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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

EDITED BY

THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,

1889.



CALCUTTA :

PRINTED AT THE BAPTIST MISSION PRESS,

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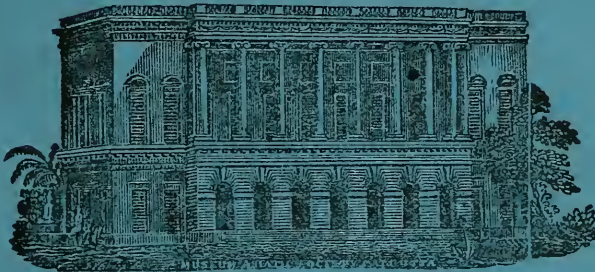
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EDITED BY
THE HONORARY SECRETARIES.

No. I. JANUARY, 1889.



“The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature.”—SIR WILLIAM JONES.

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** It is requested that communications for the *Journal* or *Proceedings* may be sent under cover to the Honorary Secretaries, Asiatic Soc., to whom all orders for these works are to be addressed in India; or, in London, to the Society's Agents, Messrs. Trübner and Co., 57 & 59, Ludgate Hill.

N. B.—In order to ensure papers being read at any monthly Meeting of the Society, they should be in the hands of the Secretaries at least a week before the Meeting.

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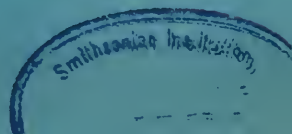
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Issued May 16th, 1889.



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LIST OF BOOKS FOR SALE

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(Continued on third page of cover.)

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JANUARY, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd January 1889, at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following Members were present :

E. T. Atkinson, Esq., Bábú Gaurdás Bysack, Bábú Saratchandra Dás, S. R. Elson, Esq., Dr. Hoernle, T. R. Mallet, Esq., W. H. Miles, Esq., Bábú Asutosh Mukhopádhyaý, L. de Nicéville, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

Visitor :—Mohunt Omrao Giri Gossain.

The Minutes of the last Meeting were read and confirmed.

Fifty-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 ballotted for and elected Ordinary Members.

Bábú Jogendra Chaudra Ghose, M. A., B. L.

G. C. Dudgeon, Esq.

Kumár Rameswar Maliáh, of Searsole (re-elected).

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

Bábú Surendranath Ráy, B. L., Pleader, High Court, proposed by Bábú Asutosh Mukerji, seconded by H. M. Percival, Esq.

C. Little, Esq., M. A., Professor, Presidency College, proposed by Lt.-Col., J. Waterhouse, seconded by A. Pedler, Esq.

The PRESIDENT said: I have much pleasure in announcing that His Excellency the Viceroy has been graciously pleased to accept the office of Patron of the Society. The following is the letter received from the Private Secretary to His Excellency, in reply to the invitation of the Council.

GOVERNMENT HOUSE.

Calcutta, 1st January 1889.

SIR,

I am desired by His Excellency the Marquess of Lansdowne to acknowledge the receipt of your letter of the 27th ultimo, and to request you to inform the Council of the Asiatic Society of Bengal that the Viceroy accedes with much pleasure to the desire of the Society that he should accept the office of Patron in succession to the Marquess of Dufferin and Ava.

His Excellency has long been aware of the services which your Society has rendered to Oriental research, and the illustrious names which adorn its rolls are familiar to him.

The Viceroy trusts that the future career of the Society may be worthy of the eminent position which it has maintained during the past hundred years under his predecessors.

I have the honor to be, &c.,

J. C. ARDAGH.

The PRESIDENT announced that the Photographic Society of India had offered the use of their reading-room and dark room at 29 Chowringhee to any Members of the Asiatic Society who may be interested in Photography. The rooms are open from 6 A. M. to 10 P. M. and the latest photographic news-papers and publications will be found on the tables.

The PRESIDENT also intimated the resignation of Mr. Percival, and said—

It is with considerable regret that I have to announce that Mr. H. M. Percival has been obliged to resign the arduous office of General Secretary on account of bad health and pressure of work. Mr. Percival has held the office since 1886 and has carried on the work with very commendable efficiency. I am sure he will have our very cordial thanks for the work he has done for us so long, and our sympathy in the circumstances which have caused him to give it up. I propose, therefore, that we record a formal vote to that effect.

The proposal, seconded by Mr. E. T. Atkinson, was carried unanimously.

The PRESIDENT added that he was pleased to say that Mr. C. Little,

who would be proposed as a candidate for election that evening, had agreed to undertake the duties and the Council were glad to have obtained his services.

The PRESIDENT exhibited a medal presented to the Society by the Corporation of the City of London in commemoration of the visit of Indian Potentates and others to London in connection with the Colonial and Indian Exhibition of 1886.

The PRESIDENT exhibited two Rowland's diffraction gratings, one plane, the other concave; also a copy of Professor Rowland's photographed map of the solar spectrum from λ 5075 to λ 3795 obtained with a large concave grating, and said:—

Although these gratings and photographs are now fairly well known in Europe and America, they are, I believe, quite new in India, certainly in Calcutta, and therefore may be of interest to the meeting. There can be no doubt that Professor Rowland has by the invention of the concave grating, the perfection to which he has brought the machine used for ruling the gratings, and the liberality with which they have been put at the disposal of spectroscopists at very reasonable prices, given an enormous impetus to spectroscopic research, especially as applied to the sun and to the spectra of the elements as obtained by means of powerful electric currents.

The two gratings before the meeting are ruled with 14,438 lines to the inch, which is the number usually adopted by Professor Rowland, though they are also made with more or less close ruling.

The principle on which these gratings work is not quite easily explained, but will be found in the standard works on optics and spectroscopy. It will suffice to note that when a strong ray of white light is thrown upon one of these gratings, on either side, right and left of the direct and bright white central reflection, a series of more or less brilliantly coloured spectra will be seen, all with their violet ends in the direction of the central white reflection, and overlapping each other more and more as the distance from the central reflection increases. If the light of the sun be passed through a fine slit parallel to the lines of the grating and viewed with a telescope, somewhat in the same way as when viewing a prismatic spectrum, the Fraunhofer lines of the spectrum can be seen with very great perfection, especially in the less refrangible regions of the yellow, orange and red rays, which appear in the true proportions of their wave lengths, instead of being unduly compressed as they are when viewed through prisms.

The spectra nearest the direct central reflection are termed the

spectra of the first order, and are generally the brightest and purest. They are apparently separated from the direct reflection on one side, and from the spectra of the second order on the other, by dark spaces, but at the violet end a considerable space is filled by the invisible ultra-violet rays extending beyond the H lines, at λ 3933, to λ 2200; a great part of which can be photographed by suitable appliances. Towards the red end also, there is a long series of rays invisible below A, which can also be photographed to about λ 10,000, as done by Abney; and they have been observed to an immense extent further by Mr. S. P. Langley, with his very sensitive thermopile called a bolometer. About the red end of the first order near B, the extreme rays of the ultra-violet of the second order begin to make their appearance when photographed, unless special means are taken to exclude them. Then appear the visible violet rays of the spectra of the second order; then the indigo, blue, green and so on, till we find the red end of the second order still more overlapped by the violet and blue rays of the third, and so on. With these gratings the spectra of one side are usually more brilliant than those of the other. Every grating has its own peculiarities, due to slight variations in the ruling. With glass gratings four series of spectra are formed round the circumference of a circle, by reflection and transmission; but with metal gratings only two, by reflection.

It will be noticeable that the deviation, or angular distance from the centre, of any particular ray in the successive spectra increases as the whole numbers 1, 2, 3, 4. The amount of dispersion in the spectrum of the second order is, therefore, twice that of the first; in the third order three times, and so on. This is a very valuable property of gratings in enabling spectra to be viewed under different dispersions with the same instrument. It must be noted that, as a rule, in the same way as with prisms, the amount of light decreases as the dispersion increases.

The amount of dispersion or deviation of any particular ray is inversely proportional to the sum of the width of a polished space and a groove; the closer and finer the ruling, therefore, the greater dispersive power of the grating.

Gratings have a further advantage over prisms that the spectra obtained with them are dependent on absolute measurements of the wave-lengths of the different rays. The wave-length may be obtained by multiplying the sum of the width of a transparent interval and a bar, or groove, by the angular deviation of the ray in the spectrum of the first order.

The deviations of two colours in the same spectrum are proportional to their wave lengths, and this is why in all the spectra the violet is nearest to the central reflection and the red most distant.

The plane gratings, as above remarked, are used much in the same way as prisms, either for photography or observing with a telescope. Light is passed through a fine slit attached to a collimating tube and lens, so that parallel rays from the slit fall on the centre of the grating and accurately parallel to the ruling. The image of the slit is then viewed through a telescope or received on the focussing glass of a photographic camera, mounted so that it can revolve on the same axis as the grating. Then by inclining the grating, or by revolving the telescope or camera, the spectra of the different orders are brought into view. When working with the higher orders of spectra special means have to be adopted for separating the overlapping spectra, either by a prism placed between the grating and the telescope or camera, or by using suitably coloured screens in front of the slit. Thus in photographing the red end of the spectrum, a red glass or other screen is always required to cut off the ultra-violet rays.

With plane gratings the focus changes in different parts of the spectra according to the refrangibility of the rays, and the foci of rays of different orders overlapping do not correspond. This latter property is often of use in measuring wave-lengths and coincidences of lines, in the various spectra.

The concave gratings were first introduced some six years ago by Professor Rowland, of the Johns Hopkins University, Baltimore, who made a greatly improved machine for ruling and adapted it to rule concave surfaces of speculum metal.

In these gratings, the lines of the spectrum, formed by the image of a fine slit, come to a focus at a distance from the grating equal to its radius of curvature, and, therefore, if the slit, the ruled surface of the grating, and the eyepiece of the telescope or photographic plate are always situated on the circumference of a circle of which the radii are equal to half the radius of curvature of the grating, the spectrum will always be in focus at any point on the circumference of the circle. Moreover, when the centre of the grating and the centre of the eye-piece, or photographic plate are in the same straight line, the line of foci will be perpendicular to the direction of the light, and the spectrum will be normal, whatever the position of the slit, provided it is on the circle.

It will be seen, therefore, that these gratings are especially suitable for photographic work—though from the amount of dispersion given, even by comparatively small gratings, the extent of spectrum included on a plate at any one time is comparatively small, unless long plates be used and curved to correspond with the curvature of the circle of which the focal length of the grating is the radius.

The camera in which the concave grating exhibited this evening is

used has been made up on the principle of the arrangement described by Captain Abney, R. E., in *Phil. Trans. Roy. Soc.*, Vol. CLXXVII, Part II, 1886, but modified so that it works automatically on a pivot placed below the centre of the grating. It consists of a long box or camera fitted at one end with a suitable holder in which the grating is placed so that it may be vertical and its axis central with the axis of the collimator, on one side, and to the centre of the photographic plate or eyepiece on the other. This holder has screw adjustments for slightly moving the grating in vertical and horizontal arcs.

To the other end of the box an ordinary photographic bellows-camera is adapted. The back of this camera is arranged so that the ordinary glass focussing-screen can be removed and its place supplied by eye-pieces which serve for focussing the lines sharply for photography or for observing by eye. The eye-pieces fit in a tube arranged to travel in slides vertically and horizontally, so that it can be brought to any part of the spectrum in any position within the size of the photographic plate. This tube is pivoted so as to be able to view the rays obliquely, which is very important in observing extreme rays, especially with the prismatic spectrum.

Below the grating end of the camera, and vertically underneath the centre of the grating, is a pivot by which the plank supporting the slit and tube is attached to the camera. This plank has grooves at the sides in which travels a bar carrying the Ys which support the tube. One of these Ys, nearest the slit, is fixed, and the other is moveable, sliding backwards or forwards, according to the length of the tube, and also right and left, so that the circle of light formed by the slit in passing through the tube may be centered on the grating. The Ys are elevated or lowered by means of screws, so that the axis of the tube may be levelled in a line with the centre of the grating and axis of the camera. A rack-work attached to the foremost Y, and worked by means of a Hook's joint attached to a long handle, enables the observer at the camera or eyepiece to gently turn the slit round so as to bring it exactly parallel to the lines of the grating. This adjustment, as Captain Abney has pointed out, is very important in securing good definition.

The sliding tube is a telescope tube fitted with additional screw joints so that it may be extended or shortened, as required, from about 1 foot to 5 feet.

The outer end of the tube carries the slit, which is adjustable by a micrometer screw. With the concave grating no collimating lens is necessary, as with the plane ones; and this is a great advantage in dispensing with the use of glass, which always cuts off more or less of the extreme rays at both ends of the spectrum. The end of the tube is fitted

with rackwork by which the slit can be drawn in and out so that its plane may be brought exactly over a pivot fixed on the sliding bar carrying the Ys, and to which pivot is also attached a second bar the other end of which is fixed by a pivot placed below the camera at a central point between the grating and the photographic plate. The apparatus is adjusted so that the distances from the central pivot of the camera to the grating, the photographic plate and the slit are all equal to half the radius of curvature of the grating, and the lines of the spectrum should then appear in sharp focus when viewed through the eye-piece placed so as to focus the centre of the ground-glass of the camera. As the camera is drawn away from the slit the violet of the first order comes into view, followed by the indigo, blue, &c. Beyond the red end of the spectrum of the first order there is an apparently dark space, which, as I remarked above, is really filled with lines of the invisible ultra-violet of the second order. About b of the second order, the violet lines of the third order make their appearance, and below the D lines of the second order come the H lines of the third order; so that if it is required to photograph these D lines a yellow screen must be used; otherwise the photograph obtained will show the H and other violet lines most prominently, as one of the plates I have with me will show.

With the apparatus as it stands, the D lines of the third spectrum are just beyond the travel of the camera; but by a little adjustment of the tube they could be seen. The b lines of this spectrum can readily be seen, with very considerable dispersion.

In working the apparatus, it is best to set the plank carrying the tube in the direction of the heliostat, and then fasten it down by clamps or screws on to a table large enough to carry the whole apparatus and admit of the camera being opened out to its widest extent. As the end of the camera moves round on a circular arc, it is quite easy to mark off on the table the positions of the principal lines on a corresponding arc, so that the centre of the camera can be brought to any particular line in either of the orders, at once. If greater accuracy is required, scales of wave-lengths can be marked off, in the same way, for the different orders, either along the arc or along the grooved plank in which the tube slides.

I am sorry I am unable to show you the powers of the instrument, but even with an electric-light apparatus it would be difficult to do so satisfactorily. The capabilities of the new gratings can only be fully appreciated by observing the solar spectrum; and without exaggeration I may say that it is one of the most fascinating things I know to watch the lines in different parts of the spectrum under their varying aspects and groupings, and to feel that in them may be the key to mighty and yet unfathomed secrets of the universe.

The red end, from D to A, is particularly interesting, especially about sunset. I have already noticed considerable variations in the number of lines that can be seen *between* the D lines. During the rains, 11 could generally be easily counted, but during the dry cold weather we have just been having, 7 or 8 only can easily be distinguished. Two Sundays ago, however, the full number of 11 were counted; though fainter than in the rains. Once one has mastered the instrument, it will probably not be difficult to take photographs showing many of the more notable changes in this part of the spectrum at different times of the day and seasons of the year. I have already succeeded in obtaining fair photographs of the B and a groups and even of A, with possible traces of lines below in the ultra-red, though this is nothing new.

The apparatus has been made up at the Mathematical Instrument Office, and I am indebted to my colleague, Major C. Strahan, R. E. for many useful hints, and to Mr. T. Marshall, Mathematical Instrument maker, for his assistance in making it up.

The large map of the diffraction spectrum I have placed on the board has been brought out by Prof. Rowland, and has, I believe, been made with a concave grating of about 21 feet focus. This gives an enormous dispersion, far beyond the power of the most powerful prismatic spectroscopes. A great deal more can, of course, be seen by the eye with such an instrument than can be photographed, but Professor Rowland believes he has very nearly reached the limit of visibility. This map has now become the standard of reference for the solar spectrum; at present it only extends to λ 5795 and does not include the D group and below. It is to be hoped that it will be possible to extend it at least to A.* With my small grating I can see almost all that is shown on the maps, using an eyepiece of fairly strong power—though I cannot photograph anything like so much.

I should be glad to show the working of these instruments to any members of the Society who would like to see them.

BÁBÚ SARAT CHANDRA DÁS exhibited a coloured drawing giving a bird's eye view of Tashi-lhun-po (the second city in Tibet) the capital of the Tashi-Lama, obtained as a present from the Political Agent of the Dalai Lama at Peking.

THE PHILOLOGICAL SECRETARY read the following letters :

I. Letter from Bábu Gaurdás Bysack intimating the presentation to the Asiatic Society of two rare Tibetan MSS. by Omrao Giri Gossain, the Mohunt of the Bhotebagan Temple, Ghosery.

* Since this was written a new edition of this map extended to B has been announced.

“It gives me great pleasure to be the medium of procuring for the Oriental Library of our Society two rare valuable Tibetan MSS. which Puran Giri Gossain in the last century brought with him from the Court of the Tishu Lama, to which he was deputed as an Embassy, and which his present successor, Mohunt Omrao Giri Gossain, has entrusted me for presentation to the Society. The only condition he desires to attach to his gift is, that should the Society publish the MSS., as he ardently hopes it will, two copies of the work may be given him for his and his brother Mohunt Belasgir Gossain’s use and benefit.

“As soon as the MSS. were handed to me by the esteemed Gossain I placed them in the hands of my friend, Bábú Sarat Chandra Dás for examination. His notice of the works, together with the MSS., will be laid before the next General meeting, when I propose, with the permission of the Council, to read my note on the Buddhist Monastery at Bhotebagan opposite Calcutta, and on the celebrated Puran Giri Gossain.”

The following is the notice of the two works by Bábú Sarat Chandra Dás, referred to in the letter.

The bundle contains two block print volumes, one is the great work called Lam Rim Chhen-po, *i. e.*, “the large work on the gradual way to perfection”, and the other is called *Kdorje Hchhañ Chhenpohi* LAM GYI RIM-PA, (see page 197, Csoma’s Tibetan Grammar). Both the works are much damaged by damp and insects.

As regards the work called Lam Rim Chhe-wa, composed by the great reformer Tsoñkhapa, I do not hesitate to say that it is *the* most important religious and philosophical work of Tibet. What the Dhammapāda is to the Southern Buddhists, or the Veda to the Bráhmans, the Lam Rim Chhe-wa is to the paramount church of Tibet. In it are condensed the pith of the Tripitaka of the Maháyána school, and the substance of the philosophical teachings of Nágárjuna, Arya Sangha, Chandra Kírti, Dharmottara and other ancient Indian Buddhist sages. The recovery of a copy of this great work from the hitherto obscure *math* of Bhot Bagan will, I may venture to add, be welcomed by the Tibetan students of Europe and America, inasmuch as no copy of the Lam Rim Chhe-wa exists in any of the great libraries of London, Paris, or St. Petersburg. This work, when published, will enable the students of Tibetan to ascertain the Maháyána philosophy as it is understood in Tibet, and also the cult of the northern Buddhists. The Prajñáparámita, or its Tibetan version the Sher-chin, may be of some use to those who care to know what the Buddhism of Nepal was in the early centuries after Christ, but as occidental scholars are now beginning to take greater interest in the sacred literature of Tibet than in that of Nepal, I believe they may

care more to read the Lam Rim Chhe-wa, than the Sher-chin. The former, when printed, may cover about four fasciculi of the Bibliotheca Indica. I have a xylograph copy of it, obtained from Tashi-Ihun-po, which, with the Society's copy (also a xylograph), will enable one to edit the work.

The following is a literal translation of the introduction :—

“ Herein is condensed :—the substance of the “excellent word” (*pravachana*) of Jina—the doctrines of both Nágárjuna and Ārya Saṅgha of the great vehicle (Maháyāna)—the religious practices of the principal personages who have gone over to the knower of all things—the abridgement of the complete series of the study of the *three persons* (*purusha-traya*) ; and (in short) herein is explained the manner how to conduct one's self according to the (doctrine) of “the gradual way to perfection” to the blessed Buddha.

In this I wish to explain the Dharma (Buddhist religion) in reference to the three purities ; *viz.*—(1) the purity of the speech of the teachers (in connection with the Buddhist sages of Śrī Nāleṅdra)—(2) the purity of the line of their pupils—(3) and the purity of the doctrines (they) expounded.

In later times the (Buddhist) creed (*śāsana*), being developed at Vikramaśīla, among its scholars there were eminent authors. The excellence of religious teaching, the manner of its explication, and the two important methods of comprehending it will be explained here. According to first of these (methods) there are four stages in the gradual way to perfection of the Bodhisattvas :—(1) for shewing veneration to the origin of Dharma and thereby to set forth the greatness of the author ; (2) for growing faith in the precept (doctrine), so as to point out the superiority of the Dharma (Buddhist creed) ; (3) how to explain and hear the Dharma that is possessed of the two greatneses (excellences) ; and (4) how to guide the student by the real precept.

This precept is generally of the doctrine of Abhisamaṅgālakāra, or the ornament of judicious learning, which was promulgated by the venerable Maitreya. The basis (original work) of this (Lam-Rim-chhe-wa) is especially the work called Bodhipatha pradīpa—the author of which is also relatively the author of this work (Lam-Rim-chhe-wa). He is the great teacher Dipāṅkara Śrījñāna, who is well known by his other name *Dpal ldan Atīśa*.”

The last leaf, which is numbered 491, contains the following : “ With the exception of the demonstration of the general characteristics of the three persons (*purusha-traya*) mentioned in the “Bodhipatha pradīpa,” all other terms being easy have not been introduced here. This work has been based upon the contents of the Lam Rim, written

by the great Locháva (Rinchhen Bssañpo) and the Doluñpa father and spiritual son. It contains the substance of numerous Lam-rim works (by different authors). Being possessed of all the requirements of the “way” in a convenient manner, and there being no confusion in its arrangement, this work was composed by the great renouncer and Srávaka Sar Tsoñkhapa, BLo bssañ Grags-pa Dpal, the hermit of the Maháyána doctrine of Himavat at the branch monastery of Rgyal-wahi dWen gnas of Byañ Ra-deñ. It was printed at the mountain retreat of Brog Señgehi Shol, the writer being *Bsod nams dpal bssañpo*.”

No. 2. The second work is the principal work on Tantrikism (as adopted by the reformed or Gelug-pa School of Tibet, of which the Dalai Lama is the head.) It is called *Rdorje Hchhañ Chhenpoñi Lam-gyi-Rim-pa*. In it is embodied the substance of the sixty volumes of the Kahgyur collection, which treat of the Tantras and the esoteric cult of the Northern Buddhists. This work is unique in its character, because, as the Tantric works of Tibet are compared with the great oceans on account of their vastness and immensity, no work exists in Tibet in which one could find the real meaning of Tantrik doctrines and rites explained in a lucid manner. This work alone is able to give an idea of the Tantrikism of Tibet and Magadha. I did not meet with such a work in Tibet or Peking. I therefore congratulate you in the discovery of a work in the temple of Bhotbagan which does not occur in the Society’s library or in the libraries of Europe. Lam-gyi Rim-pa is a purely Tantrik work and treats of the Tantrik cult of the Gelug-pa or yellow hat School, called the *Rdorje Theg-pa* or the venerable vehicle doctrine. In it are described the various mystic rites and ceremonies for propitiating the tutelary deities, and also for entering into what is called the direct and the shortest path to the state of beatitude of the northern Buddhists. The blocks from which this work was printed were engraved in Peking. Purangir must have brought it from Peking when he returned to India after the death of the Tashi Lama. This work will be of much interest to those who wish to inquire about the esoteric part of the Gelug-pa Buddhist religion.

The author, Tsoñkhapa (called Lo-ssañ tagpai pal or Sumati Kírti S’rí), begins the work as follows:—“Whereas the power of the argumentative philosophy of the “great doctrine” is not mean, the Protector of the doctors of the Buddhist divinity, out of mercy for the common people, with a view that they might be firm in their faith and that the wicked, who are wandering in the world and to whom the liberation from that state is most difficult, might in a short space of time attain to the state of Buddha who alone is the object of universal refuge, has promulgated this shorter means of attaining Nirvána. It is for that reason

that I have here to explain the gradual way of the venerable Vajradhara." The work contains 40 chapters extending over 450 leaves.

The author concludes the work in the following manner:—"This work, called *Rdorje Hehhañ Chhenpohi Lam gyi Rimpa*, which fully opens the substance of all mysteries, has been compiled for the purpose of acquiring a thorough culture in the profound learning of the aphorisms and the mantras of the Buddhists. The author, Sár Tsoñkhapa *Blo bssañ Grag-pa*, a monk of Sákya-muni, after a careful examination of all the Tantrik works, has composed this work at the hermitage of Chambaling, also called *Sañ ñag nañ* (the house of mysteries), attached to the great monastery of *Hode Guñ Rgyal*, which is situated at the foot of the Prince of the Mountains of Himavat (Tibet). The writer (on the blocks) was *Bsod nams dpal bssañ-po*, surnamed *Dkañ bshi ñdsin-pa* of *Gyag-sde*. Let this work be also possessed of the power to spread the sacred creed to all directions in all the quarters of the world."

2. Letter from Bábú Hanumán Prasáda, Raís, of Chunar, forwarding copy of an inscription and photographs of some sculptures lately discovered in a rock temple in the Chunar Fort.

"I have the pleasure to send photographic views of Hindú gods of a cave temple recently discovered on the south-west corner of Fort Chunar. On its first opening it was found to be a mere quarry hole with a ledge of rock left overhead as a roof. This gives an idea that it is something like the cave temple described in Indo-Aryans of Dr. Rájendralála Mitra, Vol. I, p. 18, l. 30. The images are beautifully cut on the rock and when the place was excavated they were found no way injured. The rock appeared of peculiar quality per Dr. Oldham's remark given in Indo-Aryans, Vol. I, p. 79.

"I send a lithographic copy of the inscription engraved on the foot of the images which I hope will be deciphered by the distinguished scholars of your well-known Society.

"In the meantime I shall feel much obliged for a copy of the translation when the inscription is deciphered by your Society, giving also an idea of its antiquity.

"I shall be glad to furnish you with any other information you may require connected with this cave temple, for the preservation of which I have obtained the sanction of the Military authorities, and am arranging for the erection of a temple there."

THE PHILOLOGICAL SECRETARY read a Report on a find of six old coins in the Sarun district, forwarded by the Collector of Sarun with his No. 560 G, dated 3rd July 1883, and No. 1239 G, dated 3rd December 1883.

1. These coins appear to have been found by some children of the village of Deolokhan, near Baniyápur, in the Sarun district.

2. They are of more or less impure silver, and belong to the class, commonly called "Indo-Sassanian" (see Prinsep's *Indian Antiquities*, Vol. I, p. 32, 402-410). Coins of this class are found in large numbers, and are of no particular value. The six coins under report are not good specimens; one of them is broken in two, apparently for the purpose of testing the metal.

The following papers were read—

1. *Notes on Assam Butterflies*.—By WILLIAM DOHERTY, ESQ. *Communicated by the NATURAL HISTORY SECRETARY.*

2. *On certain Earth-worms collected in the Western Himalaya and Dehra Dun*.—By ALFRED GIBBS BOURNNE, D. Sc. (Lond) C. M. Z. S., F. L. S., *Fellow of University College, London, and of the Madras University. Communicated by the SUPERINTENDENT OF THE INDIAN MUSEUM.*

These papers will be published in the Journal, Part II.

3. *Vikramasíla and the Pála kings of Magadha*.—By BÁBÚ SARAT CHANDRA DÁS.

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 December last.

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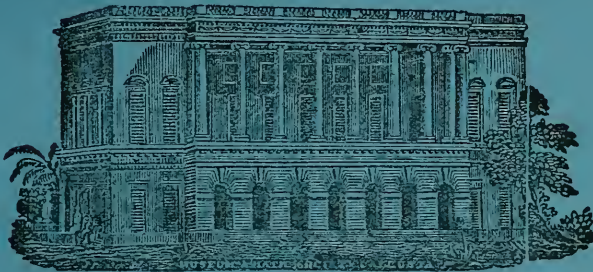
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

EDITED BY
THE HONORARY SECRETARIES.

No. II. FEBRUARY, 1889.



“The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature.”—SIR WILLIAM JONES.

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N. B.—In order to ensure papers being read at any monthly Meeting of the Society, they should be in the hands of the Secretaries at least a week before the Meeting.

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1889.

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(Continued on third page of cover.)

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR FEBRUARY, 1889.

The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th February 1889, at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the chair.

The following members were present :

E. T. Atkinson, Esq., H. Beveridge, Esq., Bábú Gaurdás Bysack, W. R. Criper, Esq., Bábú Saratchandra Dás, E. Gay, Esq., Bábú Rajanikánta Gupta, Kumar Rameswar Maliáh, Major General Mainwaring, R. D. Melita, Esq., Bábú Asutosh Mukhopádhyaý, T. R. Munro, Esq., L. de Nicéville, Esq., Moungh Hla Oung, Esq., T. A. Pope, Esq., H. M. Rustomjee, Esq., Dr. J. Scully, C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

Visitors :—Dr. J. Burgess, Rev. Dr. Lausdell, R. H. M. Rustomjee, Esq., C. H. M. Rustomjee, Esq.

According to the Byc-Laws of the Society the President ordered the voting papers to be distributed for the election of Office-Bearers and Members of Council, and appointed Messrs. Beveridge and de Nicéville, Scrutineers.

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

ANNUAL REPORT FOR 1888.

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, 21 gentlemen were elected Ordinary Members of the Society, 14 members withdrew, 5 died, 9 were removed from the list, *viz.*, 2 under Rule 38, as defaulters, and 7 under Rule 40, being more than 3 years absent from India, and 1 member was struck off on account of non-payment of his admission fee, by which his election became void under Rule 9. Of the 21 members elected, 2 were old members who rejoined. The total number of members at the close of 1888 was thus 305 against 313 at the end of the preceding year—of these 98 were Resident, 136 Non-Resident, 15 Foreign, 20 Life, 34 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 for the past 6 years.

Year.	Paying.				Non-paying.				Grand Total.
	Resident.	Non-Resident.	Foreign.	Total.	Life.	Absent.	Special Non-Subscribing.	Total.	
1883 ...	100	142	18	260	15	47	1	63	323
1884 ...	102	157	12	271	15	39	1	55	326
1885 ...	105	161	13	279	16	34	1	51	330
1886 ...	93	142	18	253	16	48	2	66	319
1887 ...	98	137	15	250	17	44	2	63	313
1888 ...	98	136	15	249	20	34	2	56	305

The five Ordinary Members the loss of whom by death during the year we have to regret, were Mr. F. Fedden, Mr. S. S. Jones, Mr. J. Hart, Mr. J. MacDonal and Surgeon Major J. J. Montearth.

Among the Corresponding Members intimation has been received of the death of Professor Holmböe of Christiania. Their number now stands at 7.

There were no casualties among the Special Honorary Centenary Members, Honorary Members, and Associate Members, their numbers standing at 6, 27, and 8 respectively.

Three members compounded for their subscription as Non-Resident Members, *viz.*, Hon. Ajodhianath Pandit, Mr. A. P. Pennell, and Bábú Gaurdás Bysack, and the latter gentleman was also exempted from further subscription as a Resident Member, under Rule 27, in consideration of his long connection with, and former services to the Society.

Indian Museum.

The following presentation made to the Society was transferred to the Indian Museum under the provisions of Act XXII of 1876.

A stone slab (broken into 3 pieces) containing an inscription in Nagari characters, dated 1720 Vikramáditya Samvat, found in the village of Khukhrá in Chutia Nagpur, referred to in the Society's *Proceedings* for November 1887.

Dr. D. D. Cunningham was appointed a Trustee on behalf of the Society in the place of Mr. E. T. Atkinson, who vacated on becoming a Government Trustee in his official position as Accountant-General, Bengal.

The other Trustees on behalf of the Society were:—

Dr. A. F. R. Hoernle.

Rájá Rájendralála Mitra, LL. D., C. I. E.

E. Gay, Esq.

A. Pedler, Esq.

Finance.

The accounts of the Asiatic Society are shown in the appendix under the usual heads.

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

The Budget of the year 1888 was estimated at the following figures:—Receipts, Rs. 14,000. Expenditure, Rs. 20,324 (Ordinary Rs. 13,824, Extraordinary Rs. 6,500). Taking into account only the ordinary items of receipt and expenditure for the year 1888, the actual results have been:—Receipts Rs. 15,131-11-6 and Expenditure Rs. 13,667-12-2, leaving a balance in favour of the Society on its ordinary working of Rs. 1,469-15-4.

There has, however, been an unusually large amount of extraordinary expenditure on account of further heavy repairs to the Society's building, and for the erection of an iron railing and gates in place of part of the old boundary wall which was acquired by the Municipality, as reported last year. The compound has also been thoroughly put in order, and the out-houses repaired. The cost of all these repairs and alterations is estimated at Rs. 9,101.—of which Rs. 7,363-14-1 were paid during the year, leaving about Rs. 1,737 still due. Deducting the Rs. 2,116 paid in the year before by the Municipality, the total cost of the railing and gates borne by the Society was Rs. 1,334, and the cost of further repairs expended during the year was Rs. 3,913-14-1, or a total of Rs. 5,247-14-1. This amount cannot, however, be fairly charged to the account for the year, but should be spread over a term of at least 4 years.

It seems also desirable that, if possible, a sum of Rs. 1,000 should be set apart in the Budget yearly to meet the cost of these extraordinary repairs as they recur from time to time; but it is impossible to do so without cutting down expenditure in other items, and this it is difficult to do.

The other items of extraordinary expenditure are trifling, and include Rs. 100, Auditing fee, Rs. 250, for purchase of coins, and Rs. 1-9-6 for postage charges in connection with the enquiry into the Barisal Guns. To meet this extraordinary expenditure Rs. 4,000 of our securities in Government paper had to be sold out, reducing the capital of the Society to Rs. 1,38,000, nominal value.

The total receipts have been Rs. 15,137, against an estimate of Rs. 14,000. The excess is due to an increase in all the items. Under *Subscriptions* the estimate was Rs. 7,300, and the actuals Rs. 7,623, of which Rs. 700 were received on account of Compounding Fees, but these have to be invested in the Permanent Reserve Fund under Rule 70, and cannot therefore be taken as income. Under *Sale of Publications* the estimate was Rs. 400 and the actuals Rs. 724-10-11, of which Rs. 608-0-11 is credited on account of sales by Trübner & Co., amounting to £ 43-1-5, at 1-5d per rupee. *Interest on Investments* was estimated at Rs. 6,200, but the actuals are Rs. 6,594-7-7. The difference is explained by the fact that Rs. 142 were received as interest for $2\frac{1}{2}$ months on the investment of Rs. 10,000 transferred from the $4\frac{1}{2}\%$ to the 4% loan when the former was paid off by Government in November last. Owing to the reduction of the balance of the O. P. Fund only Rs. 240 has been credited to the Fund instead of Rs. 480 as in the previous year, and Rs. 240 has thus accrued to the Society. Owing to the transfer of Rs. 10,000 of the Society's funds to the 4% loan the amount of interest we shall receive in future will be less than it has been, and this has been taken into account in framing the Budget for 1889. The *Miscellaneous Receipts* have been Rs. 195-5-0 against Rs. 100 estimated. Deducting Rs. 700 on account of Compounding Fees and only Rs. 142 excess of interest, the total ordinary receipts become Rs. 14,294, showing an excess of Rs. 294 over the estimate.

The ordinary expenditure was estimated to be Rs. 13,824, but the actual expenditure has been Rs. 13,667-12-2. The principal items in excess are *Taxes, Postage, and Purchase of Books* which is Rs. 720 above the estimate. The actual expenditure on the *Journal and Proceedings* has been

Journal	{	Part I—Rs. 876-8-0
		Part II— „ 3,107-4-2
Proceedings—		„ 669-7-0

making a total of Rs. 4,653-3-2, which is less than the budget estimate by Rs. 746-12-10,; but a sum of Rs. 1,714-4-0 remains due on this account, viz. Rs. 155-0-0 for Part I; Rs. 855-3-0 for Part II and Rs. 704-11-0 for *Proceedings*. The expenditure on *Journal, Part II*, has again been very heavy, chiefly owing to the large number of plates, many of which have been done in Europe.

The Budget Estimate of Ordinary Receipts and Expenditure proposed for 1889 does not differ much from that for 1888, the probable receipts may again be put down at Rs. 14,000 and the ordinary expenditure at Rs. 13,920.

On the receipts side the estimate under the head of "*Subscriptions*" has been left at the same amount as last year. The amount to be received from "*Sale of Publications*" has been estimated at Rs. 400. The amount estimated for interest is placed at Rs. 6,200, which allows for the sale of Rs. 3,000 to meet immediate liabilities.

On the expenditure side the changes in last year's estimate are slight—a small addition has been allowed for "*Establishment*," also for *Taxes, Postage and Books*. Rs. 4,200 have been allowed for the *Journal*, as before, but the *Proceedings* have been reduced to Rs. 1,000.

The only probable item of extraordinary expenditure this year is Rs. 1,737 on account of balance due for the repairs to the Building. For this, and also to pay off outstanding bills of Messrs. Trübner and Co., it may be necessary to sell out about Rs. 3,000 of our securities. The expenditure on account of *Repairs* which has been so heavy during the last 2 years should not now occur again for many years to come.

The Budget Estimate for 1889 is as follows :—

RECEIPTS.				
Subscriptions	...	...	...	Rs. 7,300 0 0
Sale of Periodicals	...	...	...	... 400 0 0
Interest on Investments	...	...	...	... 6,200 0 0
Miscellaneous	...	...	...	... 100 0 0
				Rs. ... 14,000 0 0
EXPENDITURE.				
Salaries	...	...	...	Rs. 4,200 0 0
Commission	...	...	...	... 380 0 0
Stationery	...	...	...	... 100 0 0
Lighting	...	...	...	... 80 0 0
Building-Ordinary	...	...	...	... 20 0 0

Municipal Taxes	...	...	...	...	780	0	0
Postage	...	...	...	...	650	0	0
Freight	...	...	...	...	20	0	0
Meeting	...	...	...	...	100	0	0
Contingencies	...	...	...	...	150	0	0
Books	...	...	...	...	1,600	0	0
Local Periodicals	...	...	...	...	40	0	0
Binding	...	...	...	...	500	0	0
Journals	...	...	...	...	4,200	0	0
Proceedings	...	...	...	...	1,000	0	0
Printing Circulars	...	...	...	...	100	0	0
					Rs.	13,920	0 0

Extraordinary expenditure during 1889.

Auditor's Fee	...	...	...	Rs.	100	0	0
Repairs to House	...	...	...	...	1,737	0	0

London Agency.

The statement furnished by Messrs. Trübner & Co. of their account with the Society for 1887 showed a debit balance of £109-19-7, of which £55-11-0 represented payments made for Plates for the Journal, Part II.

The sales of the Society's Publications effected by them during 1887 amounted to £43-1-5 and of the Bibliotheca Indica to £19-8-0—This is an improvement over the sales of the previous year, which were only £14-19-4½ and £6-3-6 respectively.

The numbers of copies of parts of the Journal, of the Proceedings, and of the Bibliotheca Indica sent to Messrs. Trübner & Co. during 1888 for sale were 611—360, and 1524 respectively.

Thirteen invoices of books purchased, and of publications of various Societies sent in exchange, were received during 1888. The value of books purchased amounted to £109-6-6, which includes a subscription of ten guineas to the Pali Text Society for their publications for the next six years.

Library.

The total number of printed volumes, or parts of volumes added to the Library during the year was 2,112, of which 816 were purchased and 1,296 presented.

The Catalogue of the Burmese Manuscripts has been printed, and those of the Persian and Tibetan Manuscripts are both passing through the press.

Publications.

There were published during the year nine numbers of the Proceedings, containing 219 pages of letter press and 4 plates; two numbers of the Journal, Part I, containing 82 pages of letter press and 11 plates; and three numbers of the Journal, Part II, containing 272 pages of letter press and 15 plates. There was also published a fifth number of the Journal, Part II, for 1887, containing the Index, &c. for that year.

Building.

Extensive repairs had to be undertaken during the year. Twenty-one beams were found defective on the ground floor, and were replaced by rolled iron girders, so that they will not again require renewal. The south wall of the meeting-room was also found to be in a very defective state, and has been strengthened by iron rails across the arches over three of the doors, whilst the whole of the ground floor and staircase has been whitewashed and painted, and the corridors colour-washed. The exterior of the building and the out offices were thoroughly repaired and, painted, and in addition, the compound has been entirely re-arranged and laid out in grass. Wire netting was also fixed to many of the windows on the ground floor, in order to give better ventilation by allowing the windows to be kept open during the day. The total cost of these repairs will be about Rs. 5,237, of which Rs. 3,913-14-1 has been paid.

The new iron railing and gates, mentioned in last year's report, have been erected at a cost of Rs. 3,450, of which Rs. 2,116 was received from the Municipality for the strip of the Society's land taken up under Act X of 1870, for widening the footpath in Park Street.

Coin Cabinet.

During the year under review 108 coins were added to the Cabinet by acquisition under the Treasure Trove Act. Of these 81 were from the Bengal Presidency, and 27 from the Bombay Presidency. No coins were received from Madras.

The 81 coins acquired in the Bengal Presidency were the Society's share of troves found at Bijnaur, Hoshangábád, Rohtak, Sárún, Sháhpur, Sialkot and Wardha. They comprised 11 gold, 28 silver, 8 gold and silver, and 32 silver and copper coins; there was also one silver-gilt forgery, These coins belonged to the following classes: (1) later Indo-Scythian,

viz., *Kida* 6, *Yaşovarman* 4; (2) *Paṭhan*, *viz.*, *Muḥammad bin Sám* 7 (copper and silver), *Muizzu-d-dín Kaiqobád* 1 (Chron. No. 116), *'Aláu-d-dín Muḥammad* 5 (Chr. Nos. 130, 133, 134), *Muḥammad bin Tughlaq* 2 (Chr. Nos. 175 *a*, 213), *Fírúz Sháh* 2 (Chr. Nos. 223, 225), *Fírúz Sháh* and *Faṭḥ Khán* 1 (Chr. No. 240), and *Fírúz Sháh* and *Zafar* 1 (Chr. No. 245), all these being gold; (3) contemporaries of *Patháns*, *viz.*, *Hasan Qurlagh* 8; (4) *Rájpút*, *viz.*, *Madanapála* 2, *Cháhaḍ Deva* 9, *Prithiráj* 2; (5) *Mughal*, *viz.*, *Aurangzib* 3, *Bahádur Sháh* 1, *Farrukh Siyar* 5, *Muḥammad Sháh* 10, *Aḥmad Sháh* 5, *Sháh 'Álam* 5, *Akbar II* 1, all these being silver; (6) one forgery. More detailed descriptions of these coins are given in the Society's Proceedings for April, May, August, November, and December.

The 27 coins presented by the Government of Bombay were the Society's share of troves found at *Aḥmadábád*, *Amrávati District*, *Khandeish*, *Kurrachi*, *Nasik*, *Poona* and *Satara*. It comprised 7 gold, 18 silver, and 2 copper coins. They belong to the following classes: (1) *Mughal*, *viz.*, *Akbar* 1 (gold), *Sháh Jahán* 3 (1 gold), *Aurangzib* 6 (2 gold), *Farrukh Siyar* 2, *Muḥammad Sháh* 3, *Aḥmad Sháh* 1, *'Alamgír II* 1, *Sháh 'Álam* 5; (2) *Hún* 3 (gold); (3) *Gadhiyá* 1; (4) *Persian* 1.

By purchase were acquired 68 coins; *viz.*, 3 silver *Indo-Sassanians* from the Government of the North-Western Provinces, and 65 from Mr. J. G. Delmerick. The latter comprised 1 gold (*Gupta*), 49 silver and 15 copper coins. They belonged to the following classes: 38 *Bactrian*, 2 *Sassanian*, 1 (*Samudra*) *Gupta*, 16 *Paṭhán*, 3 *Mughal*, 2 *Old Hindú*, 2 *Ghazní*, 1 *Kábul*. Among the *Bactrians* there were two of considerable value, and are described in the Society's Proceedings for April. A large number of these coins, of which the Society already possessed other specimens, were subsequently re-sold to members that wished to possess them.

Office of the Secretaries.

Mr. J. Wood-Mason and Dr. Hoernle continued as *Natural History Secretary* and *Philological Secretary* throughout the year. Mr. H. M. Percival held the post of *General Secretary* till December, when he resigned owing to pressure of work and ill health: Dr. Hoernle has carried on the duties in the interval which will elapse before Mr. Little can take them up.

Mr. A. Pedler continued *Treasurer* until September when he was obliged to resign on account of failing health and pressure of official work. Dr. W. King succeeded him in November, the duties being carried on by Mr. A. Simson in the meantime.

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

Mr. J. H. Elliott resumed charge of his post as Assistant Librarian in December, on return from leave for twelve months, as mentioned in the report for last year, when the acting arrangements made for carrying on his duties ceased.

Babu Nriya Gopal Bose continued as Cashier, Babu Hari Mohan Mukherji as Pandit, and Babu Jogesh Chandra Chatterji as Copyist, throughout the year.

Bibliotheca Indica.

Fifty-eight fasciculi were published during the year, of which twenty-one were in the Arabic-Persian, thirty-four in the Sanskrit, and three in the Tibetan Series. They belong to twenty-six different works, of which four are in the Arabic-Persian, twenty in the Sanskrit, and two in the Tibetan Series. There was one new publication, the *Tarīkh-i-Fīrūz Shāhī*, in the first Series; eight in the second Series, *viz.* *Aṅu Bhāshyam*, *Advaita-Brahma-Siddhi*, *Bṛihad-dharma Purāṇam*, *Nyāya Kusumāñjali Prakaraṇam*, *Sāṅkhya Sūtra-vṛitti*, *Srī Bhāshyam* and *Tulśī Satsaī*: whilst in the Tibetan Series there were two works, the *Sher-Phyin* and the *Rtogs brjod dpag bsam lkhri S'ñ*, of which three fasciculi were issued, being the first that have been published since it was mentioned in the Annual Address for 1887 that the Society intended to take up Tibetan works: the second work contains the Sanskrit text in juxtaposition with the Tibetan.

It was stated in the annual report for 1887 that 50 fasciculi had been estimated as the out-turn for the ensuing year, at a probable cost of Rs. 18,800. The actual out-turn has been 58 fasciculi, as already stated. The expenditure out of the Oriental Publication Fund during the year amounted to Rs. 17,353-1-1, which includes printing charges for 45 fasciculi, and editing charges for 51 fasciculi, and gives an average of Rs. 356 for each fasciculus, taking into consideration that bills for Rs. 1,872, representing printing charges for 5 and editing fees for 7 fasciculi, are still outstanding. For the year 1889 the out-turn may be reckoned at 50 fasciculi. These, at the above average rate, will cost Rs. 17,800. The average annual income, calculated on the receipts of the last 5 years, is Rs. 13,182, which gives an excess of estimated expenditure over average income of Rs. 4,618, towards meeting which there is a balance of Rs. 7,713-11-4. This balance will have to meet a further charge of Rs. 3,000, if a proposal that is under consideration to purchase a set of the Tibetan work "Tangyur," in block print, should be carried out.

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

1. TABAQÁT-I-NÁŠIRÍ (Index of Persons and Places); 2, PRÁKRITA LAKSHAṆA (English translation and Notes); 3, KÁTANTRA (introduction); 4, SUŚRUTA SAMHITÁ (English translation); 5, MUNTAKHAB-UT-TAWÁRIKH, Vol. II, (English translation); 6, APASTAMBA ŚRAUTA SÚTRA (Text); 7, MANU ṬÍKÁ SAMGRAHA (Text); 8, PRITHIRÁJA RÁSAU (Text); 9, LALITA-VISTARA (English translation).

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

1. BRIHADDEVATÁ (Text); 2, PRÁKRITÁDHYÁYA (Text and translation); 3, CHARAKA (English translation with notes); 4, NAQÁID-UL FARAZDAQ-JERIR (Text with English translations in prose and verse); 5, KÁLA VIVEKA (Text); 6, VEDÁNTA SÚTRA, Commentaries on, (Text); 7, YOGINI' TANTRA (Text); 8, KARAṆA GRANTHA (Text); 9, MUNTAKHAB-UL-TAWÁRIKH Vol. I. (English translation); 10, TÁJ-UL-MÁÁSIR (Text); 11, TÁRIKH-I-WASSAF (Text); 12, TARIKH-I-YÁMINÍ (English translation with notes); 13, JŃÁTÁDHARMAKATHÁ and VIPÁKA SÚTRA (Text); 14, SADDHARMA PUṆḌARÍKA (Text); 15 AL TABRÍZÍ's Commentary (Text); 16, MÁRKAṆḌEYA PURÁṆA (English translation); 17, SVAYAMBHÚ PURÁṆA (Text); 18, BAUDHÁYANÍYA ŚRAUTA SÚTRA and HIRANYAKEŚÍ ŚRAUTA SÚTRA (Text); 19, TUZAK-I-JEHÁNGIRÍ (Text); 20, A'IN-I-AKBARÍ (English translation); 21, RIYÁZU-S-SALÁTÍN (Text and English translation); 22, NYÁYAVINDU, ṬÍKÁ (Text in Sanskrit and Tibetan).

The following new work was sanctioned during the year for publication.

B. Sanskrit Series.

BHAṬṬOPALA'S Commentary on VARÁHA MIHIRA'S BRIHAT SAMHITÁ: Text, to be edited by Dr. G. Thibaut.

The following is a detailed list of the publications issued during 1888.

A. Arabic-Persian Series.

1. IŞÁBÁH, or the Biographical Dictionary of persons who knew Muḥammad, by Ibn Hájjar, edited by Maulvi Abdul Hai. Nos. 264, 265, old Series, Vol. II. Fasc. XIII, XIV. Total *two* fasciculi. This completes the volume.

2. MAÁSIR-UL-UMARÁ, or Memoirs of Nobles, by Nawáb Samsám-ud-Daulah Sháh Nawáz Khán, edited by Maulvi Abdur Rahim of the Calcutta Madrasah. It is a Biographical Dictionary of the great nobles of the Mughal Court since the days of Akbar. Nos. 643, 648, 653, 656, 659,

Vol. I. Fasc. V, VI, VII, VIII, IX, Nos. 665, 669, 673, 679, 684, Vol. II. Fasc. I, II, III, IV, V. Total *ten* fasciculi.

3. TÁRÍKH-I-FÍRÚZ SHÁHÍ, or the Annals of the reign of Fírúz Sháh of the Tughlaq Dynasty, by Shams i Siráj Afif, edited by Maulvi Viláyat Hosain. This work is to be distinguished from the Táríkh-i-Fírúz Sháhí, by Zíá-i-Barní. Nos. 662, 666, 680, 691, Fasc. I, II, III, IV. Total *four* fasciculi.

4. ZAFARNÁMÁH, or Book of Victory, an account of the wars of Tímúr, by Mauláná Sharf-ud-dín 'Alí, of Yazd, edited by Maulvi Muḥammad Iḥádád. Gibbon, who made use of a French translation of this work, says that its geography and chronology are wonderfully accurate. Nos. 646, 651, 660, 674, 683, Fasc. IV, V, VI, VII, VIII. Total *five* fasciculi.

B. Sanskrit Series.

5. ASHTA-SÁHASRIKÁ PRAJÑÁ PÁRAMITÁ, or the Transcendental Knowledge of the Buddhists of the Maháyána School, in 8,000 slokas. The publication of this work has been completed under the editorship of Rájá Rájendralála Mitra, LL. D., C. I. E. The edition has been prepared from six manuscripts collected from various sources, of which the editor gives an account in the preface. In the introduction the editor gives an account of the various recensions of the Prajñá Páramitá. The present work treats of *S'únyatá* or the doctrine of the evolution of cosmos from vacuity. Nos. 645, 671, 690, Fasc. IV, V, VI. Total *three* fasciculi.

6. ANU BHÁSHYAM, edited by Pandit Hemachandra Vidyáratna, is a *bháshya* commentary on the Vedánta Aphorisms of Bádaráyaṇa by Vallabháchárya, the founder of a Vaishnava sect in Western India who flourished about the year 1479. Vallabha considered the non-dualistic commentary of these Aphorisms, by Sámkaráchárya to be erroneous and founded a new School in which an attempt was made to reconcile the dualistic and non-dualistic theories in one harmonious whole. No. 637, Fasc. I. Total *one* fasciculus.

7. ADVAITA BRAHMA SIDDHI, of Sadánanda Yati, an inhabitant of Kashmir, edited by Pandit Váman Sástri, with notes and explanations in Sanskrit. An attempt has been made in this work to bring all the various philosophical schools into harmony by rejecting every thing in them which is opposed to the Vedas. The chapters of the work are called *Mudgaraprahára* or blows with a club on the head of the writer's opponents. Nos. 661, 698, Fasc. I, II. Total *two* fasciculi.

8. VRIHAD-DHARMA PURÁNA, edited by Pandit Haraprasád Sástri. This is a system of mythology and tradition indicating the latest phase

of the development of the Puranic literature ; the principal interlocutors being Vyása and Jábáli; and Jayá, Vijayá and the goddess Durgá. No. 668, Fasc. I. Total *one* fasciculus.

9. CHATURVARGA CHINTÁMAṆI, Volume III, Part I, S'ráddha-kalpa, has been completed this year under the joint editorship of Pandits Jogeśvara Smṛitiratna and Kámákhyá Náth Tarkavágísa. The author of the work is Hemádri, who flourished in the court of Mahadeva, one of the Yadava Princes of Devagiri, in the Deccan, about the middle of the thirteenth century. The edition was prepared from three MSS. Volume III, Part II, Kála Nirṇaya has been taken in hand by the same editors. Nos. 652, 675, Vol. III, Part I. Fasc. XVIII, Vol. III, Part II, Fasc. I. Total *two* fasciculi.

10. KÁLA MÁDHAVA, edited by Mahámahopádhyaýa Chandrakánta Tarkálankára, is an astrological treatise by Mádhaváchárya for the determination of the proper time for various rituals of the Hindus. The work is a sort of an appendix to Mádhava's commentary on the Institutes of Parásara, and it treats of the time for the performance of rituals mentioned in it. The work has been completed this year. No. 676, Fasc. V. Total *one* fasciculus.

11. KÚRMA PURÁṆA, edited by Bábu Nílmaṇi Makerji, M. A., Professor of Sanskrit, Presidency College, is a system of Hindu mythology and tradition advocating devotion to Vishnu. This work shows a phase of Puranic literature chronologically intermediate between the Vishnu, Agni and other older Puraṇas on the one hand and the Bṛihad-dharma and others on the other. Nos. 655 and 687, Fasc. VI, VIII. Total *two* fasciculi.

12. MADANA PÁRIJÁTA, edited by Pandit Madhusúdana Smṛitiratna, Professor of Smṛiti, Sanskrit College, Calcutta, is a digest of Hindu law later than the Chaturvarga Chintámaṇi, Mitákshará and Smṛiti Chandriká. The work was composed at a place named Kástha, a few miles towards the north of Delhi, on the Jamuná. Nos. 672, 686, 696, Fasc. II, III, IV. Total *three* fasciculi.

13. NIRUKTA, edited by Pandit Satyavrata Sámaśramí, with commentaries, has been completed in four volumes. The first volume, or the Nighantu chapter, was accompanied with the commentary of Devarája Yajvá, and the other volumes with that of Durgáchárya. The editor has given exhaustive indices of words at the end of each volume. It is a work of the highest authority on the Vedic philology. No. 664, Vol. IV Fasc. V. Total *one* fasciculus.

14. The work of editing the NYÁYA KUSUMÁNJALI PRAKARAṆAM, of Udayana, who was termed the Nyáyáchárya or the great teacher of the Nyáya philosophy, has been taken in hand by Mahámahopádhyaýa Chan-

drakánta Tarkálankára, Professor, Sanskrit College, Calcutta. This is a very different work from the Kusumánjali Kárika edited some time ago by Mr. E. B. Cowell. That work is in verse but this is entirely in prose. The work is accompanied with the commentary entitled *Prakáśa*, by Vardhamána, the commentary again being explained by extracts from the gloss entitled *Makaraṇḍa* by Ruchidatta. This is a work of the highest authority in the Nyáya School of Philosophy, having for its object the determination of the nature of *mukti*. Nos. 689, 695, Fasc. I, II. Total *two* fasciculi.

15. PARÁŚARA SMṚITI, edited by the same learned professor, is the text of Paraśara as commented upon by the great Mádhaváchárya. The first volume of the work treats of the *Achára Káṇḍa*, and the second of the *Práyaśchitta Káṇḍa*. The first volume has not yet been completed. Nos. 649, 678, Fasc. VI, VII. Total *two* fasciculi.

16. SÁMKHYA SÚTRA VṚITTI, edited with indices by Dr. Richard Garbe, Professor of Sanskrit in the University of Königsberg, consists of two rare commentaries of the Saṃkhya Aphorisms by Aniruddha and Vedanti Mahádeva. Though the commentaries are not very old, yet they throw much light on the history of the Sámkhya Philosophy. Aniruddha appears to be older than Vijñánabhikshu whose work in fact has cast Aniruddha into the shade. Mahádeva is later than Vijñánabhikshu and has made very good use of his work. The learned editor has given only the original parts of Mahádeva's comments. No. 688, 692, Fasc. I, II. Total *two* fasciculi.

17. The first volume of SÁMKHÁYANA ŚRAUTA SÚTRA, edited by Dr. Alfred Hillebrandt, of Breslau, containing the text and indices, has been all but completed. The various indices of Vedic quotations are exceedingly valuable. In the preface the learned editor says that the home of the Sankhayanins was Northern Guzerat, and that the Sútras contain a very large number of interpolations. In the second and subsequent volume the editor intends to publish the commentaries to the work. No. 667, Vol. I, Fasc. VI. Total *one* fasciculus.

18. ŚRÍ' BHÁSHYAM, a Vaishnava commentary on the Vedánta Aphorisms of Vádaráyaṇa by Rámánuja, edited by Pandit Rámánath Tarakarátna. The peculiar doctrine taught by Ramannuja, a great teacher who appeared in Southern India in the thirteenth century, is what is called the Viśiṣhṭádvaitaváda, a peculiar form of Advaitaváda. No. 658, Fasc. I. Total *one* fasciculus.

19. TATTVA CHINTÁMAṆI, edited by Pandit Kámákhyánáth Tarkavágiśa, is the standard work on the Nyáya philosophy in the Schools of Mithila and Bengal. It was composed about 500 years ago by Gangeśopádhyaýa, and is a complete work on the various logical proofs. It is

complete in four parts treating of Perception, Inference, Analogy and Tradition. The work was accompanied with the commentary of Mathuránátha, which has the rare merit of really elucidating the text. But as after the publication of the seventh fasciculus, the MSS. of the commentary became almost unprocurable, Jayatírtha's commentary, entitled *Aloka*, was substituted for it. The ninth fasciculus brings the Pratyaksha-khaṇḍa, or the chapter on perception, to a close. The 10th goes on with the chapter on Inference, the most important chapter in Hindu Logic. Nos. 663, 682, Fasc. IX, X. Total *two* fasciculi.

20. TULSI' SATSAI', or Seven Hundred Verses by Tulsí Dás, the author of the Hindí Rámáyana, edited by Pandit Bihárilál Chaube, under the supervision of Dr. Hoernle and Mr. Grierson. This is a very important work from a philological point of view, as it is one of the very few works written in mediæval Hindí. The work treats of Ráma, and each verse contains a separate riddle about him. Nos. 670, Fasc. I. Total *one* fasciculus.

21. UVÁSAGADASÁO, or the seventh Anga of the Jainas, on the rules of conduct of Jain laymen. The Prákrita text is accompanied with the Sanskrit commentary of Abhayadeva, an English translation by the Editor, and copious notes for the purpose of elucidating technical terms and obsolete Prákrit words. One more fasciculus, containing an index of the prakrit words and an account of the MSS. used, will complete the edition. No. 697, Fasc. V. Total *one* fasciculus.

22. VARÁHA PURÁṆA, A System of Mythology and Tradition inculcating devotion to Vishṇu, edited by Pandit Hrishí Keshá Sástří Professor, Sanskrit College, Calcutta. Nos. 647, 654, 677, 694, Fasc. V, VI, VII, VIII. Total *four* fasciculi.

23. VÁYU PURÁṆA, A system of Hindu Mythology and Tradition, said to have been uttered by Váyu, edited by Rája Rájendralála Mitra, LL. D., C. I. E. The work has been completed this year. The editor has given a preface in which he says that the work is often identified with the Siva Purána. No. 181, Vol. II, Fasc. VII. Total *one* fasciculus.

24. VRIHANNÁRADÍYA PURÁṆA, an *Upa* or Minor Purána, A System of Mythology and Tradition, edited by Paudit Hriší Keśa Sastri. No. 685, Fasc. V. Total *one* fasciculi.

C. Tibetan Series.

25. SHER-PHYIN, edited by Bábu Pratápachandra Ghosha, is a Tibetan translation, word for word, of the Prajñáparamítá of one hundred thousand verses. It is a work on the transcendental philosophy of the Nepalese Buddhists of the Maháyána School. Nos. 650, 701, Vol. I, Fasc. I, II. Total *two* fasciculi.

26. AVADĀNA KALPALATĀ, edited with its Tibetan translation *RTOGS brjod dpag bsam hkhiri S'iś*, by Bābu Saratchandra Dās, C. I. E. and Pandit Harimohan Vidyābhūṣaṇ, Oriental Librarian to the Asiatic Society of Bengal. The first volume of this work was lost in India for some centuries and has been lately recovered by Bābu S. C. Das from Lhasa. The work was written by Kshemendra, a voluminous poet of Kāsmīr, who, though a Hindu, wrote this work at the request of a Buddhist friend Nakka. No. 693, Vol. I, Fasc. I. 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.
- * Amsterdam :—Royal Zoological Society.
- * ———— :—Royal Academy of Sciences.
- * Angers :—Société d' Etudes Scientifiques d' Angers.
- * Baltimore :—Johns Hopkins University.
- * Batavia :—Society of Arts and Sciences.
- § ———— :—Magnetic and Meteorological Observatory.
- * ———— :—Kon. Natuurkundige Vereeniging in Nederlandsch-Indië.
- * Berlin :—Royal Academy of Sciences.
- † Berne :—Société Suisse d' Entomologie.
- § Birmingham :—Birmingham Philosophical Society.
- * Bombay :—Bombay Branch, Royal Asiatic Society.
- * ———— :—Anthropological Society.
- * ———— :—Editor, Indian Antiquary.
- * ———— :—Editor, Times of India.
- * ———— :—Natural History Society.
- * Boston :—Natural History Society.
- § ———— :—American Philological Association.
- * Bordeaux :—L' Académie Nationale des Sciences, Belles-Lettres et Arts.
- § ———— :—Société de Géographie Commerciale.
- * ———— :—Société Linnéenne.
- * Brisbane :—Royal Society of Queensland.
- * Brookville :—Society of Natural History.
- * Brunswick :—Verein für Naturwissenschaft.

