast species.					
1.	Andaman—Nicobar	Influence	$7\frac{2}{3}$	or	38·34 %.
2.	Pegu—Malayan	ditto	$6\frac{1}{6}$	or	30·83 %.
3.	Assam—Arracan	ditto	$6\frac{1}{6}$	or	30·83 %.
			20		100·0

2. *Noviciæ Indicæ II. An additional species of* Ellipanthus.—*By* D. Prain. (With a plate.)

3. *Rust and Mildew in India.*—*By* A. Barclay, M. B., *Bengal Medical Service.*

These papers will be published in the Journal, Part II.

4. *Description of a new Psyllid.*—*By* M. Lethierry. *Communicated by* E. T. Atkinson, Esq.

In December last, Mr. R. C. Wroughton sent a Psyllid that was found to be attended by ants of the genus *Camponotus* (probably *C. sylvaticus,* Olivier). He wrote that he found a tree simply covered with these insects. "They were all along the midribs of the leaves (beneath), and all over the young twigs, and the ants were also swarming over the tree. The eggs of the insect were fixed in clusters on each side of the midrib, and were of a bright yellow." M. Lethierry has kindly identified the insect as a new species of *Diaphorina.*—E. T. A.

Diaphorina guttulata, Lethierry.

Caput et thorax lutea ; vertex lutens, duabus maculis rotundatis fuscis ; sternum et dorsum rubescentia, dorsulum et mesonotum maculis longitudinalibus fuscis ; abdomen flavescens, suprâ fasciis nigro-fuscis, segmento genitali sæpissime fusco : coni frontales subglobosi, 2/3 longitudinis verticis æquantes : antennæ latitudine verticis vix longiores, flavescentes, articulis basalibus fuscis, duobus terminalibus nigris : elytra $2\frac{1}{2}$ tam longa quam lata, opaca, nigra, venis nigris, maculis numerosis albis conspersa, margine postico cellularum sex apicalium usque ad apicem clavi albo unimaculato : femora fusca, tibiis et tarsis flavis vel albidis, harum ultimo articulo nigro.—Long corporis 2 millim. cum elytris 3 millim. ♂ ♀

Variat : elytris albis, subhyalinis, maculis numerosis opacis nigris, venis nigris.

D. Putoni, Löw et *propinquæ,* Löw similis, major, elytris obscurioribus, venis nigris distincta.

Hab. Poona, Bombay.

5. *On some Definite Integrals.*—*By* Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

1. If two concentric ellipses of equal size and shape intersect each other, their common chords intersect orthogonally at the common centre and bisect the angles between the major axes of the ellipses.

2. The area of the curvilinear quadrilateral common to the two ellipses is

$$2ab \tan^{-1}\left\{\frac{2ab}{a^2-b^2}\ \frac{1}{\sin\theta}\right\}$$

where a, b are the semi-axes and θ the angle between the major axes of the ellipses.

3. Noting that when $z = 1$

$$\log z \log \frac{1-z}{1+z} = 0,$$

it is shewn that

$$\int_0^{\frac{\pi}{2}} \tan^{-1} \left\{ \frac{2z}{1-z^2} \frac{1}{\sin \theta} \right\} d\theta$$

$$= \log z \log \frac{1-z}{1+z} + 2 \left\{ z + \frac{z^3}{3^2} + \frac{z^5}{5^2} + \ldots\ldots \right\}.$$

4. The average value of the curvilinear area common to the two curves is

$$\frac{4ab}{\pi} . u$$

where

$$u = \log \frac{b}{a} \log \frac{a-b}{a+b} + 2 \sum_{n=\infty}^{n=1} \frac{1}{(2n-1)^2} \left(\frac{b}{a}\right)^{2n-1}.$$

5. Remembering that

$$\int_0^{\pi} \tan^{-1} \frac{a \sin \theta}{1 + a \cos \theta} d\theta$$

$$= 2 \left\{ a + \frac{a^2}{3^2} + \frac{a^5}{5^2} + \ldots\ldots \right\},$$

it is shewn from (3) that if

$$P = a^2 (1 - a^2) \cos 2\theta + 2a (1 + a^2) \cos \theta + a^2 (a^2 + 3)$$
$$Q = a^2 (1 - a^2) \cos 2\theta + 2a (1 + a^2) \cos \theta + (1 + 3a^2)$$

we have

$$\int_0^{\pi} \tan^{-1} \left\{ \frac{P}{Q} \cot \theta \right\} d\theta = 2 \log a \log \frac{1-a}{1+a}.$$

The connection of the above integrals with Schaeffer's integral

$$\lambda (x) = - \int_0^x \frac{1}{a} \log (1 - a) \, da$$

is pointed out. (See *Crelle*, t. XXX, 277—295).

Pandit Haraprasád Shástri read a short account of an old gun recently dug up at False Point.

On the completion of the light house at False Point, about 1838, three guns seem to have been removed from the Old Fort at Cuttack and buried in the ground there for the purpose of setting up the rigging

of the Flagstaff. Two of these guns are reported to have no inscription on them, and are still at False Point. The third, which contains an inscription, has been removed to Calcutta and placed in Captain Petley's compound in Hastings, where every care is taken that the inscription is not injured. I examined the gun and the inscription towards the end of April. The gun is made in the old fashioned method of welding together a number of large iron rings three inches thick with an opening in the middle with a diameter of three inches. It is in fact a unique piece of Artillery.

The inscription is written in a character intermediate between modern Bengali and the old Kutila. Some letters are quite Bengali, but others retain their Kutila form. For instance J is written জ, D is written দ, but I is written ই and not ই. The inscription is let into the breech of the gun in brass letters. In many places these brass letters have altogether disappeared, leaving the indentures in the iron; in other parts of the inscription the indentures could not be distinguished from the surface of the gun, owing to large corrosions caused by neglect and exposure in the open air. As far as it can be made out it runs thus:—

শ্রীশ্রীসর্গদেব জয়ধ্বজসিংহ মহারাজেন যব। ১।

নং + + + বাকসদ্যা ইদং যন্ত্রং প্রাপ্তং সকে—২৮০.

Maharájá Jayadhvaja who is in heaven obtained this machine * * * a yavana in the year + 280. [বাকসদ্যা with three letters lost before it, cannot be translated.] So, a Hindu chief obtained this gun from some European. The machine was new at the time as it had not got a specific name, and it was thought so strange that an inscription was placed upon it, and it was exhibited to the people. Who the Maháráj́á was it is difficult to tell. He must have belonged to the large number of petty chiefs of Bengal who, after the Muhammadan conquest of this country, founded small States on the borders of Bengal and Orissa and became tributary to the latter.

I have translated সর্গদেব as 'the king who is in heaven.' It may be a patronymic of the family of chiefs.

But the most important part of the inscription is the date. It is said to be in the śaka year 280 with some letters lost before 2. If the first figure of the number is 1, it is 1280 S'aka; adding 78 we get 1358, twelve years after the battle of Cressy in which guns were first used in Europe. It seems impossible that guns should travel so far in such a short period of time. It has been suggested that the 0 at the end is so small that it may not be taken into account at all, and the worn out socket hole before 2 may also represent 9. We would in that case come to 928 Saka which in many backward places is used for any era. Taking this to be the ordinary Hijri era, as the Bengali year was not known then, we get

928 + 622 = 1550 minus a few years for the lunar calculation of the Muhammadans. Thus the year comes to about 1525 A. D. when the Portuguese were anxious to make a settlement in Orissa and in Bengal. A petty chief might have been gained over to grant them land or privileges of trading by presents not known in the country.

LIBRARY.

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

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JUNE 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday that 4th June 1890, at 9-15 P. M.

H. BEVERIDGE, ESQ., C. S., President, in the chair.

The following members were present :

Dr. J. R. Adie, Dr. A. W. Alcock, Bábu Gaurdás Bysack, Bábu Saratchandra Dás, C. L. Griesbach, Esq., Dr. Hoernle, Dr. W. King, Rev. Father E. Lafont, T. H. D. La Touche, Esq., W. A. Lee, Esq., Bábu Asutosh Mukhopádhyáy, T. R. Munro, Esq., Major J. H. Sadler, Dr. J. H. Tull Walsh, Colonel J. Waterhouse.

Visitors, Colonel P. Fitz G. Gallwey, R. A. H. Haward, Esq.

The minutes of the last meeting were read and confirmed.

Nineteen 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 balloted for and elected Ordinary Members.

Robert P. Heilgers, Esq.
Bábu Man Mohan Chakravartí, B. A., B. L.

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

T. W. Arnold, Esq., M. A. O. College, Aligarh, proposed by E. J. Kitts, Esq., seconded by C. Little, Esq.

W. C. Bonnerjee, Esq., (for re-election) Barrister at Law, proposed by Bábu Gaurdás Bysack, seconded by C. Little, Esq.

Bábu T. N. Mukharji, Assistant Curator, Economic Section, Indian Museum, proposed by Col. J. Waterhouse, seconded by C. Little, Esq.

P. Donaldson, Esq. (for re-election), proposed by Col. J. Waterhouse, seconded by C. Little, Esq.

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

Colonel A. C. Toker.
J. W. Parry, Esq., C. E.

The Secretary reported the death of the following member:

A. Grant, Esq., (Life Member).

The President announced that a proposal had been made by the Calcutta Photographic Society to rent two rooms on the ground floor of the building for Rs. 60 a month, and that the Council had decided in favour of the arrangement. The details had not been settled yet, but it had been decided that the rooms should be let. They were not wanted by the Asiatic Society, and by letting them a desirable increase would be made to our monthly income. At present we had no fund for the repairs of the building, and the Rs. 60 a month would be useful for this purpose.

Colonel Waterhouse exhibited a photograph of a flash of lightning taken on the evening of the 18th May by Mr. H. Haward, Head Assistant in the Photographic Office, Survey of India. He said—the principal interest attaching to the picture is the remarkable closeness of the flash which Mr. Haward says was within 25 yards of him, and is clearly seen to the left of the picture running between the camera and a house about forty yards away. Another peculiarity in the flash is the succession of bright points at intervals indicative of more intense electrical action at those points. The brighter flashes to the right were taken first and then the near flash took place, but the whole exposure was not more than two seconds.

Colonel Waterhouse also exhibited a bottle of solution of silicate of soda from which the silica had separated out in agate-like layers at the lower part of the bottle. He said—I do not know exactly how long I have had this bottle, but most probably since 1881 and possibly earlier. It was lying for many years in a corner of a glass cupboard in No. 1, Wood Street, near a west window, where it would be exposed to light on one side during the time the office was open daily;

but whether light has had anything to do with the decomposition of the solution and the formation of the deposit, it is impossible to say, and it is uncertain even whether the side of the bottle which shows the formation was continuously exposed to light.

Towards the end of 1883 a fire took place in the room in which this bottle was kept, and it and other chemicals in the same place were exposed to a very great heat in a closed-up room. I did not at the time notice any change in the silicate solution—nor do I recollect when I first did notice the formation, but it was at least some three or four years ago : the deposit was then well formed, and no particular change has been noticeable since, except that the upper part of the solution, which then was clear, is now clouded and beginning to solidify. The bottle appears never to have been opened since it came, but it is now cracked in the upper part and air might have access to the contents. The bottle may have cracked from the heat at the time of the fire.

I am indebted to Dr. W. King and Mr. Lake of the Geological Survey for kindly helping me in looking up the literature of the subject, and from a memo. by the latter, it appears that solutions of alkaline silicates are prone to deposit silica in a gelatinous form by keeping. In one somewhat similar case of deposit in a bottle, the deposit contained 97·6 $Si\ O_2$ and 2·4 $Na\ O_2$ in 100.

The causes that bring about this deposition are :—

(1.) Cooling of the solution.

(2.) Evaporation.

(3) Access of air containing CO_2.

(4.) Contact with certain silicates (*e. g.*, glass) in which the acid is not saturated and which therefore tend to remove alkali from the solution (?).

(5.) Silica is also precipitated by almost all acids and many salts.

Except in the case of the fire the solution has been exposed to no extremes of temperature, beyond the ordinary seasonal changes between 60° and 94° ; so that cause (1) could not have had any very great effect in producing the change except at the time of the fire.

The bottle having been closed there has been no sensible evaporation, nor except by the crack could air with CO_2 have had access to the solution and then only in very small quantities. No acids or other reagents have been added—so that the only remaining possible cause of the deposition of silica is the decomposition of the glass of the bottle itself, and this seems most probable.

Herr O. Maschke, who has particularly studied the separation of crystallised silica from watery solutions (see *Pog. Annalen*, cxlv), does not appear to have noted upon depositions by lapse of time, as in the

present case—but he says that by strongly heating a solution of sodium silicate in glass tubes the glass is attacked layer by layer and silica is dissolved, forming a more acid sodium silicate. This compound is changed again by cooling into a more basic silicate by the deposition of silica in the form of nodules. The glass by losing silica is converted, layer by layer, into a more basic silicate, which by taking up water is ultimately transformed into a stratified zeolitic substance.

At about 180° and above, free silica separates from alkaline solutions in the form of quartz; below 180° in that of tridymite; at still lower temperatures as crystallised, and finally as amorphous hydrate of silica.

From this it would seem most probable that the fire may have been the original cause of the stratified deposit—but the origin of the curious pentagonal nucleus, clear in the centre and almost opaque white around within the first layer, with the broken strata and generally circular formation above is not apparent, unless it may possibly have been due to a small fragment of glass falling from the crack above into the solution. Nor is it clear why the deposit should be almost entirely on one side of the bottle—unless that side was exposed to greater heat from the fire or to the light falling on it for years. I am very sorry that I have no more positive data to give towards finding out the actual causes that have been at work in this instance—however, I thought it might be of interest to record it in the hope that other members better acquainted with the subject, might be able to throw some light upon them.

The Philological Secretary read the following reports on finds of Treasure Trove Coins:

I. Report on 25 old coins forwarded by the Deputy Commissioner of Rawal Pindi, with his No. 613, G, dated 7th March 1888.

The coins are stated to have been found by a man, while grazing sheep and goats, buried in the village common land, in an earthen vessel near the hamlet Hashu of village Dhangdeo, Tahṣíl Gujar Khán, in the Rawal Pindi District.

They are later Indo-Scythian coins of the *Kida* class, the issue probably of some chief of a Hunnic tribe, invading India. Many different varieties of this class of coins have been found, at various times, in different localities; but a hoard of 62 coins of the very same variety as the present one, was found in the same year (1888) in the Bijnaur District, N.-W. Prov., a report on which is printed in the "*Proceedings*" of this Society for November 1888. The obverse shows the legends *kida*, *kasha* and *kshaṇaṃ*, and the reverse has *sala*. Most of the specimens of the present find are in indifferent condition. They are a mixture of gold and silver.

II. Report on four old coins forwarded by the Secretary to Government N.-W. Prov. and Oudh, Financial Department, with his No. $\frac{3610}{\times \cdot 25}$ dated the 18th June 1889.

The coins are stated to have been found in the village of Mahlotah Pargáná Sandí, in the Hardoi district.

They are of gold and silver mixed, and belong to the class of later Indo-Scythian coins of the "Kida" type, and are probably an issue of one of the Hunnic leaders who invaded India in the 5th and 6th centuries A. D. Numerous varieties of these *kida* coins have been found at different times and at different places. Some of them are described in the *Indian Antiquary*, Vol. XII, p. 6; and in Prinsep's *Indian Antiquities*, Vol. I. A specimen of the particular variety to which these four coins belong, is figured on plate XXX, fig. 19, and described on p. 376. The figurement of it, however, is not good. Unfortunately none of the present four specimens are sufficiently good to allow of their legends being fully read. The obverse shows, as usual, the standing figure of the king, with *kida* under his left arm; under his right arm can be read बर्द्ध *bardhana* or perhaps वर्द्ध *vardhana*, as on the coin in the *Indian Antiquities.* The reverse shows, as usual, the crude form of a seated goddess; along the right-hand margin, to be read from within, is a legend of five *aksharas*, the first two of which are distinctly श्रीकृ *S'rí-Kṛi;* the last is probably *ya* or a compound of *ya* (*sya ?*); the two medial ones are mutilated beyond recognition. The legend is rather better preserved on the coin figured in the *Indian Antiquities*, and has there been read as *Kṛigodháya*, though *Kṛigodhíya* would probably be more correct. The traces on the present coins do not go against this reading; but it rests on too unsatisfactory materials to be accepted. So much, however, seems clear that the legend gave the name of some prince *S'rí-Kṛi*[*godhíya*] *Vardhana.*

It was hoped, that more specimens of these coins may have been found. That, however, as appears from the letter of the Secretary to Government, No. $\frac{4143}{\times \cdot 25}$, dated 10th July 1889, is not the case.

III. Report on 33 old coins, forwarded by the Deputy Commissioner of Gurdáspur, with his No. 727 of the 31st March 1890.

The Deputy Commissioner states that 25 of these coins were found in May 1888 in Sojanpur Tahṣíl, Paṭhankoṭ, buried in a piece of cloth; and that the other coins were found in Ratawal, in May 1889, buried in a brass pot.

The coins are all rupees of Moghul mintage, except four which are of Sikh mintage, and one which is of Persian mintage.

Those of Moghul mintage belong to the following Sultáns of Delhi:

I, AURANGZÍB, A. H. 1068-1118 = A. D. 1658-1707; of the ordinary type; dates 1094, 1095 and 1112; mint of one *Nárnol,* of two others illegible. 3

II, FARRUKH SIYAR, A. H. 1124-1131 = A. D. 1712-1719, type: *Farrukh* in top line; date illegible; mint *Dáru-l-Khiláfat Sháh Jahánábád.* 1

III, MUHAMMAD SHÁH, A. H. 1131-1161 = A. D. 1719-1748,

1, type: *Sáhib Qirán;* date incomplete on all; mint of all *Dáru-l-Khiláfat Sháh Jahánábád;* 7

2, type: *Bádsháh Ghází;* dates 1132, 1156, on others incomplete; mint on five *Dáru-s-Saltanat Láhor*, on one *Murshidábád*, on one *Akbarábád;* 7

IV, AHMAD SHÁH BAHÁDUR, A. H. 1161-1167 = A. D. 1748-1754, type: *Bahádur* at top of first line; dates 1161, 1165, 1164, two illegible; mint of three *Dáru-s-Saltanat Láhor*, of one *Muhammadábád-Banares*, of one *Etáwá.* 5

V, 'ÁLAMGÍR ZÁNÍ, A. H. 1167-1173 = A. D. 1754-1759; ordinary type; date incomplete; mint *Dáru-s-Saltanat Láhor.* 1

VI, SHÁH 'ÁLAM, A. H. 1173-1221 = A. D. 1759-1806.

