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I. The Invention of Fire.

By H. G. GRAVES, *Controller of Patents, India.*

“When this invention was made, tell me, what was then the state of the Art, what was then known?”

In a popular lecture, recently delivered at the Indian Museum, Calcutta, Mr. J. Coggin Brown dealt with man in the ages of stone implements and his development in India through roughly hewn and polished stones to the use of metal tools. A classification of the various stages throughout the world, going back through countless ages, led to the mention of one great step in the progress of mankind—the invention of fire—perhaps somewhere between fifty and a hundred million years ago. Necessarily no exact date can be given; only an imaginative approximation is possible on the available, but all too scanty, data. The geologist, who has to deal with periods of time involving millions of years, frankly says that some millions more or less in his estimate are of less account than a hundred years or so in the date of an event determined by a historian in early historic times. In turn, his errors are commensurable with a week sooner or later for some obscure happening a century or two ago.

The invention of fire, or the discovery of fire, call it what you will, what has it not meant to the progress of mankind? Yet it must not be thought of as one great outburst of progress. Rather it should be considered as a gradual development, progressing by slow and uncertain stages, many times forgotten and rediscovered in those days of primitive know-

ledge. Nowadays fire seems a simple thing. A handful of sticks, a few dry leaves, or a piece of paper, or some fine twigs perhaps, and possibly some coal, are the essentials. Nor must the matches be overlooked, and then there is the blazing fire, ready to cook man's food or to warm him when he is cold. It is a necessity for existence, and knowledge of its utilisation might almost be termed of the axiomatic order. When the fire dies down and the coldness grows, it is so easy to add a few more sticks or another piece or two of coal to make the fire blaze up again, and again to give warmth. But is it all so simple, that addition of another stick? The dog or the cat will stretch itself before the fire and get warm but will never think of replenishing the fire as it grows low. A trick dog might be trained to do so, perhaps, or an imitative monkey, but that presupposes a teacher.

In the days of primitive man, there was no teacher save necessity, and though necessity may be urgent, she is not very audible in her manner of giving advice. Early man must be conceived as approximating closely to the animal in his deductive and inductive powers and in his easy forgetfulness. Or perhaps he might have been compared in those respects to a young child, just passed the days of infancy. Give such a child some sweets, stuck in the bottom of a bottle, with a neck too small to admit his hand. He enjoys the noise of banging the bottle on the floor. If, perchance a sweet falls out, he enjoys that also, but it takes a long time to associate the extraction of the sweet with the pounding performance. It is a still further advance to utilise a stick to prise out a sweet when the hammering fails. Ten minutes afterwards, he has forgotten how to use the stick, and has to rediscover it many times before it is part of his mental equipment.

Much in the same condition was man millions of years ago. He threw a stick on a fire and it blazed up again. That did not appeal to him as a case of cause and effect. Probably he straightway forgot that he had thrown the stick and would stand glowering at the red but dying fire, which had warmed him, or which perhaps had rendered him service. Or he might pelt the fire with green branches or even stones, oblivious of the essentials of combustibility. To keep a fire alight is beyond the power of any animal or child, until certain imitative or reasoning powers have been developed. So it must have been with early man. This point is reiterated because the "invention" of fire involved so many stages, each of which must, in the intellectual development of that day, be imagined as constituting an enormous advance. Consider a few of the steps.

First there was the appreciation of the fact that fire was good for anything. Next came the ability to control a fire, to keep it alight within proper bounds. Afterwards followed the

power to preserve the fire from day to day and from year to year, and to convey it from camp to camp. Then ensued one of the greatest discoveries of all, the potentiality of originating a fire where no fire existed. It was almost an act of creation. No more was a long journey up the nearest volcano, or a long wait for the next forest fire, necessary to renew the happiness of the community when the fire-tender had been negligent and had been soundly thrashed on that account by a cold, hungry, and very angry community.

How many thousands of years elapsed before that pitch of perfection was attained no one can tell, but we do know that matches, now two annas a dozen boxes, were only invented less than ninety years ago. Of course it is all very speculative, these various steps in the conversion of fire, one of the great forces of nature, into the service of man, which is the essence of one division of the work of the civil engineer. In one century the engineer has given us railways, telegraphs and flying machines. The primitive engineer was not so expeditious. He had not the skill and experience of ages to help him in applying a discovery. So, as he did it so very very slowly perhaps a few moments may now be spared for imaginings of his progress.

Lamb, in one of his happy essays, described the discovery of roast-pig in China after a fire had swept away the owner's house. More primitive man found his roast in a burnt-out forest, but even then one must conceive much trepidation and hunger before he became educated enough for the taste and smell to appeal to him. Or perhaps the comfortable sensation near a red-hot lava flow on a cold, wet and windy night first created a desire for warmth, when the sun, that only shines by day, had gone. Or did an infuriated man brandish a burning branch against a sabre-toothed tiger, and find it more effective than a throwing-stone? Anyway, fire always existed, and he somehow managed to appreciate it and then to utilise it.

Some of the difficulties of keeping fire alight have already been discussed. The selection of proper materials and their addition at the right time are not learned in a hurry as any picnic party, unaccustomed to country life, knows only too well. Then the foresight to lay in a stock of combustible material and to protect it from rain, is not the result of a day. Much bitter experience also probably had to be endured from uncontrolled conflagrations before our ape-like progenitor could keep his fire in proper bounds. The application of fire to cooking is part of a larger subject with which this note does not intend to deal.

The carriage of fire was the next great step to be learnt. A burning brand in itself is not a very portable object and is not easily concealed in case of emergency. Some material is required with the property of long smouldering and ready re-igni-

tion. With that extinct, the tribe might have to wait long years or make long journeys to get a renewal. Even now, amongst uncivilised races, men will prefer to visit a neighbouring camp to replenish their extinct fire when matches have not reached them. Imagination boggles at the invention of means for restoring a fire *de novo*, and yet it is not the greatest step in the "invention" of fire as compared with its first utilisation.

Several sources of natural fire, unstarted by man, are to be found. There is the volcano always available, while forest or prairie fires are spasmodic. In addition to the volcano, in the ordinary and more popular sense, as a source of fire, there are, as Mr. Coggin Brown has suggested, mud volcanoes and similar eruptions also to be considered. From these, gas in large quantities is often given off, and it very readily takes fire. Whether the starting of flame is due to spontaneous combustion, as occurs with certain compounds such as phosphorated hydrogen, or to lightning, or to some hydro-electric action, or to the impact of ejected stones, is not clear. The fact remains that certain forms of natural gas do take fire and often remain alight for years if the supply is continuous. Natural fire would also from time to time be found in the outcrop of coal seams or beds of peat under favourable circumstances.

Forest fires are now generally due to man, but they occasionally are originated by lightning, or possibly by friction between dry branches waving in the wind, or by volcanic eruptions. Spontaneous combustion, such as occurs in stacks of straw or hay, is an unlikely source of fire in nature, and there are few recorded instances of man's adaptations of that phenomenon for useful purposes. Nor is it very likely that sparks from a fall of rock would start a fire. Yet it is possible that primitive man observed the frictional or spark origin and adopted one or the other. Or again it is possible that he noticed the warmth when rubbing two things together and, by pushing the friction to a limit, obtained fire.

Most people are inclined to give priority to the frictional origin as opposed to a percussive origin, but now it is not possible to decide with any certainty. Legendary lore will not carry us back to the days of the mammoth, and so is absolutely useless. The flint and steel is of course much easier to work than the rubbing stick or the fire drill, but then iron and steel were unknown. Sparks can be obtained with much difficulty from properly chosen stones, such as pyrites or possibly from carbonaceous grit as long as there is sufficient combustible matter present to ignite in the highly heated particle which flies off on impact. Ordinary stones, except perhaps with very great violence, will not spark. On the other hand the fire stick method is very difficult to work and is essentially a matter of knack. How difficult it is, few people know, though

they will glibly say that is the method they would adopt in an emergency. When they do try, they generally get much warmer than their instruments.

Except in more or less uncivilised places, and here and there for ceremonial purposes, the match has ousted the flint and steel and the fire stick. It, in turn, may be replaced by the spongy platinum or other form of "automatic lighter" in which, by the opening of a neat little pocket case, a file is caused to scratch a mass of an alloy of iron and cerium giving showers of sparks to ignite a small spirit lamp. The distribution of the fire stick method in its various forms has been dealt with very fully and carefully by Mr. E. B. Tylor in his "Researches on the Early History of Mankind and the Development of Civilisation," and by Mr. H. Balfour in the *Journal of the Royal Anthropological Institute*, Vol. XLIV, 1914, p. 32.

The focussing lens and the fire pump, in which tinder is ignited by the heat due to the compression of air, are comparatively modern methods, modern that is as compared with the stone and iron ages. Mr. H. Balfour describes the five piston and its origin and distribution in the "Anthropological Essays presented to E. B. Taylor, 1907." The origin of gunpowder has been ascribed to a fortuitous mixture of charcoal with saltpetre from the saline accretions on midden heaps, but such a mixture requires flame for ignition and is not readily set on fire by percussion.

In this sketch of the origin of the use and generation of fire for the service of man, the use of wood has been assumed as the only fuel. Later on, other fuels would be employed, such as charcoal, coal and peat, and also natural gas and oils would be utilised. Artificial gas did not come into vogue until the beginning of last century when William Murdoch's experiments resulted in lighting the Soho works of Boulton Watt & Co. near Birmingham.

Charcoal, which is wood freed almost completely from its volatile constituents, is smokeless and can be considered as a development of charred embers from a fire of wood, brought into the primitive man's cave to add to his comfort; but probably primitive man, like many of his modern descendants, did not object to smoke in his dwelling. When coal was first employed is very uncertain, but the history of coal mining has been worked out by Galloway and other authors. Natural gas is not a portable thing but at one time it attained a very important religious signification. Within the last fifty years the gas wells of America have been an enormous source of power. With uses of coke and artificial gas in all their many forms in historic periods, this paper is not concerned. Only attention is drawn to it in order to show that development increased in rapidity as time went on, and it may be remarked that every step was delayed by allegations of non-utility.

The main object of this paper has been to show the excessive slowness with which the development of the utilisation of fire in the service of man has proceeded. This has been here ascribed in part to the incapacity of primitive man to appreciate the effect of any observation he may have made, and to his inability to remember and to apply his knowledge when remembered. Very largely this was due to want of education; and early man was hampered to an inordinate extent, as compared with man of the present day, by lack of power to apply analogy and to use inherited skill, induction and deduction.

It is always easy to be wise after the event. It is difficult to appreciate how hard it is to invent anything which satisfies a really existent, but unrecognised, want; and it is very easy, in view of existing knowledge, to be astonished at the apparent simplicity of the problem which has been solved with such trouble and pain. In any case involving the infringement of a patent, when the validity comes into question, it is more than exceedingly difficult to revert mentally to the state of the art at the date of the invention, or in other words, to obliterate from the mind all the progress that has ensued since the prior date. So to us, in the present day, fire and matches are everyday things—we know them so well and the state of affairs in their absence is almost inconceivable. Fire for the service of man probably took ages and ages to develop in the then existing stages of primitive civilisation, and life without fire is now unthinkable.

Life without matches is at least a hardship. For the sake of comparison the invention of matches amongst a civilised race, in contradistinction to the invention of fire amid a highly developed animal race may be considered in view of present knowledge. As has been said, flint, steel and tinder, with few exceptions were the prevalent means of getting fire until well on in the 19th century, say between 1840 and 1850. In 1827 a practical form of frictionally ignited match was first put on the market, but only on a very small scale at the very high price of a shilling (twelve annas) a box. Long before then, the want of some readier means of obtaining fire had been felt. From late in the 17th century some attempts had been made to utilise phosphorus which had just been discovered by Robert Boyle. The beginning of the 19th century saw the use of mixtures of sugar and potassium chlorate which are ignited by contact with strong sulphuric acid. The history may be read in the *Encyclopaedia Britannica*. In the sixties of last century, matches cost an anna a box at least. Now they can be bought, in spite of the war, at two annas (pence) or less per dozen and each box contains three score sticks.

Consider what this means. A neat little box with the potentiality of some fifty or more fires at the cost of a farthing or even less, and each fire is obtainable with practical cer-

tainty within a second of time. The problem that had to be solved was to produce a stick, tipped with a sufficiency of composition to ignite it when struck. With matches in our hands, almost since the day we were born, it is very easy to overlook the details. First a composition had to be invented which would take fire but would not explode when struck or rubbed. Then it had to be brought into contact with something which would preserve the flame from it temporarily at least—a little stick or strip of paper was the obvious solution. It was eminently desirable to stick the stuff on the end of the stick so that the two things were always together and available for immediate use. That means the stuff must be such as to take fire when struck; it must be sufficiently adhesive to remain on the stick while the friction is taking place; and it must be sufficiently powerful to set fire to the stick, which, in turn, must be able to take and maintain the fire.

These are only a few of the problems that have to be solved in the production of a really good match. The match must be protected to some extent against damp. It must not stink like the early sulphur abominations did. The red-hot head must not fall off and, for further safety, the match must only strike on the box. Wood of suitable quality, not too brittle, easily cut into sticks, and sufficiently combustible must be found in sufficient quantities. Poison must be avoided—and so on and so on. Now we accept matches as a matter of course, and we forget all the skill and machinery involved in the production of boxes of matches by thousands of millions.

Let the match-user put himself back only a hundred years into the days of flint and steel and let the fire-user put himself back a hundred million years to the days of the man-monkey. Then let him consider the absence of the knowledge of a match and of the presence of skill to invent it. And let him consider the absence of knowledge of how to start or even to utilise and control a fire and the absence of skill in almost every direction save what might be called instinctive. Only by disabusing the mind of present knowledge in this way can the meaning of the "invention" of fire really be brought home to us in these days of civilisation.

"Then tell me, for thou knowest, what is fire?"

* * * * *

".....This fire I seek

Not for myself,.....

But for my children and the after time,

For great the need thereof, wretched our state":

* * * * *

".....and withdrew a tongue

Of breathing flame, which lives to leap on earth

For man the father of all fire to come."

* * * * *

Oh heavenly fire, life's life, the eye of day."

(*Prometheus the Firegiver.*) (By Robert Bridges.)

2. On the Genuineness of the Eighth Canto of the Poem *Kumāra-Sambhavam*.

By RAI MONMOHAN CHAKRAVARTI BAHADUR.

Of Kālidāsa very little is unfortunately known. Hence any scrap of information about his works would be welcome. In this paper I raise the question whether the eighth canto of his great poem the *Kumāra-sambhavam* (the birth of the war-god) is spurious or genuine.

The older reports on the search of Sanskrit manuscripts in India were often silent on the point whether the manuscripts of this poem contained the eighth canto or not. Where the reports mention the number of the cantos, the manuscripts are found to contain generally not more than seven cantos. Manuscripts containing the eighth were rare. Moreover, the commentaries now existing run up, in ninety-nine instances out of hundred, to seventh canto only. Hence arises the question whether the eighth canto found in a few manuscripts is genuine or spurious.

In Bengal the mediæval Sanskrit writers appear to have been doubtful on the point. Bharata Sena (Mallik) in his well-known commentary on the *Kumāra-Sambhavam* voiced the traditionary opinions of his predecessors when in the introductory verses he remarked¹ :

“ It is said that the great poet Kālidāsa made the epic poem *Kumāra-Sambhavam* in sixteen (*sic* seventeen) cantos. The circulation of the last eight cantos ceased from supernatural reasons ; while the eighth canto is not read from the curse of the goddess. A commentary on the (first) seven cantos

¹ Sanskrit College MS., vol. VI, 29, introd. verses 2-4:—

कुमारसंभवं नाम कालिदास महाकविः ।
यच्चकार महाकाव्यं सर्गैः षोडशभिः त्रुतम् ॥ [२ ॥]
तस्य षोडशसर्गस्य संचारोऽशुद्धदेवतः ।
पाठोऽष्टमस्य सर्गस्य देवोशापाच्च विद्यते ॥ [१ ॥]
द्वौका तत्सप्तसर्गस्य सुबोधाच्च यथामति ।
गौराक्षणीन पुत्रेण भरतेन वितन्यते ॥ [४ ॥]

Bharata Sena's time is not yet settled. Anyhow he must be older than Saka 1650 or 1728 A.D., the date of a MS. of his *Ghatakarpura-tīkā* (R. Mitra, *Notices*, vol. IX, No. 3172).

by name *Subodhā* (easy understanding) is (now) expounded according to the best of his powers by Bharata, son of Gaurāṅga Sena. ”

In view of such remarks it is worth examining this question at some length. The question of genuineness may be examined in two ways, either

- (i) by external evidence, or
- (ii) from its internal contents.

By external evidence is meant whether this canto was ever commented upon by any old commentators, or whether any of its verses was ever quoted or referred to in any of the older works.

On examining the existing commentaries it appears that
(a) Commentaries. Mallinātha, the versatile and popular Tikā-kāra on Kālidāsa's poems, annotated on the eighth canto.¹ Mallinātha flourished in the first half of the fourteenth century. Though not very old, Mallinātha has the reputation of being a commonsense critic, and of being very particular as to the text and its different readings. Consequently his acceptance of the eighth canto as genuine has much weight.

Going further back, the oldest existing commentator on the *Kumāra-sambhavam* was Vallabhadeva of Kaśmīra. His gloss is named the *Pañjikā*. Its ordinary manuscripts omit the eighth canto. But several are reported to be fuller, containing notes on the eighth sarga. I myself have come across two manuscripts giving the eighth. One of them is in Śaradā characters, and the other in Nāgri; and both appear to be pretty old in age.² They differ slightly from each other as regards the text of this canto, but as a rule they agree. I see therefore no sufficient reasons to doubt that Vallabhadeva accepted this canto as genuine. Vallabha notices different read-

¹ MSS. of Mallinātha's *Tikā* on the eighth canto are found in S. India. The *Tikā* has also been printed at Madras and Bombay. Mallinātha belonged probably to Teliṅgānā.