- * Brussels :—L' Académie Royal des Sciences.
- * ————— :—Musée Royal d' Histoire Naturelle de Belgique.
- * ————— :—Société Entomologique de Belgique.
- * ————— :—Société Royale Malacologique de Belgique.
- § Buda Pest :—Royal Hungarian Academy of Sciences.
- * Buenos Ayres :—Museo Nacional.
- * ————— :—Academia Nacional de Ciencias de la Republica Argentina.
- * Calcutta :—Agri-Horticultural Society of India.
- * ————— :—Geological Survey of India.
- * ————— :—Editor, Englishman.
- * ————— :—Editor, Hindu Patriot.
- * ————— :—Editor, Indian Daily News.
- * ————— :—Indian Mirror.
- * ————— :—Indian Museum.
- † ————— :—Mahomedan Literary Society.
- * ————— :—Public Library.
- * ————— :—Survey of India.
- * ————— :—Tuttobodhini Shova.
- † ————— :—University Library.
- * Cambridge :—University Library.
- * Cassel :—Der Verein für Naturkunde.
- * Cherbourg :—Société Nationale des Sciences Naturelles.
- * Christiana :—University Library.
- * Colombo :—Ceylon Branch, Royal Asiatic Society.
- * Copenhagen :—La Société Royale des Antiquaires du Nord.
- † Cuttack :—Cuttack Library.
- * Danzig :—Naturforschende Gesellschaft.
- * Dehra Dun :—Great Trigonometrical Survey.
- * Dublin :—Royal Dublin Society.
- * ————— :—Royal Irish Society.
- § ————— :—Geological Society of Dublin.
- * Edinburgh :—Royal Society.
- * ————— :—Scottish Geographical Society.
- § ————— :—Botanical Society.
- * Florence :—Società Italiana di Anthropologia e di Etnologia.
- * ————— :—Società Africana d' Italia.
- * Frankfurt :—Naturwissenschaftlichen Verein.
- * ————— :—Senekenbergische Naturforschende Gesellschaft.
- * 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.
- * Hamburg :—Naturhistorisches Museum zu Hamburg.
- * ——— :—Naturwissenschaftlicher Verein.
- * Halle ;—Deutsche Morgenländische Gesellschaft.
- * ——— :—Die Kais. Leopoldinisch-Carolinische Akademie.
- * Hamilton :—Hamilton Association (Canada).
- § Harrisburgh :—Second Geological Survey of Pennsylvania.
- * Havre :—Société de Géographie Commerciale du Havre.
- * Helsingfors :—Societas pro Flora et Fauna Fennica.
- * ——— :—Société des Sciences de Finlande.
- § Ithaca (U. S. A.) :—Cornell University.
- * Königsberg :—Die Physikalisch-Oekonomische Gesellschaft.
- * Lahore :—Editor, Civil and Military Gazette.
- § ——— :—Anjuman-i-Panjab.
- * ——— :—Agricultural Society.
- † Leyden :—Royal Herbarium.
- * Liège :—La Société Géologique de Belgique.
- * ——— :—La Société des Sciences.
- * Liverpool :—Literary and Philosophical Society.
- * London :—Anthropological Institute.
- * ——— :—Editor, Academy.
- * ——— :—Editor, Athenæum.
- * ——— :—British Museum.
- * ——— :—Geological Society.
- * ——— :—Institution of Civil Engineers.
- * ——— :—Institution of Mechanical Engineers.
- * ——— :—Editor, Nature.
- * ——— :—Linnean Society.
- * ——— :—Royal Asiatic Society of Great Britain and Ireland.
- * ——— :—Royal Astronomical Society.
- * ——— :—Royal Geographical Society.
- * ——— :—Royal Institution.
- * ——— :—Royal Microscopical Society.
- * ——— :—Royal Society.
- * ——— :—Society of Electrical Engineers.
- * ——— :—Statistical Society.
- * ——— :—Zoological Society.
- * Lyons :—La Société d' Agriculture, d' Histoire Naturelle et des Arts
Utiles.
- * ——— :—Muséum d' Histoire Naturelle.
- * ——— :—Musée Guimet.

- * Lyons :—La Société d' Anthropologie.
- † Madras :—Literary Society.
- * ——— :—Government Central Museum.
- * Manchester :—Literary and Philosophical Society.
- § Melbourne :—Royal Society of Victoria.
- * Mendon, Ill. :—Editor, American Antiquarian and Oriental Journal.
- * Mexico :—Sociedad Científica “Antonio Alzate.”
- * Moscow :—Société Impériale des Naturalistes.
- * Munich :—K. Bayerische Akademie der Wissenschaften.
- * Naples :—Società Africana d' Italia.
- * New Haven :—Connecticut Academy of Arts and Sciences.
- * ——— :—American Oriental Society.
- * Newport (R. I.) :—Natural History Society.
- * Ottawa :—Geological and Natural History Survey of the Dominion of Canada.
- * Oxford :—Bodleian Library.
- † ——— :—Indian Institute.
- * Paris :—La Société de Géographie.
- * ——— :—National Library.
- * ——— :—Société d' Anthropologie.
- * ——— :—Société Asiatique.
- † ——— :—Société Zoologique.
- * ——— :—Société Académique Indo-Chinoise.
- * Philadelphia :—Academy of Natural Sciences.
- § ——— :—American Philosophical Society.
- * Pisa :—Società Toscana di Scienze Naturali.
- § Prague :—K. K. Sternwarte.
- * Rio de Janeiro :—Museo Nacional.
- * Rome :—Società degli Spettroscopisti Italiani.
- * Santiago :—Sociedad Científica Alemana.
- * St. Petersburg :—Comité Géologique.
- † ——— :—Imperial Library.
- * ——— :—Société Impériale Russe de Géographie.
- * ——— :—Académie Impériale des Sciences.
- * ——— :—Le Jardin Impérial de Botanique.
- * San Francisco :—Californian Academy of Arts and Sciences.
- * Schaffhausen :—Schweizerischen Entomologischen Gesellschaft.
- * Shanghai :—North China Branch, Royal Asiatic Society.
- * Simla :—United Service Institution of India.
- * Stettin :—Entomologischen Verein.
- * Stockholm :—Kongl: Svenska Vetenskaps Akademien.
- * Sydney :—Royal Society of New South Wales.

- * Sydney :—Linnæan Society of New South Wales.
- * Tokyo :—Imperial University of Japan.
- * Toronto :—Canadian Institute.
- * Trieste :—Società Adriatica di Scienze Naturali.
- * Turin :—Reale Accademia delle Scienze.
- † Ulwar :—Ulwar Library.
- * Vienna :—Anthropologische Gesellschaft.
- * ——— :—K. K. Akademie der Wissenschaften.
- § ——— :—K. K. Central-anstalt für Meteorologie und Erdmagnetismus
- * ——— :—K. K. Geologische Reichsanstalt.
- * ——— :—K. K. Zoologisch-Botanische Gesellschaft.
- * ——— :—K. K. Naturhistorischen Hof-Museum.
- * Washington :—Commissioners of the Department of Agriculture.
- * ——— :—Smithsonian Institution,
- § ——— :—U. S. Army Signal Service.
- * ——— :—United States Geological Survey.
- § ——— :—U. S. Coast and Geodetic Survey.
- * Wellington :—New Zealand Institute.
- * Württemberg :—Natural History Society.
- * Yokohama :—Asiatic Society of Japan.
- * ——— :—Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens.
- * Zagreb :—Arkeologickoga Druzva.

ABSTRACT OF PROCEEDINGS OF COUNCIL DURING 1888.

January 26th, Ordinary Meeting.

A copy of the *Orientalische Bibliographie*, a new publication in place of the *Literature Blat für Orientalische Philologie*, the publication of which has been discontinued, was subscribed for.

An offer from Professor Cowell to revise the translation of the *Muntakhab-ut-Tawárikh* was accepted, and he was authorised to postpone the translation of Khafi Khan.

Read a letter from Mr. F. E. Pargiter stating that he will be happy to complete the translation of the *Márkandeya Purána* without notes, but will add such notes as may suggest themselves in the course of the work.

The Government of Bengal was informed, in reply to an enquiry made by the Government of India whether the entire cost of purchasing a complete set of the *Tangyur* from Tibet could not be met from the Government grants made to the Society, that the charge for the purchase could only be met from the Oriental Publication Fund, and that in the

opinion of the Council it would not be possible to meet the entire cost of purchasing the Tibetan work from the balance of that Fund.

A letter from the Assistant Surveyor, Survey of India Dept., reporting that in consequence of new rules for debiting all work done in the office cash payment will be required in future for all drawings made or photographic work done on account of the Society, was recorded.

On an application from Babu Saratchandra Dás it was resolved that the Cambridge University should be asked for the loan of the two Manuscripts of the *Bodhisatvá avadána kalpaláta* in the University Library, to help him in editing that work.

An exchange of publications (Journal, Part II) with the College of Medicine, Imperial University of Japan, was sanctioned.

An enquiry from the Superintendent, Baptist Mission Press, regarding the rate to be allowed for printing Tibetan works was left to the Philological Secretary for settlement.

It was resolved that the future fasciculi of the *Maásir-ul-Umara* should be printed in demi octavo instead of royal octavo size.

It was ordered that 600 copies of the catalogue of Burmese Manuscripts should be printed, and also the same number of the catalogue of Tibetan Manuscripts.

The Council approved of the proposed triangular shape for the new durwan's lodge, the position selected for it not admitting of the erection of a square building.

March 1st, Ordinary Meeting.

A letter from Major H. G. Raverty, offering to contribute articles to the Society's Journal if proofs of his papers could be sent to him, was referred to the Philological Secretary.

An exchange of publications with the Imperial Botanic Gardens, St. Petersburg, was sanctioned.

On the recommendation of the Philological Secretary a copy of certain Sanskrit works published by Moheschandra Paul was subscribed for.

An application from the Ceylon Branch of the Royal Asiatic Society, for a copy of Rules and Regulations was complied with.

Maulvi Kabir-ud-din Ahmed having offered to continue the printing of the *Maásir ul-Umara*, in royal 8vo. size at a reduction of Rs. 36 per fasciculus, on the understanding that the reduced charge was to be confined to that work, it was decided to accept the offer.

A letter was received from the Government of Bengal intimating that the Government of India could not sanction a grant from Imperial funds in the present state of the Finances, towards purchasing a com-

plete set of the *Tanggyur* from Tibet, and that the Lieutenant-Governor was also precluded from sanctioning an additional grant but had no objection to the whole cost being met from the Oriental Publication Fund, if it could be managed. The matter was referred to the Finance Committee for report.

Read a letter from the Editor of Indian Notes and Queries stating that he has been compelled to discontinue the publication of that work owing to pressure of official business.

The several Committees for 1888 were appointed.

On the recommendation of the Philological Committee Dr. G. Thibaut was appointed to edit Bhaṭṭotpálás commentary on Varáha Mihirá's Brihat Saṃhita.

The Philological Secretary was authorised to arrange with a private Engraver for printing a plate of some coins required for the Proceedings.

A bill for Rs. 263-4, for drawings executed at the Survey of India office was passed.

Messrs. Meugens and King were re-appointed Auditors for the current year.

March 29th, Ordinary Meeting.

A proposal by the Natural History Secretary, and seconded by the Philological Secretary, that elections to Corresponding Membership should be revived, and that such Members should henceforth receive the publications of the Society, was circulated to the Council for consideration.

The purchase of a collection of coins offered for sale by Mr. J. G. Delmerick for Rs. 250 was sanctioned, some of the coins being very rare.

An agreement on stamp paper for the erection of an iron railing with two gateways along the southern boundary of the Society's premises, was signed by the Contractor and the General Secretary.

On the recommendation of the Natural History Secretary permission was granted to the Microscopical Society of Calcutta to hold their meetings in the Society's rooms, and it was resolved that such papers read before the Society as seemed to have a scientific value should be accepted for publication in the Journal, on the condition that the papers were brought up at the monthly meetings.

A specimen proof of the first form of the new Persian Catalogue was approved. The edition to consist of 500 copies, royal 4to. cost Rs. 3-8 per page.

A recommendation by the Philological Secretary to subscribe for

a copy of a new work called the "Epigraphia Indica and Record of the Archæological Survey of India," to be published quarterly, was postponed.

The price of the new Tibetan work "Sher-Phyin" was fixed at one rupee per fasciculus, for the present.

A proposal to subscribe for a copy of the "Asiatic Quarterly Review" was negatived.

The old beams remaining over from the late repairs were sold for Rs. 112.

A paper on "Benares Kinkob" received from Rajchandra Sanyal, Librarian, Benares College, was returned to the Author, not being suitable for the Society's publications.

April 26th, Ordinary Meeting.

An exchange of publications with the *Verein für Naturwissenschaft Zu Braunschweig* was declined.

A letter of congratulation was written to the *Société des Sciences de Finlande* in commemoration of the 50th Anniversary of its foundation.

The completion of Part III of Atkinson's *Lepidoptera* was reported by Mr. W. T. Blanford, by whom the work had been supervised after the death of Mr. A. Grote, the total cost being £155-9-9, leaving a balance of £6-6-9 out of the sum of £161-16-6 remitted to London in September 1886 for the publication of the work.

It was resolved, on the report of the Physical Science Committee, to take steps for investigating into the cause of the explosive sounds known as the "Barisal Guns."

Read letters from the Superintendent, Baptist Mission Press, agreeing to accept Rs. 3-8 a page, *provisionally*, ultimately reducible to Rs. 3-3, for printing Tibetan works, royal 8vo, and Rs. 5-4 a page, 4to, for Arabic works, with vowel points. Both changes to include "doing up," as well as printing and paper.

May 31st, Ordinary Meeting.

On an application from the American Philological Society of Philadelphia inviting the co-operation of the Asiatic Society in perfecting a universal language for learned and commercial purposes, based on the Aryan vocabulary and grammar in their simplest forms, a reply was sent intimating the willingness of the Society to assist as far as possible, but that a special delegate could not be sent to represent the Society at the congress which was proposed to be held.

An application from the *Sociltà Africana d' Italia*, Naples, to be supplied with Part I of the Journal, in addition to Part II, was negatived.

On an enquiry from the Government of India, Home Department, whether the literary qualifications of Monsieur S. Levie, of the School of High Studies at the Sorbonne, Paris, were such as to entitle him to be placed on the list of Savants to whom copies of the Catalogues of Sanskrit Manuscripts are sent, a reference was made to the French Consul at Calcutta.

In reply to a letter from the Engineer to the Calcutta Corporation stating that the water channels across the new entrances to the Society's premises could not be improved without altering the levels of the roadside channels, and building at least one new gully pit, at a cost of Rs. 60, which the Society would be called upon to pay, he was asked whether the ordinary iron gateway tubes could not be supplied at the Society's expense.

The Literary and Historical Society of Quebec having expressed a wish, through the Government of India, to exchange publications with Societies in India, a number of each part of the Journal was sent, and specimen copies of their publications asked for in return, to decide whether an exchange should be made.

An exchange of publications (Journal, Part II) with the Entomological State Museum, Stockholm, was sanctioned.

Permission was accorded to the Theosophical Publication Fund Society of Bombay to reprint the English translation of 12 Upanishads originally published in the Bibliotheca Indica series, which had been out of print for some years.

The Baptist Mission Press was authorised to make an extra charge of one anna per page for "doing up" Tibetan works, in addition to the rate of Rs. 3-8 per page for printing previously sanctioned.

On the recommendation of the President a visiting Committee was formed, consisting of the officers and one or two members of Council, to meet whenever necessary for the inspection of the Office, Library, Stock, &c.

It was decided that there was no necessity to revive the election of Corresponding Members at present.

An offer from Professor Duncan to undertake the determination and description of the collection of the Ophinroidea and Echinoidea, recently dredged up on board the "Investigator," was accepted.

Authority was given to Mr. V. A. Smith to use the negatives of the plates attached to his paper on Gupta gold coins published in the Journal, Part I, for 1884, and to reprint so much of the text as might be necessary in preparing a comprehensive Monograph of all the Gupta coins, on which he was engaged.

The Baptist Mission Press was directed to revert to the use of blue paper for the cover of the Society's Proceedings.

Intimation was received from Messrs. Trübner & Co. of the dispatch of the copies of Part III, of Atkinson's Lepidoptera.

On the recommendation of the Library Committee certain books were ordered to be purchased, and the re-grant of the sum of Rs. 1,000 for binding the principal periodicals was sanctioned.

An estimate of Rs. 47 was sanctioned for levelling the ground by the east gate, and for sand plastering and color washing the remaining portion of the compound wall in Park Street.

June 28th, Ordinary Meeting.

The Agri-Horticultural Society of Burmah was authorized to subscribe to the Society's publications on the usual terms.

Two copies of Mr. E. Blyth's catalogue of the Mammals and Birds of Burmah were presented to the Library of the Indian Museum.

A requisition from the Government of India, Home Department, for a report showing the progress made since 1883 in the search for Sanskrit Manuscripts in the Lower Provinces of Bengal was referred to Dr. R. Mitra.

Dr. D. D. Cunningham was appointed a Member of the Council, and a Trustee of the Indian Museum on behalf of the Asiatic Society in the place of Mr. E. T. Atkinson, who had become a Trustee on behalf of the Museum by virtue of his official position as Accountant General, Bengal.

Instructions were issued to the Engineer to the Calcutta Corporation to have the necessary alterations carried out to remedy the defect of the carriage way at the entrances of the new gateways in accordance with his recommendation.

The purchase of certain books for the Library was sanctioned on the recommendation of the Library Committee.

A suggestion that all papers requiring plates should be published in the Journal in order not to delay the Proceedings was referred to the Secretaries.

It was announced that Professor Cowell was engaged with Professor Lowe in revising the translation of "*Muntakhab-ut-Tawárikh*."

Rules for the grant of leave &c. to the office establishment were sanctioned.

July 26th, Ordinary Meeting.

Intimation was received from the Secretary of State that Her Majesty the Queen, Empress of India, had been graciously pleased to accept the address presented by the Society on the occasion of Her Majesty's Jubilee.

A representation from Messrs. Trübner & Co. for an increase in the rate of discount allowed them for the sale of the Society's publications was ordered to be circulated to the Council.

On an application from the Rev. Mr. Sandberg for the loan of two volumes of the Tibetan Xylograph *Ka-gyur M.do* it was decided that the books could be lent out if Mr. Sandberg would sign a bond of indemnity for Rs. 300, and pay all postage and insurance charges.

An old portrait in oil colours sent by the Hon'ble Mr. Quinton for identification was returned to the Commissioner of Allahabad in compliance with Mr. Quinton's request.

A letter from the Solicitor to Government stating that the Manuscripts belonging to the estate of the late ex-King of Oudh were with Colonel Jarrett for the preparation of a Catalogue, was recorded.

The price of the colored copies of Atkinson's *Lepidoptera*, Part III, was fixed at Rs. 6.

On the recommendation of the Philological Secretary it was resolved to engage a Tibetan from Darjeeling to assist Babu P. C. Ghosha in editing the Sher-Phyin, and to look after the Tibetan books in the Society's Library.

August 30th, Ordinary Meeting.

On an application from Dr. W. A. Conklin, a copy of Part II of the Journal was ordered to be given in exchange for the Journal of Comparative Medicine and Surgery, it being understood that the Journal would be deposited in the Library of the New York Zoological Gardens.

Intimation was received of the death of Salvatore Tommasi, President of the Società Africana d' Italia, Naples.

Under instructions from the Government of India, Home Department, the name of Monsieur S. Levie was entered in the list of persons to whom Catalogues of Sanskrit Manuscripts are sent.

Certain Sanskrit Manuscripts in the Government collection were authorised to be lent to Mr. Apte, Pleader of the High Court, Bombay, on the conditions named by that gentleman.

Mr. G. G. Palmer was authorized to make a copy for himself of the oil painting by Geo. Morland in the Society's collection, he having promised to clean and varnish the painting before returning it.

A reprint of the Rules of the Society was ordered.

The application from Messrs. Trübner & Co. for an increase of commission on the sale of the Society's publications was referred to a Sub-Committee.

It was decided to hold a meeting of the Society in the month of September.

An exchange of Part II of the Journal was sanctioned with the following Societies: Entomological Society "Iris," Dresden, Gesellschaft des Naturforschenden Freunde, Berlin.

The Baptist Mission Press agreed to supply, without extra charge, paper weighing 20lbs. to the ream for printing the Bibliotheca Indica publications.

The following estimates were sanctioned:

For renewing beams and burgahs, &c, on the ground floor and general repairs to the building, Rs. 3,855-8.

For thorough repairs to the out offices, Rs. 343-10-6.

For putting wire netting to the windows of some of the rooms on the ground floor, fitting brass bolts with hasps to all the windows and supplying padlocks, Rs. 172-8.

September 27th, Ordinary Meeting.

The subscription of ten guineas to the Pali Text Society was sanctioned for a further period of six years, but a proposal from the Secretary to the Society to exchange advertisements with the Royal Asiatic Society of Great Britain and Ireland was declined.

A letter was read from the Société d' Anthropologie, Paris, intimating that the Society had been assigned a place in the Exposition of the Minister of Public Instruction in 1889 and asking all persons who desire to take a part therein to communicate with the Committee of Organisation.

An application from Dr. L. G. Wirth, of Alexandria, to be admitted a Member of the Society without paying any fee was declined.

A letter from the Government of the N-W. P. and Ondh offering 46 photographic plates of Archæological remains in the Jhansi district on condition of receiving two copies of each photograph struck off, was referred to the Trustees of the Indian Museum.

The Collector of Hooghly was authorized to have a copy made of an old Dutch plan of Hooghly from a book in the Society's Library.

The Geographical Society of Paris was furnished with the names of certain persons in India to whom invitations might be sent to attend the Geographical Congress to be held at Paris in 1889.

An offer from the Microscopical Society of Calcutta of an Honorary Membership in that Society to the President of the Asiatic Society of Bengal was accepted.

An additional expenditure of Rs. 39 for half terracing the roof of one of the godowns, for which no provision had been made in the estimate, was sanctioned.

November 1st, Ordinary Meeting.

An exchange of publications with the Literary and Historical Society of Quebec was declined.

The presentation from the Government of India, R. and A. Dept. of a set of 56 photographs of the paintings in the cases of Ajunta taken from March 1884 to April 1885, was announced.

The Government of the N.-W. P. and Oudh was informed that the Trustees of the Indian Museum would accept the photographic plates of Archæological remains in the Jhansi district offered to the Asiatic Society.

It was resolved to subscribe for a copy of a work on the Ornithology of Turkestan and the adjacent countries, to be published by Dr. Menzbier of the University of Moscow.

The report prepared by Dr. Rájendralála Mitra regarding the progress made in the search for Sanskrit Manuscripts in the Lower Provinces of Bengal called for by the Government of India was ordered to be forwarded to Government.

On the recommendation of the Library Committee certain books were ordered to be purchased for the Library.

Two rooms on the ground floor were placed at the disposal of the Photographic Society for their exhibition during a week or two in the cold weather.

Dr. W. King accepted the office of Treasurer in the room of Mr. A. Pedler, who had been obliged to resign on account of ill health and pressure of official duties.

November 30th, Ordinary Meeting.

The loan of the oil painting of Warren Hastings in the Society's collection was made to Mr. G. G. Palmer, for the purpose of making a copy for himself, on the understanding that it was not for sale, and that the painting would be cleaned thoroughly and varnished before return.

Under instructions from the Government of India the name of Monsieur Charles Michel, Professor of Sanskrit at the University, Belgium, was placed on the list of persons to whom copies of the Notices of Sanskrit Manuscripts are sent.

On an application from Mr. J. Cockburn for the assistance of the Society in his proposed exploration of the bed of the river Jumna for fossils, Dr. W. King and the Natural History Secretary were asked to give Mr. Cockburn all possible assistance.

It was decided that there was no present necessity for making any alteration in the Rules regarding the rate of subscription of Foreign Members.

The question of the steps to be taken regarding the cracks in the south wall of the Society's Meeting room was referred for settlement to the Building Committee.

A copy of the Persian Manuscript "Shah Tamasp" was lent to Dr. Paul Horn of Halle, the Royal Library at Berlin having undertaken to receive it into safe custody during the period of loan, and a similar arrangement was sanctioned with regard to Manuscript No. 273 for Professor Hillebrandt in connection with the edition of the "Hiranyakesin Sranta Sutra," which he is preparing for the Bibliotheca Indica, provided the University Library at Breslau would agree to keep it in safe custody.

The purchase of a copy of the work named "Hymnen des Rigveda" edited by Professor Herman Oldenberg, was sanctioned on the recommendation of the Philological Secretary.

Lists were circulated to Council of the names of the Office Bearers and Members of Council for the ensuing year.

December 20th, Ordinary Meeting.

The Government of India was informed in reply to an enquiry whether any portion of the grant for the search for Sanskrit Manuscripts could be spared for the publication of the Reports of the Archæological Survey of India, that the Council was of opinion, that the search should be continued for a further period of 4 years and then cease, but meanwhile the grant should not be reduced.

Mr. J. Talboys Wheeler was informed in reply to an offer he made for the sale to the Society of his Manuscript copy of the Mahābhārata and Index for £60 that the copy was not required.

A letter was received from the Government of India forwarding a Medal presented to the Society by the Corporation of the City of London in connection with the Colonial and India Exhibition of 1886.

An application from the Directeur de la Feuille des Jeunes Naturalistes, Paris, for an exchange of publications was declined.

The thanks of the Council were conveyed to the Honorary Secretaries of the Photographic Society of India for the offer of the use of the reading room and dark room of the Society to any members of the Asiatic Society who may be interested in Photography.

On the recommendation of the Building Committee an estimate amounting to Rs. 299-10 was sanctioned for repairing the cracks in the south wall of the Society's Meeting Room.

With reference to a letter from Dr. Henning, Frankfurt, applying on behalf of the Naturwissenschaftlichen Vereins for a copy of the Journal in addition to the Proceedings, it was decided that the Journal could not be given.

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

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

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

The PRESIDENT then addressed the Meeting.

Address.

The Report of the Council which has just been read gives full details of the working of the Society during the past year and I trust you will consider it satisfactory. Judging by the flow of members and the number of papers that have been brought before us, there seems to be no diminution in the usefulness of the Society. The ordinary income and expenditure have been much as usual, the former showing, as it should, a fair balance in excess of the latter. We have, however, had very heavy expenditure to meet on account of the repairs and alterations of our premises, for which it has been necessary to sell out a portion of our capital from the Temporary Fund, and more will have to be sold out to meet present liabilities. It is, however, a great satisfaction to know that the substitution of a railing for the wall along Park Street and the other improvements made in clearing the compound of trees and vegetation, which stopped the proper ventilation of the house, have met with general approval both in and out of the Society. Now that these repairs have been completed, it is to be hoped that nothing more will be required in this way for some years to come, and we may be able to turn our attention to improvements in the Library, and other matters which have had to be postponed in consequence of the repairs.

We ought, however, to realise that our income is barely sufficient to meet these recurring extraordinary expenses in addition to the ordinary calls upon it, and that every effort should be made to increase our resources, to the extent of at least Rs. 1,000 per annum, by the influx of additional members and the exercise of due economy. It is a matter of great regret to me to see so few new standard works added to our Library, but the expenditure for keeping up our magnificent series of periodicals already exceeds the Budget grant allotted for the purchase of books.

Before proceeding further I must not omit to remind you of the obligations we are under to the officers of the Society, to whose zeal and devotion to the duties confided to them its successful working is entirely due. I know from experience how heavily these duties sometimes press in addition to the daily official work in a trying climate. Mr. Wood-Mason, the Natural History Secretary, and Dr. Hoernle, the Philological Secretary, have both devoted all their energies to the editing of their respective parts of the Journal. It is a matter of great regret that Mr. Pedler found himself obliged by the strain of official duties to give up the office of Treasurer which he had so efficiently held since May 1887. Still more recently our excellent and hardworking General Secretary, Mr. H. M. Percival, has had to resign his post for the same reason. The Treasurership was held for a short time after Mr. Pedler's resignation by Mr. A. Simson, and now Dr. W. King has kindly taken it over. To all these gentlemen and to our Vice-President, and late President, Mr. E. T. Atkinson, I desire to offer my warm personal acknowledgments for the help freely afforded me in presiding over the affairs of the Society, and I would also ask you to pass a cordial vote of thanks to them for their services to the Society during the past year. (*The vote was passed unanimously*). It was a great pleasure to see my old friend our Vice-President, and former President, Rájá Rájendralála Mitra, the Nestor of the Society, recently among us once more, and I trust we may hope for his entire restoration to health.

As already announced, Mr. C. Little, who will be balloted for as a new member this evening, has very kindly consented to undertake the duties of General Secretary.

Following the good custom of many of my predecessors, I propose to give a brief review of the progress of Science and Oriental literature in this country and its nearer border-lands during the past year. Such a review must, I know, be very incomplete and imperfect, owing to my inacquaintance with many of the subjects treated on, as well as to the large number of subjects, each of which would give good material for an address by itself, and the vastness of the area with which we have to deal. For we have not only to show our fellow-workers in other countries what is being done here; but to many of our members residing in other parts of India, far from libraries of reference, it will be interesting to know what is being done elsewhere in connection with subjects coming within the scope of our enquiries. It is also well, I think, that we should periodically endeavour to sum up the progress we are making in carrying out the intentions of our founder, and continuing the labours of the many distinguished workers in the field of literature

and science, whose names have adorned our member rolls for upwards of a century.

Such work in India has to be performed for the most part under the greatest difficulties. The climate is ever trying, and official duties tend daily to press more heavily. Libraries too are few, and the appliances for scientific work difficult to obtain and to keep in good order.

We have as yet no class of leisured devotees of science, as in other countries, though it may be hoped that as time goes on, the seeds of the scientific education, now so liberally thrown broad-cast over the country, may produce good fruit. It is disappointing, however, to see from a recent resolution of the Government of Bengal, that this branch of education is making so little advance and that the science course is losing popularity in favour of more literary but less practical studies. For progress in the practical applications of science we have mainly to look to the Scientific Departments of the Government; for few of us have either the facilities or the leisure for carrying out independent researches of our own; and thus it has come about that experimental science occupies so small a place in our Journal, a fact greatly to be regretted, for the field of useful work is still large. It must be admitted, however, that there is much in favour of the centralisation of the results of the scientific work carried on under Government in various departments, so that enquirers in this or other countries may at once know where the information they are in search of is most likely to be found; the work is done more completely, and the continuity of the records of it thus secured is of the utmost importance.

For myself, though I should be the last to underrate the value of the admirable work our Society has done and is doing, I should be glad to see it occupy a more prominent position as the exponent and representative of scientific progress in this country and keep itself more in touch with the movements of the day in the direction of scientific and technical education, and the spread of scientific knowledge in its application to the practical requirements of the country. New Societies and new Journals are being started, some of them for objects quite within our scope. It is exceedingly gratifying to see this evidence of progress, but at the same time it seems to show that our Society does not sufficiently meet the requirements of the times, and it might be well for us to consider whether anything could with advantage be done to extend its usefulness by a re-arrangement of our Journals and the encouragement of branch Societies or Sections for special objects. This, however, is a subject upon which I cannot now enlarge.

As it would be quite impossible to deal with work going on all over the Continent of Asia, I propose to limit my remarks as far as possible

to subjects which have a more or less immediate connection with India, and even with that limit the field of enquiry is a vast one.*

Commencing with the principal work of our Society—

ORIENTAL LITERATURE, HISTORY AND LINGUISTIC STUDIES.

I regret that other duties have, of late, prevented me from turning my attention to the study of Eastern literature and languages, ancient or modern. It would, in any case, however, have been far beyond my powers and opportunities to have tried to place before you a complete review of what has been accomplished during the year in the extension of the knowledge of Indian Literature and the prosecution of linguistic research, but Dr. Hoernle has kindly prepared for me a brief abstract which will, I hope, enable you to form some idea of what has been done in this direction by our own Society and other Societies in India, as well as in other lands. It is, however, peculiarly gratifying to me to see that these enquiries into the ancient literature, philosophy and languages of Asia are being prosecuted with undiminished interest and energy in all parts of the civilised world, and we may hope that in due time they will throw light on much that is now obscure in connection with the early religions and languages of mankind, as well as the early history of this country.

Publications of the Society.—Two numbers of the Journal, Part I, have been issued by Dr. Hoernle during the year, and in place of the two remaining numbers, an Extra Number will shortly appear which will contain Mr. G. A. Grierson's valuable "Materials for the Modern Vernacular Literary History of Hindústán." This work, which was originally compiled for the Seventh International Congress of Orientalists, at Vienna, will give more or less extended notices of not less than 952 poets of Hindustan, many of whom have hitherto been not even known by name.

Among the papers contained in the two quarterly numbers, the only one bearing on literature is by Bábú Sarat Chandra Dás "on the Sacred and Oriental Characters of Tibet." Mr. Beveridge contributes papers "on the Era of Lachman Sen," which is mentioned by Abu-l-Fazl, in the Akbarnámah, as commencing in 1119 A. D.; also on "Father Jerome Xavier," who stayed with the emperor Akbar for many years at Agra.

* I have to gratefully acknowledge the assistance received, in preparing this address and passing it through the press, from Dr. Hoernle, Dr. Burgess, Col. Thuillier, Dr. W. King, Messrs. Eliot and Pedler, Mr. C. H. Reynolds, Dr. G. King, Dr. D. D. Cunningham, Dr. J. Scully, Mr. E. T. Atkinson, and Mr. Wood-Mason. Also to Dr. Führer, Mr. A. Rea, Dr. Hendley, Mr. Basil Scott, Mr. J. F. Duthie, Mr. H. H. Risley, Mr. E. C. Cotes and Mr. Phipson for information kindly supplied.

He has, further, a note to a paper "on the mother of Jahángír," by Kaviráj Shyamal Dás.

Bibliotheca Indica.—This valuable series of publications has made greater progress than usual under the vigorous supervision of Dr. Hoernle, assisted by Pandit Hara Prasáda Sástrí. Fifty-eight fasciculi, the largest number ever published in a single year, were issued during the year and a complete list of them will be found in the Report of Council. Of these 34 belong to the Sanskrit, 21 to the Persian and 3 to the Tibetan series. The parts of the Sanskrit series are chiefly continuations of works commenced in previous years, but there are seven works newly begun. These are the *Sankhyá Súra Vr̥ttí*, by Professor Garbe; the *Nyáya Kusumánjalí*, by Prof. Ch. K. Tarkálankár; the *Brihad Dharma Purána*, by Pandit Hara Prasáda Sástrí; *Aṇu-Bhášhyam*, by Pandit Hemachandra Vidyaratna; the *Sr̥i Bhášhyam*, by Pandit Rámanátha Tarkaratna; the *Advaita Brahma Siddhi*, by Pandit Vámana Sástrí Upádhyáya; also one Hindí work, the *Tulsí Satsaí*, by Pandit B. L. Chaube. In the Persian series also, most of the published fasciculi belong to continuations; but there is one new work, the *Tarikh-i-Firúz Sháhí of Shams-i-Shiráj-i-'Ajíf*, edited by Maulawí Viláyat Husain. Both works of the Tibetan series are new commencements. The publication of Tibetan works in the Bibliotheca Indica is a new departure, the importance and first beginnings of which have been fully detailed in the addresses of the two preceding years. The first fasciculus of the *Shér-phyn*, or the *Ashṭasáhasriká Prajñáparamítá*, was nearly finished at the time of the Annual Address of 1886, and a few pages of the *Pag Sam Khri-S'it*, or the *Avadána Kalpalatá*, were printed at the time of the Address of last year. Of the former work there are now two parts finished, and of the latter one.

Catalogues.—A Catalogue of our Persian and Arabic Manuscripts and prints or lithographs has been some time under preparation by Maulawí Mirza Ashraf Ali, of the Calcutta Madrasah, under the superintendence of Dr. Hoernle. The Persian portion is completed, and 52 pages are printed, a copy of which is placed on the table. The Arabic portion is far advanced towards completion.

Search for Sanskrit MSS.—A part of the work of searching for Sanskrit MSS.—that done in the province of Bengal—is carried on, in connection with our Society, by Rájá Rájendralála Mitra. The results of his search are recorded in the well-known "Notices of Sanskrit MSS." These have now reached their twenty-third number, which contains notices of 168 manuscripts, bringing the total of manuscripts hitherto described up to 3,240. The following remarks are summarised from the Rájá's interesting report, prefixed to Volume IX of his "Notices,"

which comprises the whole period from 1881-82 up to this year. The principal places visited for the purpose of the search were Benares, the chief towns of Tírhút, Rangpur and Dinájpur, Púrí in Orissa, and 'Azínganj, near Murshidábád. Benares and Tírhút, being ancient and flourishing seats of Sanskrit learning, yielded rich harvests. The search in Rangpur and Dinájpur was disappointing. In Púrí the richest collection, of over 1,200 works, is in the S'ankara Maṭha; but it contains nothing unique or exceptionally rare. But the most valuable results were obtained at 'Azínganj. This place is the seat of a large and affluent Jain community, which maintains several monasteries possessing more or less valuable collections of MSS. The most extensive and valuable library, however, of over 600 works, is in the possession of a private Jain gentleman, Rai Dhanápat Singh, whose name will be known to you in connection with his publication of a large number of Jain Sacred Books. In spite of the well-known reluctance of the Jains to allow the inspection of their literary treasures, Rájá Rájendralála Mitra succeeded not only in examining a portion of the Jain libraries, but also in purchasing a considerable number of Jain works. This class of literature was not much noticed until very recently. The first list of any larger dimension was published by the Rájá in his "Catalogue of Bickaneer MSS." This was followed by the lists contained in Professor Peterson's and Professor Bhandarkar's "Reports of the search in the Bombay Presidency," during the years 1883 to 1884, 1884 to 1886. It is particularly gratifying that the search for Jain MS. is now being taken up also in Bengal. The Bombay Government collection, having been begun earlier, is richer in Jain works, but a very respectable nucleus has now been formed for the Calcutta collection. Altogether Rájá Rájendralála Mitra has purchased 913 works, of which 94 are Jain. In his "Notices," which cover the period from 1881—1888 and which are included in the volumes VI—IX, a total of 1,260 works are described, many of which will appear new to Oriental scholars.

The search in the province of Oudh is entrusted to Pandit Deví Prasáda. His "Catalogue of Sanskrit Manuscripts" records the work done in 1888, and notices 316 manuscripts, including 3 Jain.

Of the operations, conducted in the Bombay Presidency by Professor R. G. Bhandarkar, we have received his "Report of the Search for Sanskrit Manuscripts during the year 1883-1884." It is a large volume with numerous extracts from selected manuscripts, described in the report. Its catalogue enumerates 737 manuscripts as purchased for Government. A noteworthy and valuable feature in it is the large space devoted to the description and discussion of manuscripts of the Jain literature, both of the Digambara and Svetámbara sects.

In view of the interest that is growing up with regard to everything connected with Jainism, it is particularly satisfactory to note the increasing attention bestowed on the search for Jain MSS. In the three last volumes of the "Notices," there are described no less than 266 of these MSS., of which, as already stated, 94 have been acquired for the Government collection which is in the custody of the Society.

Other Indian Societies and Journals. The last number of the '*Journal of the Bombay Branch of the Royal Asiatic Society*,' published in 1887, contains several papers of much interest. Professor R. G. Bhandarkar contributes his 'Wilson Lectures' on "the Prákrits and the Apabhramśa," as well as a report of his visit to the Vienna Congress. There is also a paper by Professor Peterson "on a new Sanskrit Anthology, the *Suktimuktávali*, of Jalhana."

The *Madras Journal of Literature and Science*, in addition to papers on coins and antiquities &c., which will be found under separate heads, contains a paper by Mr. E. Stradiot "on the Principles of Hindu Music."

A recently established Journal, which deserves notice, is the *Orientalist*, edited in Ceylon by Mr. William Goonetilleke. It is mainly devoted to the discussion of subjects more or less closely connected with Ceylon. The current volume is the IIIrd, of which we have received eight parts. The editor and Rev. Chas. Carter give us papers on the vexed question of "Transliteration"; M. H. A. Piercis, D. A. Jagavardana, G. Weerakoon, and H. White contribute stories of "Singhalese Folklore," and the latter also gives an account of "Singhalese measures of time." There are also papers, by W. Varasinha Tissanayaka on "the philology of the Singhalese language"; by Mr. F. H. de Vos, a "translation of Wybrandt van Waerwijek's voyage to the East Indies;" and of "the Deed of gift of the Island of Ceylon to the Portuguese;" by Mr. C. W. Mudaliyár, on "extracts from the Mahavamsa," and by Mr. T. B. P. Ratamahatmiya, "Translations of the Jatakas." Mr. Britts continues his "Curiosities of Tamil Literature," and some of his remarks are criticised by Mr. P. Coomara Swamy in a paper on "the Tamil Language and Literature." In addition there are numerous notes and queries, Sanskrit puzzles and book-notices.

Another useful periodical, the *Indian Notes and Queries*, I regret to say, has ceased to exist.

Foreign Oriental Societies and Journals. The *Journal of the China Branch of the Asiatic Society* contains an account of "the Chinese Oriental College" by F. Hirth. The college was established in 1407, in the 5th year of Gunglo, and one of its principal duties was to train

interpreters for the Chinese Foreign office. The languages originally taught were eight: Tartaric, Judhik, Tibetan, Sanskrit, Arabo-Persian, Pa-yi, Uigurian and Burmese; but others, like Siamese, Japanese, &c. were added in the course of time. Mr. W. M. Becher gives "notes on the Mineral Resources of Eastern Shantung," and Ludovico Nocentini a very useful compilation of the "names of the sovereigns of the old Korean States and a Chronological Table of the present dynasty."

The Journal of the Batavian Society of Arts and Sciences (*Tijdschrift voor Indische Taal-, Land- en Volken-kunde*) contains an account of the origin of the Achinese people and their condition under the former Sultáns of Achin. Dr. J. Brandes communicates a Jayapattra dated S'aka 849, and three copperplates from the time of Mataram found in the residency of Krawang.

In the *Journal of the Royal Asiatic Society* Mr. Simpson gives us "some suggestions of origin in Indian architecture." From Mr. E. E. Oliver we have a historical paper on "the Chagatái Mughals," the coins of whom he describes in another paper shortly to be published in our own Journal. Mr. J. F. Hewitt has some interesting "notes on the early history of Northern India," and Mr. R. Sewell some "further notes on early Buddhist symbolism." Mr. John Capper describes "the Dágabas of Anurádhapura, and Major-General Sir F. J. Goldsmid contributes an appreciative review of Professor Sachau's "Albiruni." The other papers are by Professor A. H. Sayce, on "the Cuneiform Inscriptions of Van;" by Mr. R. N. Cust, on "the languages spoken in the Zarafshan valley, in Russian Turkistan," and by Mr. M. V. Portman, "on Andamane Music."

I cannot but regret that we have not received any numbers of the *Journal of the American Oriental Society*, as it usually contains papers of considerable interest to us in India.

The Journal of the Asiatic Society of France (*Journal Asiatique*) brings us again one of Mr. Senart's valuable contributions on "Indian Epigraphy," in which he discusses the fresh information derivable from the newly discovered XIIth edict of Aśoka at "Mansera," now published by Prof. Bühler in the *Epigraphia Indica*. Of equal interest is Mr. Abel Bergaigne's account of "the Ancient Kingdom of Champá," linguistic, historic, geographical, religious, &c., as it may be gathered from its inscriptions. Mr. Leon Feer continues his "Buddhistic Studies," in which he gives us translations of the legendary and narrative portions of the commentary on the Upáli Sutta.

The Journal of the German Oriental Society (*Zeitschrift der Deutschen Morgenländischen Gesellschaft*) as usual, contains a very large number of contributions of which I will here only mention those that are of

special interest to us in India. Professor O. Böhtlingk gives us two small but useful notes on "the impersonal use of the participle future passive in Sanscrit," and on "the Grammar of Kátantra." Mr. E. Wilhelm has contributions to the "Lexicography of the Avestá," and D. H. von Wlislöcki, to "Benfey's Panchatantra." To Professor Oldenberg we are again indebted for two valuable papers on "the Song-writers" and "the Adhyáya division of the Rigveda." I would call particular attention to the proposals addressed by Professor E. Leumann "to all future editors of Indian dramas and non-vedic prose texts" with reference to the adoption of an uniform system of editing with the object of facilitating, especially for the purpose of Dictionaries, an easy and intelligible system of citation of words or passages from the edited texts.

The *Vienna Oriental Journal* is keeping up its high character, and gives us a great variety of most interesting matter. I may instance Professor Kielhorn's paper on "Hemachandra's Sanskrit Grammar," Mr. Manilal N. Drivedi's on "the Advaita philosophy of Sankara," Prof. H. Jacobi's "on Rudraṭa and Rudrabhaṭṭa" and "on Viśákha-datta," and Dr. Jos. Zubaty's on "the change of quantity in the terminations of Vedic words." Dr. Hanusz continues his "Contributions to Armenian Dialectology," and Prof. Bühler adduces "further proofs of the authenticity of the Jaina tradition." Mr. Joh. Kirste again discusses the vexed question of the meaning of the words *raonano rao* on the Indo-Scythian coins, to which he proposes to assign a Semitic origin from a root meaning "to guard as a shepherd."

Indo-Aryan.—On the subject of the Indo-Aryan languages generally, I have to notice the translation of the first volume of Professor H. Brugmann's "Elements of the Comparative Grammar of the Indo-European languages," prepared by Mr. J. Wright. It contains the introduction and phonology.

Sanskrit.—This is a vast subject, and I must limit myself to drawing your attention to some of the more prominent publications in Europe and India. For fuller information, I cannot do better than refer you to the annual lists of serial publications, such as our own *Bibliotheca Indica*, the *Benares Sanskrit Series*, the *Bombay Sanskrit Series*, the *Sacred Books of the East*, *Orientalische Bibliographie*, and others. Mahámahopádhyáya Ch. K. Tarkálankára has published an edition of the *Kusumánjalí*, a standard work of the Nyáya philosophy, with the explanation (*vyákhyána*) of Haridása Bhaṭṭáchárya, to which he has added a very full commentary (*tíká*) of his own. Dr. Winternitz has given an excellent edition of the *Ápastámbíya Gṛihya Sútra*, with extracts from the commentaries of Haradatta and Sadarśanárya; Professor Jolly, of the *Mánava Dharmasástra*, and Professor P. Peterson of the

S'árngadhara Paddhati, the two latter in Trübner's *Oriental Series* and the *Bombay Sanskrit Series* respectively. To Professor Paul Deussen we are indebted for a translation (in German) of the *Vedánta Sútras*, or the *S'áviraka-Mímámsá*, of Bádaráyaṇa, with the complete commentary of S'ankara, and to Professor Böhlingk for a translation (also in German) of "Páṇini's Grammar," together with the text and explanations. Professor A. Weber has contributed the edition of a very curious little book, called the "*Párasí-prakása*." It is a Persian-Sanskrit vocabulary, written in Sanskrit by Vishṇudatta, during the reign of the emperor Akbar. To Professor Delbrück we are indebted for a "Syntax of the Ancient Indian Language" (*Altindische Syntax*). Your attention may be specially drawn to the new great work of Professor Oldenberg on the "Hymns of the Ṛigveda," of which the first volume has been issued. The author makes an attempt in this work to restore the text of the Ṛigveda from its traditional to its original shape, as far as Vedic tradition and the present state of philosophical inquiry allow. The first volume explains the Vedic metres, discusses the principles of arrangement, and traces the history of the Vedic text. In subsequent volumes the text itself will be published, with a full 'apparatus criticus.' I need not do more than recall to your memory the Sanskrit Dictionaries of Böhlingk and Cappeller, the re-edition of the *S'abda-Kalpa-Druma* by the two brothers Baradá Prasáda and Hari Charana Basu; Pratáp Ch. Ray's English Translation of the *Mahábhárata*, and Parab and Durgá Prasád's *Kavyámálá* (a monthly magazine), the publication of all of which is making satisfactory progress. But I must not omit to notice Professor J. Eggeling's "Catalogue of Sanskrit MSS. in the library of the India Office," of which Part I, containing the Vedic MSS., has been issued; and the new edition of Professor Sir Monier Williams' "Sanskrit Dictionary."

Páli.—The most important publications of Páli literature are those of the Páli Text Society. In their Journal have appeared the "*Símáviváda-vinichhayá-kathá*," edited by Prof. J. P. Minayeff; the "*Saddham-mopáyaṇa*," edited with notes by Dr. Morris, and the "*Pajjamadhu*, a poem in praise of Buddha," edited by Mr. G. R. Gooneratne (Modaliyar) Their annual volume has given us the text of the first volume of the "*Majjhima Nikáya*," edited by Mr. V. Trenckner. To this I may add the translation, by Mr. L. W. Modliyar, of that portion of the *Mahá-vamsa* which remained untranslated by the Hon'ble G. Turnour, and which is now in course of publication.

Prákrit.—Of publications of works in the ordinary Prákrit, I have to note Vákpati's historical poem, called the *Gaúdarváho*, which has been edited by Mr. Sh. P. Pandit, in the *Bombay Sanskrit Series*, and to which

he has added an elaborate introduction, discussing the historical questions connected with king Yaśovarman of Kanauj whose exploits are related in the poem. With regard to the Jaina Prākṛit, Dr. A. F. Rudolf Hoernle's edition of the *Uvāsagadaśo* in our own *Bibliotheca Indica* deserves attention as being the first complete edition of a Jain work, furnishing in full the Prākṛit Text, Sanskrit commentary, and English translation with explanatory notes. The work is the seventh of the earliest sacred books (or *Āgamas*) of the Jainas, and sets forth the rules of conduct incumbent on a Jain layman. A most valuable contribution to the study of Jainism is Professor A. Weber's "Catalogue of Jain MSS. in the Royal Library of Berlin."

Zend and Pahlavī.—With reference to Zend your attention may be drawn to Dr. Karl F. Geldner's standard edition of the "*Avesta*, the Sacred Books of the Parsis," the publication of which is making satisfactory progress. I may also note Mr. H. D. J. Jamasp-Asána and Mr. E. W. West's joint edition of the Pazand Sanskrit Text together with a fragment of the Pahlavī, (in the *Bombay Sanskrit Series*), to which the editors have added a comparative vocabulary and introduction.

Arabic.—The most noteworthy publication in Arabic literature is Professor E. Sachau's English Translation, with notes and indices, of Alberuni's 'India,' the Arabic text of which has been published a year before. The same scholar, in his *Indo-Arabische Studien*, makes an interesting contribution to the elucidation of the pronunciation and history of the Indian Vernaculars in the earlier half of the eleventh century as evidenced in Albiruni's 'India.' W. E. Gasselin's French-Arabic Dictionary, is making satisfactory progress. I may also note W. C. Salemann's edition of the *Míyar-i-Jamáli*, a full account of which the editor has given in Vol. XXXII of the *Bulletin of the Imperial Academy of Sciences of St. Petersburg*. The issue of the first volume of the second edition of the Catalogue of Arabic MSS. in the Library of the Leyden Academy, by M. J. de Goeje and M. Th. Houtsma, is also deserving of notice.

Modern Indian Literature.—The progress made in Modern Indian Literature in general may be best seen from the 'Catalogues of Books printed in British India,' which are published quarterly in every Province under the provisions of Act XXV of 1867. It is a very large and interesting subject, but I can only briefly refer to it in this place, and so far as the catalogues have been available. In general, it may be said that there is a kind of family likeness observable in the lists of Vernacular and English works published in the various provinces. The majority of the writers are Hindús, brought up under very similar circumstances and influences. In Bengal, the North-West, the Panjáb, Bombay and Madras, the provinces which have any considerable literature, they are inspired by the

same high regard for the Hindú Shástras, the same desire for bringing about a revival of Hinduism, the same admiration for the science of Hindú Medicine, the same aversion to the Anglicising tendency of the past generation, combined with the same admiration for the great writers and thinkers of Europe, and the same loyalty to the British rule and Empress. It is curious to note that literary effort in India occupies itself more with religion than with any other subject. Though there is a family likeness between the several lists, yet each provincial list exhibits also a peculiar characteristic. Bengal has a literature rich in biography and fiction; the Panjáb is noticeable for its controversial writings of the professors of the Hindú, Arya, Sikh, Muhammadan and Christian religions; Madras excels in the number of books published for the glorification of the deities of particular shrines; Bombay is distinguished by Jain and Parsi publications. Even in Muhammadan literature we mark the same family likeness in the several lists, in the matter of a preponderance of Persian fiction. Urdú in its various forms is the Muhammadan vernacular throughout the several provinces, from the pure and elegant Urdú of the Doáb and Oudh to its variously modified phases in Bihár, Bengal, Gujarát and Panjáb: and I may remark here, in passing, that the Bengálí Urdú even possesses peculiar and hitherto almost unnoticed alphabetical characters of its own. The backward condition of the Muhammadan community is plainly observable in the paucity of their English-written books.

Bengal, including Bihár, Orissa and Assam.—In Bengal we notice 2,351 entries in the official catalogue, from the middle of 1887 to the middle of 1888. Of the entries about 80 per cent. are Bengali, and 35 per cent. are works designed for educational purposes. Publications in English are becoming more and more numerous, and more and more important. During the period under review two excellent biographies in English were published by two native gentlemen. One is the "Life of Rai Kristo Das Pal" by Mr. N. N. Ghose. The other is Bábú P. C. Mozumdar's "Life and Teachings of Keshub Chunder Sen." Dr. Shambu Chandra Mukherji's "Travels and Voyages between Calcutta and Independent Tippara" gives a faithful picture of Hill or Independent Tippara, and shows to young Bengalis, fond of travelling to Europe, that there are many interesting things nearer at home which should engage their attention before they think of undertaking a journey beyond the seas. Ram Chander Bose's work on "Hindu Heterodoxy" contains a review of Buddhism, Jainism and other systems of religion not considered orthodox by the people of India. The number of works of fiction issued from the Bengal presses is very large; it will suffice to draw your attention to two of the most striking. The "Bishad

Sindhu" is written by a Muhammadan, Mír Musharraf Husain, in standard Bengalí,—a form of Bengalí which Musalman writers but rarely employ, their works being generally written in what is called Musalmání Bengalí, written from the right to the left, and containing a large admixture of Persian words, phrases and idioms. It is a sort of historical novel, introducing the principal events from the death of Muḥammad to the release of Zainu-l-'Abidín. The other novel that I may note is the "Abalábalá," by Satya Charan Mitra; it tells the story of a Hindú wife engaged in the search of her lost husband. The republication of the works of the followers of Chaitanya, by Ráma Návayana Vidyaratna, and of Hindú philosophical works by Mahesha Chandra Pála, which were noticed in the last Annual Address, is making satisfactory progress. The progress of two other serial works, the "Bárat Kosh," or "Indian Encyclopædia," by Ráj Krishna Ráy and Sarat Chandra Deb, and the "Biswa Kosh," or "Universal Encyclopædia," by Rangalal Mukharji and P. N. Mukharji, also deserves mention. An edition of the Sámaveda Samhitá, with a Bengalí translation, by Pandit Satyavrata Samásramí, shows the growing popular interest in the most ancient literature of India. The Uriya and Assamese works entered in the Bengal catalogue are mostly either works designed for educational purposes, or works in connection with local forms of Krishṇa myths. Of Hindú works published in Bihár, I would draw your attention to the publication of the collected works of the celebrated modern Hindí poet Harischandra, by Rám Dín Singh. It is printed in the Kaḍga Vilás Press in serial parts. The same editor is also now publishing a very careful edition of the famous Tulsí Rámáyan from old MSS. in the possession of Mr. G. A. Grierson. Ray Káshí Parshád is publishing an excellent edition of the same text with a very fine commentary. It will take some years before this great work is finished.

North-Western Provinces and Oudh.—I regret that I have only been able to obtain the official catalogue of the second quarter of 1888. In it there are 5 publications in English, 135 in Urdu, 52 in Hindí, 4 in Sanskrit, 9 in Arabic, 23 in Persian, 64 polyglot, and 18 periodicals. The average number of publications in the united Provinces is about 1,000. Of original works in Hindí the following deserve notice: the "Bichitropades" an anthology of humorously didactic verses, collected from the works of numerous mediæval and modern poets, by Pandit Nak'chhedí Tiwári; the "Sangít Málá," a collection of folk-songs in the popular dialects, by Lála Kántá Parsád; the "Badmásh Darpan," of Teg Alí, which describes the habits and customs of the rabble of Benares city in their own Bhojpúri dialect; and the "Merí Janma-bhúmi játrá" by Pandit Damodra Sástri. Specially meritorious work is being done in the edit-

ing of old and new standard works. Two editions of the *Tulsí Dás Rámáyana* I have already noted under Bengal. To these I may add an edition of Chand's great Epic, the "*Prithiráj Rásau*," which is being published in serial parts by Pandit Mohanlal Vishnulal Pandia; the "*Nakh Sikh*," written A. D. 1637 by Sayad Gulám Nabí, *alias* Ras Lín, and edited by Pandit Nak'chhedí Tíwári; and the "*Sringár Sangrah*," written by the poet Sardár of Banáras, and edited by the well-known Munshi Newal Kishore of Lakhnau. Of original works in Urdú may be noted a "*History of Oudh*" (*Tawárikh Aína-i-Awadh*) from the earliest times, by Sháh Abul-Hasan Pírzáda; and a life of the late king of Oudh, Wajid Ali Sháh, (*Tawárikh Sháh-i-Awadh*) by Syud Muhamed Sajjad Husain: of translations into Urdú, a version of the "*Tárikh-i-Ferishta*," and of Sir Mackenzie Wallace's work on "*Egypt*."

Panjáb.—The number of publications registered in the Panjáb Catalogue is nearly 1800; but the majority of them are of an ephemeral character. Of medical works may be mentioned the "*Madhusúdí Nighañtu*," a glossary of medical terms in English, Arabic, Persian, Hindí and Sanskrit. Religious controversial works are specially numerous, those of the Sikhs and Aryas being particularly interesting. There are also numerous works in praise of Muhammadan saints, written in Urdú. Publications in the latter language are the most common, though there are also many in Panjábí and Hindí, and some in Sindhí, Pushtú, Persian, Arabic and English.

Madras.—The Madras publications average about 250 per quarter, and are written in English, Tamil, Telugu, Malayálim, Kanarese, Tulu, Hindí, Sanskrit and Persian. A Tamil-French Vocabulary has been published by Mr. M. A. Lap. Besides works designed for educational purposes, there are a large number of works written either in defence of the "*advaita*" or non-dual system of philosophy, or in praise of Siva or Vishnu of particular shrines. Madras being the home of Sankara Achárya and his '*advaita*' philosophy, that system has still a stronger hold there on popular belief than in any other province.

Bombay.—The average number of publications in Bombay is about 1,900 a year. Maráthí and Gujarátí are the languages in which the largest number of works are published; but Urdú, Hindí, Sindhí, English, Sanskrit, Zend, Hebrew also contribute their quota. Besides literary works and works designed for educational purposes, such as Mangal Das Prabudá's "*English-Gujarátí Dictionary*," Bombay publishes the largest number of works on the Jaina and Zoroastrian religions. "*Parsiism, its place in history*," in English, by Professor J. Darmesteter, is a learned exposition of Zoroastrianism, giving it a high place among the religions of the world. Kabasji Edalji Kauga has published

a Gujarátí transliteration and translation of the Zend-avesta. I may also note some Maráthí translations of Sanskrit works: the Brihat Kathá Ságara, a free translation of Somadeva's Kathá Sarit Ságara; the Gítá Subodha Chandriká, a translation of the Bhagavadgítá (with the text); the Dharmasindhu, a translation of Kásínátha's Dharmasindhu. The "Jain Vṛitta Sikshápatra," by Svámi Ládhdáji Deoji, in Gujarátí, is designed as a book of instruction in Jainism. More important are two books by Muni Atmárámji Vijay Anandjí, both in Hindí, the "Ajñána-timira-bháskara," a controversial book and the "Jainádarsha," an exposition of Jainism. I may also draw your attention to the edition of a few chapters of the "Dnyaneshvarí," a commentary on the Bhagavadgítá, which is published in a work entitled "Nabaníta" (or butter), a collection of Maráthí poems. The Dnyaneshvarí is regarded as the oldest Maráthí work in existence, and its language is so different from the modern Maráthí that it cannot be understood without a commentary.

Indian Border-lands.—I will now pass on to a brief review of the literature of the Border-lands of India. The "Manual of *Sikkim* and *Bhután* languages," by the Rev. G. Sandberg, will prove a very useful help to many of us; and the same may be said of the "Grammar of *Lhotá Nága*," by Rev. W. E. Witter; of the "*Bengali-Garo* Dictionary," published by the Calcutta Missionaries, and of the *Rámáyan* by Bhánu Bhaktáchárya, in *Nepáli*. To *Kashmíri* students may be recommended Rev. W. Wade's "Grammar of the *Kashmíri* language," with texts, and Rev. J. Hinton Knowles' "Folktales of *Kashmír*:" and to those who interest themselves in *Andamanese*, a "Manual" of that language, by Mr. M. V. Portman. Perhaps I may best mention here *Gipsy*, which is an Indian dialect spoken in Europe, as shown by its very name "Romani Çib" (*Domani Jíbh*). A grammar, vocabulary and chrestomathy of it has been published by W. J. Ješina; and I may also note the "English Gipsy Index," by Mrs. Grierson (originally in the *Indian Antiquary*), of which a separate edition has been issued. Of *Singhalese*, we have a "Grammar," by the Rev. C. Chounawel; of *Burmese* a "Manual," by Captain Chas. Slack, and a "Pocket Dictionary, with an abridgment of Dr. Judson's Grammar," by M. M. Phinney and Ebeleth. Of the *Shan* language, there is a "Grammar," by Mr. J. N. Cushing; and of *Malayan* a "Grammar," by Mr. J. Pijnappel, and "a Complete Course, in the form of letters, to teach the *Malayan* language," by Mr. A. A. Rockoff, both in Dutch, also an "English, *Salu* and *Malay* Vocabulary," by Mr. T. H. Haynes.