1, type, ordinary: date 1196, others illegible; mint of one *Láhor* (?), of another *Saharanpur.* 3

2, type, new: date [111]9, mint Tattah; the verse on its obv. runs as follows:

سکہ مبارک بر هفت کشور زد بر مہر و ماہ

شاہ جہان ثاني سلطان معظم بادشاہ, 1

The coins of Sikh mintage belong to the following Mahárájas:

I, MAHÁ SINGH, father of Ranjit Singh, or of his time; date 1839 Saṃvat = 1783 A. D. Mint *Srí Amritsar.* Like No. 4 in Mr. Rodgers' paper on the Sikh coins in Journal A. S. B., Vol. L, p. 81, (Pl. V, 4): but the reverse reads only

سري امبرتسر

ضرب

سنہ ۱۸۳۹ 1

II, RANJÍT SINGH, 1792-1839 A. D. Type: marked with a leaf on reverse, as published by Mr. Rodgers, *ibid.*, pp. 85, 86 (Plate V, 17); dates 1861, 1872, 1874 Saṃvat (= A. D. 1805, 1816, 1818); mint *Srí Amritsar.* 3

One coin of Persian mintage belongs to Nádir Sháh, and was struck by him after his invasion and conquest of India in 1151 A. H (1738 A. D.). It bears date 1160, and mint Pasháwer. Similar coins have been published by Mr. Rodgers in the *Numismatic Chronicle*, IIId Series, Vol. II, p. 325. 1

Total 33

IV. Report on 1004 old copper coins, forwarded by the Deputy Commissioner of Jalandhar, with his No. 592, dated 7th March 1889, No. 681, dated 21st May 1889, No. 1225 dated 14th October 1889, and No. 181, dated 5th February 1890.

These coins are stated to have been found in a field about 30 or 40 yards to the east of the old and ruined "pacca" fort (*koṭ* 1) of Muḥammad Amín, in the course of levelling it for cultivation. Originally one coin was found by the diggers, which led to a police investigation, with the result that 8,950 coins were discovered in a loose condition.

On examination, all the coins proved to belong to the three first members of the Imperial Súrí family, Sher Sháh, Islám Sháh, and Muḥammad 'Ádil Sháh, whose reign extended over a period of about 16 years, from 1540 to 1556 A. D. All the coins belong to the species of copper coins called *dám*, which are equal in weight to about 3 modern paisás. They were found to be of a very large number of types and varieties, as set out below:—

A, Sher Sháh, A. H. 947-952 = A. D. 1540-1545.

Type I, square areas with marginal sections on both obverse and reverse :

Variety 1, area inscriptions, as on Nos. 356, 357 in Thomas' *Chronicles of the Pathán Kings of Delhi.*

Sub-variety a, date on obverse area (No. 356) :

Mint Gwáliyar, of 2 variations,	...	94	
Agrá, of do	...	51	
Alwar	...	44	
Shírgaṛh ...	...	60	
Sambhal ...	...	19	
Total	...		268

Sub-variety b, date on obverse margin (No. 357),

Mint Nárnol, of 2 variations,	...	128	
Hisár, of do.	...	75	
Kálpí, of do.	...	20	
Malot	...	16	
Shírgaṛh ...	...	3	
Total	...		242

Variety 2, obverse legend as on Variety 1, but reverse legend has خلد الله instead of the mint name; date on obverse margin 17

Variety 3, obverse legend as on Variety 1; but reverse legends has ابوالمظفر instead of the mint name; date on obverse area 3

Variety 4, legend on obverse and reverse different from Variety 1-3 3

Variety 5, very crude; apparently a forgery ... 1

Total of Type I, ... 534

Type II, lettered surfaces on obverse and reverse.

Variety 1, legends exactly as on No. 355 in Thomas' *Chronicles.* Four varieties, differing only in the arrangement of the words of the reverse legend; all have the date on the obverse:

Sub-variety a, with 2 variations, ... 68
Sub-variety b, ... 48
Sub-variety c, ... 10
Sub-variety d, ... 6

Total ... 132

Variety 2, in every respect like variety 1, except that the reverse legend has *as-Sulṭán*, instead of *Sulṭán.* Four varieties, differing only in the arrangement of the reverse legend. All have the date on the obverse:

Sub-variety a, ... 39
Sub-variety b, ... 1
Sub-variety c, ... 2
Sub-variety d, ... 3

Total ... 45

Variety 3, with *Farídu-d-dín* in the reverse legend; dotted margin. Three sub-varieties, all with date and mint on obverse:

Sub-variety a, ... 7
Sub-variety b, ... 10
Sub-variety c, ... 2

Total ... 19

Variety 4, with *Sulṭán al 'Ádil,* mint *Dáru-ẓ-ẓarb Qil'ah Shírgaṛh,* no date 6
Variety 5, with *as-Sulṭán Abul Muẓaffar,* and mint and date 2

Total of type II: 204

Grand total of Sher Sháh's coins ... 738

B, Islám Sháh, A. H. 952-960 = A. D. 1545-1552.

Type I, square areas, with marginal sections, both, on obverse and reverse 6

Type II, lettered surfaces on obverse and reverse; legends exactly as on No. 363 in Thomas' *Chronicles.* Nine varieties, only differing in the arrangement of the words of the reverse legend. All have the date on the obverse.

Variety 1, with 2 sub-varieties, ...	108
Variety 2, with do.	57
Variety 3, ...	15
Variety 4, ...	27
Variety 5, ...	5
Variety 6, ...	4
Variety 7, ...	1
Variety 8, ...	2
Variety 9, ...	3

Total ... 222

Type III, lettered surfaces, but with different legends, ... 1

Type IV, lettered surfaces, but with different legends, and crude execution; with undetermined mint. ... 5

Total of Islám Sháh's ... 234

C, Muḥammad 'Ádil Sháh, A. H. 960-964 = A. D. 1552-1556.

Type: lettered surfaces, with legends exactly as on No. 366, in Thomas' *Chronicles* 32

Grand total of all coins ...1004

V. Report on 6 so-called "double Rupees," forwarded by the Collector of Patna with his No. 2658 R, dated the 18th January 1889.

The Collector states in his No. 2034 R, of the 8th November 1887, addressed to the Commissioner of Patna, that on the 23rd June 1887, a treasure consisting of "6 double sikka and 39 kalledar sikka" old

silver coins, were found in the sudder sub-division while breaking the walls of the houses acquired for railway purposes at Digha.

Of this treasure only the 6 coins, designated as "double sikka rupees" were forwarded to me, at my request, for examination. On examination, however, they turned out to be common rupees of British mintage. Rupees, of this kind, *i. e.*, with straight milling, were struck between the years 1818—1832, by the East India Company in the name of Sháh 'Álam. See Mr. Thurston's *History of the Coinages of the East India Company*, p. 42.

The following papers were read—

1. *Some new and little known Hot Springs in South Bihar.—By* L. A. WADDELL, M. B.

The paper will be printed in the Journal, Part II.

2. *An account of the different hierarchical governments which prevailed in Tibet from* 1045 *to* 1645 *A. D. when the supremacy of the Dalai Láma was established by Gushi Khan.—By* BABU SARATCHANDRA DÁS.

3. *On the Copper Coins of the Súrí Dynasty.—By* DR. A. F. RUDOLF HOERNLE (with 3 plates).

4. *On some new or rare Hindi and Muḥammadan Coins. No. II.—By* DR. A. F. RUDOLF HOERNLE (with 2 plates).

5. *A descriptive Catalogue of the Central Asiatic Coins in the Indian Museum collected by* CAPT. A. F. DE LAESSOE.—*By* DR. A. F. RUDOLF HOERNLE, (with 2 plates).

These papers will be printed in the Journal, Part I.

LIBRARY.

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University,—Circulars, Vol. IX, No. 80.

Berlin. Konenklijke Natuur Kundige Vereeniging in Nederlandsch-Indië,—Natuurkundig Tijdschrift voor Nederlandsch-Indië, Deel XLIX.

Calcutta. Geological Survey of India,—Memoirs, Vol. XXIV, Part 2.

Calcutta. Geological Survey of India,—Records, Vol. XXIII, Part 2.

———. Indian Engineering,—Vol. VII, Nos. 19—22.

———. Photographic Society of India,—Journal, Vol. III, Nos. 5and 6.

Florence. La Società Africana d' Italia,—Bullettino, Tome VI, Fascicolo 1° e 2°.

Graz. Des Naturwissenschaftlichen Vereines für Steiermark,—Mittheilungen, Jahrgang, 1889.

The Hague. Koninklijk Instituut voor de Taal- Land-en Volkenkunde van Nederlandsch-Indië,—Bijdragen tot de Taal-Land-en Volkenkunde van Nederlandsch-Indië, Deel V, Aflevering 2.

Ithaca. Cornell University,—Library Bulletin, Vol. II, No. 12.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLIV, Heft 1.

London. Geological Society,—Address delivered at the Anniversary Meeting on the 21st February 1890.

———. Institution of Electrical Engineers,—Journal, Vol. XIX, No. 86.

———. Nature,—Vol. XLI, No. 1069, Vol. XLII, Nos. 1070—1072.

———. The Academy,—Nos. 938—941.

———. The Athenæum,—Nos. 3261—3264.

Mendon, Illinois. The American Antiquarian and Oriental Journal,—Vol. XII, No. 2.

Mexico. Observatorio Meteorológico-Magnético Central de Mexico,—Boletin Mensual, Tomo II, No. 5 et 6.

———. La Sociedad Cientifica "Antonio Alzate,"—Memorias, Tomo III, No. 4—6.

Paris. La Société de Géographie,—Compte Rendu des Séances de la Commission Centrale, Nos. 7 et 8, 1890.

Pisa. La Società Toscana di Scienze Naturali,—Atti, Vol. VII.

Rio de Janeiro. Observatorio do Rio de Janeiro,—Revista do Observatorio, Anno V, No. 3.

Rome. La Società Degli Spettroscopisti Italiani,—Memoire, Vol. XIX, No. 4.

St. Petersburg. Le Jardin Impériale de Botanique,—Acta, Horti Petropolitani, Tomus XI, No. 1.

——————. La Société des Naturalistes de Kiew,—Mémoires, Tome X, No. 2.

Sydney. Linnean Society of New South Wales,—Proceedings, 2nd. Series, Vol. IV, Part 4.

Taiping. Government of Perak.—The Perak Government Gazette, Vol. III, Nos. 12—14.

MISCELLANEOUS PRESENTATIONS.

Taj-i-Farrokhi, by the Nawab of Rampur. 4to.

E. T. ATKINSON, ESQ., C. S.

Report on the Police Administration of the Central Provinces for the year 1889. Fcp. Nagpur, 1890.

Returns of the Rail-borne trade of the Central Provinces during the quarter ending 31st December 1889. Fcp. Nagpur, 1890.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Las Aguas Minerales de Chile, por el Dr. L. Darapsky. 8vo. Valparaiso, 1890.

COMISARIA GENERAL DE LA EXPOSICIÓN NACIONAL, SANTIAGO.

Report of the Government Scientific Expedition to Bellenden-Ker Range upon the Flora and Fauna of that part of the Colony. 8vo. Brisbane, 1889.

DEPARTMENT OF AGRICULTURE, BRISBANE.

Report of the Central Park Menagerie for the year 1889. 8vo. New York, 1890.

DEPARTMENT OF PUBLIC PARKS, NEW YORK.

Returns of the Rail-borne trade of Bengal for the quarter ending the 31st December 1889. Fcp. Calcutta, 1890.

GOVERNMENT OF BENGAL.

Army Estimates of effective and non-effective services for 1890-91. Fcp. London, 1890.

Copies of, or Extracts from, Correspondence relating to the Numbers and Functions of the several Councils in India. Fcp. London, 1890.

The Indian Antiquary,—Vol. XVIII, Part 228, December 1889 and Vol. XIX, Part 232, March 1890. 4to. Bombay, 1890.

Memorandum of the Secretary of State relating to the Army Estimates, 1890-91. Fcp. London, 1890.

Return of all Loans raised in England under the provisions of any Acts of Parliament, chargeable on the Revenues of India and outstanding at the commencement of the half-year ended on the 30th September 1889. Fcp. London, 1890.

Returns of all Loans raised in India, chargeable on the Revenues of India, and outstanding at the commencement of the half-year ended on the 30th September, 1889. Fcp. London, 1890.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Progress Report of A. Rea, M. R. A. S. on the Archæological Survey of Southern India, ending January, 1890. Fcp. Madras, 1890.

GOVERNMENT OF MADRAS.

Catalogue of the Manuscripts in the Persian, Arabic and Turkish Languages to be found in the Public Library of Turkistan. 8vo. Turkestan, 1889.

GOVERNOR GENERAL OF TURKESTAN.

Brief Sketch of the Meteorology of the Bombay Presidency in 1888-89. Fcp. Bombay, 1889.

METEOROLOGICAL REPORTER FOR WESTERN INDIA.

Viridarium Norvegicum. Norges Væxtrige et Bidrag til Nord-Europas Natur-og culturhistorie af Dr. F. C. Schübeler. 3die Bind. 4to. Christiania, 1889.

Symbolae ad Historiam Ecclesiasticam Provinciarum Septentrionalium Magni Dissidii Synodique Constantiensis Temporibus Pertinentes. auctore, Dr. Ludovico Daae. 4to. Christianiae 1888.

UNIVERSITY OF CHRISTIANIA.

PERIODICALS PURCHASED.

Berlin. Orientalische Bibliographie,—Band III, Heft 8.

Calcutta. Indian Medical Gazette,—Vol. XXV, No. 4, April, 1890.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XXIII, No. 4.

Leipzig. Annalen der Physik und Chemie,—Band XXXIX, Heft 4 und Band XL, Heft 1.

———. ———. Beiblätter, Band XIV, Stück 4.

London. The Chemical News,—Vol. LXI, No. 1587—1590.

———. The Nineteenth Century,—Vol. XXVII, No. 159, May 1890.

———. The Society of Arts,—Journal, Vol. XXXVIII, Nos. 1953—1956.

Paris. Revue Scientifique,—Tome XLV, Nos. 17—20.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For July, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 2nd July, 1890 at 9-15 P. M.

H. Beveridge, Esq., C. S., President, in the chair.

The following members were present:

Nawáb Abdul Latif, Bahádur, Dr. A. W. Alcock, J. H. Apjohn, Esq., E. T. Atkinson, Esq., Rev. A. W. Atkinson, Bábu Gaurdás Bysack, W. B. Colville, Esq., Dr. A. Crombie, Bábu Saratchandra Dás, Bábu Rajanikánta Gupta, W. H. Jobbins, Esq., Dr. W. King, Rev. Father E. Lafont, C. Little, Esq., Bábu Asutosh Mukhopádhyáy, T. R. Munro, Esq , A. M. Nash, Esq., L. de Nicéville, Esq., Dr. D. Prain, Major J. H. Sadler, Pandit Haraprasád Shástri, W. L. Sclater, Esq., Dr. J. Tull Walsh, Colonel J. Waterhouse.

Visitors—W. Connan, Esq., F. D. Fowler, Esq., Colonel Gallwey, R. A., H. Haward, Esq., H. Holmwood, Esq., W. R. C. Jewell, Esq., W. H. Nightingale, Esq., G. O. Ranger, Esq , F. N. Rushton, Esq., T. Traill, Esq., W. J. Williamson, Esq , J. Winterscale, Esq.

The minutes of the last meeting were read and confirmed.

Thirty-seven 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:

T. W. Arnold, Esq.
W. C. Bonnerjee, Esq., (re-elected).
Bábu T. N. Mukharji.
P. Donaldson, Esq., (re-elected).

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

The Most Rev. Dr. Paul Goethals, S. J., Archbishop of Calcutta, proposed by Col. J. Waterhouse, seconded by J. Wood-Mason, Esq.

The Secretary reported the death of the following member:

Professor Bápu Deva Sástri, C. I. E., of Benares (Honorary Member).

The Philological Secretary read the following report on a find of Treasure Trove Coins.

Report on 18 old silver coins forwarded by the Offg. Collector of Durbhanga, with his No. 201 G, dated 16th May 1890.

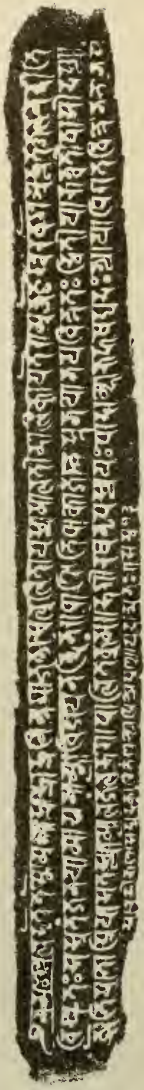
The coins are stated to have been found on the 6th May 1889. The find place is not mentioned, but as the finder is said to have been a person belonging to Somoul, Perganah Hati, it may be assumed that the coins were found in that locality. Their approximate value is given as Rs. 18.

All the coins belong to different early Pathan Kings of Delhi. Numismatically they are in an indifferent condition, for in all of them the margin, giving the date and mint, is entirely or almost entirely wanting. They are attributed, as follows:

Nāṣiru-d-dīn Maḥmūd Shāh, A. H. 644—664 = A. D. 1246—1265, mint and date lost on all four specimens:	4
Ghiyáṣu-d-dīn Balban, A. H. 664—686 = 1265—1287 A. D., mint and date wanting in all four specimens:	4
Muizzu-d-dīn Kaiqobād, A. H. 686—689 = A. D. 1287—1290, one shows mint Delhi, another the date 687, a third appears to be double struck; total	7
Jalālu-d-dīn Fīrūz Sháh, A. H. 589—695 = A. D. 1290—1295; on both, mint Delhi; date lost, ...	2
'Alāu-d-dīn Muḥammad Shāh, A. H. 695—715, A. D. 1295—1315; mint and date lost	1
Total ...	18

Rev. Father Lafont exhibited the new Phonograph of Th. A. Edison, and gave illustrations of the perfect manner in which the instrument reproduces all kinds of sounds from music to the human speech.

NEW YORK



INSCRIPTION FROM A STONE RECENTLY FOUND AT MUDGAL-ASRAMA, KASHTA-HARANI GHAT, MUNGIR.

Reg. No. 323, As. Socy., Bengal.—30-9-90.—605. Photo., S. I. O., Calcutta.

The following paper was read—

Note on an inscription in Kutila characters, from a stone recently unearthed at Mudgal-âsrâma (Kashtaharani ghât) Mungir, with ink impression of inscription.—By L. A. Waddell, M. B.