² See Deccan College Library catalogue, Nos. 82 and 72 of 1883-4 (Śaradā), and No. 333 of 1892-95 (West Indian Nāgri). The eighth canto notes are on folios 196-201 of the Śaradā MS. and on folios 486 to 566 of the Nāgri MS. The three introductory verses at the beginning of the poem are omitted by the Śaradā MS., but are thus given in the Nāgri (fol. 1a):—

यस्य भृंगवलिः कंठे श्रुतदानांबुशुषिते ।

भानि कङ्कालमालेव स तः पायाद्विनायकः ॥ १ [॥]

कालिदासोऽप्ययः कुत्र व्याख्यातारो वयं कुतः ।

तदिदं नन्ददौपेन नागवेश्यप्रकाशनं ॥ २ [॥]

तथापि क्रियतेऽस्माभिः पञ्जिका कन्दसंभवे ।

उद्धताश्रयमाहात्म्यास्तत्प्रख्यातसालमेः ॥ ३ [॥]

ings of its text, which must have been therefore much older than his time.¹

In the final colophon Vallabhadeva calls himself son of Ānandadeva.² He wrote commentaries on several other poems, such as Kālidāsa's *Rayhuvamśam* and *Megha-dūtām*, Māgha's *Śiśupāla-vadham*, *Sūrya-śatakam*, *Vakr-okti-pañcāśikā*, etc. Vallabhadeva's *Pañjikā* is quoted by Hemādri and Mallinātha. He must therefore be older than the thirteenth century at least. He is probably to be identified with Vallabhadeva, the grandfather of Kayata the Kaśmirian who wrote a *Ṭīkā* on Ānandavardhana's *Devī-śatakam* during the reign of Bhīmagupta in 4078 Kaliyuga era (977 A.D.).³ Allowing an interval of half a century for the two generations between Kayata and Vallabhadeva, the time of the latter falls in the second quarter of the tenth century. Judging from the commentaries therefore the eighth canto was considered an integral part of the poem from a time considerably older than the tenth century.

As regards quotations from or references to the canto, one naturally turns to those store-houses of quotations, the works on (b) References in Rhetorical Works. Alaṅkāra or rhetorics. One of the oldest Sanskrit rhetoricians is Ānandavardhanācārya. In his *Vṛtti* or gloss on the *Dhvany-āloka* (the light on suggestiveness),⁴ this author remarks that the famous descriptions of the amours of the highest deities by the great poets, though (essentially) improper, are saved from the fault of vulgarity by their genius; for example, the description of the amorous enjoyment of the Devī Pārvatī in the (poem) *Kumāra-sambhavam*. The author adds that such amorous descriptions by a poet without genius would clearly be faulty.

In commenting on this passage Ācārya Abhinava Gupta notes that descriptions of the amours of the highest deities are as improper as descriptions of the amours of one's parents.⁵

¹ For mention of different readings see, for example, under verse 32 of the eighth canto (No. 28 of the Nāgri MS.), विरसदौनकंठयो"रिति पाठांतरः।

² The Nāgri MS. final colophon (fol. 56b):—

इत्यानंददेवादिनि बहवविरचितायां कुमारसंभवविष्टतावह्वलः सर्गो समाप्तः।

³ The *Kāvya-mālā*, I, p. 101, footnote.

⁴ The *Dhvany-āloka*, Udyota III, Karikā 6 (Nir. Sāg. Press, pp. 137-8):— तथाहि महाकवीनामप्युत्तमदेवताविषयप्रसिद्धसंभोगशृंगारनिबन्धनाद्यनौचित्यं शक्तिरिच्छतं प्राप्यत्वेन न प्रतिभासते : यथा कुमारसंभवे देवीसंभोगवर्णनम्। एवमादौ च विषये यथौचित्यत्यागस्तथा दर्शितमेवायम्। शक्तिरिच्छतत्वं चान्यथ्यतिरेकाभ्यासमवस्येयते। तथा हि शक्तिरहितेन कविना एवविधे विषये शृंगार उपनिध्यमानः स्फुटमेव दोषत्वेन प्रतिभासते ॥

⁵ The *Dhvany-āloka-lochanam*, p. 138 :—

It is thus clear that the eighth canto of the *Kumāra*, which describes the amorous life of Śiva and Pārvati after marriage, was known to the rhetoricians Abhinava Gupta and Ānandavarddhana. The former was a prolific writer whose time falls in the fourth quarter of the tenth and the first quarter of the eleventh century. The latter flourished, according to the *Rāja-taraṅginī*, in the time of the Kāśmīrian king Anantavarmman (second half of the ninth century).¹

Several other older rhetoricians quote even particular verses of this canto. Without burdening this article with all the quotations, the following few may be mentioned as samples :—

(i) In the *Sarasvatī-kanth-ābharana*, attributed to the king Bhoja of Dhāra (1021 A.D.), verse 11 is quoted to illustrate upamāna (similitude) subhead prativiṃba (reflexion), verse 49 for anādara-krta-vikāra (passion from lover's neglect), verses 79 and 80 for mada (intoxication).²

(ii) Ksemendra alias Vyāsadāsa, living in the time of the king Ananta-rāja (1028-1080 A.D.), quotes in his *Suṛtta-tilakam*³ the verse 63 as an example of the metre Rathodhdhatā, and in his *Aucitya-vicāra-carccā* criticises the verse 87 as not proper for Lord Śiva, the Guru of the three worlds.

(iii) In the *Tippanī* (gloss) of Namisādhu on Rudrata's *Kāvya-ālaṅkāra* (composed in Saṁvat 1125 or 1068 A.D., some manuscripts give Saṁvat 1176 or 1119 A.D.), the verse 2 is quoted to illustrate non-forwardness (shyness) in a girl lover.⁴

(iv) In the commentary of Dhanika on Dhanañjaya's *Daśa-rūpaka* (twelfth century), the same verse 2 is cited for Mugdhā (a young artless girl) and for sādhasabhāva (feeling of anxiety).⁵

(v) In the *Kāvya-ānuśāsanam* of Hemacandra, a prolific Jaina writer (Saṁvat 1145-1229 or 1088-1172 A.D.), verses 5, 6,

उत्तमदेवतासंभोगपरिमर्षे च पिष्टमंभोग इव लज्जातंकादिना कष्टमत्कारावकाश
पत्याधैः । संभोगोऽपि ह्यसौ वर्जितस्तथा प्रतिभाभवता कविना यथा तत्रैव विश्रान्तः
हृदयं पौर्वापर्यपरामर्शं कर्तुं न ददाति ।

cf. Hemacandra's *Kāvya-ānuśāsanam* (N. S. Press), p. 124.

¹ The Introduction to the *Dhvany-āloka*, pp. 1-2.

² The *Sarasvatī-kanth-ābharana*, A. Barooah's ed., pp. 188, 286, 305, 308.

³ The *Suṛtta-tilakam* in the *Kāvya-mālā* II. p. 51, under यथा चसैव, that is Kālidāsa's. The *Aucitya-vicāra-carccā* with his own gloss, in the *Kāvya-mālā*, I. p. 120:—यथा वा कालिदासस्य (then quotes verse 87):
चचाम्बिकामंभोगवर्षने पामरनारीसमुच्चितनिर्लेख्यसङ्गनकराजिविराजितोदबुल्लहृत-
विहोचनतं विहोचनस्य भगवतस्त्रिजगज्जदुरोर्यदुक्तं तेनामौचित्यमेव परं प्रबन्धाद्यं
पुञ्जाति ।

⁴ Rudrata's *Kāvya-ālaṅkāra*, Nir. Sāg. ed., p. 143.

⁵ Dhanika's commentary, the *Āloka*, N. S. ed., pp. 54, 128.

11 and 63 are quoted. The poem itself is quoted therein as an example under the sub-heads, description of night, of sunset, of moon-rise, of wine-drinking and of amorous dalliance, subjects which are peculiar to the eighth canto only.¹

It is thus clear that this canto was known to the rhetoricians from before the ninth century, and that none considered it to be spurious. Kṣemendra in quoting the verses 61 and 87 calls them distinctly as Kālidāsa's.

Let us now turn to internal evidence. The first point is metre. The general metre of the canto is Rathodhatā, but the last verse is in Mālinī. Such an arrangement introducing a variety in metre of the last one or two verses is characteristic of Kālidāsa's epic poems. Moreover the metre Rathodhatā was used by the poet, for instance, in the body of the eleventh canto of the *Raghuvamśam*. Mālinī metre was also used by him several times for end verses, for example, in the second canto of the *Raghuvamśam*, and in cantos first and second of the *Kumāra-sambhavam*.

In grammatical constructions I have come across no marked variations from the general run of Kālidāsa's works.

Next the subjects. They may be divided into two groups of ideas, erotic and non-erotic. The erotic ideas and descriptions need not be discussed at length. But in respect of them the eighth bears the same relation to the other seven cantos of the *Kumāra-sambhavam*, that the nineteenth canto of the *Raghuvamśam* bears to the rest of the cantos in that epic. The standard of rhetorical excellence is similar. In fact the rhetoricians while treating of the general ideas and various stages of erotic sentiment, quoted the verses of the eighth canto more frequently than the nineteenth, and quoted them generally as models of the poetic art.

The non-erotic group include verses describing natural scenery, such as the sunset (30-47), and the evening (52-75) on mountains. The easy flow of the lines, the general accuracy of the descriptions, the profusion and appropriateness of the similes, and the high passionate imagery of some of the ideas are not unworthy of the great poet. For example, take the following :—

38. The deers are entering the courtyards of the huts ; the trees by water-sprinkling are looking up vigorous ; the cows required for the Agnihotra (ceremony) are entering ; the fires are burning (for the evening homa) ; in these ways the hermitage is shining.

40. The western sides touched by the ruddy sun from

¹ The *Kāvya-ānuśāsanam*, N. S. ed., pp. 40, 88, 102, 355-6 (in the *tikā* of his own). For his time, see Peterson's Fifth Report, Introduction, p. lxxxv.

a distance and therefore with few rays only is looking lovely like a virgin adorned on the forehead with pollened flowers of (red) Bandhujiva (*Pentapetes Phoenicia*).

56. Eyesight fails to pass upwards, downwards, sideways, frontwards and backwards. This world is living in the night like an ovum in the (dark) ovary.

57. Between the pure and the impure, the stationary and the moving, the curved and the straight, all (differences) have been obliterated by this darkness. Shame to the darkness for removing the distinctions (between the good and the bad)!

63. The moon with its finger-like rays removing the (black) hair-like darkness from the bud-like (shut) lotus eyes is, as it were, kissing the (beloved) night.

Sufficient facts have now been adduced, and they fairly prove that the eighth canto formed part of the original poem. Why then

The cause of its omission in MSS.

has it been omitted from most manuscripts? Its disappearance is, I think, due to the subject selected. The amorous dalliance of the Divine Being and His consort, described like the dalliance of an ordinary human lover and his mistress, shocked the religious instincts. Unlike Vaiṣṇavism that permitted such amorous descriptions, Śaivism and Śāktism were more strict and stern. The Śaiva rhetoricians condemned such descriptions directly and indirectly; and their condemnation was followed by the gradual dropping of the canto from ordinary manuscripts. Finally we see the disappearance attributed to a curse of the goddess Pārvatī.

I conclude this paper with a discussion of the question as to the position of the eighth canto in the original poem. Was it the last canto, or was it followed by nine other

Ninth to seventeenth cantos spurious.

cantos as now alleged? On this point the following facts are worth noticing. Firstly, the cantos nine to seventeen appear in extremely few manuscripts, mostly very recent manuscripts. Secondly, they were not commented upon or recognised by any of the older commentators like Vallabha or by any reliable critics like Mallinātha. Thirdly, neither the cantos generally nor any of their verses particularly have been quoted or referred to in rhetorical or other works. Fourthly, the verses are unequal in merit, and generally speaking do not run up to the high standard of excellence set up in the first eight cantos or in the other poems of Kālidāsa. The power is perceptibly less; and the similes, the great characteristic of the poet, much fewer and less appropriate. Fifthly, these cantos describe the growth of the Kumāra, his fight with the demon Tripura and his followers, and his destruction of them. These subject-matters disagree with the title of the poem which is expected to describe only the events leading

up to the birth of the war god. Sixthly, on comparing with the *Raghuvamśam* the intention of the poet appears to be to end his poem in the sweetness of erotics (sṛṅgāra). Its last (nineteenth) canto deals with the love and amorous dalliances of the king Agnivarna. Similarly, the *Kumāra-sambhavam* should end in the eighth canto dealing with the loves of Śiva and Pārvati.

A consideration of these facts and others leads to the conclusion that the cantos ninth to seventeenth are probably spurious. At least it would be safer to treat them like *Nalodayam* and other poems attributed to Kālidāsa, as not his until proved otherwise.

In the present paper I do not propose to discuss the *voxata questio* of Kālidāsa's time. Twelve years back I had an occasion to discuss this subject. I then came to the conclusion that Kālidāsa should belong to a period of great culture, that this period can only be the period of the Imperial Guptas, and that internal evidence point to his flourishing in the time of Kumāra Gupta and Skanda Gupta, say in the third quarter of the fifth century A.D.¹ Since then I have come across no authentic facts pointing otherwise, and so must leave the date question as it was then.

Kālidāsa's Time—Third quarter of the fifth century.

¹ J.R.A.S. 1903. pp. 183-186; Do., 1904, pp. 158-161.

3. Taxilá as a Seat of Learning in the Páli Literature.

By BIMALA CHARAN LAW, B.A.

Taxilá has been frequently referred to in the Páli Literature as a centre of learning in Ancient India. Pupils from different parts of India used to visit the place for learning various arts and sciences. According to Dhammapadatthakathá, Pasenadi, the king of Kosala, was educated at Taxilá.¹ Jivaka, the renowned physician at the court of King Bimbisāra was educated in medicine and surgery here.² Princes from various kingdoms used to be sent to this place for their education.³ In one place⁴ there is a reference to a young man of the Lālha country going to Taxilá for education. Lālha is the Páli form of Rāḍha. As to its identification I agree with Mr. Nandalal Dey who in his 'Notes on the History of the district of Hugli or the Ancient Rāḍha' (J.A.S.B. New Series, Vol. VI, 1910, p. 604) writes: "It should be borne in mind that the princess Suppadevi was carried away by a lion at Lālha while she was proceeding from Vanga to Magadha (Modern Behar), and therefore Lālha must have been situated between Vanga and Magadha and not in Kalinga. The identification of Lāla or Lāta, the native country of Vijaya with Guzerat by some writers cannot be at all correct." In several places in the Páli Jātakas,⁵ there are references to highly renowned teachers living at Taxilá and various subjects that were taught there. In one of the Jātakas, a very beautiful picture of the student life of those days has been drawn (Jātaka, Vol. II, p. 277). A son of the King of Benares went to learn arts at Taxilá from a renowned teacher. He carried with him 1,000 gold coins as the teacher's fee. In those days, there were two classes of pupils—(i) those who used to pay for their education, (ii) those who served their teacher during the day-time in lieu of payment and received instructions during the night. The paying pupils used to live in the house of their teacher like his eldest son. Corporal punishments for offences were not unknown in those days as there is reference to a prince being beaten by his preceptor for an offence. From the Cittasambhūta Jātaka,⁶ it appears that the instructions were given to the higher classes only, namely, to the Brahmins and Kshat-

¹ P.T.S. edition, p. 211.

² Mahāvagga (Vinaya Pitaka edited by Dr. Oldenberg), VIII. 3.

³ Jātakas, Vol. I, p. 259; Vol. V, pp. 161, 210, 457.

⁴ Ibid., Vol. I, p. 447.

⁵ Ibid., Vol. VI, p. 347; Vol. I, pp. 402, 463, 317.

⁶ Ibid., Vol. IV, p. 391.

triyas, for it has been said there that two Caṇḍāla youths disguised as Brahmins were learning sciences from a teacher, but were expelled when found out. Of the subjects taught, the three Vedas and eighteen Vijjās are frequently mentioned. The three Vedas are the Rigveda, Sāmaveda, and Yajurveda. The Atharvaveda as the fourth Veda has been mentioned nowhere in the Pāli Jātakas. In many places¹ pupils have been described as learning *sippas* (*Silpas*) only, but the word *sippa* appears to have been used in the comprehensive sense of learning.

In the Kosiya Jātaka² it is stated that during the reign of Brahmadata, the King of Benares, Bodhisatta being born in a Brahmin family studied the three Vedas and eighteen Vijjās at Taxilā; became a renowned teacher at Benares and used to teach the three Vedas and eighteen Vijjās to the Kshattriya princes and the Brahmin boys. In the Dummedha Jātaka³ we find that during the reign of Brahmadata of Benares, the Bodhisatta was born in the womb of the chief queen of Brahmadata and was called Brahmadattakumāro. At the age of 16, he went to Taxilā and mastered the three Vedas and eighteen Vijjās. There is a description in the Bhīmasena Jātaka⁴ as to how the Bodhisatta learnt the three Vedas and the eighteen Vijjās from a renowned teacher at Taxilā, and in many other Jātakas⁵ we find that the Bodhisatta became well versed in the three Vedas and eighteen Vijjās at Taxilā.