Tibetan.—A translation of the *Bses-pai-phrin-yig* or "the Friendly Epistle" has been published in the *Journal of the Páli Text Society*. But the most important contributions to the publication of *Tibetan*

Literature have been made in our own *Bibliotheca Indica*. Of the *Shes-rab-kyi-pha-rol-tu-phyin-pa* (commonly called Sher-chin) or the *Satasahasrika Prajñāpāramitā*, Bábú Pratāpachandra Ghosa has now published a second fasciculus; and of the *Rtogs-brjod-dpag-bsam-khri-sñ* (or shortly Pag-sam-khri-sñ) or the *Avadānakalpalatā*, edited by Bábú Saratchandra Dás, the first fasciculus has just been issued. An especially important feature in the latter edition is that it gives side by side the original Sanskrit text of the work and its Tibetan translation. It is much to be regretted that we have not been able to follow the same plan in the case of another important Buddhist work, the *Nyāyabindu Tíkā*, of Dharmottara Achārya. A manuscript of this work was discovered, some time ago, by Professor Peterson in the temple of Sántināth, in Cambay.* His offer to edit it for the Society was gladly accepted; and it was at first intended to publish the text of the Tibetan translation by the side of the Sanskrit original. But failing to obtain a copy of the translation, it was resolved no longer to defer the publication of the Sanskrit original. It is now in the press, and it is hoped that the first fasciculus will appear before long. Quite recently Professor Peterson has succeeded in obtaining a copy of the text, as well as another copy of the tíkā, so that there will be no difficulty in ensuring a good text. Perhaps I may best notice in this connection two other Buddhist Sanskrit works. One is the *Svayambhu Purāna* which is being prepared for publication in the *Bibliotheca Indica* by Pandit Hara Prasāda Sāstrī, from MSS. in the Society's and the Cambridge University's Libraries. The other is the "*Ashṭasahasrika Prajñāpāramitā*," the edition of which has now been completed by Rájá Rájendralāla Mitra.

NUMISMATICS.

A very large number of coins, amounting to upwards of four thousand specimens, have during the year been examined and reported on by Dr. Hoernle, our Philological Secretary. Most of the coins found in Northern India are, under the provisions of the Treasure Trove Act (VI of 1878), forwarded to the Society for examination and distribution to the principal Museums of India; and the detailed reports on them are regularly published in the *Proceedings* of the Society. The total number of coins thus reported on was 2,460. They belonged to coin-troves found at various dates in Jabalpur, Sháhpur (Panjáb), Sialkot, Sarun (Bihár), Rohtak, Rawal Pindí, Bijour (N.-W. Prov.), Wardha (Cent. Prov.), Hoshangábád. Among them were 456 gold, 786 silver, 83 mixed silver and gold, 1,130 mixed silver and copper, and 5

* Journ. Bo. B. R. A. S., Vol. XVIII, No. XLV, (Extra Number) p. 33.

copper coins. Of the gold coins, 451 are of various Paṭhān emperors of Delhi, and 1 of the Bengal king Sikandar Sháh. Of the 786 silver coins, 1 belongs to Ranjít Singh, 1 to Nádír Sháh, and the remainder to various Mughal emperors of Delhi. Among the 83 coins of mixed silver and gold, 62 are later Indo-Scythians of the *Kida* type, and 25 are Mughal forgeries. Among the 1,130 coins of mixed silver and copper, there are 37 so-called punch-coins, 877 belong to different Paṭhān emperors of Delhi or their cotemporaries, 159 to different early Rájput Rájás and 57 to Yaśovarman. The 5 copper coins are all early Indo-Scythians or Bactrians. Detailed notices of all these have been given in the special reports, printed in our *Proceedings*. Most of the coins belong to well-known and often described and published types. There are, however, among them a few of special interest. In a hoard of 477 coins discovered in Hoshangábád, there were found no less than five unique Paṭhān gold mohurs, descriptions of which will be published by Dr. Hoernle in our *Journal*. One of them is a new coin of Muḥammad bin Tughlaq; two belong to Ghiyáṣu-d-dín Tughlaq II.; one to Abú Bakar, the son of Zafar Khán, and one to the Bengal Sulṭán Sikandar bin Ilyás. I may also note the coins of Yaśovarman and of Saifu-d-din Hasan Qurlagh, in the August and November *Proceedings*, which offer improved readings of their legends. The Society's share of these coins, distributed under the Treasure Trove Act, was 89, the details of which are given in the Annual Report.

Another large quantity of coins, collected by Bábú P. C. Mukherji, on special duty with the Archæological Survey, and sent by him to the Imperial Museum in Calcutta, has also been examined and identified by Dr. Hoernle. It comprised 506 specimens which belonged to 20 different classes. Among them were 2 Roman brass coins (1 of Gallienus); 2 silver Byzantines; 8 copper Bactrians; 27 early and 11 later copper Indo-Scythians; 12 silver Guptas; 3 silver Surashtrians; 3 silver punch-coins; 1 copper Yaudheya; 126 old Hindú coins of a large variety of types (including 32 Mitras and 72 so-called Buddhist Satraps); 7 silver Sassanians and 4 silver Indo-Sassanians; 8 gold Raṭhors and Chandels; 2 copper Kashmír (Toramaṇa); 5 copper early Rájput (3 Bull and Horseman); 6 copper Paṭhāns; 1 copper Kángrá; 1 copper square Málwa (Ghiyáṣu-d-dín bin Maḥmúd), and 4 modern copper and nickel (Turkish) coins. A more detailed report is being prepared by Dr. Hoernle for publication in our *Journal*; but I may note that there are among them a few curious coins, *e. g.*, 2 Bactrian coins of impure silver with a quadriga and the legend LAECA on the reverse; a Hverki copper coin of the NANA type, which appears to be an ancient forgery of the corresponding gold coins, though the specimen shows no trace

of gilding or silvering, and 3 copper coins with two female and one male figures on the reverse, resembling certain Gupta types.

Besides these a very large number of coins, upwards of a thousand, have passed through Dr. Hoernle's hands, sent to him by private collectors for identification. Among them there were some of very special interest. Your attention may be drawn to a new Bactrian coin, a variety of a silver hemidrachm of Strato I., which offers a new legend with *dhramikasa*, instead of *prachachhasa*, and was purchased for the Society's collection from Mr. J. G. Delmerick; also to a new gold Gupta coin, a unique variety of the "king and queen" type of Chandra Gupta I., which was forwarded by Mr. H. S. Boys. Both are noticed in the April *Proceedings* of the Society. Another unique gold coin, belonging to the Bengal Sultán Jalálu-d-dín Fath Sháh, and dated 890, has lately fallen into Dr. Hoernle's hands and will be published in the *Society's Journal*.

The Lucknow Museum has received a large number of additions; *viz.*, 24 gold, 148 silver, and 879 copper coins. Dr. Führer's report classifies them as follows: "of the gold coins; 10 are of Kumára Gupta Mahendra of six different types, 6 of Chandra Gupta II. of three different types, 4 of Gangeya Deva of Chedi, 1 of the Chandela Viravarma Deva I., 1 of Narapála Deva of Rewa, and 2 of Govinda Chandra Deva of Kanauj. Of the silver coins; 15 are of the earliest Hindú period, 10 of the Indo-Bactrian period, 12 of the Indo-Sassanian period, 6 of the Varáha dynasty, 10 of Vighraha Pála of Magadha, 6 of Muḥammad bin Sáme, 6 of Ghiyáṣu-d-dín Balban, 7 of Muizzu-d-dín Kaiqobád, 1 of 'Aláu-d-dín Muḥammad Sháh I., 8 of Sher Sháh, 11 of Islám Sháh, 5 of Akbar, 1 of Jahángír, 2 of Sháh Jahán, 4 of Aurangzáb, 1 of 'Alam Sháh, 2 of 'A'lamgír II., 7 of Sháh 'A'lam Jalálu-d-dín, and 26 British and Indian war medals. The copper coins comprise 257 Buddhist (inscribed), 41 of the Mitra dynasty, 306 Indo-Bactrian, 72 Indo-Scythian, 1 of Gangeya Deva of Chedi, 199 Musalmán, 2 Burmese, and 1 Nepalese." The Coin Catalogue of the Museum is in the press.

The coin collections of the Madras Museum received large additions during the year, including a gold coin of Táju-d-dín Yildiz; coins of the Greek and Scythic kings of Bactria and India, Lysias, Rajnabala, Spalirises and Azes, Abdagases, Orthagnes, Zeonises, Kadphises I., and Kadaphes, the bronze coin of the last king having on the obverse a head of the king diademed, and closely resembling the head of Augustus on some of the coins of that Emperor; several new types of Mysore coins, and a collection of copper coins found at Kilakarai on the Madura Coast, where there are remains of a large city, said to have extended from Kilakarai to Muthupettah, about 9 miles, and also to Sheramoddelly

Theeoo, an island about 5 miles south. Illustrated Catalogues (Nos. 1 and 2) of the coins of Mysore and of the Roman, Indo-Portuguese, and Ceylon coins, contained in the Museum collections were issued, and Mr. Thurston was engaged upon a history of the Coinage of the East India Company, from the first issue of coins, the portcullis money of Queen Elizabeth in 1601, to the passing of Act No. XIII of 1862. A great deal of interesting information on this subject was found in going through the records of the Madras Mint.

The Journals of the different Asiatic and Numismatic Societies have brought us some very interesting papers. Our own *Journal* has two papers, by Mr. Chas. J. Rodgers, on the "Couplets or *baitis* on the coins of Sháh Núru-d-dín Jahángír" and "on Coins after the time of Jahángír," and another paper by Mr. E. E. Oliver, "on the Coins of the Chagatái Mughals" will shortly be published. The *Madras Journal of Literature and Science* contains a paper by the Rev. James E. Tracy "on Pandyan Coins," and a continuation of Captain R. H. C. Tufnell's useful "Hints to Coin-collectors in Southern India." In the *Journal of the Bombay Branch of the Royal Asiatic Society*, Mr. O. Codrington contributes a paper "on coins of Kachh and Kathiawar;" and a very important paper by Dr. Gerson da Cunha, on the "gold coins of the Mongol dynasty of Persia," will shortly be published in it. The gold coins of the Persian Mongols are very rare. Hitherto only 20 specimens have been catalogued and published. Dr. da Cunha now promises to publish 40 new coins from his own cabinet. The *Numismatic Chronicle* of England continues to hold its high place. Among its many valuable articles, I will only draw your attention to two which are of special interest to students of Indian coins. One is a paper by Professor Percy Gardner on some "New Greek coins of Bactria and India," which describes a curious decadrachm, supposed to be of Eukratides or Helioles, and a few new didrachms of Diomedes, Strato, Philoxenos and Hermaios. The other is a paper by Major-General Sir A. Cunningham on "coins of the Indo-Seythian king Maüs or Heraüs," in which he shows that this person was not a king of the S'akas but of the Kusháns. I have also to note another of Mr. Stanley Lane-Poole's welcome coin catalogues. This is the "catalogue of the Muhammadan coins preserved in the Bodleian Library at Oxford," enumerating a total of 951 coins of Muhammadan dynasties in Europe, Asia and Africa.

ARCHÆOLOGY AND EPIGRAPHY.

The past year has been specially fruitful in Archæological work,—interest in which shows no sign of decline, but, on the contrary, appears to have revived, if we may judge by the appearance of new publications,

the vigour with which the operations of the Archæological Surveys have been conducted all over India, and the increasing care and attention given to the preservation of the monuments of the past by local Governments.

Publications. The *Indian Antiquary* continues, as hitherto, *facile princeps* among Indian Archæological Journals. The year's issue is especially distinguished by the numerous valuable contributions by Mr. J. F. Fleet, Prof. Kielhorn, Pandit Sh. B. Dikshit, on various difficult or still unsolved problems connected with the calculation of Hindu dates and eras, such as the Twelve-year cycle of Jupiter, and the Gupta, Śaka, Kalachuri and Newar eras. I may specially notice Prof. Jacobi's elaborate paper on methods and tables for verifying Hindu dates, tithis, eclipses, nakshatras etc. which occupies the whole of the June issue, and will be welcomed by all who may have occasion to verify the dates of ancient documents. Mr. Fleet and Professors Bühler and Kielhorn, also, give us a continuation of their readings of Sanskrit Inscriptions; and Mr. H. H. Howorth of his history of "Chingis Khán and his ancestors." Dr. A. F. Rudolf Hoernle gives "an account of the Bakḥshálí Manuscript, with extracts and translations" from it; and Mr. E. Rehatsek of the "*Zafarnámah-i-Ranjít Singh*, of Kanhayya Lál." Capt. J. S. King contributes a paper on "the Story of the murder of Ali 'Adil Sháh I. of Bijapur." The Rev. T. Foulkes gives an account of the "Vicissitudes of the Buddhist literature of Ceylon," and Dr. Edkins of "Confucius and his Mission." In addition we receive instalments of republications and papers published elsewhere by Professor Weber, on "the Literature of translations of the Jains," and by Mr. Senart on "the Inscriptions of Piyadasi."

A new Journal, which promises to become in one respect a formidable rival of the *Indian Antiquary*, is the "*Epigraphia Indica and Record of the Archæological Survey*." It is edited by Dr. Jas. Burgess, C. I. E., the indefatigable Director of the Archæological Survey of India, with the assistance of Professors Bühler and Kielhorn, Dr. Hultzsch and other linguistic scholars, whose names are a guarantee for the trustworthiness and success of the new serial. It is to be issued in parts of about 56 pages each—four in the year—and will form really a continuation of the "*Corpus Inscriptionum Indicarum*," of which Sir. A. Cunningham issued Vol. I. some years ago, and Vol. III is under preparation by Mr. Fleet.

Part I. has been recently issued, and Part II. is ready for issue. In a short introductory note the Editor states briefly the importance of epigraphical research in its bearing on Indian history and antiquities. The first inscription is a copper-plate grant of the Pallava king Śivaskandavarman of about the 4th century, which is philologically of great importance. The second is a *prasasti* from a

village in the Himalayas, of about the end of the 6th century, which gives the names of twelve kings of Singhapura, a small kingdom in the Panjáb mentioned by Hiuen Tsiang. The next by the same editor, Dr. Bühler of Vienna, is a careful transcript and translation of the recently discovered twelfth Edict of Aśoka at Sháhbázgarhí. This discovery happened thus:—In 1887, Dr. Burgess visited Yusafzai and Hazara and took impressions of the great inscriptions in Baktrian Páli of the Aśoka edicts. When at Sháhbázgarhí he looked carefully, in company with Captain H. A. Deane, the Assistant Commissioner, for the missing twelfth edict, making enquiry of the cattleherds for any inscribed stones. Later in the year a heavy fall of rain washed the earth from a stone, the mere crest of which was previously above the surface, and laid bare a portion of the inscription. Captain Deane, on noticing this, had the face of the stone laid bare and transmitted impressions to Dr. Burgess, who had them photographed. M. E. Senart saw the impression when visiting Dr. Burgess at Mathurá, in January 1888, and was so interested in the discovery that, having previously edited the Aśoka inscriptions so far as accessible, he arranged to visit Sháhbázgarhí personally, and has given a second version of this edict, which was first read to the Bombay Asiatic Society, and since to the Société Asiatique, with emendations and comments and an edition of the Mánserá version, which has just been issued separately as “*Notes d’Épigraphie Indienne.*” The fourth inscription in this publication is a long but sadly mutilated *praśasti* from Dabhoi in Gujarát. Then follow three long inscriptions from the Central Provinces, the stones being now in the Nagpur Museum, edited by Professor Keilhorn from Dr. Burgess’ impressions. The part closes with a Ráshtrakúṭa grant of Krishṇa II., dated Śaka 832, by Dr. E. Hultzsch.

Part II, will contain a copperplate grant of Śrí Harshavardhana, and other papers of interest; and a series of Arabic and Persian inscriptions will appear shortly. The great inscription mentioned by Dr. Fitz Edward Hall (J. A. S. B., Vol. XXXI, pp. 6, 7), so long desiderated, has been found by Dr. Burgess at Sídoṇí Khurd, in the Lalitpur District. It has been translated by Dr. Kielhorn, and will be published in the new journal. The work will thus be valuable for the historian as a standard work of reference.

The volume on the Antiquities of Dabhoi (*anc. Darbhavatí*), announced last year, has been carried through the press by Dr. Burgess, for H. H. the Mahárája of Baroda. It is beautifully illustrated with numerous photolithographs and photocollotypes, from the very careful drawings by Mr. Cousens and his staff, and is produced in a style that does credit to the liberality of an enlightened native prince. A much

larger volume on the antiquities of Anhilwāḍa, Siddhpur, and other places in His Highness' dominions is in an advanced state of preparation.

Archæological Surveys.—During the year vigorous progress has been made in the Archæological Surveys in various parts of India, and in the publication of the work of previous years. I am indebted to Dr. Burgess, C. I. E., the Director General, and his assistants for very interesting accounts of their labours, from which I can only give brief extracts.

Dr. Burgess recently made a tour in Yusufzai and has made a geographical identification of some interest, *viz.*, that Tārīlī, in the hills to the N. W. of Shāhbāzgarhī, is the ancient *Dhalila*, the capital of Udyāna.

Inscriptions.—During the camping season 1887-88, Dr. E. Hultsch copied 124 inscriptions at Salem, Trichinopoly, Tanjore and Chodambaram. Among these, the large and numerous inscriptions of the Tanjore temple prove most interesting. According to one of them the temple was built by the Chola king Rājārāja-deva, and according to two others its enclosure was constructed by the commander of his army. A comparison of the Chellūr grant of the Eastern Chālukya king Vīra Choḍa with a number of unpublished Chola inscriptions has enabled Dr. Hultsch to settle with some probability the date of Rājārāja-deva and of his son and successor Rājendra-Chola-deva. The latter was an antagonist of the western Chālukya king Jāyasimha III. (about S'aka 940 to 964), and the former seems to have fought with the Western Chālukya Satyāśraya II. (S'aka 919 to about 930). The Tanjore inscriptions contain long lists of the countries conquered by Rājārāja-deva and Rājendra-Chola-deva, most of which can still be identified. As the epoch of these two reigns is now fixed within narrow limits, the approximate dates of a number of earlier Chola kings can be determined with the help of the large Leyden grant of Rājārāja-deva. Dr. Hultsch's first volume of South Indian inscriptions, which contains the materials collected in 1886-87, is now in the press. The present season's work was commenced at Chitradurga, where he took impressions of fourteen Kanarese inscriptions. From there he went to Hampī, the old Vijayanagar, where he has done much work; Tirupatī, will next be visited. Dr. Hultsch has also contributed translations of a Rāshtrakūṭa and a Valabhi copperplate grant and other papers to the *Epigraphia Indica*.

Mr. O'Dwyer has sent to the Lahore Museum a very interesting inscription from the Salt range. It is of the time of the "Mahārāja Toramāna Shāli," at the end of the fifth century (in 490—500 A. D.), and records certain endowments to a Buddhist monastery. Coins of Toramāna are known, but only one stone inscription—on a Boar at Eran,

in the Central Provinces—has hitherto been discovered. The date on this epigraph is unfortunately so injured that it is doubtful if it can be fully read. Its discovery so far from Eran adds to its importance. The characters are distinctly of the later Gupta type, about A. D. 500.

The last report of the Lucknow Museum contains a list of a considerable number of interesting additions to the Archæological collections, including a number of Inscriptions, several of which have been published in our *Journal*, and the remainder will appear in forthcoming numbers of the *Epigraphia Indica*.

The Kudarkoṭ Inscription of Takshadatta, which was found, in 1875, at Kudarkoṭ, in the Etáwah District, and is now in the Lucknow Museum, has been published by Dr. Führer in Part I. of our *Journal* for 1888.

Dr. A. F. Rudolf Hoernle is preparing for publication “a new copper-plate grant of Govinda Chandra Deva of Kanauj, dated in Samvat 1188.” The plate was found in the debris of a fallen high bank of the Jamuná river, close to the inhabited site of the village of Ren, not far from the village and police station of Lalautí in the Fathpur District. This new grant exhibits some curious new readings, not occurring in any of the previously found grants of the same king; but it is especially noteworthy on account of its date in Samvat 1188, which is given both in words and figures, and is important because it proves that Govinda Chandra was still reigning in the year 1131 A. D., his latest date, hitherto ascertained, being the year 1128 A. D. (or Samvat 1185). The village to which the grant refers is Dosahali.

Archæological Survey, Bengal.—Mr. J. D. M. Beglar, the Archæological Surveyor, and his assistant, Mr. Garrick, have been employed during the last season at the Adina Masjid at Panḍuah and at Rohtasgáph. A number of drawings have been made at both places during the last three years.

Archæological Survey, Western India.—During the past year the attention of this Survey, under Mr. H. Cousens, has been engaged principally with the old city of Bījapur and its remains, which lie spread out on the plains of the Dekhan in a series of ruins of palaces, tombs, mosques, serais, tanks, fortifications and gardeus, overrun with jungles of prickly pear, and the city itself encompassed by six and a half miles of crumbling walls.

Up to the present 123 sheets of drawings have been made, illustrating the style of architecture practised here, with abundance of details of mouldings, ornaments &c.; 65 photographs have been taken, and 130 facsimile impressions have been made of Persian, Arabic, Devanágari and Kanarese inscriptions. The bulk of these inscriptions

have since been translated. The work was also carried into the suburbs which extend for miles around the city, and has now been completed. The staff are engaged in Kathiawar.

In addition to the above work, the drawings, made in previous seasons in the Chalukyan districts, illustrating Chalukyan architecture, have been worked up and, with the MS. to accompany them, are ready for publication.

About 10 miles from Bijapur is an old hunting, or picnic, lodge of the 'Adil Sháhí kings, with elaborate arrangements for baths and the showering down of water from the roofs. The walls of the principal building have been covered with frescoes, now much decayed, but containing hunting and other scenes very spiritedly drawn. Among the larger figures are some evidently representing Europeans of rank, perhaps Portuguese ambassadors, in the dress of the 16th or early in the 17th century. But for the Survey these would have been destroyed.

Mr. Cousens' progress-reports gave so good an account of the Bijapur buildings that Government have sanctioned their being expanded into a Handbook descriptive of the place; and it is now ready for issue.

Archæological Survey, Southern India.—Mr. Rea, the Archæological Surveyor, began the last season's work by a survey of the rock-cut and structural remains at Bezvaða in the Kistna District. The former were found to be without exception Brahmanical in character, with no traces of Buddhism. The structural temples date from the 7th century. The only example anterior to that date is the structural Buddhist chaitya, discovered near Bezvaða which dates from about the 3rd century A. D. The rock-cut remains at Undavalle and Mogalrajapuram are also of Hindu origin and date about the same as those at Bezvaða. On completing these Mr. Rea proceeded north into the Godávarí District and surveyed the early Buddhist rock-cut remains at Guntupalli, discovering two additional rock-cut viháras. Some excavations were made at one of the group of Buddhist stúpas and some marble sculptures found, but through the obstruction of the local zamindar, who thought the digging was for treasure, the work was postponed till the following season. Some ancient sites at Pedda Vengi and other places in the neighbourhood were examined, and notes made for excavations to be subsequently conducted.

Mr. Rea then proceeded to Chinna Ganjam and at Kollitippa, in the neighbourhood, found the site of a demolished stúpa and unearthed a large inscribed column in white marble. At the neighbouring mounds of Franguladinne two white marble sculptures had been found some years previously. These were supposed to have been removed from Amarávatí or some of the other stúpas in the district. To prove

whether this was so, or whether they had been from a stúpa on the spot, Mr. Rea made a careful examination of the ground and found a large brick stúpa *in situ*. Some preliminary digging was done and a few small marble sculptures found. The principal point of interest, however, was found when a shaft sunk in the centre revealed not a relic casket but a large *swastika* formed of large bricks. In a neighbouring mound a smaller stúpa platform with inner concentric circle and radiating walls, all in the form of a *chakra*, was found. These may have had some symbolical significance.

At Kanuparti a number of white marble slabs and columns were seen, which had been dug by the villagers from surrounding mounds. Some exploratory digging was done here and a white marble column found.

At Motupalle over 400 coins were found by searching in the mounds which mark the ancient site.

The season's work was concluded at Amarávatí, where some very valuable slabs and other sculptures were unearched from near the stúpa. The principal are :—A large stúpa slab with carvings so minute as to resemble work in ivory. It shows a stúpa with all accessory details ; another was a rail panel with figure groups on both sides, over 6 feet long. A number of other large panels, all complete, were found. They include over a dozen inscriptions in Páli. Some exploration in the neighbouring Kuchidibba revealed a number of white marble Buddhist sculptures, and some Hindú images cut out of Buddhist piers.

The present season's work is being again devoted to the Kistna and adjoining districts. Some work has been done in Nellore, amongst which is the discovery of some ancient remains at Juvuladinna. Excavations have been conducted at the Bogandanidibba (No. 1 Stúpa) at Pedda Ganjam, discovered last season, and Mr. Rea writes that, though the work had only proceeded for a few days, five large slabs of sculptured white marble had already been found standing erect around the drum of the stúpa. The digging may be expected to reveal other valuable relics. A third stúpa has also just been discovered in the neighbourhood : it is small and its chief interest is that it has the same symbolical *swastika* in the centre as has the large No. 1 Stúpa. These discoveries are interesting as showing extensive Buddhist remains at a place where they had been unexpected.

Dr. Burgess has informed me that Mr. Rea has quite recently made a great discovery, a veritable Buddhist Chaitya of early date, brick with marble pillars, and used as a Hindu temple, at Chezarla, in the Kistna district.

In a paper on "Some Prehistoric Burial-places in Southern India,"

contributed to our *Journal*, Mr. Rea gives an interesting description of the megalithic remains and earthen sarcophagi found at Pallavaram, in the neighbourhood of Chingleput and Madura and the Palni Hills.

The *Madras Christian College Magazine* contains very complete notices of Mr. Rea's Archæological work in Southern India.

Archæological Survey, N. W. P.—During the cold season of 1887-88, whilst Mr. E. W. Smith and the draftsmen were engaged at Jaunpur in making detailed drawings of the Jámi Masjid, Dr. Führer visited the districts of Partábgarh, Rái Barelí, Unáo, Kánhpur, Fathpur and Hardoi in search of ancient sites visited by the Chinese Buddhist pilgrims Fa Hian and Hiuen Tsiang. On topographical grounds and from a calculation of distances, he identifies *Tusháran-Bihár*, in the Partábgarh district, with *Hayamukha*; *Jagatpur*, in the Rái Barelí district, with *O-yu-to*; and *Kankúr* with the *stúpa* and *samgháráma* of *Vásu-bandhu*, which Hiuen Tsiang places at 40 *li* to the north-west of *O-yu-to*; *Naval*, near Bángarmáu in the Unáo district, with *Navadevakula*; and *Sanchán-kót*, in the same district, with the capital of the *Sháchi*, mentioned by Fa Hian.

A careful search along the banks of the Arind river resulted in the discovery of several old temples illustrating the brick architecture prevalent in the Doáb during the ninth and tenth centuries; *viz.*, at *Bári-Bhitarí*, *Parolí*, *Rár*, *Simbhúa*, *Behta-Bedoná*, *Khurdá*, *Kanchlípur*, and *Sarhár-Amanlí*, in the Kánhpur district. The *sikhara* of these temples is of elaborately moulded brick, whilst the cella which it covers is of carved stone, in the same style as the Chandela temples at Khajuráho. These temples, besides those at *Bahuá* and *Tindulí* in the Fathpur district, are the only surviving specimens of this once flourishing architecture in Northern India.

Persian and Arabic inscriptions were collected at Mánikpur, Dúl-mán, Safípur, Bángarmáu, Malláwán and Bilgrám, which will be published in the forthcoming numbers of the *Epigraphia Indica*.

Later in the season the whole Survey Party visited the Rohilkhand Division, *viz.*, the districts of Sháhjahánpur, Pilibhít, Barelí, Badáon, and Murádábád. Whilst Mr. E. W. Smith and the staff were engaged in preparing detailed drawings of the Jámi Masjid at Badáon, Dr. Führer visited Golá-Ráípur, which he identifies with the *Hi-lo* of Fa Hian; and Mátí in the Sháhjahánábád district; several ruined fortified cities buried in the Government Forests near Dhanáraghát, Suápára, and Sháhgarh of the Pilibhít district; the ancient sites near Pachómí (*Panchbhúmi*), Gwála Prasiddh, Attar Chhendí, and Rámnagar (the Buddhist *Ahichhattra*) in the Barelí district; Badáon (*Fodámayútdá*), Sahaswán (*Sahasrabáhumagara*), and Kót Sálbahan in the Badáon dis-

trict; Shambhal (*Sambhalapura*), Amrohá (*Ambikánagara*) and a great number of *kherás* in the Bilári pargana of the Murádábád district.

Badáon yielded a large stone inscription of *Lakhanapála*, of the *Ráshtrakúta* clan, the eleventh ruler of *Vodámáyutá*. Iláhábás Dewal, in the Pilibhít district, furnished a big stone inscription of a petty chieftain, named *Lalla*, dated Samvat 1049, whilst at Rámnagar, in the Barelí district, several Buddhist railings and ornamental slabs of red sandstone were unearthed, containing dedicatory inscriptions of the Indo-Scythian period. A large collection of Arabic and Persian inscriptions, mostly written in Tughrá, Kúfí, and Bahárá, were obtained at Badáon, Sambhal, and Amrohá.

In the beginning of the cold season of 1888-89 the Survey visited the Jaláon and Jhánsí districts. Detailed drawings have been prepared of the Chaurási Gumbaz at Kalpí, the Jámi Musjid at Erichh and the great Chaturbhuj temple at Orchá. Several historically valuable records of the Chandela king *Kírttivarman* have been obtained at Gerahó, and a great number of Persian and Arabic inscriptions at Kalpí, Jaláon, Kunh, and Erichh.

At the end of December, Dr. Führer visited the Fort at Chunár, in order to see the so-called "cave-temple" which was reported to have been discovered during the progress of renewal of the retaining wall of No. 2 Battery, at the south-west corner of the Fort. He found six small rock-cut Saiva images, representing Gaurí Sankar, Párvatí, Síva, Gaṇeśa, and Rudra, and four short dedicatory inscriptions in characters of a very early type.

In January 1888, Dr. Burgess made extensive excavations in the Kankálí, Chaubára and Páli Kherá mounds at Mathurá, and was richly rewarded in finding a large number of Bauddha and Jaina relics, and several inscribed statues of the time of Kanishka. The Government of the North-Western Provinces and Oudh having again sanctioned a sum of Rs. 600 for archæological researches, Dr. Führer is at present engaged in excavating the Kankálí Tíla and, in the course of a few days, has unearthed the bell-shaped capital of an Aśoka lion-pillar, similar to that of the Lauriya pillar; a large number of Buddhist railings; several Buddhist images with inscriptions of the Indo-Scythian period, and two colossal statues of *Padmaprabhánátha* and *Maháviránátha*, dedicated by the *Svetámbara* community of Mathurá in Samvat 1038, according to inscriptions on their pedestals.

Dr. Führer's account of the Sharqi architecture of Jaunpúr, edited by Dr. Burgess, is in the press and will be illustrated by a large number of plates now being printed at the Survey of India Office.

Papers on 'The Ruins and Antiquities of Rampál,' by Mr. Asutosh

Gupta, and 'Notes on the Arthúná (Sanskrit) Inscription,' by Kavirája Syamal Dás, have been read at our meetings and will be published in the *Journal*, Part I.

The *Madras Journal of Literature and Science* contains a 'Revised List of Antiquities in the Chicacole Taluq,' by the Rev. J. K. Hutchinson.

I must not omit to mention the very valuable "general Index to the Reports of the Archæological Survey of India, Vol. I to XXIII" prepared by Mr. V. A. Smith, which will be found most useful for reference.

GEOGRAPHY AND SURVEYS.

Although the records of geographical work in India and the surrounding countries during the past year appear to present no specially brilliant achievements, much good steady work has been done by the Survey of India in pushing on Surveys within our own territories and the countries immediately bordering them, as well as by foreign explorers in increasing our knowledge of the yet unexplored regions lying quite beyond our boundaries, and several interesting publications of travels and explorations carried out in former years have been issued.

To commence with the operations of the Survey of India :—

Geographical Surveys and Exploration, Survey of India.—The only purely exploratory work done, during the year has been the extension of the reconnaissance and approximate triangulation of Western Nepal, eastwards from the Kumaon boundary to the Gandak river, in Central Nepal, which completes the data for sketch maps along the whole Southern frontier of Nepal from Kumaon to Sikkim. No attempt was made to penetrate the Nepal country, and the greater part of the work had to be done by fixing some of the more prominent peaks and ridges from the tower Stations of the N. E. Longitudinal Series. The sketch maps thus obtained are necessarily imperfect, but are valuable as a basis for maps of this hitherto unknown region.

A complete report embodying a large amount of information regarding Bhutan and Tibet, collected by various explorers, is now in the press and will shortly be ready.

Hukong Valley.—Mr. Ogle accompanied the expedition under Mr. J. F. Needham, Political Officer at Sadiya, in his attempt to penetrate the Hukong Valley from Assam. The exploring party left Dibrugarh early in January 1888, and from Makum crossed the Patkoi range by the route traversed by Colonel Woodthorpe in 1884-85. Thence they proceeded by a route usually followed by people going to Assam from Namphai and places thereabouts, and after five days' marching arrived at a small Singpho village on the Namyung river. Owing to diffi-

culty in obtaining supplies the party was obliged to retrace its steps when only two days' march from the Hukong Valley. Mr. Ogle was able, however, to survey an area of 1,500 square miles of totally unknown country, notwithstanding delays by rain and foggy weather, and this is a valuable acquisition to geography, which will compensate in some measure for the failure of the expedition to reach its objective points.

The result of the Expedition, however, has been to establish the possibility of reaching the Hukong Valley by either of the two routes explored, *viz.*, that by the Nongyong Lake, Namyang and Daffa Nong's village, which is two days' march from Mainkhwom; and the other by the Nágá Hills route, through the villages of Yogli, Phung, Morang, Shange, Hasang, and Khulluk, to Sombia Nong's village, which is five marches from Mainkhwom. The Nágás south of the Patkoi were found to be very friendly.

Details of this Survey will appear in the forthcoming Annual Report of the Survey of India, now under preparation.

Hazára Border.—A survey party under Captain Wahab, R. E., accompanied the military expedition to the Black Mountain and Hazára country in October and November last, and surveyed and mapped on the half-inch scale a total area of about 500 square miles, including a considerable tract across the Indus, adjoining Buner, and of the Indus Valley above Thakot, which was sketched from commanding points. The triangulation extended over about 600 square miles and the heights of 24 points have been fixed trigonometrically.

The course of the River Indus has been definitely fixed to some distance north of Thakot, with the exception of some 13 miles between Judbai and the mouth of the Chakeswar River; but there it has been fixed approximately and its course determined within narrow limits.

It is to be regretted that the survey party had not the opportunity of reconnoitring the river route between Thakot and Kunhar, to enable the completion of the map with regard to the western slopes of the Black Mountain.

Upper Burma.—It is satisfactory to know that the Reconnaissance Survey of our newly acquired territories in Upper Burma is being vigorously pushed on, and a very large amount of work was done during the last field season by Major Hobday and his assistants, in connection with the various military movements undertaken for the pacification of the country.

Triangulation has been carried over an area of 23,274 miles, and the area of country mapped on the scale of 4 miles = 1 inch amounts to about 20,780 square miles.

A large-scale survey of the Ruby-mine tract has also been made,

comprising an area of about 77 square miles, of which 21 were surveyed on the scale of 6 inches, and 56 on the scale of 2 inches to the mile. Useful maps of the whole tract have been made.

The Survey of the Town of Mandalay on the scale of 40 feet to an inch has been completed.

The triangulation from Mandalay to Bhamo has been completed and extended thence to Senbo.

In the Southern Shán States, Captain Jackson has carried on a survey from Fort Stedman, down the valley of the Balu Chaung, to Pekon, making a detour through the Southern States of the Myelat. From Pekon he advanced to Loipok and eastwards, across the Pon and Tein rivers, to Maukmé, Mainghan and the Salwin River; thence proceeding northwards, *viâ* Moné, Lezya and Maing-Kiang to Maingye and Mansé, and on, through Lashio, Mansam and Panglon, to Thibaw.

In the Northern Shán States, about 3,500 square miles was surveyed from Thibaw to Nansan and across the Myit-nge or Namtu River to Theinni, on the Salwin, and thence, *viâ* Maingyaw, to Mansé.

Materials thus exist for a reliable map of the Shán States.

The whole of the Yaw country has been thoroughly surveyed, and on the north a connection has been made with the work executed by Col. Woodthorpe's party last year in the Kubo Valley.

A considerable extent of country was surveyed by the surveyors accompanying the column which proceeded from Bhamo to Mogaung and thence to the Jade-Mines and Endawgyi Lake, returning, *viâ* Sakan and Mogaung, to Katha on the Irrawaddy. Surveys were made in the Katha District and the survey of the Irrawaddy downwards from Bhamo to Tigyaing completed. The Chindwin and Irrawaddy Rivers were also surveyed in the neighbourhood of their junction.

Further important results may be expected from the expeditions proceeding this season from Mogaung to the Kachin Hills and the headwaters of the Uru and Chindwin Rivers, and from the expedition to the Chin country, which will start from Kolewa. A third starts from Mogok, in the Ruby-Mines district, proceeding *viâ* Momeit to Taungbain and back; while another, starting from Bhamo will go south-east to the Shweli River and over Northern Theinni.

Trigonometrical Branch.—Triangulation has been extended down the Madras coast for 370 miles, thus completing the scheme for this part of the coast. The object of it was to fix the positions of beacons, temples, lighthouses and other conspicuous objects for the use of the Marine Survey of India and it now extends from False Point to Point Calimere in the Tanjore District. The party has been transferred to Burmah to carry on the triangulation there. A new 12-inch microscope

micrometer theodolite, by Troughton and Simms, has been procured for this work and it is intended to make the triangulation as perfect as the rest of India and to incorporate it therewith for the discussion of the earth's figure.

Tidal and Leveling operations.—The recording of the tidal curves by the self-registering tide gauges, their reduction, and the publication of the predicted heights have been continued as usual during the year at 18 stations round the coasts of India and Burma and at Aden. Work has ceased at Negapatam, where 5 years' observations have been completed, and at Elephant Point, where only $4\frac{1}{2}$ years' observations could be made, owing to the observatory becoming unsafe.

Two new observatories have been established, one at Tuticorin and the other at the entrance to Princes' Dock, Bombay, where the gauge is a new one by Legé and of a different pattern from any of the others in use in India. An observatory will probably be started at Mergui at once.

The following summary of the results of the predictions for 1887 is interesting, as showing the comparative accuracy of predictions and actuals.

	Percentage of Predictions			
	within 15 minutes of actuals.		within 8 inches in height of actuals.	
	High-Water.	Low-Water.	High-Water.	Low-Water.
Open coast Stations	56	52	98	98
Riverain ...	71	71	69	64

In connection with the tidal operations, spirit-leveling operations were carried out from Madras to Vizagapatam, *viâ* Nellore, Guntúr and Coconada, and from Chinsura to Nuddea, along the right bank of the Hughli River.

Tide tables for 1889 have been prepared which contain predictions of the heights and times of high and low water for 28 ports, being one more than in the volume for 1888.

I may mention in connection with this subject that the first volume of the Records of the Volcanic Eruption at Krakatoa, in 1883, lately published by the Royal Society, contains the reductions by Captain W. J. L. Wharton, R. N., of the observations of the Seismic Sea Waves, including those made by the automatic tide-gauges at different points round the coast of India and at Aden, of which a report was given by Major A. W. Baird, R. E., Survey of India, then in charge of the Tidal operations. The observations have all been reduced to Greenwich time, and show that the sea disturbance was probably composed of two descriptions of waves, *viz.*:—long waves with periods of over an hour, and shorter but higher waves with irregular and much

brief intervals. To the north and east the long wave can be traced for about 450 miles. To the west it travelled over great distances, reaching Cape Horn and possibly the English Channel. To the south and east the propagation of the disturbance was limited. The shorter waves reached Ceylon and Mauritius. The velocities of the first great wave in mid-ocean, as observed at different points round the Coast of India, were; Negapatam 357 miles an hour. Madras 338. Vizagapatam 338. False Point 308. Dublat 351. Beypore 326. Bombay 331. Karachi 340. At Aden, 347 miles an hour.

Electro-telegraphic Longitude Observations.—The services of two astronomical parties, in charge, respectively, of Lieutenant-Colonels George Strahan and W. J. Heaviside, R. E., being available, the operations for the electro-telegraphic determination of arcs of longitude were resumed in Southern India and seven arcs were measured, *viz.*—

From Nagarkoil to Bangalore, Madras and Mangalore and from Mangalore to Bellary (new). From Madras to Bangalore and Mangalore (revised); and from Mangalore to Bombay (completed); thus completing the South Indian work to Cape Comorin.

In the course of these operations Colonel Strahan has made experiments with the object of throwing light upon the causes of the errors which occur in the observations; and especially towards ascertaining whether the mere elevating or depressing of the telescope affected in any way its position in the meridian; or in other words, whether there is unequal flexure in the two halves of the transit axes acting at different altitudes in an uncertain and variable way, for which no law has yet been traced. The method employed was by comparison of observations on a star's transit by direct vision with those obtained from it by reflection from the surface of mercury. It is satisfactory to note that Colonel Strahan found from his experiments that the times of transit by direct and reflected vision differed by only $\cdot 05$ of a second, and that with the least trustworthy of the two telescopes employed.

This season's measurements afford additional evidence towards establishing a curious geodetic fact which now rests upon so strong a basis as to be practically proved, *viz.*:—the deviation of the plumbline round the coasts of India in the direction of the sea. This fact has already been brought to notice in the preface to vol. IX of the "*Operations of the Great Trigonometrical Survey of India.*" The conclusion is based on the fact that, in every case of longitudinal arcs running east and west with one or both stations on the coast, the astronomical arc is less than the geodetic one, thus showing a displacement of the zenith in the opposite direction from the sea. The numerical results cannot be given at present, but the tendency is obvious and confirms the

evidence already obtained, by swinging pendulums and by levelling, of the increase of density in the submarine strata.

Topographical Surveys.—General Surveys, in continuation of those of former seasons, were carried on in Baluchistan, Gujarát, the Panjáb, Himalayas, and the Madura and Tinnevely districts of Madras, as well as the reconnaissance survey of Upper Burma, as far as the movements of the troops would permit. Forest surveys were continued in Lower Burma, in the Belgaum and Thana districts of Bombay, and commenced in the Hoshungabad District of the Central Provinces.

It has been decided to postpone the Topographical Survey of the portions of the Madras Presidency still remaining unsurveyed, and the party that was engaged thereon will be exclusively employed on Forest Surveys for the Madras Government.

Revenue Surveys.—Cadastral Surveys, by which each plot of land held with separate occupancy rights is separately surveyed and the rights of the occupiers recorded, have been conducted in the Gorakpur, Basti, Mirzapur and Terai Districts of the N.-W. Provinces; in the Bilaspur Districts of the Central Provinces; the Nowgong District of Assam; the Thongwa District of Burma; also in two Government estates and in three Ward's estates in different parts of Orissa and Bengal. Traverse operations, designed so as to furnish a framework on which cadastral surveys are to be executed by the permanent staff of village surveyors and accountants, have been confined to the Central Provinces, and have been carried out over very large areas in nine districts. Several Districts in the Punjab have also been traversed for the construction of a new series of maps for the Province, from the Settlement Surveys; a large and important work which has made good progress. The new Survey of the Town of Calcutta, executed with great minuteness of detail on the scale of 50 feet to an inch, including the delineation of the boundaries of the separate properties, has been completed, and the drawing of the maps in a style suitable for publication by photozincography is now occupying the attention of the Surveyors. The new map is much wanted, the best available map being Simm's, which was made in 1847 to 1849 and has long been out of date.

Publishing Offices.—Very large numbers of maps and other subjects have been reproduced during the year by copper-plate engraving, lithography, photozincography, heliogravure and other photographic processes, not only for the Survey Department, but for many other Government Departments.

The amount of work turned out in the printing offices of the Survey may be judged from the fact that the total number of copies of maps &c. printed in Calcutta during the last Survey year was nearly a million.

Trans-Frontier and other Geographical work.—Turning now to other geographical work in Indian territories or in the countries adjoining our frontier, as recorded in the Journals and Proceedings of the principal European Geographical Societies, and proceeding from east to west.

Tonquin and French Cambodia.—The subject of the navigation of the Upper Mekong is attracting the attention of French geographers and officials. M. Pavie, the Vice-Consul of France at Luang Prabang, has succeeded a second time in travelling from Laos to Tonquin along the Black River. He ascended the Namu, a tributary of the Mekong, and from there reached Shán Territory. MM. Blanchet and de Fesigny have navigated in a small steamer the Preapatang rapids, hitherto regarded as impassable. M. de Fesigny has prepared a map of the Upper Mekong. M. Gauthier has successfully navigated the river from Luang Prabang to Khong, and proposes to establish two lines of steamers, one from Khong to Kemmarab, a distance of 185 miles, and the other from the latter point to the rapids 37 miles below Luang Prabang, a distance of 370 miles. During the season of high water, vessels of a mean tonnage can navigate the river as far as Stung-Treng. The object of these lines and other projects for the navigation of this great river is to prevent the diversion of the trade of the Laos country to Burma.

Siam.—Mr. J. M'Carthy, Superintendent of Surveys in Siam, contributes to the *Proceedings of the Royal Geographical Society* an interesting account of that country and of his journeys in the Malay Peninsula and the N. E. of Siam. The paper is accompanied by a map of Siam which is a very valuable contribution to our hitherto limited knowledge of that country.

A very interesting account of the Chieng-mai country, between the Salwín and the Mekong, by Mr. Archer, the Vice-Consul at Chieng-mai, has been recently published in *Parliamentary Papers* (Siam No. 2, 1888). Mr. Archer visited Nan, the most eastern of the Lao States, through a country hitherto almost unvisited by Europeans.

Upper Burma. The principal explorations in Upper Burma have already been noticed, but mention should be made of a very interesting description by Mr. Robert Gordon, which appears in the *Proceedings R. G. S.*, of the celebrated Ruby Mines, near Mogok, and of the country in their neighbourhood which has so long been a sealed tract to European travellers and trading enterprise, but has now been fully explored and mapped by the Survey of India Department.

Lower Burma.—The *Scottish Geographical Magazine*, for September last, gives an interesting abstract of the explorations in Tenasserim from Moulmein to Mount Mulai, the southernmost peak of the Dona Mountains, undertaken by Signor Leonardo Fea, who made large zoological and

botanical collections which have been made over to the Natural History Museum at Genoa.

Hydrography of South Eastern Tibet.—There has been considerable discussion in the *Proceedings of the Royal Geographical Society*, and the *Bulletin of the French Société de Géographie*, on the subject of the River systems of S. E. Tibet and the sources of the Lohit Brahmaputra and Irawadí. In a note "on the Hydrography of S. E. Tibet," which appears in the former, General Walker, C. B., our late Surveyor-General, refutes the theory brought forward by M. Dutreuil de Rhins that the sources of the Irawadí lie in Central Tibet to the west of the basin of the Lu; that the Kenpou, or Gakbo dsangpo, is the principal source of the Irawadí, and that a cluster of smaller rivers flowing northwards between the Kenpou and the Lu are its minor sources; and he shows that no Tibetan river west of the Lu can possibly be the source of the Irawadí; that most probably the Kenpou is the upper course of the Dibong and is joined by the Nagong Chu a little above the point where it enters the Himalaya mountains to make its way across them into Assam.

The erroneous nature of M. Dutreuil de Rhin's principal contention, that the Kenpou passes between Sadiya and Ríma on its way to join the Irawadí, is proved by the result of Mr. J. F. Needham's journey along the Lohit Brahmaputra between these two points, of which a very complete account has recently been published in the *Supplementary Papers of the R. G. S.* (Vol II, Part 3), together with a good deal of information on the subject of former attempts to penetrate the Mishmi country by Wilcox, Griffith, Rowlatt and the French Missionaries Krick and Boury, who were murdered at Samé.

The geographical information gathered by Mr. Needham regarding the source of the Brahmaputra entirely corroborates the report of the Pandit A.-K., who visited the head waters of both its branches which unite close to Ríma. Mr. Needham saw the gorges of both these streams. The easterly one, the La ti, is called the Zayul Chu by the Pandit, and the westerly, the Mí Chu, or Rong Thod Chu, is said to rise at a distance of 15 marches from Ríma, in the same range as another river which flows away west into the Abor country and is, in fact, that eastern affluent of the Dihong called the Nagong Chu. Mr. Needham's discovery of the identity of the river of Ríma with the Brahmaputra also settles the doubtful question of the identity of the Sanpo with the Dihong, because we know from the Pandit that the Sanpo does not go into Burma round the sources of the Ríma river and can therefore only go into the Dihong, for which there is also the evidence of the Mishmis, and it may now be accepted as a fact.

On this latter question I may refer to an interesting report by Col. Tanner, which appears in the last Annual Report of the Survey of India Department, and may mention that a native explorer has been sent to make further observations about the lower course of the Dihong.

The many interesting problems connected with the sources of the five large rivers which, all flowing from the south-east corner of Tibet through a tract of not more than 400 miles in width, extend southwards and eastwards, and water an enormous tract extending almost from Calcutta to Shanghai, must await for their definite solution the further opening out of the hitherto sealed regions on our new Upper-Burma Frontier; but now that the question of new trade-routes between Burma, Assam and China is attracting the earnest attention of the Government in this country, we may hope in the interests of geography that it will not long be deferred. The geographical aspects of the question cannot be in better hands than they are with our late chief, General Walker, and his present successor, Col. Thuillier.

Tibet.—Tibet still remains impenetrable as ever to Europeans. A further attempt was to have been made last year by a Russian expedition, under command of the veteran traveller and explorer Prjewalski, to reach Lhassa, which had long been the dream of his life, but at the very outset of the journey he died, on the way from Tashkend to Vernyi, aged only 50. To the Russian nation and the still greater realm of science, the loss of a servant so devoted and untiring as Prjewalski, must be irreparable, but it is gratifying to know that his work is to be continued, and we may hope that sooner or later the dreary wastes of Northern Tibet, which have so long remained closed to all European explorers, will be opened out to science.

In the course of his four journeys to Central Asia Prjewalski traversed nearly the whole of Eastern Turkestan, the desert of Gobi and the country in the neighbourhood of the Yang-tse Kiang and the Hoang Ho, penetrating as far eastwards as Peking. He re-discovered the Lake of Lob Nor, which no European had visited since Marco Polo. During the course of these journeys he made most extensive zoological and botanical collections which it will take many years to work out. Among his most notable 'finds' were the wild camel and the wild horse. The accounts of his four journeys have all been published and some of them translated into many European languages. The scientific results are still being worked out.

The following extract from a letter lately received by Dr. Prain from Mr. Maximowicz, the well-known Russian botanist, may be of interest. "He (Prjewalski) was a powerful man, and during the intervals between his travels devoted to book-writing (he never started for a new voyage

without publishing the last one) much inclined to become stout, and every time stouter. Beginning of fatty degeneration of the heart was the consequence, but when on a new voyage he used to train himself down and felt well again. He would have done so this time also, but got infected with typhus, (typhoid or enteric?) fever somewhere; did not heed it but continued to hunt, march and expose himself to every weather, till five days before his end, when his heart would not stand the fever heat, and he succumbed in full possession of his mental powers."

The death of another well-known Russian explorer and anthropologist—Nikolaus von Miklucho-Maclay—during the year is also announced. He is best known in connection with the exploration of New-Guinea and the Malay Peninsula.

Eastern Turkestan.—By far the most interesting paper of the year on Asiatic Geography is Lieut. Younghusband's account, in the *Proceedings, R. G. S.*, of his journey across Central Asia from Manchuria and Peking to Kashmir, over the Mustágh Pass. The part of the journey which more immediately concerns us is the description of the route from Yarkand up the valley of the Tisnaf River to the hitherto unexplored Chiragh Saldi Pass, between 15,000 and 16,000 feet in height, and then, by the Yarkand and Surukwat rivers, across the Aghil Dawan range, whence following the Shaksgam River he ascended the Sarpo-Laggo valley, near the grand peak K 2, and reached Suget Jangal, whence, with the greatest difficulty, he crossed the Mustágh Range by the old pass, the new one being closed, and made his way through Kashmir to Rawal Pindi.

An account has also recently been published of the travels of the three adventurous French explorers, MM. Bonvalot, Capus and Pepin, across the Pamir, in March 1887, noticed in last year's Address.

An interesting paper on the Tian Shan Range has been presented to the Geographical Society of Berlin by Herr von Krasnof, who visited those regions in 1886, in company with Ignatief, the geologist. His enquiries had special reference to the distribution of plants, and he notes the remarkable differences between the flora of the northern and southern slopes of the range, the former preserving many of the types which characterize the Alpine flora in Europe. He also notices the glacier features of the tract, and discovered some curious prehistoric rock-drawings showing that the horse was a domestic animal in very early times.

A Russian officer, Captain Grombtchevsky, has quite recently visited the Pamir region, the Mustágh Range, the Taghdumbask, and the country to the north of Baltistan. From the Ferghana territory he passed by Hai and Lake Karakol to the Southern Pamir region and found an encampment of Chinese Kirghiz on the Murghab. He passed

into Wakkan and by the Darkot Pass into Chinese territory, and on to Kanjut and Khunsa, penetrating as far as Raskun, but was unable to carry out his intention of visiting the Karakorum Pass and returned to Ferghana.

The Russian Geographical Society has published a new map of the present Russo-Afghan frontier, on the scale of $\frac{1}{840000}$, with an accompanying pamphlet by M. Kuhlberg, the Russian Commissioner, narrating the progress of the delimitation.

We have accounts of other explorers in these regions, but space does not allow me to refer to them in detail.

The opening Address, delivered by Col. Sir C. W. Wilson, R. E., as President of the Geographical Section of the British Association at Bath, is especially deserving of notice here in India, because in it he discusses the question of ancient and modern trade routes to the East, and shows how the construction of the Suez Canal, by making India immediately accessible from the Mediterranean, is causing a remarkable redistribution of the channels and trade centres of commerce between India and other eastern countries and the Western European nations, and that Great Britain is, in fact, losing the monopoly of the carrying trade from India which is being diverted to the ports of Southern Europe.

GEOLOGY.

The general classification of the Indian formations has received its latest modification at the hands of Dr. W. T. Blanford, President of the Geological Society of London, in a note prepared for the late meeting in September last, in London, of the International Geological Congress; on the basis of classification given in the "Manual of the Geology of India," published in 1879, the most important alterations or corrections being the placing of the *Vindhyan*s as lower Palæozoic, and a re-arrangement of the *Transition* series. The very obvious physico-geological division of India into Peninsular and Extra-Peninsular regions, with the great intervening one of the Indo-Gangetic-Brahmaputra plain, still necessitates the keeping up of two tables of classification, so long as the fact remains that no marine fossiliferous beds of palæozoic age have yet been discovered in the peninsular region. For the purposes of this Address it will suffice to give these two tables in condensed form, and homotaxially with the European Series.

PENINSULAR INDIA.

		INDIA.	EUROPE.	
		Blown Sand.—Cotton soil.—Modern Alluvium ...	Recent.	
		Older Alluvium.—Low-level Laterite.—Cuddalore Sandstones ...	Pliocene.	
		Upper Tertiary of Cutch.—Bone gravels of Perim ...		
		Argillaceous beds of Cutch.—Miocene of Kattivar,—Quilon beds ...	Miocene.	
		Arenaceous beds of Cutch ...		
		<i>Orbitoides</i> Limestone of Cutch ...	Eocene.	
		Nummulitic beds of Cutch and Gujerat.—High-Level Laterite ...		
		Upper Deccan Trap.— <i>Rana pusilla</i> beds of Bombay ...	Cretaceous.	
		Lower Deccan Trap.— <i>Physa prinsepi</i> beds of Central India.—Lameta Group.—Bág beds.—Ariatur, Utatur, and Trichinopoli stages ...		
		Nocomian of Cutch ...	Jurassic.	
GONDWANA SYSTEM	Upper	{ 4. Cutch and Jabalpur ... }		Umia and Katrol of Cutch.—Tripatti Sandstones, Ellore.—Chari and Patcham of Cutch.—Ragavapuram beds, Ellore. ...
		{ 3. Kota-Maleri ... }		
	Lower	{ 2. Mahadeva ... }		
		{ 1. Rajmahal ... }		
		{ 4. Panchet ... }		
		{ 3. Damuda { Raniganj ... } Barákar ... }		
		{ 2. Karharbari ... }		
		{ 1. Talchir ... }		
	Upper	... ..			Bhanrer ... Rewah ... Kaimur ... Son.—Semri.—Kadapa. Kaladgi ... Arvali ... Transitions of Behar and Shillong... Ordinary Gneiss of Peninsula ... Bundelkhand Gneiss ...
		Lower	
		Devonian		
		Cambro-Silurian.		
		Triassic.		
		Carboniferous.		
		Archaean.		

EXTRA PENINSULAR.

Modern Alluvium ...	Recent.
Old gravels of the Himalaya and Sub-Himalaya.—“Karewas” of Kashmir ...	Pliocene.
Sivaliks of the Himalaya. Mammaliferous beds of Thibet. Upper Manchar of Sind. Dehing group of Assam. Fossil wood deposits of Burma ...	
Lower Manchar and Gaj of Sind. Lower Sivalik or Nahun of the Himalaya. Tipam group (Assam). Pegu group (Burma) ...	Miocene.
Upper Nari (Sind). Kasauli (Himalaya). Archipelago series (Andamans) ...	
Lower Nari (Sind). Mari Beds (Panjab). Dagshai (Himalaya) ...	Eocene.
Khirthar (Sind). Nummulitic limestones (Sind, Panjab, Assam, Burma, &c.) ...	
Ranikot (Sind). Lower Nummulitic (Salt Range, Panjab and Baluchistan). Gypsum and Rock-salt of Kohat (Panjab) ...	Eocene.
<i>Paleocene</i> , <i>Cardita Beaumonti</i> beds and intercalated basalts of Sind. Olive group of Salt Range. Negrais group (Burma). Port Blair series (Andamans) ...	

INDIA.	EUROPE.
<i>Hippurite</i> limestone of Qnetta, Sind, &c. Chikkim beds, Himalaya.	} Cretaceous.
Dipsang group (Assam). Upper cretaceous (Khasi Hills). Mai-i group, Burma	
Cretaceous of Mt. Sirban, Hazara	
Chichali Pass beds, Western Salt Range	} Jurassic.
Jurassic of Salt Range. Giumal and Spiti stages, Himalaya	
Variegated group of Salt Range. Schists of Spiti	
Upper Tagling limestone, Himalaya. Silhet trap	} Triassic.
Lower Tagling and Para limestone. <i>Nerinwa</i> and <i>Megalodon</i> bed of Hazara	
Lilang group, Himalaya. Axial group, Burma	
<i>Ceratite</i> beds, Salt Range. Lower Trias of Niti, Milan, and Spiti, (Himalaya)	} Carboniferous.
<i>Productus</i> Limestone of Salt Range. Kuling beds (Himalaya and Kashmir). Lower Trias and Tassol of Hazara? Kiot limestone (Pir Panjal)? Krol and Supra-krol (Himalaya)? Mandhali of Garhwal. Maulmain series (Burma)	
Wanting	
Muth series (Himalaya) } Babeh series (Himalaya) }	} Devonian.
} ? Salt Marl, Salt Range. Blaini and Infra-Blaini of Simla. Panjab System (Kashmir). Attock slates (Panjab)...	
Shillong series (Assam). Mergui series (Burma)	} Cambro-Silurian.
Ancient gneiss of the Himalaya ..	
Gneiss of Assam and Burma	} Archæan.

Prof. Oberbergrath Dr. Waagen, formerly Palæontologist of the Survey, but now in the Polytechnic University of Prague, still retaining his hold on the study of Indian Geology, has within the last year published an exhaustive paper in the *Jahrbuch der K. K. Geol. Reichsanstalt*, Vienna, on the Carboniferous Glacial Period, which owes much of its value to observations and deductions made from time to time, since 1856, by the Geological Survey in working out the Gondwana Formation, particularly in connection with correlated deposits in South Africa and in Australia, glacial evidences of more or less importance having at the same time been observed in all. This correlation, and homotaxy, according to Dr. Waagen's latest deductions, is shown in the annexed statement.

	SOUTH AFRICA.	INDIA.	EASTERN AUSTRALIA.
Neocomian	Uitenhage	Cutch { Plant beds. Marine beds. Tithonian.	? Marine beds in Queensland.
Tithonian. ?		
? Rhætic and Jurassic.	Stormberg beds.	Jabalpur beds Kota Maleri beds Râjmahâl beds	Bellarine beds. Clarence River beds. Southern coalfields, Queensland.

	SOUTH AFRICA.	INDIA.	EASTERN AUSTRALIA.
? Lowest Trias.	Beaufort beds.	Panchet beds	Wianamatta beds. <i>Unconformity.</i>
Permian.	Koonap beds	Damuda beds	Hawksbury beds (glacial).
Upper Carboniferous.	<i>Unconformity</i>	Kárhárbári beds	Newcastle beds.
	Ecce beds (glacial)	Tálchir beds (glacial)	Stony Creek beds. Bacchus Marsh beds (glacial).
Lower Carboniferous.	Lepidodendron beds	Resting unconformably on crystalline rocks.	Strond and Port Stephen's beds, &c.
Devonian.	Marine Devonian	.....	Lepidodendron beds. Marine Devonian.