The inscribed stone, from which is taken the accompanying ink impression, was found by me a few weeks ago lying at Kashtaharani Ghât, the *âsrâm*, or hermitage, of the celebrated Saint Mudgalaputra, on the Ganges at Mungir. The priest in charge of the ghât and temple informed me that the stone appeared about three months ago at the side of the ghât on the receding of the flood-waters of the Ganges, and on being thus exposed it was carried up one or two steps of the ghât and there deposited, where I found it.

The stone is a narrow oblong slab about 27 inches long, and about 5 inches broad, and $3\frac{1}{4}$ inches deep, roughly chiselled on its upper and lower surfaces, and evidently had been originally built, or intended to be built, into a wall. The inscription extends along the smooth narrow lateral face of the stone, covering nearly the whole extent of that surface. The stone is in excellent preservation, as the ink impression attests: this excellent state of preservation is doubtless owing to the stone having remained buried in the mud for several centuries. The inscription is entire, and the date is distinctly engraved 'Samv. 13.' The relatively modern form of the letters suggests that the era here referred to may be that of Lakshmana Sena, which commenced in the first quarter of the twelfth century A. D.

It will be interesting should the inscription, amongst other information, throw any light on the etymology of the name 'Mungir,' in regard to which opinion is divided. The recognized modern way of spelling the name of Mungir seems a sort of quasi scientific compromise between the several forms Mongir, Monghyr, Munggar, &c. The native mode of spelling the name is still the same as that recorded by Dr. Buchanan in his Statistical Survey at the beginning of the century, *viz.*, Munggar (মুঙ্গের) Part of Dr. Buchanan's note on the etymology of the word I quotc here, especially as the volume containing it* is not in the Society's library—"in an inscription† seven or eight centuries old found at the place ...... the name is written Mudgagira, the hill of Mudga, and not Mudgalpuri, or the abode of Mudgal. The existence of the saint and prince of that name is perhaps therefore problematical, as Mudga is the Sangskrita name for a kind of pulse, the *Phaseolus mungo* of Linnæus, from whence also the vulgar name of the place (Mugger) is probably derived."

* *Eastern India*, Vol. II, p. 45.

† This is evidently the 'Mungir Copper-plate grant' described in Vol. I of the *Asiatic Researches*, and now, I believe, in the custody of the Society.

As apparently favouring Dr. Buchanan's opinion as to the probable derivation of the name, it is to be noted that the modern Hindi name of the kind of pulse called mudga in Sanskrit is mung. But on the other hand the *mung* bean does not affect hilly or rocky sites, and its cultivation is widespread throughout the Gangetic plain. It seems not unlikely that the vulgar name of the fort, *viz.*, Mungger, is merely a Muhammadan perversion of the old name, somewhat like the change by which 'Naba-dwíp' was converted into 'Nadiya.'

The fact that the Sanskrit *Mudga* can become, in Prakrit, in the colloquial *mung*, is almost equally favourable to a derivation from the Sage Mudgal, as in ordinary parlance many letters of the old names are elided, thus the classical Kastaharani Ghât close at hand is popularly called 'Katharni,' and the Chinese pilgrim Hiuen Tsiang in the 7th century also mentions the Sage Mudgalaputra in connection with this neighbourhood;* and the hermitage of this Sage here is still a favourite place of Hindu pilgrimage. It seems therefore more probable that the place derives its name from this Sage than from the species of pulse called 'mung.'

It is somewhat remarkable in this regard to find that now-a-days what is locally known as Mun-pahar—a name which is synonymous with Mun-giri—is not Mungir itself, but the cluster of rocks presently in mid-channel of the Ganges, about $1\frac{1}{4}$ miles north of the Mudgalâsrama and called in the Trigonometrical Survey maps the 'Beacon rocks.' These rocks are also called 'Mun *pathar*' or the 'Sage's *rock*.'

Translation.

Om. Salutation to the holder of the trident, on whose head the fleeting Gangá, sporting like a piece of white cloud, appears like a garland composed of the Málatí flower.

To the family of Mukuteshvara belonged the far-famed Kulanandí. He had a son Vijayanándí by name. From him was born the son versed in politics named Dháretipáka. He had a wife named Ambá who was as a second Arundhati. She became his beloved. By her he had a son Gopálitakrama. This man was like a bee in the lotus of the feet of Bhagíratha, the king. Having acquired money by honest means, he, afraid of the transmigration of the soul, constructed this building dedicated to S'ambhu for the increase of his own merit and that of his parents.†

Samvat 13.

* Si-yu-Ki translated by Beal, Vol. II, p. 188.

† The inscription is in verse. The third verse is defective as the first foot contains one Syllable less and the fourth contains two Syllables less in the fourth foot. Hence there is some doubt as to the reading of proper names Dharetipárka and Gopalitakrama.

Library.

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

Transactions, Proceedings and Journals,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University,—Circulars, Vol. IX, No. 81.

Bombay. Bombay Natural History Society,—Journal, Vol. I, No. 4, and Vol. V, No. 1.

———. The Indian Antiquary, Vol. XIX, Part 234, May, 1890.

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———. Photographic Society of India,—Journal, Vol. III, No. 7, July, 1890.

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———. Nature,—Vol. XLII, Nos. 1073-1075 and Index to Vol. XLI.

———. Royal Astronomical Society,—Monthly Notices, Vol. L, Nos. 4 and 5, February and March, 1890.

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———. Royal Society,—Proceedings, XLVII, No. 287.

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———. Zoological Society of London,—Proceedings, Part 4, 1890.

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Naples. La Società Africana d' Italia,—Bollettino, Anno IX, Fasc. I—IV.

New Haven. American Oriental Society,—Proceedings, October 1889.

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Paris. La Société Académique Indo-Chinoise de France,—Mémoires, Tome 1.

———. La Société D'Anthropologie de Paris,—Bulletins, Tome XII, (IIIe série), 3e Fascicule.

———. La Société D'Ethnographie,—Bulletin, Série 2e, Nos. 9—11, 1887.

———. La Société de Géographie,—Compte Rendu des Séances, No. 9, 1890.

———. La Société Zoologique de France,—Bulletin, Tome XV, Nos. 2 et 3.

Philadelphia. American Philosophical Society,—Proceedings, Vol. XXVI, No. 130.

————. Journal of Comparative Medicine and Veterinary Archives,—Vol. XI, No. 5.

Pisa. La Società Toscana di Scienze Naturali,—Processi Verbali, 2 Marzo, 1890.

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Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Vol. XIX' Disp. 5^{a}.

Roorkee. The Indian Forester,—Vol. XVI, Nos. 4—6, April to June, 1890.

St. Petersburg. La Société Impériale Russe de Géographie,—Journal, Tome XXV, Nos. 6 et 7.

Taiping. Government of Perak,—The Perak Government Gazette, Vol. III, Nos. 15-18.

Turin. La R. Accademia delle Scienze di Torino,—Atti, Vol. XXV, Disp. 8^{a}—10^{a}.

Turin. La R. Osservazioni Meteorologiche fatte nell' anno 1888.

Washington. United States National Museum,—Bulletin, Nos. 33-37.

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Ashraf-ud-din Ahmad, Moulvie Sayid. Durdanai Khyal. 8vo. Lucknow, 1889.

———. Tabaqa-i-Muhsinya, or the Persian History of the Hooghly Emambarah. 8vo. Calcutta, 1889.

Bloomfield, Dr. Maurice. The Kāuçika-Sūtra of the Atharva-veda, with extracts from the commentaries of Dārila and Keçava. 8vo. New Haven, 1890.

Bural, N. C. Free Masonry as allied to religion,—A Lecture delivered at the meeting of the Calcutta "Emulation" Lodge of Improvement, on the 28th March, 1890. 8vo. Calcutta, 1890.

Hayter, Henry Heylyn, C. M. G. Victorian Year-Book for 1888-89, Vol. II. 8vo. Melbourne, 1889.

Manucha, Kaccoo Mal, Rai Bahádur. The Hindu Home-Life. 8vo. Lucknow, 1890.

Ráy, Pratápá Chandra, C. I. E. The Mahábhárata, translated into English prose, Part LVIII. 8vo. Calcutta, 1890.

Rosny, Le'on De. L'Apologue a la Chine et dans l'Inde. 8vo. Paris, 1876.

Saussure, Henrico De. Prodromus Œdipodiorum Insectorum ex ordine Orthopterorum (Mémoires de la Société de Physique et d'Histoire Naturelle de Genéve, Tome XXVIII, No. 1) et Additamenta (Mémoires de la Societe de Physique et d'Histoire Naturelle de Genéve, Tome XXX, No. 1). 4to. Geneva, 1884 and 1888.

Miscellaneous Presentations.

Tagore Law Lectures, 1886. The Law relating to the transfer of immoveable property, *inter vivos;* with an Appendix containing the Transfer of Property Act, being Act IV of 1882. By K. M. Chatterjea, B. A. 8vo. Calcutta, 1890.

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Report on the Jails of the Central Provinces for the year 1889. Fcp. Nagpur, 1890.

Report on the Judicial Administration (Civil and Criminal) of the Central Provinces for the year 1889. Fcp. Nagpur, 1890.

Report on the Lunatic Asylums of the Central Provinces for the year 1889. Fcp. Nagpur, 1890.

Resolution on the Revenue Administration of the Central Provinces for the year 1888-89. Fcp. Nagpur, 1890.

Triennial Report on the working of the Government Charitable Dispensaries in the Central Provinces for the year 1889. Fcp. Nagpur, 1890.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Administration Report of the Marine Survey of India for the official year 1889-90. Fcp. Bombay, 1890.

COMMANDER R. F. HOSKYN, R. N.

Chartularium Universitatis Parisiensis. Tomus I, ab Anno MCC usque ad Annum MCCLXXXVI. 4to. Paris, 1889.

Inauguration de la Nouvelle Sorbonne par M. le Président de la République, le lundi 5 Aout 1889. 4to. Paris.

CONSEIL GE'NE'RAL DES FACULTE'S DE PARIS.

Annual Report on the Lunatic Asylums of Bengal for the year 1889. Fcp. Calcutta, 1890.

Reports of the Alipore and Hazaribagh Reformatory Schools for the year 1889. Fcp. Calcutta, 1890.

GOVERNMENT OF BENGAL.

Catalogue of Minerals, Ores, and Rocks; with a note of meteorites, of which the fall in Southern India has been recorded. 8vo. Madras, 1890.

GOVERNMENT, CENTRAL MUSEUM, MADRAS.

The Indian Antiquary,—Vol. XIX, Parts 233 and 234, April and May, 1890. 4to. Bombay, 1890.

Usha, Vol. I, Parts 1-4. 8vo. Calcutta, 1890.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Progress Report of Dr. E. Hultzsch, Government Epigraphist, on the Archæological Survey of Southern India from February to April, 1890. Fcp. Madras, 1890.

Report of Mr. A. Rea on the Archæological Survey work of Southern India undertaken from February to April, 1890. Fcp. Madras, 1890.

GOVERNMENT OF MADRAS.

Handleiding tot de Kennis der Flora van Nederlandsch Indië. Beschrijving van de families en geslachten der Nederl. Indische Phanerogamen, door Dr. J. G. Boerlage. Eerste Deel. Dicotyledones Dialpetalæ. Eerste Stuk. Thalamiflorae—Disciflorae. Fam. I, Ranunculaceae—Fam. XLII, Moringaceae. 8vo. Leiden, 1890.

GOVERNMENT OF NETHERLANDS INDIA, BATAVIA.

L'Asie Centrale, (Thibet et Régions Limitrophes) Text et Atlas, par J. L. Dutreuil de Rhins. 4to. and fol. Paris, 1889.

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Results of the Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1887. 4to. London, 1889.

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Seventh Annual Report of the United States Geological Survey for 1885-86. 4to. Washington, 1888.

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Berlin. Deutsche Litteraturzeitung,—Jahrgang, XI, Nrn. 9—15.

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Braunschweig. Jahresbericht über die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften, Heft 6, für 1886, Heft 4, für 1887.

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Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Göttingische Gelehrte Anzeigen. Nrn. 4—6, 1890.

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Leipzig. Annalen der Physik und Chemie,—Beiblätter, Band XIV, Stück 5.

———. Literarisches Centralblatt,—Nrn. 10—16, 1890.

Leyden. Internationales Archiv-für Ethnographie,—Band III, Heft 1.

London. The Annals and Magazine of Natural History,—Vol. V (6th series), No, 28, April, 1890.

———. The Chemical News,—Vol. LXI, Nos. 1591-1594.

———. The Entomologist,—Vol. XXII, No. 323, April, 1890.

London. The Entomologist's Monthly Magazine,—Vol. I, No. 33 (2nd series) April, 1890.

———. The Ibis,—Vol. II, (6th series), No. 6, April, 1890.

———. The Journal of Botany,—Vol. XXVIII, Nos. 327 and 328, March and April, 1890.

———. The London, Edinburgh and Dublin Philosophical Magazine, —Vol. XXIX, (5th series) No. 179, April, 1890.

———. The Nineteenth Century,—Vol. XXVII, No. 160, June, 1890.

———. Pali Text Society—Journal, 1889.

———. The Quarterly Journal of Microscopical Science,—Vol. XXXI, No. 71, April, 1890.

———. Rhopalocera Exotica, Part 12, April, 1890.

———. The Society of Arts,—Journal, Vol. XXXVIII, Nos. 1957—1960.

New Haven. The American Journal of Science,—Vol. XXXIX, (3rd. Series), Nos. 231 and 232, March and April, 1890.

Paris. L' Academie des Sciences,—Comptes Rendus des Séances, Tome CX, Nos. 8—14.

———. Annales de Chimie et de Physique,—Tome XIX, (6me Série), Mars, 1890.

———. Journal des Savants,—Février et Mars, 1890.

———. Revue Scientifique,—Tome XLV, Nos. 21—24.

———. Revue Critique d' Histoire et de Litterature,—Tome XIX, Nos. 8—15.

Philadelphia. Manual of Conchology,—Vol. XI, Parts 4 and 4 A, and Vol. V, (2nd Series), Part 4.

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Bonavia, E., M. D. The cultivated Oranges and Lemons etc. of India and Ceylon, Text, and Atlas of plates. 8vo. London, 1890.

Davids, Prof. T. W., Ph. D., and Carpenter, Prof. J. Estlin. The Dīgha Nikāya, Vol. I (Pali Text Society). 8vo. London, 1899.

Müller, F. Max. The Sacred Books of the East, Vol. XXXV,—The questions of King Milinda, translated from the Pali. By J. W. Rhys Davids. 8vo. Oxford, 1890.

Two Hieroglyphic Papyri from Tanis. 1. The Sign Papyrus (by F. LL. Griffith). 2. The Geographical Papyrus (by W. M. F. Petrie). (Extra Memoir of the Egypt Exploration Fund). 4to. London, 1889.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR AUGUST, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th August 1890 at 9-15 P. M.

H. BEVERIDGE, ESQ., C. S., President, in the chair.

The following members were present:

Bábu Gaurdás Bysack, P. Donaldson, Esq., F. G. Hickson, Esq., Lieutenant General G. B. Mainwaring, Bábu Asutosh Mukhopádhyáy, T. R. Munro, Esq., Major J. H. Sadler, Pandit Haraprasád Shástri, Colonel J. Waterhouse.

The minutes of the last meeting were read and confirmed.

Forty-one 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.

The Most Rev. Dr. Paul Goethals, S. J., Archbishop of Calcutta.

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

Kumár Sarat Chandra Singh (for re-election), proposed by Bábu Gaurdás Bysack, seconded by C. Little, Esq.

The following gentleman has expressed a wish to withdraw from the Society:—

I. C. Bose, Esq.

The PRESIDENT announced that Mr. Wood-Mason had resigned the

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Editorship of the Journal, Part II, and that Mr. W. L. Sclater had been appointed Natural History Secretary and Editor of that part of the Journal. There had been no separate Natural History Secretary since Mr. Wood-Mason became a Vice-President in 1887.

The President stated that the arrangement announced at the last meeting for renting two rooms on the ground floor of the building to the Photographic Society of India had been completed and possession taken of the rooms. The rent is to be Rs. 60 a month, and the occupancy to be terminable at 3 months' notice on either side.

The President congratulated the Society on the arrangement. It had converted a useless lumber room into a pleasant apartment, and had given the Society a very acceptable addition of Rs. 720 a year to their income.

The President reported that the Government Securities belonging to the Society, amounting to Rs. 1,27,000 in the $4\frac{1}{2}$ per cent. loans of 1878 and 1879, which mature on 15th September 1893, would have to be transferred to the 4 per cent. loan of 1854-55 under the terms of the Notification of the Government of India, Department of Finance and Commerce, dated 25th June 1890. The transfer will cause a permanent annual reduction of Rs. 635 in the Society's income from interest.

The President added that whatever might eventually be done with the Securities it had appeared to the Council necessary that the offer of Government should be accepted, and the transfer effected. There was no rule compelling the Society to invest its funds in Government Securities, and it might hereafter be advisable to invest them in other securities which would yield a higher rate of interest, but before such a step could be taken all the Members of the Society had to be consulted and the votes of three-fourths of them to be obtained (Rule 67). In the meanwhile the transfer had to be made, and it had this advantage that it gave the Society the command of over Rs. 1,900, for Government had agreed to pay the extra half per cent. interest in advance. This money would be very useful as the Society had some debts to pay, and amongst others a sum of Rs. 1,400 on account of printing Mr. Grierson's book on the Modern Vernacular Literature of Hindustan.

The President informed the meeting that the alteration of Rule 70, proposed by the Council, of which intimation had already been given by Circular to all resident members in accordance with Rule 64, would now be brought forward for discussion.

The object of the alteration is to admit of admission fees being made available for the general expenditure of the Society: at present they have to be invested, and the interest only can be spent.

No objection having been made, the President stated that the proposal would be circulated and brought up again at the November meeting on the votes of the members.

Col. Waterhouse exhibited some photographic dry-plates showing a remarkable reversal or transformation of the image from a negative into a positive, caused by the addition to the developer of small quantities of thio-carbamides or sulpho-ureas.

He said:—These plates, though not so good as could have been wished, might perhaps be of interest from the fact of their being produced in an entirely new and simple manner and with substances which, he believed, had never before been used in photography, though they exerted a very powerful reducing effect on the haloid salts of silver which apparently had not been noticed before and is not produced by any of the ordinary reducing agents. Apart from the scientific interest attaching to any new method of reversing the photographic image, by which light could be thrown on the still unsolved problems connected with the formation of the developed photographic image, a practical process which would enable either positives or negatives to be taken in the camera by the ordinary methods would be of great value in many ways.