In the Bhīmasena Jātaka⁶ we find that the Bodhisatta learnt archery at Taxilā and afterwards became a famous archer. After learning the three Vedas and the eighteen Vijjās at Taxilā he went to a weaver named Bhīmasena who was so called because of his gigantic appearance, and asked him to search for an appointment for himself as an archer, assuring him that the Bodhisatta would actually do all his work for him. When Bhīmasena got the appointment as an archer to the King of Benares, he was asked by the king to kill a tiger which was devouring all his subjects. Bhīmasena at once killed the tiger, being guided by the Bodhisatta, and was rewarded. On another occasion he killed a wild buffalo. He became proud of his strength and valour and began to disregard the Bodhisatta. Shortly afterwards, a foreign king attacked Benares. Bhīmasena was sent on an elephant, but he was so frightened that he was about to fall down from the back of the animal. The

¹ Ibid., Vol. VI, p. 347; Vol. I, pp. 406, 431, 447; Vol. V, pp. 177, 210.

² Ibid., Vol. I, p. 463.

³ Ibid., Vol. I, p. 285.

⁴ Ibid., Vol. I, p. 356.

⁵ Ibid., Vol. I, pp. 505, 510; Vol. IV, p. 200; Vol. II, p. 87; Vol. III, pp. 115, 122.

⁶ Ibid., Vol. I, p. 356.

Bodhisatta sent him home and defeated the foreign king. In the Asadisa Jātaka¹ we find that the Bodhisatta mastered the three Vedas and the eighteen Vijjās at Taxilá. He was born as the eldest son of the King of Benares named Asadisa and he had a younger brother named Brahmadata. His father willed away his throne to his eldest son, but he refused to take the kingdom and gave it over to his younger brother. The councillors intrigued. Upon this, he left the kingdom and went to the dominion of another king where he made himself known as a bowman. The king appointed him as his archer. In order to remove all doubts about him from the minds of his old bowmen, the king asked him to bring down a mango from the top of a tree with his bow and arrow. He succeeded in doing so by shooting an arrow to the sky which came to the earth with the mango aimed at.

In the Sarabhaṅga Jātaka,² the Bodhisatta was born in the womb of the wife of a priest. His father sent him to Taxilá to learn arts. He studied arts and paid fees to the famous teacher. After completing his education, he received from his teacher Khaggaratana (a valuable sword), Sandhiyuttamendakasiṅgadhanum (a bow made up of the horn of a ram), Sandhiyuttatunhiraṁ (a quiver made up of joints), Sannāhakañcukaṁ (an armour), Unhisa (a turban). The Bodhisatta trained up 500 young men and then returned home. The king, in order to see the arts of the Bodhisatta, collected 60,000 archers and he caused his drum to be beaten in the city intimating to the people to come and see the arts of the Bodhisatta. He came to the assembly with a sword only in his hands concealing other things given by his teacher. The assembled archers refused to give their bows to him. Bodhisatta requested the king to encircle a space in the centre with a cloth and entered into the enclosure. After entering into the enclosure, he put on a turban and took his bow. He requested the king to call men from 4 classes—Akkhanavedhī, Vālavedhī, Saddavedhī, and Saravedhī. Then the king summoned the archers. The Bodhisatta gave 30 arrows to each and asked them to shoot them at him simultaneously while he would prevent them alone. The archers refused to shoot at the young Bodhisatta. They afterwards shot and the Bodhisatta prevented them by *nārāca* (a light javelin). The Bodhisatta said that he would pierce them by an arrow. They became terrified. Four plantain plants were kept on four sides and he pierced them by one arrow. He was further requested to show more feats, namely, *saralatti* (a stick of arrows), *sararajjum* (a rope of arrows), *saraveni* (a row of arrows), *sarapāsāda* (a palace of arrows), *saramaṇḍapa* (a pavilion

¹ Ibid., Vol. II, p. 87.

² Ibid., Vol. V, p. 127.

of arrows), *sarasopāna* (a ladder of arrows), *sarapokkharanī* (a tank of arrows), *sarapadumain* (lotus of arrows), *saravassam* (a flight of arrows). He pierced a plank 8 fingers thick, an iron-sheet one finger thick, a cart full of earth and sand, and a hair from the distance of an *Usabha*¹ by the sign of an egg-plant (*vātingāna*). In the *Pañcāvudha Jātaka*,² we find that in the past when Brahmadata was reigning in Benares, Bodhisatta was born as his son and the Brahmins foretold that he would be the best man in the Jambudīpa in using five kinds of weapons. He went to a famous teacher at Taxilā to learn arts. When he finished learning arts he was given five kinds of weapons by his teacher. From Taxilā on his way to Benares he met a Yakkha named Silesaloma. When Bodhisatta was attacked by the Yakkha, he first of all shot 50 poisoned arrows one after another. He then used sword and spear, and struck with the club, with the right hand, with the left hand, with the right leg, with the left leg, and at last with the head. When the weapons proved to be of no effect, and when he was caught by the Yakkha, he said that he had *Vajirāvudha* (a weapon of knowledge) with him with which he would be able to put an end to the life of the Yakkha. At last the Yakkha was defeated.

In the *Susīma Jātaka*,³ the Bodhisatta was born in the womb of the wife of a priest. At the age of 16, he lost his father. His father was a *hatthimaṅgalakārako*. When the king wished to perform *hatthimaṅgala* ceremony, his ministers requested him to choose a priest from among the elderly Brahmins. Upon this, the widow of the priest became sorry and her young son coming to know of his mother's sorrow enquired as to where he would be able to learn *Hatthisuttam* and three Vedas. His mother asked him to go to Taxilā which was at a distance of 20,000 *Yojanas*. The young son went to Taxilā in a day and learnt *Hatthisuttam* in a day and he returned on the third day. He took part in the ceremony on the fourth day.

In the *Campeyya Jātaka*⁴ it is related that a young man of Benares learnt *Ālambanamantam* (mantram for charming snakes) at Taxilā. The Bodhisatta was born as the *Nāga-king* in the *Campā River* between *Aṅga* and *Magadha*. He was very righteous. On a full-moon day, he observed *Uposatha* (sabbath) coming on shore out of water. The young Brahmin on his way home saw the *Nāga-king* and charmed him by his mantra, but he was afterwards saved by his wife.

¹ *Usabha* is a measure of distance = 20 *yatthis*, and 1 *yatthi* = 7 *ratana*s (*Abhidhānappadīpikā*, pp. 196, 996).

² *Jātaka*, Vol. I, p. 273.

³ *Ibid.*, Vol. II, p. 47.

⁴ *Ibid.*, Vol. IV, p. 456.

It is mentioned in the Vrahāchatta Jātaka¹ that a son of the King of Kosala learnt *Nidhiuddharana mantam* at Taxilá. He then found out the hidden treasure of his deceased father and with the money thus obtained he engaged troops and reconquered the lost kingdom of his father.

¹ Jātaka, Vol. III, p. 115.

4. A Note on the Bengal School of Artists.

By S. KUMĀR, M.R.A.S., *Supdt. of the Reading Room,
Imperial Library, Calcutta.*

In 1869, Dr. Anton Schiefner of St. Petersburg (now Petrograd) published, under the auspices of the Russian Imperial Academy, a German translation of Tārānātha's History of Buddhism in India. The work is originally in Tibetan and it is almost a sealed book, as it were, to many who are not very well acquainted with the language. But the translation has made the work more popular. It has almost become a fashion, nowadays, with a certain section of Orientalists to speak of it as an authoritative work on the history of Northern India during the pre-Muhammadan period. The original work was written in about the beginning of the 17th century A.D. It is an embodiment of traditions in the shape in which they reached the author, mostly garbled and strongly biased, and with a large amount of personal equation which might be accounted for the creed of the author. An analysis of Tārānātha's statements has not yet been completed, so that for the present the actual historical value of the work cannot be estimated with any amount of definiteness. But so much has already been proved as would enable us to say that it would not be quite safe to regard Tārānātha's work as a record of unadulterated historical facts, or of reliable traditions. It is a curious jumble of facts and fiction, of truth and untruth, of proved historical facts and garbled Buddhistic traditionary accounts. What we have said above might be illustrated by referring to a particular instance taken out of Tārānātha's History.

Just before the accession of the Pālas of Bengal there were anarchy and lawlessness in the country,—a fact recorded by Tārānātha in the following terms:—"Zu der Zeit waren schon viele Jahre vergangen, ohne dass in Bangala Könige waren, und alle Einwohner des Reichs waren in Unglück und Kummer gerathen."¹ Further he says,—“Da sagten alle, dass er im Besitz grossen Tugendverdienstes sei, wählten ihn beständig zur Herrschaft und gaben ihm den Namen Gopāla.”²

There can be no doubt about the truth of these statements, as it has been borne out by the copper-plate grant

¹ Tār. Gesch. d. Buddh. i. Ind. Ueberset. v. A. Schiefner, p. 203.

² Ibid., p. 204.

executed in the reign of Dharmapāla.¹ Let us take another instance; we find it stated by Tārānātha that Mahipāla I and Rāmpāla reigned for 52 and 46 years respectively.² This might probably be regarded as not very far from truth, as many metal images have been discovered which were executed during the 48th year of Mahipāla's reign and one of stone dated the 42nd year of the reign of Rāmapāladeva. But Tārānātha fails to give a correct genealogy of the Pālas of Bengal in spite of their importance in the history of Northern School of Buddhism. They were the last of the royal patrons of the religion and it was under them that so many sects and doctrines originated, such diverse opinions were entertained, and such an abstruse metaphysics was developed as made the Mahāyānism a profound subject of study for the Orientalists. According to Tārānāth,³ Devapāla was the father of Dharmapāla and Yaṅṅapāla was the son of Rāmapāla.⁴ But from the inscriptions and copper-plate grants we have come to know that Devapāla was the son of Dharmapāla⁵ and that Yaṅṅapāla had no blood-relationship with the Pāla Kings of Bengal.⁶ In the Manahali copper-plate inscription of Madanapāladeva⁷ a complete genealogy of the Pālas has been found which, when compared with the one given in Tārānātha's History, will show the discrepancies in the latter:—

The list of Pālas as given by Tārānātha.

Gopāla.	S'reṣṭapāla.
Devapāla.	Caṅakapāla.
Rasopāla.	Virapāla.
Dharmapāla.	Niyāpāla.
Masurakṣita.	Amarapāla.
Vanapāla.	Hastipāla.
Mahipāla.	Kṣāntipāla.
Mahapāla.	Rāmapāla.
Sāmupāla.	Yaṅṅapāla.

The genealogy of the Pālas as derived from the copper-plate grants of Dharmapāla and Madanapāla, the 2nd and the last kings of this dynasty respectively:—

¹ Epi. Ind., Vol. IV, 243 ff., A.S.B. 1894, I, 46 ff.

² Gesch. d. Bud. i. Ind. Schiefner, pp. 225 and 251.

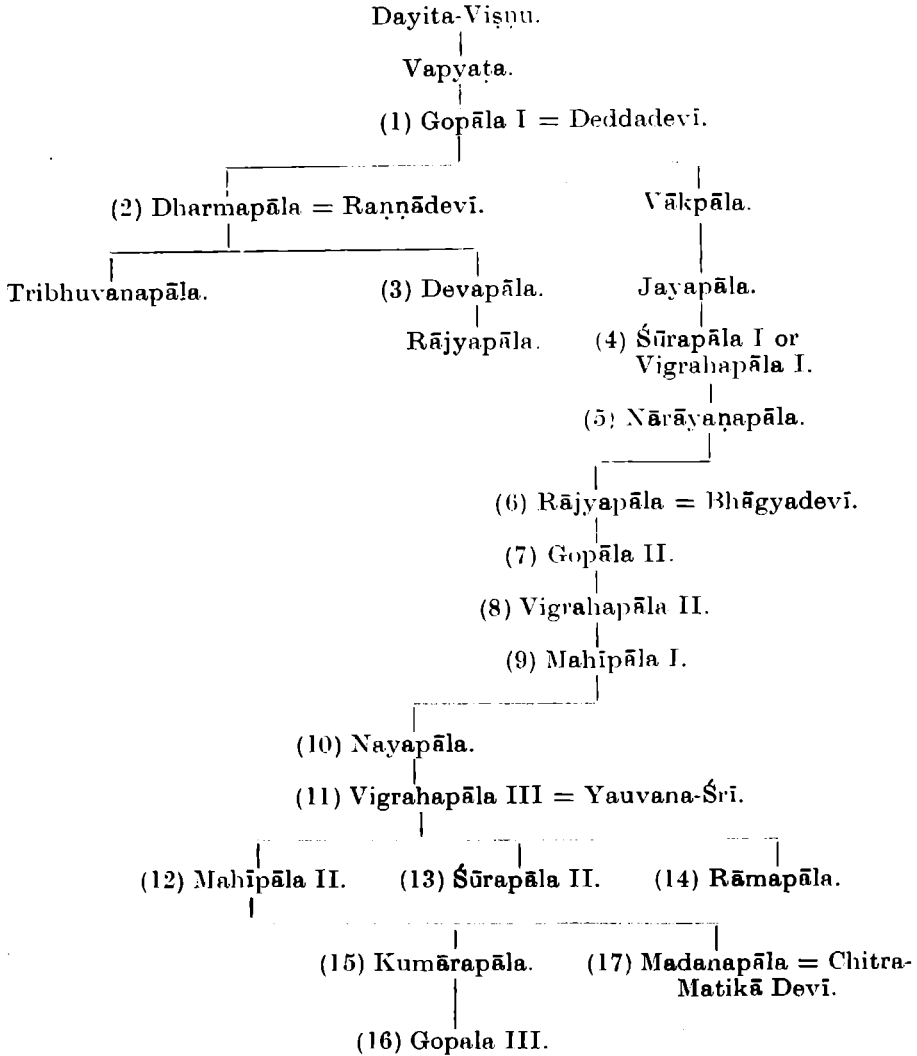
³ Ibid., p. 208.

⁴ Ibid., p. 251.

⁵ Ind. Ant., Vol. XX, 253 ff.

⁶ Ibid., Vol. XVI, 63 ff.

⁷ J.A.S.B., Vol. LXIX, I, 66 ff.



By a comparison of the above we see that Tārānātha's statements, like the accounts given in the genealogical works of Bengal, are altogether baseless and cannot be accepted as historical data unless they are supported by external evidence. Tārānātha has said that in a work by Kṣemendra-bhadra of Magadha a detailed account of the events has been given down to the reign of Rāmapāla, and that in the "Buddhapurāṇa,"—a work said to have been written by Indraḍatta of Kṣatriya caste, the history of the first four kings of the Sena dynasty is to be found. But these two works are yet to be discovered, and the mere mention of their names by Tārānātha cannot, at present, be of any use to us. Ghulām Husain Salim of Maldah, the author of Riyāz-us-Sālātīn, has said in many places of his book that the accounts collected therein have been found in certain works, but he has not given their names, and up till now, in no work have been found those new facts which have

been included by Ghulām Ḥusain in his History of Bengal. However, his statements have been supported by a number of Arabic inscriptions and hence there cannot be any hesitation in accepting as historical facts the accounts given in Riyūz-us-Sālātīn. But the case is different with Tārānātha. Evidence is not lacking which proves that accounts given by him are mostly fictitious, rather than historical.

Relying on the statements of Tārānātha, which are mostly contradictory and untrustworthy, Mr. Vincent A. Smith writes:—“The Nāga productions of Nāgārjuna’s time were rivalled by the creations of Dhīmān and his son Bītpālo, natives of Varendra (Bengal), who lived during the reigns of Devapāla and Dharmapāla. Both father and son were skilled alike as painters, sculptors and bronze-founders. Bītpālo, who remained in Bengal, was regarded as the head of the Eastern School of Bronze-casting. But his disciples in painting being numerous in Magadha (South Bihar) he was also held to be the chief of the ‘Later Middle Country’ school of that art, whereas his father was considered to be the head of the Eastern School of paintings.¹”

Mons. Foucher, in the course of his remarks, on the miniature paintings on the MSS. Add. 1643, Cambridge, and A 15, Asiatic Society of Bengal, says that the illuminators of these MSS. were “très suffisamment maîtres de leurs moyens.” To this Mr. V. A. Smith adds, “If they date from the eleventh century, they may represent the ‘Eastern’ School of Dhīmān, which, according to Tārānātha, was favoured in Nepāl at about that time.²”

The only source of information to which Mr. Smith has referred, in the above passages, is Tārānātha’s work. In no inscription, neither in any copper-plate grant, are to be found the names of Dhīmān and Vitapāla (or Bītpālo, as Tārānātha calls him). Mr. Akṣaya Kumāra Maitreya of the Varendra Research Society in his introduction to the “Gauḍa-rājamāla,”—a Bengali work published by the Society,—probably following Tārānātha, says that in this age (during the reigns of Dharmapāla and Devapāla) Dhīmān and his son Vitapāla of Varendra enriched the Gauḍian art by the production of the finest specimens, and that these will be described in the “History of Art” to be published by the Varendra Research Society. He further adds that the writers on the subject being not so well-informed are in the habit of explaining them away as specimens of provincial art of Magadha and Orissa of this age.

The “History of Art” above referred to has not yet seen the light of day. But on the occasion of the visit of His Ex-

¹ History of Fine Art in India and Ceylon, p. 305.

² Ibid., p. 324.

cellency Lord Carmichael to the Museum of the Society, they published a Guide Book in English. In this, it will be found that the Society have come to the conclusion that among the specimens exhibited, there are a few stone images which might be attributed to Dhīman or his immediate follower.¹ None of these, we presume, contain any inscription, as there is no mention of any in the Guide Book. We are at a loss to understand how a particular image might be regarded as a specimen of artistic creation of any particular person when there is nothing in the shape of inscription indicating the name of the artist. It is needless to say that such assertion, unsupported by evidence, has no place in history.