The mass of evidence brought together in this elaborate paper, which treats of (I.) India, (II.) South Africa, (III.) Eastern Australia, (IV.) the Salt Range, and (V.) Europe, demonstrates, according to the author's interpretation, that a glacial period appeared with great intensity in upper carboniferous times on a continent, the greater part of which lay south of the equator, but which, later in the Permian period, extended itself over the greater part of the globe: and that, though many ice-made formations have been mentioned in geological literature as being of earlier or later age, at no time can such deposits be shown to have had such a wide extension as in the Carboniferous, or in the Quarternary periods.

Mr. R. D. Oldham gave a much needed and valuable paper, in the August part of the *Records of the Geological Survey of India*, on the "Sequence and Correlation of the Pre-Tertiary Sedimentary formations of the Simla Region of the Lower Himalayas;" founded on an amalgamation, as far as is possible, of the many isolated accounts which have been published of different portions of the range since the publication of the *Manual of the Geology of India* in 1879. He gives the following sequence, in descending order:—

KROL SYSTEM.

CARBONACEOUS SYSTEM. { *Carbonaceous division.*
Blaini group.
Simla slates.

DEVONIAN SYSTEM.

JAONSÁR SYSTEM.	}	Upper Jaonsár. Jaonsár Quartzite. Lower Jaonsár.
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‘CENTRAL GNEISS.’

In discussing the correlation of these systems with those of Stoliczka, Lydekker, Waagen, and Wynne, in Spiti, Kashmir and the Panjáb, as also the Vindhyan in Peninsular India: the conclusion is arrived at that the Central Gneiss is presumably of Archæan age; that the Jaonsár system may be equivalent to the *Vindhyan* in the Peninsular area, this correlation tending to give both systems an age corresponding at the latest to part of the Silurian system of Europe. No equivalent, however, can be found among the fossiliferous beds of the Central Himalayas for the Deoban limestone. The Carbonaceous system, in correlation with Lydekker's *Zanskars* and *Panjals* in Kashmir, and Stoliczka's *Kuling* of Spiti, is considered to have been deposited during the latter end of the Palæozoic period, and that it corresponds to part, if not the whole, of the Carboniferous and Permian eras. The Krol limestone is then considered as probably represented by part, which part cannot be determined, of the limestones which extend from Lower Trias to Lias in Spiti and Kashmir.

The attention of the officers of the Geological Survey of India appears to have been specially directed during the year to the elucidation and working out of several important questions connected with economic Geology.

As regards the economic importance of the *Dhárwár* series, further exploration points to an increased promise of their value, in the recognition by the Survey of an extensive and promising gold-field in the Raichur Doáb of the Nizam's Dominions.

An interesting question has been opened up, quite lately, regarding the occurrence of diamonds in the Madras Presidency, otherwise than in what has been hitherto considered the proper diamond-bearing sandstone (*Banaganpilis*) of the Karnúl formation. A few diamonds, one of them of considerable value, had been found at Wajra Kurur, where there is no trace now of the Banaganpilli beds from which they might have been derived: and it is supposed, with some show of plausibility, that the gems may have come from a “neck” of igneous or volcanic rock occurring there, which bears some resemblance to the “blue” of the Cape diamond-fields. It is doubted by the Survey whether the diamonds can be so derived, preference being given to the view that they occur in a remnant of the debris—present surface soils and gravels—of some pre-existing diamondiferous portion of this “neck” rock which had passed through carbonaceous deposits long since denuded from the face of the country.

The enquiry into the quality and extent of the Manganese deposits in the Jubbulpore District has been completed, with an estimate of over 75,000 tons of available pyrolusite; the manganese hematite being considered practically unlimited in its extent. The geological interest attaching to this enquiry lies in the question of the origin and mode of distribution of the pyrolusite, which also partly occurs in what may be called a manganese laterite, in contrast to the ordinary or ferruginous rock of that name. The distribution of the pyrolusite in this laterite and other superficial deposits, or in the outcrops of the rocks, is attributable to a deposition by leaching out of a manganese carbonate from the adjacent manganiferous hematites; while the occurrence of manganese laterites points to a probably more extended, though local, distribution of manganese ores among the widely distributed laterites in the peninsular region than has been previously anticipated.

During the enquiry into the conditions of the Sapphire-bearing rocks of the Zanskár district in Kashmir, a very interesting confirmation was made of the find of *nummulites* by Dr. Thompson in 1852; more particularly so as this occurrence which had been adopted by MM. d'Archiac and Haime in their classic work on the Nummulitic fossils of India, had been since questioned by Mr. Lydekker in his "Geology of Kashmir."

A Memoir on the Physical Geology of the Sub-Himalaya of Garhwal and Kumaun, following on the surveys of Mr. C. S. Middlemiss, will shortly be published. The more interesting subjects treated of in the author's general considerations, are:—absence of metamorphism; no evidence of glacial conditions; each reversed fault represents an ancient shore-line, or mountain-foot, *i. e.*, a limit of deposition; contrast of the south face of the Himalaya with the eastern aspect of England; the disturbance of the Sub-Himalayan rocks not representative of that of the older rocks; abstract theories of mountain-making; consideration of Mr. T. Mellard Reade's theory and the Rev. O. Fisher's "Physics of the Earth."

The oil region of Makum, in Assam, has undergone additional examination by Mr. R. A. Townsend, Superintendent of Petroleum-Works in Baluchistan: his report of the oil-shows and the possibilities of this tract being most favourable. A certain amount of caution must, however, be observed in forming an estimate of the value of the oil, for the present, at least; because the results obtained in the Geological Survey laboratory, from examination of the sample of oil brought down by Mr. Townsend, agree very closely with that already given by Prof. Boverton Redwood, (Cantor Lectures on Petroleum and its products) from an assay of petroleum from Assam, where he obtained no percentage of burning oil, 94.2 per cent. being merely lubricating oil. It must be

noted, however, that Mr. Townsend's sample was taken from the surface; whereas a true estimate can only be formed on oil taken from a bore-hole.

In connection with the subject of petroleum beds, mention may be made of a recent theory, advanced by Professor Mendeléeff, that petroleum is of mineral origin, and is formed by the combination of water with glowing metallic carbides, chiefly iron, below the crust of the earth; whereby it is decomposed, the oxygen uniting with the iron, while the hydrogen takes up the carbon, and ascends to higher regions, where part is condensed into mineral oil and part remains as a natural gas.

Strictly geological work in Burma is still subservient to the examination of economic products such as the oil-tracts of Thayetmu, Yenangyoung, &c; iron ore near Shengaung in the Shan Hills; and the Ruby-bearing limestones of Kya-nhyat: while only lately attention has been directed to the Tin ores of Tenasserim, in connection with a mission which has been carried out in Perak, with the view of ascertaining the system of Chinese labour there utilized.

The *Quarterly Journal of the Geological Society* contains some papers bearing on Indian Geology, among which the following may be noted:—"On the law that governs the action of Flowing Streams," by Mr. R. D. Oldham. "On some of the auriferous tracts of the Mysore Province. Notes on the Melkote and Seringapatam areas and general observations," by Mr. G. Attwood.

A paper on "certain features in the Geological structure of the Myelat District, Upper Burma, as affecting the drainage of the country," by Brigadier-General Collett, C. B., has been read to our Society, and will be published in an early number of the *Journal*.

METEOROLOGY.

In Indian Meteorology, I am informed, the past year was one of steady progress. It was (probably) that of minimum sun-spots of the present cycle, and like its predecessor of the two previous cycles, 1866 and 1877, has been characterised by very marked abnormal deviations and weather features. The hot weather was unusually severe and several tornadoes and hailstorms of almost unexampled violence occurred in Bengal and Upper India. Interesting and valuable accounts of two of those storms, *viz.*, the tornado at Dacca in April last, in which 118 people were killed, and the hailstorm of May at Moradabad, in which 150 people were killed or frozen to death, have been presented to the Society by Messrs. Pedler and Crombie, and Hill. The commencement of the south-west monsoon was marked by a very abnormal retardation of the monsoon current at the head of the Bay for upwards of a fortnight, during which the heat was

almost unprecedented in South Bengal. The South-West monsoon was also characterised throughout by great variations. But fortunately the total distribution of the rains has been such as to avert the famine threatened by prolonged partial drought on more than one occasion in several districts, more especially in Orissa. The experience of the past year, however, tends to confirm the general conclusion of the meteorology of the past 22 years in India, *viz.*, that the greatest irregularities and abnormal deviations in the weather over India occur at the minimum sun-spot period or at (according to Lockyer) the period of least activity in the solar photosphere.

It may be noted that these abnormal features of the weather have not been confined to India; the summer months in Europe were unusually cold and wet, and marked by snowstorms and floods. In America also, remarkable blizzards occurred in the months of January and March, over the States of Dakota and New York, which caused great destruction of property and loss of life to man and beast, owing to the intense cold and violence of the wind. In Australia the hot months have been marked by great drought.

Several improvements have been made during the year in the methods of preparing and issuing the daily weather-charts and storm-warnings. The hour for recording the observations daily transmitted by weather-telegram to Simla, Calcutta and Bombay has been changed from 10 A. M. to 8 A. M., which is more in conformity with European practice. The telegraph lines being most free from traffic between 8 and 10 A. M., the weather messages are now forwarded without delay and the daily reports can be issued several hours earlier than in previous years. The Calcutta daily Report and Chart can thus be issued at about 11 A. M., or at the beginning of the office day instead of at the end of it; thus practically securing the gain of a day. The Simla daily Report is also issued from 12 to 24 hours earlier, and delays are now mainly due to the great distance between many of the Observatories and the Telegraph offices. In future this will be remedied as far as possible by establishing all new Observatories at Telegraph offices. This will not only facilitate the telegraphic communication of observations, but in many cases provide observers of greater intelligence than would be otherwise obtainable.

Satisfactory arrangements for the warning of the Burmah and Madras Ports of the occurrence of cyclones and cyclonic storms were effected and sanctioned in the beginning of the year. The duty of warning all ports on the Bay of Bengal Coast is assigned to the Meteorological Reporter to the Government of Bengal. An unusually large number of cyclonic storms, one or two of which were of a very exceptional character, occurred during the past year, but in every

case ample and sufficient warning was given to the Bay of Bengal Ports. During the prevalence of such storms in the Bay, the Reporter has an exceedingly responsible and most arduous task to perform night and day till they disappear, and on this account the Society has to regret the loss of Mr. Pedler's valuable services as Treasurer, the strain of constant work and anxiety having obliged him to give up all extraneous work. It is satisfactory to know that arrangements have been made for giving the Reporter assistance at such times.

The duty of warning the West-Coast ports was transferred to the Simla Meteorological office in August last. The system in force differs from that followed for the Bay of Bengal Ports and has been found unsatisfactory, because it is limited to the warning of the Ports of approaching storms and not to the warning of ships in ports of the existence of distant storms in the Arabian Sea which they might encounter if they left port. The disaster to the *Vaitarna* (which went down, with 800 persons on board in November last, during a storm in the Arabian Sea that only slightly affected the coast ports) has drawn attention to the defects of the signal system, and it is hoped it will soon be placed on a satisfactory footing.

The Government of India has recently sanctioned a series of changes, most of which came into force on the 1st of January last. One of the most important is the more systematic collection of observations of storms than has yet been attempted. It may be desirable to point out that storms in India may be classed as follows :

1st, Cyclonic storms of the South-West Monsoon.

2nd, Cyclonic storms of the North-East Monsoon, or cold-weather storms, during which by far the larger proportion of the winter rainfall of Upper India and the snowfall of the Himalayan area occurs.

3rd, Hailstorms, Nor'-westers, Tornadoes, and other small but excessively violent storms of the hot weather, which occur chiefly in the neighbourhood of the seas and hills.

4th, Duststorms, such as occur frequently in the hot weather in the driest districts of N.-W. India.

Much labour has been devoted (and on the whole successfully) to the investigation of the first two classes of storms. Little has, however, been done to elucidate the meteorological features of the last two classes. District officers, who have ample opportunities of collecting local information, could provide important data, if they occasionally ascertained the extent, exact times of occurrence and variations of intensity of the more severe hot-weather storms in their Districts. It is highly probable that the Nor'-Westers of Bengal are of very limited extent. Usually, however, a large number of these detached storms appear to occur about

the same time of day in different parts of Bengal and Assam during periods of slight general atmospheric disturbance in Northern India. If the conditions happen to be unusually favourable, these Nor'-Westers may occasionally develop into or include a tornado, as in the case of the Dacca storm.

The most important addition sanctioned by Government undoubtedly is the systematic collection of observations recorded in the logs of vessels entering the ports of Bombay and Calcutta, with a view to the early publication of daily charts of the whole area, including India, the Indian Seas, Baluchistan, Afghanistan, South Arabia and Persia. It is hoped that this extension will throw much light on the causes of the variations in strength of the South-West Monsoon current on land and at sea, and also upon the origin of the cold-weather storms of Northern India. It may be hoped that some day it will be possible to obtain observations from various parts of Russian Asia which might also be of use. Although Indian Meteorology is chiefly affected by influences coming from the Bay of Bengal on the one side and the Arabian Sea and Indian Ocean on the other, the colder currents from the regions to the far north must exert some influence on the equatorial currents, and a knowledge of the meteorological conditions prevailing in those northerly regions might possibly be a guidance to meteorologists here.

Mr. H. F. Blanford, late President of our Society, has fully completed during the past year his very valuable Monograph on the Rainfall of India, and it is now issued as a separate volume of the *Indian Meteorological Memoirs*. He has also written during the year several papers on questions connected with Indian Meteorology which have appeared in the Royal Society's '*Transactions*' and in '*Nature*.' He has also completed a work on the Meteorology of India, based on the publications of the Meteorological Department and giving a popular exposition of the more important features of the climate and weather of this country. It will not only increase the interest taken in Indian Meteorology but, it is hoped, lead to greater attention on the part of European meteorologists to the problems it presents.

Mr. Eliot has also continued his researches into the nature, origin and paths of the cyclonic storms generating in the Bay of Bengal, and has during the year contributed two papers to the *Indian Meteorological Memoirs*, the first giving a list and brief account of the south-west monsoon storms in the Bay of Bengal during the years 1882 to 1886, and the second giving the full history of the cyclonic storms of November and December 1886 in the Bay of Bengal. The history of these three interesting storms, which succeeded one another at intervals of about a fortnight, appears to support the condensation theory of the formation of cyclones which has been so ably advocated by Mr. Eliot.

Mr. Eliot has during the year also worked out in detail the history of the formation of the cyclone which visited Balasore on May 26th 1887, and caused the loss of the steamers *Sir John Lawrence* and *Retriever* at the mouth of the Hooghly. The description of this cyclone is given in a new publication of the Meteorological Department called "*Cyclone Memoirs*," of which this forms the first part. This publication is intended to contain short descriptions of cyclones in a form suitable for issue to ship-captains, and to be issued as soon as possible after the occurrence of the storms described. The first part also contains some very valuable suggestions to sailors as to the best course for them to pursue in the case of their meeting similar storms.

Mr. F. Chambers has published during the year, in the *Indian Meteorological Memoirs*, a full description of a cyclone which occurred in the Arabian Sea in May 1881, in which he investigates very thoroughly the connection between the wind direction in the storm and the position of its centre, and the relation which the direction of the movement of the storms bears to the direction of the normal monsoon wind blowing at the time of its formation.

Of the Meteorological papers printed in our *Journal*, the first is a description, by Messrs. Crombie and Pedler, of the severe tornado at Dacca, in April last, in which it appears to be proved that the storm followed Meteorological conditions similar to those which usually precede tornadoes in the United States, in which country the subject of tornado formation has been worked out to the fullest extent by the Signal Services, under Lieut. J. P. Finley, U. S. A.

The second paper was by Mr. S. A. Hill, on "The Tornadoes and Hailstorms of April and May 1888 in the Doab and Rohilkhand," and in it he discusses the origin of such disturbances, and shows that the tracks of the tornadoes have no apparent relation to the distribution of temperature or pressure at sea level, but the disturbances probably originate in the eddies in the stratum of the atmosphere where cloud formation and precipitation commence, at a level of 9000 to 10,000 feet.

Mr. Hill has also published two other papers; one, on "The Annual Variation of the Barometer in India," in the *Met. Zeitung* for September 1888, in which he points out several features which are still ignored by European meteorologists: notably (1) that the annual variation at all stations north of 20° is accompanied by one of semi-annual period; (2), that the annual variation diminishes in range as the elevation increases, and probably dies out or becomes reversed in direction at 14,000 or 15,000 feet; (3) that the annual range is greater in Central India and along the southern edge of the Gangetic plains than at the foot of the Himalaya. This is very important, as it is the direct cause of

the easterly winds of the summer monsoon in the Gangetic valley and the westerly winds of the cold-weather in the same region.

The other paper, on "The Life-Statistics of an Indian Province," appeared in "*Nature*," and in it the relations obtaining between vital statistics and weather, in India, are illustrated by the Statistics of the N. W. P. and Oudh for the ten years ending with 1887. The annual death-rate is shown to vary with the rainfall with great regularity. The birth-rates vary from year to year, according to the health of the people and the abundance or scarcity of food.

In connection with Indian Meteorology the progress of Meteorological work in northern Australia and China is deserving of notice.

Mr. Wragge, the Government Meteorologist of Queensland, now publishes a daily report with chart and forecasting the weather in the Australian area, based on telegraphic reports from 72 stations in Australia, Van Diemen's Land and New Zealand. As Australia occupies nearly the same geographical position (lying between 10° and 38° parallels of latitude) in the southern, that India does in the northern hemisphere, there is little doubt that progress in Australian Meteorology will not only react on Indian Meteorology, but throw much light on many of the larger problems with which Indian meteorologists have to deal.

Dr. Doberck, Director of the Hongkong Observatory, is also doing very useful and valuable work in China, where a general system of meteorological observations is also being organised.

Mr. Meldrum continues to collect systematically important information respecting the Indian Ocean from ships visiting Mauritius. It will hence soon be possible, by combining the information collected by these various Meteorological Departments to obtain a fairly complete idea of the larger weather features and changes in the whole area including China, India and Australia and the adjacent seas, and it would be very desirable that this work should be undertaken if only for a limited period.

Comparison of Earth Thermometers.—The records of the observations of temperatures of earth thermometers sunk at different depths, at the Survey of India Trigonometrical Branch Office, Dehra Dún, show some very curious results, one particularly noticeable being that the maximum at a depth of 25·6 feet occurs almost invariably in November, the maximum mean shade temperature at the surface being usually in June, but sometimes in May. Taking the means of the five years recorded, the earth temperature at a depth of 25·6 feet in November is $76\cdot64^{\circ}$ F., as compared with a mean temperature of $73\cdot54^{\circ}$, in the shade at the surface.

On the other hand, the minima are usually in April or May. Taking the means of the six minima recorded and comparing them with the corresponding shade temperature at the surface, we have a mean minimum earth temperature of 73.94° F., against a mean surface shade temperature of 91.97° . The minimum earth temperature at 25.6 feet, of which records are given, is 73.50° , in May 1887, and the maximum 77.33° , in October 1884. The minimum mean surface shade temperature during the same period was 59.79° , in January 1887, and the maximum 98.66° , in May 1887.

The common practice up-country of building taikhana under houses, and excavating chambers about deep wells, as one often sees in Central India and Rajputana, with the object of having these chambers warm in winter and cool in summer, is thus found to agree with scientific observation.

BARRISAL GUNS.—Babú Gaur Dás Bysack has again called the attention of the Society to the peculiar explosive sounds, occurring about the Sundarbans, and known as the “Barrisal guns.” A memorandum, giving an abstract of the information recorded on the subject, was drawn up by me and read at the March meeting. A considerable amount of interest was evinced in the subject and a Sub-Committee was appointed to investigate it anew. The Sub-Committee drew up some rules for observers and circulated them, with the memorandum, to the Meteorological Offices, Marine authorities, District officials, and other persons likely to be able to afford assistance and information. Numerous replies have been received, but as yet nothing to show definitely the cause of these mysterious sounds. The observations will be examined and collated immediately and laid before the Society. One of the most suggestive communications on the subject is a letter from Mr. Manson of Chittagong, who, among other likely causes for the sounds, suggests that they may be caused by the breaking in of the dry crust of mudbanks, due to the washing out of the soft semi-fluid mud beneath, and the sudden escape of the imprisoned air; the sound thus produced being multiplied by echoes. Valuable observations were also sent in by Mr. Waller, the Collector of Jessore and by Dr. Crawford, Civil Surgeon, Barisal, also by Mr. Elson, of the Pilot Service.

CHEMISTRY.

Reviewing the progress of chemistry in India during the year we find no records of pure chemical research. In applied chemistry, which perhaps in some ways is more important, good work has been done. The vast and, until within comparatively recent years, unexplored field which India affords for investigation on the chemical, and other valu-

able properties of its abundant indigenous vegetable products and drugs has engaged the attention of some of our chemists.

In Bengal, Professors Pedler and Warden have published in our *Journal* an account of their investigation of the properties of Bish Kachu, a member of the large family of *Aroidæ*, a natural order of which some species in most parts of the world bear an evil reputation. In India, especially, certain arums are held to be highly toxic, and the paper contains valuable information regarding the whole family. The results obtained indicate that the toxic symptoms induced by ingestion of the *bish kachu* are referable to the mechanical irritation caused by the raphides, or minute needles, of calcic oxalate which are found in all parts of the plant, and not to the presence of any specific poisonous principle.

They have also examined the bark of the *Anona squamosa*, or custard-apple tree, and from it isolated a crystalline neutral principle, an acid resin, and a viscid neutral body. Also the dried carpels of *Xanthoxylum elatum*, which had some years previously, been the subject of a research by Dr. Stenhouse, who obtained from them an essential oil and a steareopten. Messrs. Pedler and Warden have determined some of the physical constants of the essential oil but have failed to isolate a steareopten. They also separated a fixed oil, and a yellow acid principle.

Few drugs have within the last few years caused greater interest than the alkaloid cocaine, contained in the leaves of the *Erythroxylon coca*. Though the stimulating property of the leaves when chewed was known to the Indians of Peru more than 300 years ago, it was not until Koller pointed out, in 1884, the remarkable anæsthetic properties of cocaine, that the drug received attention from the medical profession. In 1884 the price of this alkaloid was about 2s. 6d. a grain and the demand was almost greater than the supply. The cultivation of the plant thus appeared likely to prove profitable. Seedlings of it were distributed to various tea-gardens by the Agri-Horticultural Society of India, and last year Dr. Warden examined a large number of samples of locally grown leaves and found that they were exceptionally rich in alkaloid, and that physiologically the drug is in no way inferior to that obtained from other sources. His investigations were published in the *Journal* of the Agri-Horticultural Society of India.

During the foregoing investigation Dr. Warden isolated cocatannic acid. The acid hitherto described under that name, and first observed by Wackenroder and Gacdecke, is probably a decomposition product of the acid now isolated for the first time.

He has also isolated the active principle of the berries of the *Embelia ribes*, the 'Barbarang' of native materia medica, which have long been

highly esteemed as a vermifuge in this country. It is a golden coloured crystalline acid, and he has designated it *Embellic acid*.

From *Delphinium zabil*, a drug used chiefly in Bombay for dyeing silk, but also believed to possess medicinal properties, he has isolated a yellow acid and certain other principles; and from the stems and roots of the *Cocculus villosus* obtained a bitter alkaloid and other principles. An examination of the bitter oil contained in the almond of the *Melea azadirachta*, or *Nim* tree, commonly called 'Margosa oil,' shows it to be highly complex in composition. This oil had already been examined by Dr. Cornish in 1856, and from it he isolated a substance called margosic acid, but did not investigate its composition or properties. Dr. Warden's results will be found in the *Pharmaceutical Journal*.

It is to be hoped that Messrs. Pedler and Warden will continue these interesting researches. The demand for new medicinal principles is unceasing, and if openings can be made for the encouragement of the cultivation in this country of the plants containing them, the benefits to the world at large and to this country will be great.

It is not often that a chemical manufacturing process has origin in India. This year, however, has been marked by the invention and application of a very ingenious process for the manufacture of quinine from cinchona bark. It depends on the solvent action of fusel oil on the cinchona alkaloids; and is actually worked by agitating very finely powdered bark, which has previously been mixed with an alkali, in a mixture of fusel and kerosine oils. The alkaloids displaced by the alkali from their natural combinations in the bark become dissolved in the mixture of oils, from which they are in turn recovered by the addition of dilute sulphuric acid. From the acid solution thus obtained the crystals of sulphate of quinine ultimately form out, and by a slight subsequent purification are ready for use. This beautiful and simple invention was originated by Mr. C. H. Wood, lately Quinologist to the Government of Bengal; and it has been worked out by Mr. J. Gammie, resident manager of the Cinchona plantation near Darjiling. By making the invention public property, the Government has thus completed the task, which it began in 1861, of so cheapening the only remedy for the commonest disease of the tropics as to put it within the reach of the poorest sufferer.

In Madras, Mr. David Hooper, the Government Quinologist, has examined the leaves of the *Adhatoda vasica*, or "Arusa," a widely distributed plant used in medicine, as a dye, and also in agriculture. The latter use is interesting. In the Sutlej valley the fresh leaves are scattered over recently flooded fields, under the idea that they act as a manure and also poison the aquatic weeds that otherwise would injure the

rice crops. The leaves and extracts are also valuable as insecticides, the alcoholic extract of the leaves being an intensely lethal poison to all the lower orders of animal life, while producing no appreciable effect on healthy animals of the higher orders. From the leaves Mr. Hooper has isolated a well defined alkaloid, *Vasicine*, and an acid which he has termed *Adhatodic acid*.

The rhamnids, or buckthorns, have long been known to yield important products used in medicine and the arts. The berries of some of the European varieties of *Rhamnus* have been examined by Lefort, Stein and Schützenberger and certain crystalline glucosides obtained, but so far the cathartic principle was unknown. The introduction of the bark of *R. frangula* and *R. parshianus* into the last British Pharmacopœia led Mr. Hooper to examine the bark of an Asiatic species, *R. Wightii*, from which he has been able to isolate *Cathartic acid*, a crystalline body, several resins, resin acids and neutral principles.

Another bark examined by Mr. Hooper has been that of the *Michelia Nilagirica*, one of the most abundant and perhaps most characteristic of the forest trees of the Nilgiri Hills. The bark appears to have lately attracted some attention on the Continent as a source of a new aromatic essential oil, and it is believed to possess febrifugal properties.

Mr. Hooper communicated two interesting papers to the last annual meeting of the Pharmaceutical Conference, one on "Carthagena bark"; the other on the "Hybridisation of Cinchonas."

In Bombay we learn that Dr. Dymock, the well-known authority on Indian Materia Medica, is preparing a third edition of his work on indigenous drugs, under the title of the *Pharmacographia Indica*. It may perhaps be mentioned, as an indication of the high appreciation in which Dr. Dymock's investigations on Indian drugs are held in England, that he was lately awarded the Hanbury medal at a meeting of the Pharmaceutical Society of Great Britain.

It will thus be seen that good progress is being made in the working out of Indian drugs, &c., but entirely by the European officers of Government, though the subject is one which might have been expected to have attracted the attention of native students of medicine more than it appears to have done. It should be mentioned, however, that Mr. John Taswoo White, a native of Burma, has published in the '*Chemical News*' communications on "Analytical Processes."

TELEGRAPHY AND ELECTRICAL SCIENCE.

Not the least important among the practical sciences is Telegraphy, and to us in India, where we have to maintain not only a largely increasing daily communication with Europe and other foreign countries,

several thousands of miles away, but also a series of inland lines of perhaps greater extent than any other country in the world, except Russia and the United States, any means of increasing the carrying power of the lines must be of special importance. It is satisfactory, therefore, to be able to record that during the present year the system of quadruplex telegraphy has been perfected in India, so that four messages can now be transmitted simultaneously over the same wire, two in one direction and two in the other. Bombay and Madras work quadruplex direct; Calcutta works quadruplex with Agra or Allahabad on one line, and with Akyab or Rangoon on another; and the results obtained over these very long circuits have been most satisfactory. The system in use is the same as that used in America and in England, with the apparatus altered in certain important respects to suit the conditions of Indian telegraphy. Four signallers are employed at each end of the wire, two in despatching messages and two in receiving them, each man working a separate instrument. One wire thus keeps eight men fully employed, and it is easy to conceive the great saving in plant, thus gained. The difficulties met with at first have now been all overcome and the future extension of the system in India depends only on traffic requirements. It will be within the memory of many of the members present that our lamented fellow-member Louis Schwendler took a very prominent part in the introduction of Duplex telegraphy into India, and described the general theory of its working very fully in our *Journal*, Part II, for 1873-74-75. It would have been a great pleasure to him could he have lived to see the perfection and extension of his labours.

Another great advance in Indian telegraphy is the substitution of hard copper wire for the ordinary galvanised iron wire. The trials of the copper wire were so satisfactory, that it has now been put up for the whole distance (800 miles) Bombay to Madras, also from Bombay towards Nagpur, and on shorter sections. The great advantages of copper wire lie in its high conductivity and virtual freedom from electromagnetic inertia, which tends to retard the flow of the electric current through iron wire. This really means that within certain limits two offices will work as well with one another through 1000 miles of copper wire as they would through 500 miles of iron wire. It is on this copper wire that Bombay and Madras work quadruplex direct and work excellently; in fact, better than they formerly did on an iron wire, which necessitated automatic repetition or translation at Bellary.

Another improvement to be recorded is the introduction of mica 'lightning-dischargers' in telegraph offices. These lightning-dischargers are placed at either end of a telegraph line where it enters an office, in

order to protect the signallers from the destructive effects of lightning. Hitherto the so-called "plate-lightning-discharger" has been in general use in India. The upper plate has two screws, to one of which is connected the line wire entering the office, and to the other the telegraph apparatus. The lower plate is connected direct to the earth. The two plates on the sides facing each other are finely grooved in parallel lines, the grooves in the line-plate crossing those in the earth-plate at right angles, so that each crossing approximately represents two cones with their points facing each other, with a small space of air between them; and the more numerous such crossings, and the smaller the air-space, the more efficient the discharger.

However, actual experience in India and, very recently, a long series of laboratory experiments, certainly seem to show that a greater amount of protection can be obtained by employing two perfectly smooth metal surfaces separated only by a thin sheet of mica, two or three circular holes being cut in the mica to admit of the discharge passing between the plates and so to earth. The reason of this greater protection lies in the fact that mica possesses at least five times greater capacity or power of drawing in charges of electricity than air has. For example, if two comparatively small plates separated by mica, and two much larger plates separated by air are connected up 'parallel' or 'in series,' in a circuit in which currents of high potential are generated, it will be observed that the sparks all pass between the mica-separated plates and none at all between the air-separated ones.

It may be noted that in 1846 Steinheil used a plate-discharger with a sheet of silk as the insulating medium, the principle of action involved being in a lesser degree exactly that of the new mica discharger.

The use of telephones is extending, and during the year they have been adopted in the Harbour Defence Works, Bombay and Karachi, for giving orders and information. They have been found useful in the construction of railways and, especially, in difficult tunnelling works. Also in station-yards, where it is necessary for a Station-master to convey simultaneous orders to three or more signal-boxes regarding the shunting of trains &c. They have been used at rifle ranges instead of the old system of flags, or in addition to it.

A system for recording the hearing powers of persons, especially those under treatment for deafness, by means of an arrangement of telephone and electrical resistance has been devised and will no doubt be tried in our hospitals. A record of hearing can be kept as accurately as a record of weight is now kept.

Electric lighting is slowly making its way in India, but the almost prohibitive cost of installation prevents its extended adoption in place of gas.

A very interesting sketch of the History of Telegraphic communication between the United Kingdom and India, by General Sir R. Murdoch Smith, appears in a recent number of the *Scottish Geographical Magazine*.

PHOTOGRAPHY.

You will doubtless expect me to tell you something of recent advances in photography: there is, however, little to tell.

It is gratifying to note the resuscitation of our local Photographic Society and the establishment of new Societies at Bombay, Allahabad and Madras as an indication of the awakened interest in photography brought about by the perfection and simplicity to which the working of gelatine dry plates has now arrived. To the archæologist these plates are invaluable and permit of an immense deal more work being done than was the case with the old collodion methods, wet or dry. With these plates, which need not be developed on the spot, the explorer can now obtain far more trustworthy records of the strange places and people he visits than was formerly the case when all had to be done by hand and eye. Great improvements have also been made in printing methods, both solar and photo-mechanical, which greatly facilitate the reproduction of photographs for book illustration.

As the recording pencil of Science in all branches the use of photography is daily extending. In astronomy, microscopy and spectroscopy, especially, its powers of revealing the invisible are invaluable and almost indispensable for research. Photographs have been lately taken of nebulæ which the most powerful telescopes fail to show to the eye. A complete photographic Survey of the Heavens has been arranged for internationally, and I should have been glad to have seen this country taking part in it, but special instruments and arrangements would be necessary, for which it would be hopeless to ask the aid of Government at present, while so many more important things remain to be done.

Photographic observations of sunspots and faculæ are made regularly every day, weather permitting, at the Trigonometrical Branch office, Survey of India, at Dehra Dún, on 8-inch plates and—when any large spots of special importance are visible—with the large photoheliograph, which gives images of 12 inches diameter. Copies of the negatives are sent home to complete the Greenwich observations. The advantage of having this observatory at Dehra Dún is shown by the tables of comparative visibility of the sun at Dehra and at Greenwich. At Dehra the percentage of invisibility, since 1881, has averaged from 10 to 22 days, while at Greenwich it was from 41 to 60 days between 1880-81 and 1885-86.

In the Photographic Office, Survey of India, experiments have been made with the object of improving the ordinary process of photozincography by impressing the photographic image directly from the negative instead of transferring it from a paper impression. The results obtained are sharper and more accurate in scale. The process of heliogravure by the etching method, has made great advances, and is now being largely utilised for the reproduction of photographs from nature or other subjects which are unsuited for photozincography, or require finer and more delicate treatment. A large number of the plates illustrating Dr. Führer's forthcoming report on the Archæological Remains at Jaunpur have been reproduced in this manner, and a specimen has also appeared in our "*Proceedings*." A series of plates, chiefly selected from the drawings executed by the Archæological Surveys, is being reproduced in this manner under the orders of the Government of India, R. and A. Department, for the use of Art Schools throughout the country.

In this country we depend almost entirely on photography for the rapid multiplication of the maps of our Surveys, and other plans and drawings; for we have no Keith Johnstons, nor Stanfords here, and no class of professional engravers, draughtsmen, or lithographers to draw upon, though we hope our Schools of Art will in time supply this deficiency.

It is peculiarly gratifying to me to be able to tell you that the property possessed specially by the eosin dyes, of rendering bromide of silver very highly sensitive to the yellow rays of the spectrum,—a fact which was first announced in this room, in January 1876,—has been turned to useful account in the preparation of the so called orthochromatic, or isochromatic, plates, which have been found of the greatest use in copying paintings and in photo-micrography, photo-spectroscopy and other purposes when it is desired to photograph objects of a yellow colour, which reproduce so unsatisfactorily by the ordinary methods. During the year I commenced a series of observations on the orthochromatic properties of different kinds of eosins and hope, if the pressure of other duties permits, to be able to resume them and to lay them before you with further photo-spectroscopic observations of the less refrangible rays, with the aid of the Rowland gratings exhibited at our last meeting.

Before proceeding further, mention may be made of several mathematical papers by Babu Asutosh Mukhopádhyaý, that have appeared in our *Journal* and *Proceedings*, on Poisson's Integral and on Monge's Differential Equations to the Parabola and to all Conics.

MUSEUMS.

As the founder of the first Museum in this country our Society

should have a peculiar interest, not only in the Imperial Indian Museum, in which its own collections are now preserved, but in the welfare and progress of the Museums which have been established all over the country and are so valuable for the due conservation and study of objects of historical or scientific interest, besides being a most potent means of education by the eye, to the student, or craftsman, as well as to the merest sightseer : and it is satisfactory to think that the poorest cooly can enjoy these advantages gratuitously and without let or hindrance.

Indian Museum.—This Museum, in which we have so strong a direct interest, is doing good work in many directions which have been especially noticed under their respective heads. It is a very great pleasure to me to be able to report that the new building to accommodate the Economic and Anthropological Collections, has been commenced, under the orders of the Government of Bengal. When this is completed the Museum will have a magnificent range of buildings worthy of the Imperial capital and Presidency town.

It is specially gratifying to know that the Sea-Dredging operations by the Marine Survey department, in the starting of which our Society took so prominent an interest some years ago, are yielding very fruitful results. The contributions of zoological specimens collected by Commander Carpenter, Dr. Giles—the naturalist, and other officers of the Marine Survey, are steadily increasing in number and importance. According to a summary kindly furnished to me by Mr. Wood-Mason, the Superintendent of the Museum, no less than 515 distinct species, exclusive of the results of numerous surface gatherings and of isolated fragments of Sponges, Hydroids, Alcyonaria, Mollusks &c., were brought on the books of the Museum during the year ; and many specimens, including the fine collection from 20 to 1,900 fathoms formed last May by Mr. Wood-Mason, who temporarily took Dr. Giles' place on board the 'Investigator' as naturalist, are still being sorted and registered. The retirement of Dr. Giles from the Survey, threatened to interfere with the continuity of the zoological work, but it is satisfactory to know that a competent successor to him, in Dr. Alcock, has been appointed by Government, and there is no reason to fear that the results of the present season will be inferior to those of past seasons. It is hoped that with steel dredging-wire, which has been ordered from Europe, results of still greater value and importance will be attained.

The other most important recent acquisitions are a collection of interesting Neolithic worked stones from Southern India, presented by Mr. R. B. Foote ; and the remarkable collection of remains of the same age discovered by Mr. Driver, and referred to elsewhere.

The rough draft of the "Catalogue of Mantodea, with descriptions of new Genera and Species in the Collections of the Indian Museum," referred to by my predecessor last year, has been completed by Mr. Wood-Mason; Part I, which will be illustrated by 30 to 40 woodcuts, is ready for press, and it is hoped will be issued during the current year. Mr. Wood-Mason has also commenced a descriptive catalogue of the extensive collection of the Malacostracous Crustacea.

Mr. W. L. Sclater has been actively continuing the "Catalogue of Mammalia," commenced by Dr. J. Anderson, and has completed the determination and listing of the *Carnivora*, and made considerable progress with the *Ungulata*.

Parts III and IV of a "Catalogue of the Moths of India," by Mr. Cotes and Col. Swinhoe, which was referred to in last year's Address, have been issued, and Part V, (*Pyrales*), completing this useful work, in the preparation of which Col. Swinhoe has had a prominent share, is ready to be issued.

The very important subject of the investigation of the insect-pests of India has received the earnest attention of the Trustees, and, at the suggestion and with the aid of the Government of India in the Revenue and Agricultural Department, has been placed on a systematic footing. Mr. E. C. Cotes has been allowed to devote a portion of his time to collecting information on this subject and publishing the results periodically as "Notes on Economic Entomology" and further to bring into use when practicable the methods and apparatus that have proved successful in dealing with insect-pests in Europe and America. Two numbers of the "Notes" (on the Wheat and Rice Weevil, and on Insecticides) have already appeared; a third (on Indian Insect Pests) is in preparation, and a large amount of material has been collected, which will gradually be worked up with the aid of specialists.

The extensive Zoological collections from the Mergui Archipelago, formed for the Museum by Dr. J. Anderson, F. R. S., while Superintendent, are being described in the Zoological Section of the *Journal of the Linnean Society of London*. In Vol. XXI, No. 131, Mr. S. O. Ridley contributes an account of the *Alcyoniid* and *Gorgoniid Alcyonaria*; Prof. A. C. Haddon describes two new species of *Actinia*, and Mr. F. E. Beddard reports on the *Annelids*; Dr. de Man's report on the *Podophthalmous Crustacea* occupies the whole of Vol. XXII, and forms one of the most extensive contributions to the knowledge of the carcinological Fauna of Indian seas that has been published in our time. Papers on the *Mollusca*, by Prof. E. von Martens, and on the *Gephyreans*, by Prof. E. Selenka, have also been published by the Linnean Society during last year.

In the Economic Section good progress has been made by Mr. T. N. Mukharji, the Curator, in rearranging the collections of economic products according to Dr. Watt's 'Dictionary.' Little can, however, be done in properly arranging the various collections in this Section until the completion of the new buildings. Mr. Mukharji has during the year compiled and published a very complete and useful work on the Art Manufactures of India.

Madras Museum.—From the Report of the Madras Museum for 1887-88, of which the Director has favoured me with a copy, it appears that the Herbarium was gone systematically through and rearranged by Mr. W. A. Lawson, the Govt. Botanist.

Mr. Thurston, the Director, made two tours to Tuticorin and the Nilgiris. At the former place large collections of marine fauna were made with the assistance of native divers. Large collections of birds, reptiles and butterflies were made on the Nilgiris. The results of these two tours will be published hereafter.

An Art-Gallery has been established. A preliminary report on the marine fauna of Rameswaram and the neighbouring islands was issued, and an illustrated catalogue of the Batrachians (frogs, toads and coccilians) of Southern India was in the press.

Jeypore Museum.—The Jeypore Museum is specially worthy of notice, not only for the completeness with which it has been organised by the munificence of the Maharajah of Jeypore, but for its great success as an educational institution of the highest kind in a part of the country where such results would scarcely be looked for. Dr. T. H. Hendley, the Honorary Secretary of the Museum, to whose exertions much of its success has been due, has favoured me with the latest report of the working of this Museum since its foundation, from which the following brief abstract may be of interest.

The Museum was first founded as a Natural History Museum by the late Maharajah, but this was abolished in 1879, and an Economic and Industrial Museum, was opened temporarily in the city from August 1881 till September 1886, when the collections were removed to the Albert Hall in the Jeypore Public Gardens.

The New Museum was opened in this building in February 1887. The building itself, designed by Col. Jacob, R. E., is replete with copies of the best ornament from the most important edifices in the Indo-Saracenic style at Agra, Delhi, Futtelhpur Sikri and Amber. There is also a great deal of original work by students in the local School of Art; sons of Jeypore masons.

It was constructed by local labour, with marbles and other materials, from Rajputana and shews that the indigenous architectural talent

which has raised so many beautiful buildings in all parts of India, almost unsurpassed, even in Western countries, for grandeur of effect on the one hand and delicate intricacy of minute detail on the other, is by no means dead and only requires due encouragement and direction. The new Bori Bunder Railway Station, at Bombay, much of the ornament of which was also worked out by students of the Bombay School of Art is another good example of the same.

The interior is decorated with mural frescoes, executed by local artists, comprising copies of some of the most celebrated specimens of Indo-Persian art of the time of Akbar, as well as of characteristic specimens of ancient art in Western and Eastern countries, besides some admirable reproductions of the frescoes at the Ajanta caves. The Japanese and Egyptian frescoes have just been completed.

The collections include metal work from all parts of India, enamels and pottery, carvings in wood, stone, ivory, textiles and all other Indian arts, and in every section choice specimens of European work, in original or copy, have, within the last year, been exhibited for comparison.

As the objects of the Museum are more especially economic and industrial, and space is wanting, no attempt has been made to collect a large number of specimens of stuffed animals, though it is intended to completely illustrate the natural history of Rájputána. A large number of type collections of minerals and other geological and physiological specimens,—glass and enamel models of the invertebrata—and other models illustrating the higher forms of animal life and illustrative of the structure of plants are to be found here—besides models, maps and other educational appliances. An Art library is in process of formation.

The collections also include a series of economic products which will be classified and numbered in conformity with the system carried out in the Indian Museum and the Imperial Institute.

The Museum is entirely supported by the Durbar, which has spent about a lac of rupees upon it, exclusive of outlay on the building. Since its foundation, in August 1881, it has been visited by upwards of 2,000,000 persons and the number of visitors, averaging a quarter of a million yearly, is increasing.

The above brief abstract will give an idea of the good work that is being done in this comparatively out-of-the-way Native State, and the efforts of all those, by whose munificence and intelligent exertions these results have been achieved, to maintain a high standard of pure native art and promote the higher education of the masses by means of this splendid Museum, deserve our warm sympathy.

Lucknow Museum.—From the last report of this Museum, it appears to be making good progress under the energetic management of Dr.

Führer. The presentations, including books, amount to 6,698 items, and this large increase to the collections tends to delay the issue of catalogues. The number of visitors was about 285,820. The most interesting additions to the collections have been in the Archæological section and Coin Cabinet; these are noted elsewhere. A marked feature of the Museum is the department for the sale of art-ware, which appears to be flourishing.

Colombo Museum.—The Reports, for 1887, by Mr. A. Haly, the Director, and Mr. F. H. M. Carbet, the Librarian, contain much interesting information regarding the working and progress of this Museum. The principal additions and other points of interest have been noted under their respective heads.

Phayre Museum, Rangoon.—This Museum seems to be doing well. As noticed elsewhere, the staff have been chiefly employed in making a complete collection of Burmese entomology. Nothing has been done in other departments of Natural History. There is a good collection of Economic Products, and arrangements are being made to add other local specimens not represented. A collection of Timbers will shortly be made and placed in the Museum. A collection illustrative of the process by which tin is obtained from the ore at Renaung, on the borders of Tenasserim, has recently been added. It is hoped that the Museum will form an essential feature of the proposed Jubilee Memorial Hall.

I regret that I have been unable to obtain any account of the Lahore Museum, which is always obtaining acquisitions of archæological interest.

OTHER INSTITUTIONS AND SOCIETIES.

Royal Botanic Garden, Calcutta.—The Report of the past year shows that this garden is making steady progress under the management of Dr. G. King, F. R. S. Further improvements in the roads and laying out have been carried out. There has been a large demand for *Rheea* fibre and also for seeds and plants of the rain tree. Mahogany and other economic trees and plants have been largely distributed. Trials have been made, in Sikkim, of a special kind of Mexican wheat and of an Abyssinian grain, called Seff (*Eragrostis Abyssinica*), both of which grow at high altitudes, but without success.

The Herbarium, under Dr. D. Prain, has been considerably enriched by many valuable contributions of plants from Burma and the Shan Hills, the Sikkim-Nepal Frontier, the Chittagong Hill Tracts, Kashmir and other parts of India and its borderlands, as well as from foreign countries. The set of plants of the *Euphorbiaceæ* have been returned by

Sir J. D. Hooker bearing, in his own handwriting, the names he has given to them in his "Flora of British India." The Library has also received an important acquisition in the correspondence of Wallich, contained in 33 volumes, extending from 1794 to 1849, which has been transferred from the Kew Library.

Zoological Garden.—Our Society, as you may recollect, took an active part in the establishment of the Zoological Garden, at Alipore, and it is satisfactory to learn that it is flourishing and continues to attract large numbers of visitors, forming a pleasant place of resort for the Calcutta public, European and native. The past year appears to have been a satisfactory one in every way. The number of visitors to the Garden who paid entrance fees in 1887-88, was 108,041, exclusive of students and children under 8 years of age.

The most important additions to the menagerie during the same period were:—By purchase; two Bactrian camels and three Russian bears, also an Indian and a Javan rhinoceros purchased from the sale of the menagerie of H. M. the late king of Oude. By the acquisition of these valuable and rare animals, the Committee were able to exhibit all the species of Asiatic Rhinoceros side by side. I may also mention that a young rhinoceros has lately been born in the gardens; a fact that is interesting as being very rare, and also because the young one is a hybrid between *R. Sumatrensis* and *R. Lasiotis*. 131 presentations, including 48 mammals, 79 birds and 4 reptiles, were made during the year.

Several improvements have been made and additional accommodation for animals provided, including a snake pit. Additional kiosks for the deer have been erected, and these animals show a greatly improved appearance as the result of their being protected from sun and rain. This is specially conspicuous in the Sambhar, which, as a rule, had always suffered in health and been very subject to skin diseases during the rains; while, during the past season, they have remained throughout in excellent condition. That the animals appreciated their improved accommodation was sufficiently clear from the fact that during the wet weather they were hardly ever to be seen lying down anywhere save on the well-raised masonry floor of their shed. Even though we are within the tropics, proper shelter for animals is necessary, and a new house for tropical birds, in which a proper temperature can be maintained during the cold nights of the winter months, is about to be built. A special secluded den, communicating with the back compartments of the portion of the Carnivora House occupied by the lions, has been constructed. It is only where such accommodation is present that successful brooding of lions in confine-

ment has been achieved, and it appeared to be well worthy of some expenditure to provide it. The Committee propose to establish a 'Schwendler' medal to be given for special services to the gardens.

Microscopical Society.—This young Society, which may be hailed as an indication of the newly awakening desire for practical science, has just published its first annual Report and seems to be doing very good work. As stated elsewhere, a Committee has investigated the Mango Weevil, and several papers have been read; two of which, "on *Anoplophrya Æolosomotis*, a new ciliate infusorian parasite", and "on some new forms of *Euplotes*," both by our member Mr. H. H. Anderson, have been presented to the Society and will be published in our *Journal*. Mr. Wood-Mason, who has taken a very active interest in this Society, of which he has just been elected President, contributes a paper "on the Eyes of the *Stomatopoda*." Several other interesting notes have been brought before the meetings.

The *Natural History Society of Bombay*, so far as may be judged from the rapid accession of numbers, now numbering over 400, and the publications issued, appears to be flourishing and to be doing good work. The principal papers that have appeared in its *Journal* are noticed under their respective heads. The newly formed *Anthropological Society of Bombay* also appears to be doing well and now has over 330 members.

The *Journal of the Madras Literary Society* maintains its high standard and contains several papers of general as well as local interest.

ANTHROPOLOGY AND ETHNOLOGY.

The Ethnographic Survey of Bengal which was started, under Mr. H. H. Risley's supervision, in 1885, has now been completed and the extensive materials collected are being prepared for publication. The first two volumes of the work, containing the measurements (taken on the French anthropometric system) of nearly six thousand subjects, representing about eighty castes and tribes of Bengal and Northern India, are expected to appear shortly; while two other volumes, forming an ethnographic glossary of the castes, tribes, sects, occupations and other subordinate groups of the people of these Provinces will, it is hoped, be published within the year. Mr. Risley has been invited by the Committee of the Paris Exhibition to take part in the Anthropological Section, and a series of life-size models of representative types of the races of Bengal are now being prepared at the School of Art for exhibition at Paris. This experiment is of special interest as being an attempt to combine artistic effect with the accurate delineation of feature required for scientific purposes. A number of measurements of each subject are taken on the French system, and the model is worked up

in strict accordance with these dimensions, a list of which will be attached to the final castings. If scientific opinion in Europe approves of these figures, it is hoped that some permanent demand may arise which would lead to an extension of the series, and while offering employment to the indigenous modellers, would, at the same time, admirably illustrate the marked diversity of type met with within even the limits of a single Province, and would afford the means for systematic study of Indian ethnology in Europe.

The prehistoric and ancient relics that are being unearthed by Mr. W. H. P. Driver, of Rauchi, in the Neolithic sites discovered by him in that district, are being sent to the Indian Museum for examination and description by Mr. Wood-Mason, who has already contributed a paper on the subject to the Society's *Journal*, illustrated by four plates of arrows and other worked stones. The most interesting of the objects discovered by Mr. Wood-Mason amongst the material sent down by Mr. Driver are the chisel-shaped arrow-heads, similar to those which have been found, still hafted and feathered, in ancient Egyptian tombs, and, sporadically, in several parts of Europe, including the British Isles. The rarity of this type of arrow in collections is probably explained by its simplicity causing it to escape the notice of collectors.

Most of the other communications on this subject in our *Journal* and *Proceedings* have also been contributed by Mr. Driver, and comprise a paper containing "a description of a peculiar custom obtaining amongst the aboriginal tribes of Lohardaga, called 'Era Sendra' or 'women's hunt,' with the object of expelling the cholera demon, and "Notes on some Kolarian Tribes," published in the *Journal* No. 1, Part I. In this paper Mr. Driver describes the Asurs, who are to be found only in the extreme west of the Lohardaga District and are iron-smelters by profession; also the Birhors, who lead a wild nomadic life in Chutiya Nágpur, travelling about in small communities, and live by making string from the *chop* (*Bauhinia scandens*) bark; and the Kharigas, who are found in the S. W. corner of Lohardaga and the neighbouring states, and in Sambhalpur. They are said to be found also, in a most savage condition, in the Manbhúm and Singbhúm districts.

Another paper, by the same author, "on the aboriginal Tribes of the Paháriyá Hariyás and the Koroas," will be published in the *Journal*, Part II.

Col. Bloomfield contributes a short note on "Copper Celts in the Bálaghát District," to the July *Proceedings*.

Judging from the list of papers received by the Anthropological Society of Bombay, many interesting points connected with anthropology in India are being worked out by its members. Among the most

important of these is a paper, published in June, by Mr. F. Fawcett, on "the Soaras of Ganjam," and among the unpublished papers the following may be mentioned: "Statistics of Suicide in Bombay in 1886 and 1887," "Note on the Bhonde Kumars," "A descriptive alphabetical list of twenty occult Sciences of the Muslims," "Note on the Bundi Devuru ceremony of mutilation in a sub-sect of the Vokalijaru Caste of the Mysore Province," "Note on the minor Vaishnava sects of Bengal."

The Society and the science of anthropology have just sustained a heavy loss in the death of Mr. E. Tyrrell Leith, in Germany. He was the founder of the Society, and had, in an advanced state of preparation, an elaborate work on 'Cannibalism in India.'

The *Madras Journal of Literature and Science* contains a very interesting paper, by Dr. G. Oppert, 'on the Original Inhabitants of Bharatavarṣa, or India,' dealing chiefly with the Dravidians. The *Madras Christian College Magazine*, has a series of papers by Mr. J. Cain on the Kois.

Col. Tanner's report on the Explorations in Bhutan and the Lower Sanpu River, already noticed, contains some interesting notes on the tribes inhabiting Bhutan, and a Chingmi vocabulary.

The *Calcutta Review*, for April, contains a paper, by Mr. J. C. Nesfield, 'on the Musherās of Central and Upper India.'

The Ceylon "*Orientalist*" contains papers, by Mr. H. White, on "Cingalese Folklore" and "Paddy cultivation customs;" by A. T. Shamseddin, "on the ceremonies of child-birth among the Moors of Ceylon;" by C. B. Bell "on superstitious ceremonies connected with the cultivation of Alvi, or hill-paddy."

The "*Journal Bombay Branch of the R. A. S.*" contains a paper, by Dastur Darab Pershotan Sanjana, "on the alleged practice of next-of-kin marriages in old Iran."

The *Indian Antiquary* contains contributions by G. T. da Penha, Pattibai D. H. Wadia, and Pandit S. M. Natesa Sastri on "the Folklore of Southern India," and by Mr. Crask, "Notes on the Gipsy tribes of the North-West Provinces and Oudh."

In the "*Proceedings of the Royal Geographical Society*" is a very interesting account, by Mr. Maurice Portman, of the Onges, inhabitants of the Little Andamans, who until very recently appeared to be irreclaimable savages, but have now been conciliated and brought to order. Mr. Portman states, on the authority of Mr. W. Maxwell of Penang, a well-known Malay scholar, that the Malays look on the Andamanese as the Monkey race mentioned in the Rámáyána and had long known them as the Orang Hándoumán, the Islands being called Handoumans.

The *Journal of the Anthropological Society of Vienna* (Vol. XVIII) contains a very elaborate paper by Dr. Moritz Winternitz; "Der Sarpabali, ein Alt-indischer Schlangencult,"—on ancient Indian Snake-worship. Also a paper by Dr. W. Tomaschek—"Die Zinnengewinnung und Bronzebereitung in Asien," with references to the use and working of tin and bronze in various parts of India and Central Asia; and by Dr. Haberlandt, "Die Cultur der Eingeborenen der Malediven," a study of the Maldivian Islanders.

In the *Journal of the Geographical Society of Vienna* (XXXI) is a short account of the Nicobarese, by Dr. Sroboda, with a map and figures.

A new work by Dr. F. Max-Müller, "Biographies of Words and the home of the Aryans," deserves notice.

ZOOLOGY.

This is a subject of which my knowledge is so limited that any attempt on my part to put before you the main points of interest in the progress of this widely extended branch of science during the past year in India must necessarily be very imperfect.

The opening up of Upper Burma has already increased our knowledge of its fauna, principally of the birds and lepidoptera, but it is somewhat disappointing to find that so little has been done from India itself to take advantage of the numerous expeditions that have been made into all parts of the country, and that the principal honors are scored by foreigners. However it must be a matter of congratulation that good work has been done in this new country, and it matters not by whom.

Good progress has been made in adding to our knowledge of the fauna of Indian Seas, by the Marine Survey Department under Commander Carpenter, who has enriched our Museum Collections to an unprecedented extent in this direction; while the results are being worked out by Mr. Wood-Mason, who is a specialist in this branch. Mr. Thurston, the Director of the Madras Museum, has also been busily engaged in diving operations off the Southern Coasts and obtained large and interesting collections. Mr. Haly, Director of the Colombo Museum has also done some dredging on the Ceylon coasts. These marine investigations are of special interest in connection with the distribution of animal life and the occurrence of living forms of extinct species now found as fossils.

The progress of the recently-formed Natural History and Anthropological Societies of Bombay shews that a lively interest is taken in Zoological and Anthropological studies on that side of India.

Another advance of great importance in the interests of the

country itself, is the attention which is being paid, under the direction of the Trustees of the Indian Museum, to Economic Entomology, in the investigation of the insect-pests which work so much destruction to food and other crops, and of the means of eradicating them.

Sericulture is another important branch of this subject to which attention has also been given during the year.

Mammals.—In our own *Journal* is a description, with two plates, by Mr. O. Thomas, of "*Eupetaurus*, a new form of Flying Squirrel from Kashmir," and Mr. W. T. Blanford contributes "Notes on Indian *Chiroptera*."

At our April meeting Mr. W. L. Sclater exhibited some specimens of *Paradoxurus* which tend to show the impossibility of dividing *P. musanga* into two species, as proposed by Mr. W. T. Blanford, and that the Indian and Burmese forms of Palm-cat are identical.

The Journal of the Bombay Natural History Society, contains a paper, by Veterinary Surgeon J. H. Steel, "on the nearest allies to the horse" and "Notes on Sambhur," by Mr. R. Gilbert."

In the *Annals and Mag. Natural History*, our former member and valued contributor, Dr. G. E. Dobson, describes two new species of Indian Soricidæ, viz., *Crocidura leucogenys*, from Ajmir, and *C. Dayi*, from the Madras Presidency.

We have to welcome the appearance of the first part of a long projected and important work on "the Fauna of British India, including Ceylon and Burmah," under the editorship of our esteemed former President, Mr. W. T. Blanford. It is for the present intended to restrict this work to the *Vertebrata* and to complete it in about seven volumes. One volume will be devoted to the *Mammals*, Mr. W. T. Blanford being himself the author; Mr. E. W. Oates has undertaken the preparation of that portion of the work (three volumes) which will be devoted to *Birds*; the *Reptiles* and *Batrachians* will be described by Mr. G. A. Boulenger in one volume; and Dr. F. Day will treat of the *Fishes* in the remaining two volumes of the series. The part which has appeared is a half-volume treating of a portion of the mammals, and the author, Mr. Blanford, is to be congratulated on the very favourable reception accorded to this portion of his work. This account of the mammals of India worthily embodies all the additions to our knowledge of this group since the date of Jerdon's "Mammals." It is profusely illustrated with excellent figures of the animals and of their crania and dentition and will doubtless be much appreciated by Indian naturalists and sportsmen.

Birds.—It is satisfactory to find that the Indian Ornithological Journal '*Stray Feathers*' is not yet extinct, although it appears at very

irregular intervals. A number, comprising parts 1 to 4 of the eleventh volume of this work, has lately appeared, and the 353 pages of which it consists are wholly devoted to an account of the Birds of Manipur, Assam, Sylhet and Cachar, by Mr. A. O. Hume, assisted by Mr. J. R. Cripps. Another complete work, devoted to the "Game, Shore, and Water Birds of India," by Col. A. Le Messurier, has been published and is intended mainly for the use of sportsmen in this country. Mr. J. A. Murray continues his "*Avifauna of India*," and has issued two parts of the second volume of his book during the year.

Our own *Journal* contains no notices of birds. The *Journal of the Natural History Society of Bombay* contains two papers by Captain E. F. Becher—"Some cold-weather notes from Guzerat" and "Hot-weather notes in the Central Provinces," which are entirely of ornithological interest. Also papers, by Lieutenant H. E. Barnes, on "Nesting of the Indian *Hirundines*," and "on Nesting in Western India."

The '*Ibis*,' as usual, contains a number of papers, bearing on Indian ornithology. Among these may be noted: Mr. Hargitt's monographic account of the genus *Gecinus*; Mr. Norman's "Note on the Geographical Distribution of the crested Cuckoos"; a letter, by Mr. W. Davison, on "Travancore Birds;" Mr. Whitehead's "Notes on some oriental Birds"; Mr. Sharpe "on two apparently undescribed species of *Sturnus*"; A note by Mr. Seebohm on the Identity of *Ibis propinqua* with *Ibis melanocephala*; "On the Birds of Bhamo, Upper Burmah," in which Mr. E. W. Oates enumerates the species not described in Count Salvadori's paper on the Birds of Upper Burma, published in the *Ann. Mus. Civ. Stor. Nat. Genova*, 2nd series, Vol. IV; "Notes on the Birds of Kashmir and the Drás District, by Lieutenant W. W. Cordeaux; "On *Phasianus torquatus* and its Allies," by Mr. H. Seebohm, describing some Chinese and Central Asian species; "on *Hirundo rustica* and *Motacilla melanope* in Ceylon," by S. Bligh. Count Salvadori's "Birds from Tenasserim," is noticed.

The *Proceedings of the Zoological Society of London*, contain two papers by Mr. R. Bowdler Sharpe, entitled "Notes on Specimens in the Hume Collection of Birds"; also, by the same, "A list of a collection made by Mr. Wray in the main range of Perak, Malay Peninsula," including many Himalayan genera.

Mr. Haly's "Catalogue of Birds in the collection of the Colombo Museum" is in the press.