In the course of some experiments, made early in July, with an eikonogen developer, to which a little phenyl-thio-carbamide had been added, he was astonished to find traces of reversal in the darker parts of the picture. Following up this indication he found that with suitable proportions of the phenyl-thio-carbamide he was able to produce, at will, more or less complete positive pictures in place of negative ones under otherwise quite normal conditions of exposure and development.

Further experiments showed that similar results could be obtained with allyl-thio-carbamide, or thio-sinamine, and also, though not so regularly, with thio-carbamide, or sulpho-urea, but not by simple carbamide, or urea. The latter fact tends to show that sulphur must exert an active influence in bringing about the reversal.

The thio-carbamides of the alcoholic series are formed by the action of ammonia on the so-called "mustard oils", or thio-carbimides.

The phenyl and allyl-thio-carbamides when applied to precipitated bromide or chloride of silver, or to gelatine dry plates or films containing these salts, have no visible action upon them, but if an alkali be added, a darkening and reducing action is set up, even in the dark. With the iodide the action is not so strong.

Thio-carbamide appears to have a more powerful reducing action on the bromide and chloride than the two alcoholic thio-carbamides, and in strong solution has been found to darken an ordinary gelatine dry plate in the dark even without the aid of alkali, though it does not visibly darken precipitated silver bromide. With iodide it is less active.

Thio-sinamine and thio-carbamide in watery solution, especially the former, seem to exert a solvent action on the silver haloids.

Urea does not visibly darken or reduce the haloids in the dark, even with alkalis.

Phenyl-thio-carbamide seems to reverse the image most satisfactorily when used with the ordinary eikonogen developer in the proportion of from 20 to 25 parts of the saturated solution in 100 parts of mixed developer. The presence of sodium sulphite seems an advantage but may be dispensed with; a little bromide of potassium improves the result. With ferrous oxalate, pyrogallol and quinol developers the same reversing effect has not been obtained as with eikonogen.

Allyl-thio-carbamide appears to be a much stronger reversing agent than the phenyl salt, probably owing to its greater solubility, and reversals have been obtained by its means with the pyrogallol and quinol developers (containing sodium sulphite) as well as with eikonogen, but not with ferrous oxalate. About 1 part of the saturated solution in 100 parts of developer is sufficient to produce the effect.

Thio-carbamide has not yet been fully tried; it evidently has strong reversing powers, but works irregularly and must be used in very minute proportions, otherwise no reversal is obtained.

Urea used with the eikonogen developer shows no tendency to reversal, whether added in the same small proportions as the thio-carbamides or in larger ones. It has not yet been tried with other developers, but the result will probably be the same.

With the phenyl-thio-carbamide and thio-sinamine the image generally developes first of all quite normally and then gradually reverses, and sometimes a positive image is visible on the plate before fixing. At others the action is more irregular and no image is seen until the plate is fixed. Some of the positive images thus obtained have a very rich brown or purple colour and are dense and full of detail, though not always perfectly reversed nor clear in the lights. They are quite different to the weak grey images ordinarily produced by solarisation or over-exposure, which, in this case has to be very carefully avoided.

With regard to the cause of the reversal he had not been able to give this part of the question full attention, nor in any case would it

be possible in the present imperfect state of our knowledge of the phenomena connected with the formation and reversal of the invisible photographic image, to give any valid opinion—but, although in many respects the results he had obtained appeared to be in direct opposition to the ordinary conditions of reversal by over-exposure or other abnormal action of light, he believed that these reversals were brought about much in the same way and could be explained by the theories worked out by Capt. Abney some years ago, and generally accepted.

Reversal in ordinary cases is caused by over-exposure or other abnormal action of light, by the action of certain rays of the spectrum, or by oxidation of the gelatine film, but in this case there is no question of any of these causes or of any abnormal action so far as exposure to light is concerned.

If an ordinary gelatine dry plate receive a normal exposure a negative image is developed, but if the exposure be unduly prolonged, the light undoes its first action and reversal is produced. In the present instance there was in the developer a substance which was capable of liberating halogen by reduction of the haloid silver salt in the dark, and thus the film, although it might only have received a normal exposure to light, was really in the same state under the developer as if the exposure to light were being continued and halogen liberated all over it —as in the case of over-exposure—and the image was reversed by the halogen attacking the parts reduced by the normal action of the developer, while the developer and the alkaline thio-carbamide completed the reduction of the unexposed parts. During the process the thiocarbamide would probably become oxidised and lose sulphur which would most likely combine with the silver and add to the density of the images. The subject, however, required further investigation.

The only similar case of reversal he had been able to find was that recorded by Carey Lea as caused by the action of hypophosphite of soda on silver bromide films—but though he had tried this substance, and also alkaline solutions of glucose and manna on dry plate films or mixed with the developer, he had not been able to obtain any sign of a reversal, and the reducing action of these substances on the pure silver haloids or gelatine films containing them is not so strong as it is with the thiocarbamides.

Among the plates exhibited were some of the spectrum which showed reversal only in the ultra-violet rays, but he had not been able to fully work out the action of the spectrum with these new reversing agents.

The results obtained at present left much to be desired in clearness, but he hoped to be able to bring the process to a practical issue.

The new method opened up a large number of very interesting collateral questions which would take some time to investigate.

Pandit Haraprasád S'ástrí exhibited a Map of ancient Áryávarta prepared by Nagendra Náth Basu, and said—

It contains much valuable information about the geography of India from a number of Puránas, among which the Vámana, the Brahmáṇḍa, the Matsya, the Márkandeya Puránas may be mentioned, besides those contained in European works on the ancient geography of India. The writer has embodied in it the results of the most recent researches in the fields of Indian Archæology. I will not take up much of your time by going into the details of the map, but will content myself by pointing out the route taken by the Cloud Messenger of Kalidása's well-known work the Megha Dúta.

The Cloud commenced his journey from Rám-giri, which being in the Deccan does not fall within the scope of this map. From thence it came to Ámra Kúta, which is the Amara Kantuk of the present day. It crosses over the Narbuda, then comes over to Vidisha, the present Vilsa of the maps. The hills and rivers about Vidishá have been faithfully put down. Then comes Ujjayiní the great capital of the Kshatriyas of Málava. The next place of importance is *Daśapura* which has been completely identified by Mr. Fleet in his excellent work the *Corpus Inscriptum Indicarum*, Vol. III, with Mandasar of the present day. The Cloud then goes to Kurukshetra which has been put down at its proper place. Kanakhal is the last place in the plains mentioned in Megha Dúta, after which the Cloud enters the heights of the Himalayas, in which Hansadvára and Kailása have been marked with care. The Cloud's passage is now complete, and can be gathered at a glance on the map. It is a valuable contribution to the geography of ancient India, and will help much in understanding the position of places celebrated in Indian antiquity.

The following papers were read :—

1. *Description de Curculionides et de Brenthides, inédits faisant partie des collections du Musée Indien, 1re partie, par* M. T. Desbrochers des Loges.—*Communicated by* J. Wood-Mason, Esq.

2. *Note on* Poritia harterti, *Doherty. By* Ernst Hartert—*Communicated by* J. Wood-Mason, Esq.

Through the kindness of Mr. Wood-Mason and of my fellow traveller in Upper Assam, Mr. Doherty, I have received two copies of the latter's "Notes on Assam Butterflies", published in the Journal of the Asiatic Society, Vol. LVIII, Pt. 2, p. 118. Though more of an ornithologist than

a lepidopterist, I may perhaps be allowed to make a few remarks on that interesting and valuable paper.

1. On p. 123 it is stated that "the specimens described below are in Mr. Neumoegen's collection unless the contrary is stated;" as some mistake might arise out of this, I may say that all the specimens caught by me during that trip to Assam are in Dr. Staudinger's collection at Dresden. Amongst them are the only fine untorn specimens of *Aemone amathusia*, Hew. (*A pealii*, W.-M.), two fine males of *Apatuua* (*Potamis*) *ulupi*, Doherty, *Poritia harterti*, Doherty, and many others.

2. With regard to *Poritia** *harterti*, the allied species *Poritia phalena*, Hew. has only been taken by Mr. A. R. Wallace near Singapore and has never been procured since, so that Doherty was certainly justified in considering that my specimen taken far away north in the Patkoi hills in Assam was a different species or at any rate a geographical race. Unfortunately, Mr. Doherty had no specimen of *Poritia phalena* with which to compare the Assam *Poritia* but only the very poor figure in Distant's *Rhopalocera Malayana* (Pl. XXII, Fig. 8) and perhaps that in the Illustrations of Diurnal Lepidoptera (*Lycaenidæ*, Pl. LXXXIX) with the accompanying descriptions.

I, however, was lucky enough some time after to secure in the Baltak hills in North East Sumatra, almost in the verandah of the house of my friend Dr. Martin, of Munich, another specimen of *Poritia*; a comparison of this Sumatran, specimen with the Assamese one showed that the two were undoubtedly identical; moreover, I found that my Sumatran specimen agreed entirely with the description of *Poritia phalena*, Hew.; the comparison was made by me with Dr. Staudinger, who is also of my opinion.

It therefore seems to me that the species named by Doherty after me *Poritia harterti* must be relegated to the large and increasing class of synonyms.

3. *Coins of Sallakshaṇa Pála Deva, Madana Pála Deva, and Prithiví Deva, by* Vincent A Smith, B. S. C.

The late Mr. Edward Thomas was a numismatist of such skill and experience that mistakes in his work cannot often be detected, but I observed long ago errors in the attribution of the coins of the princes named in the heading of this note, and should have pointed out the mistakes earlier, only that I supposed them to be so obvious as not to be likely to mislead any one accustomed to numismatic researches.

Now, however, I perceive that so good a scholar as Dr. Hoernle has

* This butterfly is placed by Doherty in the genus *Messaga*; for my part I see no reason for retaining a genus distinguished by such slight differences.

been misled by the authority of Thomas, and it is worth while to make the correction.

At page 62 (Nos. 33 and 34) of the *Chronicles* Thomas describes Bull and Horseman coins of Sallakshaṇa Pála Deva, with reverse legend S'rí Samanta Deva, and coins of Madana Pála Deva, with reverse legend Mádhava S'rí Samanta Deva.

At page 65 he assigns these coins in the following words: "It will be seen that I propose to assign the next coin, in the order of date, to Sallakshaṇa Pála I, the Chandel monarch of Mahoba, who, we learn from inscriptions, extended his conquests into the Gangetic Doáb; and to his grandson Madana Varmma Deva I assign the coins bearing his leading name, in preference to the nearly contemporary Madana Pála of Kanauj, whose territory was supplied with a different description of coinage, as well as on account of the serial consistency, if the earlier pieces are rightly attributed to his grandsire, whose power he seems to have inherited in added stability."

The last sentence is one of Mr. Thomas' numerous hard sayings, but it means that if the coins of Sallakshaṇa Pála are rightly attributed to Sallakshaṇa Varmma Chandel, then the nearly similar coins of Madana Pála should be ascribed to Madana Varmma Chandel.

At page 55 Mr. Thomas observes that he "was originally under the impression that the coins of Aṇangpál and Sallakshanpál (Nos. 32 and 33 *infra*) belonged to the sixth and seventh kings of Albírúni's consecutive series [*scil.* of kings of Kábul], supposing that, the one name being *identical*, the other might represent the designation of his successor, so strangely perverted by the Muslim writers into the many varying forms of M. Reinaud's 'Nardajanpál.'"

Dr. Hoernle has recently described a large hoard of Bull and Horseman coins, amounting to 538 in number, found in the Sháhpur district of the Panjáb in 1886. (*Proc. As. Soc. Bengal for* 1888, *p.* 126). This hoard mainly consisted of the well-known coins of Muhammad bin Sám *alias* Shaháb-uddín, but included 22 specimens of the coinage of Madana Pála Deva, and three of that of Sallakshaṇa Pála Deva. Dr. Hoernle refers to the *Chronicles,* and, without comment, accepts Mr. Thomas' attribution of these coins to the Chandel (Chandella) kings of Mahoba in Bundelkhand.

But there can be no possible doubt that the attribution is wrong. It was simple perversity on Mr. Thomas' part to make it, for, in a footnote to page 66 of the *Chronicles*, he quotes General Cunningham's description of the Chandel coins, as follows:—

"The gold and silver coins are all of the well-known types of the Ratnors of Kanauj, which bear a seated figure of the four-armed goddess

Durgá or Párvatí on the obverse,* and, on the reverse, the king's name in three lines of mediæval Nágarí characters. The copper coins bear on the obverse, a two-armed male figure, which appears to be that of the monkey-god Hanumán, and, on the reverse, the king's name in Nágarí characters."

Since this extract was written, Sir A. Cunningham has more fully described and illustrated the Chandel coinage in Volume X of the Archæological Survey Reports, pages 25—27, Plate X.

He there shows that the Chandel coins, though extremely rare, are known to occur in gold, silver, and copper. The silver coinage is known by only one specimen. "The gold and silver coins are direct copies of the money of Gánggeya Deva, the Kulachuri Raja, of Chedi, who was a contemporary of Mahmúd of Ghazni. On the obverse is a figure of the four-armed goddess Durgá, which was the cognizance of the Haihaya, or Kulachuri, princes of Chedi, and is accordingly found upon their seals......... In their copper issue the Chandel kings departed from the original type of Durgá, and substituted the figure of Hanumán."

It requires no argument to show that the coins thus described have absolutely nothing in common with the Bull and Horseman series, but, clear though the distinction is, I may as well specify the leading points of difference. The Chandel coins are exceedingly rare, less than forty specimens in all metals being known. Some of these belonged to Mr. Freeling, and, if not lost in the mutiny, as many of his coins were, may possibly be now in the Bodleian. Colonel Ellis' five specimens were lost in the mutiny. I possess three, one of which I bought in the Hamírpur District; the other two were presented to me by Sir A. Cunningham. The British Museum has seven, and Sir A. Cunningham the rest. On the other hand the Madana Pála and Sallakshaṇa Pála coins occur in considerable quantities.

The metal differs, for the Bull and Horseman series are composed of billon, a mixture of silver and copper in varying proportions. The Chandel coins are of good gold, silver, or copper. The types and legends differ in every respect, as shown above, and as any one can see by comparing plates of the two series of coins. So far as Mr. Thomas had any reason for his assignment of the Sallakshaṇa Pála and

* It is a pity that the terms obverse and reverse are not used more carefully. Here Sir A. Cunningham inverts the terms in a very awkward way. The king's name on the Chandel coins takes the place of the king's effigy on a Bactrian, Indo-Scythian, or Gupta coin, and the side bearing it is the obverse. The figure of Durgá or Hanumán corresponds to the goddess on the reverse of earlier types of coinage, and the side bearing it is, and should be called, the reverse.

Madana Pála coins to the Chandels, his decision was based on the supposed identity of names. But the names are not really identical. The name Sallakshaṇa does not occur on the Chandel coins at all. The Chandella prince was named Hallakshaṇa, and the legend on his coins is unmistakeably S'rímad Hallakshaṇa Varma Deva. The common name Madana certainly does occur in the Chandel as well as the Bull and Horseman series, but no Chandel king ever assumed the cognomen of Pála. The distinctive cognomen of the dynasty is Varma (Varmma).

Thus it is apparent that absolutely no reason whatever exists for the assignment of the Sallakshaṇa Pála and Madana Pála coins to the Chandel dynasty of Bundelkhand, but that on the contrary the attribution of them to that dynasty is demonstrably wrong.

I am not prepared to decide the question as to who Sallakshaṇa Pála and Madana Pála really were, but they were certainly not Chandel princes.

On page 19 of the *Chronicles* Mr. Thomas has made an equally serious blunder by ascribing to Pṛithiví Varma Deva Chandel a gold coin with the legend S'rímat Pṛithiví Deva, and the usual seated Lakshmí reverse. This coin he says is common. On the other hand only 9 specimens of the Chandel king Pṛithiví Varma's coinage are known, namely six gold and one silver in the British Museum, and two copper in Sir A. Cunningham's cabinet (*Arch. Rep. Vol. II, p.* 58).

The gold coins of Pṛithiví Varma Chandel agree in type with those of the other princes of his dynasty, as above described, which type differs considerably from that of the coin described by Mr. Thomas. It seems evident that Mr. Thomas had never seen a Chandel coin.

I have now disposed of the main subject of this communication, but may take this opportunity of remarking that I believe the supposed "appearance of the joint names of Muhammad bin Sám and Prithiví Rája on one and the same coin" (*Chronicles, page* 17, *with woodcut*) to be purely imaginary. In the text Mr. Thomas says that "the imperfect and obscured reverse epigraph, in which is involved the whole question of novelty, leaves a doubt as to the finality of any opinion that may now be pronounced."

But in the foot-note he calls the reading "obvious," and says that General Cunningham did not contest the "obvious reading of the letters still visible on the coin." I cannot see the name Pṛithiví in the woodcut, and I do not believe that he and his opponent ever put their names together on a coin.

4. *Theory on the origin of the sounds known as the 'Barisál Guns.'*—*By* LIEUTENANT-GENERAL MAINWARING, B. S. C.

(Abstract).

After enumerating the various theories hitherto given and stating his inability to accept any of them as conclusive, General Mainwaring formulated his theory as follows: "The vast river formed by the coalescence of the Ganges, Brahmaputra and Megna with the numerous large streams chiefly meeting in the mouth of the misnomened Megna, here resolves itself into a broad sea ere commingling with and augmenting in no small degree the waters of the Ocean Bay. This mighty river and all the enormous and innumerable volumes of water-mouths of the Ganges which pour southward into the Bay carry with them innumerable quantities of mud and fresh decaying and decayed vegetable and other organic matter. All this composes the bed of the Bay. In it are germinated vast and ever accumulating stores of gas. This, without doubt, partly escapes, gradually, by ebullition but a far greater portion is confined in the superincumbent mud. This when collecting in quantity too great and forcible to be restrained, bursts forth and discharges itself into the air thus occasioning the loud report."

Though anxious to obtain evidence of the escape of gas in quantity sufficient to cause these sounds, Gen. Mainwaring failed because during the monsoon season the boatman refused to proceed to sea. The latter half of the paper was taken up with accounting for various peculiarities observed in the sounds—such as (1) the double sound so frequently heard (2) their occurrence during the monsoon season, (3) their being heard far inland. The first is explained by the gas not all escaping at once, being followed at a short interval by the remainder; the second by the disturbed water in the rains stirring up the mud and relieving the gas; the third by the existence of lakes or marshes near the place where the sounds are heard, and in which similar decomposition of vegetable matter occurs.