Many of the specimens of art which have been discovered in Southern and Western Bengal are not in any way inferior to those found in Northern Bengal, or Varendra. Recently Mr. Nagendranath Vasu has discovered, in the village of Aṭṭahāsa, in the District of Burdwan, a stone image of a goddess seated or squatting on her haunches. It is a figure of an old, emaciated woman, on the pedestal of which are to be found in relief the figures of two worshippers, one male and the other a female, of a horse and of an ass. We have not yet succeeded in finding what goddess it represents, but one would surely be convinced of the genius of its author by merely looking at it. The figure is draped by a single piece of cloth tied in the loins in the Indian fashion, but the upper part of the body is undraped. The skill, with which the ribs and the emaciated breast have been chiselled out, is certainly unrivalled and covers it with a glow of realism, so rare, and so artistic. At a first glance one would think that it represents a human form on the point of suffocation. The emaciated lips, parted by a faint smile, testifies the high order of artist's conception. On the neck of the image, there is a charm hanging by means of a thin string necklace, and on the wrists a pair of bangles is in evidence. There is no other ornament on the body of the image. Her hair is dishevelled and thrown on her back. A portion of the figure is broken away, yet what remains is a standing testimony of the high order of art, of which South and West Bengal may justly be proud. We do not remember

¹ According to Tārānāth, two great painters and sculptors, Dhiman and Bitapala, flourished in Varendra in the reign of Dharmapala and of his successor Devapala and founded independent schools. A comparison of exhibits Nos. 11, 14, 34, 95, and 99, which may be safely attributed to Dhiman or to his immediate followers, with the best specimens of mediæval sculptures of Orissa, Behar and other parts of Northern India reproduced in Chapter VII of Mr. V. A. Smith's monumental work 'A History of Fine Art in India and Ceylon', clearly shows that the Tibetan Historian is substantially correct, and that we have to look to Varendra for the fountain-head of Mediæval Art of Northern India."—*Guide-Book to the Exhibition of Relics of Antiquity and Manuscripts on the Occasion of the Visit to Rajshahi of H. E. Lord Carmichael, Governor of Bengal*, p. 8.

that any such image,—a specimen of such a high order of artistic skill,—has ever been discovered anywhere else in Bengal, or in Bihar.

A few years back in Kāndī sub-division, in the District of Murshidābād, three bronze figures were discovered. We do not think such figures have, up till now, been found in Varendra. Mr. Rothenstein, the celebrated artist, has said that such beautiful specimens of Indian Metal figures are not to be found in any other museum. In the village of Cuḍāiṇa in the District of Dācca a silver image of Viṣṇu has been discovered, which is kept in the Indian Museum. We do not know of any other figure, like this, which has been discovered elsewhere in India. So we see, that relying upon Tārānātha's statement we cannot by any means assert that Dhīmān was the inaugurator of the Eastern School of Indian Art, of which the history is yet to be written. From the specimens discovered up to the present time, we can safely assert that there was but one school and one system in the whole of Bengal and Bihār. The special features of the images collected should be studied before anything can be said in the shape of history about the "Eastern School" of the Indian artists.

A large number of dated images, both in metal and stone, executed during the reigns of the Pālas and the Senas of Bengal, has been discovered. These are to be studied with reference to a certain period of the national history before any serious attempt is made about a historical exposition of the "Eastern School" of Indian art.

5. Notes on the Geography of Orissa in the Sixteenth Century.

By RAI MONMOHAN CHAKRAVARTI, BAHADUR.

The special use of geography for historical studies has been often emphasized. Unfortunately very little is known about the old geography of Bengal and Orissa. So in the present paper I propose to discuss the available geographical details of mediæval Orissa, and its fiscal divisions.

By mediæval Orissa, I mean the time of its latest Hindu kings, and of the earliest Musalman occupation, that is, the sixteenth century. For the Hindu period the main authority is the *Mādalā Pāñji* or the chronicles of the Jagannātha temple at Puri.¹ These chronicles furnish us with two valuable lists. The first list is headed *desa-khañjā*, or lands allotted to the gods Jagannātha and Kṛttivāsa throughout Orissa. The second list gives a table of gods with their places throughout Orissa who were endowed with money grants from the government. These lists thus supply us with the names of many villages and their fiscal divisions as existing towards the close of the Hindu rule.

For the early Musalman period our main authority is the *Aīn-i Akbari* of Abul Fazl.² In the *Aīn* 15 he describes the Imperial dominion as existing in the fortieth year of the Ilāhi era (1594-5 A.D.). In this account Orissa is placed under Subah Bangalah, but only nominally. In fact its description and its list of mahals are all put at the end quite separate from those of Bengal.

The information given in the *Mādalā Pāñji* are only incidental to other topics, and therefore though valuable are incomplete. But the *Aīn* purports to give a complete list of the fiscal divisions constituting Orissa under the Mughal rule. Hence the *Aīn*'s list has been made the basis of the present paper.

During the subsequent Mughal rule the fiscal divisions of

¹ The meaning of *Mādalā* is not yet known. It is derived, I think, from *Mudala*, sealed with *mudī* or ring. The word *mudalena* is used in inscriptions, e.g., *Baidi-Mahāsenāpati-mudalena* (J.A.S.B., 1895, p. 149), again *aradhārīta-mudale* (Do., p. 152); and *Halī-Prahlāda-mudalena* (J.A.S.B., 1896, p. 254). Compare also *Mudrasta*, *mudra* and *hasta*, seal-handed, an officer in the temple of Jagannātha whose duty is to seal the temple doors at the end of the daily ceremonies. *Mādalā Pāñji* would thus mean a chronicle of the (royal) orders.

² Jarrett's English Translation, Bib. Ind. ed., vol. II, pp. 126-129, 142-144.

Orissa underwent much change. But their basis, the maḥals, though increased in number, were not radically changed. Hence in checking and identifying the *Aīn*'s list considerable help has been obtained from the list of pargaṇās supplied to the British at the time of their occupation.¹

General Remarks.

The *Mādalā Pāñji* reveals that the basic unit of the administration was the gā (Sansk. *grāma*) or village. The village had a headman, *padhāna* (Sansk. *pradhāna*, the head), an accountant, *Bhoi* (Sansk. *bhūmika*), and a watchman, *Dandoāsi* (Sansk. *daṇḍa-vāsika*, staff-holder).² Through these the revenue was collected and order maintained. A number of villages were grouped under an administrative subdivision, called generally Bisi (Sansk. *Viṣaya*) and a subdivisional head, Bisoī (Sansk. *Viṣayī*). This general name for the subdivision was sometimes changed to Khaṇḍa (tract), as in West Katak, Caura or Cāura (meaning probably a tract cleared), as in North Balasore and South Midnāpur, or Bhūm (land) as in West and North Midnāpur. The suffix Muthā of several pargaṇās in east Midnāpur (Hijili) is not found either in the *Mādalā Pāñji* or in the *Aīn*, and is therefore more recent.

The next higher step in the fiscal arrangement was the Daṇḍapāta (division). It consisted usually of a number of Bisis, Khaṇḍas, Cauras, etc. It covered generally a considerable tract of the country and corresponded to the Sanskrit *Bhūkti* used in Bengal and Mithilā. Occasionally a Daṇḍapāta had no Bisi.

The country was essentially rural. The only town life traceable was in some sacred tirthas or in some headquarters of the king. The principal tirthas or places of pilgrimages usually formed head-quarters of the king when he toured over his territory. All these stations were called *Kataka*, a Sanskrit word meaning camp. In inscriptions we come across the following *Katakas*: Puruṣottama, Kṛttivāsa, Vārānasī, Remuṇā, Rauhattā, Nārāyanapūra, Devakūta. To these the *Mādalā Pāñji* adds Āsikā, Khurdhā, Cauduāra, Jājapūra.

At each *Kataka* the king had generally a masonry building for his residence. The most imposing of such edifices was at Vārānasī *Kataka*. This town appears to have been the capital of the later Gaṅgas and their successors, and was kept by the Musalmans as their chief head-quarters in Orissa.

¹ This information is summarised in Sheristadar J. Grant's *Analysis and Review of the Bengal Finances (1787)*, published as Appendix III to the *Fifth Parliamentary Report*, 1812. I quote from the Madras Reprint, 1883.

² A *Dando-āsī Ohora* (watchman's tax) is mentioned in an Oriyā inscription of the Jagannātha temple. J.A.S.B., 1893, p. 91.

The *Mādālā Pāñji* contains an interesting statement, attributed to the king Anaṅgabhimadeva, about the extent and the income of the Orissa kingdom. This may be literally translated thus :—

“ In the times of the kings beginning with the Kesaris, up to me, the sixth ruler of the Gaṅga dynasty, the following revenue in the kingdom of Oṛisā was realised. The revenue was (then) realised from a kingdom that extended on the east from the arka kṣetra (Kaṅāraka) on the sea to Bhīmanagara Daṇḍapāta on the west, from the Kāsabāsa river on the north to the Ṛsikulyā river on the south. From this circle of lands the revenue realised was *jiti* gold fifteen lakh Mārhas. By the grace of the Lord Jagannātha, by the blessings of Brāhmins and through faith in god Viṣṇu, conquering with sword the Bhuyās and Purāṇas (elders), I have extended my kingdom, on the north from the Kāsabāsa to the river Danāi Buṛhā (Jan Perdo or the old Dāmodar), on the south from the Ṛsikulyā to Rājamahendrī Daṇḍapāta, and on the west from Bhīmanagara to Sunupura on the borders of Boda. By conquering on the three sides I got an (additional) revenue of twenty lakhs Mārhas in *jiti* gold.”

The ascription of this statement to Anaṅgabhimadeva is certainly apocryphal. In the *Mādālā Pāñji* several things which were done by his predecessors or successors were attributed to this king, e.g., the building of the temple of Jagannātha, the causing of a survey of the kingdom and so forth. But otherwise the statement contains a real geographical truth, as will be seen later on.

The *Mādālā Pāñji* supplies us with the names of 31 Daṇḍapātas (including the Puruṣottama Kṣetra as one) and of 110 Bisis.

In the *Aīn* Orissa was subdivided into five sarkārs and seventy-nine maḥals. The arrangement of the *Aīn* calls for special attention on several points. Firstly, as remarked *supra*, the list of maḥals is given at the very end of the Bengal table, and not alphabetically arranged with its sarkārs. Secondly, the sarkārs of Oṛisā, unlike those of Bengal, are arranged geographically from north to south, and not alphabetically. Thirdly, in the two southernmost sarkārs, Kalaṅga and Rājamahendra, no details of the maḥals are forthcoming. The details were evidently not known, as these sarkārs had not come into the occupation at all of the Mughals or their predecessors, the Bengal Sultāns. Fifthly, the maḥals named correspond closely with the Hindu Daṇḍapātas where known. At the same time their grouping into sarkārs was unknown to the Hindus, being the work apparently of the Musalman Sultāns of Bengal. The Sarkār Kaṭak which came last in the occupation of the Musalmans shows practically no change from the Hindu arrangement; while in the Sarkār Jalesar occur some Musalman varia-

tions of the maḥal names, while some smaller subdivisions of the Daṇḍapāṭas were turned into separate maḥals.

The ignorance of the fact that the maḥals of the *Aīn* were a further development of the Hindu fiscal divisions, has now and then led to mistaken remarks, for example, by Beames. Furthermore, the want of knowledge of the old Hindu names has prevented a satisfactory checking of the names in the *Aīn*, whose manuscripts show a lamentably corrupt state of preservation in addition to the actual difficulty of transcribing the vernacular names correctly in the Persian. The names of the fiscal divisions have since then changed greatly, and as their knowledge is now more or less disappearing, the difficulty of their identification with modern divisions can be well imagined.

Before proceeding to identify the maḥals, it is better to give here some account of the fiscal changes introduced by the Musalmans. Orisā was one of the provinces conquered very late by the Musalmans. The northern part up to the Cilkā Lake was conquered by the army of the Bengal Sultān Sulaimān Karārāni in 1568-9 A.D. The southern part was invaded and the greater portion of it occupied by the forces of the Golkonḍā Sultān, Ibrāhim Kutb Shāh, in 1571 A.D. By the time of compiling the *Aīn* the Musalmans had thus been in possession for only a quarter of a century, and that possession, too, was very much disturbed and partial owing to the continual fights between the Afghāns and Mughals. The Musalmans had thus little time and less leisure to make radical changes, a fact that explains the general retention of the old Hindu subdivisions, both in name and in extent.

The next important change in Todar Mal's rent-roll was made seventy years later, during the second viceroyalty of the Prince Shāh Sujah (1646-58 A.D.). Orisā which had been administered by a separate governor, generally appointed direct from Delhi, had been then added to the prince's viceroyalty of Bengal. In his time Orisā was rearranged into three groups of four sarkārs each, or twelve sarkārs and 276 maḥals (Grant, p. 527). Of these the northernmost six sarkārs were dismembered from Orissa and annexed to Bengal. The main reason for this change was said to be to protect the growing port of Balasore and its sea-coast against the ravages of the Arracanes (G., p. 246).

The next great change was introduced in the 'perfect' rent-roll of Murshid Kuli Khān (1722 A.D.). He changed the general name, maḥal, into pargaṇā, and for the khālsa portion added an administrative division higher than sarkārs, the caklās. The northern sarkārs which had been annexed to Bengal in the time of Shāh Sujah were placed under two caklās, Bandar Balasore (17 pargaṇās), and Hijli (35 pargaṇās) besides the zamindari of Tamluk (G., p. 253).

In 1728 was prepared the corrected rent-roll of Nawab Suja-ud-daulah. The southern half of the dismembered portion with the port of Balasore was re-added to Orissa for administrative purposes, but kept in Bengal for revenue purposes (Nos. 20 and 23, G., p. 265).

In 1751 A.D. the Bengal Sultān Ālivardi Khān tired of fighting with the Marāthās ceded to them Orisā up to the Subarnarekhā river, with Parganā Patāspūr beyond the river. In the ceded portion of Bengal 12 parganās besides Patāspur were included. In the early British accounts the Caklā Midnāpūr did not include Hijli, Tamluk, Rāipore, Bogri and Soohent. It was divided into four sarkārs and 54 maḥals (G., pp. 532-3, year 1777-78 A.D.).

I. Sarkār Rājmahindra.

This is Rājamahendri Daṇḍapāṭa of the Temple chronicles. No details of its 126 maḥals are given. Both inscriptions and Musalman histories show that during the prosperous rule of the Gaṅga and the Sūrya dynasties the kingdom of Orissa extended south of the Godāvari river up to at least Ellore on Colair lake. Puruṣottamadeva of the Sūryavamśa (1469-96 A.D.) ceded Koṇḍapalli and Rājamahendri to the Bahmani Sultan Muḥammad Shāh II for his help in securing the throne of Orissa. But the loss was temporary and he had recovered Rājamahendri before 1488-89 A.D.

The headquarters of this division was Rājamahendri, a town on the north bank of the Godāvari. In 1510 A.D. it was visited by Caitanya, the Vaiṣṇava preacher of Bengal, in the course of his pilgrimage to the south. The accounts of the pilgrimage mention that Rāmānanda Rāya was then the Orīyā governor of Rājamahendri on behalf of the king Pratāparudradeva.

During the dissensions brought about by the death of the last independent Hindu king of Orissa, Teliṅgā Makunda Haricandanadeva, in 1571 A.D., the army of Ibrahim Kutb Shah overran the east coast up to Chicacole. But the Musalman occupation of the Rājamahendri division remained more or less precarious until the time of Āsaf Jah Nizām-ul Mulk, the first Nizam of Hyderabad.

His army in the first quarter of the eighteenth century brought the whole of the east coast under fair subjection. His Government had two headquarters therein, one at Rājamahendri and the other at Chicacole. In 1753 A.D. the northern sarkārs passed into the hands of the French from whom they were conquered in 1759 A.D. by the Bengal army of the East India Company under Colonel Forde.

The Daṇḍapāṭa corresponds to the present district of Godāvari plus the southern part of Vizagapaṭam district.

II. Sarkār Kalang Daṇḍapāṭa.

It is the only place in the *Āin* where Daṇḍapāṭa, the Hindu word for the older higher divisions, has slipped in. It had 27 mahals, but no details thereof are given. Kaliṅga Daṇḍapāṭa is mentioned in the temple chronicles, but without any Bisis.

Kaliṅga is one of the oldest names recorded in Indian history and is mentioned in Asoka's inscriptions. It is not my intention to trace here its old history. Its mediæval history has been briefly narrated in the account under Rājamahendri.

Its headquarters appears to have been shifted from time to time. During the early Gaṅga rule the capital was at Mukhaliṅgam, modern Nagarikataka, on the upper reach of the Vanāsadhara river. Later it appears to have been shifted to Śrī-kūrmam on the sea-coast, where the main temple is covered with inscriptions recording grants of the Gaṅga kings. The road to Kāñci (modern Conjeveram) passed by this town, and its temple was visited by Caitanya in 1510 A.D.

During Musalman occupation the headquarters was changed to Chicacole, 8 miles west, on the north bank of the Lānguliya river. Its Musalman occupation is shown by several mosques, of which the oldest existing goes back to 1030 H. (1620 A.D.), and the next oldest, the Jummā Masjid, to 1055 H. (1644 A.D.).

Kaliṅga Daṇḍapāṭa was bounded on the north by the Rṣikulyā river and extended southwards probably as far as Vizagapaṭam, thereby including the notable tīrtha Śimhācalam. It would thus comprise the greater part of modern Gañjām and the northern part of Vizagapaṭam district.