Reptiles and Batrachians. The *Journal of the Bombay Natural History Society* contains papers on the Biscobra, by Mr. G. W. Vidal and Mr. J. A. Da Gama; also a "Catalogue of Snakes in the Society's collections" and a note, from the *Asian*, "on the hearing of Snakes."

In the *Proceedings Zoological Society, London* is a notice of a new snake, *Azemiops Fea*, found by Sig L. Fea in the Kakhien Hills—Upper Burma. The discovery is important because this snake combines the external characters of a lycodontoid colubrine with the poison-apparatus of a viper. It has a loreal shield, which has hitherto been regarded as indicating the innocuous nature of a snake.

The *Ann. and Mag. Natural History* contains "Description of a new earth snake of the genus *Silybura*, from the Bombay Presidency, with remarks on better known *Uropeltide*." By G. E. Mason.

Mr. Haly's report on the Snakes, Lizards and Frogs in the Colombo Museum has appeared.

The *Proceedings of the Zoological Society of London*, contains an interesting paper, by Messrs. Howes and Ridewood, on the limb-skeleton of the tailless Batrachians, and a "note on the classification of the *Ranide*," by Mr. Boulenger, who also describes two new Frogs from India—*Rana Leithii*, from Matheran, and *R. himalayana*, from Darjiling—in the *Annals and Magazine of Natural History*.

An illustrated Catalogue of the Batrachians (Frogs, Toads and Cæcilians) of Southern India, already noticed, has been issued by Mr. Thurston, Director of the Madras Museum.

Fishes. In the *Proceedings of the Zoological Society, London*, Dr. F. Day, in Part I. of "Observations on the Fishes of India," notes alterations in nomenclature and distribution of species described in his "Fishes of India," and gives some additions.

The *Journal of the Natural History Society of Bombay* contains a continuation of the very interesting papers, by an anonymous author, "On the waters of Western India," which deal chiefly with notes on the fish to be met with and fishing.

Mollusks.—Our former member and contributor, Col. Godwin-Austen, has described some land mollusks, including new species, from Burmah and the Andaman and Nicobar Islands, in the *Proceedings of the Zoological Society of London*. The same Journal contains papers by Mr. G. R. Sowerby, on new species of Shells, chiefly from the Eastern Seas, among which is *Malletia angulata*, from the Bay of Bengal.

The *Annals and Magazine of Natural History*, contains "Diagnoses of new species of *Pleurotomidæ* in the British Museum," by Mr. E. A. Smith, with descriptions of Indian and other Asiatic species. Mr. Kirkpatrick describes some *Polyzoa* from the Indian ocean.

This journal also contains a translation of T. Brock's paper on the so-called eyes of *Tridacna*, a huge bivalve mollusk which is amongst the commonest inhabitants of our Indian coral-reefs, and the occurrence of "green cells" in its vascular system.

In the *Journal of Conchology*, Mr. J. Cosmo Melvill gives descriptions of new species of *Pecten* and *Mitra*, including some from the Andamans and other Eastern localities, and of two new *Siphonalia* from Japan.

Two parts of Tryon's "Manual of Conchology" have been received in the Library, Vol. IV, 2, (*Helix*), and Vol. X, 2, (*Neritina*—*Navicella Alearbis*—*Cyclostrema*—*Vitrinella*—*Teinostoma*—*Liotia*).

In the *Mémoires de la Société Zoologique de France*, Dr. F. Jousseaume gives a description of the mollusks collected by Dr. Faurot in the Red Sea and the Gulf of Aden. They were mostly collected at Cameran and Obock, and comprise many species common to the Indian Ocean, even as far as Japan and the Philippines. It is noticed that no Mediterranean forms were found in the Red Sea, though in the Suez Canal both forms showed a tendency to advance towards each other. Eastward of Aden forms were found similar to those of Ceylon and the Philippines.

The *Transactions of the Linnean Society* contain the second part of "A monograph of recent *Brachiopoda*," illustrated by 12 beautiful plates by the late Mr. T. Davidson, F. R. S.

Entomology.—This ever popular branch of Zoology has made good progress during the year.

In our *Journal* Part II, Mr. E. T. Atkinson continues his notes on Indian *Rhynchota*; *Heteroptera*.

Papers have been read:—"On new or little-known Butterflies from the Indian Region," by Mr. L. de Nicéville; "The Butterflies of the Nilgiri District," by Mr. G. F. Hampson; and "*Pseudopulvinaria Sikkimensis*," by Mr. E. T. Atkinson. These will be published shortly.

In the Colombo Museum, Mr. Haly reports that manuscript catalogues have been prepared of Butterflies to the end of *Nymphalidæ* and of the Moths to the end of *Bombycoides*. It may be of interest to collectors to know that citronella oil has been found most effective in preserving Entomological specimens from fungus and vermin. For sending specimens of insects to the Museum the plan of placing a layer of naphthalene at the bottom of a tin box and then alternate layers of cotton wool and insects has been found to answer well.

A collection illustrative of Burman Entomology is being made in the Rangoon Museum. This collection was commenced in 1885, and now contains nearly 400 named species of butterflies and over 500 kinds of moths, also named, besides a number of undetermined forms. Many of these Lepidoptera have been named by our member Mr. de Nicéville, and by Col. Swinhoe. The former has described three new species in our *Journal*, *viz.*, *Papilio noblei* ♂, *Hesperia cephaloides*

♂ and *Parnara uma* ♀. Several moths are awaiting identification by Col. Swinhoe. Difficulty is experienced in having the other orders named. Only a very few of the *Hemiptera* and *Hymenoptera* have been identified and none of the others, of which considerable numbers have been collected.

The *Journal of the Bombay Natural History Society* contains "Notes on a collection of Butterflies made in Burmah in 1885 and 1886," by Lieut. E. Z. Watson; "Hints on collecting Hymenoptera," and "on some Bees and Wasps from Burmah," by Captain C. T. Bingham; "On the Lepidoptera of Karáchi and its neighbourhood, Part II, by Col. C. Swinhoe; "Butterflies and Ants," by L. de Nicéville.

The Annals and Magazine of Natural History contains several papers on Entomology among which may be noted:—Mr. W. L. Distant's description of new species of Oriental *Cicadidæ*, preparatory to the issue of his monograph on the Oriental *Cicadidæ*, of which the first part will appear this year at the expense of the Trustees of the Indian Museum. Mr. A. G. Butler's papers, on Butterflies of the genus *Teracolus* from Khandesh, and on three collections of Lepidoptera made by Major Yerbury in Upper India. Mr. C. O. Waterhouse's "descriptions of new species of the Coleopterous families *Lucanidæ*, *Cetoniidæ*, and *Buprestidæ* from South India." "Descriptions of new Genera and Species of *Lepidoptera Heterocera*," from the Kangra District, by F. Moore. Mr. C. J. Gahan gives descriptions of some new Indian species of Longicorn Coleoptera," comprising *Monohammus auratus*, *M. bimaculatus*, *M. griseatus*; also of Lamiidæ Coleoptera belonging to the *Monohammus* group, containing new Indian and Asiatic species; and of a new species of the Longicorn genus *Cyriocrates*, (*C. elegans*) from Upper Burma; Mr. Pascoe describes some new *Curculionidæ*, chiefly Asiatic.

In the *Transactions of the Entomological Society of London* are papers by Mr. A. G. Butler on the lepidopterous genus *Euchromia*, of which he describes some new species from the Oriental and Austro-Malayan regions. Mr. Elwes' valuable "Catalogue of the Sikkim *Rhopalocera*" is enriched with additions and corrections and notes on the seasonal and local distribution by the late Mr. Otto Müller. Mr. W. L. Distant contributes to our knowledge of Oriental *Rhynchota*, including some species from Sikkim sent to him by Mr. E. T. Atkinson. Prof. Westwood contributes notes on the life-history of various species of the neuropterous genus *Ascalaphus*, founded chiefly on Ceylonese material communicated to him by Mr. J. Staniforth Green of Colombo; Mr. F. Merrifield reports progress in Pedigree Moth-breeding to the end of 1887. Mr. C. O. Waterhouse communicates additional observations on the Tea-bugs of the genus *Helopeltis*, which play such havoc amongst the tea-bushes in this and other countries where tea is grown.

The *Transactions of the Linnean Society* contain two parts of the Rev. A. E. Eaton's valuable monograph of Recent *Ephemeridæ*, or May-flies, illustrated by two plates of very careful drawings.

Turning to Foreign Journals:—

In the *Berliner Entomologische Zeitschrift*, as well as in the *Verhandlungen der K. K. zoologisch-botanischen Gesellschaft*, in Vienna, and the *Tijdschrift voor Entomologie*, of the Dutch Entomological Society, at the Hague, are valuable articles by Professor Schaufuss on the little known families *Pselaphidæ* and *Scydmænidæ*. Several butterflies from the Austro-Malayan and Malayan regions are described by Dr. E. G. Honrath, who, also with Dr. H. Dewitz, notices the rare *Papilio cacicus* in the *Deutsche Entomologische Zeitschrift*. The Iris Society, in Dresden, publishes an interesting essay by Dr. E. Haase, "on the odoriferous apparatus in the Indo-Australian Lepidoptera," and Mr. J. Röber describes some new Indian butterflies.

Economic Entomology.—The work done in this direction in the Indian Museum has already been noticed. The *Journal of the Agricultural Society of India* contains an interesting paper, by Mr. W. J. Simmons, on the Mango Weevil (*Cryptorhynchus mangifera*). This weevil has been further investigated by a Committee of the Microscopical Society, which, although unsuccessful in ascertaining how this pest gains access to the fruit, found that, unlike some of the fruit-infesting weevils, it passed its larval and pupal stages in the fruit and only quits it as a perfect insect, and they obtained a good deal of other information regarding this and other pests infecting the mango. In the same Journal Mr. Cotes describes the work of the United States Entomological Commission, which has been so successfully carried out under Professor Riley.

Arachnilians.—The *Journal of the Bombay Natural History Society* contains an interesting notice by the Rev. Fr. Dreckmann, with a note by Mr. Wood-Mason, and a colotype plate from life, of the simultaneous Twin Parturition of *Buthus afer*, the Black Rock-Scorpion; also a paper by Mr. E. W. Oates; "on the Indian and Burmese Scorpions of the genus *Isometrus*, with descriptions of three new species."

Crustaceans.—In our own *Journal*, No. IV, part 2, for 1887, Mr. Wood-Mason, who has done so much in establishing the sea-dredging operations of the Marine Survey on an efficient basis, and in working out the results, gives a description of a new species of the Brachyurous genus *Lyreidus* from the depths of the Andaman Sea, obtained by Commander Carpenter, R. N., of the Indian Government Marine Survey Steamer, "Investigator;" and in No. 3 of 1888, Dr. Gilcs, the naturalist to the Survey, gives "Further notes on the *Amphipoda* of Indian waters." Dr. De Man's valuable report on the Podoptthalmous Crustaceans from the Mergui Archipelago has already been noticed.

Echinoderms.—In the *Proceedings of the Zoological Society*, Professor F. J. Bell gives a “Report on a collection of *Echinoderma* made at Tuticorin, Madras,” by Mr. E. Thurston, Director of the Madras Museum.

In the *Annals and Magazine of Natural History*, Dr. M. Duncan has a valuable paper on “the anatomy of the *Temnopleuridae*, a family of regular *Echinoidea*.”

Rhizopods.—In a paper in the latter journal on the structure and affinities of the Genus *Parkeria*, Dr. H. A. Nicholson states, and promises in a future paper to show, that the genus *Syringosphaera*, of Duncan, is a Hydrocoralline nearly related to the recent genera *Allopora* and *Sporadopora*. Dr. Th. Studer, of Berne, describes some new species of the Alyconarian genus *Spongodes*. Mr. H. J. Carter contributes a description of a large variety of *Orbitolites Mantelli*, Cart., from the Irrawaddy, also papers “on the Foraminiferal genus *Orbitoides* of d’Orbigny;” “on the organic and inorganic changes of *Parkeria*,” and other papers of interest.

BACTERIOLOGY.

The forthcoming number of the “Scientific Memoirs by Medical officers of the Army in India” contains an interesting paper in which Dr. Douglas Cunningham deals with the special work relating to cholera carried out in the Laboratory attached to the office of the Sanitary Commissioner with the Government of India, and the conclusions arrived at in it, as the result of experimental investigation of the behaviour of comma bacilli under various circumstances, are that, even if it be granted that the bacilli really are the cause of cholera, they cannot be regarded as in themselves efficient causes for the occurrence of epidemic diffusion of the disease, and that the really important factors securing this must be in special conditions of locality. The practical importance of this in relation to the question of Quarantine *versus* Local Sanitary Improvement is self-evident.

In connection with this important subject mention may be made of a paper entitled “an enquiry into the causation of Asiatic Cholera,” communicated to the Royal Society of Edinburgh by Drs. McLeod and Miller, both of Shanghai, in which the authors, after a series of careful experiments, arrive at the conclusion that there is strong evidence for regarding the comma bacillus of Koch as the cause of Asiatic Cholera.

BOTANY.

In systematic Botany, the chief Indian publication of the year has been the second and final part of Dr. George King’s exhaustive “Mono-

graph of the Species of *Ficus* of the Indo-Malayan and Chinese countries,' which forms the first volume of the new *Annals of the Royal Botanic Garden, Calcutta*. It deals with the *Synoezia*, *Sycidium*, *Covellia*, *Eusyce* and *Neomorphe*, and is fully illustrated with plates which have been excellently lithographed by students of the Calcutta School of Art. Dr. King proposes to issue a supplement dealing with the new species recently collected by Mr. H. O. Forbes in New Guinea, and containing an "account of the fertilisation of *Ficus Roxburghii*," by Dr. D. D. Cunningham. A similar monograph of the genus *Quercus*, by the same author, the commencement of which was noticed by my predecessor last year, is rapidly approaching completion, and will probably be issued during the current year.

In the department of Physiological Botany several most interesting memoirs have been published by Dr. D. D. Cunningham. The chief of these gives an account of an elaborate series of researches into the causes of the movement in the sensitive plant; the result amounting almost to a demonstration that these are to be found rather in mechanical arrangements of the fluids in the tissues, than in any vital or nervous force originating in the cell protoplasm. This research appeared in the volume of *Scientific Memoirs by the Medical officers of the Army of India* which was issued by the Surgeon General for the year just ended. In the same volume Dr. Cunningham also describes a new genus of *Ustilagineae* and a curious Alga entophytic in the leaves of the pretty floating water-weed so common in Bengal—*Limnanthemum indicum*, and Dr. James Tomes, gives an interesting account of the way in which flies visiting the flowers of *Wrightia coccinea* are entrapped and killed.

The forthcoming number of the same publication contains two botanical papers:—Dr. D. D. Cunningham gives a series of notes on the life history of two species of *Ravenelia*, a genus of the *Uredineae*, regarding which very little was previously known beyond the mere morphological characters of certain of the reproductive elements. A paper, by Dr. Barclay, is also occupied with details of the life-history of another Uredine, a new species of *Cocoma* occurring in the Simla Hills, on *Smilax aspera*, Linn., and characterised by the very peculiar character of its æcidial fructification and the abnormal form of germination of the teleutospores, the promycelia breaking up directly into sporidia, in place of giving origin to the latter through the intervention of sterigmata.

Dr. Barclay has also contributed to our Journal a "Descriptive List of the *Uredineae* occurring in the neighbourhood of Simla," illustrated with plates.

A paper, by Mr. H. F. Blanford, giving a List of the Ferns of Simla, between levels of 4,500 and 10,500 feet, was read at the May meeting of our Society and will be published immediately.

Dr. Prain has just completed his monograph on the Indian *Pediculares*, noticed in last year's 'Address,' and has presented it for publication by our Society.

General Collett, C. B. has continued his collection of the plants of the Shan Hills under his command, and among other novelties has discovered a new rose. The Botany of these hills having hitherto been as obscure as their economical and political condition, General Collett's collections are of much interest. A detailed account of them will soon be published.

In the *Journal of the Bombay Natural History Society* the following botanical papers may be noted. "Note on *Vigna vexillata*," by the Rev. A. G. Cane, in which he describes the ingenious contrivances by which the fertilisation of the flowers is secured. Brigade-Surgeon W. Dymock continues his papers on "Maráthi names of Plants" and also contributes an interesting paper on "the means of self-protection possessed by plants." Dr. K. P. Kirtikar's Lecture on the "Folklore of Indian plants," though not botanical, is of interest as containing tales and legends connected with many of our best known trees and plants.

In an interesting paper on the "conditions for the distribution of plants and the means by which it is performed, with special regard to Indian species," Mr. G. Cartensen discusses the special means of protection possessed by various members of the Indian flora against heat, drought, and other climatic and meteorological influences affecting them. Mr. M. H. Starling gives a description of the difficulties which attend growing ferns from spores, and the best way of overcoming them.

A very full account of the Botany of the Afghan Delimitation Commission, by Dr. J. E. T. Aitchison, C. I. E., the naturalist attached to the Mission, has been published in the *Transactions of the Linnean Society* for 1888. The author describes the physical features and accompanying vegetation met with in the course of the Mission through Northern Baluchistan, the valleys of the Helmund, Harut and Hari Rud rivers, the Badghis district, Mount Do-shakh and Khorasan, and gives an enumeration of the plants.

The *Journal* of the same Society (*Botany*) contains a "Revision of the Genera *Microstylis* and *Malaxis*," by H. N. Ridley, in which reference is made to several Indian species of *Microstylis*.

In the *Journal of Botany*, I find some notes by Col. Beddome on Ferns from Manipur, Perak and Penang.

Mr. J. F. Duthic, the Director of the Botanical Department North-

ern India, has made interesting botanical collections at Quetta and the Khojak Pass, also at Khandwa, in the Central Provinces, and he accompanied the Black Mountain Expedition as botanist. The results of these tours have not yet been worked out. Much of his attention has been given to the planting of the *Usar* reserves with trees likely to thrive on saline soils, and he was most successful with the paper-mulberry (*Broussonetia papyrifera*) which seems to thrive better on such soils than anything which has been previously tried. This plant yields a valuable fibre and is also useful as a fodder plant. Large numbers of plants of the rain-tree (*Pithecolobium saman*), which is likewise a valuable fodder-plant, have been issued, also for planting on *Usar* land, from the Royal Botanical Garden, Calcutta.

The cultivation of the date-palm in India has been encouraged by the distribution of seed obtained from the Persian Gulf, Egypt and from Tunis.

One of the most important developments of Economic Botany in this country is certainly the growth of Cinchona for the production of quinine. Mr. Gammie's report on the working of the Government Cinchona Plantation, near Darjiling, shows that important progress has been made there during the last year, under Dr. G. King's superintendence. The new process of preparing the sulphate of quinine from the bark has already been noticed. The old red bark, or Cinchona febrifuge-yielding plants, are being steadily replaced by the *Calisaya ledgeriana* and hybrid varieties which yield quinine. Attempts to naturalise the species of Cinchona which yield the hard Carthagena and cuprea barks, have been unsuccessful, but three new South American varieties of *calisaya*,—*verde*, *morada* and *zamba morada*,—sent out in 1883, have been cultivated with success. Though fanciful as to soil and situation, they are quick and sturdy growers, and the quality of the bark yielded by them seems little inferior to that of *ledgeriana*: their introduction appears, therefore, likely to be one of the most important and promising experiments ever tried at the Plantation.

The *Indian Forester* contains papers on "The Influence of Forests on Rainfall," by Dr. D. Brandis, and "The Nilgiri *Strobilanthes*," by Mr. J. S. Gamble; besides notes on Resins, Bamboos &c., which are interesting on the side of Economic Botany.

The *Journal of the Agricultural and Horticultural Society* contains a valuable note by Dr. Warden on *Erythowylon Coca* grown in India, with an appendix containing reports of the cultivation of the plant in various places. The chemical results have already been noticed.

In the same *Journal* is a note, by Dr. D. Prain, on "Lokao; the Chinese green dye yielded by various species of *Rhamnus*."

The Government of Madras have recently issued an interesting "Monograph on the Coconut Palm (*Cocos nucifera*)," by Dr. J. Short.

This review, brief and incomplete as it is, has, I fear, far exceeded the ordinary limits of an Annual address, but will, I trust, be sufficient to show that the 'record of work done,' in India, during the past year has been a remarkably good one and fruitful in subjects of interest and importance.

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

President.

Lieut.-Col. J. Waterhouse, B. S. C.

Vice-Presidents.

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

Rájá Rájendralála Mitra, LL. D., C. I. E.

J. Wood-Mason, Esq.

Secretaries and Treasurer.

Dr. A. F. R. Hoernle.

W. King, Esq., B. A., D. Sc.

Other Members of Council.

D. Waldie, Esq., F. C. S.

H. M. Percival, Esq., M. A.

E. Gay, Esq., M. A.

H. Beveridge, Esq., C. S.

A. Pedler, Esq., F. C. S.

A. Simson, Esq.

Dr. J. Scully.

Pandit Harapasád Shástri, M. A.

Dr. D. D. Cunningham.

Hon. Sir A. W. Croft, K. C. I. E., M. A.

Prince Jahán Qadr Muhammad Wáhid Ali Bahádur.

The Hon. Mr. Justice Wilson.

Bábú Gaurdás Bysack.

The meeting was then resolved into the Ordinary General Meeting.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Twenty-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.

Babu Surendranath Ráy, B. L.

C. Little, Esq., M. A.

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

Col. H. R. Thiullier, R. E. (for re-election) Surveyor General of India, proposed by Lt.-Col. J. Waterhouse, seconded by Dr. Hoernle.

Surgeon D. Prain, M. A., M. B. Curator of the Herbarium, Royal Botanical, Garden, Sibpur, proposed by, Lt.-Col. J. Waterhouse seconded by Dr. G. King.

Tom. D. La Touche, Esq., B. A. (Cantab) Geological Survey Department, proposed by E. J. Jones, Esq., seconded by J. Wood-Mason, Esq.

Bhupendra Sri Ghosha, B. A., proposed by J. Wood-Mason, Esq., seconded by Lt.-Col. J. Waterhouse.

John Mann, Esq., M. A., Bengal Education Department, proposed by Sir A. W. Croft, seconded by C. H. Tawney, Esq.

Major A. W. Jamieson, S. C., 7th Bengal Infantry, Saugor, C. P., proposed by W. L. Sclater, Esq., seconded by Dr. W. King.

Bábú Jagannáth Khunnah, proposed by Bábú Gaurdás Bysack, seconded by Dr. Hoernlé.

Bábú Hanuman Prasad, Rais, Chunar, proposed by Lt.-Col. J. Waterhouse, seconded by Dr. Hoernle.

W. H. Jobbins, Esq., Principal, Government School of Art, Calcutta, proposed by J. Wood-Mason, Esq., seconded by E. T. Atkinson, Esq.

The following gentlemen have expressed a wish to withdraw from the Society.

H. M. Kisch, Esq., C. S.

Kumar Saratchandra Siuha.

The SECRETARY reported the death of the following Member :

Otto Möller, Esq.

and that the election of the following gentleman had been cancelled

under Rule 9, as he had not paid his admission fee and first quarter's subscription.

Nawab Mir Mahomed Ali, proposed by Bábú Gaurdás Bysack.

The SECRETARY read the following Circular letter from the Royal Academy of Sciences of Turin, offering for competition the seventh Bressa Prize of the value of 12,000 Italian lire.

"The Royal Academy of Sciences of Turin, in accordance with the last will and testament of DR. CESARE ALESSANDRO BRESSA and in conformity with the Programme published December 7th, 1876, announces that the term for competition for scientific works and discoveries made in the four previous years 1885-88, to which only Italian Authors and Inventors were entitled, was closed on December 31st, 1888.

The Academy now gives notice that from the 1st of January 1887 the new term for competition for the seventh BRESSA Prize has begun, to which, according to the testator's will, scientific men and inventors of all nations will be admitted. A prize will therefore be given to the scientific Author or Inventor, whatever be his nationality, who during the years 1887-90 "according to the judgement of the "Royal Academy of Sciences of Turin, shall 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 term will be closed at the end of December 1890.

"The value of the prize amounts to 12,000 Italian lire.

"The prize will in no case be given to any of the National Members of the Academy of Turin, resident or non-resident."

The President of the R. Academy,

A. GENOCCHI.

Turin, January 1st, 1889.

The PHILOLOGICAL SECRETARY exhibited some coins presented by the Bombay Branch, Royal Asiatic Society, and Mr. W. Sandford, and read the following reports on finds of Treasure Trove Coins :

1. Report on 152 silver coins of old mintage, forwarded by the Collector of Sarun with his No. 1380G, dated 21st December, 1888.

The coins are stated to have been found as long ago as the 9th February, 1887, in the Mouzah Kowa, Pargáná Koodi, Subdivision Gopálganj of the Sarun District; and to have been acquired for Government at an approximate valuation of Rs. 188-1-6.

They belong to the following Mughal emperors of Delhi :

	No. of specimens.
I. MUHAMMAD SHÁH, A. H. 1131—1161 = A. D. 1719—1748; type: <i>Bádsháh Ghází</i> ; mint: Muḥammadábád-Banáras, 'Azímábád; legible dates 1148, 1152, 1154, 1159, 1160	9
II. AHMAD SHÁH BAHÁDUR, A. H. 1161—1167 = A. D. 1748—1754.	
<i>a</i> , Variety I, with date in top-line; mint: Muḥammadábád-Banáras, legible dates 1161 ³ , 1162, 1163, 1164 ⁵ , 1166	15
<i>b</i> , Variety II, with date in bottom-line; mint: 'Azímábád, symbol on reverse Nos. 28 or 39, on plate XLVI, in Princep's Useful Tables; dates 1162 ³ , 1163, 1164, 1166, 1169 (the last wrong for 1166, as the regnal year is given 6)	8
III. 'ALAMGÍR ZÁNÍ, A. H. 1167—1173, A. D. 1754—1759;	
<i>a</i> , Type: 'Alamgír Zání; variety I, with date in top-line, right side; mint: Muḥammadábád-Banáras; legible dates 1168, 1169 ² , 1171 ³ , 1172	53
<i>b</i> , Variety II, with date in top-line, middle; mint: Muḥammadábád-Banáras; date of all 1171...	15
<i>c</i> , Variety III, with date in bottom-line; mint: 'Azímábád; dates 1168 ³ , 1169 ³ , 1170, 1171 ² .	9
IV. SHÁH 'ALAM, A. H. 1173—1221, A. D. 1759—1806;	
<i>a</i> , Variety I, thick piece, with date on bottom-line; mint: Muḥammadábád-Banáras; legible dates: 1177 ⁷ , 1178 ³ , 1179 ³	16
<i>b</i> , Variety II, thick piece, with date on top-line, mint: Muḥammadábád-Banáras; dates illegible, except partially 11** on one	19
<i>c</i> , Variety III, broad piece; mint: 'Azímábád (with symbol No. 28, as above); legible dates 1177 ¹ , 1178 ¹	8
Total ...	152

2. Report on 3 silver coins of old mintage, forwarded by the Collector of Sarun, with his No. 1382G, dated 21st December, 1888.

These coins are stated to have been found by a person of Kho-

waspore, Pargana Poroi, Subdivision Sewan, District Sarun, and to have been acquired for Government for Rs. 3-11-6.

They belong to the following two Paṭhān emperors of Delhi :

	No. of specimens.
I. ISLĀM SHĀH, A. H. 952—960 = A. D. 1545—1552 ; one specimen, dated 960, resembling No. 359 in E. Thomas' <i>Chronicles</i>	1
II. MUḤAMMAD 'ADIL SHĀH, A. H. 960—964 = A. D. 1552—1556 ; two varieties :	
<i>a</i> , one like No. 365 in E. Thomas' <i>Chronicles</i> , dated 961 ; margin illegible	1
<i>b</i> , one specimen, differing from the preceding only in the omission of 'Adil from the obverse legend ; date 961	1
Total ...	3

3. Report on 148 copper coins of old date forwarded by the Deputy Commissioner of Sialkot, with his No. 1926, dated 21st December, 1888.

These coins are stated to have been found near the village of Vadalla in the Sialkot district, while digging a grave.

The whole of the coins, with the exception of two, appear to belong to the well-known type of "Horseman and Bull" with the *Sāmanta Deva* legend over the Bull. But they are in a too bad state of preservation to determine to which of the many species of that type the several coins may belong.

Of the two exceptions, above referred to, one is quite illegible. The other is a coin of Saifuddin Muḥammad Qutlagḥ, showing on the obverse a Persian inscription encircling a horse, while the reverse face bears a Hindī legend. This kind of coin has been described and figured in Prinsep's *Indian Antiquities* (ed. E. Thomas), Vol. I, pp. 37, 343, (plate II, fig. 14 and plate XXVII, fig. 27, 28).

4. Report on 57 old copper coins, forwarded by the Deputy Commissioner of Balaghat, with his No. 4214 of the 7th December, 1888, and No. 26 of the 2nd January, 1889.

These coins are stated to have been found at the village of Pandiwara, within the limits of the Police Station House at Waruseoni in the Balaghat District.

They are square copper coins of the kings of Malwah, and are of two different types :—

<i>a.</i> One type appears to have the Muhammadan creed on one side, and the king's name on the other; but they are not in a sufficiently good condition to determine the name with certainty; it appears, however, to be Muḥammad, who reigned in 818—839 A. H. = 1434—1455 A. D.; no dates legible; No. of specimens ...	19
<i>b.</i> The other type would seem to belong to Maḥmūd bin Násir Sháh, who reigned from 916—937 A. H. = 1510—1530 A. D. Some show faint traces of dates, apparently, 916, 917, 930; No. of specimens	38
	—
Total ...	57
	—

DR. HOERNLE exhibited a large coloured genealogical tree illustrating the chronology of the Jain religion, and all its divisions and subdivisions, prepared by Muni Atmárám Jí Ananda Vijay Jí,—

Also 4 gold Gupta coins forwarded by Mr. Rivett-Carnac, and a unique gold coin of the Bengal Sultán Jalálu-d-dín Fath Sháh, an account of which will be published in the Journal, Part I.—

Also read a letter from Bábú Hanumán Prasáda, Rais, of Chunar, and exhibited photographs and copies of inscriptions taken from the sculptures found in the newly discovered rock temple in the Fort of Chunar, forwarded by the Rais.

The following papers were read:—

1. *Diagnoses of new Indian Pediculares.*—By SURGEON D. PRAIN, Curator of the Herbarium, Royal Botanical Garden, Sibpur. Communicated by DR. G. KING.

2. *Note on some ancient burial grounds in the Lohardagga district.*—By W. H. P. DRIVER, ESQ.

These papers will be published in full in the Journal, Part II.

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.*

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Notulen, Deel XXVI Afllevering 3.

- Bombay. Anthropological Society of Bombay,—Journal, Vol. I, No. 5.
 ———. The Indian Antiquary,—Vol. XVII, Part 215, December, 1888, Part I.
- Budapest. La Société Hongroise de Géographie,—Bulletin, Tome XVI Nos. 7 et 8.
- Calcutta. Geological Survey of India,—Records, Vol. XXI, Part 4.
 ———. Indian Engineering,—Vol. V, Nos. 1—5.
 ———. The Indian Engineer,—Vol. VI, Nos. 14—18.
- Chicago Ill. The American Antiquarian and Oriental Journal,—Vol. X, No. 6, November, 1888.
- Copenhagen. K. Nordiske Oldskrift-Selskab,—Aarboger, Raekke II Bind. III, Hefte 3.
- Havre. Société de Géographie Commerciale du Havre,—Bulletin, Novembre—Décembre, 1888.
- Ithaca. Cornell University,—Library Bulletin, Vol. II, No. 8, November, 1888.
- London. Nature,—Vol. XXXIX, Nos. 999—1002.
 ———. Society of Telegraph Engineers and Electricians,—Journal, Vol. XVII, No. 75.
 ———. The Academy,—Nos. 868—871.
 ———. The Athenæum,—Nos. 3191—3194.
- Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, No. 3, 1888.
 ———. Meteorologische Beobachtungen, Das Jahr 1888—Erste Hälfte.
- Paris. La Société D'Anthropologie de Paris,—Bulletin, Tome. XI (3^e série), No. 3.
 ———. La Société de Géographie,—Bulletin, Tome. IX, No. 3.
- Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Tome XVII, Dispensa 10^a 11^a.
- St. Petersburg. La Société Impériale Russe de Géographie,—Journal, Tome. XXIV, No. 3.
- Stettin. Entomologischen Vereine Zu Stettin,—Entomologische Zeitung, Jahrgang XLIX, Nrn 10—12.
- Sydney. Linnean Society of New South Wales,—Proceedings, Vol. III (2nd series), Part 3.
- Toronto. Canadian Institute,—Proceedings, Vol. VI (3rd series), No. 1.
- Vienna. Der Anthropologischen Gesellschaft in Wien,—Mittheilungen, Band. XVIII, Heft. 4.
 ———. Des K. K. Naturhistorischen Hofmuseums,—Annalen, Band, III, Nr. 3.

BOOKS AND PAMPHLETS,

presented by the Authors, Translators, &c.

- TAREÁLANKÁRA, MAHÁMAHOPÁDHYÁTA CHANDRAKÁNTA. Kaumudi-Sudhákara A Prakarana. 8vo. Calcutta, 1888.
 —————. Kusumánjali. 8vo. Calcutta, 1888.
 THORNTON, F DU PRE. Elementary Arabic, Part I. 8vo. London, 1888.

MISCELLANEOUS PRESENTATIONS.

- A Report from the Librarian of the Bodleian Library, Oxford, 1882-87, and previous history of the Library. 4to. Oxford, 1888.
 BODLEIAN LIBRARY, OXFORD.
 Hydrographic Notice No. 1 (1888). Andaman Islands. 8vo. Bombay, 1888.

COMMANDER A CARPENTER, R. N.

- Description of the Oudh and Rohilkund Railway Bridge across the Ganges at Benares, opened by His Excellency the Viceroy, Lord Dufferin, in December 1887, and called the "Dufferin Bridge." 4to. Lucknow, 1887.

A. CONSTABLE, ESQ.

- Report on the Administration of the Central Provinces for the year 1887-'88. Fcp. Nagpur, 1888.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

- General Report on Public Instruction in Bengal for 1887-'88. Fcp. Calcutta, 1888.
 Notes on the annual statements of the Charitable Dispensaries under the Government of Bengal for the year 1887. Fcp. Calcutta, 1888.
 Report on the Administration of Bengal, 1887-'88. Fcp. Calcutta, 1889.
 Report on the Rail-borne traffic of Bengal during the year 1887-'88. Fcp. Calcutta, 1888.
 Report on the River-borne traffic of the Lower Provinces of Bengal, and on the Inland trade of Calcutta, and on the trade of Chittagong and the Orissa Ports, with notes on Road-traffic for the year 1887-'88. Fcp. Calcutta, 1888.
 The Fauna of British India, including Ceylon and Burma. Mammalia. By W. T. Blanford, F. R. S. 8vo. London, 1888.
 The Indian Forester, Vol. XIV, Nos. 11 and 12, November and December, 1888. 8vo. Roorkee, 1888.

GOVERNMENT OF BENGAL.

- Final Report of the Royal Commission appointed to enquire into the

- recent changes in the relative values of the Precious Metals; with Minutes of Evidence and Appendices. Fcp. London, 1888
- Return of all Loans raised in England under the provisions of any Acts of Parliament, chargeable on the Revenues of India, outstanding at the commencement of the Half-year ended on the 30th September, 1888. Fcp. London, 1888.
- Selections from the Records of the Government of India, Home Department, No. 247. Reports on publications issued and registered in the several provinces of British India during the year 1887. Fcp. Calcutta, 1888.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

- Epigraphia Indica and Record of the Archæological Survey of India, Part I. 4to. Calcutta, 1888.

GOVERNMENT OF INDIA, REV. AND AGR. DPT.

- Annual Report on the Lunatic Asylums in the Madras Presidency for the year ending December 1887. Fcp. Madras, 1888.
- Report on the Administration of the Madras Presidency during the year 1887-'88. Fcp. Madras, 1888.

GOVERNMENT OF MADRAS.

- Report on the Administration of the Panjab and its dependencies for 1886-'87. Fcp. Lahore, 1888.

GOVERNMENT OF THE PUNJAB.

- Ládilichandra-prakásha, Bramanastava and Gopálsúkta (3 Sanskrit works bound in one vol.). 8vo. Benares.

BABU MOHINI LALL GUPTA.

- Report of the Eleventh Annual Meeting of the Indian Association for the Cultivation of Science, Calcutta, held in April 1888. 8vo. Calcutta, 1888.

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE.

- Return of Wrecks and Casualties in Indian Waters for the year 1887, Fcp. Calcutta, 1888.

PORT OFFICER, CALCUTTA.

- Proceedings and Transactions of the Royal Society of Canada for the year 1887, Vol. V. 4to. Montreal, 1888.

ROYAL SOCIETY OF CANADA.

- Anuario del Observatorio Astronómico Nacional de Tacubaya. Año de 1889. 8vo. Mexico, 1888.

SECRETARIA DE FOMENTO, MEXICO.

- Tide Tables for the Indian Ports for the year 1889 (also January 1890). 8vo. London, 1888.

SURVEY OF INDIA, TIDAL AND LEVELLING OPERATIONS.

PERIODICALS PURCHASED.

- Braunschweig. Jahresbericht über die Fortschritte der Chemie un
verwandter Theile anderer Wissenschaften,—Heft. 3, 1886.
- Calcutta. Calcutta Review,—Vol. LXXXVII, No. 175, January, 1889.
- . Indian Medical Gazette,—Vol. XXIII, No. 12, December,
1888.
- Geneva. Archives des Sciences Physiques et Naturelles,—Tome. XX,
No. 12.
- Leipzig. Annalen der Physik und Chemie,—Sachregister, Band 1—
CLX; Ergänzungsband I—VIII und Jubelband 1824—1877.
- . ————. Beiblätter, Band. XII Stück. II.
- London. Mind,—Vol. XIII, No. 53, January, 1889.
- . The Chemical News,—Vol. LVIII, Nos. 1517—1520.
- . The Nineteenth Century,—Vol. XXV, No. 143, January,
1889.
- . The Society of Arts,—Journal, Vol. XXXVII, Nos. 1883—
1886.
- Paris. Revue Scientifique,—3^e série, Tome. XLII, Nos. 24—26, et
Tome XLII, Nos. 1 et 2.

BOOKS PURCHASED.

- Subdakalpadruma, Vol. II, Nos. 28 and 29. 4to. Calcutta, 1888.



Chaturvarga Chintámāni, (Sans.) Vols. I, Fasc. 1—11; II, 1—25; III, Part I, Fasc. 1—18; Part II, Fasc. 1—3 @ /6/ each Fasc. ...	21	6
Chhándogya Upanishad, (English) Fasc. II ...	0	6
Dasa Rupa, Fasc. II and III @ /6/ ...	0	12
Gobhíliya Grihya Sūtra, (Sans.) Fasc. I—XII @ /6/ each ...	4	8
Hindu Astronomy, (English) Fasc. I—III @ /6/ each ...	1	2
Kálamádhava, Fasc. I—IV @ /6/ ...	1	8
Kátantra, (Sans.) Fasc. I—VI @ /12/ each ...	4	8
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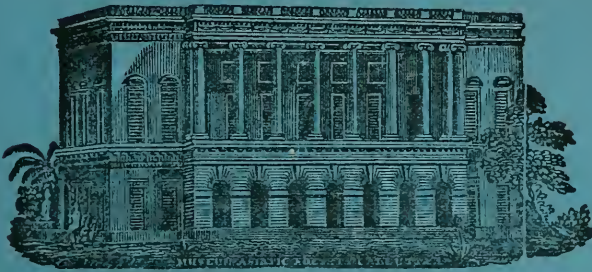
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EDITED BY
THE HONORARY SECRETARIES.

No. III. MARCH, 1889.



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(Continued on third page of cover.)

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MARCH, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th March 1889 at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President in the Chair.

The following members were present :

H. Beveridge, Esq., Bábú Gaurdás Bysack, E. C. Cotes, Esq., Dr. A. Crombie, E. Gay, Esq., S. A. Hill, Esq., Dr. G. King, Professor C. R. Lanman, C. Little, Esq., Kumár Rameswár Máliah, Bábú Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., A. Pedler, Esq., T. A. Pope, Esq., W. L. Sclater, Esq., Pandit Haraprasád Shástri, C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

Forty four presentations were announced as detailed 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.

Col. H. Thuillier, R. E., (re-elected).
Surgeon D. Prain, M. A., M. B.
Tom D. La Touche, Esq., B. A., (Cantab.).
Bhupendra Sri Ghosha, B. A.
John Mann, Esq., M. A.
Major A. W. Jamieson.
Babu Jaganáth Khunnah.
Babu Hanuman Prasad, Rais.
W. H. Jobbins, Esq.

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

Bábú Goneschandra Chandra, proposed by Bábú Gaurdás Bysack, seconded by Dr. Hoernle.

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

A. P. MacDonell, Esq., C. S.

The PRESIDENT announced that as Dr. Hoernle had resigned the officiating General Secretaryship, the Council had elected Mr. C. Little a Member of Council and General Secretary ; and that Messrs. Meugens and King had been appointed Auditors of the Society's accounts for 1889.

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

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E. Gay, Esq.	A. Pedler, Esq.
Bábú Pratápachandra Ghosha.	Dr. J. Scully.

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Dr. W. J. Simpson.

D. Waldie, Esq.

The PHILOLOGICAL SECRETARY exhibited a silver Bactrian coin and two gold Indo-Scythian coins, forwarded by Mr. A. Simson.

The following papers were read—

1. *Notes on a Buddhistic Monastery at Bhotébagan (Howrah), on two rare and valuable Tibetan MSS. discovered there; and on Puran Gir Gossain, the celebrated Indian Acharya, and Government Emissary at the Court of the Tashi Lama, Tibet, in the last century.*—By BABU GAURDÁS BYSACK, (postponed from last meeting).

Opposite to Calcutta on the right bank of the river, in the village of Ghusari, behind a range of temples, stands a two-storied house of worship of an old construction partaking of a Tibetan character, and having no arches in any part of it.

The locality is called *Bhotébágán*, the structure *Bhotmandir* or *math*, and its priest *Bhot Gosain*. Among noticeable objects here are various deities of the Hindu and of the Tibeto-Buddhistic* mythology, worshipped together within the math, and a Tibetan Dungen like cubiform *Samádli mandir* or tomb surmounted by Siva's Phallus, and sheltered within a low-roofed small room having a Bengali inscription on its door-top. The following questions arise from a cursory examination of the place:—

What is the origin, and what the history of this Buddhistic temple so near Calcutta? How Hindu gods and goddesses with those of Tibet receive joint worship? Who was Puran Gir Gosain Mohant, described on his tomb with all the veneration of an apotheosized being, claiming worship and honour from Hindus, Musalmans and other religionists?

From the Sanads and a Tibetan Passport produced by the present Mohant, Umrao Giri Gosain, the following facts have been gathered.

Warren Hastings granted to Teshu Lama, the great sovereign pontiff of Tibet, rent-free lands in the village of Ghusari on the riverside, for the establishment of a house of worship in 1774 and 1783 and, the Lama, in his turn at the same time, granted the same lands to Puran

* *Tará, Mahákálabhairava, Sambhara Chakra, Samája Guhya, and Vajrabhruti.*

Gir Gosain, famous for his piety and the confidence he enjoyed of the Tibetan authorities. He died in 1795 and was buried as a saint near his *Math*.

The dates give a clue for research into the histories, official reports and other records of the time, whereby a solution of the questions raised has been arrived at, and many interesting incidents connected therewith have come to light.

The Teshu Lama, sovereign of Teshu Lumbo and the guardian of the infant Delai Lama of Lhassa, at the entreaty of Dejudhar, chief of Bhutan who had invaded Kuchh Behar and was defeated by a British force, addressed an intercessory letter to Warren Hastings in 1773 and intrusted it to Puran Gir Gosain as his envoy.

This Sanyási, towards the end of March 1774, delivered his credentials to the first Governor-General and laid before him the Lama's presents, which included "talents of gold and silver, bulses of gold dust and bags of genuine musk."

The keen-sighted statesman with a desire to oblige the Lama in the interest of Tibeto-Bengal trade, complied with his request and sent, under the guidance of Puran, the well-known Bogle Mission to the court of Teshu Lumbo, where the Lama expressed his desire to have a place in the neighbourhood of Calcutta, and on the banks of the Ganges, to which he might send his people to pray. He wished to build a monastery there, leaving its details to be settled by Puran Gir. The reason assigned by the Lama was that although in the different periods of his reviviscence, he had chosen many regions for places of his birth, yet Bengal was the only country in which he had been born twice, for which he had a predilection for it beyond any other, and was desirous of making it a place of his abode.

Warren Hastings accordingly got a piece of land purchased and assigned to the Teshu Lama. The *Bhotmandir* was founded on this site, and its construction was commenced under the direction of Mr. Bogle, who had been previously entrusted by the Lama with a considerable remittance in money. As soon as it was completed, it was filled with the idols which, together with their precious adornments, the Lama had taken care to send down.

The public services which the now-forgotten Puran Gir Gosain had rendered both to the British and the Tibetan Government in the last century were most remarkable. His work began when as a young Sanyási of twenty-five years of age, he came down as the Lama's envoy to meet the Governor-General of India; he next accompanied and guided Mr. Bogle as the head of the first British Mission to Tibet, and interested himself in the cause of Tibeto-Bengal trade; he joined the Lama in his

unfortunate journey to the Court of the Chinese emperor, kept a careful and interesting itinerary of it, and supported the advocacy of the honest Lama in bringing about friendly relations between the Pekin Court and the Bengal Government: he returned to Bengal with the Tibetan Regent's Mission, conveying the melancholy intelligence of the Lama's death in 1781, from small-pox, in the neighbourhood of Pekin, and succeeded in maintaining the friendly relations between the two Governments; he accompanied the Turner Mission in 1783, which Hastings had organised by seizing the occasion of a condolence, as well of congratulation on the appearance of an incarnation of the deceased Lama of which he had been apprised by the Teshu Lumbo Court, and helped Captain Turner in obtaining the establishment of an extended commercial intercourse so far as the assent of the Regent could grant it; and lastly he was himself made the accredited agent of Hasting's Government to the regenerated Teshu Lama's Court in 1785, in which capacity he proved his ability, honesty and devotion in the same way as on former occasions. With this last service of Puran Gir, terminated the series of Missions which Hastings successively sent to the Cis and Trans-Nevean States.

It will be seen that the establishment of the Bhotbágán, and the despatch of the Tibet missions with which it is intimately connected owe their origin mainly to the conciliatory policy of Hastings, to the mysterious doctrine of Lama incarnations, and to the faithful service of a Sivite Sanyási.

The personal history of this remarkable ascetic has been gathered from the traditions of the Bhotbágán. He was a Brahmana and a *dandi*, and a follower of Sankaráchárya's teachings, he was a young man when he went to Tibet, had fair features, was tall, strong and sinewy, and was a good rider (as stated also by Bogle and Turner). He possessed remarkable intelligence and wisdom and was master of many languages, including Tibetan and Mongolian, a wide range of experience acquired by travel in and out of India, a practical insight into all the commercial relations of Asia, of which Tibet formed the heart, and enjoyed and deserved a reputation for piety and integrity which made him the trusted Agent of the Lama and of the British Government.

After his return from Tibet in 1785, he finally settled himself in his Bhotbágán *Math*, where he spent his time in pious observances and deeds of charity and hospitality, which it was the wish of the Lama he should attend to, specially towards the Tibetan pilgrims, for whom he had built guest-houses. He had also an agency business there, directed to help the traders or their people from Tibet in disposing of their wares and making purchases. Gold in large quantities was one of the principal articles which came from Tibet.

Thus he lived piously, usefully, and happily in this retreat for about a decade, enjoying the veneration of people who came into contact with him, and the high esteem of the Bengal Government. The Governor-General, it is said, used to visit him in his *math*.

A terrible catastrophe soon happened which cut short his happy and useful life. The fame of Bhotébágán as a storehouse of the richest gold had spread far and wide, a band of dakaits burst one night into the Monastery and began to plunder it. Our Puran Gir nothing daunted, kept the robbers at bay by the dexterous use of his sword, fought for awhile, then fell overpowered and senseless, pierced with the thrust of a *sarki* or bamboo spear. The dakaits took no further notice of him, made good their plunder and decamped. The sad news was conveyed to the Governor-General who lost no time in sending a Surgeon to help the Gosain, but the victim of violence after lingering for a while, breathed his last. The Government was not remiss in tracing out the dakaits. A short enquiry led to the vindication of justice, and four robbers expiated their guilt on the gallows erected on the Bhotébágán itself.

Daljit Giri, the successor of Puran in the Mohantship, lost no time in performing the funeral rites of his Guru, and buried him in the tomb already described. The worship of the motley group of Hindu and Buddhistic deities in the *math* follows from the peculiar form of Buddhism in Tibet under Tántrik influence, some meagre information regarding which can be gathered from the reports of Bogle and Turner, but upon which fuller light is being thrown by recent researches.

The Bhotébágán *Math* now remains a solitary monument of the genius and of a special policy of the first Governor-General of India, of the piety of Teshu Lama as exhibited in Bengal, of the work of Puran Gir, and of the Tibeto-Bengal trade which flourished centuries ago, and was restored, though in a stifled form, a hundred years ago.

Great and powerful are the ties which bind Tibet to Bengal; the religious associations, the traditions, and remembrance of ancient commercial intercourse, should attract the Tibetans to Bengal. If the policy of the first administrator of India had been only continuous, our Government could by this time have enjoyed its best results.

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

2. *Description of a stag's head allied to Cervus dybowskii, procured from the Darjeeling Bazaar.*—By W. L. SCLATER, Esq., *Deputy Superintendent Indian Museum.*

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

3. *On a small collection of Mammals procured by the Museum Collector at Sháhpur in the Panjab, under the supervision of Dr. G. Henderson.*—By W. L. SCLATER, ESQ., *Deputy Superintendent, Indian Museum.*

The following is an account of a small collection of Mammals made by the Museum Collector at Sháhpur in the Panjab under the supervision of Dr. G. Henderson. The collection consists of 18 specimens, 4 skins and 14 specimens preserved in spirit, belonging altogether to 5 species. Sháhpur is a civil station situated on the Jhelum River just south of the Salt Range; all the animals are typical Panjab desert Forms, with the exception perhaps of *Vulpes bengalensis*.

1. *Vulpes bengalensis*, (Shaw.)

One pair a ♂ and ♀ of this the common Indian Fox not differing in any way from the ordinary Indian form; it would have been expected that the fox of Sháhpur would have been *Vulpes leucopus* of Blyth, which in the opinion of Mr. Blanford does not differ specifically from *Vulpes griffithii* and *pusillus*.

2. *Herpestes auro-punctatus*, Hodgs.

One specimen, a male.

3. *Erinaceus collaris*, Gray and Hardwicke.

One specimen of this hedgehog, a male.

4. *Scotophilus pallidus*, Dobson.

Nine specimens, of which three are males and six females, all in spirit. These specimens agree with the type of the species in the Museum collection very well, except that they are somewhat larger and also that the colouration of the Sháhpur specimens is somewhat darker; this may possibly be accounted for by their being fresher specimens.

This species can be at once distinguished from *Scotophilus temminkii*, the common Indian species, by its tragus, which in *Scotophilus pallidus* is smooth and obtusely truncated, whereas in *Scotophilus temminkii* the tragus is traversed by a transverse ridge and is acutely pointed.

The species appears somewhat rare; there appears to be only one specimen in the British Museum, and there are only 4 including the type in the Indian Museum.

5. *Mus bactrianus*.

One adult and four immature specimens all in spirit. This appears to be the common mouse of the Punjab.

4. *On Clebsch's transformation of the Hydrokinetic Equations.*—By BABU ASUTOSH MUKHOPÁDHYÁY, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of this note is to point out, how the method of applying Clebsch's transformation to obtain a first integral of the hydrokinetic equations of Euler in the case of general rotational motion may be materially simplified by means of Laplace's solution of linear partial differential equations of the first order. It is also incidentally pointed out that the three cases of irrotational motion, steady rotational motion and general rotational motion, may be worked out by one uniform method.

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

5. *Notes on the Founder and the Founding of Calcutta, with photographs and tracings of plans of the Town in 1753.*—By T. R. MUNRO, Esq.

Mr. Munro afterwards exhibited and explained some old tracings of a Map of Calcutta, dating from 1753, and photographs of plans now in the British Museum of the above date, and also one supposed to have been drawn in 1723 or 1724—

6. *On a difficult passage in the Rigveda.*—By PROFESSOR C. R. LANMAN, Harvard College, Cambridge, U. S. A.

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

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LIBRARY.

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

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*presented by the respective Societies and Editors.*

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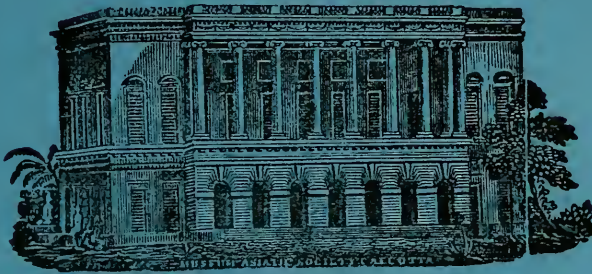
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OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.

No. IV. APRIL, 1889.



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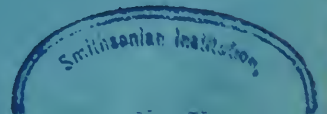
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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR APRIL, 1889.

---

The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 3rd April 1889, at 9.15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present :

H. Beveridge, Esq., Bábú Gaur'lás Bysack, W. Cripser, Esq., Dr. A. Crombie, E. Gay, Esq., Dr. Hoernle, W. H. Jobbins, Esq., Rev. Father Lafont, C. Little, Esq., Kumár Rameswár Máliah, R. D. Mehta, Esq., Bábú Asutosh Mukhopádhyáy, Pandit Pránnáth Saraswati, Kumár Devendra Náráyan Roy, Pandit Haraprasád Shástri, C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

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

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

Bábú Gones Chandra Chandra.

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

Rev. J. Muir Hamilton, proposed by J. Wood-Mason, Esq., seconded by C. Little, Esq.

Maulvi Dilawar Hossain Ahmad, B. A., (for re-election), Deputy Magistrate Gya, proposed by Maulvi Golam Surwar, seconded by Maulvi Kabir-uddin Ahmed.

Hon. Justice Gurudás Banerji, M. A., D. L., proposed by Babu Gaurdás Bysack, seconded by Lieut.-Col. J. Waterhouse.

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

Bábú Tara Prosad Chatterjee.

The PRESIDENT announced the presentation by T. R. Munro, Esq., of two enlarged photographs, framed, of plans of Calcutta, one from drawings made in 1723 or 1724 showing the palisaded enclosure within which the Christian community resided, and the other from a survey of the town made in 1753 by Lieut. Wills, in command of the Artillery in Bengal.

Also the receipt from Count Landberg, Secretary General of the Congress, of copies of the Programme of the eighth International Congress of Orientalists, to be held at Stockholm and Christiania in September next, with a request that they might be distributed amongst the members of the Society—and stated that Monsieur Senart had been asked to represent the Society at the Congress.

The PRESIDENT exhibited some photographs of the red end of the spectrum from C to Z taken with Rowland's plane and concave diffraction gratings and said :—

In November 1875, I exhibited to the Society some photographs of the red end of the spectrum about A and a short distance below it, obtained on dry collodio-bromide of silver plates stained with anilin blue and given a momentary exposure to white light before being acted on by the spectrum. In these photographs, however, it was noticeable that under the influence of the red as well as of the blue rays the image of the spectrum was strongly reversed, *i. e.*, instead of being a photographic negative it was a positive showing the lines as dark lines on a clear ground. The photographs now before you are on gelatine dry plates stained also with a blue dye, but they show no traces of this reversal in any part of the spectrum, and not only extend much further into the infrared region, but show infinitely better definition and greater dispersion in this part of the spectrum owing to the employment of gratings in place of prisms.

The dye I have used for staining these plates is Alizarin Blue ( $C_{17}H_6NO_4$ ), the quinoline of Alizarin. It is prepared from nitro-alizarin by heating it with glycerine and sulphuric acid, and is found in commerce as a paste insoluble in water and only slightly so in alcohol. It dissolves in liquor ammonia with a greenish-blue colour. By mixing the paste with a concentrated solution of sodium bisulphite the dye

dissolves and when dried forms a dark purple powder, known as Alizarin Blue S or Anthracene Blue. In this form it is readily soluble in water, the solution in distilled water being at first of a brownish orange colour, turning blue on exposure to air. By keeping a few days the colour forms a flocculent precipitate, and is then only partially soluble in dilute ammonia.

Examined with the spectroscope solutions of the dye do not give a very marked absorption spectrum.

The plain orange solution of Alizarin S in distilled water absorbs the violet, blue and green up to about *b*.

The greenish-blue ammoniacal solution absorbs the red, orange and yellow very strongly down to about  $D \frac{1}{2} E$ ., with a general lowering all over the spectrum. There are no distinct absorption bands. I do not find any marked difference in the absorption spectra of the ammoniacal watery solution of three samples of the dye in my possession.

I. Alizarin Blue paste, from the Elberfeld Factory, formerly F. Baeyer and Co.

II. Alizarin Blue S, from the Badische Anilin and Soda Fabrik.

III. Anthracene Blue, from Dr. Schuchardt of Görlitz.

In his work "*Practische Spectral Analyse Irdischer Stoffe*," Dr. H. W. Vogel gives two very different absorption spectra for the ammoniacal watery solutions of pure alizarin blue and of Anthracene Blue, also obtained from Schuchardt; the first agrees with my observations—but the second, which shows maximum absorption between D and E, does not.

The photographs now exhibited have for the most part been taken with No. II, but others have been taken with Nos. I and III. The effect of all of them seems very similar, but further trials are required to ascertain which is best.

The plates I have used have been the ordinary commercial gelatine dry plates. Wratten's 'Instantaneous' have perhaps given me the best results, but the 'Ordinary' have also proved wonderfully sensitive under the action of the dye. The plates are stained by bathing them for one or two minutes in a solution of the dye in distilled water in the proportion of 1 part of the dye to 10,000 parts of distilled water, with 1% of strong solution of ammonia added. The solution has at first a strong greenish tint, but this soon changes to blue and I have noticed that after a time it again takes a greener tint.

With a small spectrograph on Dr. Vogel's principle, consisting of a Browning pocket spectroscope attached to a camera in front of a single element of a small Steinheil aplanatic lens (the addition of this lens is, I find, a great improvement to the instrument as originally proposed by Dr. Vogel) the spectrum obtained on the stained plates shows very

intense action through the violet and blue regions as far as b: from E to C there appears to be a minimum of action, and then it rises again with clearly marked bands of increased sensitiveness between C and A, strongest between C and B and a to A. Below A the sensitiveness quickly diminishes.

I have found the sensitiveness to red differ considerably on plates prepared at different times and have not yet discovered to what this due. With a screen of deep ruby glass in front of the slit, the sensitiveness to red becomes very marked and the maximum sensitiveness is found between D and A, the remainder of the spectrum being either cut off at D, or showing only slight traces of action from F to H, according to the length of exposure.

On a plate taken, about 8:30 a. m. on the 19th March, with the plane Rowland grating in the first order spectrum, using a deep ruby glass screen, exposing 10 minutes, the slit being .02 millim., the sensitive action in the red commences just below D, and seems gradually to increase to A, then diminishing to about  $\lambda$  8,000, beyond which lines are distinctly visible, beyond the Z group, up to about  $\lambda$  8,400. Considering that these photographs have been taken without any special appliances for securing the transmission of the infra red rays, it is probable that with them a much greater extent of the infra red spectrum might be photographed on plates stained with this dye.

With the concave grating also, using a deep ruby glass screen, I have been able to obtain lines in the infra red region to about  $\lambda$  8,300 with much greater dispersion and distinctness than the plane grating will give. The photograph I have with me shows the spectrum from C to A and below. It is taken on a Wratten's 'Ordinary' plate, a slow kind which unstained would show no action beyond E. It is unfortunate that the sensitiveness of the plates falls off so much just below A, so that the infra red spectrum has not sufficient density to print well, although up to A the image shows too much density for the lines to print clearly. The various photographs, however, serve to show the value of the dye as a ready and simple means of photographing the spectrum from C to A. with ordinary dry plates.

Using plates stained with a special preparation of quinoline blue (cyanin) and sulphate of quinine, Mr. J. C. Burbank has been able to photograph the infra red rays from A to  $\lambda$  9,900, or to about the limit of Cape Abney's latest map, which was prepared from photographs made on collodion plates containing a greenish form of bromide of silver specially sensitive to the infra red rays. I have tried cyanin prepared in this manner and found that though it is undoubtedly sensitive to the infra red rays, its maximum sensitiveness is between D and B and between B and A its action is much weaker than that of alizarin blue.



The cyanin and quinine solution, however, is troublesome to prepare and neither it nor the plates keep well; moreover the dye is expensive, so that some more simple and more certain stain is desirable, and if alizarin blue, which chemically is allied to cyanin, can take its place for such observations it will be an advantage. I may mention that it has already been tried by Schiendl and Eder, but they do not appear to have recognised its great sensitiveness for the red rays, which is not so apparent with prism spectroscopes as with gratings and requires the use of yellow or red screens to produce its full effect.

Dr. Eder has recommended cœrulein as a sensitiser for the red rays, but though it certainly is useful, the maximum of effect is produced between D and B, while with alizarin blue it is between C and A. I have also found it uncertain in its action, but hope to make further trials of it with the gratings, as well as of a dye called gallocyanin, obtained by the action of nitroso-dimethyl-aniline on tannic acid, which also I have found is a strong sensitiser for the red rays.