BABU GAURDÁS BYSACK remarked that according to General Mainwaring the sounds of the 'Barisál Guns' are produced by the action of river water on the mud, bed or bank, and that of gas generated from vegetable matter, but these conditions were certainly not confined to the rivers in Backergunj, or in the eastern districts, where the mysterious phenomenon occurs. They are equally, or perhaps with greater force, applicable to the Hughly river which brought down much vegetable matter and yet no sound of the kind is ever heard at Diamond Harbour or in the vicinity of Calcutta. He has heard the sound at Tumlook, but the fact that the river Rupnarain on which that town

stands, carries greater quantities of vegetable matter than the river Hughly had yet to be established before the theory could be accepted.

Colonel Waterhouse suggested that the sounds might be due to explosions in the Petroleum beds at Cheduba Island.

The President urged further observations and suggested that the Government officers at Hattia, Manpura and Dakhin Shabazpur should be addressed. It was clear that in Backergunge the sounds came from the South and the 'echo' theory did not seem to account for them, as they were heard where there were no river banks, *e. g.*, at Kukri Mukri.

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NEW YORK

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For November, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 5th November 1890, at 9 P. M.

H. Beveridge, Esq., C. S., President, in the chair.

The following members were present:—

Rev. A. W. Atkinson, Bábu Sarat Chandra Dás, Bábu Bhupendra Sri Ghosha, Dr. W. King, Tom D. La Touche, Esq., C. Little, Esq., Kumár Rameswár Máliah, Bábu Asutosh Mukhopádhyáy, Dr. W. H. Solf, Dr. J. H. Tull Walsh, Colonel Waterhouse.

Visitors, T. H. Holland, Esq., Bábu P. N. Dutta.

The minutes of the last meeting were read and confirmed.

One hundred and thirty-four 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 during the recess, in accordance with Rule 7.

Kumár Sarat Chandra Singh (re-elected).

Romesh Chandra Dutt, C. S.

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

C. A. Samuells, Esq., C. S., Maldah, proposed by H. Beveridge, Esq., seconded by Colonel Waterhouse.

Captain A. Brame, proposed by H. Beveridge, Esq., seconded by C. Little, Esq.

Rev. H. B. Hyde, Chaplain of St. John's, proposed by H. Beveridge, Esq., seconded by Haraprasád Shástri.

Rai Nalinaksha Bose, Bahádur, Chairman, Burdwan Municipality, proposed by Asutosh Mukerjee, seconded by Gaurdás Bysack.

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Bábu Varada Charan Mitra, Jt. Magistrate, Begu Serai, Monghyr, proposed by Pratápa Chandra Ghosha, seconded by R. C. Dutt, Esq.

W. Connan, Esq., Public Works Dept., proposed by H. Beveridge, Esq., seconded by Colonel Waterhouse.

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

A. Macdonald, Esq.
T. A. Pope, Esq.
Maulvi Abdur Rahman.

The SECRETARY reported the death of the following Members :—

E. F. T. Atkinson, Esq.
S. A. Hill, Esq.

The PRESIDENT observed that as this was the first meeting that had been held since the death of Mr. Atkinson, he took the opportunity of expressing the regret which they doubtless all felt at that event. Mr. Atkinson had come out to India in 1863, and had for many years devoted his spare hours to literary and scientific research. He had long been a member of their Society, and was for two years their President, and had as such delivered two able and interesting Addresses. He had laboured two years under the disease of which he died, but had gone on uncomplainingly with his duties and his studies. It was supposed that his death was accelerated by a chill which he caught while attending the funeral of the late Mr. Montague Bradford. The President read an extract from the *Pioneer* of the 29th September last. It gave a fairly appreciative notice of Mr. Atkinson, but was rather stinted in its praise, and in particular it failed to mention the excellent work which Mr. Atkinson had done as Chairman of the Trustees of the Indian Museum. The President stated that the Council had drawn up the following Resolution in which the Members expressed their regret at the death of their friend and colleague, and that a copy of it had been sent to Mrs. Atkinson, with a letter of condolence signed by the President and the Members of Council.

" The Council desire to place on record their deep sense of the " very great loss the Asiatic Society of Bengal and Indian Natural " Science have sustained by the untimely death of their former Presi- " dent and Vice-President, Mr. E. F. T. Atkinson, and to express their " great sorrow at the sad event that has deprived the Society of one of " its most active and enthusiastic supporters, and the Council of a much- " esteemed colleague and friend."

The PRESIDENT stated that the votes would now be taken on the proposed alteration of Rule 70, so as to allow of Admission Fees being treated as part of the income available for general expenditure, reported at the meeting in August last, and appointed Dr. J. H. Tull Walsh and Bábu Asutosh Mukhopádhyáy to be scrutineers, who reported that there were 74 Votes in favour of, 7 Votes against the proposed alteration, and 3 with qualifications, whereupon the President announced that it had been duly carried.

The PRESIDENT laid before the meeting a list of Members who were more than 2 years in arear of subscription, for sanction to the Council being empowered to take legal proceedings for the recovery of the amount due, under the provisions of Rule 48 (g.)

The meeting approved of any action being taken by the Council that might be considered necessary.

COLONEL WATERHOUSE exhibited a birch bark manuscript, and some coins, found by Lieutenant Bower in Kashgaria.

The following note by Lieut. Bower accompanied the exhibit:—

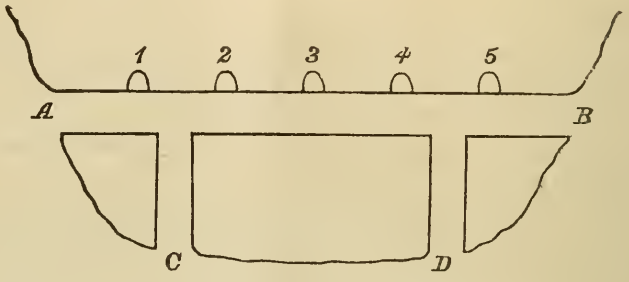
"While at Kuchar a man offered to show me a subterranean town, provided I would go there in the middle of the night, as he was frightened of getting into trouble with the Chinese if it was known that he had taken a European there. I readily agreed and we started off about midnight. The same man procured me a packet of old manuscripts written on birch-bark. They had been dug out of the foot of one of the curious old erections of which several are to be found in the Kuchar district; there is also one on the north bank of the river at Kashgar. The one out of which the manuscripts were procured is just outside the subterranean city."

"These erections are generally about 50 or 60 feet high, broad in proportion and resembling somewhat, in shape, a huge cottage loaf: they are solid and it is difficult to conceive for what purpose they were erected. They are principally composed of sun-dried bricks with layers of beams now crumbling away. Judging from the weather-beaten appearance they possess, and taking into consideration the fact that in Turkestan the rain and snow-fall are almost nominal, they must be very ancient indeed. The natives attribute them to King Afrásiáb, a contemporary of Rustam, who ruled over a kingdom corresponding to the present Chinese Turkestan, but I found they had a habit of attributing everything ancient to King Afrásiáb."

The subterranean ruins of Mingai, to which my guide had promised to take me, are situated about 16 miles from Kuchar, on the banks of

the Shahyar river, and are said to be the remains of Afrásiáb's capital. The town must have been of considerable extent, but has been greatly reduced owing to the action of the river. On the cliffs on the left bank, high up in mid-air, may be seen the remains of houses still hanging on to the face of the cliffs."

"One of the houses I entered was shaped as shown below.



A. B. represents a tunnel, 60 yds. × 4 yds., through a tongue-shaped hill; C and D are the entrances, the hill being almost perpendicular at A and B; 1. 2. 3. 4. 5. are cells roughly 6 feet × 6 feet. The walls have been plastered, and what appear to be the remains of geometrical patterns can be made out."

"I was told that the remains of other similar towns may be seen in the district. In Yaqub Beg's time a lot of gold was dug up."

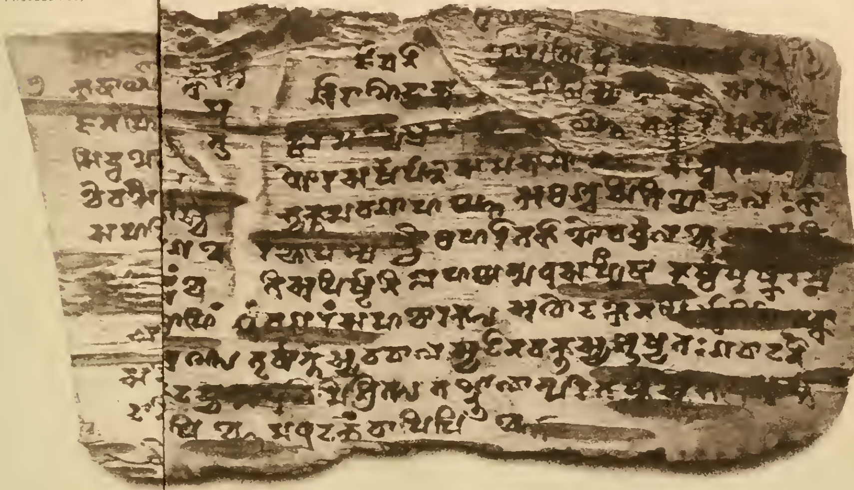
"I believe the ruins and MS. to be Buddhist."

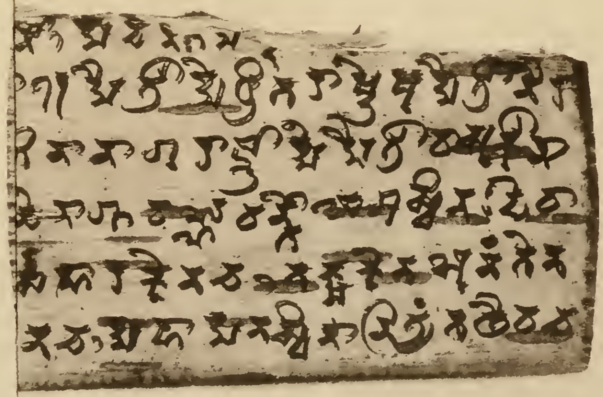
Of the coins two were found in the ruins of Shahr i Babar, one of the ancient towns of Takla Makan, now lying under the sands of the Gobi Desert."

Babu Sarat Chandra Das said, the MS. was very ancient and of great interest, and kindly promised to try and decipher it.

[He has since written to say that both Lama Phuntshog and he had failed in their endeavour to decipher this very ancient and rare MS. unearthed by Lieut. Bower in Eastern Turkestan—the country which he had identified with the *Liyul* of the Tibetan and *Kumṣa Desa* of the Indians in his contribution on the antiquities of Khoten, (*Journal*, Part I, 1886). In that paper it was noticed that there existed in Khoten and the countries north of it numerous Buddhist works in a form of Sanskrit. The Chinese traveller Fa Hian also testified to that. He believes that this MS. is the only remnant (come to light after

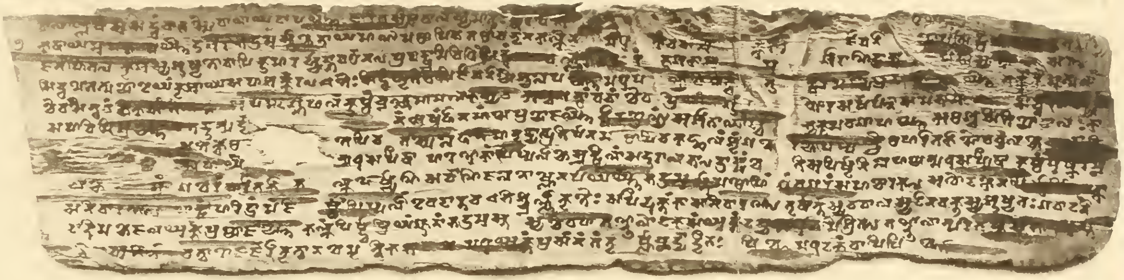
PLATE III

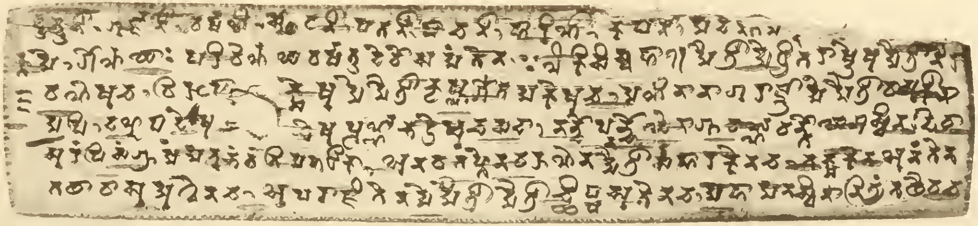




S. I Offices, Calcutta, November 1890.

LE CITY NEAR KUCHAR, EASTERN TURKESTAN.





Photo…

S. I. Offices, Calcutta, November 1890.

LEAVES FROM A BIRCH-BARK MANUSCRIPT FOUND IN AN UNDERGROUND [illegible] NEAR KUCHĀR, EASTERN TURKESTAN.

the lapse of so many centuries) of the Indo-Tartar Sanskrit, which was current in Khoten and Kashgar during the early centuries after Christ.

Most of the letters correspond partly with the ancient Newari and Wartula characters after the model of which the Tibetan characters were shaped by Thonmi Sambhota in the middle of the 7th century A. D. He had compared the MS. writing with some of the characters which were formed by the Locávas of Tibet and called *Yig-sar*, (*vide* Plate VII of *Journal A. S. B.* Vol. LVII, Part I, of 1888). Although he had been able to trace some similarity of shape in the characters of the MS. to those of the *Yigsar*, he failed to make anything out of it, even with the help of some Buddhist Newars of Nipal, now in Calcutta, and had abandoned the hope which he so long entertained of being able to interpret the MS.]

It may be mentioned that the MS. consists of 56 leaves of birch-bark, some in single thickness and others from two to four thicknesses, for the most part written on both sides. The writing, which is entirely in black ink, seems to be in several different hands. Some of the leaves appear perfectly fresh and clear, others are much discoloured; all are very brittle and tender. The leaves are enclosed between two boards and a string runs through them. As the MS. appears to be particularly rare and interesting, a facsimile of two leaves of it, reproduced in heliogravure at the Survey of India Offices, is given in Plate III in the hope that some of our members may be able to decipher it or throw some further light upon its age and origin.

The following papers were read :—

1. *Preliminary list of the Butterflies of Madras.—By* LIEUTENANT E. Y. WATSON, B. S. C.

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

2. *A new Trap-door Spider from Orissa.—By* SURGEON J. H. TULL WALSH, *Indian Medical Service.*

(Abstract.)

Adelonychia, n. gen.

Adelonychia nigrostrata, ♀, n sp. At present the following description will be that of the genus also.

The spider, which I think is not full grown, measures 10 mm. The falces are reddish-brown; fangs long. Pedipalpi medium length, terminal joint furnished with a black pad of strong hairs. Eyes: anterior and centre pairs large and of a blackish-brown colour; hind-centrals and hind-externals small and pearly white. Cephalothorax reddish-

brown above, whitish yellow below ; fovea transverse with eight dark, shallow grooves radiating from it. Cephalo-thorax markedly convex in front between the anterior dark markings and slightly convex over remaining part. Abdomen oval, truncated in front and more convex on the upper than on the under surface. The ground colour above is greenish-grey with a central black stripe and seven well marked black lateral striæ directed downwards and slightly backwards from the central line. The entire upper surface of the abdomen is covered with fine light coloured hairs. Under surface of abdomen dull grey, the four lung sacs visible as small white spots ; 2 pairs of white spinnerets. Legs ; relative length 4. 1-2. 3, pale reddish-yellow above, almost white below. Tarsi without hooks (?) but terminating in brush-like black pads. Falces, pedipalpi and legs thickly covered with strong blackish-brown bristle-like hairs.

Hab. Orissa (Khurda forest).

[A fuller description will appear in the Journal, Part II.]

3. *On some Indian Psychidæ.—By* F. Moore, F. Z. S.

4. *On a new species of* Diptera *in the collections of the Indian Museum.—By* Mons. J. M. F. Bigot. *Communicated by* J. Wood-Mason, Esq.

These papers will be published in the Journal, Part II.

5. *Uriyá Inscriptions of* 15*th and* 16*th Centuries, from the Temple of Jagannáth at Puri, and the Temple of Mahádev at Bhuvanesvar.—By* Manmohan Chakravarti.

6. *Chhatisgar: Notes on its Tribes, Sects and Castes.—By* P. N. Bose, *Geological Survey of India.*

These papers will be published in the Journal, Part I.

7. *Extracts from the Journal of a trip to the Glaciers of Pandim, Kabru, &c., in September* 1889.—*By* P. N. Bose, *Geological Survey of India.*

It was resolved that this paper should be presented to the Geological Survey Department for publication in the "Records" of that Department.

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.

Baltimore. Johns Hopkins University,—American Chemical Journal. Vol. XI, Nos. 6—8; Vol. XII, Nos. 1—5, and General Index of Vols. I—X.

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Berlin. Berliner Entomologische Zeitschrift,—Band XXXV, Heft 1.

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Bombay. Bombay Natural History Society,—Journal, Vol. V, No. 2.

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Geneva. La Société de Physique et d' Histoire Naturelle de Genéve.—Tome XXX, Partie 1 et 2.

Giessen. Der Oberhessischen Gesellschaft für Natur-und Heilkunde,—Bericht, Band XXVII.

The Hague. Koninklijk Instituut voor de Taal,- Land-en Volkenkunde van Nederlandsch Indië,—Bijdragen tot de Taal- Land-en Volkenkunde van Nederlandsch-Indië. Deel. V Aflevering 3 und 4.

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———. Institution of Mechanical Engineers,—Proceedings, No. 1, 1890.

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Santiago. Deutsche Wissenchaftlichen Vereines zu Santigo.—Verhandlungen, Band II, Heft 2.

Schaffhausen. La Société Entomologigue Suisse.—Bulletin, Vol. VIII. Heft, Nr. 5.

Sydney. Linnean Society of New South Wales,—Proceedings, (1st series) Vol. VII, Parts 1—4, Vol. VIII, Parts 1—4, Vol. IX, Parts 1—4, Vol. X, Parts 1—4. (2nd series) Vol. I, Parts 1—4, Vol. V, Part 2.

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Stuttgart. Des Vereins für vaterländische Naturkunde in Württemberg,—Jahreshefte. Jahrgang, 1890.

Taiping. Government of Perak,—The Perak Government Gazette, Vol. III, Nos. 22—28.

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Toronto. Canadian Institute,—Proceedings, Vol. VII, No. 2.

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Vienna. Der Anthropologischen Gesellschaft in Wien,—Mittheilungen. Band XX, Heft 1 und 2.

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NEW YORK.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For December, 1890.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 3rd December 1890, at 9 P. M.