III. Sarkār Kaṭak.

This sarkār covered a very large area, and was assessed with the highest revenue in Bengal, 91,432,730 dāms, or at the rate of 40 dāms per Ilahi Rupee, Rs. 22,85,818½. It lay approximately between the Baitaraṇi river on the north and the Rṣikulyā river on the south, with the sea on the east, and the ill-defined Garjāt state of Bod on the west. It comprised thus almost the whole of Kaṭak district, the whole of Puri district, the northern part of Gañjām district, and several Garjāt states on either bank of the Mahānadī river, such as Āthagara, Tigiriā, Baṛambā, Khaṇḍapara, Narsingapura, Daspallā, Dhenkānāla. Bod, besides Raṇapura and Nāyāgara further south.

The heading of the *Āin* gives 21 mahals, but the details below supply only 20 names. The mahal omitted in the text was probably Lembāi Daṇḍapāṭa: see *infra*. There is not a single Mahomedan name in the mahals, a fact due to its very recent conquest by the Mahomedans and to its imperfect pos-

session on account of the continuous fight between the Afghāns and the Mughals for the possession of Bengal. By the treaty of peace concluded between the Mughal viceroy Munim Khān and the Afghan chief Dāud at Katak town on 12th April, 1575 A.D., Sarkār Katak was left to Dāud. After that the Mughals never came to this sarkār until Mānasimha reconquered Orissa in 1000 H. (1592 A.D.). So Katak could have been known to the Mughals mostly by hearsay, and was only nominally subject to the emperor at the time of the compilation of the *Aīn*.

I now pass on to identify the maḥals.¹ They are arranged in the *Aīn* according to Persian alphabet.

(1) *Āl*. The Āli Daṇḍapāta of the Temple chronicles, of which no Bisis are named. It has survived in modern times as Killā Āli, a pargaṇā in the Kendrāparā subdivision of Katak district, lying between the Kharsuā on the north and the Brāhmani on the south. From the large revenue assessed (Rs. 1,60,728½) the eastern sea-board of Kanikā would seem to have been attached to it at the time.

The present zamindar of the killah is a lineal descendant of Mukunda Haricandanadeva, the last Hindu king of Orissa. On the reconquest of Orissa, Mānasimha recognised three chiefs in the Mughalbandi, Rāmchandradeva in Killah Khurdā, and the two sons of Mukunda in Killahs Āli and Paṭiyā. These two sons are probably Adwand and Sundar, zamindars of Orisā, whose names appear in the list of *Aīn*'s grandees as Mansabdars of 200 (Nos. 413 and 414).² From some Persian documents Stirling got the information that the Rājā of Āl had the rank of 500 with 24 zamindaris and 42 killahs under him.

(2) *Asakah*. The Āsikā Daṇḍapāta of the T. chronicles. The maḥal has survived in a zamindari and in a town of that name on the north bank of the Rṣikulyā river, in Gañjām district. The temple of Gokarṇeśvara in Mahendra-māla (the Mahendra hills) lay in this division. The Daṇḍapāta spread therefore from the Mahendra hills on the west to the sea on the east, and from the Rṣikulyā on the south to the Cilkā Lake on the north. Drained by the Rṣikulyā the land must have been fairly fertile, as the revenue of Rs. 79,009½ indicates. The quota of men, 15,000 infantry, indicates that a considerable hilly tract of the west with its militia of pāiks was included. Āskā town, 25 miles N.-N.-W. of Berhampur, is noted at present for the manufacture of sugar and rum.

¹ In making the various identifications I have drawn largely from the notes taken by me during my service in Orissa for thirteen years (1886-97 and 1902-3). Mr. J. Beames' *Notes on Akbari Soubahs No. II: Orissa*, in J.R.A.S., 1896, pp. 743-764, are, on account of his personal knowledge of Orissa, useful. Dr. R. Mitra's footnotes on this sarkār in the *Antiquities of Orissa*, vol. I, p. 2, are unsatisfactory.

² Blochmann, *Aīn-i Akbari*, vol. I, p. 526.

(3) *Athgarh*, with a fort. The *Āthagaṛa Daṇḍapāta* of the T. chronicles which give the names of two Bisis, *Jesthasiṅghā* and *Airātata*. *Kakharī* (opposite *Katak* town) and *Baidyeswara* (in *Bānki*) were in the former Bisi. The *Daṇḍapāta* thus included not only the present tributary state of *Āthagaṛa*, but also *Bānki* and *Domeparah* of *Katak* district, with the adjoining tributary state of *Tigiriā*. In spite of the wild rugged nature of the country, the maḥal had a revenue of Rs. 29,634½, in addition to a quota of 200 cavalry and 7000 infantry, and so must have covered a considerable area. The name is derived from *aṣṭa* = eight + *gaṛa* = forts. Only one fort is mentioned in the *Ain*, probably the one near *Kakharī*, on the other side of the *Mahānadi* river. This one must have been best known to the Musalmans from its proximity to *Katak* town.

(4) *Pūrab Dīkh*, with four forts. *Kanikā*, *Kujang*, *Harishpūr* and *Mirichpur* (Beames). An erroneous suggestion. It is the *Pūrabadiga Daṇḍapāta* of the T. chronicles, which included a southern section separately named therein, *Bārabisi Daṇḍapāta*. The former is said to have contained twenty-one Bisis and the latter twelve, but the names of fifteen and seven Bisis only can be traced. They are noted below, alphabetically arranged according to *Oṛiyā* letters:—

Pūrabadiga Daṇḍapāta (15)—*Asureśvara*, *Kusamaṇḍala*, *Caudakulāta*, *Dāhaṅga*, *Derābisi*, *Tikoṇa*, *Pa-idā*, *Paenā*, *Bāli*, *Birumoḷo*, *Brahmabayālisi*, *Mohaṛā*, *Yadisāhi*, *Sarasvatī*, *Sukhana-i*.

Bārabisi Daṇḍapāta (7)—*Āpilā*, *Kaluṇiyā*, *Khaṇḍi*, *Gaṇḍi-to*, *Tirana*, *Beṇāhāra*, *Yakhemra*.

Of the first group all except Nos. 4, 11 and 12 survive still as *parganās*, some in a rather altered form, such as *Bālūbisi* for *Bāli*, *Karimuḷa* for *Birumoḷo*. In the second group all but No. 2 can be traced. The last one, *Yakhemra*, is the old name for modern *Parganā Jhaṅkaṛa*, and appears as such in the *Bhārata* of *Sārola Dāsa*¹ composed during the reign of *Pratāparudradeva* (1496-1540 A.D.).

From the present position of these *parganās*, *Pūrabadiga* lay entirely on the east side of *Katak* district. It lay enclosed between the *Brāhmaṇi* river on the north, and the main branch of the *Mahānadi* on the south, having its apex at the bifurcation of the *Mahānadi* and its branch *Birūpā*, and thence spreading eastward fanlike until the saliferous tract on the coast is touched.

The *Bārabisi Daṇḍapāta* lay south of *Pūrabadiga*, between the main branch of the *Mahānadi* on the north, and its *Devi* branch on the south. It was separated from the *Kodiṇḍa Daṇḍapāta* on the west by a wedge of the northern part

¹ J.A.S.B. 1898, p. 346, *Jakhemrapūra-vāseni Hīṅgulā Caṇḍī Sārola*, or (the goddess) *Hīṅgulā Caṇḍī*, resident at *Jakhemra-pūrā*.

of Dakhinadiga Daṇḍapāta, and from the sea by the saliferous tract of Kujāṅga and Hariṣapura.

Some of the Bisis are pretty old. Lands were granted in Derā-*viṣaya* and Svāṅga-*viṣaya* (Bisis of Pūrbadiga) by a copperplate grant dated 6th August, 1296 A.D., under orders of the Gaṅga king Narasimbadeva II.¹

A good many names of the above Bisis can be derived, and therefore could not have been very old. For example, take *Asureśvara* or Lord of the Asuras, the name of a śiva; *Kuśa* = grass + *maṇḍala* = circle; *cauda* = fourteen + *killāta* = forts; *Derā* = a caste + *Viṣaya* = a division; *ti* = three + *kona* = angle; *payas* = milk + *dā* = giver; *bāli*—sand; *Birhi* = a kind of pulse + *mūla* = source; *Brahma* = the name of a god + *bayālisi* = forty-two (villages); *Yadi* = an aboriginal tribe + *sāhi* = quarter; *Sarasvatī* = the name of a holy stream; *sukha* = pleasant + *na-i* = river; *Khaṇḍi* = tract; *benā* = grass + *hāra* = removal. In fact the very names indicate that cultivation progressed eastwards with increase in pasturage and reclamation of wastes and sandy tracts.

The maḥal covered a very large tract, and had the largest revenue payable in whole Bengal, Rs. 5,72,039½.

(5) *Pachchham Dikh*. This included kilās Darpan, Madhupur, Balrāmpūr and Chausaṭhpāra between the Brahmini and Mahānadi, and probably also Dompāṛā and Patiā, south of the latter river (Beames). Another erroneous remark. It is really the Pacchimadiga Daṇḍapāta of the Temple chronicles, subdivided into thirteen Bisis, of which eight have been named, *viz.* Alti, Kaṭarkuā, Kīnalakhaṇḍa, Kuḷākhaṇḍa, Koroārakhaṇḍa, Khaṇḍilokhaṇḍa, Tapanakhaṇḍa, Dharmupūra. Of these Nos. 1, 5 and 7 still exist as parganās in West Katak. Dharmupūra included the present killah of Darpana, as the Mahāvīnāyaka temple of Baruṇāi is said to have been in it. In this Daṇḍapāta the substitution of the suffix *khaṇḍa* for Bisi is worth noticing.

From the parganās still existing taken with the special use of the term *khaṇḍa*, the position of this maḥal can be roughly traced. It spread above the Birūpā branch of the Mahānadi north-east towards the Brāhmaṇi river which formed the northern boundary while that on the west was ill-defined, but probably extended up to the Brāhmaṇi river in the Dheṅkānāl tributary state. The tract was mostly on laterite soil covered with jungles and scrub woods. Hence though the money revenue was small, Rs. 16,562¼ only, the quota of men were considerable, 100 cavalry and 50,000 infantry. This infantry can only be the local militia of pāiks, in which every able-bodied man was counted as a soldier.

The old Pādshāhi road passed through this maḥal. Toḍar

¹ J.A.S.B. 1896, p. 255, *Derā-*viṣaya*-madhy-āsīnam Eḍara-grāman, Svāṅga-*viṣaya*-madhy-āsīnam sunāilo-grāma.*

Mal in his pursuit of Dāūd forwards Katak reached Kalkalghāṭi where he halted for some time. This would be somewhere near modern Chatīā on the Jagannātha road, up to which apparently extended the killah of Kalkallā, though it is now restricted to the south-west corner of Darpaṇagara. Chatīā was in old days a place of some importance. In the tour of the kings, Chatīā was the next halting station north of Caudūāra, being only 13 miles therefrom by road. Here are the remains of an old fort with Hindu remains.

(6) *Bahār*. All the extensive tract of country now known as the tributary mahals (Beames). Not correct, as a number of the tributary states were included in other mahals. This is probably the Āhāra Daṇḍapāṭa of the T. chronicles, which by upcountry people would be uttered *vāhār*. Of this two Bisis are named, Olāsmi and Āhāra. The former has survived as Olāsa in subdivision Jājapura District Katak. This parganā lies between the bifurcation of the Brāhmaṇi river and its branch the Kharsuā. At present it is flooded very much by these two rivers. But to judge from the large revenue assessed, Rs. 1,28,245½, the mahal must have been in the old days very fertile and much larger, extending eastwards probably up to Āli.

(7) *Basāi Diwarmār*, *B. Diwarnār*, *B. Diwarbār*, *B. Diwarnā*, or *B. Pūrbā*, Bāsudebpur Ārang, 14 miles north-east of Bhadrakh (Beames). This identification is not acceptable as it would take Sarkār Katak too far north, 30 to 40 miles beyond the Baitaraṇi river, the real north boundary of the sarkār. At the same time the second part of the name appears so corrupt that no correct identification is possible.

(8) *Barang*, with nine forts among the hills and jungles. No place of this name known, but it should be identified with the celebrated fortress of Sārang Gar, four miles south-west of Katak city (Beames). This is really the Paraṅga Daṇḍapāṭa of the Temple chronicles. It had six Bisis, of which three are named Āṭiri, Paraṅga, Sabhari. Paraṅga means in Oṛiyā upland and is thus applicable clearly to the highlands of modern Khurdhā. Āṭiri has survived in the modern Āṭiri Gaṛa, seven miles west of Khurdhā town. Sabhari refers evidently to the Savaras, an aboriginal tribe that still survives in Khurdhā subdivision. The Daṇḍapata Paraṅga corresponds therefore to the northern part of this subdivision, and included the important town of Bhuvanewara, famous for its numerous temples and for the neighbouring Jaina caves of Khaṇḍagiri hills.

This mahal of the *Ain* apparently included another Daṇḍapāṭa, named Kandhrā or Kondhrā in the T. chronicles. Bānapura and Rāmesvara Gaṛa were in this division, which therefore comprised the southern Khurdhā (south of Munāguṇi river) with part of the adjoining Raṇapura tributary state.

Khurdhā subdivision is studded with many gaṛas or small forts, and the more important of these are, of course, referred to

in the *Ain* by "nine forts among the hills and jungles." The country was wild and hilly, and must have covered a large tract to be assessed with such a considerable revenue as Rs. 53,323½. The zamindars are said to have been by caste Ahirs, in Oṛiyā Gauṛa. From the wide pasturage available on the laterite table-lands of Khurdhā and Raṇapura, the prevalence of the Gauṛa caste is not unlikely. A poet from Raṇapura T. state, by name Acyutānanda Dāsa, calls himself a Gauṛa.¹

(9) *Bhājnagar* with a fort. Bhanjagar or Gumsur in Ganjam District, some 20 miles north of Askā (Beames). It is really the Bhīmanagara Daṇḍapāṭa of the T. chronicles. This according to Anaṅgabhīmadeva's statement lay on the westernmost border of the former kingdom of Orissa, and in his time lay east of Bod. Its position was therefore between the tributary state of Bod and that of Bāṅki-Āthagara, and comprised evidently the intervening tributary states of Daspallā, Nayāgara, Khaṇḍaparā, Narsīṅgpura, Baṛambā, and possibly Aṅgul and Hindol. That the maḥal covered a large tract of these wild rugged lands is clear from its small revenue of Rs. 21,509¾ and its large quota of men, 50 cavalry and 22,000 infantry. The zamindar was a Teliṅghā, probably a collecting officer of Government placed in charge of a number of these small tributary states.

(10) *Banjū, Banjūd, or Banhu*. Bāṅchās in Central Puri (Beames). More probably it is Bhañja, the title assumed by several chiefs of tributary states. That the maḥal should refer to the wild tract of tributary states is clear from the note that the zamindar was a Rajput, and in addition to a small revenue of Rs. 21,655, had to furnish a large quota of men, 100 cavalry and 20,000 infantry. By calling the chief a Rajput, the maḥal should, I think, be identified with the Bod tributary state which is expressly mentioned in the chronicles as lying on the westernmost border of Orissa, and which included at the time probably parts of Daspallā, Gumsur and Aṅgul. It could not have been applied to Mayurabhañja, whose position adjoins Jaleśar Sarkār and was thus far off from Katak Sarkār. The Bod chiefs actually claim to have been descended from a Rājput relation of the Jaypur Rāj in Rājputānā.

(11) *Parsotam*, detailed in each sarkār. This refers, of course, to the *deśa khañjā* of the T. chronicles, describing the numerous land grants to the god Puruṣottama of Puri town, the lands being taken from various Bisīs of Orissa.

(12) *Chaubīskot* with four forts. The Caubīsakuda Daṇḍapāṭa of the T. chronicles, of which only one Bisi is named, Rāetirāṇa Māṅikapatnā and Mālud are said to be in this Daṇḍapāṭa. It included therefore not only the present pargaṇā

¹ J.A.S.B., 1898, p. 349. *Gauṛa-kuḷare mu bolāi Mahata*, or among the Gauṛas I am called Mahata or head.

of Caubisakuda, lying between Puri town and the Cilkā lake, but also the sandy strip separating the Cilkā lake from the sea. The name is derived from *caubisa* = twenty-four + *kuda*—heaps (rising above water).

The four forts were probably Killahs Andhāri, Pārikuda, Mālud and Bajrakot, all found in the sandy strip. There must have been other killahs, for the quota of men to be furnished (500 cavalry and 20,000 infantry) approach the tenure of Garjāt states.

(13) *Jash* or *Habsh*, *urf Tājpur* with a fort. Amisprint for Jajpur, the ancient, celebrated and sacred city on the Baitarni (Beames). No Daṇḍapāta or Bisi by name Jājapur can be traced in the *Mādalā Pāñji*. But I see no reasons to doubt Beames' identification. The maḥal had a considerable revenue, Rs. 59,974½, and included not only the present pargaṇā of Jājapura, but also Pargaṇās Tisāñiā and Dolagrāma. It was thus bounded on the north by the Baitaraṇi, on the west and the east by the Burhā branch and an old branch of the Baitaraṇi, and on the south by the Kharsuā branch of the Brāhmani river. In the subsequent rent-roll of the Prince Shāh Shujah, Jājapur was formed into a separate sarkār with five mehals.

The fort at Jājapura now lies in ruins at Gara Solampura. This village is situated opposite Jājapura town on the left bank of the Baitaraṇi, and thus lie within the jurisdiction of Thānā Dhāmanagara, Subdivision Bhadraka, District Balasore. According to traditions it was built by the king Kapilendradeva of the Sūrya dynasty (1434-1469 A.D.). Traditions speak also of an older fort near the temple of Birajā, two miles south of the Baitaraṇi river. The name of this place Nahara-padā signifies "the land of the palace."