I have also lately been trying a new fluorescent phthalein dye, recently introduced by the Badische Anilin and Soda Fabrik, called Rhodamine (the phthalein of meta-amido phenol) which I thought might be likely to be useful in orthochromatic photography for copying coloured drawings &c. It undoubtedly has capabilities in this direction, but so far as I have tried it, seems inferior to erythrosin in sensitiveness for yellow. It is prepared by fusing phthalic anhydride with diethyl-meta-amido-phenol and forms a reddish violet powder, very easily soluble in water, the solution being of a bright crimson with a strong orange fluorescence. It is not very soluble in alcohol. Acetic acid dissolves it and the solution shows a very vivid scarlet fluorescence. Ammonia produces no visible change. Dilute mineral acids slightly redden, but do not, as with the eosins, destroy the fluorescence of its watery solutions; on the contrary they rather heighten it. Nitrate of silver precipitates it from the watery solution, but not readily; the brick-red precipitate is very soluble in pure water.

Examined in the spectroscope a strong watery solution absorbs the spectrum strongly in the blue, green and yellow from  $a \frac{1}{2}$  D to  $F \frac{1}{2}$  G, though the only distinct absorption band with a weak solution is about midway between D and E.

Gelatine dry plates stained with a solution of rhodamine in distilled water at 1:10,000 with 1% of solution of ammonia, show two very marked regions of increased action—one between G and F, the other from E to D, strongest from D to  $D \frac{1}{2}$  E. The photographs taken with the small spectrograph show a curious but well marked series of bands of increased sensitiveness in the parts of the spectrum where the

action of the dye is most marked. The action of the yellow rays about D is quite as strong as, if not stronger than on plates stained with the best of the eosin dyes, but for copying coloured pictures I have not found rhodamine with ammonia equal to erythrosin either with or without a yellow screen; further trial is, however, requisite.

The addition of a small quantity of nitrate of silver to the ammoniacal solution of rhodamine greatly increases the general sensitiveness of the plates, but does not seem to heighten the yellow-sensitiveness, either with the spectrum or with coloured pictures, so much as it does with erythrosin.

It is, however, noticeable that plates stained with a solution of the dye containing acetic acid in place of ammonia appear almost as sensitive in the yellow as those prepared with ammonia and give about equally good results for copying work: if on further experience this is proved and found to work with certainty, it will be of importance, because the use of eosin dyes in conjunction with ammonia for staining gelatine dry plates for orthochromatic photography has been protected by various patents. It is possible that further experiments with acid-stained plates in conjunction with the use of specially suitable yellow screens might result in a method of using this dye for orthochromatic photography which would be efficient and open to general use.

In photographing the spectrum with the concave gratings I have found the rhodamine-stained plates useful for the region immediately about D. On a plate I have with me, showing the D lines in the second order, 7 lines can be clearly seen between  $D_1$  and  $D_2$ , though 11 are sometimes visible to the eye.

Another new dye from the same manufactory called *Nile Blue*, which also belongs to the rhodamine series, shows considerable sensitiveness to the region between D and B, by the addition of ammonia; though not so much so as alizarin blue. Without ammonia the general sensitiveness of the plate is much reduced, as Dr. Eder has remarked is the case with most blue dyes, and the image of the spectrum does not extend beyond b.

It is noticeable that the spectrum taken in the small spectrograph on plates stained with the ammoniacal solution of this dye shows numerous narrow bands of extra sensitiveness similar to those in the spectrum of rhodamine, showing that both dyes belong to the same group. These bands in the photographed spectra of the two dyes would be an interesting subject for further enquiry.

I have to acknowledge the kindness with which the managers of the Badische Anilin and Soda Fabrik have supplied me with samples of the dyes referred to.

The following papers were read—

1. *On the species of Thelyphonus inhabiting Continental India, Burma, and the Malay Peninsula.*—By EUGENE W. OATES, ESQ., F. Z. S. Communicated by the NATURAL HISTORY SECRETARY.

2. *Notes on the ruins of Jay Mangla Garh (with 2 Buddhist coins).*—By ASUTOSH GUPTA, ESQ., C. S.

Jaimangla garh may be described as an island surrounded by an extensive garh or artificial lake. It is an extensive mound about seven square miles in area, now overgrown with jungle. The garh is a vast sheet of water, about seven miles long on either side of the island, its breadth varying from about 300 to 500 yards. Its area is therefore about four square miles. It is shown in the district map as Kabur Tal lake. Its southern extremity is about twelve miles north of Beguserai, the head quarters of the subdivision of that name in the district of Monghyr. Being north of the Ganges, it is in old Mithila. The water of the lake is remarkably fresh and salubrious, though it is overgrown with weeds. It abounds in fishes and game birds and except during the rains when it is too full, it is the daily resort of a large number of fishermen. Navigation is made by long narrow skiffs scooped out of single *sal* trees.

The place contains ruins of old brick built gates and spacious buildings. It is strange that there is no local tradition about it. There is a large earthen mound or hillock about half a mile north-east of the lake, which is said to have been built by Viswakarma, the mythological architect of heaven. The bricks found in Jaimangla garh are of the same small size which characterize ancient architecture. The place is no doubt the ruins of a large ancient city, apparently the fort of some old Hindu Raja.

The place takes its present name from the goddess Jaymangla, a stone idol of Bhagavati placed in an old, dark, miserable, brick built shrine without any inscription to show its age. It is visited by flocks of pilgrims from various places on Tuesdays and Saturdays when the goddess is worshipped.

The only reliable material evidence I could get of the antiquity of the place consists of two copper coins, which are being forwarded to the Asiatic Society. These are irregularly shaped old coins which I collected from the place.

There is apparently no letter in them but there are some symbols on one side and an elephant looking animal on the other.

3. *Three new Homoptera.*—By M. L. LETHERRY. Communicated by E. T. ATKINSON, ESQ., C. S.



The following descriptions refer to the small homopterons found in such abundance on the mango tree in the early part of the year and indeed up to the rains. Some account of them has been given in the Indian Museum 'Notes on Economic Entomology,' No. III, and their life-history is now being investigated.

IDIOCERUS NIVEOSPARSUS.

Flavescens, fusco et albo variegatus: vertice subtilissime aciculato-sfrigoso, medio infuscato, vertice utrinque puncto minutissimo nigro: fronte subtilissime aciculato-strigosa, flava; clypeo flavo, macula basali nigra: pronoto flavo, fusco-irrorato: scutello basi utrinque macula triangulari, medioque vitta angusta usque ad medium continuata, ibique punctis duobus minutis, nigris; summo apice albo: tegminibus nitidis, griseoflavis, subpellucidis, venis fuscis, fascia subbasali interrupta alba, maculaque parva irregulari ad apicem corii alba; lateribus maculis duabus, una media, oblonga, altera apicali, nigris, spatio insigni albo-hyalino interruptis: corpore cum pedibus subtus fusco-variegato, unguiculis nigris.—Long. 4 millim, ♂ ♀. *I notato*, Fabr. affinis: maculis lateralibus hyalino et spatio laterali hyalino tegminum distinctus.

Hab. Saharanpur, Calcutta.

IDIOCERUS ATKINSONI.

Elongatus, flavescens: vertice medio infuscato, puncto basali punctoque laterali medio utrinque distinctissimo, nigris, ornato: fronte flava: clypeo flavo, linea media longitudinali parva nigra, strigisque lateralibus minutissimis fuscis: pronoto flavo, linea longitudinali angusta media fusca, punctisque duobus anticis nigris: scutello basi utrinque macula triangulari nigra, medioque vitta angusta antice et postice dilatata, fusca, punctisque duobus fuscis: tegminibus subpellucidis, venis fuscis, im-maculatis: corpore subtus cum pedibus flavo, unguiculis fuscis.—Long. 5 millim. ♂, ♀.

Hab. Calcutta, Baliganj.

IDIOCERUS CLYPEALIS.

Minor, flavescens: vertice flavo, aut immaculato, aut punctis duobus lateralibus (uno utrinque) nigris ornato: fronte flava, aut immaculata, aut punctis duobus mediis nigris ornato: clypeo flavo, in medio semper vitta angusta nigra, ad basim latiori, ornato: pronoto flavo, immaculato: scutello flavo, basi utrinque macula obtuse triangulari nigra ornato: tegminibus flavis, nitidis, venis concoloribus, vena costali dilutius flava, intus in medio nigro angustissime cincta: corpore subtus flavo, macula



laterali sat magna prosterni nigra : pedibus cum unguiculis flavis. Long,  $3\frac{1}{2}$  millim. ♂, ♀. Species pictura clypei insignis.

Hab. Calcutta.

4. *Græco-Roman influence on the civilization of Ancient India.*—By V. A. SMITH, Esq., C. S. (postponed from last meeting).

An abstract only of this paper was read. The paper itself which had not yet been received, will be read at a subsequent meeting, in the Proceedings of which the abstract will be published.

5. *Notes on some of the symbols found on the punch marked Coins of Hindustan, and on their relationship to the Archaic symbolism of other races and distant lands.*—By W. THEOBALD, Esq., M. R. A. S.

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

6. *Note on Stokes' Theorem and Hydrokinetic circulation.*—By ASUTOSH MUKHOPÁDHYÁY, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of this note is to give a new proof of Stokes' formula for hydrokinetic circulation, and to point out how it is an immediate consequence of the theory of the change of the variables in a multiple integral. It is pointed out that as no physical conception enters into the proof, it holds good whether we regard the theorem as a purely analytical one or as merely furnishing a formula for hydrokinetic circulation.

7. *A descriptive list of the Uredineæ occurring in the neighbourhood of Simla (Western Himalayas). Part II, Puccinia.*—By A. BARCLAY, M. B., Bengal Medical Service.

These papers will be published in full in the Journal, Part II.

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### LIBRARY.

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

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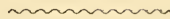
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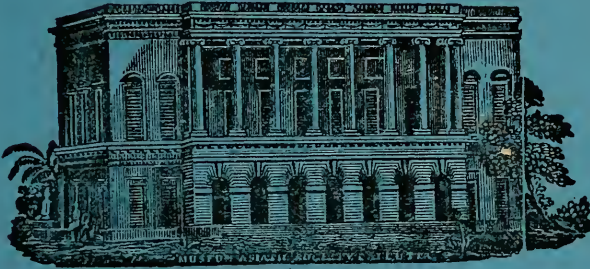
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ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.

No. V. MAY, 1889.



“The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature.”—SIR WILLIAM JONES.

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*(Continued on third page of cover.)*



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MAY, 1889.

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The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 1st May, 1889, at 9-15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present: H. Beveridge, Esq., Bábú Bupendra Sri Ghosha, Kumár Rameswár Máliah, J. Mann, Esq., R. D. Mehtá, Esq., W. H. Miles, Esq., Pandit Nilmani Mukerjee, Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., A. Pedler, Esq., Dr. P. K. Ray, Dr. J. Scully, Bábú Hiralál Sen, C. H. Tawney, Esq., D. Waldie, Esq.

Visitor—Captain J. Hayes Sadler.

The Minutes of the last meeting were read and confirmed.

Forty-two presentations were announced as detailed 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:

Rev. J. Muir Hamilton.

Maulvi Dilawar Hossain Ahmad, B. A., (re-elected).

Hon. Justice Gurndás Banerjee, M. A., D. L.

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

Dr. O'Connell Raye (for re-election), proposed by Dr. J. Scully, seconded by Lt.-Col. J. Waterhouse.

Rev. Walter Hamilton, proposed by L. de Nicéville, Esq., seconded by C. Little, Esq.

F. J. Rowe, Esq., proposed by A. Pedler, Esq., seconded by C. Little, Esq.

Captain J. Hayes Sadler, Offg. Under-Secretary, Government of India, Legislative Department, proposed by E. T. Atkinson, Esq., seconded by Lieut.-Col. J. Waterhouse.

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

R. A. Sterndale, Esq.

The SECRETARY announced the death of the following Member :  
Maulvi Kabir-ud-din Ahmad.

The PRESIDENT announced that Dr. A. Crombie, had been elected a member of the Council in the room of the Hon. A. Wilson, resigned in consequence of proceeding to England on furlough.

The PRESIDENT exhibited a photograph of the palm tree (*Corypha* sp. inc.) now flowering in the Society's grounds, presented by J. T. Gladstone, Esq.

The PHILOLOGICAL SECRETARY exhibited a palm leaf Burmese Manuscript containing the nine chapters of *Abhidhammatthasangae kampa-thanasangahavilbhago*, or *Saṅgro Pali*, with a commentary, presented to the Society by H. C. Blaker, Esq.; and read the following report on a find of old copper coins in the Benares district.

Report, on 4 old copper coins forwarded by the Collector and Magistrate of Benares with his No.  $\frac{1}{\text{XII-48}}$  dated the 16th January, 1889.

In his letter the Collector states that, on the 7th August 1888, 14 seers of copper pies were found in the jurisdiction of Chaubepur Police Circle in the Benares district. Only 4 specimens,—those sent for identification—were retained, while the rest were returned to the finder and not treated under the Treasure Trove Act. This is to be regretted, because the four samples turned out to be coins of considerable interest. The Collector was at once applied to, to secure, if possible, the balance; but it was too late; the balance could not be obtained any longer. I would take the liberty to suggest, that instruction should be given by Government, that no Treasure Trove Coins should be disposed of without first awaiting the result of the examination of the coins by the Asiatic Society of Bengal.

The four samples, sent for examination, belong all to the Indo-Scythian period (from about 150 B. C. to 300 A. D.) Two of them are large copper coins of KADPHISES, (1st cent. B. C.) of the well-known bilingual type, figured in the *Ariana Antiqua* (Plate X, figs. 15-18). Another is a coin of KANERKI (1st cent. A. D.), of the four-handed OKPO type, as figured in *Ariana Antiqua*, plate XII, fig. 17. The

fourth is a coin of the so-called KENORANO or OOR (probably *Oerki*, 2nd cent. A. D.), with the cross-legged sitting king on the obverse, and the standing MAO on the reverse, as shown in *Ariana Antiqua*, pl. XIII, fig. 10. All these coins are in rather indifferent preservation; the legends being nearly obliterated, though both the obverse and reverse figures are well distinct.

The interest of these coins is, that copper coins of the Indo-Scythian kings whose rule extended not much beyond Mathurá, should be found so far to the East as the Benares district; and it would have been of some importance to know whether any more (and perhaps better preserved) specimens of this class of coins were contained among the 14 seers of copper pice.

The following papers were read—

1. *Notes on Indian Rhynchota*, No. 6. *Family Coreidæ*.—By E. T. ATKINSON, Esq., B. A.

2. *Note on the volatility of some of the compounds of Mercury, and of the metal itself*.—By A. PEDLER, Esq., F. C. S.

(Abstract.)

The volatility of the metal mercury at ordinary atmospheric temperatures has already been shewn by several previous observers. A good instance of the very considerable volatility of the metal is described as having occurred in a Barometer at the meteorological observatory at Buxar, where considerably more than half a gramme of the metal had been actually distilled into the upper part of the Torricellian vacuum of the Barometer. The fact that such a large quantity of mercury can thus distil upwards is one of which meteorologists should take note, for had the barometer in question been constructed on what is called the Kew principle, which is the case with a very large proportion of the barometers that are used, the distillation of this quantity of mercury in the instrument would have utterly vitiated all its readings by causing them to be distinctly lower than they should have been.

Experiments as to the volatility of mercurial compounds were made on the following substances:—Mercuric oxide, mercuric cyanide, mercuric oxalate, mercuric iodide, mercuric bromide mercurous chloride (calomel) and mercuric chloride (corrosive sublimate). The experiments were usually made in vacuó and in a part of the vacuous space, containing the mercurial compound, some re-agent was placed which had the power of combining with and fixing one of the constituents of the substance experimented on. The volatility was determined under the conditions of an Indian climate (in Calcutta) generally at temperatures obtained in full sunlight, but also in some cases at shade tempera-

tures and in the dark. When tested in this way it is found that mercuric oxide when exposed to sunlight in *vacuó* is distinctly volatile. A small portion of the mercuric oxide is also decomposed into mercurous oxide. Mercuric cyanide appears to be quite non-volatile under these conditions, the salt is also not decomposed by the action of sunlight. Mercuric oxalate appears also to be non-volatile but under the influence of sunlight it decomposes entirely into mercury and carbon dioxide. Mercuric iodide was quite non-volatile, and it was also practically undecomposed by the action of light, for though by exposure to sunlight it darkened, yet on re-exposure to the air in diffused day-light its original colour was regained. Mercuric bromide is very distinctly volatile in *vacuó* in sunlight; a small portion of the mercuric bromide is also decomposed into mercurous bromide. Mercuric chloride is very decidedly volatile in *vacuó* both in sunlight and also when kept in the dark. It is so volatile indeed that the loss in weight can be easily determined. Mercuric chloride also partly decomposes under the influence of light, and distinct amounts of mercurous chloride (calomel) are formed. A similar decomposition to the latter is also shewn to take place in solution, but this last fact has been previously known. Mercurous chloride appears to be volatile in *vacuó* in sunlight in an exceedingly feeble manner, but the sunlight also decomposed it distinctly but partially into mercury and free chlorine.

Attention is prominently drawn to the importance of the fact of the volatility of mercuric chloride inasmuch as this salt is very largely used, particularly in India. Its uses are as an antiseptic and for preserving perishable materials and for protecting books, specimens &c. from the attacks of insects.

Cases of mercurial poisoning from the use of mercuric chloride as a preservative are quoted, which have apparently been put down to the existence of solid particles of mercuric chloride floating in the air, and which have been thrown off from surfaces like dust, but it is pointed out that the volatility of the salt which has now been proved is a much more probable cause of this poisonous action.

The PRESIDENT remarked that in the light of Mr. Pedler's experiments it seemed very probable that the fading of photographic negatives that had been intensified with bichloride of mercury, in conjunction either with alkaline iodides and sulphides or with liquor ammonia, as is commonly the practice both for wet and dry plates, might be partly due to the volatilisation of the mercurial compound formed. Such fading was very common in this country and high temperature would increase the tendency if due to this cause. Bichloride of mercury was a



very valuable preservative for books and dried vegetable specimens, and Mr. Pedler's warning would be useful to those unaware of its volatile properties.

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

Captain Sadler exhibited his fine collection of Birds' eggs.

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

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

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- Budapest. La Société Hongroise de Géographie, Bulletin, Tome. XVII, Fasciculi, 3.
- Calcutta. Agricultural and Horticultural Society of India,—Journal, Vol. VIII, (new series), Part 3.
- . Indian Meteorological Memoirs,—Vol. IV, Part 6.
- . Indian Engineering,—Vol. V, Nos. 14—17.
- . The Indian Engineer,—Vol. VII, (new series) Nos. I—5.
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- Dorpat. Der Naturforscher-Gesellschaft bei der Universität Dorpat,—Sitzungsberichte, Band VIII, Heft 2.
- Edinburgh. The Scottish Geographical Society,—Magazine, Vol. V, No. 2, February, 1889.
- Frankfurt, a O. Des Naturwissenschaft. Vereins des Reg-Bez. Frankfurt,—Monatliche Mittheilungen aus dem Gesamtgebiete der Naturwissenschaften, Jahrgang VI, Nrn. 4—6.
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- . ————. ————. Nova Acta, Tome LII.
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- London. Institution of Electrical Engineers, Journal, Vol. XVIII, No. 78.
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- . Nature,—Vol. XXXIX, Nos. 1012—1015.

- London. Royal Asiatic Society of Great Britain and Ireland,—Journal, Vol. XX, Part 4.
- . Royal Astronomical Society,—Monthly Notices, Vol. XLIX, No. 3.
- . Royal Geographical Society,—Proceedings, Vol. XI, No. 2.
- . Royal Microscopical Society,—Journal, December, 1888 and February, 1889.
- . Royal Society,—Proceedings, Vol. XLV, Nos. 273—275.
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- . The Academy,—Nos. 882—884.
- . The Athenæum,—Nos. 3204—3207.
- Lyon. La Société D'Anthropologie de Lyon,—Bulletin, Tome VII, No. 3.
- Manchester. The Manchester Literary and Philosophical Society,—Memoirs and Proceedings, Fourth series, Vol. I.
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- Munich. Der K. B. Akademie der Wissenschaften,—Abhandlungen, Historische Classe. Band XVIII. Abtheilung 1.
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- Paris. Journal Asiatique,—Tome XII, No. 3; Tome XIII, No. 1.
- . La Société de Géographie,—Compte Rendu des Séances. No. 6, 1889.
- . La Société Zoologique de France,—Bulletin, Tome XIII, No. 10; Tome XIV, No. 1.
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- . —————. Verhandlungen, No. 3, 1839.
- . Der Kaiserlichen Akademie der Wissenschaften,—Almanach, 1887.
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- Washington. Smithsonian Miscellaneous Collections, Vols. XXXII and XXXII.

BOOKS AND PAMPHLETS,

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- DAMES, M. LONGWORTH, C. S., M. R. A. S. The Coins of the Durranis (Reprinted from the Numismatic Chronicle, 3rd Series, Vol. VIII). 8vo. London, 1888.
- HAECKEL, ERNST, M. D., Ph. D. Report on the Siphonophoræ collected by H. M. S. Challenger during the years 1873-76 (The Voyage of H. M. S. Challenger. Zoology. Vol. XXVIII.) 4to. Edinburgh, 1888.

- HAECKEL, ERNST, M. D., Ph. D. Die Radiolarien. 3rd Theil. Die Acantharien oder Actipyleen Radiolarien. 4to. Berlin, 1888.
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- LYMAN, BENJ. SMITH. A Geological and Topographical Map of the New Boston and Morea Coal Lands, in Schnylkill, County Penn'a. Sheet. Philadelphia, 1889.
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- ROY, PRATAP CHANDRA, C. I. E. The Mahábhárata, translated into English Prose, Part 48. 8vo. Calcutta, 1889.

MISCELLANEOUS PRESENTATIONS.

- Monumenta Tridentina, Beiträge zur Geschichte des Concils von Trient. Von August von Draffel. Heft III, Januar-Februar, 1546. 4to. München, 1887.
- Das Bayerische Praecisions-Nivellement. Siebente Mitteilung. Von Carl Max von Bauernfeind. 4to. München, 1888.
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PROCEEDINGS
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ASIATIC SOCIETY OF BENGAL,
FOR JUNE, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th June, 1889 at 9-15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present :—

H. Beveridge, Esq., E. C. Cotes, Esq., E. Gay, Esq., Bábú Bhupendra Sri Ghosha, A. Hogg, Esq., E. J. Jones, Esq., Dr. W. King, C. Little, Esq., W. H. Miles, Esq., Bábú Asutosh Mukhopádhyaý, L. de Nicéville, Esq., W. L. Sclater, Esq., Bábú Heralal Sen, Bábú Haraprasád Shástri, D. Waldie, Esq.

The minutes of the last meeting were read and confirmed.

Twenty-five 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 :—

Dr. O'Connell Raye (re-elected).
Rev. Walter A. Hamilton.
F. J. Rowe, Esq.
Capt. J. Hayes Sadler.

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

Lala Brij Bhukhan Lall, proposed by E. E. Oliver, Esq., seconded by C. Little, Esq.

The following gentlemen have expressed a wish to withdraw from the Society :—

J. Wilson, Esq., C. S.
R. Whittal, Esq.

The SECRETARY reported the death of the following member :—
Hon. Ráo Sáheb Visvanáth Náráyana Mandlik, C. S. I.

The SECRETARY announced that R. D. Mehtá, Esq. had compounded his subscription as a Resident member by the payment in a single sum of Rs. 390.

MR. WOOD-MASON exhibited 4 Cannon balls (?) and 1 Musket ball found six feet below the surface of the ground at the Katholya gate of Rohtas fortress by Mr. H. B. W. Garrick, Archæological Survey of Bengal.

MR. E. C. COTES exhibited specimens of the silkworm fly.

The following papers were read—

1. *Catalogue of the Insecta, Order Rhynchota. Sub-order Hemiptera Heteroptera. Family Capsidæ.*—By E. T. ATKINSON, ESQ., C. S.
2. *On a curve of Aberrancy.*—By ASUTOSH MUKHOPÁDHYAY, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of this note is to prove that the aberrancy curve (which is the locus of the centre of the conic of closest contact) of a plane cubic of Newton's fourth class is another plane cubic of the same class, the invariants of which are proportional to the invariants of the original cubic; it is also proved that the two cubics have only one common point of intersection, which is the point of inflexion for both.

The papers will be printed in the Journal, Part II.

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.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Notulen, Deel XXVI, Aflevering 4.

- Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Tijdschrift voor Indische Taal-, Land-en Volkenkunde, Deel XXXII
Aflevering 6.
- . Koninklijke Naturkundige Vereeniging in Nederlandsch-
Indië,—Naturkundig Tijdschrift voor Nederlandsch-Indië, Deel
XLVIII.
- Bombay. Anthropological Society of Bombay,—Journal, Vol. I, No. 6.
- . The Indian Antiquary, Vol. XVIII, Part CCXIX, March,
1889.
- Brisbane. Royal Society of Queensland,—Proceedings, Vol. VI, Part I.
- Calcutta. Indian Engineering,—Vol. V, Nos. 18—22.
- . The Indian Engineer,—Vol. VII, No. 6.
- Florence. La Società Africana d' Italia,—Bullettino, Tome V, Fascicolo
1°—3°.
- . La Società Italiana di Antropologia, Etnologia e Psico-
logia Comparata,—Archivio per L' Antropologia e la Etnologia,
Vol. XVIII, Fascicolo 3°.
- Giessen. Der Oberhessischen Gesellschaft für Natur-und Heilkunde,—
Bericht, XXVI.
- Graz. Des Naturwissenschaftlichen Vereines für Steiermark,—Mit-
theilungen, Jahrgang 1888.
- The Hague. Koninklijk Instituut voor de Taal-, Land-en Volkenkunde
van Nederlandsch-Indië,—Bijdragen tot de Taal- Land-en Volken-
kunde van Nederlandsch-Indië, Deel IV (5^e Volgr), Aflevering 2.
- Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift,
Band XLIII, Heft 1.
- London. Institution of Electrical Engineers,—Journal, Vol. XVIII,
No. 79.
- . Nature,—Vol. XXXIX, Nos. 1016—1020.
- . The Academy,—Nos. 885—889.
- . The Athenæum, Nos. 3208—3212.
- Mendon. The American Antiquarian and Oriental Journal,—Vol. XI,
No. 3.
- Paris. La Société De Géographie,—Compte Rendu des Séances, No. 7,
1889.
- Rio de Janeiro. Imperial Observatorio do Rio de Janeiro,—Revista do
Observatorio, Anno IV, No. 2.
- Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Vol. XVIII,
Dispensa 3^a.
- Simla. United Service Institution of India,—Journal, Vol. XVIII,
No. 75.
- Tōkyō. Imperial University of Japan,—Journal of the College of
Science, Vol. II, Part 5.

- Trieste. La Società Adriatica di Scienze Naturali in Trieste,—Bollettino, Tome XI.
- Turin. La R. Accademia delle Scienze di Torino,—Atti, Vol. XXIV, Dispensa 8^a—10.
- . La Osservatorio della Regia Università di Torino,—Bollettino. Anno XXII, 1887.
- Vienna. Der K. K. Géologischen Reichsanstalt,—Verhandlungen, Nrn 4—6.
- Yokohama. Der Deutschen Gesellschaft für Natur-und Völkerkunde Ostasiens in Tokio,—Mittheilungen, Band V, Heft 41 und supplement-heft zu Band V.
- Zagreb. Arkeologickoga Druztva,—Viestnik,—Godina XI, Br. 2.

BOOKS AND PAMPHLETS,

presented by the Authors, Translators, &c.

- ELSON, S. R. Prospectus and Plan of Elson's maritime Code of Signals, with specimen pages and plate of Flags. 8vo. Calcutta, 1889.
- HAYTER, H. H. Victorian Year-book for 1887-88, Vol. III. 8vo. Melbourne, 1888.
- MURDOCH, J., LL. D. Papers on Indian Reform: Sanitary, Material, Social, Moral and Religious. 8vo. Madras, 1889.

MISCELLANEOUS PRESENTATIONS.

- Ethnologische Mittheilungen aus ungar, Jahrgang I, Heft 2. 4to. Budapest, 1888.
- Magyar Tudományos Akadémiai Almanach, 1888. 8vo. Budapest, 1887.
E. T. ATKINSON, Esq.
- Dagh-Register gehonden int Easteel Batavia vant passerende daer ter plaetse als over geheel Nederlandts-India, Anno 1659. Van Mr. J. A. Van Der Chijs. 8vo. Batavia, 1889.
- BATAVIAASCH GENOOTSCHAP VAN KUNSTEN EN WETENSCHAPPEN.
Report of the Fifty-eighth meeting of the British Association for the advancement of Science, held at Bath in September, 1888. 8vo. London, 1889.
- BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.
Notes on the Annual Statements of the Government Charitable Dispensaries in the Central Provinces for the year 1888. Fcp. Nagpur, 1889.
- Report on the Judicial Administration (Civil) of the Central Provinces for the year 1888. Fcp. Nagpur, 1889.

Resolution on the Revenue Administration of the Central Provinces for the year 1887-88. Fcp. Nagpur, 1889.

Returns of Rail-borne Traffic of the Central Provinces for the quarter ending the 31st of December, 1888. Fcp. Nagpur, 1889.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report of the Central Park Menagerie, New York, for the year 1888. 8vo. New York.

WILLIAM A. CONKLIN, ESQ.

The Indian Forester, April 1889. 8vo. Roorkee, 1889.

GOVERNMENT OF BENGAL.

Magnetical and Meteorological observations made at the Government Observatory, Bombay in the year 1887. 4to. Bombay, 1889.

GOVERNMENT OF BOMBAY.

Die Hymnen des Rigveda. Von Hermann Oldenberg. Band I, Metrische und textgeschichtliche Prolegomena. 8vo. Berlin, 1888.

Extracts from a Journal kept by Mr. W. J. Archer, acting British Vice-Consul at Chiengmai, of a visit to Chiengtung in May and June, 1888. Fcp. London, 1889.

Return of all Loans raised in India, chargeable on the Revenues of India, outstanding at the Commencement of the Half-year ended on the 30th September, 1888. Fcp. London, 1889.

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Annual Administration Reports of the Forest Department (Southern and Northern Circles), Madras Presidency, for the official year 1887-88. Fcp. Madras, 1888.

Progress Report of Dr. E. Hultzsch, Epigraphist, on the Archæological Survey of Southern India for the months of February and March, 1889. Fcp. Madras, 1889.

Progress Report of Mr. A. Rea, on the Madras Archæological Survey for the months of December 1888 and January to March 1889. Fcp. Madras, 1889.

GOVERNMENT OF MADRAS.

Twelve maps belonging to the Karnal Settlement Report by D. C. J. Ibbetson, Esq., C. S. Sheets.

GOVERNMENT OF THE PUNJAB.

A Catalogue of the Moths of India, compiled by E. C. Cotes and Colonel C. Swinhoe. Part IV, Geometrites. Part V, Pyrales. Part VI, Crambites, Tortrices, and Addenda. 8vo. Calcutta, 1889.

INDIAN MUSEUM.

Map of Sikkim prepared and used by the Tibetan Military authorities during the campaign in 1886 (Reduced to half scale by Photography

from the original, and Lithographed at the Survey of India office.)
Sheet. Calcutta, 1889.

LT.-COL. J. WATERHOUSE, B. S. C.

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- Calcutta. Indian Medical Gazette,—Vol. XXIV, Nos. 4 and 5, April and May, 1889.
- Ceylon. The Orientalist,—Vol. I, Parts 1—12; Vol. II, Parts 1—12; and Vol. III, Parts 1—10.
- Geneva. Archives des Sciences Physiques et Naturelles,—Tome XXI, No. 4.
- Leipzig. Annalen der Physik und Chemie,—Band XXXVII, Heft 1, und Namen Register, Band I—XXXV.
- London. The Chemical News,—Vol. LIX, Nos. 1534—1538.
- . The Nineteenth Century,—Vol. XXV, No. 147, May, 1889.
- . The Society of Arts,—Journal, Vol. XXXVII, Nos. 1900—1904.
- Paris. Revue Scientifique,—Tome XLIII, Nos. 15—18.
- Vienna. Vienna Oriental Journal,—Vol. III, No. 1.

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- English and Tamil Dictionary. 3rd Edition. 8vo. Madras, 1888.
- SEEBOHM, HENRY. The Geographical Distribution of the family *Charadriidae*, or the Plovers, Sandpipers, Snipes, and their allies. 4to. London, 1888.



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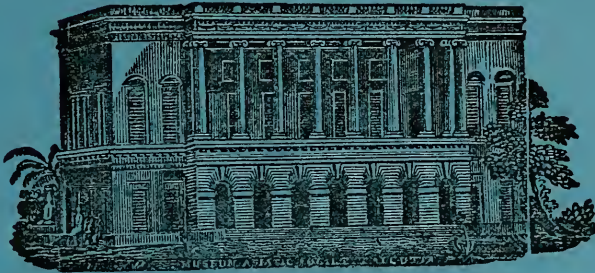
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EDITED BY
THE HONORARY SECRETARIES.

No. VII. JULY, 1889.



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N. B.—In order to ensure papers being read at any monthly Meeting of the Society, they should be in the hands of the Secretaries at least a week before the Meeting.

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1889.

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FOR JULY, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 3rd July 1889, at 9-15 P. M.

COLONEL J. WATERHOUSE, President, in the Chair.

The following members were present :

Rev. A. W. Atkinson, R. R. Bayne, Esq., Dr. A. Crombie, S. R. Elson, Esq., Bábú Bhupendra Sri Ghosha, Dr. Hoernle, W. H. Jobbins, Esq., E. J. Jones, Esq., Dr. W. King, Rev. Father Lafont, C. Little, Esq., Kumár Rameswár Máliah, T. R. Munro, Esq., Bábú Asutosh Mukhopádhyaý, L. de Nicéville, Esq., Dr. P. K. Ray, Capt. J. Hayes Sadler, W. L. Selater, Esq., Dr. J. Scully, J. Wood-Mason, Esq.

Visitors :—Dr. J. R. Adie, B. W. Colville, Esq., J. D. Nimmo, Esq., Hon. Mr. Justice Tottenham, W. H. Wood, Esq.

The Minutes of the last meeting were read and confirmed.

Thirty-four 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 :

Lala Brij Bhukhan Lal.

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

F. R. Mallet, Esq.

The SECRETARY reported the death of the following members :

Ordinary.

Mahárájá Isvariprasád Singh, G. C. S. I. of Benares.
Dr. D. Waldie.

Honorary.

Professor William Wright, Cambridge.

The PRESIDENT said:—I very much regret to have to announce the death since our last meeting of Dr. D. Waldie, one of our oldest members of Council. Dr. Waldie joined the Society in 1865 and had served on the Council since 1879, having been Vice-President in the years 1884 and 1885. He was a most regular attendant at our meetings, and was always ready to further the work of the Society in auditing accounts and giving his services on the various Committees.

He published several papers in the *Journal* and *Proceedings*, most of which were connected with the Water-supply of Calcutta and the effective filtration of the Hooghly water during the rainy season, which has always been a difficulty.

Before Dr. Waldie came to India some forty years ago, he had been connected with Sir James Simpson, who was the first to apply sulphuric ether as an anæsthetic, and appears to have suggested to him the use of chloroform instead of ether, though our late friend and associate does not seem to have received full credit for his share in one of the most important discoveries of the age.

A man of retiring and unassuming ways, we here had few opportunities of knowing the full extent of his scientific work, but as an analytical chemist and chemical manufacturer he undoubtedly did much to promote chemical science in this country. I believe he also did good service in connection with the establishment of Libraries and Institutes in the neighbourhood of his works at Cossipore and Dakhinsur. We shall miss his kindly presence here, and he will be regretted by many who knew his worth.

DR. W. KING exhibited some specimens of interesting minerals.

The SECRETARY gave a summary of the observations received from different sources regarding the explosive sounds known as the "Barisál Guns" and showed how the theory, suggested by Mr. Manson, that they are echoes, explains many peculiarities observed in connection with these sounds.

The following papers were read—

1. *On certain Lycænidæ from Lower Tenasserim.*—By WM. DOHERTY Esq., Cincinnati, U. S. A. Communicated by the SUPERINTENDENT OF THE INDIAN MUSEUM.

MR. DE NICEVILLE made the following remarks:—

The members present will have noted that this paper deals with one family only of the butterflies. Mr. Doherty took up the butterflies of this group so that the species new to science that he described might be included in my "Butterflies of India, Burmah and Ceylon;" the third volume of which, dealing with the *Lycænidae*, is now passing through the press.

Mr. Doherty's list gives over 100 species of *Lycænidae*, and he says that Lower Tenasserim probably possesses twice that number; in this I agree with him, as his list omits many common species which have often been obtained in Burmah, and are sure to occur in the region Mr. Doherty visited.

In 1886, Mr. Doherty proposed the subfamily of *Amblypodinae* of the *Lycænidae*, but in this paper he proposes to alter the name to *Arhopalinae*. If this subfamily is to stand, I think it would be as well to let his first proposed name remain, as it is derived from by far the better-known genus of the two.

Mr. Doherty's notes on green butterflies are most interesting. As far as my experience goes, it coincides with his that those *Lycænidae* which are of a rich glistening metallic green colour on the upperside are invariably males. The green coloration of the undersides of such butterflies as the European "Green Hairstreak," *Thecla rubi*, Linnæus, and the Indian *Lehera eryx*, Linnæus, is undoubtedly protective, these insects being very difficult to see when at rest with closed wings on green leaves. This green colour, too, occurs in both sexes, while the metallic-green coloration is found in the *Lycænidae* in males only.

Mr. Doherty is to be congratulated on the success of his trip to Lower Tenasserim, as in one family of Butterflies alone he has added fifteen species new to science. Such a high percentage (fifteen) is not often obtained now-a-days in the best-known sub-order of insects.

2. *Materials for a Flora of the Malayan Peninsula*.—By GEORGE KING, M. B., LL. D., F. R. S., F. L. S., *Superintendent of the Royal Botanic Garden, Calcutta*.

As the Calcutta Herbarium contains a rich collection of Malayan plants, I propose to publish from time to time a systematic account of as many of them as are indigenous to British provinces, or to provinces under British influence. In addition to the states on the mainland of the Malayan Peninsula, these provinces include the islands of Singapore and Penang and the Nicobar and Andaman groups. The classification which I propose to follow is that of the late Mr. Bentham and Sir Joseph Hooker. It is unlikely that, with the scanty leisure at my command, I shall

be able to complete even the meagre account of the Flora of which the first instalment is now submitted. In spite, however, of this consideration, I think it better to begin at the beginning. The orders will therefore be taken up pretty nearly in the sequence followed in the *Genera Plantarum* of Bentham and Hooker, and in the *Flora of British India* of the latter distinguished botanist. The natural orders now submitted are *Ranunculaceæ*, *Dilleniaceæ*, *Magnoliaceæ*, *Menispermaceæ*, *Nymphæaceæ*, *Capparidææ*, and *Violareæ*. The order *Anonaceæ* should have come between *Magnoliaceæ* and *Menispermaceæ*; but, on account of its extent and difficulty, I have been obliged to postpone its elaboration pending the receipt of further herbarium material. It will, however, it is hoped, soon be taken up.

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

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LIBRARY.

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

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A List of ancient mounds in the Kistna district which are supposed to contain buildings or other objects of archæological interest. Fcp. Madras 1889.

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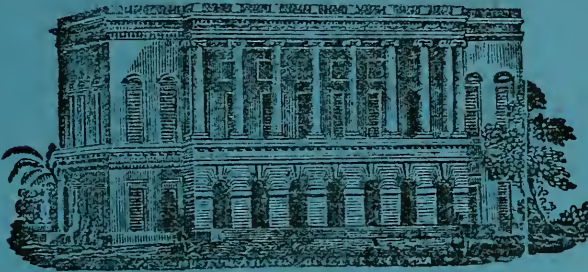
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EDITED BY  
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No. VIII. AUGUST, 1889.



“The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature.”—SIR WILLIAM JONES.

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N. B.—In order to ensure papers being read at any monthly Meeting of the Society, they should be in the hands of the Secretaries at least a week before the Meeting.

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(Continued on third page of cover.)



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR AUGUST, 1889.

---

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th August 1889, at 9-15 P. M.

E. T. ATKINSON, Esq., Vice-President, in the Chair.

The following Members were present :

Dr. A. W. Alcock, R. R. Payne, Esq., H. Beveridge, Esq., Bábú Gaurdás Bysack, Bábú Saratchandra Dás, Dr. Fritz Noetling, Bábú Bupendra Sri Ghosha, Bábú Rajánikánta Gupta, Dr. Hoernle, A. Hogg, Esq., W. H. Jobbins, Esq., E. J. Jones, Esq., C. Little, Esq., Kumár Rameswár Maliáh, W. H. Miles, Esq., Bábú Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., W. L. Sclater, Esq., Bábú Hiralal Sen, Pandit Haraprasád Shástri, Dr. W. J. Simpson, C. H. Tawney, Esq., J. Wood-Mason, Esq.

The Minutes of the last Meeting were read and confirmed.

Thirty-nine presentations were announced, details of which are given in the Library List appended.

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

John Duncan Nimmo, Esq., proposed by T. R. Munro, Esq., seconded by W. R. Criper, Esq.

Munshi Aziz-ud-din Ahmad, Deputy Collector, N. W. P., proposed by V. A. Smith, Esq., seconded by Dr. Hoernle.

H. H. the Máharájá of Benares, Prabhunarain Sing, Bahádur, proposed by Bábú Gaurdás Bysack, seconded by Col. Waterhouse.

The SECRETARY reported the death of the following member :

Dr. Francis Day.

DR. HOERNLE exhibited a large silver seal of Kumára Gupta, found at Bhitari and forwarded by Mr. J. Nicholls, C. S., and read the following abstract from his letter referring to it:—

“The seal was dug up in 1885 when digging for those old bricks of great size which so frequently occur at Bhitari. They were wanted for use in some new buildings. I think these are of the sort of bricks which Cunningham says are often marked with the name Kumára.

“The man who brought me the seal from his father was in Government employ for six years in Gházipur, and for about three years under me as Judge. He was lately turned out, as he had never passed the Middle Class examination, and he came to me for help in his trouble. I think it impossible for him or any of his people to have attempted an imposition. My father-in-law, Mr. Richard Tregear, has known these people and had business with them for very many years. They always grow indigo for his factory and are respectable people.”

DR. HOERNLE observed that the seal had been announced as one of silver, but it was more correct to describe it as a copper seal, because from an assay, made by Dr. Scully, it appeared that the metal contained about 63 per cent. of copper to 36 per cent. of silver. There was also a very small quantity of gold in the mixture. The characters, as usual on such seals, were slightly raised, while on copperplate grants they were usually engraved. In all probability the seal had once belonged to a copperplate grant; but it differed from other seals, in that it appeared to have been soldered on to the plate by the two knobs on its back; while usually the seals were attached to the plate by means of a sliding ring passing through a hole in the plate. There were only three other seals like the present one known: a copper one of Harsha Vardhana, which was a little larger, another of Sarva Varman, of about the same size, and a third of Samudra Gupta, of about half the size. The characters of the inscription belonged to the North Indian class of alphabets; and the inscription was in a fairly good state of preservation. This was a most fortunate circumstance, as the inscription was one of very considerable importance. It carried the genealogy of the early Gupta dynasty two generations further than in any record hitherto known. The line was given thus: 1, Gupta, 2, his son Ghatotkacha, 3, his son Chandra Gupta I., 4, his son Samudra Gupta, 5, his son Chandra Gupta II., 6, his son Kumára Gupta I., 7, his son Pura Gupta; 8, his son Narasiṃha Gupta; 9, his son Kumára Gupta II. It was distinctly stated that the series ran from father to son in every case. The list contained three new names, *viz.*, Pura, Narasiṃha and Kumára II., while all the other names were the same as those given in all Gupta genealogies hitherto found. The difficulty, however, was that the genealogies hitherto known, gave

seven names also running from father to son: Gupta, Ghatotkacha, Chandra I., Samudra, Chandra II., Kumára and Skanda. In the place of the seventh name Skanda Gupta, the new list gave Pura Gupta. The question was in what relation Skanda Gupta stood to Pura Gupta. Were they identical, or perhaps brothers? There was another important piece of information in the new list; it mentioned by name the queens of every king, except the two first and the last. Their names were: 1, Kumára Deví, queen of Chandra Gupta I., 2, Datta Deví, queen of Samudra Gupta, 3, Dhruva Deví, queen of Chandra Gupta II., 4, Ananta Deví, queen of Kumára Gupta I., 5, Śrīvatsa Deví, queen of Pura Gupta, 6, Śrímatí Deví, queen of Narasiṃha Gupta. The older genealogies only mentioned three of these names, *viz.*, Kumára, Datta and Dhruva. The queen of Kumára Gupta I. and mother of Skanda Gupta was never named, though she was referred to in them. The queen of Skanda Gupta was never mentioned at all, whether by name or otherwise. Among the older genealogies, there were only two that carried the line down to the seventh generation of Skanda Gupta. These were the genealogy recorded on the Bhitari stone pillar, and another, in a greatly mutilated state, on the Bihár stone pillar. The former mentioned that Skanda Gupta, after having restored the fallen fortunes of his empire, reported his victories to his mother. The latter mentioned that his father Kumára Gupta married the sister of a person who appears to have been named Ananta Sena. Unfortunately that inscription was in a too bad state of mutilation to place any reliance on it. But if Kumára Gupta's wife's brother was named Ananta Sena, the sister herself would very probably have borne the name of Ananta Deví, by which name Kumára Gupta I's queen is called in the new genealogy. In that case the probability was either that Pura Gupta was identical with Skanda Gupta, or that he was a younger brother of Skanda Gupta, and succeeded the latter, who probably died without issue, there being no indication of his wife's name or existence. In any case the present seal seemed to prove that the line of the early Guptas did not, as was hitherto generally assumed, terminate with Skanda Gupta, but extended to at least two more generations. Hitherto it was supposed that there was only one Kumára Gupta; and the appearance of a second Kumára Gupta would perhaps necessitate a reconsideration of certain historical speculations based on the assumption that there was only one member of that name in the early line of Guptas. Curiously enough there was some independent evidence for the existence of a king Narasiṃha Gupta. Among the gold coins, belonging to the class of the early Gupta coins, there were some which bore the name of Nara or Nara Gupta. Hitherto these coins had been a puzzle; they resembled very closely the coins of the

by the Collector to the finder under the orders of Government (see Collector's No. 156 G, dated 3rd May 1889).

All the 24 specimens are rupees of the Pathán Sultán 'ALĀU-D-DĪN MUḤAMMAD SHĀH, who reigned from A. H. 695-715 = A. D. 1295-1315. The remainder are stated (in Collector's letter No. 51 G, dated 13th August 1888) to have been identical in appearance. It may be presumed, therefore, that all the coins of the hoard were rupees of the same type of the same Sultán. The type is that described and figured in E. Thomas' *Chronicles of the Pathán kings of Delhi*, p. 171, Nos. 133 and 134, plate III, fig. 57. In most of the 24 specimens, the margin is entirely or almost entirely cut away; accordingly neither the place nor the year of mint can be determined. In 9 specimens, however, traces of the mint place *Dáru-l-Islám* (*i. e.*, Dehli), and in two others, of *Ḥaṣrat Dehlí*, can be distinguished. Two specimens also preserve traces of the dates 711 and 713.

3.—Report on 89 ancient coins, forwarded by the Deputy Commissioner of Rawalpindi, with his No. 847 G, dated the 25th March, 1889.

The coins are stated to have been dug up by a zamindár, in June 1888, near Hasan Abdal, in land held by him in joint-ownership.

They all belong to the well-known "Bull and Horseman" type of silver coins of the Brahmanic kingdom of Kabul. They have been often found in large quantities, and described and figured; *e. g.*, in Wilson's *Ariana Antiqua*, Plate XIX, fig. 1-5, Prinsep's *Indian Antiquities* (ed. Thomas), Plate XXV, fig. 3-5, etc. They show on the obverse a mounted warrior with the legend *Bhīma* and the date 814; and on the reverse a recumbent Bráhmaṇí Bull with the legend *Srī Samanta Deva* (82 specimens) or *Srī Syalpati Deva* (7 sp.). The date 814 is most probably referable to the Saka era, and therefore equivalent to 891-892 A. D.

The average weight of each coin is 47.55 grains. One specimen has been, in kind response to my request, assayed by Dr. J. Scully Assay Master, Calcutta, with the following result. The fineness is, silver 894, 6 per mille; the only other metals entering into the composition of the coins being copper and a very small amount of gold. The intrinsic value of each coin, derived from weight and fineness, is 4 annas  $1\frac{1}{2}$  pie. The modern four-anna piece weighs 45 grains and has a fineness of 916.6 per mille; so the lower fineness of the ancient coin is more than compensated by its superior weight.

Twenty-five of the coins are in bad preservation; the remainder are more or less fairly preserved; on 23 of the latter the date is legible.

The SECRETARY laid before the Meeting the report of the "Barisál Guns" Sub-Committee.



Mahárájádhirája, the glorious **Chandragupta** (I.), (*and*) the daughter's son of Lichehavi, begotten on the Mahádevi KUMÁRADEVÍ,

(Line 3.)—(*was*) the most devout worshipper of the Divine One, the Mahárájádhirája, the glorious **Chandragupta** (II.), who was accepted by him (*i. e.*, *Samudragupta*); who was begotten on the Mahádevi DATTADEVÍ; and who was himself without an antagonist (*of equal power*).\*

(Line 4.)—His son (*was*) the Mahárájádhirája, the glorious **Kumáragupta** (I.), who meditated on his feet, (*and*) who was begotten on the Mahádevi DHRUVADEVÍ.

(Line 5.)—His son (*was*) the Mahárájádhirája, the glorious **Puragupta**, who meditated on his feet, (*and*) who was begotten on the Mahádevi ANANTADEVÍ.

(Line 6.)—His son (*was*) the Mahárájádhirája, the glorious **Narasimhagupta** who meditated on his feet, (*and*) who was begotten on the Mahádevi S'RÍVATSADEVÍ.

(Lines 7 and 8.)—His son (*was*) the most devout worshipper of the Divine One, the Mahárájádhirája, the glorious **Kumáragupta** (II.), who meditated on his feet, (*and*) who was begotten on the Mahádevi S'RÍMATÍDEVÍ.

The PHILOLOGICAL SECRETARY read the following reports on finds of Treasure Trove coins.

1.—Report on 372 old copper coins, forwarded by the Deputy Commissioner of Jubbulpore with his No. 4783, dated 8th December, 1887.

The find place is not specified. It must have been somewhere in the Jubbulpore district.

All the coins belong to Ĥusámu-d-dín Ĥúshang Sháh, the second of the kings of Málwa and Mándú. They are described by Thomas in his *Chronicles of the Pathan Kings of Delhi*, p. 348. They are small copper coins, having on the obverse *Ĥúshang Sháh as-Sultán*, and on the reverse: Dáru-l-Mulk Shádiábád. They bear no date.

2.—Report on 24 ancient silver coins, forwarded by the Collector of Champaran, with his No. 1119 G, dated 20th February 1889 :

On or about the 5th July 1887, a Kúli Dusádh of Kundilpur found a hoard of buried silver coins, which is supposed to have amounted to about Rs. 500 or Rs. 600, but of which only Rs. 124 were recovered. On the 20th January 1889, 24 of the best preserved specimens were forwarded to me for examination, while the remainder were returned

\* Or, "who was himself an antagonist (*of equal power to all his enemies*)," if we read *svayaṃ cha pratirathaḥ*.

by the Collector to the finder under the orders of Government (see Collector's No. 156 G, dated 3rd May 1889).

All the 24 specimens are Rupees of the Paṭhán Sulṭán 'ALÁU-D-DÍN MUḤAMMAD SHÁH, who reigned from A. H. 695-715 = A. D. 1295-1315. The remainder are stated (in Collector's letter No. 51 G, dated 13th August 1888) to have been identical in appearance. It may be presumed, therefore, that all the coins of the hoard were Rupees of the same type of the same Sulṭán. The type is that described and figured in E. Thomas' *Chronicles of the Pathán kings of Delhi*, p. 171, Nos. 133 and 134, plate III, fig. 57. In most of the 24 specimens, the margin is entirely or almost entirely cut away; accordingly neither the place nor the year of mint can be determined. In 9 specimens, however, traces of the mint place *Dáru-l-Islám* (*i. e.*, Dehlí), and in two others, of *Ḥaṣrat Dehlí*, can be distinguished. Two specimens also preserve traces of the dates 711 and 713.

3.—Report on 89 ancient coins, forwarded by the Deputy Commissioner of Rawalpindi, with his No. 847 G, dated the 25th March, 1889.

The coins are stated to have been dug up by a zemindar, in June 1888, near Hasan Abdal, in land held by him in joint-ownership.

They all belong to the well-known "Bull and Horseman" type of silver coins of the Brahmanic kingdom of Kabul. They have been often found in large quantities, and described and figured; *e. g.*, in Wilson's *Ariana Antiqua*, Plate XIX, fig. 1-5, Prinsep's *Indian Antiquities* (ed. Thomas), Plate XXV, fig. 3-5, etc. They show on the obverse a mounted warrior with the legend *Bhima* and the date 814; and on the reverse a recumbent Brahmaní Bull with the legend *Srī Samanta Deva* (82 specimens) or *Srī Syalpati Deva* (7 sp.). The date 814 is most probably referable to the Saka era, and therefore equivalent to 891-892 A. D.

The average weight of each coin is 47.55 grains. One specimen has been, in kind response to my request, assayed by the Assistant Mint Master, Dr. J. Scully, with the following result. The fineness is silver 894, 6 per mille; the only other metals entering into the composition of the coins being copper and a very small amount of gold. The intrinsic value of each coin, derived from weight and fineness, is 4 annas  $1\frac{1}{2}$  pie. The modern four-anna piece weighs 45 grains and has a fineness of 916.6 per mille; so the lower fineness of the ancient coin is more than compensated by its superior weight.

Twenty-five of the coins are in bad preservation; the remainder are more or less fairly preserved: on 23 of the latter the date is legible.

The SECRETARY laid before the Meeting the report of the "Barisál Guns" Sub-Committee.

*Report on 'Barisál Guns' made at a meeting of the Sub-Committee held on the 17th July 1889, to consider the observations recorded during the year 1888.*

*Present :*

COLONEL WATERHOUSE.  
 REV. FATHER LAFONT.  
 A. PEDLER, ESQ.  
 BABU GAURDÁS BYSACK.  
 C. LITTLE, ESQ.

The reports sent by correspondents have been partly by means of the forms sent out by the Sub-Committee, partly by letters. Fifteen forms were filled up and returned, and the information contained is given in the accompanying table, in which the more important facts are entered. The dates on the forms are from April 28th to August 14th, 1888 and March 11th, 1889. A large proportion come from Khulna and Barisál, the other places being Moyapore (1), Narainganj (1), Noakhalli (2), Harispur (1), and Daulat, six miles north of Khulna (1). Dr. Crawford sent 5 from Barisál, Mr. Rainey 2 from Khulna, and the facts supplied by Mr. Waller were observed at Khulna by himself or in neighbouring districts by his subordinates. None of these forms or letters refer to the same day, except two cases on the 16th of July and the 14th of August, but the sounds were not heard at the same hours and frequently there are considerable gaps between consecutive dates: this fact, however, may go to shew that these sounds are heard at isolated places and not over a tract of country. This is suggested by the sounds being heard frequently by Mr. Waller in June, and not by Mr. Rainey till the 2nd or 3rd of July, though they were both in Khulna and lived not very far apart.

In all of these forms cloudy or rainy weather is reported, both at the time the sounds were heard and during the previous 24 hours. On this point there is almost complete unanimity.

The only information to be drawn from the reported directions of the sounds is that they always come from a southerly direction, the only exception to this being Kutubdia Light House, and then the sound came from the north-west, while the wind direction was almost due opposite. From Dr. Crawford's and Mr. Rainey's reports it seems that the sounds generally come from the same direction to any given place, and this direction does not alter with a change of wind. During the first two days on which Dr. Crawford reports, the wind was blowing lightly from the S. E. and the sounds came from S. S. E., the second day a little more southerly: during the last three days a strong wind was blowing from the S. W., but the directions of the sounds remained unchanged.



Mr. Rainey reports that the sounds come always from a south-westerly direction, from the direction of the river. If the other observers had repeated their observations, and given information as to the position of the river from where the sounds were heard, this connection might have been more thoroughly established. The other points referred to in the reports are the electrical disturbance and state of the tides. The existence of the former, near or at a distance, is negated by all observers except Messrs. Crawford, Rainey and Elson. Mr. Elson reports the sounds heard by him at Moyapore on the 29th April, five hours after a nor'wester had passed over. The sound of thunder died away in the distance, and some time afterwards the 'guns' became audible. He considers them due to thunder in the distance. Mr. Rainey says thunder and bombs were heard before and after the 'guns' he reports, but the thunder came from the S. E. while the 'guns' were from the S. W. The tide is in the majority of cases reported as full, but sometimes half full and low tide.

The more important letters have been sent by Messrs. Manson and Waller. The former writes of what was observed by him ten or twelve years ago, and after shewing that the banks of the river have the power of concentrating sounds so that echoes may be heard after passing over 50 to 100 miles, he enumerates various sounds loud enough to produce these echoes. The more frequent sounds arise from breaking surf, falling of banks, and bombs. He suggests at the end of his letter that the sounds are echoes which are audible over a limited area, very near the focus in which the sound rays are more or less accurately concentrated.

Mr. Waller has confined his attention more to the number of sounds heard from day to day, and the hours at which they occurred. In the official report sent by him to the Bengal Government, he has summarised his observations and sent along with it a table containing the number of sounds heard in his district, arranged according to the day and hour they were heard. In the table, which extended from the middle of July to about the end of August, the numbers are very large for four days about the middle of August. More sounds were heard during those days than all the other days together. In some of his letters sent to the Society he reports that the guns were very numerous just before the breaking of the monsoon on the 27th of June, and again on 14th July.

These three occasions of Mr. Waller's hearing an unusual number of 'guns' agree very closely with the occurrence of disturbed weather at the head of the Bay, accompanied, as shown by the daily weather report from the Mutla light ship, by a heavy swell and consequently heavy breakers at the mouths of the rivers. It is also noticeable that



the sounds are heard during the period of calm weather, while the centre of disturbance is still at a considerable distance, and that they almost entirely cease after the strong winds and stormy weather commence.

A few other letters of less importance have been received. Mr. D. Ross, of Sultanpur, Purneah, mentions that these sounds, though heard with startling distinctness in a calm evening, were not followed by echoes, though a gun-shot echoed and re-echoed among the neighbouring hills. Mr. M. Punchard, who, while commander of a river steamer had heard the sounds frequently, gives a strong opinion against their being caused by the falling of river banks or the explosion of bombs: his reason for the latter being that he has heard the sounds 'where human habitations are unknown.' Commander Jones of the S. S. "Resolute" reports hearing sounds of distant firing to the S. E. on September 15th, 1888 about 10.30 P. M. There was no thunder, but slight sheet lightning to the N. E. Mr. La Touche, of the Geological Survey, writes that he heard similar sounds in the Khasia hills on the edge of the plateau about 14 miles to the west of Cherrapoonjee, close to the village of Kengsao, on the 19th March between 5 and 6 P. M. from W. S. W., generally two in quick succession, short, low booms occurring 3 or 4 times. Later, about 8 P. M., a thunderstorm passed to the north, but not from the same direction as the other sounds.

After consideration of these reports we are almost unanimously of opinion that the evidence is very strongly in favour of the sounds being closely connected with the river banks, and that their frequent occurrence during two or three days immediately preceding the arrival of disturbed weather from the Bay of Bengal may be attributed to the atmosphere being highly charged with moisture, and the comparatively calm weather which occurs at such times. We have carefully considered the evidence in favour of the theory of echoes from the river banks suggested by Mr. Manson, and supported as it is by strong circumstantial evidence, in that it readily explains many peculiarities noticed in connection with these sounds, we think, it at least deserves, that efforts should be made to disprove it. There seems to be no evidence in favour of volcanic action, or the 'Swash of no-ground' being the causes of the sounds, and we are of opinion that by gradually narrowing the field of enquiry in this way the arrival at results may be more readily effected.

Babu Gaurdas Bysack, while dissenting from the expression of opinion that the sounds are due in some way to the river banks, wishes it to be recorded that his reason for so doing is because of the existence of similar banks in other parts of the Ganges near which no such sounds are ever heard.









*Summary of Mr. Waller's observations.*

The general result of observations I made during some 6 weeks of June and July gave the following results

(a) the sounds seemed always to come from the south or south-east.

(b) they were sometimes single and sometimes double, *i. e.*, like 2 cannons fired immediately after each other;

(c) they came sometimes singly at short intervals and sometimes as many as 5 or 6 in quick succession with only a second or two between, while at other times a single sound was heard not followed by another at all that day, or not till after a long time;

(d) the sounds were heard indistinctly except in somewhat still weather, hence they were heard more clearly and distinctly at night as a rule than by day;

(e) the sounds when loud and distinct could not be mistaken for any other sound, but when indistinct might not be distinguishable from the sounds of bombs;

(f) the distinctive characteristic of the sounds was the resounding hollowness of them, resembling the sound of a large heavy substance falling on to a wooden floor in a very large vaulted building heard at a considerable distance;

(g) the wind was invariably from the south, or south-east by south, at this time of the year;

(h) there was an unusual number of frequent discharges day and night just before the monsoon broke here on June 27th;

(i) I noticed 2 or 3 times that when there were a considerable number of the sounds heard, a bank of rain cloud from the south had come up discharging rain within the previous 24 hours;

(k) the sky was more or less overcast to the south always;

(l) no electrical disturbances or thunder were observed, either locally or at a distance, before or after or at the time of the sounds;

(m) the sounds were heard at all states of the ebb and flood tides equally.

The way in which the sounds may be heard by one person and not by another in the same or almost the same place was exemplified by my bearer hearing 3 sounds on my house steps as I rode slowly up to them in the evening, while I, who was not 50 yards off, heard nothing. Mr. Rainey also told me he had heard them while in a house with others, who being in another part of it heard nothing.

From Chanduria, Debhatta and Morrellgunj it is reported that, though heard in former years at those places, none were heard during 1888, and though I heard many at my house at Khulna, Mr. Rainey, whose house is about a quarter of a mile east of Rupsha river, close to which

my house stands, told me he had heard none this year. They were heard, however, at Satkhira, generally in the morning and evening and at quite irregular intervals, and from the east and south-east, and usually while there was light rain falling after a clear sky the previous day. The Municipal Chairman there says he has heard them at Ranaghat in Nuddea, and that Hindu children are taught that the sounds are the opening of the gates of Ravan, king of Lanka.