H. Beveridge, Esq., C. S., President, in the chair.

The following members were present:—

Bábu Gaurdás Bysack, Hon. Sir A. W. Croft, Bábu Saratchandra Dás, Bábu Jogendrachandra Ghose, W. H. Jobbins, Esq., C. Little, Esq., C. J. Lyall, Esq., T. R. Munro, Esq., L. de Nicéville, Esq., M. H. Oung, Esq., Pandit Haraprasád Shástri, Dr. W. H. Solf.

The minutes of the last meeting were read and confirmed.

Nineteen 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:—

C. A. Samuells, Esq., C. S.
Captain A. Brame.
Rev. H. B. Hyde.
Rai Nalinaksha Bose, Bahádur.
Babu Varada Charana Mitra.
W. Connan, Esq.

The following gentlemen have expressed a wish to withdraw from the Society:—

Rev. A. W. Atkinson.
Babu Kaliprasana Ghosha.

a3

The PRESIDENT exhibited a facsimile, kindly lent by Mr. Samuells, of an inscription in the Tughra character which was on a piece of black basalt now in the Magistrate's compound at Maldah.

The stone had been found in a jungle near Nawabganj on the Mahananda about twenty miles S. E. from Gaur. This, and some other stones and some Hindu carvings, had belonged to a faqir, and on his death they were sent to the Magistrate as unclaimed property in December 1889. The king referred to in the inscription was an Abyssinian and was known by the name of Sidhi Badr diwanah (mad). He killed the king of Gaur and then usurped the throne and called himself Shamsuddaniya Abul Naçr Muzaffar Sháh. He was a great tyrant and was apparently killed in 899 A. H. (Blochmann' Contributions, p. 81 and the Riyáẓ-us-Saláṯín, pp. 167-169.) The Riyáẓ says he built a mosque in Gaur and probably this inscription belonged to it. The Riyáẓ makes him reign till 903 A. H.

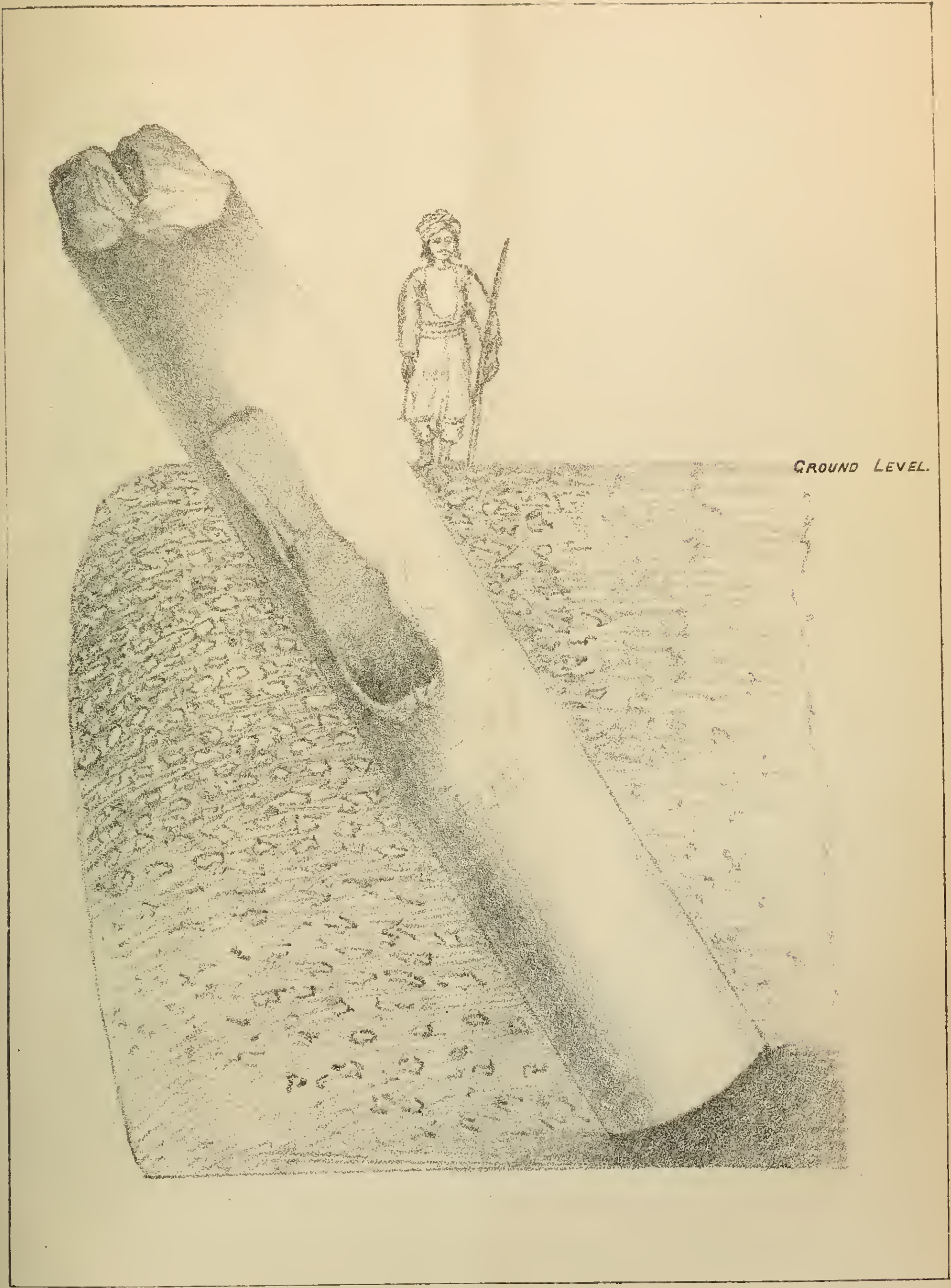
قال النبي صلى الله عليه و سلم من نبي مسجد الله و الله انه الله له وجهه
يبعي تبيا مثله فى الجنته نبى في عهد السلطان الاعظم شمش الدنيا و الدين ابو النصر
مظفرشاه السلطان خلد الله ملكه و سلطانه نبي هذا المسجد الجامع في مجلس المعظم
و المكرم مجلس الغ خرشيد دام علوه العشر من ربيع الاول سنه ثمان وتسعين و ثمانماية *

TRANSLATION.

The Prophet (God's blessing on him,) says "He who builds a mosque for God, it will be the reason of purchasing a house like it in paradise.' It was built in the reign of the great king Shamsuddunya waddin Abunnasr Muzuffar Sháh, may God perpetuate his rule and kingdom. This Jámi mosque was built by Majlisul-moazzam walmakarram Majlis Ulugh Khurshid—May his elevation be everlasting! on the 10th Rabi-al-awal 898. (30th December, 1492).

The PRESIDENT exhibited a copper-plate inscription found at Ashrafpur in the Dacca district, and read a translation of it by Rájá Rájendralála Mitra.

The copper-plate was found in 1884 or 1885 by a ryot named Mir Khan while levelling a mound in Ashrafpur about 30m. S. E. of Dacca and about 5m. from the Sital Lakhya. It was 6 or 7 ft. underground. Another plate was found at the same time and was described and figured in our Proceedings for March 1885. The existence of the copper-plate was brought to notice in the *Statesman* by Tarak Nath Roy, a Bráhman residing at Lakarshi, and it was through him that the plate was acquired by the Society. The plate was in very good preservation,



L. A. WADDELL *Del.* A L. PAIN *Lith.*

THE 'MANIK-THAM' MONOLITH OF THE PURANIYA DISTRICT.

and the date on it was clear. The inscription related to a grant of land by a Jain. Rájá Rájendralála Mitra's translation and remarks would be published in the Journal.

The inscription is of interest as affording the names of 4 kings hitherto unknown to history who flourished in Bengal before the Pala kings who belong to the 9th century.

The President exhibited a badly executed facsimile of an inscription from a mosque in the town of Suri. The inscription had originally no connection with the mosque, and was said to have lain for many years in the Collectorate before it was made over to the builder of the mosque and placed by him upon it. The inscription was dated 922 A. H. (1516) and related to the famous Hosain Shah of Gaur. Possibly it was the same inscription as that described in our Journal, XXX, 389-390. The facsimile was too imperfect to admit of its being read.

Pandit Haraprasád Shástri exhibited a copper-plate inscription of the last century from Orissa.

The Secretary read an invitation for the second Inter-Ornithological Congress to be held at Budapest in May, 1891 forwarded by the Chancellor of the Imperial and Royal Austro-Hungarian Consulate, Calcutta, at the request of the Ministry of Foreign Affairs, Vienna.

The following papers were read—

1. *Some additional species of* Labiatæ, *by* Dr. D. Prain.

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

2. *On place and river names in the Darjeeling district and Sikhim by* Dr. L. A. Waddell.

This and Rájá Rájendralála Mitra's paper on the Ashrafpur inscription will be published in Part I of the Journal.

3. *Note on the 'Manik-tham' monolith in the Puraniya (Purneah) district, (with a sketch and coin).—By* L. A. Waddell, M. B

The only notice of this ancient monument which seems to be on record is a brief and admittedly vague note by Dr. Buchanan, in his report for the Puraniya district.* Lately having had an opportunity of examining the pillar with some care,† I beg to forward the following brief description of it.

* Eastern India III, p. 55.

† The existence of this pillar was brought to my notice by Dr. Picachy, the Civil Surgeon of Purneah.

The pillar is situated outside the N. W. corner of the old fort of Sikligarh, 'the chain fortress', on the western border of the district. It is of thick, inelegant shape, and has the same general proportions and appearance as the Ghazipur edict pillar, now in the grounds of the Benares College. The stone is a light reddish granite of such fine texture as to appear almost like sandstone. It can scarcely be called a 'rude' cylinder, as it is perfectly cylindrical and its surface is smooth and almost polished. It is no longer erect, but is inclined at an angle of about 65°—this inclination, I am informed, was given it about 3 years ago by the then Collector of the district who dug around the pillar and then tilted it over in this way to make sure his excavation had reached the base.

As the appearance of the monolith was suggestive of its being probably an edict pillar, and its greater portion was buried under ground, I had it excavated. This operation showed that the pillar had originally been implanted for over half its length in a foundation of irregular layers of bricks and mortar. The appearance of the column on excavation is well seen in the annexed sketch.* The pillar retained its smooth and almost polished surface throughout its extent, except in a few portions where this surface has scaled off, and where about its middle third the west face of the pillar had been very roughly chipped away to form an irregular oblong depression about 6 feet in length and about $2\frac{1}{2}$ feet in breadth. The most careful search all over the pillar, however, failed to find any trace of an inscription. The basal extremity of the pillar was sharply truncated across and rested in the sand, and here immediately under the pillar was found the gold coin of Indo-Scythic character which accompanies this note.

The upper extremity of the pillar is perforated by a hole (12 inches deep, and in diameter $5\frac{1}{2}$ inches at the top and $3\frac{1}{2}''$ at the bottom) which evidently formed the socket for the stem or bolt of a crowning ornament; and in forcibly wrenching out this latter the top of the shaft has been extensively fractured, (*vide* sketch). Local tradition alleges that the shaft was formerly surmounted by the figure of a lion, but that this was removed many hundreds of years ago, no one knows where.

The dimensions of the pillar are as follow:—total length is 19 ft. 11 inches (of which $7\frac{1}{2}$ feet are above ground); circumference at 3 feet from summit, is $112\frac{1}{2}$ inches.

Regarding the purpose of this pillar there must still remain much doubt. The villagers in the neighbourhood call it '*Manik tham*' or 'the precious pillar' of Hindu fable, and worship it. Dr. Buchanan

* Plate IV.

failed to get any local history or tradition concerning the stone. Now-a-days, the villagers assert that this was this scene of the Mahábhárata episode of the Sivaic Hiraṇya Káns'* attempted slaughter of his son Prahladha for devotion to the worship of Vishnu. King Hiraṇya Káns, it is alleged, lived in the adjoining fortress of Sikligarh and sent out his son to be bound to this pillar and put to death here, when on the appeal of Prahladha to his deity, the latter in the form of Nara Sinha appeared incarnate in the lion-figure surmounting the capital and saved his devotee.

In this legendary tradition it is remarkable that the pillar is associated both with a human sacrifice, and the presence of a surmounting lion: the former possibly suggestive of its being a *sati* pillar, while the latter indicates rather an edict (Asoka ?) pillar. Perhaps it may be the upper part of an edict pillar which has been utilized for *sati* purposes. The stone had originally been carefully fashioned, while the rudely chipped depression is evidently of more recent date. The coin too with its Sivaic emblem on the reverse might imply the creed of the person who erected the stone in this locality, thus coinciding with the popular tradition. It is also curious to find that the river which flows past the further side of the fort is named the *Hiraṇya nadi*, thus lending local colour to the applicability of the Mahábhárata legend.

The coin is described on page 209 of Von Sallet, Die Nachfolger Alexanders des grossen.

It is a coin of Vasudeva or Bazodeo (2nd century A. D.).

Obverse. King standing to left hand, with a nimbus round his head; he wears a peaked cap; a sword by his side; a trident in his left hand; the right hangs over an altar, above which is a trident.

Legend. PAO NANO RAO BAZOΔHO KOPANO (or more correctly KOPNO as the A seems to be omitted), which probably means—"The king of kings Vasudeva the king." But some suppose the last word not to be the Greek *κοιράνου*, but the name of a tribe.

Reverse. OKPO (the Sanskrit Ugra) or S'iva with a humped bull behind him, with only one head. (On some coins of this king he has three heads.) He holds in his left hand a trident, in his right a garland, or perhaps a fillet, or a noose.

See also Percy Gardner's Coins of Greek and Scythic kings, p. 160.

* The name is so pronounced locally, *not* 'Hiraṇya *Kashipu* (हिरण्यकशिपु ।) as is usual. A raja Káns is identified with several places in this and the adjoining district of Dinajpur. Raja 'Kanis' according to Stewart's History of Bengal, p. 94, was a Hindu king of Bengal from 1385 to 1392 A. D. This may be the same as the raja '*Ganes*' mentioned by Dr. Buchanan.

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LIST OF MEMBERS

OF THE

ASIATIC SOCIETY OF BENGAL.

ON THE 31ST DECEMBER 1889.

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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 wiil 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, Nawáb Bahádur, C. I. E. *Calcutta.*
1885 Mar. 4.	R.	Abdur Rahmán, A. F. M., Barrister-at-Law. *Calcutta.*
1888 Feb. 1.	N.R.	Adamson, Major Charles Henry Ellison, M. S. C., Deputy Commissioner. *Rangoon.*
1889 Nov. 6.	R.	Adie, J. R., M. B., Surgeon, Eden Hospital. *Calcutta.*
1860 July 4.	N.R.	Ahmad Khán, Bahádur, Hon. Sayid, K. C. S. I. *Aligarh.*
1888 April 4.	R.	Ahmud, Maulvi, Khán Bahádur, Arabic Professor, Presidency College. *Calcutta.*
1872 April 3.	N.R.	Ashán-ullah, Khán Bahádur, Nawáb. *Dacca.*
1860 April 4.	A.	Aitchison, J. E. T., M. D., C. I. E. *Europe.*
1888 Feb. 1.	N.R.	Alcock, Alfred William, M. B., Surgeon Naturalist, Marine Survey Department.
1884 Mar. 5.	L.M.	A'li, Sir A'li Qadr Syud Hassan, Nawáb Bahádur, K. C. I. E. *Murshedabad.*
1874 June 3.	R.	Amír A'li, Hon. C. I. E, M. A. Barrister-at-Law, Judge, High Court. *Calcutta.*
1888 Feb. 1.	R.	Anderson, Henry H. *Calcutta.*
1865 Jan. 11.	F.M.	Anderson, John, M. D., F. R S., F. L. S. *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, C. I. E., B. A., C. S. Acct.-General, Bengal. *Calcutta.*
1869 Feb. 3.	N.R.	Attar Singh, Bahádur, Sirdár, Sir, K., C. I. E., M. U F., Chief of Bhadour. *Ludiana.*

Date of Election.		
1889 Aug. 29.	N.R	Aziz-ud-din Ahmad, Deputy Collector and Magistrate. *Jaunpur.*
1870 Feb. 2.	L.M.	Baden-Powell, Baden Henry, C. I. E., C. S., Offg. Judge, Chief Court of the Panjab. *Lahore.*
1865 Nov. 7.	N.S.	Ball, Valentine, M. A., F. R. S., F. G. S. *Europe.*
1889 May 1.	R.	Banerji, Hon. Dr. Gurudás, M. A., D. L., Judge, High Court. *Calcutta.*
1862 Aug. 1.	N.R.	Barclay, Arthur, M. B., Surgeon Major, Sec. to Surgeon General and Sanitary Commissioner with the Govt. of India. *Simla.*
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.	A.	Barnett, John, Bengal Pilot Service. *England.*
1881 Aug. 3.	A.	Barstow, Henry Clements, C. S., Magistrate and Collector. *Europe.*
1887 Aug. 3.	R.	Basu, Haricharan. *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.	R.	Beames, John, C. S., Member, Board of Revenue. *Calcutta*
1878 Sept. 25.	N.R.	Beighton, T. D., C. S., 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.	A.	Biddulph, Col. J., B. S. C. *Europe.*
1884 Jan. 2.	N.R.	Bidie, G., Surgeon-General C. I. E., F. L. S., M. B., Belmont, Ootacamund. *Madras.*
1884 Feb. 6.	N.R.	Bigg-Wither, Major A. C., B. A., A. I. C. E. *Quetta.*
1885 Jan. 7.	A.	Bignold, T. E., C. S. *Europe.*
1885 Mar. 4.	N.R.	Bilgrámi, Syud A'li, B. A., A. R. S. M., F. G. S. *Hyderabad.*
1886 Aug. 4.	N.R,	Bingham, Major 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. *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.*
1885 Mar. 4.	R.	Bolton, C. W., C. S., Secretary, Board of Revenue. *Calcutta.*
1889 Sept. 26.	R.	Bose, I. C., B. A., Financial Department, Government of India. *Calcutta.*
1880 Nov. 3.	N.R.	Bose, Pramatha Náth, B. SC., F. G. S., Geological Survey of India.