(14) *Dakhan Dikh*, with four forts. The four forts of the southern region, Pārikūd, Mālūd, Bajrakot and Andhāri (Beames). A mistake, for they lie in Caubisakuda (see No. 12). It is really the Dakhinadīga Daṇḍapāta of the T. chronicles. Of this no less than seventeen Bisis are named, viz., Athāisa, Antarodha, Oldhāra, Kāte, Kurulo, Kudāhāra, Kotarāhānga, Kodhāra, Damārakhāṇḍa, Degā, Pacchimaḍuāi, Pubbaḍuāi, Bācāsa, Marāḍa, Rāhānga, Sāibiri and Sāilo.

Except No. 6 all these still exist as pargaṇās, Marāḍa being the older name of Hariharapura. Kāte, Degā, Marāḍa, Sāibiri and Sāilo are in south-east Katak, and the rest are in eastern Puri district. The maḥal thus covered an extensive area, spreading north-east from Puri town along its east coast, and then crossing the river Devī into Katak district where its Bisis thrust themselves between the Bārabisi Daṇḍapāta on the east and the Kodiṇḍā Daṇḍapāta on the west. The largeness of its area is shown clearly not only by the number of its Bisis, but also by its revenue, Rs. 5,51,644½, with its quota of men, cavalry 180 and infantry 13,060.

The Dakṣiṇadīga Daṇḍapāṭa with Antarodha and Bāñcāsa Bīsī is named in Oriyā inscriptions on the jamb of the porch of the Jagannātha temple¹; while Marāḍa is named in a Sanskrit copperplate inscription of the ninth year of Mahāśivagupta.²

This Bīsī named can be mostly derived. For example *Athāisa*, containing the famous sun temple at Kaṇāraka, means twenty-eight (villages or Śāsanas); *Antarodha* = obstruction; *Oḷa* = a name + *dhāra* = bank or stream; *Kāṭe* = cut; *Kuda* = heap + *hāra* = removal; *Koṭa* = own + *Rāhāṅga* = a Bīsī name; *Ko* = a name + *dhāra* = stream; *Domara* = of Doma caste + *Khanda* = tract; *Deo* = god's + *gā* = village; *Pacchima* = western + *duhāi* = heap; *Pubba* = eastern + *duhai* = heap; *Baṇa* = woods + *cāsa* = cultivation. Some of the Bīsīs are evidently connected with one another, thus Rāhāṅga and Kotarāhāṅga, Pacchimaduhāi and Pubbaduhāi; Oldhāra and Kodhāra.

(15) *Sirān*. The Sirāi Daṇḍapāṭa of the T. chronicles, where four of its Bīsīs are named, Āru, Kabara, Talītara, Sirāi. It had the smallest revenue in the sarkār (Rs. 5,195 $\frac{3}{4}$). It has survived to modern days, as a pargaṇā lying north-west of the Cilkā lake and west of the Dayā branch. Even now it is an infertile tract, the northern part being liable to be flooded, and the southern part bordering on the Cilkā barren and saliferous.

(16) *Shergaḥh*. The Sargaṛā Daṇḍapāṭa of the T. chronicles. No Bīsī are named. Tārakoṭe is said to be in it. It is thus identifiable with the modern pargaṇā of the same name, lying in the north-west of Jājapur subdivision, District Katak. The name is made up of *saara*—the Savara tribe and *Gara*—fort.

(17) *Koṭdes*, with three forts. The Koṭhadesa Daṇḍapāṭa of the T. chronicles, of which two Bīsīs are named, Oromalo and Koromalo. According to a copperplate grant of the king Narasimhadeva IV,³ Koṭhadesa was divided into eight khaṇḍas, of which two are named in the inscription, the Uttara-Khaṇḍa of Kalabho, and Oṛamola Madana khaṇḍa. Oṛamolo is evidently the same as Oromalo of the T. chronicles. Koṭhadesa still exists as a pargaṇā in Central Puri, lying along the both banks of the Kusabhadra branch. The name is derived from *Koṣṭha* = own + *deśa* = lands.

The original fort is said in the *Aīn* to be a *kasbah* (town) or *kusaibah* (small town), meaning that the town itself was fortified.

¹ J.A.S.B., 1893, p. 91, *Puruṣottamadeva-Mahārājāṅkara dat-Dakṣiṇadīga-Daṇḍapāṭe, Antarodha-Viṣe Mādhōtila-grāmā, Dakṣiṇadīga-Daṇḍapāṭe Bāñcāsa-Bīse Gopapura-grāma*.

² Ep. Ind., vol. III, p. 32, *Dakṣi(ṇa)-Tosalāyām Marāḍa-Viṣayīya-Cānda-grāme*. Fleet corrects the first word to *Dakṣiṇa-Kosalāyām* (see note 11); but this is unnecessary as Tosālī was the name of a tract in South Orissa: *vide* Asoka's rock inscription of Dhauli.

³ J.A.S.B., 1895, p. 152, *Ātha-khaṇḍa-Koṭhadesa Madanakhaṇḍa-Viṣaye, Oṛamolo-Madanakhaṇḍa-madhye*, and p. 149, *Kalabhora Utara-khaṇḍa-madhye*.

(18) *Haveli Katak Banāras*, with a fort and a masonry palace within. This refers, of course, to the city of Katak with its suburbs. The maḥal is represented in the T. chronicles by Kodinḍā Daṇḍapāta, and comprised the modern parganās of Kodinḍā, Bākhrābād and Paṭiyā. Bākhrābād is the *ābād* or clearance of Bākhir Khān, who was governor of Orissa towards the end of Jahangir's rule, and in the beginning of Shahjehan's. This maḥal was bounded on the north by the main branch of the Mahānadi and on the south and west by the hilly jungles of Domaparāgara and Khurdhā. The tract was not large, and being too much liable to floods did not yield much direct revenue (Rs. 15,140 only).

The maḥal is, of course, noteworthy for its containing the capital of Orissa. In the inscriptions, the Temple chronicles and the older Musalman records¹ the name of the capital appears as Vārānāsī Katakā or Katak Banāras (Musalman), Vārānāsī being usually pronounced Banāras by upcountry people. The name still survives in Birānāsī, a small quarter of the city along the Kāthajori branch, a little below its bifurcation from the main river Mahānadī, and two miles west of the fort. The double-worded name was apparently found cumbrous, and so it was reduced to simply Katakā, a form found not only in the *Ain* but also in the older Vaiṣṇavite works like the *Caitanya-bhāgavata*. At present the second part of the name has been entirely forgotten.

The city has been described briefly in the *Ain*. But Jarrett's translation evidently requires correction in two places. Firstly, "this city has a stone fort situated at the bifurcation of the two rivers." This is misleading. It is not the fort, but it is the city which is so situated. Secondly, "Rajah Makand Deo built a palace here nine stories in height; the first storey was taken up for the elephants and the stables; the second was occupied by the artillery and the guards and quarters for attendants"; and so on. A nine-storied building, if not entirely impossible in those days, is *prima facie* incredible. From William Bruton's description of Katak city and palace in 1632 A.D. (O.S.) it is clear that the translation for *ashinah* should be not storey but quarters.² A similar description of various

¹ For the mention of Vārānāsī kataka in Sanskrit inscriptions, see J.A.S.B., 1895, p. 149, *Ravi-vāre Vārānāsī-katake*; and p. 151 *Maṅgala-vāre Vārānāsī-katake*; in Uṇṇiyā inscriptions, see J.A.S.B., 1893, p. 100, *Bārānāsī-katake*, *Srīnaara-Gopālapriya-jagatīra daksīṇa-meṛhare*. Vārānāsī Katak was first mentioned in Musalman accounts in connection with Sultan Firoz Shāh's invasion of Jājnagar in 761 H. (1360 A.D.). Firoz reached this Banāras, the capital of Jājnagar-Uḍisah, after having crossed the river Mahā-nadrī; see the *Tārīkh-i Firoz Shāh* of Shams-i Sirāj Afī (Elliot, III, pp. 313-5, and a summary thereof in Raverty's footnote to pages 591-2 of his translation of the *Tabakāt-i Nāsiri*).

² For a description of Katak town in 1632 A.D. (O.S.), see William

quarters before entering the main building of the courtesan Vasantasenā is given in the Sanskrit drama *Mṛccha-katikā*. The present temple of Śrīraṅgam has similarly seven quarters, one separate from the other by high wall, before entering the sacred precincts of the god.

In the time of the *Aīn* the palace in the fort was the residence of the governor. But by the time of Bruton the Musalman governor had removed his residence to the bank of the Kāthajōri, which part came therefore to be known as Lālbāgh. The town was divided into several quarters, which were called sāhis in Hindu time, but generally bāzars in Musulman time. Besides Birānāsi, the oldest part of the town, is, of course, the fort named Bāra-bāti from its covering an area of twelve Bātis of land.

(19) *Khatrah, Khadah, or Khazah*, with a fortress. The khetra or the sacred area round the city of Puri (Beames). The Puruṣottama Kṣetra of the T. chronicles whose *luna penṭha* or store of salt is mentioned. The *Kṣetra* or sacred area is generally taken to be *pañca-kosī* or five-kossed in extent.

The sacred city was at the time of the *Aīn* under the charge of Rāmacandraḍeva, the Rājā of Khurdhā. The city had been plundered by the Afghans just a little before and had been saved from further pillage by Mānasinha in 1593 A.D. In the *Aīn* Rājā Rāmchandra, Zamindār of Orisā, appears as a Mansabdār of 500 (No. 250). From some undescribed Persian manuscripts Stirling however gives him a rank of 3,500. According to a version in the *Mādalā Pāñji*, Rāmoandraḍeva was a son of the king Danei Vidyādhara, belonging to the Bhoi dynasty.

The fortress in Puri town refers to the fortified palace of the Oṛiyā kings where they halted when they visited the temple. This palace was probably situated in Bāli Sāhi near the old *nahara* or palace of the Khurdhā kings.

(20) *Mānakpatan*. Mānikapatnā in the sandy strip between th Cilkā lake and the sea. The maḥal was purely of salt taxes, the village itself being in Caubiskuda Daṇḍapāta (No. 12). The salt revenue is estimated roundly at six lakh dāms or Rs. 15,000. The Cilkā lake was a great centre of the manufacture of the salt known as *karkac*. This manufacture was stopped by Government towards the end of the last century.

(21) The heading gives 21 maḥals in Sarkār Katak. But the twenty-first is omitted in the detailed list. I think the omitted maḥal was the Lembāi Daṇḍapāta of the Temple chronicles. No Bisi of it is mentioned therein, but the villages Delānga and Kāḷupaṛā lay within it. Hence it is identifiable with the modern Pargaṇā of Lembāi, in Central Puri, separated

from the Khurdhā subdivision by the branch Dayā. A considerable number of land grants to the god Jagannāthā lay in this Dandapāta.

IV. Sarkār Bhadrak.

A small division consisting of seven maḥals only, but with a considerable revenue, Rs. 4,67,179½. It consisted part of northern Katak (Baruā and Kāimā) and the greater part of present Bhadrak subdivision. Excluding Baruā the sarkār lay between the Baitaraṇi (in its old course) on the south, the Kāsabāsa on the north, between the sea on the east, and the Nilgiri hills and south-east Keuñjhara tributary state on the west.

The higher grouping into sarkār did not exist in Hindu time, but was formed during the occupation of the Afghāns. When the treaty between the Afghān Sultān Dāūd and the Mughal generals Munim Khān and Todar Mal was signed at Katak on 12th April, 1575 A.D., sarkār Katak was left with Dāūd, while sarkārs Bhadrak and Jalesar passed to the Mughals. Nazar Bahādūr was the first Mughal governor of Bhadrak. When Munim Khān died of epidemic at Gauṛ in the following rains, Dāūd attacked Nazar Bahādūr and killed him. The whole of Orissa then passed into the hands of Afghāns, and remained in their possession until reconquered by Mānasimha in 1593 A.D. In the 45th year (1599-1600 A.D.) during the absence of Mānasimha the Afghāns under Usmān revolted, defeated the Imperialists near Bhadrak, and repossessed Orisā. Mānasimha hurried back, defeated the Afghāns in a great battle at Sherpur Atāi in Murshidabad and recovered Orisā and Western Bengal.

(1) *Barwa* with two fortresses, Bānak and Raskoi. A pargaṇā lying between the Brāhmaṇi and the Kharsuā rivers in north Katak (Beames). Not mentioned in the Temple chronicles. Probably formed in Mahomedan time on account of its importance, the Pādshāhi road passing through it. The maḥal had a fairly large revenue of Rs. 81,000 and therefore comprised not only the present pargaṇā of Baruā, but also Jodh. It would have been thus bounded on the east by the Burhā branch of the Baitaraṇi with the Kharsuā, and on the south by the Brāhmaṇi. At present these pargaṇās are subject to much floods. But in the older days when the Kharsuā was not so destructive, the land must have been very fertile. In Prince Shāh Sujah's rent-roll Barwa was raised into a sarkār with nine maḥals and added to Katak group.

The two forts at Bānak and Raskoi lay apparently on the Pādshāhi road. The first may be Bānka-sāhi as identified by Beames; but his identification of the second with the insignificant village of Rispur on the Kharsuā is open to doubts.

(2) *Jaukajri*. Jogjuri village on the southern slope of

Nilgiri hills (Beames). A very small maḥal with a revenue of Rs. 1,428½ only.

(3) *Haveli Bhadrak* with a fort at Dhāmanagara. The Bhadrekha Daṇḍapāṭa of the T. chronicles. Of this the following five Bisis are named, viz. Āmkoṛā, Uripaṛā, Dhāmanagara, Rāede, Soṇātiri. Nos. 1 and 3 still survive as pargaṇās in Balasore district, while Soṇātiri is probably Senaot. Ahiyāsa is mentioned to be in this Daṇḍapāṭa. It is clear therefore that the old Baitaraṇi, instead of going east as at present, turned south-east near Siddheswar village and flowed into the Kharsuā branch of the Brahmini above Jari. This old course thus formed the south-western boundary of this maḥal, separating it from Jājapur Maḥal on the west. The Haveli extended on the east up to the sea and on the north up to the Matāi river. It had a high revenue of Rs. 2,38,569. In Shāh Sujah's rent-roll Bhadrak continued to be a sarkār with 19 maḥals, belonging to Balasore group.

The governor of the sarkār resided at Dhāmanagara, which, as Beames pointed out, has still a number of Musalman residents. The old Pādshāhi road passed from Bhadrak due south to Dhāmanagara and thence south-west to Jājapura. Hence in 1575 A.D., when Dāūd invaded the Mughal territory, his first attack fell on the governor at Dhāmanagara.

(4) *Sahansū* with two forts. Sohso pargaṇā, fifteen miles west of Bhadrak (Beames). The Soso Daṇḍapāṭa of the T. chronicles. Three Bisis of it are named, Caudabisi, Purusaṇḍā, Heṭhāba-i. No. 2 still survives as a Tappā and Soso itself as a pargaṇā, both in Thānās Bhadrak and Soro of Balasore district. The maḥal must have been a fertile one, to be assessed with a revenue of Rs. 87,857. It lay between the Sālinḍi on the south and the Kāsabāsa on the north.

(5) *Kāimān*, with a fort. Now divided into three pargaṇās, Kāimā, Kismat Kāimā and Killa Kāimā, lying on both sides of the Baitaraṇi (Beames). The Kāemā Daṇḍapāṭa of the T. chronicles, no Bisis of which are named. In modern time Pargaṇā Kāemā lies in Thānās Dhāmanagara and Cāndabāli of Bhadrak subdivision; Kismat Kāemā in Thānā Ahiyāsa of Jājapura subdivision and Thānā Cāndabāli of Bhadrak; and Killā Kāemā in thānā Āli of Kendrāparā subdivision. The maḥal therefore lay on both sides of the modern Baitaraṇi; but as already pointed out, the present stream in its lower part was evidently not the main channel in the old days.

(6) *Kadsū* or *Garsu*. Garh Sokindah in north-west Katak (Beames). Not satisfactory. Not traceable in the T. chronicles. The text seems corrupt.

(7) *Maḥkūrīn*, independent Talukdars, with three forts, Pacchham Donk, Khaṇḍait, Majori. Pachhimkoṭ village in Pargaṇā Ragaḍi, north-west Katak, Khanditor on the Kharsuā, ten miles west of Jajpur, Manjūrī, a pargaṇā on the north bank

of the Baitarni, four miles above Jajpur (Beames). The first identification is possible, but doubtful; the second unsatisfactory as taking the sarkār too far south; the third correct. The forts are, of course, in vernacular called killās.

V. Sarkār Jalesar.

This sarkār¹ was very large in area and was heavily assessed (Rs. 12,51,318½). On the south from the Kāsabāsa river it extended first north-east and then north until the rivers Bhāgirathi and the Rūpanārāyaṇa were reached; and then on the north it was bounded roughly by the Palāspāi Khāl and the Silāi river, while the western boundary was ill-defined, consisting of jungle maḥals. The sarkār thus comprised north Balasore, nearly the whole of Midnapore (except Hijili Islands and the eastern half of Ghātāl subdivision), and small parts of the districts Bānkuṛā, Mānbhum, Siṅgbhum and of the Mayūra-bhañja tributary state.