My own impression is, that the sounds are undoubtedly atmospheric, and caused by some meteorological phenomena resulting from the approach of banks of warm vapour from the Bay of Bengal towards the land, and possibly to their meeting with a cold air current from the north.

*Extract from a letter written by A. MANSON, Esq.*

I have heard them at Dacca, in the Noakhali district, on the Meghna, and going through the Sundarbans on one of the Assam steamers, but it is all so long ago that I cannot trust my memory for exact particulars.

I. In Dacca it was in August—October 1875 at night.

II. On the Meghna in October 1875 during the last 4 or 5 days of the month as I was travelling down from Dacca to Noakhali by native boat: and III, afterwards in 1878-79 in some parts of Noakhali district, I cannot say exactly where, nor what time, but I think in the cold weather.

IV. Going through the Sundarbans by steamer from Calcutta to Goalando during the last few days of October 1876 I heard them at Barhaisal itself, and some other occasions I had much talk about them with the steamer Captain, this time (at Barhaisal) it was in the evening, about sunset I think, and the day before the great cyclone which drowned out Soondeep &c., tide about at the full I remember. On that occasion I thought the sounds were possibly native fire-works, "bâns"—but the Captain was convinced they were the genuine "guns." I may say that every time and place where I have heard them there has always been the possibility of native bombs. I have been a good deal about the Meghna in boats and along this sea coast, and can testify that natives are perpetually firing off these 'bâns' at all hours of the day and night. A large joint of bamboo rammed with some pounds of powder, or sometimes a stout earthenware bombshell, is buried in the ground, rammed tight and fired with a fuse just for the sake of the noise, but it is mostly done when crops are reaped and the ground is dry, December to June. The "Guns" are not at all like one of these bombs when heard within a couple of miles, for I know the bombs very well. The "Guns" are more of a dull roar with a reverberation, like a blast in a quarry amongst the hills, or a heavy gun some miles off. I cannot tell the direction of the

sounds, but always had the impression they were from the south—but once I distinctly made out such sounds coming from the falling of the banks. This was on the second occasion above mentioned. I was rowing down with the ebb, I think it was afternoon but the exact place I cannot say; hearing such a sound I went out of the cabin and sat on the roof of the boat with my binoculars watching. I heard the sounds pretty often and found they always followed any considerable fall of the bank when that took place a mile or so from the boat: the bank must have been 20 feet high and many falls were taking place, as usually happens when the ebb is running out. One very large piece fell within a few hundred yards of the boat, and there was no sound but the splash in the water; but at a long distance whenever I could see the splash with my glasses I could make certain of hearing the roar some minutes after. I was chiefly looking ahead, *i. e.*, southwards, but my impression is that I saw some and heard the same echo from upstream too. Echo probably has a great deal to do with it, and very likely bombs fired near the river may echo with a similar reverberation. Once 28th to 31st January 1879 I was out camping by Chur Hime on the east side of the Meghna at the boundary between Tipara and Noakhali districts. About sunset, ebb-tide I think, Mr. F. Jones the Collector of Tipara and I were walking back to our boats along the water's edge, it is a low shelving shore, and the high bank would be on the western side of the stream but at least six miles off. I fired off my gun and we were both startled nearly two minutes after to hear a loud echo come from the other side across the water, *i. e.*, from S. W., after an interval it sounded again and again, as if it were echoing backwards and forwards from one side of the river to the other. We fired a number of times to try it, and always with the same result, after waiting  $1\frac{1}{2}$  to 2 minutes the echo came and repeated itself in the same way. When a 12-gauge shot gun with  $3\frac{1}{4}$  drachms powder can wake up an echo like that, it is not unreasonable to suppose that any larger sound may echo even scores of miles. The Meghna is such a huge desert of water there is room for any sound to develop itself—it flows cutting out huge curves alternately on the two banks, and the islands, or *churs*, which form upon the shallow sides are cut out by intersecting channels on the same pattern but on a smaller scale: and the echoes probably travel along the hollow curve where the high bank is. That sounds may travel a great way I know well. Once in the cold weather I was out in camp in the low hills at a place called Darooteng in Poori district, about ten miles south of Cuttack town—it was about sunrise, clear and cold—I heard sounds like a hundred paviours at work with heavy rammers somewhere near, as it seemed; but my shikari said it was the Regiment in Cuttack fort, and I



found out he was right; every musket shot was a distinct thump—the wind was from them to me.

I have often heard the distant thunder over the sea both here and at Pooree, where I lived within 100 yards of the sea for  $2\frac{1}{2}$  years, it might easily be taken for a Barhisal “gun” sometimes. I have also often heard and watched the booming of the sea rollers which Mr. Pellew speaks of both at Pooree and here, and in the mouth of the Meghna once about Hatia island. At Pooree one sees this to perfection about October—and I have no doubt the sound of one of these toppling rollers would echo up the Meghna every bit as loud as the falling bank does. The sea is smooth, and a long wave which looks as if it were one unbroken line for miles rolls up on the outer surf bank, rising higher and higher till one can see the light through it. I suppose 10 or 12 feet high it must be and it falls over with a grand roar—but sometimes part of the wave breaks too soon in two or three places, or outruns the main line, and then the fall of the water becomes irregular, and there is a series of sharp explosions because the higher parts of the broken line of wave not only fall forward but fall inward, *i. e.*, two faces of water slap together, it is not easy to describe but the wave instead of falling over evenly all along the line, seems to run up to a peak and explode in one place, then again in another place and so on. This sort of noise would make a very good echo. At page 8 of the pamphlet by Col. Waterhouse I see a mistake is 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 Sitakund range and the so-called “Mud Volcanoes” of Ramree and Cheduba. These are nothing but escapes of marsh gas—the whole country for hundreds of miles is water-formed, recent alluvial clay shale and such like—and full of marsh gas. I have seen the Jack-o-lantern in Chittagong town itself, and you may often see bubbles come up in the swimming tank. In the marshes, which they call here “*dofa*” and in Sylhet they call “*hawar*,” there are explosions heard sometimes which are very likely sudden jets of marsh gas (or rather the echo of such a belch) when the air is still—and that gives rise to a suggestion; is it not possible that where two currents run together and form a shoal in the glue-like mud which we have in these rivers, all the gas it contains may be pressed together and form a sort of bubble under the shoal? Sometimes the top of a mud bank is caked and cracked by the sun while a foot or two below it is semifluid like custard. I know that cavities form in some of these—possibly by the underpart running out in an extra low tide—for the Kutubdia embankments sometimes sink and show such a hole as one might bury an ele-



phant in, and walking over the dry surface one can hear the whole mud flat gurgling and gulping underneath. It is likely that the water may sometimes run suddenly over such a hole, and the air would come out with a slap, but this is all surmise. As for the 'Swatch of No-ground' you have been over it often enough. My idea is, that sudden noises of various kinds go to make up the so-called "guns," and that the curious part of them is more in the echo than anything else. There is always a favourable point for an echo, and it may be heard well at the right point, and yet not be heard in neighbouring places.

The following papers were read—

1.—*Note on an inscribed seal of Kumára Gupta.*—By MR. V. A. SMITH, (the seal above referred too).

The paper will be printed in the Journal, Part I.

2.—*Græco-Roman Influence on the Civilization of Ancient India.*—By VINCENT ARTHUR SMITH, *Bengal Civil Service.*

(Abstract.)

The essay is divided into nine chapters, the contents of which may be briefly summarized as follows:—

#### *Chapter I. Introduction.*

The Indian expedition of Alexander the Great was, so far as our definite knowledge goes, the first occasion of close, conscious contact between East and West. His empire, though itself transitory, resulted in a permanent diffusion of Hellenic culture in Asia. The working of Greek ideas on Indian soil, though traceable in the fields of religion, poetry, science, and philosophy, is most obvious in the domains of architecture and plastic art, and the greater portion of the following essay is therefore devoted to the consideration of Indo-Hellenic architecture and sculpture.

#### *Chapter II. Indo-Hellenic Architecture.*

IN N. W. India the pillars in the Indo-Persian style were gradually supplanted by pillars imitated from Greek models. Strictly speaking, no Indo-Grecian style of architecture is known. The ascertained facts prove no more than that the Indians used in buildings planned after their own fashion, pillars copied, with modifications, from Greek prototypes.

In Káshmir and the Salt Range a modified form of the Doric pillar was employed. The Indo-Doric pillar is not associated with Indo-Hellenic sculpture, and, being a purely local development, is not further considered in this essay.

In the early centuries of the Christian era on the north-west frontier of India, that is to say, specially in the Gándhára country, or Lower Kábul Valley, in the neighbourhood of Pesháwar, pillars, the designs of which are modifications of the Ionic and Corinthian types, were commonly used.

The proper extension of the term Gándhára is discussed.

The Gándhára territory, in the wider sense including Taxile etc., was the principal seat of Hellenic culture in India, and from one or other part of it nearly all the known examples of Indo-Hellenic art in its most characteristic forms have been obtained. In a foot-note references are given to the principal collections of such examples, and to the publications describing them.

The Gándhára school obviously deserves, though it has not yet obtained, a place in the general history of Greek architecture and sculpture. The art of Gándhára is in the main Greek or Roman, not Indian.

The scanty Indo-Ionic remains are examined at length, and shown to date from about the beginning of the Christian era.

The peculiarities of the abundant specimens of Indo-Corinthian pillars are next discussed. The chronological question is reserved for full discussion on a later page.

### *Chapter III. The Gándhára, or Pesháwar School of Sculpture described.*

This section is devoted to the description in considerable detail of selected characteristic works of the school, the discussion of aesthetic and chronological questions being reserved, so far as possible, for chapter V.

The eldest known Indo-Hellenic sculpture found in the Panjáb is the statuette of Pallas Athene in the Lahore Museum. It is contemporary with Azes, about the beginning of the Christian era.

Leitner and Cunningham consider the figure of 'the Śaka King' to be the most striking piece in the extensive collection at Lahore. Other statues of so-called 'kings' are next discussed.

Most of the Gándhára sculptures are distinctively Buddhist. Select examples of sculptures illustrating the nativity, preaching, and death of Gautama Buddha are described in detail. In Gándhára art he is frequently represented as wearing moustaches, and with the right shoulder draped.

The suggestion is offered that the later practice of always representing Buddha and the Jain saints with curly negroic hair was merely a conventional survival from archaic art, and was probably derived from a bronze prototype.

The *Játakas*, or Birth-Stories, often formed the theme of Gáandhára sculptors, but few examples of this class of works have been preserved. The sculptures of the risers of the steps of the monastery at Jamálgarhi offer the best preserved examples, which may be studied in the British Museum. The carvings on these risers are described at considerable length.

Certain sculptures, specimens of which exist both in London and Calcutta, are described, and shown to be imitations of the Greek Gigantomachia. The conjecture is hazarded that the Indian conception of the Asuras is a derivative from the Greek myth of the giants who warred with the gods.

A group (of which several specimens are known), and which represents a young woman being carried off by an eagle, is shown, (as first pointed out by Cunningham), to be an imitation of the celebrated Rape of Ganymede, by Leochares, which continued to furnish a model to Greek and Roman sculptors for centuries.

A curious panel on which Greek soldiers are shown is next discussed, and the Greek origin of comic friezes representing boys riding on lions and so forth, and of the frequent figures of centaurs, tritons, and other monsters is briefly referred to.

The section closes with a summary account of the detached stucco heads, which are the most abundant relics of Gáandhára art.

#### *Chapter IV. Hellenistic Sculpture in India Proper.*

The works, select specimens of which are noticed in this section, are much less numerous than those of the Gáandhára school. The series begins with the sculptured capitals of Aśoka's monoliths, some of which are decorated with the honeysuckle ornament characteristic of Ionic architecture.

The centaurs, tritons, etc., seen at Bhárhut, Buddha Gayá, and elsewhere are evidently of Greek origin, as also is the four-horsed chariot of the sun, several examples of which in ancient Indian sculpture are known. Ordinarily, in Indian mythology, the solar chariot has seven horses.

The most easily recognizable Hellenistic sculptures, out of the Panjáb, are found at Mathurá, and comprise two groups, which seem to refer to the myth of Silenus, and a group of Hercules and the Nemean lion. These works are briefly described and discussed.

#### *Chapter V. The Chronology and Affinities of the Gáandhára or Pesháwar School of Sculpture.*

This is the principal portion of the essay, and the subject is treated

in a somewhat elaborate way. It would be impossible to give an adequate summary of the arguments in a small space.

The external evidence for the date of the Gándhára sculptures is first examined. It falls chiefly under three heads, Epigraphic, Numismatic, and the records of the Chinese pilgrims.

The only inscription which gives any real help in determining the chronology is the one dated 274, recently discovered by Mr. L. White King. Reasons are given for referring this date to the Saka era, and interpreting it as equivalent to A. D. 352.

The numismatic testimony is very scanty. Coins of Azes fix the approximate dates of the Taxilean temples with Ionic pillars and of the statuette of Pallas Athene.

The finding of coins of Vasu Deva at Jamálgarhi does not conflict with the other evidence which refers the remains at that site to the early part of the third century A. D.

The details of the reported discovery of coins of Kanishka at Sanghao are very puzzling, and, if implicitly accepted, would involve the dating of almost all the Gándhára sculptures earlier than A. D. 78.

It is shown that this conclusion is altogether inadmissible, and that consequently there must be some mistake in the observation of the discovery of Kanishka's coins, or in the interpretation of that observation.

A long argument is devoted to the establishment of limiting dates for the sculptures, and the gradual contraction of these limits by supplementary reasoning. Mr. Fergusson's and Sir A. Cunningham's opinions are discussed at length, and the relations between the Gándhára school and the art of the Roman empire are examined and illustrated in detail. The records of the Chinese pilgrims are utilized to supplement the evidence offered by the sculptures themselves.

A brief *résumé* of the known facts concerning the commercial intercourse between India and the Roman Empire is given to facilitate the comprehension of the comparisons made between Indian and Roman art, and to assist in fixing the limiting dates.

The principal conclusions finally arrived at are :—

(1.) That the Taxilean temples with Ionic pillars, and a very few sculptures, notably the statuette of Pallas Athene, date from the beginning of the Christian era, or a little earlier; and are, like the sculptures at Bhárhut and Buddha Gayá, results of Hellenistic, as distinguished from Roman, influence.

(2.) The sculptures from the Gándhára or Yusufzai country near Pesháwar are the work of a local school, probably founded by a foreign colony, which drew its inspiration directly from Roman, and, only remotely, from Greek art.



(3). None of the Romano-Buddhist sculptures are earlier than 200 A. D., or later than 450 A. D. The best specimens belong to the period A. D. 200—350.

(4). Romano-Buddhist sculpture shows some affinity with the style of decoration employed on the great temples at Baalbec and Palmyra in the second and third centuries of the Christian era, but its closest relationship, (and the connection is very close indeed) is with the Roman Christian sculpture of the period A. D. 250—450, as seen in the Catacombs.

#### *Chapter VI. The Indian Schools of Painting.*

Colour was used to enhance the effect of sculpture both in Gándhára and at Amarávátí, and it is highly probable that wall paintings also existed in Gándhára. No specimen of such painting, however, has yet been discovered, and the ancient Indian schools of painting are at present known only from the remains of their works in the caves of Western India.

Considerable fragments of large and elaborate pictures on plaster still exist at Ajantá in the Nizam's Dominions, and at Bágħ in the south of Málwá.

The criticisms of Messrs. Fergusson and Griffiths on these works are quoted, and the author expresses his belief that pictures of such considerable merit must have been produced under the influence of Western art. The natives of India have always shown an incapacity for the artistic treatment of the human form, except during the time when Hellenistic and Roman influence was potent.

#### *Chapter VII. The Art of Coinage in India.*

Concerning the origin of the art of coinage in India the author expresses the opinion that, though all ancient Indian coinages with the slightest pretensions to artistic merit are ultimately of Greek origin, yet the idea of coining money, and a knowledge of the simple mechanical processes necessary for the production of rude coins originated independently in India, or, at the least, were not borrowed from the Greeks.

The approximate date at which money struck to a definite standard of weight was first minted in India cannot be determined.

The most primitive pieces are blanks of silver, struck to the standard of 32 *ratís*, 58½ grains. Such pieces, and some of the uninscribed punch-marked coins, afford no indication of age. Sir A. Cunningham's belief that they are as old as B. C. 1,000, does not appear to rest on evidence.

The author holds that it would be impossible to prove that any given extant piece is older than the time of Alexander the Great, though

it is quite possible that some of the primitive coins may be considerably older.

The oldest Indian coins to which a date can be assigned are those issued by Sophytes, the contemporary of Alexander, in imitation of Syrian coins.

The only valid reason for supposing the blank and punch-marked coins not to be of Greek origin is that they show no trace of Greek influence either in weight or device. They cannot be proved to be older than the age of Alexander the Great.

The earliest Indian inscribed coins belong to the period of Aśoka. It seems probable that the use of legends on coins was one of the many effects produced in India by contact with the Hellenistic world.

It is impossible to be certain when the use of rude coins of Indian standard altogether ceased—it may have lingered in out-of-the-way parts of the country until comparatively modern times.

Aśoka's coinage must apparently have consisted chiefly of rude, uninscribed coins of Indian standard, in silver and copper. The inscribed coins of his age are rare, and do not record any king's name.

The general adaptation in India of Greek or Græco-Roman types of coinage was the result of Indo-Scythian invasions about the beginning of the Christian era. The Indo-Scythians also introduced gold coinage. Their gold coins are essentially Greek *stalers*, though showing the influence of various foreign ideas.

The Gupta coinage is intimately related to the Indo-Scythian, and its devices exhibit faint traces of Greek influence as late as A. D. 400.

The die-cutters of India never attained any high degree of excellence in their art. Their failure in the artistic treatment of the human form stands in sharp contrast to the success of the Bactrian mint masters. The peculiarities of Bactrian numismatic art are briefly explained.

The use of Greek legends on the coins of Indo-Scythian kings in the first and second centuries of the Christian era shows that a knowledge of the Greek language was then diffused in India to a considerable extent. The knowledge of Greek seems to have lingered longest in Guzerat. Corrupt Greek letters are found on coins of Skanda Gupta, struck in that region as late as A. D. 450.

It is curious that no Greek inscription has been found in India.

The numismatic facts above summarized help to render credible and intelligible the alleged Greek influence on Indian literature, science, and philosophy, to the summary consideration of which the few remaining pages of the essay are devoted.

#### *Chapter VIII. The Origin of the Indian Drama.*

The author accepts the theory maintained by Professor Windisch that the Indian drama was developed by the help of Greek influences,

and that a real connection exists between the Sanskrit dramas and the New Attic Comedy of Menander and the other writers of his school.

“We must,” says the Professor, “recognize either a wonderful case of pre-established harmony, or the existence of Greek influence on the Indian drama.”

The section is mainly occupied with an analysis of the arguments advanced by Dr. Windisch.

It is not contended that any Indian play is a translation or free adaptation of a given Greek piece. On the contrary, the best Indian plays are the work of native genius of high order, employing native materials in its own way, and for its own ends, but first set in motion by a powerful impulse received from abroad. The case of the drama is analogous to that of the Amarāvati sculptures.

*Chapter IX. Græco-Roman Influence on the Religion, Mythology, Science, and Philosophy of India. Conclusion.*

In this concluding chapter the author does not attempt to discuss the vast subject indicated by the heading, but merely takes a cursory glance at some of the results of modern research.

It is plain that Hindu religion and mythology were considerably affected by Hellenic influences, and the Hindu systems of philosophy, specially the Vedānta, show marks of Western influence.

It is now admitted that Indian astronomy, as an exact science, was learned from the Alexandrian astronomers of the school of Ptolemy. Some competent scholars deny the originality even of the logic and grammar of India. Whatever be the exact degree of the indebtedness of India to Greece, it is now certain that ancient Indian civilization was much less original and self-contained than the early European Sanskrit scholars supposed, and that the Sanskrit literature (excepting perhaps the Vedas) does not date from a very remote period.

The concluding paragraphs draw attention to the startling historical problem propounded by the sudden appearance in India during the third century B. C. of long documents in two diverse, highly developed characters, of stone architecture, stone sculpture, chronological eras, inscribed coins, and a missionary state religion.

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

3. *Natural History Notes from H. M.'s Indian Marine Survey Steamer 'Investigator,' Commander A. CARPENTER, R. N. Commanding.* No. 10. *List of Pluronectidae obtained during the years 1888 and 1889, with description of new species.*—By A. ALCOCK, M. D., *Surgeon Naturalist to the Marine Survey.*

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

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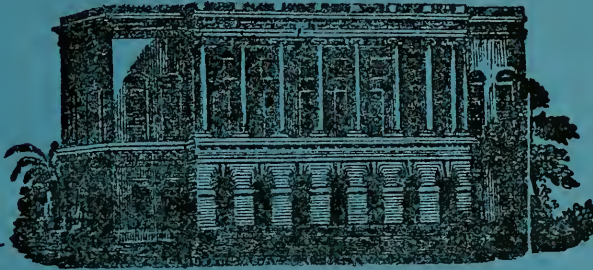
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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.

No. IX. NOVEMBER, 1889.



"The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature."—SIR WILLIAM JONES.

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N. B.—In order to ensure papers being read at any monthly Meeting of the Society, they should be in the hands of the Secretaries at least a week before the Meeting.

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(Continued on third page of cover.)

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR NOVEMBER, 1889.

---

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th November 1889 at 9 P. M.

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

The following members were present :

H. Beveridge, Esq., E. C. Cotes, Esq., Bábú Saratchandra Dás, E. Gay, Esq., Dr. G. M. Giles, Dr. Hoernle, C. Little, Esq., Dr. K. Macleod, Kumár Rameshwár Maliáh, W. H. Miles, Esq., T. R. Munro, Esq., L. de Nicéville, Esq., J. D. Nimmo, Esq., Dr. P. K. Ráy, W. L. Selater, Esq., Bábú Hiralál Sen, Pandit Haraprasád Shástri, Dr. W. J. Simpson, J. Wood-Mason, Esq.

Visitor. J. A. Cairns, Esq.

The Minutes of the last meeting were read and confirmed.

Ninety-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.

J. D. Nimmo, Esq.

Munshi Aziz-ud-din Ahmad.

H. H. Prabhnnarain Singh, Bahádur, Mahárájá of Benares.

Rájá Rámranjan Chuckerbutty, Bahádur.

J. C. Bose, Esq., M. A.

The following gentlemen, duly proposed and seconded were balloted for and elected Ordinary Members :

Hon'ble Rájá Rameshwára Singh, Bahádur.  
 Dr. Edmund James Simpson.  
 Pandit Jwála Prashad, M. A.  
 J. R. Adie, Esq., M. B.  
 W. A. Lee, Esq.  
 Dr. J. H. Tull Walsh, I. M. S.  
 Capt. D. C. Phillott.  
 W. B. Colville, Esq.

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

Kumár Nilkrishna Deb, Bahádur.

The SECRETARY reported the death of the following Member :

E. J. Jones, Esq.

also that the election of Major A. W. Jamieson had been cancelled at the request of that Officer, who reported his inability to take up Membership at present as he was contemplating an early return to Europe ; and that the election of the following gentleman had been cancelled under Rule 9, as he had not paid his admission fee and first quarter's subscription.

Bábú Surendranath Ráy, B. L., proposed by Bábú Asntosh Mukhopádhyáy.

The SECRETARY announced that J. D. Nimmo, Esq., had compounded his subscription as a Resident Member by the payment in a single sum of Rs. 420.

The CHAIRMAN announced that Mr. Beames had been elected a Member of the Council in consequence of the vacancy caused by the death of Dr. Waldie.

The CHAIRMAN read the following letter from Mons. 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 regarding birds, reptiles, insects &c.

“L'année dernière j'ai eu l'honneur de vous adresser plusieurs demandes concernant *l'hybridité dans le règne animal*, vous avez été assez bon pour m'envoyer des indications qui m'ont été très utiles. Mon intention est, cette année, d'écrire à un grand nombre de naturalistes pour savoir s'ils possèdent dans leurs collections quelques pièces hybrides ou s'ils ont observé eux mêmes soit à l'état libre, soit dans la captivité,



des croisements entre espèces animales (oiseaux, reptiles, insectes, coquilles, ou autres). Vous seriez donc bien aimable de me communiquer la liste des membres de votre société que vous avez probablement imprimée dans vos archives ; dans le cas contraire votre secrétaire voudrait-il avoir l'obligeance de me la copier (inutile d'ajouter que je m'offre à payer les honoraires pour le temps passé à ce travail qui me serait *d'une grande utilité*).

“ J'espère, Monsieur le Président, que vous voudrez bien accéder à ma demande, mon but seul, en vous demandant cette liste, est de me renseigner près des naturalistes qui peuvent avoir quelques faits à me communiquer.

“ Je vous prie, avec mes remerciements bien sincères, d'agréer l'expression de mes sentiments les plus distingués.

A. SUCHETET.

Propriétaire a' Breauté par Goderville au chateau d' Autville.

Seine Inférieure.

le 31 Julliet, 1889.

France.

The CHAIRMAN read the following translation of a French letter from Mons. E. Senart reporting his inability to attend the Congress at Stockholm, where he had been asked to represent the Asiatic Society.

“ I intended to send you a résumé of the proceedings of the Stockholm Congress and to express to you at the same time my lively appreciation of the honour the Asiatic Society of Bengal conferred on me by asking me to represent it at the Congress. With deep regret I have to inform you, to-day, of my inability to discharge the mission with which I have been entrusted. I was on my way to Stockholm, when circumstances over which I had no control whatever, compelled me to return. Under any circumstances I would have regretted this deeply ; all the more so, as in this manner I was prevented from availing myself of the flattering distinction which the Society has bestowed upon me.

“ May I ask you, Mr. President, to convey to the Council of your Society my apologies, as well as the expression of my sincere gratitude. The remembrance of the flattering honour which the Society intended to bestow on me will always be very precious to me, and add to the debt of gratitude which I already owe to your distinguished Society.

“ Please to accept, Mr. President, the assurance of my respectful sentiments, with which I have the honour to remain

Yours very sincerely,

October 5th, 1889.

EMILE SENART.

The PHILOLOGICAL SECRETARY read a letter from Mr. Sandford, forwarding a note from Mr. Chamberlain together with some coins found at Vynot, near the N. W. Railway Station, Reti.

The PHILOLOGICAL SECRETARY exhibited eleven early Muhammadan coins presented by Thakur Raghbir Baksh Sing, Talukdar of Rehwan, Rai Bareli district, through Mr. V. A. Smith; also two specimens of silver coins found in the Hardoi district, presented by the Government of the N.-W. Provinces and Oudh.

The PHILOLOGICAL SECRETARY read reports on the following finds of Treasure Trove coins.

1. Report on 196 coins forwarded by the Deputy Commissioner of Sháhpur with his No. 624, dated 24th July, 1889.

The coins are stated to have been found in an earthen vessel in the ground near Lodhi in the Salt Range.

The metal of the coins is an amalgam of copper and silver, and, with one exception, they are all of one kind; *viz.*, coins of the Paṭhán Sulṭán of Dehlí, ĠHIYÁŞU-D-DÍN BALBAN, who reigned from A. H. 664-686, or A. D. 1265-1287, of the type, described and figured by E. Thomas in his *Chronicles of the Pathan Kings of Delhi*, p. 135, No. 113 (plate II, fig. 43). They show on the obverse the Sulṭán's name and title in Arabic character, and on the reverse in a circular area the word *Balban* in Arabic, and in a circular margin the Sulṭán's name and title in Nágari characters. The single exception is a coin of Saifu-d-dín Muḥammad Kutlagh Khán, who A. D. 1255 revolted against the Sulṭán of Dehlí, Násiru-d-dín Maḥmúd, the immediate predecessor of Ġhiyáşu-d-dín Balban. This type of coin is described and figured in Prinsep's *Indian Antiquities* (ed. Thomas), vol. I, p. 37, (plate II, fig. 14).

2. Report on 304 silver coins, forwarded by the Deputy Commissioner of Jabalpur, with his No. 2128, dated 15th June, 1889.

The find-place is not stated in the Deputy Commissioner's letter. The coins were forwarded, with a rough and inaccurate attempt at identification, distributed in five lots.

The coins are all rupees of the following Mughal emperors of Delhi:

- |                                                                                        |   |
|----------------------------------------------------------------------------------------|---|
| I. SHÁH JAHÁN, A. H. 1037-1068=A. D. 1627-1658,                                        |   |
| an indifferent specimen of the two-square-                                             |   |
| areas type; regnal year 17;                                                            | 1 |
| II. AURANGZÍB, A. H. 1068-1118=A. D. 1658-1707;                                        |   |
| indifferent specimens; mint and dates; illegible on most; one with <i>míhr munír</i> . | 9 |

III. FARROKH SIYAR, A. H. 1124-1131 = A. D. 1712-1719.  
Mint: Sháh Jahánábád, date 1126 on one; others illegible.

2

IV. MUHAMMAD SHÁH, A. H. 1131-1161 = 1719-1748.

Type 1, *Sháhib Qírún*; indifferent specimens: 4

Type 2, *Bádsháh Gházi*; various dates.

|                                      |           |    |
|--------------------------------------|-----------|----|
| <i>a</i> , Mint: <i>Akbarnagar</i> , | specimens | 23 |
| <i>b</i> , ,, <i>'Azímábád</i> ,     | ,,        | 48 |
| <i>c</i> , ,, <i>Benares</i> ,       | ,,        | 6  |
| <i>d</i> , ,, <i>Murshidábád</i> ,   | ,,        | 19 |
| <i>e</i> , ,, <i>Bareilly</i> ,      | ,,        | 2  |
| <i>f</i> , ,, <i>Korah</i> ,         | ,,        | 1  |
| <i>g</i> , ,, <i>Jahángírnagar</i> , | ,,        | 2  |

105

V. AHMAD SHÁH, A. H. 1161-1167 = A. D. 1748-1754;

four varieties: *a*, date in top line 10

*b*, date in middle line 42

*c*, date in bottom line 16

*d*, do, with Bahádur inter-  
secting 15

83

VI. 'ALAMGÍR ZÁNÍ, A. H. 1167—1173 = A. D. 1754—

1759; two varieties: *a*, date in top line: 62

*b*, date in bottom line 11

73

VII. SHÁH 'ALAM, A. H. 1173—1221 = A. D. 1759—

1806, two varieties: *a*, date in top line 24

*b*, date in bottom line 7

31

Grand Total ... 304

3. Report on 112 silver and two gold coins forwarded by the Officiating Collector of Tipperah with his No.  $\frac{401 \text{ G}}{\text{XVIII-1}}$  dated 25th June 1889.

The coins are stated to have been found while reducing the plinth of the western house of Bábú Dwija Dás Datta of Gutaura in Ph. Serail, Sub-Division, Brahmanbarriah. Their value is stated to be Rs. 112-10 of the silver and Rs. 44-4 of the gold coins. Together with the coins a gold *tabíz* or amulet-holder, value Rs. 18-12, was found, which, however, has not been forwarded to me.

The coins belong to the following Mughal Emperors of Delhi :

|      |                                                                                        |     |
|------|----------------------------------------------------------------------------------------|-----|
| I.   | MUHAMMAD SHÁH, A. H. 1131—1161 = A. D. 1719—1748.                                      |     |
|      | (a) two gold mohurs, Type <i>Sháhib Qirán</i> mint Dáru-l-Khiláfat Sháhjahánábád.      | 2   |
|      | (b) three Rupees, type <i>Bádsháh Gházi</i> , mint Arcot and Súrat; dates illegible.   | 3   |
| II.  | AHMAD SHÁH BAHÁDUR, A. H. 1161—1167 = A. D. 1748—54.                                   |     |
|      | two Rupees, mint Arcot, date illegible.                                                | 2   |
| III. | 'ALAMGÍR ZÁNÍ, A. H. 1167—1173 = A. D. 1754—1759.                                      |     |
|      | 74 Rupees of two varieties, mint Arcot, date illegible.                                | 74  |
| IV.  | SHÁH 'ALAM, A. H. 1173—1221 = A. D. 1759—1806.                                         |     |
|      | (a) South-Indian variety, mint Arcot; legible }<br>dates 1205, 1198, 1183, 1206, 1199. | 29  |
|      | (b) North-Indian variety, mint Murshidábád. }                                          |     |
|      | (c) Three eight-anna and one four-anna pieces; mint Murshidábád.                       | 4   |
|      | Total ...                                                                              | 114 |

4. Report on 17 old silver coins forwarded by the Collector of Murshidábád with his No. 854-G, dated July 30th 1889.

The coins consist of 7 eight-anna and 10 four-anna pieces of the emperor Sháh 'Alam, but of British mintage, all except one bearing the mint name Murshidábád and the date 19 of Sháh 'Alam's reign, though they were really struck in Calcutta. The one exception is a four-anna piece bearing the mint name Farrukhábád and the year 40 of Sháh 'Alam's reign, but also struck at Calcutta. Though not very old, small coins of this description are not often found, and therefore possess some numismatic value.

5. Report on 175 old silver coins, forwarded by the Assistant Commissioner of Ajmere with his No. 427, dated 18th April 1889 and No. 644 of the 22nd June, 1889.

The coins are said to have been discovered in Márwára without any further specification of the find place.

They belong to the so-called class of Indo-Sassanian coins, that is, coins struck in India in more or less crude imitation of the Persian coins of the Sassanide dynasty which reigned from A. D. 226-652. Coins of



this description have been occasionally found, and specimens of several different kinds have been described and figured in Prinsep's *Indian Antiquities*, Wilson's *Ariana Antiqua* and elsewhere. But no Indo-Sassanian coins, so far as I am aware, of a type so closely resembling the real Sassanian coins as those of the present find, have ever been discovered. Those approaching nearest to the present coins are figured in Plate XXXIII (figs. 7, 8, 9, 10) of Vol. I, of the *Indian Antiquities*.

The coins of the present find show a very striking resemblance to the genuine coins of the Sassanide king Fírúz, who reigned from A. D. 459-486. His coins are of two different types of which one appears to belong to the earlier part and the other to the later part (about A. D. 471-486) of his reign. It is the latter type (*i. e.*, later type) of Fírúz's coins which the coins of the present find resemble. The distinguishing features of these later coins of Fírúz are: on the obverse, the king's bust wearing a tiara to which two eagle's wings are attached and which is surmounted by a crescent enfolding a globe or a star. The king's face is more or less bearded and occasionally moustached, his hair is gathered in a coil at the back of his head. In the field, in front and behind the head, are the conventional corkscrew fillets. On the reverse there is the usual fire-altar flanked on each side by a human figure and surmounted on the right by a crescent and on the left by a star. In exceptional cases the star is on the right and the crescent on the left, and in some others there is another crescent instead of the star. On both the obverse and reverse there are Pahlaví legends. See E. Thomas's *Sassanians in Persia*, plate V, figs 8 and 9. Every one of these particulars is clearly traceable, though in somewhat cruder execution, on all the coins of the present find. There is only one noteworthy exception; on none of them is any Pahlaví legend, nor indeed any legend whatsoever.

The coins are distinctly divisible into two classes according to the features of the head represented on the obverse. On those of Class I the head is of a distinctly Sassanian type, and in the better specimens has a decided resemblance to the head of Fírúz as seen on his coins. On those of Class II, on the other hand, the features are those of a rude Barbarian with thick lips and large nose, not unlike those of the Indo-Scythian king Kadphises on some of his well-known gold-coins. The coins of Class I, are of two different types, distinguished mainly by the artistic execution of the head. Under each type there are the two varieties marked by the position of the star and crescent on the reverse; there is a third variety which clearly shows the moustache of the king. One specimen shows clear traces of having been twice struck.

The age of the coins may be determined by their remarkably close

imitation of Fírúz's coins. They cannot be genuine coins of Fírúz for two reasons, (1) because their execution does not quite come up to the standard of Fírúz's known genuine coins; and (2) because they do not bear any Pahlaví legend. At the same time they must be of Fírúz's time, that is, of the latter half of the 5th century A. D.; they cannot be of a later date, for in that case they would rather imitate Sassanian coins of Fírúz's successors. From the absence of any Pahlaví legend and Sassanide king's name, it may be concluded that the coins were not issued either by a Sassanide king or by any of his vassals or governors. They must be the issue of some hostile king who adopted Fírúz's coinage, but omitted Fírúz's name. It is known from history that during the latter part of his reign, Fírúz was engaged in calamitous campaigns against the white Huns in which he lost his life. The Huns annexed the Eastern districts of the Sassanide kingdom (Khorasan and Kabul), and then passed on to the invasion of India. It was probably their leader who about this time (A. D. 470—486) adopted Fírúz's coinage. He naturally omitted Fírúz's name, though he at first retained Fírúz's likeness on the obverse (Class I). Subsequently he appears to have substituted his own likeness for that of Fírúz (Class II). At the time of the Hunnic invasion of India their leaders were Toramána and his son Mihirakula. The latter succeeded his father about A. D. 515; and Toramána appears to have had a rather long reign, so that he may have succeeded to the leadership of the Huns about A. D. 470 or perhaps even earlier (see Fleet's Introduction to Vol. III of the *Corpus Inscriptionum Indicarum*, pp. 10-12). His Indian campaigns, during which he conquered Kashmir, the Panjab, Sindh, Rajputana and a portion of Central India, probably fell within the period A. D. 490—510. In India it is known from extant coins of his that he imitated the contemporary Gupta coinage, and he appears to have observed a similar practice in Kashmir. It is, therefore, probable that he followed a similar course during the period of his conquest of portions of the Sassanide kingdom, and that the coins of the present find, the age of which coincides with that of Toramána, are issues of the latter king. They may have been carried by his advancing army into India, and thus be brought to the place where they have now been discovered. It is curious that these coins should bear no legend whatsoever, though Toramána's Indian, as well as Kashmirian, imitated coins are inscribed with his name. Perhaps the fact may be accounted for by the circumstance that his Sassanian imitations were his first attempt at coining money of his own. If my suggestion that these coins are issues of Toramána should prove to be correct, the barbarian head on the obverse of Class II, may be a portrait of Toramána himself.

Accordingly the coins may be classified thus :—

Class I, obverse : Sassanian Head.

Variety 1, fair execution (head of Fírúz)

|                                                            | No. of Specimen. |
|------------------------------------------------------------|------------------|
| Sub-variety <i>a</i> , reverse : star on left, crescent on |                  |
| right, ...                                                 | 12               |
| „ <i>b</i> , „ : crescent on left, star on                 |                  |
| right, ...                                                 | 18               |
| „ <i>c</i> , „ : crescent on both sides, ...               | 2                |
| „ <i>d</i> , „ : double-struck, ...                        | 1                |

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Total, ... 33—33

Variety 2, crude execution (head of Fírúz)

|                                                            |    |
|------------------------------------------------------------|----|
| Sub-variety <i>a</i> , reverse : star on left, crescent on |    |
| right, ...                                                 | 37 |
| „ <i>b</i> , „ : crescent on left, star on                 |    |
| right, ...                                                 | 27 |

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Total, ... 64—64

Variety 3, moustached head ; reverse of all have star  
on left, crescent on right, total, ...

Indifferent specimens of Class I, total, ... 39

Class II, obverse : Barbarian Head, total, ... 9

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Total ... 78—78

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Grand total, ... 175

6. Report on 395 old coins forwarded by the Deputy Commissioner of Sháhpur with his No. 586, dated 10th July, 1889.

The coins are stated to have been found in an earthen vessel on a hill-side near the village of Chitta in the Salt-range by a man called 'Alam Khán, who was digging out stones to make a wall.

The metal of the coins is a mixture of silver and copper. Their size is very small, about that of a 2-anna piece. They belong to Saifu-d-dín Hasan Qurlagh about A. H. 620 = A. D. 1222. They have been described by E. Thomas in his *Chronicles of the Pathan Kings of Delhi*, p. 96. They are coins of the so-called “bull and horseman” type and have been found rather numerous of late. On most of them (321 specimens) the legends are illegible ; on the remainder (74 specimens) the legend is more or less fully preserved.



The PHILOLOGICAL SECRETARY read the following letter from Bábú Gaurdás Bysack, announcing the presentation to the Society of a copy of Giridhara's translation of the "Gita Govinda."

"In forwarding a copy of Giridhara's metrical translation of Jayadeva's immortal lyric the "Gita-Govinda", which the editor Bábú Shámlál Bysack has handed me for presentation to the Asiatic Society, I think the fact that the translation was made by Giridhara so long ago as in the Bengali Sakábda 1658 (A. D. 1736) should be noticed. It did not appear before the public till the editor Bábú Shámlál published it only the other day with copious notes and a sketch of Jayadeva's life.

"The translation appears to be as literal as the language would allow, and what is noteworthy in it is that the metre and the music of the original Sanscrit idyll have been thoroughly preserved. Giridhara appears to have had the true poetic genius, and he can fairly claim to stand side by side with the best lyric poets of Bengal, such as Chandidása, Vidyapati and Govindadása. The best living writers of the Bengali language consider his translation by far superior to all existing translations. It is truly a literary gem. But the wonder is that the name of the poet Giridhara should have remained unknown so long to the literary world. Who this Giridhara was, it is now difficult to trace. The poet's last lines shew that he made the translation at the desire of a Vaishnava, by which he means, though he does not say as much, that as he himself was a Vaishnava, so was his patron.

"The fact of the manuscript having hitherto been in the possession of a single family, favours the supposition that a scion of that family had had a hand in the production of the work. Seeing Giridhara gifted with a poetic talent, he utilised him in effecting the translation.

"As a rule, wealthy Hindus of the olden days considered it their duty, and found special delight to encourage learned men, whether Brahmins or Vaishnavas, and among them many a poet and many a philosopher who have passed away unknown to fame, found support and patronage. The practice with the old patriarchs, specially of Vaishnava families, to make their morning prayers in hymns and songs might have led to the Bengali translation. Jayadeva's songs being popular, it is probable that Bábú Bharat Chandra Bysack, an ancestor of the editor by the maternal side who was known in his family as a learned and pious man, desired Giridhara to translate them into Bengali so that they might be set to music and sung by him in his own tongue.

"The editor and publisher Bábú Shámlál deserves the thanks of the public for having unearthed the poet after the lapse of a century and half."



The following papers were read—

1. *Some notes on the Savaras.*—By MR. W. H. P. DRIVER.  
The paper will be published in full in the Journal, Part I.
2. *Description of a new Coccid recently found attacking the Tea Plant in Assam and the Kangra Valley.*—By W. M. MASKELL, ESQ.  
Communicated by E. T. ATKINSON, ESQ.
3. *On the Tortoises described as Chaibassia.*—By R. LYDDEKER, ESQ.  
Communicated by J. WOOD-MASON, ESQ.
4. *Description of some new or rare species of Fishes from the Bay of Bengal.*—By DR. A. ALCOCK, Surgeon Naturalist to the Marine Survey.
5. *The Ethiopian and Oriental representative of the Mantodean Subfamily Vatiidæ.*—By J. WOOD-MASON, ESQ.
6. *Études sur les Arachnides de l'Himalaya recueillies par M. M. OLDHAM et WOOD-MASON et faissent partie de collection de l'Indian Museum, Ire. partie.*—Par M. E. SIMON. Communicated by the Superintendent of the Indian Museum.

These papers will be published in full in the Journal, Part II.

7. *Ha-shang-rgyal-po and Ug-tad, a dialogue translated from the Tibetan* by DR. KARL MARX, Moravian Missionary at Leh, Ladakh. Communicated by DR. HOERNLE.
8. *A tradition of Lohardagga.*—By MR. W. H. P. DRIVER.
9. *A find of early Muhammadan coins in the Rai Bareli district, Oudh.*—By V. A. SMITH, ESQ.
10. *The Non-Brahmanical religious literature of Bengal.*—By PANDIT HARAPRASAD SHÁSTRI, M. A.

These papers will be published in full in the Journal, Part I.

11. *Descriptions of seven additional new Indian Amphipods.*—By G. M. GILES, M. B., F. R. C. S., late Surgeon Naturalist Marine Survey of India.

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

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

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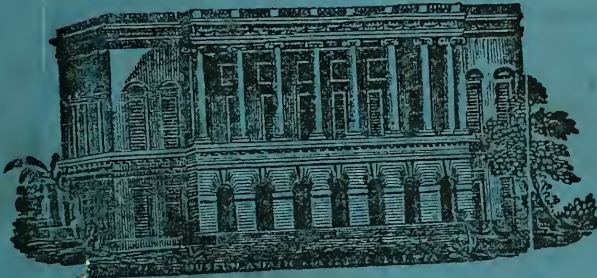
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OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.

No. X. DECEMBER, 1889.



"The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature."—SIR WILLIAM JONES.

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N. B.—in order to ensure papers being read at any monthly Meeting of the Society, they should be in the hands of the Secretaries at least a week before the Meeting.

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(Continued on third page of cover.)

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR DECEMBER, 1889.

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The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th December, 1889, at 9 P. M.

J. WOOD-MASON, ESQ., Vice-President, in the Chair.

The following members were present :

W. B. Colville, Esq., E. Gay, Esq., Dr. Hoernle, A. Hogg, Esq., Prince Jahán Qadr Muhammad Wáhid Alí, Bahádur, T. R. Munro, Esq., L. de Nicéville, Esq., J. D. Nimmo, Esq., T. A. Pope, Esq., Capt. J. H. Sadler, Bábú Hiralál Sen, C. H. Tawney, Esq.

Visitors, Hon. Mr. Justice Tottenham, J. A. Cairns, Esq.

The Minutes of the last meeting were read and confirmed.

Twenty-three presentations were announced, details of which are given in the Library List appended.

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

Thakur Suráj Bukhsh Sing, talukdar of Kasmanda, Zilla Sitapur, Oudh, proposed by Qazi Azizuddin Ahmed, seconded by Dr. Hoernle.

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

Kumár Vinaya Krishna Deb, Bahádur.

W. Sandford, Esq.

The SECRETARY reported the death of Dr. James Prescott Joule, one of the Special Honorary Centenary Members of the Society.

The CHAIRMAN read the following extract from a letter from the Librarian of the Johns Hopkins University, Baltimore, regarding the usefulness of the Society's Bibliotheca Indica publications.

"I feel it due to your Society that I should express more fully than by a mere formal acknowledgement the gratitude of this University for its munificent gift of its publications, and especially the volumes of the Bibliotheca Indica. These Sanskrit and other Oriental texts are of the highest value to us. The volumes, as completed, are strongly and handsomely bound, and pass at once into the hands of our Orientalists; so that they are fulfilling the purposes which your Society is organized to promote."

The following papers were read—

1. *Notes on Indian Rotifers.*—By H. H. ANDERSON, B. A. Communicated by the MICROSCOPICAL SOCIETY.

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

2. *Notes on the superstitious beliefs in the Sunderbuns.*—By PANDIT HARAPRASÁD SHÁSTRÍ, M. A.

3. *Description of a new and little known tribe, called Pohiras, found in an out of the way corner of the Lohardugga district.*—By W. H. P. DRIVER, ESQ.

These papers will be published in the Journal, Part I.

4. *On the occasional inversion of the temperature relations between the hills and plains of Northern India.*—By J. ELIOT, ESQ., M. A.

(Abstract.)

The present paper deals with certain interesting features of the temperature of the hill and plain districts of Northern India during the cold weather which were very strikingly exhibited in the month of January, 1889. On eleven nights during that month the minimum or lowest night temperature was higher at the hill stations in Upper India (average elevation 7000 feet) than at the plain stations at an average elevation of 1000 feet. On the night of the 3rd January the minimum temperature at Murree, Simla and Chakrata was from 1° to 12° higher than at all stations in the plains of the Punjab, Rajputana, Central India, the greater part of the Central Provinces, the North-Western Provinces, Behar, and the greater part of Bengal (including Calcutta). The paper is in part devoted to an explanation of this widely extended and remarkable inversion of the normal vertical temperature relations.

An analysis is given of the temperature conditions prevailing in the hills and plains in different types of weather. It is pointed out that there are three marked types of weather in January, &c., viz. :—

(1). Fine clear weather accompanying ordinary anti-cyclonic con-



ditions such as usually prevails in December and frequently during the greater part of January.

(2). Cloudy stormy weather accompanying rain in the plains and more or less heavy and general snow in the hills. This occurs during the eastward march of shallow barometric depressions from the north-west frontier across Northern India.

(3). The remarkably cool and dry weather with strong westerly winds which follows the clearing up of the skies after heavy and general snowfall in the mountain districts. The weather conditions are very markedly anti-cyclonic in character.

The chief temperature conditions of these periods are :—

*1st.* High day and night temperature at the hill stations and high day and low night temperature at the plains. Hence in the hills the mean daily temperature is increased and the diurnal range little affected, whilst in the plains the diurnal range is largely increased and the mean temperature differs very slightly from the normal. It is during such weather that the hill stations are occasionally warmer at nights than the plain stations.

*2nd.* In stormy weather both day and night temperatures are largely reduced at the hill stations, whilst in the plains the day temperature is increased and night temperature decreased. Hence in such weather the mean daily temperature of the hill stations is considerably below the normal, whilst the diurnal range is very slightly affected. In the plains on the contrary the mean temperature is slightly affected whilst the diurnal range is largely diminished.

*3rd.* In the fine bright weather immediately following the clearing up of the skies after heavy snowfall in the hills, both the day and night temperatures are largely reduced in the plains. The amount of vapour is rapidly diminished so that the air is very dry and bracing, and stands, more especially in Bengal, in marked contrast to the previous weather. The effect is most simply described as the passage of a cold wave eastwards across Northern India at a rate usually averaging about 300 miles *per diem*.

The last portion of the paper is devoted to a brief verbal explanation of the causes of these remarkable and contrasted variations. In the case of the prolonged fine weather of ordinary anti-cyclonic conditions (such as prevailed throughout nearly the whole of January 1889) there is little horizontal movement of the air. The adjustment of pressure to the varying thermal conditions is affected in the day time by expansion and by convective currents and at night by compression only. It is thence shewn that in such conditions the temperature above the plains of Northern India is nearly constant during such periods,

and is determined by the temperature of rapidly ascending moist but unsaturated air rising with the maximum temperature at the level of the plains. As the rate of decrease of temperature of such convective currents is about  $1^{\circ}$  for every 200 feet, the temperature at the elevation of 6000 feet above the plains of the Punjab would be about  $72^{\circ}$  (the ordinary minimum temperature of the Punjab in fine weather in January) *minus*  $30^{\circ}$  (i. e.  $\frac{6,000}{200}$ ) or  $42^{\circ}$ , which is  $6^{\circ}$  higher than the average minimum temperature in the plains in January (*viz.*  $36^{\circ}$ ).

About sunset at a hill station in such weather temperature decreases rapidly until it has reached the temperature corresponding to the same level above the plains. There is at night a slow and steady flow from the hills downwards to the plains which gives rise to a flow towards the hills from the corresponding elevated strata above the plains. This source of comparatively warm air is so large that the air coming from it maintains a nearly constant temperature during the night at the hill stations and gives them a night temperature as high and sometimes higher in such weather than at the plain stations. This explanation hence accounts not only for the high minimum temperature at night but for the cold period of rapid cooling about sunset which is a very characteristic feature of the hill station.

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

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### LIBRARY.

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

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GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.

Returns of the Rail-borne trade of the Central Provinces during the quarter ending 30th June 1889. Fcp. Nagpur, 1889.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Annual Statistical Returns and brief notes on Vaccination in Bengal for the year 1888-89, by Surgeon-Major W. H. Gregg, M. B., M. R. C. P. Fcp. Calcutta, 1889.

Report on the Rail-borne traffic of Bengal, during the year 1888-89. Fcp. Calcutta, 1889.

Resolution reviewing the Reports on the working of the District Boards in Bengal during the year 1888-89. Fcp. Calcutta, 1889.

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## OBSERVATORIO METEOROLOGIO-MAGNETICO CENTRAL, MEXICO.

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- Results of Meteorological Observations taken during the year 1887, at the Royal Alfred Observatory, Mauritius. Fcp. Mauritius, 1887.
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LIST OF MEMBERS  
OF THE  
ASIATIC SOCIETY OF BENGAL.  
ON THE 31ST DECEMBER 1888.

LIST OF OFFICE-BEARERS AND MEMBERS OF  
COUNCIL FOR THE YEAR 1888.

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L. M. = Life Member. F. M. = Foreign Member.

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N. B.—Members who have changed their residence since the list was drawn up are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alteration may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Members who are about to leave India and do not intend to return are particularly requested to notify to the *Secretaries* whether it is their desire to continue members of the Society; otherwise, in accordance with Rule 40 of the Bye-Laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

| Date of Election. |      |                                                                                 |                        |
|-------------------|------|---------------------------------------------------------------------------------|------------------------|
| 1860 Dec. 5.      | R.   | Abdul-Latif, Nawab Bahádur, c. I. E.                                            | <i>Calcutta.</i>       |
| 1885 Mar. 4.      | R.   | Abdur Rahmán, A. F. M., Barrister-at-Law.                                       | <i>Calcutta.</i>       |
| 1888 Feb. 1.      | F.M. | Adamson, Major Charles Henry Ellison, M. S. C.,<br>Deputy Commissioner, Bhamo.  | <i>Europe.</i>         |
| 1860 July 4.      | N.R. | Ahmad Khán, Bahádur, Hon. Sayyid, K. C. S. I.                                   | <i>Aligarh.</i>        |
| 1888 April 4.     | R.   | Ahmud, Maulvi, Arabic Professor, Presidency Col-<br>lege.                       | <i>Calcutta.</i>       |
| 1872 April 3.     | N.R. | Ashán-ullah, Khan Bahádur, Nawáb.                                               | <i>Dacca.</i>          |
| 1860 April 4.     | A.   | Aitchison, J. E. T., M. D., C. I. E.,                                           | <i>Europe.</i>         |
| 1888 Feb. 1.      | N.R. | Alcock, Alfred William, M. B., Surgeon Naturalist,<br>Marine Survey Department. |                        |
| 1884 Mar. 5.      | L.M. | Áli, Sir Áli Kadar Syud Hassan, Bahádur, K. C. I. E.                            | <i>Murshedabad.</i>    |
| 1874 June 3.      | R.   | Amír Áli, Syud, c. I. E., Barrister-at-Law.                                     | <i>Cal-<br/>cutta.</i> |
| 1888 Feb. 1.      | R.   | Anderson, Henry H.                                                              | <i>Calcutta.</i>       |
| 1865 Jan. 11.     | F.M. | Anderson, John, M. D., F. R. S., L. S.,                                         | <i>Europe.</i>         |
| 1884 Sept. 3.     | R.   | Anderson, J. A.                                                                 | <i>Calcutta.</i>       |
| 1887 June 1.      | R.   | Apjohn, J. H., M. I. C. E., P. W. Dept.                                         | <i>Calcutta.</i>       |
| 1887 May 4.       | R.   | Atkinson, Rev. Augustus W., M. A., Principal, La<br>Martiniere.                 | <i>Calcutta.</i>       |
| 1871 Sept. 6.     | R.   | Atkinson, Edwin Felix Thomas, B. A., C. S., Acet-<br>General, Bengal.           | <i>Calcutta.</i>       |
| 1860 Feb. 3.      | N.R. | Attar Singh, Bahádur, Sirdár, C. I. E., M. U. F., Chief<br>of Bhadour.          | <i>Ludiana.</i>        |

| Date of Election, |      |                                                                                                                                  |
|-------------------|------|----------------------------------------------------------------------------------------------------------------------------------|
| 1870 Feb. 2.      | L.M. | Baden-Powell, Baden Henry, C. I. E., C. S., Offg. Judge, Chief Court of the Panjab. <i>Lahore.</i>                               |
| 1862 Feb. 5.      | L.M. | Bysack, Gaurdás. <i>Calcutta.</i>                                                                                                |
| 1865 Nov. 7.      | N.S. | Ball, Valentine, M. A., F. R. S., F. G. S. <i>Europe.</i>                                                                        |
| 1862 Aug. 1.      | F.M. | Barclay, Arthur, M. B., Surgeon Major, Sec. to Surgeon General and Sanitary Commissioner with the Govt. of India. <i>Europe.</i> |
| 1869 Dec. 1.      | L.M. | Barker, R. A., M. D., Civil Surgeon. <i>Serampore.</i>                                                                           |
| 1877 Jan. 17.     | N.R. | Barman, Kishor Kumár Rádhá Dev, Juvráj of Hill Tipperah. <i>Tipperah.</i>                                                        |
| 1885 Nov. 4.      | R.   | Barman, Dámudar Dás. <i>Calcutta.</i>                                                                                            |
| 1885 Aug. 5.      | A.   | Barnett, John, Bengal Pilot Service. <i>England.</i>                                                                             |
| 1881 Aug. 3.      | N.R. | Barstow, Henry Clements, C. S., Magistrate and Collector. <i>Cawnpore.</i>                                                       |
| 1887 Aug. 3.      | R.   | Basu, Haricharan. <i>Calcutta.</i>                                                                                               |
| 1886 June 2.      | F.M. | Baumgarten, Casper Wilhelm. <i>Batavia.</i>                                                                                      |
| 1873 Feb. 5.      | R.   | Bayne, R. R., M. R. I. B. A., Chief Engineer's Office, E. I. Railway. <i>Calcutta.</i>                                           |
| 1864 Sept. 7.     | N.R. | Beames, John, C. S., Commissioner, Bhaugulpur Division. <i>Bhaugulpur.</i>                                                       |
| 1878 Sept. 25.    | N.R. | Beighton, T. D., C. S., Judge. <i>Dacca.</i>                                                                                     |
| 1862 Oct. 8.      | A.   | Bernard, Sir Charles Edward, K. C. S. I., C. S., <i>Europe.</i>                                                                  |
| 1876 Nov. 15.     | R.   | Beveridge, Henry, C. S., District and Sessions Judge. <i>Alipur.</i>                                                             |
| 1878 Oct. 4.      | R.   | Bhakta, Krishna Gopál. <i>Calcutta.</i>                                                                                          |
| 1879 Mar. 5.      | N.R. | Biddulph, Lt.-Col. J., B. S. C. Political Agent. <i>Deoli.</i>                                                                   |
| 1884 Jan. 2.      | N.R. | Bidie, G., Surgeon-General C. I. E., F. I. S., M. B., Belmont, Ootacamund. <i>Madras.</i>                                        |
| 1884 Feb. 6.      | N.R. | Bigg-Wither, Major A. C., B. A., A. I. C. E. <i>Quetta.</i>                                                                      |
| 1885 Jan. 7.      | N.R. | Bigbold, T. F., C. S., Dist. and Sessions Judge. <i>Sooree.</i>                                                                  |
| 1885 Mar. 4.      | N.R. | Bilgrámi, Syud Ali, B. A., A. R. S. M., F. G. S. <i>Hyderabad.</i>                                                               |
| 1886 Aug. 4.      | N.R. | Bingham, Major Charles Thomas, B. S. C., Deputy Conservator of Forests. <i>Burmah.</i>                                           |
| 1857 Mar. 4.      | L.M. | Blanford, H. F., A. R. S. M., F. R. S., F. G. S. Meteorological Reporter, Govt. of India. <i>England.</i>                        |
| 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. <i>London.</i> [ <i>Pergunnahs.</i> ]                    |
| 1885 Mar. 4.      | R.   | Bolton, C. W., C. S., Magte. and Collector. 24-                                                                                  |
| 1880 Nov. 3.      | N.R. | Bose, Pramatha Náth, B. Sc., F. G. S., Geological Survey of India.                                                               |
| 1876 Nov. 15.     | N.R. | Bowie, M. M. Colonel. Inspector General of Police C. P. <i>Nagpur.</i>                                                           |
| 1868 Jan. 15.     | N.R. | Boxwell, John, C. S., Offg. Commr., Patna Divn. <i>Bankipur.</i>                                                                 |
| 1876 May 4.       | N.R. | Bradshaw, Deputy Surgeon-General A. F. M. D. <i>Rawal Pindi.</i>                                                                 |