Date of Election.		
1876 Nov. 15.	N.R.	Bowie, Colonel, M. M. Inspector General of Police C. P. *Nagpur.*
1868 Jan. 15.	N.R.	Boxwell, John, C. S., Commissioner, Patna Division. *Bankipur.*
1876 May 4.	N.R.	Bradshaw, Deputy Surgeon-General A. F., 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.*
1887 May 4.	R.	Burál, Nobinchánd, Solicitor. *Calcutta.*
1862 Feb 5.	L.M.	Bysack, Gaurdás. *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. *Port Blair.*
1885 April 1.	N.R.	Chambers, J. W. *Naraingan j.*
1889 April 3.	R.	Chandra, Goneschandra, Solicitor. *Calcutta.*
1881 Mar. 2.	A.	Channing, Francis Chorley, C. S. *Europe.*
1880 Jan. 7.	R.	Chaudhuri, Govinda Kumár. *Calcutta.*
1861 Mar. 1.	N R.	Chaudhuri, Harachandra, Zemindar. *Sherpur Mymensingh.*
1880 Nov. 3.	N.R.	Chaudhuri, Rái Khirod Chandra. Deputy Inspector of Schools, Sonthal Pergunnahs. *Dumka.*
1886 April 7.	N.R.	Chaudhuri, Rádhába llabha. *Sherpur, Mymensingh.*
1885 Feb. 4.	N.R.	Chaudhuri, Rájá Suryakánta, Bahádur. *Mymensingh.*
1889 Sept. 26.	N.R.	Chuckerbutty, Rájá Ramranjan, Bahádur. *Hitampur, Beerbhoom.*
1885 April 1.	N.R.	Clark, H. Martyn, M. B. *Amritsar.*
1877 Aug. 30.	R.	Clarke, Lieut.-Col. Henry Wilberforce, R. E. *Calcutta.*
1880 Aug. 26.	F.M.	Clerk, Colonel Malcolm G. *Europe.*
1881 May 4.	N.R.	Cockburn, John, Asst. Sub-Deputy Opium Agent. *Karwi, Banda, N.-W. P.*
1888 Nov. 1.	N.R.	Collett, Brigadier General, Henry, C. B, F. L. S. *Shillong, Assam.*
1889 Nov. 6.	R.	Colville, W. B. *Calcutta.*
1886 Aug. 26.	F.M.	Condenhove, Count H., Attaché Austro-Hungarian Legation. *Constantinople.*
1874 Nov. 4.	F.M.	Constable, Archibald, M. I. C. E. *England.*
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. *Patna.*
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.*

Date of Election.		
1874 Mar. 4.	R.	Crombie, Alexander, M. D., Surgeon Major, Presidency General Hospital. *Calcutta.*
1888 Dec. 5.	N.R.	Crooke, William, B. A., C. S., Magistrate and Collector. *Fatighar.*
1873 Aug. 6.	R.	Cunningham, David Douglas, Surgeon-Major. Honorary Surgeon to the Viceroy. *Calcutta.*
1873 Dec. 3.	N.R.	Dames, Mansel Longworth, C. S., Asst. Commissioner. *Dera Ghazi Khan.*
1877 June 6.	N.R.	Darbhanga, Sir Luchmessur Sing, Bahádur, K. C. I. E., Mahárajá 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.*
1885 May 6.	N.R.	Dé, Rájá Baikuntanáth, Bahádur. *Balasore.*
1889 May 1.	N.R.	Delawar Hosaen Ahmed, Meerza. *Gya.*
1862 May 7.	N.R.	Dhanapati Singh Dughar, Rai Bahádur. *Azimganj.*
1877 July 4.	R.	Diler Jang, Nawáb Syad Ashgar A'li, Khán Bahádur, 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.*
1889 Jan. 2.	N.R.	Dudgeon, Gerald Cecil, Lebong Tea Company. *Darjeeling.*
1879 Feb. 5.	N.R.	Duthie, J. F., Director, Government Botanical Survey, Northern India. *Saharanpur.*
1877 Aug. 30.	N.R.	Dutt, Kedarnáth, Depy. Collector. *Cuttack.*
1870 Mar. 9.	L.M.	Edinburgh, H. R. H. The Duke of. *Europe.*
1863 May 6.	R.	Edgar, Sir John Ware K. C. I. E., 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.	N.R.	Eliot, J., M. A., Meteorological Reporter to the Govt. of India. *Simla.*
1886 Jan. 6.	R.	Elson, Samuel R. Bengal Pilot Service. *Calcutta.*
1876 Jan. 5.	F.M.	Feistmantel, Ottokar, M. D. *Europe.*
1879 July 2.	R.	Finucane, M. C. S., Director of Agriculture, Bengal. *Calcutta.*
1869 Sept. 1.	N.R.	Fisher, John Hadden, C. S. *Azamghar.*
1886 April 7.	N.R.	Fleet, John Faithfull, C. I. E., C. S. *Bijapur, Bombay.*
1876 July 5.	N.R.	Foulkes, The Rev. Thos., F. L. S., M. R. A. S., F. R. G. S. *Salem, Madras Presidency.*
1880 April 7.	N.R.	Gajapati, A'nanda Rám, K. C. I. E., Rájá of Vizianagram. *Vizianagram.*
1873 Dec. 3.	N.R.	Gamble, J. S., M. A., Conservator of Forests, Northern Circle. *Madras.*

Date of Election.		
1883 Aug. 1.	N.R.	Garga, Kumár Isvariprasád, Zemindar. *Maisádal.*
1859 Aug. 3.	LM.	Gastrell, General James Eardley. *Europe.*
1867 Dec. 4.	R.	Gay, E. M. A., F. R. A. S., Comptroller-General. *Calcutta.*
1889 Jan. 2.	R.	Ghose, Jogendrachandra, M. A., B. L. *Calcutta.*
1883 Aug. 30.	R.	Ghose, Manmohan. *Calcutta.*
1889 Mar. 6.	R.	Ghosha, Bupendra Sri. *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. J., M. B., F. R. C. S., Civil Surgeon. *Hoshangabad.*
1886 Sept. 30.	N.R.	Gimlette, George Hart Desmond, Surgeon, Bengal 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.*
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.	A.	Griffin, Sir Lepel Henry, K. C. S. I., C. S. *Europe.*
1861 Feb. 6.	N.R.	Growse, Frederick Salmon, C. I. E., M. A., C. S., Magistrate and Collector. *Fatehgarh, N.-W. P.*
1886 Mar. 3.	N.R.	Gupta, Asutosh, C. S., Assistant Magistrate and Collector. *Beguserai, Monghyr.*
1888 July 4	R.	Gupta, Rajanikánta. *Calcutta.*
1889 May 1.	R.	Hamilton, Rev. J. Muir, B. D. *Calcutta.*
1889 June 5.	F.M.	Hamilton, Rev. Walter A., Chaplain, Bengal Establishment. *Europe.*
1883 Jan. 3.	N.R.	Harding, Francis Henry, B. A., C. S. *Chittagong.*
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, A. F. R., PH. D., Principal of the Calcutta Madrasa. *Calcutta.*
1878 Mar. 6.	N.R.	Hoey, W., C. S. *Banda.*
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.	A.	Howell, Mortimer Sloper, C. S. *Europe.*
1878 Sept. 25.	A.	Hughes, G., C. S. *Europe.*
1867 Aug. 7.	N.R.	Hughes, T. W. H., A. R. S. M., F. G. S., Superintendent Geol. Survey of India.

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. *Simla.*
1884 May 2.	N.R.	Hussein, Syud, B. A., Secy. to Nizam of Hyderabad's Council. *Hyderabad.*
1872 Dec. 4.	N.R.	Ibbetson, Denzil Charles Jelf, C. S. Deputy Commissioner. *Gujranwala, Panjab.*
1866 Mar. 7.	F.M.	Irvine, William C. S. *Europe.*
1884 May 2.	N.R.	Iskander Ali Mirza, Prince. *Murshedabad.*
1880 Dec. 1.	N.R.	Jackson, William Grierson, C. S. Deputy Commissioner. *Orai, Jalaun.*
1869 Aug. 4.	R.	Jahán Qadr Muhammad Wáhid Alí, Bahádur, Prince. *Garden Reach, Calcutta.*
1879 Mar. 5.	A.	Jarrett, Lt.-Col. H. S., B. S. C., Secy. to the Board of Examiners. *Europe.*
1881 Feb. 2.	N.R.	Jenkins, Major Thomas Morris, M. S. C. Deputy Commissioner. *Tavoy.*
1889 Mar. 6.	R.	Jobbins, William Henry, Principal, Government School of Art. *Calcutta.*
1873 Dec. 3.	N.R.	Johore, H. H. the Mahárájá of, K. C. S. I. *New Johore, Singapore.*
1882 Mar. 1.	N.R.	Kennedy, Pringle, M. A. *Mozufferpur.*
1874 Dec. 2.	N.R.	Khudá Baksh, Khán Bahádur, Maulaví. *Bankipur.*
1884 Nov. 5.	N.R.	Kitts, Eustace John, C. S. *Banda.*
1867 Dec. 4.	R.	King, Brigade Surgeon G. C. I. E., M. B., F. L. S., Supdt., Royal Botanic Garden. *Sibpur.*
1881 Mar. 2.	F.M.	King, Lucas White, B. A., LL. B., C. S., Assistant Agent to the Governor General, Central India. *Europe.*
1862 Jan. 15.	R.	King, W., B. A., D. SC., Director, Geological Survey of India. *Calcutta.*
1889 Mar. 6.	R.	Khunnah, Jagánath. *Calcutta.*
1889 July 3.	N.R.	Lal, Pandit Brij Bukhan. Public Works Department. *Kurnal, Punjab.*
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.*
1889 Mar. 6.	N.R.	La Touche, Thomas Henry Digges, M. A. Deputy Superintendent, Geological Survey of India.
1889 Nov. 6.	R.	Lee, W. A. *Calcutta.*
1881 Mar. 2.	N.R.	Lee, J. Bridges, M. A., F. G. S., F. C. S., F. Z. S., Barrister-at-Law. *Lahore.*
1888 Feb. 1.	N.R.	Lee, William Herbert, C. S. *Cuttack.*

Date of Election.		
1880 July 7.	A.	Lewis, Rev. Arthur, B. A., *Europe.*
1889 Feb. 6.	R.	Little, C., M. A., Bengal Education Department. *Calcutta.*
1886 Sep. 30.	N.R.	Luson, Hewling, C. S., Assistant Magistrate. *Gya.*
1869 July 7.	R.	Lyall, Charles, James, B. A., C. S. *Calcutta.*
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. *Tezpur 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.*
1879 Feb. 5.	N.R.	Macgregor, Lieut.-Col. C. R., F. R. G. S., 44th N. I. *Manipur.*
1848 April 5.	L.M.	Maclagan, General Robert, R. E., F. R. S. E., F. R. G. S. *Europe.*
1873 Dec. 3.	R.	MacLeod, Kenneth, M. D. Brigade Surgeon. *Calcutta.*
1880 May 5.	N.R.	MacLeod, Roderick Henry, 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. *Jhang. Panjab.*
1882 Aug. 2.	R.	Mahomed Yusoof, Hon. Maulaví. *Calcutta.*
1888 July 4.	N.R.	Mahomed Zainool Abideen Khán Bahádur Ferozo Jung, Nawab Syud (Nizamut Family). *Murshedabad.*
1867 April 3.	R.	Mainwaring, Major-General George Byres, S. C. *Serampur.*
1889 Jan. 2.	R.	Maliáh, Kumár Rameswár. *Calcutta.*
1869 Sept. 1.	R.	Mallik, Yadulál. *Calcutta.*
1889 Mar. 6.	R.	Mann, John, M. A. Bengal Education Department. *Hughli.*
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., Political Agent. *Bhopawar.*
1860 Mar. 7.	A.	Medlicott, H. B., M. A., F. R. S., F. G. S. *England.*
1886 Mar. 3.	L.M.	Mehtá, Roostumjee Dhunjeebhoy. *Calcutta.*
1884 Nov. 5.	N.R.	Middlemiss, C. S., A. B., Assistant Superintendent, Geological Survey of India.
1871 Sept. 6.	A.	Miles, Colonel S. B., BO. S. C., Political Agent. *Europe.*
1884 Sept. 3.	R.	Miles, William Harry. *Calcutta.*
1870 July 6.	R.	Miller, A. B., B A., Barrister-at-Law, Official Trustee. *Calcutta.*
1874 May 6.	N.R.	Minchin, F. J. V. *Aska, Ganjam.*
1856 Mar. 5.	R.	Mitra, Rájá Rájendralála, LL. D., C. I. E. *Calcutta.*

Date of Election.		
1876 Dec. 6.	A.	Mockler, Col. E. *Europe.*
1886 May 5.	A.	Molesworth, Capt. E. H. Commandant, Police Levy, *Dibrugarh. Europe.*
1881 May 4.	A.	Molloy, Lieut.-Col. Edward. 5th Goorkhas. *Europe.*
1864 Nov. 2.	N.R.	Muir, J. W., M. A., C. S. *Azimgarh.*
1879 May 7.	R.	Mukerjea, Bhudeva, C. I. E. *Calcutta.*
1867 Mar. 6.	R.	Mukerjea, Rájá, 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. *Calcutta.*
1887 May 4.	R.	Munro, Thomas R., Port Commissioners 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.*
1889 Aug. 29.	L M.	Nimmo, John Duncan. *Calcutta.*
1887 April 6.	R.	Noetling, Fritz. Ph. D. Palæontologist to the Geological Survey of India. *Calcutta.*
1869 July 7.	N.R.	Nursing Ráo, A. V., Ráo Bahádur., F. R. A. S. *Vizagapatam.*
1885 Feb. 4.	R.	Nyáyaratna, Pandit Mahámahopádhyáya Maheschandra, C. I. E. *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, Geological Survey 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.	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.*
1888 Feb. 1.	L.M.	Pandit, Hon. Ajodhianath. *Allahabad.*
1880 Jan. 7.	N.R.	Pargiter, Frederick E., B. A., C. S. *Pubna.*
1880 Jan. 7.	N.R.	Parry, J. W., C. E. ASSOC. M. I. C. E., Asst. Engineer. *Western Bengal Surveys.*
1862 May 7.	L.M.	Partridge, Samuel Bowen, M. D., Surgeon-Major. *Europe.*

Date of Election.		
1871 Dec. 6.	N.R.	Peal, S. E. *Sibsagar, Assam.*
1873 Aug. 6.	R.	Pedler, Alexander, F. C. S., Professor of Chemistry, Presidency College. *Calcutta.*
1888 June 6.	L.M.	Pennell, Aubray Percival, B. A., C. S. *Burma.*
1865 Sept. 6.	N.R.	Peppé, T. F. Tiril Tea Estate. *Ranchi, Lohardugga.*
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. *Bijapur, Bombay.*
1888 July 4.	R.	Petley, Lieut.-Eaton W. R. N., F. R. G. S., Port Officer. *Calcutta.*
1889 Nov. 6.	N.R.	Phillott, Capt. D C., Adjutant 3rd Panjab Cavalry. *Dera Ismail Khan.*
1887 Mar. 2.	R.	Pope, T. Archdale, Assistant Superintendent, Survey of India Department. *Calcutta.*
1889 Mar. 6.	R.	Prain, David, M. A., M. B., L. R. C. S., I. R. S. E., I. L. S., Royal Botanic Garden. *Sibpur.*
1889 Mar. 6.	N.R.	Prasad, Hanuman, Raes and Zemindar. *Chunar.*
1889 Nov. 6.	N.R.	Prashad, Pandit Jwála, M. A., Assistant Commissioner. *Rai Bareli.*
1881 Feb. 2.	N.R.	Prideaux, Colonel William Francis, B. S. C, Resident. *Jeypur.*
1880 April 7.	N.R.	Rai, Bipina Chandra, B. L. *Ranaghat, Nuddea.*
1887 May 4.	R.	Ráy, Prasannakumár, D. Sc., (Lond. and Edin.) Professor, Presidency College. *Calcutta.*
1889 June 5.	R.	Raye, Surgeon-Major O'Connell, M. D. *Calcutta.*
1880 Aug. 4.	N.R.	Reynolds, Herbert William Ward, C. S. *Mirzapur.*
1884 Mar. 5.	A.	Risley, H. H., B. A., C. S. *Europe.*
1860 Jan. 3.	N.R.	Rivett-Carnac, John Henry, C. I. E., F. S. A., C. S., Opium Agent. *Ghazipur.*
1889 June 5.	A.	Rowe, F. J. M. A., Bengal Education Department. *Europe.*
1888 July 4.	N.R.	Roy, Kirán Chándrá, Zemindar. *Narail, Jessore.*
1888 June 6.	R.	Roy, Kumár Denendro Nárayán. *Calcutta.*
1881 Aug. 30.	N.R.	Roy, Nanda Kumár. *Nepal.*
1888 June 6.	R.	Roy, Peary Mohun. *Calcutta.*
1888 Sep. 27.	N.R.	Roy, Upendra Chándra, Zemindar. *Narail Jessore.*
1885 Mar. 4.	R.	Rustomjee, H. M. *Calcutta.*
1889 June 5.	R.	Sadler, Captain J. Hayes, B. S. C., Secretary, Board of Examiners. *Calcutta.*
1880 Sep. 30.	N.R.	Sage, E. M., Ex. Engineer, P. W. D. *Tounghu.*
1887 June 1.	A.	Sandberg, Rev. Graham, B. A., Barrister-at-Law, Inner Temple. Chaplain. *Europe.*
1872 Dec. 4.	R.	Sarasvati, Pandit, Pránnáth, M. A., B. L. *Bhowanipur.*
1867 April 3.	R.	Sarkár, The Hon. Dr. Mahendralál, C. I. E. *Calcutta.*

Date of Election.		
1885 Mar. 4.	R.	Sarvádhikári, Rájakumár. *Calcutta.*
1885 Feb. 4.	R.	Sástri, Pandit Haraprasád, M. A. *Calcutta.*
1888 Feb. 1.	R.	Sclater, William Lutley, Deputy Superintendent, Indian Museum. *Calcutta.*
1884 April 2.	N.R.	Scotland, John Parry, C. E., Ex. Engineer. *Midnapur.*
1874 July 1.	F.M.	Scully, Dr. John. *Europe.*
1888 Sept. 27.	R.	Sen Gupta, Kali Prasanna. *Calcutta.*
1886 Mar. 3.	R.	Sen, Hirálal, Excise Department. 24-*Pargunnahs.*
1885 April 1.	N.R.	Sen, Yadunáth. *Khurda, Puri.*
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.*
1888 April 4.	N.R.	Shástri, Haridas Bhattácharya, Sankhya Shastri, M. A. Director of Public Instruction, Jaypur State. *Jaypur.*
1882 May 3.	N.R.	Shyamaldáss, Mahámahopadhyáya Kavirâj, Private Secy. to H. H. the Mahárájá 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.*
1889 Nov. 6.	N.R.	Simpson, Edmund James, L. R. C. P., I. R. P. S. G., Civil Surgeon. *Rai Bareli.*
1884 Sept. 3.	R.	Singh, Kumár Indrachandra, of Paikparah. *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.*
1889 Aug. 29.	N.R.	Singh, H. H. Prabhunarain, Bahádur, Mahárájá of Benares.
1889 Nov. 6.	N.R.	Singh, Hon. Rájá Rameshwara, Bahádur. *Darbhanga.*
1859 Aug. 3.	R.	Siñha, Baláichánd. *Calcutta.*
1872 Aug. 5.	N.R.	Skrefsrud, Rev. L. O., Indian Home Mission to the Santhâls. *Rampur Hát.*
1885 Nov. 4.	F.M.	Smith, N. F. F. *England.*
1874 June 3.	N.R.	Smith, Vincent Arthur, C. S., Settlement Officer. *Rai Bareli.*
1872 July 3.	N.R.	Stephen, Carr, B. L., District Judge. *Amritsar.*
1876 Aug. 2.	N.R.	St. John, Lieut.-Col. Sir Oliver Beauchamp, R. E., K. C. S. I., Resident in Mysore and Chief Commissioner. *Coorg.*
1880 Nov. 3.	A.	Sturt, Lieut. Robert Ramsay Napier, B. S. C., Panjab Frontier Force. *Europe.*
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.*