The formation of the sarkār is due to the Musalmans. By the treaty of peace with Dāūd on 12th April, 1575 A.D., the northern sarkārs of Orissa passed into the hands of the Mughals. Murād Khān was the first Mughal governor of Jalesar. Later in the year when Dāūd attacked and killed the governor of Bhadrak and marched northwards, Murād Khān retreated to the capital Tāndah. Jalesar was then occupied by the Afghans, and remained in their possession until Mānasimha's reconquest in 1593 A.D. Even after that in 1599-1600 A.D., the Afghāns again rose under Usmān, defeated the Imperialists near Bhadrak and reoccupied Orissa with Jalesar Sarkār until defeated by Mānasimha.

Prince Khurram, when he rebelled against his father Jahāngir, passed through this sarkār on his way from Katak to Bardwan, and again when he retreated southwards to Deccan. In the revised rent-roll of the Prince Shāh Sujah (c. 1650 A.D.) Sarkār Jalesar was subdivided into seven sarkārs (Soro, Remnā, Bastā, Jalesar, Maljettah, Goalparah and Mazkurin) and 127 maḥals. Of these except the first all were dismembered from Orissa and added to Bengal with the port of Balasore and the Nilgiri Hills. In the 'perfect' rent-roll of Murshid Kuli Khān (1722 A.D.) these dismembered sarkārs were placed under two chaklās, Bandar Balasore and Hijili, and in the zamindari of Tamluk, comprising 104 pargaṇās. The Sarkārs Soro, Remnā, Bastā and Jalesar were dependent on Balasore, but were, however, readded to the Subah of Orisā for administrative purposes.

In 1751 A.D., Alivardi Khān ceded to the Marāthās the whole of Subah Orisā up to the Suvarṇarekhā river, and beyond

¹ Professor Blochmann had a few notes on Jalesar Sarkār in Hunter's *Statistical Account of Bengal*, vol. I. pp. 370-71.

that the Parganā of Patāsapura (now in Thānās Patāspura and Egra of Contai Subdivision). After the war in 1803, the Bhonslā Chief of Nāgpur ceded the above territory to the British.

(1) *Bānsanda* or *Bānsad*, *urf* *Haft-chor*, with five forts. Bānmundi village on the right bank of the Suvarṇarekhā opposite Jellasore (Beames). A mistake. It is the Bānsadā caura of Remuṇā Daṇḍapāta in the T. chronicles. Along with six other cauras it was raised to a maḥal in the *Aīn*. The name has survived in the fairly large village Bāsadihā near Jalesar. It must have been much more important in older days, for among the few places named in this area, appears *Bansja* in Valentyn's map (*circa* 1670 A.D.), though put higher up near Kendua or Kānthi (Contai). Father Manrique (*c.* 1630 A.D.) mentions Banga as an important centre of trade where the Portuguese had a Church.

The maḥal yielded considerable revenue, Rs. 1,05,285 $\frac{3}{4}$, and therefore must have covered a large area. It extended probably from the Suvarṇarekhā river north-east to the Bagri river. Some of the following joors or cauras included under Sarkār Jalesar by Grant (p. 533) must have formed part of the seven cauras of Bāsadihā maḥal,—Gozaljoor, Lodenjoor, Agrafoor, Lanojoor, Akrafoor, Phulwarrahjoor, Narajoor.

(2) *Bibli*. Pipli Shahbandar on the Suvarṇarekhā (Bl. and Beam.). Not traceable in the T. chronicles. Probably it did not exist in the Hindu time. It has survived in Parganā Shahbandar (royal port), Thana Bāliāpāl, District Balasore. The parganā was in area a small one, but the revenue was considerable, Rs. 50,285 $\frac{3}{4}$, which consisted chiefly of port dues.

Of the port no trace now exists. Probably it has been washed away. But it existed in Rennell's time (see his Atlas, plate VII, 1779 A.D.) and is mentioned in Midnāpūr Collector Mr. Bayley's *Memorandum on Midnapore* (1852). It was the oldest port in Orisā visited by the Europeans, and owed its rise chiefly to their trade from the sea, though its position on the Suvarṇarekhā enabled it to tap freely the resources of a large inland area. The river gradually silted up; and the greater facilities of the neighbouring port of Balasore made the latter a formidable rival in the eyes of the Europeans. It existed as a port in Bernier's time, after which its trade died out. The place is shown as *Popolai* in Gastaldi's map (1561 A.D.) and as *Piplipatan* in DeBarros' map (*circa* 1570 A.D.), and other subsequent maps. Father Manrique visited this port in 1636 A.D.

(3) *Bāli Shāhi*. Kālindi Bālishāhi (Bl.), lying among the sandhills on the seashore (B.). Not traceable in the T. chronicles. At the time of British occupation Bālisāhi was shown under two sarkārs, Maljetha (G. 434) and Mazkurīn (G. 533). The name now survives in two parganās, Kālindi and Orissa Bālisāhi, both in Thānā Rāmanagar, Subdivision Contai, District Midnāpūr.

The maḥal, as its name signifies, lay along the sea coast. A quarter of Puri town goes under the same name (Bālisāhi).

(4) *Bālkohsi*, *B. Kohi*, *B. Khosi* or *B. Kothā*, with three forts, Sokrah, Bānhas Tāli, Daddhpūr. Balikothi in Parganā Satmalang (Bl.), *Bārah Kosī*, the twelve kos between the Subarnarekhā and the Būṛhābalang (B.), Sokrah is Sohroh and Bānhas-tāli is Bhainsbāti on the Kānsbāns, six miles south-east of Sahroh (B). No such name found in the Temple chronicles. The text of the *Aīn* seems very corrupt. The maḥal may represent the Soro Daṇḍapāṭa of the T. chronicles, an important division which would otherwise remain unnoticed in the *Aīn*. Eleven Bisis of Soro Daṇḍapāṭa are named:—Āmkorā, Kāendā, Kure, Khajuri, Gaṇasara Khaṇḍa, Ja-epūra, Bācāsa, Bāsili-khaṇḍa, Beṇāhāra, Saraghara, Suneri. Except the last, all still exist as parganās, and the last (Suneri) may have been altered to Sunahat or Sunhat. The Daṇḍapāṭa thus lay roughly from the Nilgiri Hills on the west, to the sea on the east, and from the Matāi tributary of the Baitaraṇi on the south to the Jamkā stream on the north. Soroh was raised to a sarkār with 15 maḥals in Shah Sujah's rent-roll.

The first fort was at Sokrah which is probably Soroh, the letter *k* being a copyist's addition; while the second fort at Bānhas-tāli may be in Bāncāsa, one of the Bisis named. As the old Pādshāhi road passed through this maḥal, the three forts lay evidently near this road, which was much infested by robbers and thieves in old days.

(5) *Parbadā* or *Barpadā*, with a fort partly on a hill partly fenced by forest. Biripada in Morbhanj (Bl.) Garpadā village, half-way between Jellasore and Balasore (B). The Bhañjabhūmi Bāripadā Daṇḍapāṭa of the T. chronicles. This has survived in Bhañjabhum Parganā in Thānās Kespur and Sālbani, north of Midnāpūr town. A wild hilly tract, it formed part of Mayūrabhañja tributary state according to the Persian documents seen by Stirling. Hence the name Bhañjabhum, Bhañja being the family title of Mayūrbhañja chiefs. Bāripadā is still the name of the headquarters of Mayūrabhañja, being situated on the upper reach of the Būṛhābalaṅga river. The revenue was in fact the tribute assessed on this chief, and hence was in round figures six lakh forty thousand dāms or Rupees sixteen thousand.

(6) *Bhogrāi* with a fort. A large parganā at the mouth of the Subarnarekhā, partly in Balasore, partly in Hijili (Bl. and B). Not traceable in the T. chronicles. It survives in a parganā partly in Thānā Bāliapāl of Balasore District, and partly in Thānā Rāmnagara in Contai subdivision. The maḥal lay along the sea coast from the Subarnarekhā north-east, a fact which explains the statement that it had to supply a quota of 100 cavalry and 2200 archers and *matchlockmen*. Matchlocks

in the days of the *Ain* could have been supplied in that part only by Europeans trading up the Subarnarekhā.

(7) *Bugdī*. In north Midnapore (Bl. and B). Not traceable in the T. chronicles. It survives as a pargaṇā, partly in Thānā Candrakonā of Ghātāl Subdivision, but mostly in Thānā Garbetā of Midnāpūr Sadar subdivision, misspelt in the Boundary Commissioner's list as Bhogrāi and thus making it liable to be confounded with No. 6. The pargaṇā is shown in Rennell's Atlas (plate VII, 1779 A.D.).

The maḥal, though considerable in size (444.15 square miles at present), had the smallest revenue in Orisā, less than a thousand rupees (Rs. 987½). This revenue was therefore only a nominal tribute from the then zamindar of a wild hilly tract, inhabited chiefly by the aboriginal tribes. The zamindar is said to have been a Rājput. He was probably Bir Bhān Siṃha, the zamindar of Chandrakonā. His son Hari Bhān alias Hari Nārāyaṇa is mentioned in the *Tuzuk-i Jahāngīrī* as having rebelled in 1617 A.D.; but in the *Pādīshāhnama* his name appears among the mansabdars of five hundred. From a Bengali inscription recorded on a loose stone kept in the Lālji temple at Chandrakonā it appears that Lakṣmaṇāvati, the widow of Hari-nārāyaṇa, who had built a Navaratna temple in 1653 A.D., was mother of the (reigning) king Mitra Sena and a sister of Nārāyaṇa Malla. Mitra Sen died childless, and Bagri passed to the maternal family, the Mallas of Biṣenpur. In a Jamā-Kharac account of Orissa dated 1707 A.D., the name of Rājā Durjan Siṃha of Biṣenpur appears as the zamindar of Bagri (G., p. 462). By the usual malguzary operations Rājā Kīrtti Candra of Bardwan took forcible possession of the pargaṇā and succeeded in securing a Dewanny sanad from the Nawab Sujau-daula of Bengal in 1728 A.D., thus including Bagri in his estate (G. 477, 478). Its revenue had then increased to Rs. 7,001. After British occupation it increased still further to Rs. 19,006 in 1771 A.D., and to Rs. 55,679 in 1870 A.D. The greater part of the pargaṇā is now in perpetual lease to Messrs. Watson & Co.

(8) *Bāzār*. Dhenkiā Bāzār on the Kasai, south-east of the town of Midnapore (Bl., B.). It could not have the name of any territorial division, for then the name itself would have been given, e.g., Bāzār Chatāghāt in Sarkār Ghorāghāt, Bāzār Ibrahimpur in Sarkār Sharifābād. I think it refers to the market dues of a large town like Midnāpūr, and as the amount was not small (Rs. 3,143) it probably included ground rent. For similar market dues, see Sarkār Lakhnauti, Jowar (circle) Darsarak.

(9) *Bābhanbhūm*. Brahmanbhūm in north Midnapur (Bl., B.). Not traceable in the T. chronicles. This pargaṇā lies north of Bhañjabhūm, partly in Thānā Sālbani, but mostly in Thānā Kespur of the Sadar subdivision, Midnāpur district.

The suffix *bhūm* is peculiar to names of tracts in the Jungle maḥals, e.g., Bhañjabhūm, Barāhabhūm, Tuṅgbhūm, Dhalbhūm, Mānbhūm, Singbhūm. The zamindar of Brahmaṇabhūm was a Brāhman, evidently of the same family with whom a few years later Kavikaṅkana Cakravartti, the author of the well-known Bengali poem *Candī*, took refuge. Kavikaṅkana mentions Vīramādhava, his son Bākura Rāya, and his son Raghunātha, the last being his patron. They resided at Ararā, a village some four miles off from Candrakonā. In course of time the zamindari passed into the hands of Bardwan Rāj. Its revenue, assessed in the *Ain* at Rs. 2,855¹/₅ only, had in the early British assessment of 1178 B.S. (1771 A.D.) been raised to Rs. 35,910, or more than twelve times.

(10) *Taliya* with *Kasbah* Jalesar which has a brick fort. Jalesar in Midnapore and Balasore (Bl., B.). The first name is not identified by Blochmann and has proved a stumbling-block to Beames. The latter would read it *patnah*, while Mr. Beveridge would read it *Takiyā*. Unfortunately for these suggestions, the *Mādālā Pāñji* supplies us with a very similar name, Taniā or Tandiā Dandapāta, and the following six Bisis of it are named:—Ekhrā Caura, Jalesvara Caura, Dāntuni Caura, Nāraṅgā Caura, Binisarā or Bāṅisarā Caura, Berāi Caura. Except No. 4, all still exist as pargaṇās, and the fourth may be Barnichor in Thānā Dāntan. Jalesar is now in Balasore district and the others are in Midnāpur.

The maḥal covered a large area, and paid the highest revenue in the sarkār, Rs. 3,00,177³/₄. It extended from the Subarṇarekhā river northwards to the Kāliāghāi river, and was traversed by the old Pādshāhi road that crossed the Subarṇarekhā at Jalesar town.

The town is an old place, and was visited by Caitanya during his pilgrimage to the south in 1509-10 A.D. During the early Mughal occupation it was the headquarters of the governor. Murād Khān was the first governor in 1575 A.D. When Dāūd invaded Bengal on hearing the death of the Mughal viceroy Munim Khān, Murād retreated to Tāndah, and the sarkār was occupied by the Afghāns. It remained in their possession until the reconquest of Orissa by Mānasimha in 1593 A.D.

In the rent-roll of the Prince Shāh Sujah (c. 1650 A.D.), Jalesar continued to be a sarkār with 22 maḥals, but was annexed to Bengal. This smaller sarkār was retransferred to Orissa in the first quarter of the eighteenth century. When Ālivardi Khān ceded to the Marāthās Orissa south of the Subarṇarekhā, Jalesar town lying just on the north bank of the river, became of importance as a frontier town of Bengal, and continued to be so until the British conquest of Orissa in 1803.

(11) *Tanbulak*, with a fort. Tamluk (Bl., B.) The old

Tāmralipti.¹ From the old maps of Gastaldi and De Barros Tamruk appears to have been connected with the sea by another channel flowing direct south into the Haldi river. This channel was sufficiently wide and deep to admit the passage of the then sea-going vessels up to Tamruk, and thus enabled it to flourish as a port. The silting up of this channel must have been a main cause of its decline. At that time the Thānās Maslandpur and Sutāhāṭa formed an island, with this channel to the west, the Bhāgirathī on the east, the Rūpnārāyaṇa on the north and the Haldi on the south. In the early British period an attempt was made to deepen this silted-up channel, and under the name of Bāṅkā Nālā it was formally opened for traffic on 21st April, 1784. But all efforts to keep off silting proved a failure, and the scheme had to be given up.

(12) *Tarkol*, with a fort in the jungle. Tarkuā (Bl., B.). Not traceable in the T. chronicles. The Tarkuā Caura lies east of Dāntan Caura, partly in Thānā Dāntan of Midnāpūr Sadar Subdivision, and partly in Thānā Paṭāspur of Contai Subdivision. It is the same as Takaroi of the *Akbarnāmah*, near which was fought on 3rd March, 1575 A.D., the decisive battle between Munim Khan and Dāūd, a battle that lost Bengal and Orissa to the Afghāns. In 1584 A.D. the Afghāns retreated to *Takaroi* and took refuge in the neighbouring forest of Dharmapur. The importance of the place was due to the fact that the old Pādishāhi road to Oṛisā passed close by, between dense woods on either side.

(13) *Dāwar Shorbhūm urf Bārah* or *Tarah*. Pārah, the tract of saliferous land otherwise known as Shorparah, on the sea coast from the Subarnakekhā to the Rasūlpūr river (Beames). Not identified by Blochmann. Beames' identification is not satisfactory, because the saliferous tract was included in Maḥal Māl̥jyāṭhā (No. 25). The name Bārah is evidently the same as Barāha (-bhūm), and Shorbhūm is another form of Savar-bhūm, the land of Savara tribe. Barāhabhūm now lies in Mānbhūm district, drained by the upper reaches of the Kasāi river. From the rather considerable revenue assessed, Rs. 33,559, this maḥal seems to have included the whole of the hilly jungly tract on the west of Midnāpūr district from the Subarnarekhā northwards to the Kasāi.

(14) *Ramna*, with five forts, in the Haveli, Rāmcaṅdpūr, Rāmka or Rārkā, Dūt and the new (*pañjam jadid ast*). Remna, 6 miles north-west of Balasore town (Bl., B.). The Remnā Dandapāṭa of the Temple chronicles, of which no less than twenty-eight Bisis are named:—

Āṅkosa(?ṛ)ḍā, Ārimola, Kuṇḍi, Guṇeu, Chānuā Caura, Tanmaṅgaḷa, Taḷaṅga, Taḷasamohi, Nagara Caura, Naruā Caura, Nuṅkhaṅḍa, Pāṇuā, Bayāḷisi, Bāusadā Caura, Mānadā,

¹ See my article on Tāmralipti, J.A.S.B., 1908, pp. 289-91.

Mānaciā Caura, Muḷagā, Muḷapāi, Mokharā, Rāikamā, Rāepāta, Remuṇā, Lāukerā Caura, Lāngalesvara Caura, Śrīlorā, Sakintiā Caura, Sunibā Cau(ra), Surumkuta Caura. Of these Bāsadā Caura was raised into a separate maḥal (No. 1) with six other cauras. Nos. 1, 2, 3, 5, 10, 16, 18, 21 and 23 still exist as pargaṇās. Tan-(or Tin-) maṅgaḷa is related to Pāñcmaṅgal and Dasamaṅgal Pargaṇās, Talasamohi to Talasabaṅga, Mānadā to Mulidā.