| Date of Election. |          |                                                                                                                                                  |
|-------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1860              | Mar. 7.  | L.M. Brandis, Sir Dietrich, K. C. I. E., C. I. E., PH. D., F. L. S.,<br>F. R. S. <i>Europe.</i>                                                  |
| 1887              | May 4.   | R. Burál, Nobinchánd, Solicitor. <i>Calcutta.</i>                                                                                                |
| 1879              | April 2. | R. Calcutta, The Rt. Rev. the Lord Bishop of. <i>Calcutta.</i>                                                                                   |
| 1880              | Mar. 3.  | N.R. Carlleyle, A. C., Archaeological Survey of India.<br><i>Allahabad.</i>                                                                      |
| 1881              | Feb. 2.  | N.R. Carter, Philip John, Deputy Conservator of Forests.<br><i>Port Blair.</i>                                                                   |
| 1885              | April 1. | N.R. Chambers, J. W. <i>Narainganj.</i>                                                                                                          |
| 1881              | Mar. 2.  | N.R. Channing, Francis Chorley, c. s. Divisional Judge.<br><i>Lahore.</i>                                                                        |
| 1880              | May 5.   | N.R. Chatterji, Tára Prasáda, Deputy Magte. <i>Bhaugul-<br/>pur.</i>                                                                             |
| 1880              | Jan. 7.  | R. Chaudhuri, Govinda Kumár. <i>Calcutta.</i>                                                                                                    |
| 1861              | Mar. 1.  | N.R. Chaudhuri, Haranchandra, Zemindar. <i>Sherpur<br/>Mymensingh.</i>                                                                           |
| 1880              | Nov. 3.  | N.R. Chaudhuri, Khirod Chandra Rái. Deputy Inspector<br>of Schools, Sonthal Pergunnahs. <i>Nya Dumka.</i>                                        |
| 1886              | April 7. | N.R. Chaudhuri, Rádhaballabha. <i>Sherpur, Mymensingh.</i>                                                                                       |
| 1885              | Feb. 4.  | N.R. Chaudhuri, Rájá Suryakánta, Bahádur. <i>Mymen-<br/>singh.</i>                                                                               |
| 1885              | April 1. | N.R. Clark, H. Martyn, M. B. <i>Amritsar.</i>                                                                                                    |
| 1877              | Aug. 30. | R. Clarke, Lieut.-Col. Henry Wilberforce, R. E. <i>Cal-<br/>cutta.</i>                                                                           |
| 1880              | Aug. 26. | F.M. Clerk, Lieut.-Colonel Malcolm G. <i>Europe.</i>                                                                                             |
| 1881              | May 4.   | N.R. Cockburn, John, Asst. Sub-Deputy Opium Agent.<br><i>Karwi, Banda, N. W. P.</i>                                                              |
| 1888              | Nov. 1.  | N.R. Collett, Brigadier General, Henry, C. B., F. L. S.<br><i>Meiktala, Upper Burma.</i>                                                         |
| 1886              | Aug. 26. | F.M. Condenvove, Count H., Attaché Austro-Hungarian<br>Legation. <i>Constantinople.</i>                                                          |
| 1874              | Nov. 4.  | N.R. Constable, Archibald, M. I. C. E. Resident Engineer<br>and Personal Asst. to Chief Engineer, Oudh and<br>Rohilkund Railway. <i>Lucknow.</i> |
| 1884              | Aug. 6.  | R. Cotes, E. C., Indian Museum. <i>Calcutta.</i>                                                                                                 |
| 1876              | Mar. 1.  | N.R. Crawford, James, B. A., c. s., Barrister-at-Law,<br>Offg. District and Sessions Judge. <i>Patna.</i>                                        |
| 1887              | Aug. 25. | R. Criper, William Risdon, F. C. S., F. I. C., A. R. S. M.<br><i>Kasipur.</i>                                                                    |
| 1877              | June 6.  | R. Croft, The Hon. Sir A. W., K. C. I. E., M. A., Director<br>of Public Instruction, Bengal. <i>Calcutta.</i>                                    |
| 1874              | Mar. 4.  | R. Crombie, Alexander, M. D., Surgeon Major, Presi-<br>dency General Hospital. <i>Calcutta.</i>                                                  |
| 1888              | Dec. 5.  | N.R. Crooke, William, B. A., c. s. Magistrate and Col-<br>lector. <i>Eta.</i>                                                                    |
| 1873              | Aug. 6.  | R. Cunningham, David Douglas, Surgeon-Major. Ho-<br>norary Surgeon to the Viceroy. <i>Calcutta.</i>                                              |

| Date of Election. |          |      |                                                                                          |
|-------------------|----------|------|------------------------------------------------------------------------------------------|
| 1873              | Dec. 3.  | N.R. | Dames, Mansel Longworth, c. s., Asst., Commissioner. <i>Dera Ghazi Khan.</i>             |
| 1877              | June 6.  | N.R. | Darbhangá, Sir Luchmessur Sing, Bahádur, K. C. I. E., Mahárájá of. <i>Darbhangá.</i>     |
| 1865              | June 7.  | N.R. | Dás, Rájá Jaykrishna, Bahádur, c. s. I. <i>Bijnor.</i>                                   |
| 1879              | April 7. | N.R. | Dás, Rám Saran, M. A., Secy., Oudh Commercial Bank, Limited. <i>Fyzabad, Oudh.</i>       |
| 1869              | April 7. | F.M. | Day, Dr. Francis, F. L. S., F. Z. S. <i>Europe.</i>                                      |
| 1885              | May 6.   | N.R. | Dé, Baikuntanáth, Rájá Bahádur. <i>Balasore.</i>                                         |
| 1885              | Mar. 4.  | R.   | Deb, Kumár Nilkrishna, Bahádur. <i>Calcutta.</i>                                         |
| 1887              | Oct. 6.  | R.   | Deva, Kumár Vinaya Krishna, Bahádur. <i>Calcutta.</i>                                    |
| 1862              | May 7.   | N.R. | Dhanapati Singh Dughar, Raí Bahádur. <i>Azimganj.</i>                                    |
| 1877              | July 4.  | R.   | Diler Jang, Nawáb Syad Ashgar Ali, Khan Bahádur, c. s. I. <i>Calcutta.</i>               |
| 1886              | June 2.  | R.   | Doyle, Patrick, C. E., F. G. S., M. E. A. S. <i>Calcutta.</i>                            |
| 1887              | Nov. 2.  | N.R. | Driver, Walter Henry Parker. <i>Ranchi, Lohardugga.</i>                                  |
| 1879              | Feb. 5.  | N.R. | Duthie, J. F., Director, Government Botanical Survey, Northern India. <i>Saharanpur.</i> |
| 1877              | Aug. 30. | N.R. | Dutt, Kedarnáth, Depy. Collector. <i>Cuttack.</i>                                        |
| 1870              | Mar. 9.  | L.M. | Edinburgh, H. R. H. The Duke of. <i>Europe.</i>                                          |
| 1863              | May 6.   | R.   | Edgar, John Ware, c. s. I., c. s. Secretary, Government of Bengal. <i>Calcutta.</i>      |
| 1874              | Dec. 2.  | A.   | Egerton, The Hon. Sir Robert Eyles, K. C. S. I., C. I. E., c. s. <i>Europe.</i>          |
| 1871              | Dec. 2.  | N.R. | Eliot, J., M. A., Meteorological Reporter to the Govt. of Bengal. <i>Simla.</i>          |
| 1886              | Jan. 6.  | R.   | Elson, Samuel R. Bengal Pilot Service. <i>Calcutta.</i>                                  |
| 1876              | Jan. 5.  | F.M. | Feistmantel, Ottokar, M. D. <i>Europe.</i>                                               |
| 1880              | April 7. | N.R. | Fiddian, W., M. A., c. s., <i>Pubna.</i>                                                 |
| 1879              | July 2.  | R.   | Finucane, M. c. s., Director of Agriculture, Bengal. <i>Calcutta.</i>                    |
| 1869              | Sept. 1. | A.   | Fisher, John Hadden, c. s. <i>Europe.</i>                                                |
| 1886              | April 7. | F.M. | Fleet, John Faithfull, C. I. E., c. s. <i>Europe.</i>                                    |
| 1876              | July 5.  | N.R. | Foulkes, The Rev. Thos. F. L. S., M. R. A. S., F. R. G. S., <i>Salem, Madras Presy.</i>  |
| 1869              | Sept. 1. | A.   | Fryer, Colonel G. E., M. S. C. <i>Europe.</i>                                            |
| 1880              | April 7. | N.R. | Gajapati, Ananda Rám, K. C. I. E., Rájá of Vizianagram. <i>Vizianagram.</i>              |
| 1873              | Dec. 3.  | A.   | Gamble, J. S., M. A., Conservator of Forests, Northern Circle, Madras. <i>Europe.</i>    |
| 1883              | Aug. 1.  | N.R. | Garga, Kumár Isvariprasád, Zemindar. <i>Maisádal.</i>                                    |
| 1859              | Aug. 3.  | L.M. | Gastrell, General James Eardley. <i>Europe.</i>                                          |
| 1867              | Dec. 4.  | R.   | Gay, E. M. A., F. R. A. S., Comptroller-General. <i>Calcutta.</i>                        |
| 1883              | Aug. 30. | R.   | Ghose, Manmohan. <i>Calcutta.</i>                                                        |

| Date of Election. |      |                                                                                                                                                                     |
|-------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1871 May 3.       | R.   | Ghosha, Káliprasanna. <i>Calcutta.</i>                                                                                                                              |
| 1869 Feb. 3.      | R.   | Ghosha, Pratápchandra, B. A. <i>Calcutta.</i>                                                                                                                       |
| 1884 Dec. 3.      | N.R. | Giles, George, M. J., M. B., F. R. C. S., Civil Surgeon. <i>Hoshangabad.</i>                                                                                        |
| 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. <i>Central India.</i>                  |
| 1861 Feb. 5.      | N.S. | Godwin-Austen, Lieut.-Colonel H. H., F. R. S., F. Z. S., F. E. G. S. <i>Europe.</i>                                                                                 |
| 1882 May 3.       | R.   | Golám Sarwar, Maulaví. <i>Calcutta.</i>                                                                                                                             |
| 1881 Mar. 2.      | R.   | Gosáin, Hem Chunder. <i>Calcutta.</i>                                                                                                                               |
| 1863 Nov. 4.      | A.   | Gowan, Major-General J. Y. <i>Europe.</i>                                                                                                                           |
| 1877 Nov. 7.      | L.M. | Grant, Alexander, M. I. C. E. <i>Europe.</i>                                                                                                                        |
| 1876 Nov. 15.     | N.R. | Grierson, George Abraham, C. S. <i>Gya.</i>                                                                                                                         |
| 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. <i>Europe.</i>                                                                                                         |
| 1861 Feb. 6.      | N.R. | Growse, Frederick Salmon, C. I. E., M. A., C. S., Magistrate and Collector. <i>Fatehgarh, N. W.-P.</i>                                                              |
| 1886 Mar. 3.      | N.R. | Gupta Ashootosh, C. S., Assistant Magistrate and Collector. <i>Beguserai, Monghyr.</i>                                                                              |
| 1888 July 4.      | R.   | Gupta Rajanikánta. <i>Calcutta.</i>                                                                                                                                 |
| 1883 Jan. 3.      | N.R. | Harding, Francis Henry, B. A., C. S. <i>Chittagong.</i>                                                                                                             |
| 1879 Mar. 5.      | A.   | Harraden, S. <i>Europe.</i>                                                                                                                                         |
| 1875 Mar. 3.      | N.R. | Hendley, Surgeon Major Thomas Holbein. <i>Jeypore.</i>                                                                                                              |
| 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. <i>Allahabad.</i> |
| 1872 Dec. 5.      | R.   | Hoernle, Rev. A. F. R., PH. D., Principal of the Calcutta Madrasa. <i>Calcutta.</i>                                                                                 |
| 1878 Mar. 6.      | A.   | Hoey, W., C. S. <i>Europe.</i>                                                                                                                                      |
| 1886 June 2.      | R.   | Hogg, Alexander. <i>Calcutta.</i>                                                                                                                                   |
| 1884 Mar. 5.      | N.R. | Hooper, John, C. S., Settlement Officer. <i>Basti, N.-W. P.</i>                                                                                                     |
| 1873 Jan. 2.      | L.M. | Houstoun, G. L., F. G. S. <i>Europe.</i>                                                                                                                            |
| 1863 Jan. 15.     | N.R. | Howell, Mortimer Sloper, C. S. <i>Moradabad, N.-W. P.</i>                                                                                                           |
| 1878 Sept. 25.    | A.   | Hughes, G., C. S., Deputy Commissioner. <i>Europe.</i>                                                                                                              |
| 1867 Aug. 7.      | N.R. | Hughes, T. W. H., A. R. S. M., F. G. S., Superintendent Geol. Survey of India.                                                                                      |
| 1866 Jan. 17.     | A.   | Hughes, Major W. G., M. S. C. <i>Europe.</i>                                                                                                                        |
| 1870 Jan. 5.      | N.R. | Hume, Allan Octavian, C. B., C. S. <i>Simla.</i>                                                                                                                    |
| 1884 May 2.       | N.R. | Hussein, Syud, B. A., Secy. to Nizam of Hyderabad's Council. <i>Hyderabad.</i>                                                                                      |
| 1872 Dec. 4.      | N.R. | Ibbetson, Denzil Charles Jelf, C. S. Deputy Commissioner. <i>Rohtak, Panjab.</i>                                                                                    |

| Date of Election. |      |                                                                                                                        |                                           |
|-------------------|------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 1866 Mar. 7.      | F.M. | Irvine, William c. s.,                                                                                                 | <i>Europe.</i>                            |
| 1884 May. 2.      | N.R. | Iskander Ali Mirza, Prince.                                                                                            | <i>Murshedabad.</i>                       |
| 1880 Dec. 1.      | N.R. | Jackson, William Grierson, c. s.                                                                                       | <i>Fatehpur.</i>                          |
| 1869 Aug. 4.      | R.   | Jahán Qadr Muhammad Wáhid Alí, Bahádur, Prince.                                                                        | <i>Garden Reach, Calcutta.</i>            |
| 1876 July 5.      | A.   | Jarrad, Lieut. F. W., R. N., F. R. A. S., Marine Survey Dept.                                                          | <i>Europe.</i>                            |
| 1879 Mar. 5.      | R.   | Jarrett, Lt.-Col. H. S., B. S. C., Secy. to the Board of Examiners.                                                    | <i>Calcutta.</i>                          |
| 1881 Feb. 2.      | A.   | Jenkins, Major Thomas Morris, M. S. C., Deputy Commissioner,                                                           | <i>Europe.</i>                            |
| 1867 Dec. 4.      | A.   | Johnstone, Col. Sir James, K. C. S. I., C. S. I.                                                                       | <i>Europe.</i>                            |
| 1873 Dec. 3.      | N.R. | Johore, H. H. the Mahárájá of, K. C. S. I.                                                                             | <i>New Johore, Singapore.</i>             |
| 1884 Aug. 6.      | R.   | Jones. E. J., Geol. Survey of India.                                                                                   | <i>Calcutta.</i>                          |
| 1888 June 6.      | R.   | Kabir-ud-din Ahmad, Khán Bahádur, Shams-ul-Ulma, Maulvi.                                                               | <i>Calcutta.</i>                          |
| 1882 Mar. 1.      | N.R. | Kennedy, Pringle, M. A.                                                                                                | <i>Mozufferpur.</i>                       |
| 1874 Dec. 2.      | N.R. | Khudá Baksh, Khán Bahádur, Maulavi.                                                                                    | <i>Bankipur.</i>                          |
| 1884 Nov. 5.      | N.R. | Kitts, Eustace John, c. s.                                                                                             | <i>Banda.</i>                             |
| 1867 Dec. 4.      | R.   | King, G. M. B., F. L. S., Supdt., Royal Botanic Garden.                                                                | <i>Sibpur.</i>                            |
| 1881 Mar. 2.      | F.M. | King, Lucas White, B. A., LL. B., C. S., Assistant Agent to the Governor General, Central India.                       | <i>Europe.</i>                            |
| 1862 Jan. 15.     | R.   | King, W., B. A., D. sc., Director, Geol. Survey of India.                                                              | <i>Calcutta.</i>                          |
| 1880 Jan. 7.      | R.   | Kisch, H. M., M. A., c. s. Post Master General, Bengal.                                                                | <i>Calcutta.</i>                          |
| 1887 May 4.       | L.M. | Lanman, Charles R. Corresponding Secretary of the American Oriental Society, Professor of Sanskrit in Harvard College. | <i>Cambridge, Mass. U. S. America.</i>    |
| 1877 Sep. 27.     | N.R. | La Touche, James John Digges, B. A., c. s.,                                                                            | <i>Menbu, Upper Burma.</i>                |
| 1888 Feb. 1.      | N.R. | Lee, William Herbert, c. s.                                                                                            | <i>Cuttack.</i>                           |
| 1881 Mar. 2.      | N.R. | Lee, J. Bridges, M. A., F. G. S., F. C. S., F. Z. S., Barrister-at-Law.                                                | <i>Lahore.</i>                            |
| 1880 July 7.      | N.R. | Lewis, Rev. Arthur, B. A.,                                                                                             | <i>Dehra Ghazi Khan.</i>                  |
| 1886 Sep. 30.     | N.R. | Luson, Hewling, c. s., Assistant Magistrate.                                                                           | <i>Gya.</i>                               |
| 1869 July 7.      | N.R. | Lyall, Charles James, B. A., c. s.                                                                                     | <i>Shillong.</i>                          |
| 1870 April 7.     | L.M. | Lyman, B. Smith.                                                                                                       | <i>Philadelphia, Pa., U. S., America.</i> |
| 1884 Dec. 3.      | N.R. | McCabe, R. B., c. s., Deputy Commissioner.                                                                             | <i>Tezpur Assam.</i>                      |
| 1868 Dec. 2.      | N.R. | Macauliffe, Michael, B. A., c. s., Judicial Assistant Commissioner.                                                    | <i>Sialkot.</i>                           |



| Date of Election. |      |                                                                                                    |
|-------------------|------|----------------------------------------------------------------------------------------------------|
| 1886 June 2.      | R.   | Macdonald, A., Editor, "Englishman." <i>Calcutta.</i>                                              |
| 1884 Mar. 5.      | N.R. | Macdonnell, A. P., c. s. i., B. A., c. s., Secy., Govt. of India, Home Dept.                       |
| 1879 Feb. 5.      | N.R. | Macgregor, Lieut.-Col. C. R., F. R. G. s., 44th N. I. <i>Manipur.</i>                              |
| 1848 April 5.     | L.M. | MacLagan, General Robert, R.E., F. R. S. E., F. R. G. s. <i>Europe.</i>                            |
| 1873 Dec. 3.      | R.   | MacLeod, Kenneth, M. D. Brigade Surgeon. <i>Calcutta.</i>                                          |
| 1880 May 5.       | N.R. | MacLeod, Roderick Henry, c. s., Asst. Magte. <i>Kasia, Gorakpur, N.-W. P.</i>                      |
| 1881 July 6.      | R.   | Mahomed Firukh Sháh, Prince. <i>Calcutta.</i>                                                      |
| 1886 Jan. 6.      | N.R. | Mahomed Latif Khán, Sayyid, Khán Bahádur. <i>Jhang, Panjab.</i>                                    |
| 1882 Aug. 2.      | R.   | Mahomed Yusoof, Hon. Maulavi. <i>Calcutta.</i>                                                     |
| 1888 July 4.      | N.R. | Mahomed Zainool Abideen Khán Bahádur Feroze Jung, Nawab Syud (Nizamut Family). <i>Murshedabad.</i> |
| 1867 April 3.     | R.   | Mainwaring, Major-General George Byres, s. o. <i>Serampur.</i>                                     |
| 1878 April 3.     | R.   | Mallet, F. R., F. G. s., F. C. s., Superintendent, Geological Survey of India. <i>Calcutta.</i>    |
| 1869 Sept. 1.     | R.   | Mallik, Yadulál. <i>Calcutta.</i>                                                                  |
| 1880 May 5.       | N.R. | Mandlik, The Hon. Ráo Sáhib Visvanáth Náráyana, c. s. i. <i>Bombay.</i>                            |
| 1869 July 7.      | N.R. | Markham, Alexander Macaulay, c. s., F. R. G. s., Collector. <i>Banda.</i>                          |
| 1886 Aug. 26.     | A.   | Meade, Capt. Malcolm John, s. c., Assistant Agent, Governor-General. <i>Europe.</i>                |
| 1860 Mar. 7.      | A.   | Medlicott, H. B., M. A., F. R. S., F. G. s. <i>England.</i>                                        |
| 1886 Mar. 3.      | R.   | Mehtá, Roostumjee Dhunjeebhoy. <i>Calcutta.</i>                                                    |
| 1884 Nov. 5.      | N.R. | Middlemiss, C. S., A. B., Assistant Superintendent, Geological Survey of India.                    |
| 1871 Sept. 6.     | N.R. | Miles, Lieut.-Colonel S. B., s. c., Political Agent. <i>Udaipur.</i>                               |
| 1884 Sept. 3.     | R.   | Miles, William Harry. <i>Calcutta.</i>                                                             |
| 1870 July 6.      | R.   | Miller, A. B., B. A., Barrister-at-Law, Official Trustee. <i>Calcutta.</i>                         |
| 1874 May 6.       | N.R. | Minchiu, F. J. V. <i>Aska, Ganjam.</i>                                                             |
| 1875 Aug. 4.      | A.   | Minchin, Major-General, C. C. <i>Europe.</i>                                                       |
| 1856 Mar. 5.      | R.   | Mitra, Rájá Rájendralála, LL. D., C. I. E. <i>Calcutta.</i>                                        |
| 1876 Dec. 6.      | F.M. | Mockler, Lt.-Col. E., British Consul. <i>Muscat, Persian Gulf.</i>                                 |
| 1886 May 5.       | N.R. | Molesworth, Capt. E. H., Commandant, Police Lovy, <i>Dibrugarh.</i>                                |
| 1883 Dec. 12.     | N.R. | Möller, Otto Chrestien. <i>Tukvar, Darjeeling.</i>                                                 |
| 1881 May 4.       | N.R. | Molloy, Lieut.-Col. Edward 5th Goorkhas. <i>Abbottabad, Hazara, Panjab.</i>                        |
| 1864 Nov. 2.      | N.R. | Muir, J. W., M. A., c. s. <i>Azingarh.</i>                                                         |

| Date of Election. |          |      |                                                                                                         |
|-------------------|----------|------|---------------------------------------------------------------------------------------------------------|
| 1879              | May 7.   | R.   | Mukerjea, Bhudeva, C. I. E. <i>Calcutta.</i>                                                            |
| 1867              | Mar. 6.  | R.   | Mukerjea, Rájá, The Hon. Pearimohan, C. S. I., M. A. <i>Uttarpara.</i>                                  |
| 1885              | July 1.  | R.   | Mukerjea, Nilmani, Professor, Sanskrit College. <i>Calcutta.</i>                                        |
| 1886              | May 5.   | R.   | Mukhopádhyaýa, Asutosh, M. A., F. R. A. S., F. R. S. E. <i>Calcutta.</i>                                |
| 1887              | May 4.   | R.   | Munro, Thomas R., Port Commissioners Department. <i>Calcutta.</i>                                       |
| 1885              | June 3.  | N.R. | Naemwoollah, Maulavi, Depy. Magte. <i>Bulandshahr.</i>                                                  |
| 1887              | June 1.  | N.R. | Narain, Ráo Govind Ráo. <i>Allahabad.</i>                                                               |
| 1876              | May 4.   | R.   | Nash, A. M., M. A., Inspector of European Schools, Bengal. <i>Calcutta.</i>                             |
| 1881              | Nov. 2.  | R.   | Nicéville, L. de., F. E. S. <i>Calcutta.</i>                                                            |
| 1887              | April 6. | R.   | Noetling, Fritz. Ph. D. Palæontologist to the Geological Survey of India. <i>Calcutta.</i>              |
| 1869              | July 7.  | N.R. | Nursing Ráo, A. V., F. R. A. S., Ráo Bahádur. <i>Vizagapatam.</i>                                       |
| 1885              | Feb. 4.  | R.   | Nyáyaratna, Pandit Mahámahopádhyaýa Mahesh-chandra. <i>Calcutta.</i>                                    |
| 1879              | Aug. 28. | N.R. | Oldham, Brigade-Surgeon C. F., F. R. G. S. <i>Dharamsalla.</i>                                          |
| 1883              | Dec. 1.  | N.R. | Oldham, R. D., A. R. S. M., F. G. S., Deputy Superintendent, Geol. Sur. of India.                       |
| 1883              | Aug. 30. | N.R. | Oliver, Edw. Emmerson, M. I. C. E., Under-Secy. to Govt. Panjab, P. W. D. <i>Lahore.</i>                |
| 1885              | Feb. 4.  | N.R. | Oliver, James William, Forest Dept. <i>Tharrawaddy, Burmah.</i>                                         |
| 1887              | July 6.  | R.   | Oung, Moung Hla, Financial Department, Government of India. <i>Calcutta.</i>                            |
| 1880              | Aug. 4.  | L.M. | Pandia, Pandit Mohanlál Vishnulál, F. T. S., Member and Secy., Royal Council of Meywar. <i>Udaipur.</i> |
| 1888              | Feb. 1.  | L.M. | Pandit, Hon. Ajodhianath. <i>Allahabad.</i>                                                             |
| 1880              | Jan. 7.  | N.R. | Pargiter, Frederick E., B. A., C. S. <i>Pubna.</i>                                                      |
| 1880              | Jan. 7.  | N.R. | Parry, J. W., C. E., ASSOC. M. I. C. E., Asst. Engineer. <i>Western Bengal Surveys.</i>                 |
| 1862              | May 7.   | L.M. | Partridge, Samuel Bowen, M. D. Surgeon-Major. <i>Europe.</i>                                            |
| 1871              | Dec. 6.  | N.R. | Peal, S. E. <i>Sibsagar, Assam.</i>                                                                     |
| 1860              | Feb. 1.  | F.M. | Pearse, General Geo. Godfrey, C. B., R. H. A., Godfrey House. <i>Cheltenham, England.</i>               |
| 1873              | Aug. 6.  | R.   | Pedler, Alexander, F. C. S., Professor of Chemistry, Presidency College. <i>Calcutta.</i>               |
| 1888              | June 6.  | L.M. | Pennell, Aubray Percival, B. A., C. S. <i>Cuttack.</i>                                                  |
| 1865              | Sept. 6. | N.R. | Peppé, T. F. <i>Shahabad.</i>                                                                           |

| Date of Election. |      |                                                                                                                               |
|-------------------|------|-------------------------------------------------------------------------------------------------------------------------------|
| 1881 Aug. 25.     | R.   | Percival, Hugh Melville, M. A., Professor, Presidency College. <i>Calcutta.</i>                                               |
| 1877 Aug. 1.      | N.R. | Peters, C. T., M.B., Surgeon-Major. <i>Bijapur, Bombay.</i>                                                                   |
| 1888 July 4.      | R.   | Petley, Lieut.-Eaton W. R. N., F. R. G. S., Port Officer. <i>Calcutta.</i>                                                    |
| 1887 Mar. 2.      | R.   | Pope, T. Archdale, Assistant Superintendent, Survey of India Department. <i>Calcutta.</i>                                     |
| 1881 Feb. 2.      | N.R. | Prideaux, Lieut.-Colonel William Francis, B. S. C. Resident. <i>Jeypur.</i>                                                   |
| 1880 April 7.     | N.R. | Rai, Bipina Chandra, B. L. <i>Rungpore.</i>                                                                                   |
| 1887 May 4.       | R.   | Ráy, Prasannakumár, D. Sc., (Lond. and Edin.) Professor, Presidency College, Registrar, Calcutta University. <i>Calcutta.</i> |
| 1880 Aug. 4.      | A.   | Reynolds, Herbert William Ward, C. S. <i>Europe.</i>                                                                          |
| 1884 Mar. 5.      | N.R. | Risley, H. H., B. A., C. S. <i>Darjeeling.</i>                                                                                |
| 1860 Jan. 3.      | N.R. | Rivett-Carnac, John Henry, C. I. E., F. S. A., C. S., Opium Agent. <i>Ghazipur.</i>                                           |
| 1865 Feb. 1.      | A.   | Robinson, S. H. <i>Europe.</i>                                                                                                |
| 1888 July 4.      | N.R. | Roy, Kirán Chándrá, Zemindar. <i>Narail, Jessore.</i>                                                                         |
| 1888 June 6.      | R.   | Roy, Kumár Denendro Nárayán. <i>Calcutta.</i>                                                                                 |
| 1881 Aug. 30.     | N.R. | Roy, Nanda Kumár. <i>Giridhi.</i>                                                                                             |
| 1888 June 6.      | R.   | Roy, Peary Mohun. <i>Calcutta.</i>                                                                                            |
| 1888 Sep. 27.     | N.R. | Roy, Upendra Chándra, Zemindar. <i>Narail, Jessore.</i>                                                                       |
| 1885 Mar. 4.      | R.   | Rustomjee, H. M. <i>Calcutta.</i>                                                                                             |
| 1880 Sep. 30.     | N.R. | Sage, E. M., Ex. Engineer, P. W. D. <i>Tourghu.</i>                                                                           |
| 1887 June 1.      | N.R. | Sandberg, Rev. Graham, B. A., Barrister-at-Law, Inner Temple. Chaplain. <i>Jhansi.</i>                                        |
| 1877 May 2.       | R.   | Sandford, W. <i>Calcutta.</i>                                                                                                 |
| 1872 Dec. 4.      | R.   | Sarasvati, Pandit, Pránáth, M. A., B. L. <i>Bhowanipur.</i>                                                                   |
| 1867 April 3.     | R.   | Sarkár, The Hon. Dr. Mahendralál, C. I. E. <i>Calcutta.</i>                                                                   |
| 1885 Mar. 4.      | R.   | Sarvádihikári, Rájakumár. <i>Calcutta.</i>                                                                                    |
| 1885 Feb. 4.      | R.   | Sástri, Haraprasád, M. A. <i>Calcutta.</i>                                                                                    |
| 1870 May 4.       | A.   | Schlich, Dr. W. <i>Europe.</i>                                                                                                |
| 1888 Feb. 1.      | R.   | Sclater, William Lutley, Deputy Superintendent, Indian Museum. <i>Calcutta.</i>                                               |
| 1884 April 2.     | N.R. | Scotland, John Parry, C. E., Ex. Engineer. <i>Midnapur.</i>                                                                   |
| 1874 July 1.      | R.   | Scully, Dr. John. <i>H. M.'s Mint, Calcutta.</i>                                                                              |
| 1888 Sept. 27.    | R.   | Sen Gupta, Kali Prasanna. <i>Calcutta.</i>                                                                                    |
| 1886 Mar. 3.      | N.R. | Sen, Hírálal, Excise Department. <i>Mozafferpur.</i>                                                                          |
| 1885 April 1.     | N.R. | Sen, Yadunáth. <i>Khurda, Puri.</i>                                                                                           |
| 1885 April 1.     | R.   | Sen, Narendranáth. <i>Calcutta.</i>                                                                                           |
| 1879 Jan. 8.      | N.R. | Sewell, R., M. C. S. <i>Madras</i>                                                                                            |
| 1879 May 7.       | A.   | Sheridan, C. J., C. E. <i>Europe.</i>                                                                                         |
| 1888 April 4.     | N.R. | Shástri, Haridas Bhattáchárya, Sankhya Shastri, M. A. Director of Public Instruction, Jaypur State. <i>Jaypur.</i>            |

| Date of Election. |      |                                                                                                                          |
|-------------------|------|--------------------------------------------------------------------------------------------------------------------------|
| 1882 May 3.       | N.R. | Shyamaldáss, Mahámahopádhyaýa Kaviráj, Private Secy. to H. H. the Maháráná of Udaipur. <i>Udaipur.</i>                   |
| 1878 April 3.     | R.   | Simon, A. <i>Calcutta.</i>                                                                                               |
| 1887 April 6.     | R.   | Simpson, Dr. W. J., Health Officer to the Municipal Corporation. <i>Calcutta.</i>                                        |
| 1884 Sept. 3.     | R.   | Singh, Kumár Indrachandra, of Paikparah. <i>Calcutta.</i>                                                                |
| 1853 Dec. 7.      | N.R. | Singh, Mahárájá Isvariprashád, c. s. i. <i>Benares.</i>                                                                  |
| 1885 April 1.     | R.   | Singh, Kumár Saratchunder. <i>Calcutta.</i>                                                                              |
| 1882 June 7.      | N.R. | Singh, Mahárájá Kumár Harendra Kishore. <i>Bettiah.</i>                                                                  |
| 1878 Oct. 4.      | N.R. | Singh, Rájá Lachman. <i>Bulandshahr.</i>                                                                                 |
| 1882 Aug. 2.      | N.R. | Singh, Narain, Rájá Rám. <i>Khyrah, Monghyr.</i>                                                                         |
| 1880 June 2.      | N.R. | Singh, Thákur Garuradhawaya Prasád, Rájá of Beswan, Beswan Fort. <i>Aligarh.</i>                                         |
| 1859 Aug. 3.      | R.   | Siñha, Baláichánd. <i>Calcutta.</i>                                                                                      |
| 1872 Aug. 5.      | N.R. | Skrefsrud, Rev. L. O., Indian Home Mission to the Santháls. <i>Rampur Hát.</i>                                           |
| 1885 Nov. 4.      | F.M. | Smith, N. F. F. <i>England.</i>                                                                                          |
| 1874 June 3.      | A.   | Smith, Vincent Arthur, c. s., Settlement Officer. <i>England.</i>                                                        |
| 1872 July 3.      | N.R. | Stephen, Carr, B. L., Judl. Asst. Commr. <i>Amritsar.</i>                                                                |
| 1879 Oct. 2.      | N.R. | Sterndale, R. A., F. R. G. S., Asst. Commr. of Currency. <i>Madras.</i>                                                  |
| 1882 May 3.       | A.   | Stewart, H. E. Sir Donald M., Bart., G. C. B., G. C. S. I. <i>Europe.</i>                                                |
| 1876 Aug. 2.      | N.R. | St. John, Lieut.-Col. Sir Oliver Beauchamp, R. E., K. C. S. I., Resident in Mysore and Chief Commissioner. <i>Coorg.</i> |
| 1880 Nov. 3.      | A.   | Sturt, Lieut. Robert Ramsay Napier, B. S. C., Panjab Frontier Force. <i>Europe.</i>                                      |
| 1884 Mar. 5.      | N.R. | Swinhoe, Lieut.-Col. C., B. S. C., Asst. Comy. Genl. <i>Poona.</i>                                                       |
| 1864 Aug. 11.     | R.   | Swinhoe, W., Attorney-at-Law. <i>Calcutta.</i>                                                                           |
| 1880 Nov. 3.      | A.   | Swynnerton, Rev. Charles. <i>England.</i>                                                                                |
| 1868 June 3.      | R.   | Tagore, The Hon. Mahárájá Jotendra Mohun, K. C. S. I. <i>Calcutta.</i>                                                   |
| 1865 Sept. 6.     | A.   | Tawney, C. H., C. I. E., M. A., Principal, Presidency College. <i>Europe.</i>                                            |
| 1874 Mar. 4.      | A.   | Taylor, Commander A. D., late Indian Navy. <i>Europe.</i>                                                                |
| 1884 May 5.       | N.R. | Taylor, W. C., Settlement Officer. <i>Khurda, Orissa.</i>                                                                |
| 1878 June 5.      | N.R. | Temple, Capt. R. C., S. C. <i>Palace, Mandalay, Upper Burma.</i>                                                         |
| 1876 Feb. 2.      | A.   | Tennant, Major-General James Francis, R. E., C. I. E., F. R. S. <i>Europe.</i>                                           |
| 1875 June 2.      | N.R. | Thibaut, Dr. G., Professor, Muir Central College. <i>Allahabad.</i>                                                      |



| Date of Election. |      |                                                                                                         |
|-------------------|------|---------------------------------------------------------------------------------------------------------|
| 1886 Aug. 4.      | R.   | Thomas, Robert Edmond Skyring. <i>Calcutta.</i>                                                         |
| 1886 Jan. 6.      | A.   | Thomson, Colonel, W. B., B. S. C. <i>Europe.</i>                                                        |
| 1847 June 2.      | L.M. | Thuillier, Major-Genl. Sir Henry Edward Landor,<br>R. A., C. S. I., F. R. S. <i>Europe.</i>             |
| 1883 June 6.      | N.R. | Toker, Lieut.-Col Alliston Champion, B. S. C., C. B.,<br>Sec., Govt. of India, Military Dept.           |
| 1871 April 5.     | F.M. | Trefftz, Oscar. <i>Europe.</i>                                                                          |
| 1861 June 5.      | L.M. | Tremlett, James Dyer, M. A., C. S., Judge, Chief<br>Court. <i>Lahore.</i>                               |
| 1872 July 3.      | A.   | Trevor, Colonel William Spottiswoode, R. E.,<br><i>Europe.</i>                                          |
| 1885 May 6.       | R.   | Verdeau, Ivan. <i>Calcutta.</i>                                                                         |
| 1886 Sep. 30.     | N.R. | Waddell, Dr. Laurence Austine, M. B., Superinten-<br>dent of Vaccination. <i>Darjeeling.</i>            |
| 1865 Nov. 1.      | R.   | Waldie, David, F. C. S. <i>Calcutta.</i>                                                                |
| 1865 May 3.       | R.   | Waterhouse, Lt.-Col. James, B. S. C., Dy. Supdt.,<br>Survey of India. <i>Calcutta.</i>                  |
| 1887 Oct. 6.      | N.R. | Watson, Lieut. Edward Yerbury, Deputy Assis-<br>tant Commissary General. <i>Madras.</i>                 |
| 1874 July 1.      | N.R. | Watt, Dr. George, C. I. E., Reporter on Economic<br>Products. <i>Simla.</i>                             |
| 1869 Sept. 1.     | N.R. | Westland, Hon. James, C. S., Financial Member of<br>the Governor General's Council.                     |
| 1878 Aug. 29.     | A.   | Whittall, R., Forest Dept. <i>Europe.</i>                                                               |
| 1880 Feb. 4.      | R.   | Wilson, The Hon. Arthur, Judge, High Court.<br><i>Calcutta.</i>                                         |
| 1878 Mar. 6.      | N.R. | Wilson, J., C. S., Deputy Commissioner. <i>Sháhpur,</i><br><i>Panjab.</i>                               |
| 1870 Jan. 5.      | R.   | Wood-Mason, James. <i>Calcutta.</i>                                                                     |
| 1873 Aug. 6.      | A.   | Woodthorpe, Lieut.-Col. Robert Gossett, R. E., C. B.,<br>Deputy Supdt., Survey of India. <i>Europe.</i> |

## SPECIAL HONORARY CENTENARY MEMBERS.

| Date of Election. |                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1884 Jan. 15.     | James Prescott Joule, Esq., LL. D., F. R. S. <i>Manchester.</i>                                                                      |
| 1884 Jan. 15.     | Dr. Ernst Haeckel, Professor in the University of <i>Jena.</i>                                                                       |
| 1884 Jan. 15.     | Charles Meldrum, Esq., M. A., F. R. S. <i>Mauritius.</i>                                                                             |
| 1884 Jan. 15.     | A. H. Sayce, Esq., Professor of Comp. Philology. <i>Oxford.</i>                                                                      |
| 1884 Jan. 15.     | M. Emile Senart, Member of the Institute of France.<br><i>Paris.</i>                                                                 |
| 1884 Jan. 15.     | Sir Monier Monier Williams, <i>Knt.</i> , K. C. I. E., C. I. E., M. A.,<br>D. C. L., LL. D., Boden Prof. of Sanskrit. <i>Oxford.</i> |

## HONORARY MEMBERS.

|               |                                                                                              |
|---------------|----------------------------------------------------------------------------------------------|
| 1848 Feb. 2.  | Sir J. D. Hooker, K. C. S. I., C. B., M. D., D. C. L., F. R. S.,<br>F. G. S. <i>Kew.</i>     |
| 1853 April 6. | Major-General H. C. Rawlinson, K. C. B., D. C. L., F. R. S.<br><i>London.</i>                |
| 1858 July 6.  | B. H. Hodgson. <i>Europe.</i>                                                                |
| 1860 Mar. 7.  | Professor Max Müller. <i>Oxford.</i>                                                         |
| 1860 Nov. 7.  | Dr. Aloys Sprenger. <i>Heidelberg.</i>                                                       |
| 1860 Nov. 7.  | Dr. Albrecht Weber. <i>Berlin.</i>                                                           |
| 1868 Feb. 5.  | Major-General Sir A. Cunningham, R. E., K. C. I. E., C. S. I.,<br>C. I. E. <i>Europe.</i>    |
| 1868 Feb. 5.  | Professor Bāpu Deva Sāstri. <i>Benares.</i>                                                  |
| 1872 May 1.   | Sir G. B. Airy, K. C. B., M. A., D. C. L., LL. D., F. R. S. <i>London.</i>                   |
| 1872 June 5.  | Prof. T. H. Huxley, LL. D., PH. D., F. R. S., F. G. S., F. Z. S.,<br>F. L. S. <i>London.</i> |
| 1875 Nov. 3.  | Dr. O. Böttlingk. <i>Leipzig.</i>                                                            |
| 1875 Nov. 3.  | Prof. J. O. Westwood. <i>Oxford.</i>                                                         |
| 1876 April 5. | Col. H. Yule, R. E., C. B. <i>London.</i>                                                    |
| 1876 April 5. | Dr. Werner Siemens. <i>Berlin.</i>                                                           |
| 1879 June 4.  | Prof. E. B. Cowell, D. C. L. <i>Cambridge.</i>                                               |
| 1879 June 4.  | Dr. A. Günther, V. P. R. S. <i>London.</i>                                                   |
| 1879 June 4.  | Dr. J. Janssen. <i>Paris.</i>                                                                |
| 1879 June 4.  | Prof. H. Milne-Edwards. <i>Paris.</i>                                                        |
| 1879 June 4.  | Prof. P. Regnaud. <i>Lyons.</i>                                                              |
| 1879 June 4.  | E. Renan. <i>Paris.</i>                                                                      |
| 1881 Dec. 7.  | Professor Hermann L. F. Helmholtz. <i>Berlin.</i>                                            |
| 1881 Dec. 7.  | Dr. Rudolph v. Roth. <i>Tübingen.</i>                                                        |
| 1881 Dec. 7.  | Sir William Thomson, <i>Knt.</i> , LL. D., F. R. S., F. R. S. E.<br><i>Glasgow.</i>          |
| 1881 Dec. 7.  | Professor William Wright, LL. D. <i>Cambridge.</i>                                           |
| 1883 Feb. 7.  | W. T. Blandford, A. R. S. M., F. R. S., F. G. S., F. R. G. S.,<br>F. Z. S. <i>London.</i>    |
| 1883 Feb. 7.  | Alfred Russell Wallace, F. L. S., F. R. G. S. <i>Godalming.</i>                              |
| 1883 Feb. 7.  | Prof. William Dwight Whitney. <i>Newhaven, Connecticut,</i><br><i>U. S.</i>                  |

## CORRESPONDING MEMBERS.

| Date of Election. |                              |                    |
|-------------------|------------------------------|--------------------|
| 1844 Oct. 2.      | Macgowan, Dr. J.             | <i>Europe.</i>     |
| 1856 July 2.      | Krämer, A. von.              | <i>Alexandria.</i> |
| 1856 „ 2.         | Porter, Rev. J.              | <i>Belfast.</i>    |
| 1860 Feb. 1.      | Baker, The Rev. H.           | <i>E. Malabar.</i> |
| 1861 July 3.      | Gösche, Dr. R.               | <i>Berlin.</i>     |
| 1862 Mar. 3.      | Murray, A. Esq.              | <i>London.</i>     |
| 1866 May 7.       | Schlagintweit, Prof. E. von. | <i>Berlin.</i>     |

## ASSOCIATE MEMBERS.

|               |                                      |                    |
|---------------|--------------------------------------|--------------------|
| 1874 April 1. | Lafont, Rev. Fr. E., s. j., c. i. e. | <i>Calcutta.</i>   |
| 1875 Dec. 1.  | Bate, Rev. J. D.                     | <i>Allahabad.</i>  |
| 1875 „ 1.     | Maulavi Abdul Hai, Madrasah.         | <i>Calcutta.</i>   |
| 1882 June 7.  | Giles, Herbert, Esq.                 | <i>Europe.</i>     |
| 1883 Feb. 7.  | Rodgers, C. J.                       | <i>Amritsar.</i>   |
| 1884 Aug. 6.  | Moore, F., F. R. S., F. L. S.        | <i>London.</i>     |
| 1885 Dec. 2.  | Dr. A. Führer.                       | <i>Lucknow.</i>    |
| 1886 Dec. 1.  | Bábú Saratchandra Dás, c. i. e.      | <i>Darjeeling.</i> |

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 :

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 D. M. Stewart, Bart.  
 Commander A. D. Taylor.  
 Major-Genl. J. T. Tenant, R. E.  
 Col. W. S. Trevor, R. E.

## LOSS OF MEMBERS DURING 1888.

## BY RETIREMENT.

Major E. Gowan.  
 F. W. Peterson, Esq.  
 W. Trego Webb, Esq.  
 F. J. E. Spring, Esq.  
 E. T. Mondy, Esq.  
 F. C. Barnes, Esq.  
 J. G. Delmerick, Esq.  
 W. D. Blyth, Esq., c. s.  
 B. L. Gupta, Esq., c. s.  
 C. A. Hackett, Esq.  
 Major H. H. Cole, R. E.  
 R. C. Laughlin, Esq.  
 Capt. E. R. Shopland, I. M.  
 Capt. R. H. C. Tufnell, M. S. C.

## BY DEATH.

*Ordinary Members.*

F. Fedden, Esq.  
 S. S. Jones, Esq., c. s.  
 J. Hart, Esq.  
 J. MacDonald, Esq., c. E.  
 Surgeon-Major J. J. Monteath.

*Corresponding Members.*

Professor Holmboe.

## BY REMOVAL.

*Under Rule 38.*

Sirdár Gurdyál Sing.  
 Rev. A. E. Medicott.

*Under Rule 40.*

Sir R. Temple.  
 Brigade Surgeon W. H. Kirton.  
 Col. J. W. H. Johnstone.  
 Rev. J. Robertson.  
 T. H. Pellew, Esq., c. s.  
 Surgeon-Major H. Cayley.  
 Surgeon-Major T. R. Lewis.



[APPENDIX.]

ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1888.

# STATEMENT

## *Asiatic Society*

Dr.

|                                                     |     |     |               |     |              |           |                      |
|-----------------------------------------------------|-----|-----|---------------|-----|--------------|-----------|----------------------|
| To ESTABLISHMENT.                                   |     |     |               |     |              |           |                      |
| Salaries                                            | ... | ... | ...           | Rs. | 3,772        | 7         | 6                    |
| Commission                                          | ... | ... | ...           |     | 368          | 3         | 1                    |
|                                                     |     |     |               |     | <u>4,140</u> | <u>10</u> | <u>7</u>             |
| To CONTINGENCIES.                                   |     |     |               |     |              |           |                      |
| Stationery                                          | ... | ... | ...           |     | 79           | 5         | 9                    |
| Lighting                                            | ... | ... | ...           |     | 57           | 8         | 0                    |
| Building                                            | ... | ... | ...           |     | 3,929        | 8         | 1                    |
| Taxes                                               | ... | ... | ...           |     | 761          | 4         | 0                    |
| Postage                                             | ... | ... | ...           |     | 732          | 1         | 9                    |
| Freight                                             | ... | ... | ...           |     | 7            | 13        | 0                    |
| Meetings                                            | ... | ... | ...           |     | 90           | 12        | 0                    |
| Miscellaneous                                       | ... | ... | ...           |     | 153          | 3         | 7                    |
|                                                     |     |     |               |     | <u>5,811</u> | <u>8</u>  | <u>2</u>             |
| To LIBRARY AND COLLECTIONS.                         |     |     |               |     |              |           |                      |
| Books                                               | ... | ... | ...           |     | 2,220        | 4         | 10                   |
| Local periodicals                                   | ... | ... | ...           |     | 47           | 0         | 0                    |
| Binding                                             | ... | ... | ...           |     | 613          | 4         | 6                    |
| Coins                                               | ... | ... | ...           |     | 250          | 0         | 0                    |
|                                                     |     |     |               |     | <u>3,130</u> | <u>9</u>  | <u>4</u>             |
| To PUBLICATIONS.                                    |     |     |               |     |              |           |                      |
| Journal, Part I                                     | ... | ... | ...           |     | 876          | 8         | 0                    |
| Journal, Part II                                    | ... | ... | ...           |     | 3,107        | 4         | 2                    |
| Proceedings                                         | ... | ... | ...           |     | 669          | 7         | 0                    |
|                                                     |     |     |               |     | <u>4,653</u> | <u>3</u>  | <u>2</u>             |
| To Printing charges of circulars, &c.               | ... | ... | ...           |     | 95           | 11        | 0                    |
| To Extraordinary charges, Miscellaneous             | ... | ... | ...           |     | 101          | 9         | 6                    |
| To PERSONAL ACCOUNT (Written off and miscellaneous) |     |     |               |     |              |           | 17,933 3 9           |
|                                                     |     |     |               |     |              |           | <u>338 11 6</u>      |
| To EXTRAORDINARY EXPENDITURE.                       |     |     |               |     |              |           |                      |
| Iron railings                                       | ... | ... | ...           |     |              |           | 3,450 0 0            |
|                                                     |     |     | To Balance... |     |              |           | <u>1,38,032 4 10</u> |
|                                                     |     |     | Total Rs.     |     |              |           | <u>1,59,754 4 1</u>  |

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,*

*January 30th, 1889.*

No 1.  
of Bengal.

Cr.

By Balance from last report ... .. Rs. 1,42,735 12 7

## BY CASH RECEIPTS.

|                            |     |     |              |          |          |
|----------------------------|-----|-----|--------------|----------|----------|
| Publications sold for cash | ... | Rs. | 724          | 10       | 11       |
| Interest on investments    | ... |     | 6,594        | 7        | 7        |
| Advances recovered         | ... |     | 1            | 3        | 0        |
| Sale proceeds of old beams | ... |     | 112          | 0        | 0        |
| Miscellaneous              | ... |     | 82           | 2        | 0        |
|                            |     |     | <u>7,514</u> | <u>7</u> | <u>6</u> |

## BY PERSONAL ACCOUNT.

|                  |     |     |              |          |          |
|------------------|-----|-----|--------------|----------|----------|
| Admission fees   | ... | ... | 592          | 0        | 0        |
| Compounding fees | ... | ... | 700          | 0        | 0        |
| Subscriptions    | ... | ... | 7,590        | 0        | 0        |
| Sales on credit  | ... | ... | 250          | 12       | 0        |
| Miscellaneous    | ... | ... | 371          | 4        | 0        |
|                  |     |     | <u>9,504</u> | <u>0</u> | <u>0</u> |

Total income ... .. 17,018 7 6

Total Rs. .. .. 1,59,754 4 1

WILL. KING,  
Honorary Secy. and Treasurer,  
Asiatic Society of Bengal.

## STATEMENT

*Oriental Publication Fund in Account with*

Dr.

| TO CASH EXPENDITURE.                                |        |        |             |
|-----------------------------------------------------|--------|--------|-------------|
| Printing charges ... ..                             | Rs.    | 9,436  | 5 0         |
| Editing charges ... ..                              | ...    | 5,211  | 8 0         |
| Copying ... ..                                      | ...    | 33     | 11 6        |
| Salaries ... ..                                     | ...    | 1,404  | 11 0        |
| Advertising ... ..                                  | ...    | 110    | 0 0         |
| Freight ... ..                                      | ...    | 40     | 0 0         |
| Stationery ... ..                                   | ...    | 28     | 2 0         |
| Postage ... ..                                      | ...    | 990    | 8 9         |
| Contingencies ... ..                                | ...    | 38     | 3 9         |
| Commission on collecting bills ... ..               | ...    | 59     | 15 1        |
|                                                     |        |        | <hr/>       |
|                                                     |        | 17,353 | 1 1         |
|                                                     |        |        | <hr/>       |
| To PERSONAL ACCOUNT (Written off and miscellaneous) |        | 42     | 9 0         |
| Total expenditure                                   | ...    | ...    | 17,395 10 1 |
| To Balance                                          | ... .. | ...    | 7,713 11 4  |
|                                                     |        |        | <hr/>       |
| Total Rs.                                           | ...    | ...    | 25,109 5 5  |
|                                                     |        |        | <hr/>       |

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,**January 30th, 1889.*



No. 2.

*the Asiatic Society of Bengal.*

Cr.

|                                    |     |        |   |   |
|------------------------------------|-----|--------|---|---|
| By Balance from last report ... .. | Rs. | 12,368 | 2 | 6 |
|------------------------------------|-----|--------|---|---|

## BY CASH RECEIPTS.

|                                   |     |               |          |          |
|-----------------------------------|-----|---------------|----------|----------|
| Government allowance .. ..        | Rs. | 9,000         | 0        | 0        |
| Publications sold for cash ... .. | ... | 995           | 1        | 8        |
| Advances recovered ... ..         | ... | 118           | 3        | 6        |
| Interest on investments ... ..    | ... | 200           | 0        | 0        |
|                                   |     | <u>10,313</u> | <u>5</u> | <u>2</u> |

## BY PERSONAL ACCOUNT.

|                        |     |              |           |          |
|------------------------|-----|--------------|-----------|----------|
| Sales on credit ... .. | ... | 2,358        | 2         | 3        |
| Miscellaneous ... ..   | ... | 69           | 11        | 6        |
|                        |     | <u>2,427</u> | <u>13</u> | <u>9</u> |

|                     |     |        |   |    |
|---------------------|-----|--------|---|----|
| Total income ... .. | ... | 12,741 | 2 | 11 |
|---------------------|-----|--------|---|----|

|              |     |               |          |          |
|--------------|-----|---------------|----------|----------|
| Total Rs.... | ... | <u>25,109</u> | <u>5</u> | <u>5</u> |
|--------------|-----|---------------|----------|----------|

WILL. KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal,*

STATEMENT  
*Sanskrit Manuscript Fund in Account with*

---

Dr.

| To CASH EXPENDITURE. |     |     |     |     |       |       |     |
|----------------------|-----|-----|-----|-----|-------|-------|-----|
| Salaries             | ... | ... | ... | Rs. | 1,445 | 0     | 0   |
| Travelling expenses  | ... | ... | ... |     | 32    | 12    | 0   |
| Commission           | ... | ... | ... |     | 4     | 10    | 0   |
| Freight              | ... | ... | ... |     | 5     | 0     | 0   |
| Postage              | ... | ... | ... |     | 7     | 8     | 6   |
| Contingencies        | ... | ... | ... |     | 8     | 1     | 6   |
| Stationery           | ... | ... | ... |     | 4     | 4     | 0   |
|                      |     |     |     |     |       |       |     |
| To Balance           | ... | ... | ... |     |       | 1,507 | 4 0 |
|                      |     |     |     |     |       | 3,442 | 1 0 |

|           |     |  |  |  |  |       |     |
|-----------|-----|--|--|--|--|-------|-----|
| Total Rs. | ... |  |  |  |  |       |     |
|           |     |  |  |  |  | 4,949 | 5 0 |

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Examined and found correct,  
 MEUGENS AND KING,  
*Public Accountants,*  
*January 30th, 1889.*

No. 3.

*the Asiatic Society of Bengal.*

|                                 |     | Cr. |       |       |     |
|---------------------------------|-----|-----|-------|-------|-----|
| By Balance from last report ... | ... | ... | Rs.   | 1,715 | 5 0 |
| BY CASH RECEIPTS.               |     |     |       |       |     |
| Government allowance ...        | ... | Rs. | 3,200 | 0 0   |     |
| Publications sold for cash ...  | ... | ... | 16    | 0 0   |     |
|                                 |     |     |       | 3,216 | 0 0 |
| BY PERSONAL ACCOUNT.            |     |     |       |       |     |
| Publications sold on credit ... | ... | ... | 18    | 0 0   |     |
| Total income ...                |     |     | ...   | 3,234 | 0 0 |
| Total Rs.                       |     |     | ...   | 4,949 | 5 0 |

WILL. KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal.*

# STATEMENT

## *Personal*

| Dr.                                                |     |            |                |
|----------------------------------------------------|-----|------------|----------------|
| To Balance from last report ...                    | ... | ...        | Rs. 1,409 11 5 |
| To CASH EXPENDITURE.                               |     |            |                |
| Advances for purchase of Sanskrit MSS., postage of |     |            |                |
| books to members ...                               | ... | Rs. ...    | 3,186 13 7     |
| To Asiatic Society ...                             | ... | 9,504 0 0  |                |
| To Oriental Publication Fund ...                   | ... | 2,427 13 9 |                |
| To Sanskrit MSS. Fund ...                          | ... | 18 0 0     |                |
|                                                    |     |            | 11,949 13 9    |

|               |  |  |            |
|---------------|--|--|------------|
| Total Rs. ... |  |  | 16,546 6 9 |
|---------------|--|--|------------|

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,*

30th January, 1889.



No. 4.

*Account.*

Cr.

|                              |     |     |     |        |    |   |
|------------------------------|-----|-----|-----|--------|----|---|
| By cash receipts             | ... | ... | Rs. | 12,774 | 6  | 1 |
| By Asiatic Society           | ..  | ... | ... | 338    | 11 | 6 |
| By Oriental Publication Fund |     | ... | ... | 42     | 9  | 0 |
|                              |     |     |     | <hr/>  |    |   |
|                              |     |     |     | 13,155 | 10 | 7 |

| By Balances.      | Due to the Society. |       |       | Due by the Society. |       |       |
|-------------------|---------------------|-------|-------|---------------------|-------|-------|
|                   |                     |       |       |                     |       |       |
| Members ...       | 5,332               | 14    | 5     | 218                 | 11    | 11    |
| Subscribers ...   | 42                  | 11    | 6     | 59                  | 9     | 6     |
| Employees ...     | 30                  | 0     | 0     | 250                 | 0     | 0     |
| Agents ...        | 116                 | 8     | 6     | 1,568               | 1     | 10    |
| Miscellaneous ... | 160                 | 15    | 0     | 195                 | 14    | 0     |
| <hr/>             | <hr/>               | <hr/> | <hr/> | <hr/>               | <hr/> | <hr/> |
|                   | 5,683               | 1     | 5     | 2,292               | 5     | 3     |

3,390 12 2

Total Rs. ... 

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 16,546 6 9

WILL. KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal.*

## STATEMENT

### *Invest-*

### Dr.

|                                 |     | Nominal.     |     | Actual.              |
|---------------------------------|-----|--------------|-----|----------------------|
| To Balance from last report ... | ... | Rs. 1,56,300 | 0 0 | 1,55,820 9 10        |
| To cash ...                     | ... | ...          | ... | 31 4 4               |
| Total Rs.                       |     | ... 1,56,300 | 0 0 | <u>1,55,851 14 2</u> |

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,*

30th January, 1889.

| * Funds.            | Actual.             |                   |                     |  | Total. |
|---------------------|---------------------|-------------------|---------------------|--|--------|
|                     | Permanent.          | Temporary.        |                     |  |        |
| Asiatic Society ... | 1,33,000 0 0        | 2,823 2 2         | 1,35,823 2 2        |  |        |
| O. P. Fund. ....    | .....               | 7,000 0 0         | 7,000 0 0           |  |        |
| Sans. MSS. ....     | .....               | 2,000 0 0         | 2,000 0 0           |  |        |
| Trust Fund .....    | 1,100 0 0           | .....             | 1,100 0 0           |  |        |
|                     | <u>1,34,100 0 0</u> | <u>11,823 2 2</u> | <u>1,45,923 0 0</u> |  |        |

## STATEMENT

### *Trust*

### Dr.

|                                        |     |     |                   |
|----------------------------------------|-----|-----|-------------------|
| To Balance (Servants Pension Fund) ... | ... | Rs. | 1,161 3 10        |
| Total Rs.                              |     | ... | <u>1,161 3 10</u> |

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,*

30th January, 1889.

No. 5.  
*ment.*

|             |     |     |     | Cr.      |                 |          |          |                 |           |          |
|-------------|-----|-----|-----|----------|-----------------|----------|----------|-----------------|-----------|----------|
|             |     |     |     | Nominal. |                 | Actual.  |          |                 |           |          |
| By cash     | ... | ... | ... | Rs.      | 10,000          | 0        | 0        | 9,928           | 12        | 0        |
| By balance* | ... | ... | ... |          | 1,46,300        | 0        | 0        | 1,45,923        | 2         | 2        |
| Total Rs.   |     |     |     |          | <u>1,56,300</u> | <u>0</u> | <u>0</u> | <u>1,55,851</u> | <u>14</u> | <u>2</u> |

WILL. KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal.*

No. 6.  
*Fund.*

|                             |     |     |     | Cr. |              |          |           |
|-----------------------------|-----|-----|-----|-----|--------------|----------|-----------|
| By balance from last report | ... | ... | ... | Rs. | 1,111        | 3        | 10        |
| By interest on investments  | ... | ... | ... |     | 50           | 0        | 0         |
| Total Rs                    |     |     |     |     | <u>1,161</u> | <u>3</u> | <u>10</u> |

WILL. KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal.*

## STATEMENT

### *Cash*

| Dr.                             |     |     |             |
|---------------------------------|-----|-----|-------------|
| To balance from last report ... | ... | ... | Rs. 700 2 8 |
| RECEIPTS.                       |     |     |             |
| To Asiatic Society ...          | ... | ... | 7,514 7 6   |
| To O. P. Fund ...               | ... | ... | 10,313 5 2  |
| To Sanskrit Manuscript Fund ... | ... | ... | 3,216 0 0   |
| To Personal Account ...         | ... | ... | 12,774 6 1  |
| To Trust Fund ...               | ... | ... | 9,928 12 0  |
| To Investments ...              | ... | ... | 50 0 0      |
| Total Rs. ...                   |     |     | 44,497 1 5  |

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,*

30th January, 1889.

## STATEMENT

### *Balance*

| Dr.                     |     |     |               |
|-------------------------|-----|-----|---------------|
| To Cash ...             | ... | ... | Rs. 1,035 6 8 |
| To Personal Account ... | ... | ... | 3,390 12 2    |
| To Investments ...      | ... | ... | 1,45,923 2 2  |
| Total Rs. ...           |     |     | 1,50,349 5 0  |

Examined and found correct.

MEUGENS AND KING,

*Public Accountants,*

30th January, 1889.



No. 7.

*Account.*

Cr.

## EXPENDITURE.

|                              |            |     |     |           |        |               |            |
|------------------------------|------------|-----|-----|-----------|--------|---------------|------------|
| By Asiatic Society           | ...        | ... | ... | Rs.       | 21,383 | 3             | 9          |
| By O. P. Fund                | ...        | ... | ... | ...       | 17,353 | 1             | 1          |
| By Sanskrit Manuscripts Fund | ...        | ... | ... | ...       | 1,507  | 4             | 0          |
| By Personal Account          | ...        | ... | ... | ...       | 3,186  | 13            | 7          |
| By Investments               | ...        | ... | ... | ...       | 31     | 4             | 4          |
|                              | By balance | ... | ... | ...       | 1,035  | 6             | 8          |
|                              |            |     |     | Total Rs. | ...    | <u>44,497</u> | <u>1 5</u> |

WILL KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal.*

No. 8.

*Sheet.*

Cr.

|                              |     |     |     |           |          |                 |            |
|------------------------------|-----|-----|-----|-----------|----------|-----------------|------------|
| By Asiatic Society           | ... | ... | ... | Rs.       | 1,38,032 | 4               | 14         |
| By O. P. Fund                | ... | ... | ... | ...       | 7,713    | 11              | 0          |
| By Sanskrit Manuscripts Fund | ... | ... | ... | ...       | 3,442    | 1               | 0          |
| By Trust Fund                | ... | ... | ... | ...       | 1,161    | 3               | 10         |
|                              |     |     |     | Total Rs. | ..       | <u>1,50,349</u> | <u>5 0</u> |

WILL KING,  
*Honorary Secy. and Treasurer,*  
*Asiatic Society of Bengal.*

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