Date of Election.		
1880 Nov. 3.	A.	Swynnerton, Rev. Charles. *England.*
1868 June 3.	R.	Tagore, The Hon. Mahárájá Sir Jotendra Mohun, Bahádur, K. C. S. I. *Calcutta.*
1865 Sept. 6.	R.	Tawney, C. H., C. I. E., M. A., Principal, Presidency College. *Calcutta*
1884 May 5.	F.M.	Taylor, W. C., Settlement Officer, Khurda. *Europe.*
1878 June 5.	N.R.	Temple, Capt. R. C., S. C. *Palace, Mandalay, Burma.*
1875 June 2.	N.R.	Thibaut, Dr. G., Professor, Muir Central College. *Allahabad.*
1886 Aug. 4.	R.	Thomas, Robert Edmond Skyring. *Calcutta.*
1886 Jan. 6.	A.	Thompson, Colonel, W. B., B. S. C. *Europe.*
1847 June 2.	L.M.	Thuillier, Major-Genl. Sir Henry Edward Landor, R. A., C. S. I., F. R. S. *Europe.*
1889 Mar. 6.	R.	Thuillier, Colonel. H. R., R. E., Surveyor General of India. *Calcutta.*
1883 June 6.	N.R.	Toker, Lieut.-Col. Alliston Champion, C. B., B. S. C., Sec., Govt. of India, Mily. Dept.
1871 April 5.	F.M.	Trefftz, Oscar. *Europe.*
1861 June 5.	L.M.	Tremlett, James Dyer, M. A., C. S., Judge, Chief Court. *Lahore.*
1885 May 6.	R.	Verdeau, Ivan. *Calcutta.*
1886 Sep. 30.	N.R.	Waddell, Dr. Laurence Austine, M. B., Superintendent of Vaccination. *Darjeeling.*
1889 Nov. 6.	N.R.	Walsh, J. H. Tull, Indian Medical Service. Civil Surgeon. *Pooree.*
1865 May 3.	R.	Waterhouse, Col. James, B. S. C., Dy. Supdt., Survey of India. *Calcutta.*
1887 Oct. 6.	N.R.	Watson, Lieut. Edward Yerbury, Deputy Assistant Commissary General. *Burma.*
1874 July 1.	N.R.	Watt, Dr. George, C. I. E., Reporter on Economic Products. *Simla.*
1869 Sept. 1.	A.	Westland, Hon. James, C. S. *Europe.*
1880 Feb. 4.	R	Wilson, The Hon. Arthur, Judge, High Court. *Calcutta.*
1870 Jan. 5.	R.	Wood-Mason, James. Superintendent, Indian Museum. *Calcutta.*
1873 Aug. 6.	N.R.	Woodthorpe, Col. Robert Gossett, C. B., R. E., Deputy Quarter-Master-General. *Simla.*

SPECIAL HONORARY CENTENARY MEMBERS.

Date of Election.	
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, R. E., K. C. I. E., C. S. I., C. I. 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.	Dr. Warner 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. E. Helmholtz. *Berlin.*
1881 Dec. 7.	Dr. Rudolph v. Roth. *Tübingen.*
1881 Dec. 7.	Sir William Thompson, Knt., LL. D., F. R. S., F. R. S. E., *Glasgow.*
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. *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.*

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.	Mavlaví 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.	Führer, Dr. A. *Lucknow.*
1886 Dec. 1.	Bábú 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 :

Dr. J. E. T. Aitchison, C. I. E.
J. Barnett, Esq.
H. C. Barstow, Esq , C. S.
Sir Charles Edward Bernard, K. C. S. I., C. S.
T. F. Bignold, Esq., C. S.
Hon. Sir R. E. Egerton, K. C. S. I., C. I. E., C. S.
Sir Lepel Henry Griffin, K. C. S. I., C. S.
Major W. G. Hughes, M. S. C.

LOSS OF MEMBERS DURING 1889.

By Retirement.

General G. G. Pearse, R. H. A., C. B.
W. Fiddian, Esq., C. S.
H. M. Kish, Esq., C. S.
Kumar Sarat Chandra Singh.
A. P. MacDonell, Esq., C. S. I., C. S.
Babu Tárá Prasáda Chatterji.
R. A. Sterndale, Esq.
J. Wilson, Esq., C. S.
R. Whittall, Esq.
F. R. Mallett, Esq., F. G. S., F. C. S.
Kumár Nilkrishna Deb, Bahádur.
Kumár Vinaya Krishna Deb, Bahádur.
W. Sandford, Esq.

By Death.

Ordinary Members.

Otto Müller, Esq.
Maulvi Kabir-ud-din Ahmad.
Hon. Ráo Sáhib V. N. Mandlik, C. S. I.
Mahárájá Isvariprasád Singh, C. S. I. *Benares.*
Dr. David Waldie.
Dr. Francis Day.
E. J. Jones, Esq.

Special Honorary Centenary Members.

James Prescott Joule, Esq., LLD., F. R. S.

Honorary Members.

Col. Sir Henry Yule, R. E., K. C. I. E., C. B.
Professor William Wright, LL. D.

By Removal.

Under Rule 40.

Col. G. E. Fryer, M. S. C.
Major-Genl. J. Y. Gowan.
S. Harraden, Esq.
Lieut. J. W. Jarrad, R. N.
Col. Sir James Johnstone.
Major-Genl. C. C. Minchin.
S. H. Robinson, Esq.
Dr. W. Schlich.
H. E. Sir Donald M. Stewart, Bart., G. C. B., C. C. S. I.
Commander A. D. Taylor.
Major-Genl. J. F. Tennant, R. E., C. I. E., F. R. S.
Col. W. S. Trevor, R. E.

ABSTRACT STATEMENT

OF

RECEIPTS AND DISBURSEMENTS

OF THE

Asiatic Society of Bengal

FOR

THE YEAR 1889.

STATEMENT

Asiatic Society

Dr.

To Establishment.							
Salaries	Rs.	4,221	7	3			
Commission	...	421	7	6			
		4,642	14	9			
To Contingencies.							
Stationery	...	113	11	6			
Lighting	...	86	8	0			
Bnilding, Ordinary	...	8	8	6			
Taxes	...	897	12	0			
Postage	...	569	8	0			
Freight	...	4	3	0			
Meeting	...	82	8	0			
Miscellaneous	...	157	0	6			
		1,919	11	6			
To Library and Collections.							
Furniture	...	7	0	0			
Books	...	660	8	5			
Local Periodicals	...	31	0	0			
Binding	...	506	14	0			
Coins	...	3	6	0			
Catalogue of Burmese MSS.	...	67	0	0			
		1,275	12	5			
To Publications.							
Journal, Part I	...	1,092	1	9			
Journal, Part II	...	3,006	12	11			
Proceedings	...	877	9	0			
		4,976	7	8			
To Printing charges of Circulars, Receipt forms, &c.	...	126	0	0	12,940	14	4
To Personal Account (Writes off and Miscellaneous)		......			306	3	0
To Extraordinary Expenditure.							
Auditors Fee	...	100	0	0			
Repairs to House	...	1,619	4	4			
Barisál Guns	...	60	10	6	1,779	14	10
To Balance	...	......			1,39,211	13	7
Total	...				1,54,238	13	9

Examined and found correct,

Meugens & King,

Public Accountants.

The 30th January, 1890.

No. 1.
of Bengal.

Cr.

By Balance from last report			1,38,032 4 10
By Cash Receipts.			
Publications sold for cash	45 10 0		
Interest on Investments	6,169 4 11		
Advances recovered	5 13 0		
Miscellaneous	55 9 9		
		6,276 5 8	
By Personal Account.			
Admission fees	912 0 0		
Compounding fees	810 0 0		
Subscriptions	7,735 0 0		
Sales on credit	404 2 0		
Miscellaneous	69 1 3		
		9,930 3 3	
Total Income			16,206 8 11
Total ...			1,54,238 13 9

Will. King,
Honorary Secretary and Treasurer.
Asiatic Society of Bengal.

STATEMENT

Oriental Publication Fund in Account

Dr.

To Cash Expenditure.

Printing charges ...	Rs.	9,260	9	0			
Editing charges ...	...	4,435	6	0			
Binding ...	...	0	12	0			
Salaries ...	...	1,436	0	0			
Advertising ...	...	130	0	0			
Freight ...	...	15	15	0			
Stationery ...	...	29	2	0			
Postage ...	...	600	1	3			
Contingencies ...	...	13	6	6			
Commission on collecting bills ...	...	61	10	4			
		15,982	14	1			
To Personal Account (Writes off and Miscellaneous)		9	7	0			
Total Expenditure					15,992	5	1
To Balance ...		......			3,695	7	6
		Total Rs. ...			19,687	12	7

Examined and found correct.

Meugens & King,

Public Accountants.

The 30th January, 1890.

STATEMENT

Sanskrit Manuscript Fund in Account

Dr.

To Cash Expenditure.

Salaries ...	Rs.	1,300	5	9			
Travelling expenses ...	...	175	4	0			
Commission ...	...	8	0	0			
Printing charges ...	...	683	12	0			
Postage ...	...	0	1	0			
Contingencies ...	...	19	5	0			
Stationery ...	...	10	1	0			
Purchase of MSS....	...	1,175	4	0			
					3,372	0	9
To Balance ...		......			3,300	0	3
		Total Rs. ...			6,672	1	0

Examined and found correct.

Meugens & King,

Public Accountants.

The 30th January, 1890.

No. 2.

with the Asiatic Society of Bengal.

Cr.

Balance from last report ... ... Rs.					7,713	11	4
By Cash Receipts.							
Government allowance ... ... Rs.	9,000	0	0				
Publications sold for cash	612	14	0				
Advances recovered	98	15	6				
	9,711	13	6				
By Personal Account.							
Sales on credit	2,244	7	9				
Miscellaneous	17	12	0				
	2,262	3	9				
Total Income					11,974	1	3
Total Rs. ...					19,687	12	7

Will. King,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

No. 3.

with the Asiatic Society of Bengal.

Cr.

Balance from last report ... ... Rs.					3,442	1	0
By Cash Receipts.							
Government allowance ... ... Rs.	3,200	0	0				
Publications sold for cash	4	0	0				
	3,204	0	0				
By Personal Account.							
Publications sold on credit	26	0	0				
Total Income					3,230	0	0
Total Rs. ...					6,672	1	0

Will. King,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

STATEMENT

Personal

Dr.

To Balance from last report		Rs.	3,390 12 2
To Cash Expenditure.			
Advances for purchase of Sanskrit MSS., postage of books to members			2,819 15 8
To Asiatic Society	9,930 3 3		
To Oriental Publication Fund	2,262 3 9		
To Sanskrit MSS. Fund	26 0 0		
			12,218 7 0
		Total Rs. ...	18,429 2 10

Examined and found correct.

Meugens & King,

Public Accountants.

The 30*th January*, 1890.

No. 4.
Account.

Cr.

By Cash receipts	Rs.	13,426	4	2	
By Asiatic Society	...	306	3	0	
By Oriental Publication Fund ...	...	9	7	0	
					13,741 14 2

By Balances.	Due to the Society.			Due by the Society.			
Members	5,091	9	8	390	13	4	
Subscribers ...	71	2	0	59	9	6	
Employés ...	30	0	0	250	0	0	
Agents	269	2	6	...	...	...	
Miscellaneous ...	126	7	4	200	10	0	
	5,588	5	6	901	0	10	4,687 4 8

Total Rs. ... 18,429 2 10

WILL. KING,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

STATEMENT

Invest

Dr.

		Nominal.			Actual.		
To Balance from last report ...	... Rs.	1,46,300	0	0	1,45,923	2	2
	Total Rs. ...	1,46,300	0	0	1,45,923	2	2

Examined and found correct.
MEUGENS & KING,
Public Accountants.
30*th January*, 1890.

Funds.*	Actual,						Total.		
	Permanent.			Temporary.					
Asiatic Society	134,700	0	0	700	0	0	135,400	0	0
O. P. Fund ...	......	...	...	2,415	1	7	2,415	1	7
Sanskrit MSS....	......	...	...	2,000	0	0	2,000	0	0
Trust Fund ...	1,200	0	0	......	...	...	1,200	0	0
	1,35,900	0	0	5,115	1	7	1,41,015	1	7

STATEMENT

Trust

Dr.

To Balance (Servants Pension Fund)	Rs.	1,207	3	10
	Total Rs. ...	1,207	3	10

Examined and found correct.
MEUGENS & KING,
Public Accountants.
30*th January*, 1890.

No. 5.

ments.

Cr.

		Nominal.			Actual.		
By Cash	Rs.	5,000	0	0	4,908	0	7
By Balance*	...	1,41,300	0	0	1,41,015	1	7
Total Rs.	...	1,46,300	0	0	1,45,923	2	2

WILL. KING,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

No. 6.

Fund.

Cr.

By Balance from last report	Rs.	1,161	3	10
By Interest on Investments	...	46	0	0
Total Rs.	...	1,207	3	10

WILL. KING,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

STATEMENT

Cash

Dr.

To Balance from last report		1,035	6	8

RECEIPTS.

To Asiatic Society	6,322	5	8
To O. P. Fund	9,711	13	6
To Sanskrit Manuscript Fund	3,204	0	0
To Personal Account	13,426	4	2
To Investments	4,908	0	7
To Trust Fund	46	0	0
Total Rs. ...	38,653	14	7

Examined and found correct,
MEUGEN & KING,
Public Accountauts.
30*th January* 1890.

STATEMENT

Balance

Dr.

To Cash	1,712	2	11
To Investment	1,41,015	1	7
To Personal Account	4,687	4	8
Total Rs. ...	1,47,414	9	2

Examined and found correct
MEUGEN & KING,
Public Accountants.
30*th January* 1890.

No. 7.

Account.

Cr.

Expenditure.

By Asiatic Society	14,766	13	2
By O. P. Fund	15,982	14	1
By Sanskrit Manuscript Fund	3,372	0	9
By Personal Account	2,819	15	8
By Balance	1,712	2	11
Total Rs. ...	38,653	14	7

Will. King,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

No. 8.

Sheet.

Cr.

By Asiatic Society	1,39,211	13	7
By O. P. Fund	3,695	7	6
By Sanskrit Manuscript Fund	3,300	0	3
By Trust Fund	1,207	3	10
Total Rs. ...	1,47,414	9	2

Will. King,
Honorary Secretary and Treasurer,
Asiatic Society of Bengal.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

EDITED BY

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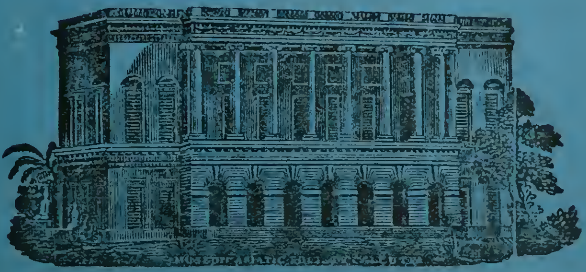
No. I. JANUARY, 1890.



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1890.

Issued, May 1st, 1890.

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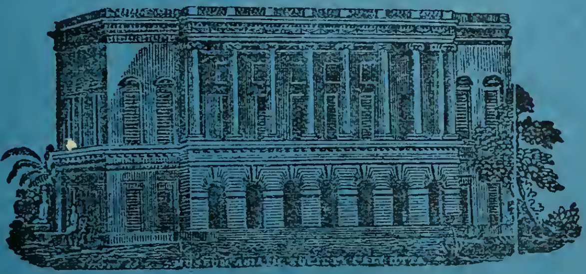

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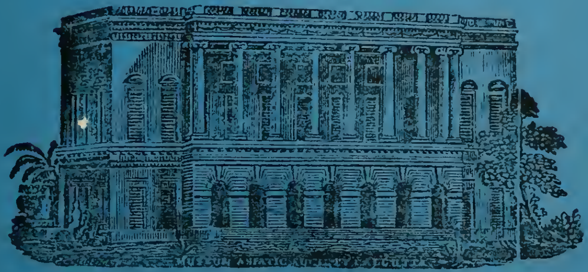

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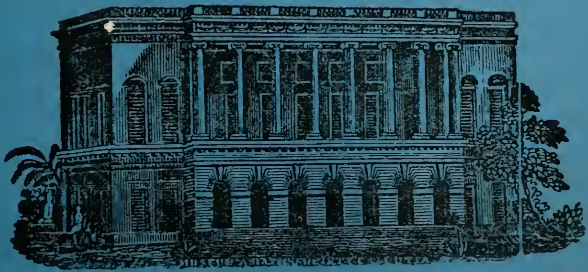

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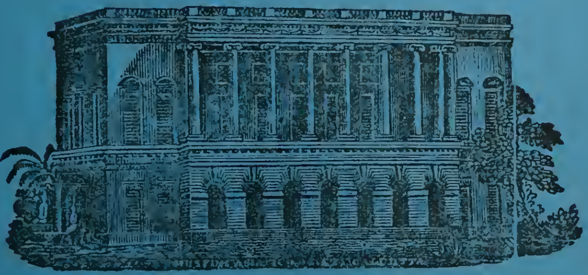

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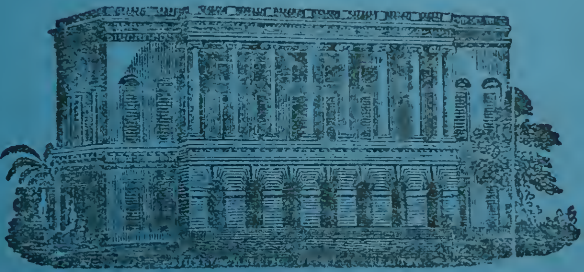

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