The Daṇḍapāta was large in size, and judging from the pargaṇās identified spread over north Balasore, in Thānās Balasore, Bastā and Bāliāpāl, and over part of the eastern Mayūrbhaṅja too. It yielded also a considerable revenue, Rs. 1,26,557½. In Shāh Sujah's rent-roll, Remuṇā continued to be a sarkār with 20 maḥals, but was added to Bengal.

Remuṇā Viṣaya is pretty old. In Śaka year 1218 (1296 A.D.) lands in two villages of Remuṇā Viṣaya were granted to a Brahman by order of the Orissa king Narasimhadeva II.¹ Among the boundaries of the villages were the *Suvarṇarekhānadī-setu*, and *Suvarṇa-nady-uttara*. These statements show that the Viṣaya extended at that time at least as far north as the Suvarṇarekhā river.

The first of the five forts was in the Haveli, i.e., in the suburbs of the town Remuṇā. The town was naturally the halting place of the king in his northern tour and had a fortified palace. In a copperplate inscription the king Narasimhadeva II made a grant while halting at Remuṇā Katakā, and this grant is dated 6th August 1296 A.D.²

Before Balasore rose into importance Remuṇā had been the chief city in north Orissa. Its temple of Kṣīra-corā Gopinātha was famous, and was visited by Caitanya in 1509-10 A.D. It was also well known to Europeans who traded up the Buṛābalaṅga river, and Remuṇā lying so near the river formed their great mart in this tract. Hence it appears in old maps of Gastaldi, De Barros, Blaeu and Valentyn. The old Pādshāhi road passed through Remuṇā, which formed the next important halting station after the Suvarṇarekhā had been crossed at Jalesore, followed by a crossing over the Buṛābalaṅga river above Balasore.

The second fort was at Rāmchandpur, eight miles north-east of Remna (B.). This village lay on the old Pādshāhi road and was shown in Rennell's Atlas (plate vii, 1779 A.D.). The sites of the other three forts are not traceable.

(15) *Rayn*, on the borders of Orissā, with three forts. It must be north of Midnapore (Bl.). Rāibaniān, seven miles

¹ See the *Vivakosa* of Babu Nagendranāth Vasu, article *Gūḅgeya*, *Remuṇā-viṣaya-madhyavartī Nṛsīṅharū-maṇḍoi grāma*.

² J.A.S.B., 1896, p. 254, *Soma-vāre Remuṇā-katakā navar-ābhyaṅtara-vijaya-samaye*.

from Jellasore, on the western side of the Subarnrekhā (B.). Blochmann's identification is not clear and Beames' attempt is a mistake. The significant expression "on the borders of Orissa" must take it far north. In the *Akbarnāmah*, at one place Harpur and at other places Cittuā are said to be intermediate (*barzakhe*) between Bangālah and Orisā. In Valentyn's map (c. 1670 A.D.) a monument is drawn west of Bardā to mark the frontier between Bengal and Orissa, and Bardā Pargaṇā (Ghātāl) adjoins pargaṇā Cittuā on the north-west. It is thus clear that the frontier of Orisā (with the Maḥal Rayn) lay west of Cittuā and Bardā Pargaṇās. So far as rivers could have formed the boundary, the Silāi and the Palāspāi khāl would have been the northernmost limit. The old Pādīshāhi road from Jehanābād passing through Cittuā apparently crossed the Palāspāi khāl, which was probably a continuation of the Silāi in those days, near this pargaṇā, and then crossed the Kasāi river lower down.

(16) *Raepur*, a large city with a fortress. West of Bagri on the upper Kasai, now in Chutia Nagpur (Bl.); in south Bānkurah, 40 miles N.W. of Midnapore (B.). Not traceable in the T. chronicles. It still survives as a pargaṇā in the Thānā of that name in Bānkurā.

The pargaṇā formed part of Biṣenpur Rāj so late as 1707 A.D., but was occupied by the Bardwan Raj and included in its general sanad of 1728 A.D. (G. 462, 478). It is shown in large letters in Rennell's Atlas (plate vii, 1779 A.D.) and was therefore a place of importance in those days.

(17) *Sabang*, with a fort in the jungle. A pargaṇā in central Midnapore (Bl., B.). Not traceable in the T. chronicles. The old Pādīshāhi road passed to its west. It is now noted for its mat manufacture, and lies in the thānā of that name.

(18) *Siyāri*. Chiara in Midnapore (Bl.) A pargaṇā on the Subarnarekhā, sixteen miles south-east of Jellasore (B.). Not traced in the T. chronicles. Of the two different pargaṇās thus identified, the one in Balasore seems to be correct. This is a small pargaṇā in Thānā Bāliāpāl of Balasore subdivision.

(19) *Kāsijorā*. In Midnapore (Bl.), in East Midnapore (B.). Not traced in the T. chronicles. The modern pargaṇā lies partly in Thānā Debrā of Midnapur sadar subdivision, but mostly in Thānā Pāsakurā of Tamruk subdivision. It was included in Goālpārāh Sarkār, and gave the name to a large zamindari often mentioned in the early records of Midnapur district (G. 532). The maḥal supplied a quota of 200 cavalry and 2,500 *matchlock* and bowmen. The matchlocks were obtained probably from the Portuguese who had settled at Tamruk and Banga.

(20) *Kharaksūr*, with a fort in the wooded hills. Kharakpur in Midnapore (Bl., B.). Not traced in the T. chronicles.

The modern parganā lies in the thānā of that name. The old Pādishāhi Road from Midnāpur town passed through it southwards. "Currackpore" is shown in Rennell's Atlas (plate vii). Its quota of 500 footmen and *matchlockmen* are interesting.

(21) *Kedārkhanda*, with three forts. In Midnapore (Bl., B.). Not traced in the Temple chronicles. The modern parganā lies in Thānās Debrā and Sabaṅg of Midnāpur Sadar subdivision. It is shown in Rennell's Atlas (plate vii) and formed part of Kāsijorā zamindari at the time of the early British occupation (G. 532).

(22) *Karāi*, *Keri* or *Kerai*. In Midnapore (Bl.). Kasiari, 20 miles south-west of Midnapore (B.). Both the identifications doubtful. It may be the Kudei Bisi of Soro Daṇḍapāṭa, the modern Kurāi Pargana in Thānā Soro of Balasore Sadar subdivision. A small maḥal with a revenue of Rs. 7,143 only.

(23) *Gagnapur*. Gagneswar, in Midnapore (Bl., B.). Not traced in the T. chronicles. The identification is a mistake. Gāgnāpur is quite distinct from Gagneswar which lies in Thānā Dāntan, while Gāgnāpur lies in Thānā Pāsakurā of Tamluk subdivision. It formed part of the Kāsijorā zamindari (G. 532).

(24) *Karohi* or *Kerauli*. Not identified (Bl.). Parganā Kurul Chaur in south Midnapore, 15 miles from Jellasore (B.). Not traced in the T. chronicles. Kurul Caura lies in Thānā Dāntan of Midnāpur sadar subdivision and Thānā Egrā of Contai subdivision. It had a very small revenue of Rs. 1,714½ only, and was probably covered with jungle. The old Pādishāhi road passed by it.

(25) *Mālchhata* or *Māljkta*. Portions of Hijili (Bl.), the tract on the sea-coast of Midnapore from the mouth of Rasulpur river in the Rūpnarāyan (B.). The Mālajeṣṭhiyā Daṇḍapāṭa of the T. chronicles. No Bisis of it are mentioned and the temple grant was from its salt (*luṅa*) revenue. This division was raised to a sarkār of 21 maḥals in the revised rent-roll of Shah Sujah, and was annexed to Bengal. In the seventeenth and eighteenth centuries the tract was placed under a Faujdār. In the early British administration this Faujdāri of Hijili consisted of five subdivisions, Jellamuṭah, Derodumnā, Mahiṣādal, Sujāmuṭah and Parganā Tamluk (G. 434). Seven parganās of Māljiyāthā Sarkār were also included at the time in Caklā Midnapore (G. 533).

In the *Caitanya-carit-āmrta* (Antyakhanda, ninth paricheda) it is narrated that Gopinātha Barajenā, brother of Rāmānanda Rāya, was in charge of this Daṇḍapāṭa. He fell into an arrear of revenue, two lakh kāhans of cowries, and was ordered by the king Pratāparudradeva to be put to death. From this fate he was saved by the mediation of Caitanya's disciples. The maḥal was assessed in the *Ain* with the second highest revenue of the sarkār, Rs. 2,32,815½. This apparently in-

cluded: the salt revenue, which in the time of the Hindu kings, was paid largely in kind.

(26) *Mednīpūr*, having a large city with two forts. Midnapur (Bl., B.). Not traced in the T. chronicles. The modern parganā extends over three thānās of Sadar, viz., Midnāpur, Kēspur and Sālbani. It was originally a small maḥal including the town and its suburbs. Hence the revenue was assessed in the *Aīn* at Rs. 25,498 $\frac{1}{4}$ only. But before British occupation it had absorbed the adjoining parganā of Bhañjabhūm. In the early British assessment of 1777-8 A.D. Parganā Midnāpur formed part of the large zamindari of Kāsijorā paying a revenue of Rs. 1,79,378 (G. 532).

The town of Midnāpur from its favourable position on the Kasāi river must have existed in the Hindu times. According to the *karā* of Govinda Dāsa, Caitanya visited Medinipur in 1509 A.D. on his way to Puri. In the daring pursuit of Dāūd by Todar Mal, the latter passed through Midnāpur and here his colleague, Muhammad Ḳulī Khān Barlās, died in Ramzan 982 H. The town grew in importance, and in the Marāṭhā war Ālivardi Khān halted with his troops and officers at Midnāpur for several months in 1750 A.D., watching the Marāṭhā advance from Nagpur and Oṛisā.

The new fort is evidently the one near the courts which was formerly used as jail. The old one lay, I think, at Gop, two miles west of the present town. Here are found ruins of a house surrounded by massive walls and a trench. This hill-top is 211 ft. above the sea level according to the Trigonometrical Survey.

(27) *Mahākānghāt urf Kutabpur*, with a fortress. In Midnapur (Bl., B.). Not traced in the T. chronicles. The modern parganā Kutabpur lies in Thānā Debrā of Midnāpur Sadar subdivision and Thānā Pāsakurā of Tamluk subdivision, almost enclosed by the Kasāi on the south, and its tributary Palāspāi Khāl on the west and the north. It was a small maḥal with the revenue fixed in round figures at Rs. 6,000.

The old Pādishāhi road passed through it. From the use of the word ghāt in the Hindu name of the maḥal, it appears to have been derived from some important crossing, either over the Palāspāi or over the Kasāi river.

(28) *Narāinpūr urf Kandhār* with a fort on a hill. In Midnapore (Bl.). Two separate parganās, a few miles to the south of Midnapore (B.). The Naranapura of the T. chronicles. It must have been a fairly large maḥal as the revenue was assessed at Rs. 57,021 $\frac{1}{2}$, and probably extended westwards as far as the Subarnarekhā river. At the time of the British occupation the Thānā Nārāyaṇagara and the Parganā Kandhāra were included in the large zamindari of Kāsijorā (G. 532).

The old Pādishāhi road passed from Midnāpur southwards to Jalesar through Nārāyaṇapura. The fort lay probably near

this road on the Kālighāi river and near the modern Nārāyaṇa-gara village. Nārāyaṇapura is mentioned in a copper-plate inscription as a Katakā where the Orisā king Narasiṃhadeva IV halted and passed orders on 24th February, 1397 A.D., about a land grant.¹ According to the *karṇā* (diary) of Govinda Dāsa Nārāyaṇagara was visited by Caitanya in 1509-10 A.D. after Medinipur.

The *Mādalā Pāñji* mentions two other Daṇḍapātas, Jauliti and Nāigā. Jauliti is mentioned between Tañiā and Naraṇapūr, and Nāigā follows just after Naraṇapur. They cannot be identified, but from their position in the context they would seem to be some Daṇḍapātas of the sarkār Jalesar. Nāigā might have survived in the name Nagwan of Thānā Egrā. It must have been a place of some importance, as a Joint Magistrate had his head-quarters here for some time before its removal to present Contai.

¹ J.A.S.B., 1895, p. 152, *Nārāyaṇapura-katakā Śrīcarane pūjā uttāru Vijekari.*

PRINCIPAL PUBLICATIONS OF THE SOCIETY.

Asiatic Researches, Vols. I—XX and Index, 1788—1839.

Proceedings, 1865—1904 (now amalgamated with Journal).

Memoirs, Vol. 1, *etc.*, 1905, *etc.*

Journal, Vols. 1—73, 1832—1904.

Journal and Proceedings [*N. S.*], Vol. 1, *etc.*, 1905, *etc.*

Centenary Review, 1784—1883.

Bibliotheca Indica, 1848, *etc.*

A complete list of publications sold by the Society can be obtained by application to the Honorary Secretary, 1, Park Street, Calcutta.

PRIVILEGES OF ORDINARY MEMBERS.

- (a) To be present and vote at all General Meetings, which are held on the first Wednesday in each month except in September and October.
- (b) To propose and second candidates for Ordinary Membership.
- (c) To introduce visitors at the Ordinary General Meetings and to the grounds and public rooms of the Society during the hours they are open to members.
- (d) To have personal access to the Library and other public rooms of the Society, and to examine its collections.
- (e) To take out books, plates and manuscripts from the Library.
- (f) To receive *gratis*, copies of the *Journal and Proceedings* and *Memoirs* of the Society.
- (g) To fill any office in the Society on being duly elected thereto.

SURVEY OF INDIA
HEAD QUARTERS (G. I.)
2 AUG. 1915

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1916.

Issued July, 1916.

List of Officers and Members of Council

OF THE

ASIATIC SOCIETY OF BENGAL

For the year 1916.

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JANUARY, 1916.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th January, 1916, at 9-15 P.M.

LIEUT.-COLONEL SIR LEONARD ROGERS, K.T., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S., President, in the chair.

The following members were present :—

Mr. H. G. Carter, Mr. J. A. Chapman, Dr. F. H. Gravely, Mr. H. G. Graves, Mr. W. H. Phelps, Dr. Satis Chandra Vidya-bhusana.

Visitors :—Mrs. Bignold, Mrs. H. G. Carter, Mr. Codd, Mr. F. C. Griffin, Mrs. J. R. Halliday, Mr. C. Humble, Mr. J. E. Judah, Mr. and Mrs. J. W. Miller, Mr. S. H. Smith, Mr. H. T. Tooze, Mr. Widnell, and two others.

The minutes of the last meeting were read and confirmed.

Thirty-nine presentations were announced.

The General Secretary reported that Lieut.-Col. E. A. R. Newman, I.M.S., had expressed a desire to withdraw from the Society.

The General Secretary reported the death of Lieut.-Col. F. J. Drury, I.M.S.

The General Secretary announced the following orders of the Council meetings held on the 24th November and 14th December, 1915, relative to the loan and consultation of manuscripts :—

“ In the case both of members and non-members security must be furnished before a MS. is lent out. The amount and form of the security to be determined by the Council in each case.”

“ Manuscripts can be consulted in the Society's rooms only on application to the Assistant Secretary, who shall direct a Pandit or Maulavi to be in attendance throughout. In the case of rare or fragile manuscripts, the Assistant Secretary shall refer the matter to the Philological Secretary or Joint Philological Secretary. Manuscripts belonging to the Government Collections shall not be consulted without special permission of the Officer-in-charge.”

The following gentlemen were balloted for as Ordinary Members :—

Babu Khagendra Nath Chatterjee, B.A., B.L., Attorney-at-Law and Zamindar, 12, Madan Mohan Chatterjee Lane, Calcutta, proposed by Babu Rakhal Das Banerji, seconded by Dr. F. H. Gravely; *Kumar Devendra Prasad Jain*, Secretary, All-India Jain Association, Arrah, proposed by Dr. Satis Chandra Vidyabhusana, seconded by Hon. Justice Sir Asutosh Mukherjee, Kt.; *Babu Harendra Kumar Mookerjee*, M.A., Asst. Prof., Calcutta University, proposed by Hon. Justice Sir Asutosh Mukherjee, Kt., seconded by Dr. Satis Chandra Vidyabhusana; *C. J. Hamilton, Esq.*, University Professor, U. S. Club, proposed by Mr. S. W. Kemp, seconded by Dr. W. C. Hossack.

The following papers were read :—

1. *A new species of Tephrosia from Sind.* By M. S. RAMASWAMI, M.A., F.L.S.
2. *On Calcutta Spiders.* (With lantern slides). By W. H. PHELPS.

These papers will be published in a subsequent number of the Journal.

The President announced that there would be no meeting of the Medical Section during this month.

FEBRUARY, 1916.

The Annual Meeting of the Society was held on Wednesday, the 2nd February, 1916, at 9-15 P.M.

LIEUT.-COLONEL SIR LEONARD ROGERS, KT., C.I.E., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S., President, in the chair.

The following Members were present:—

Maulavi Abdul Wali, Syed Abdulla-ul-Musawy, Nawabzada A. K. M. Abdus Subhan, Dr. C. A. Bentley, Dr. P. J. Bruhl, Lieut.-Col. W. J. Buchanan, I.M.S., Mr. H. G. Carter, Babu Nilmani Chakravarti, Mr. G. de P. Cotter, Babu Hemchandra Das Gupta, Dr. Harinath Ghosh, Dr. F. H. Gravely, Mr. H. G. Graves, Major E. D. W. Grieg, I.M.S., Mr. A. H. Harley, Dr. H. H. Hayden, C.I.E., Dr. W. C. Hossack, Mr. C. H. Kesteven, Mr. W. H. Phelps, Dr. C. P. Segard, Maulavi Aga Muhammad Kazim Shirazi, Dr. A. Suhrawardy, Lieut.-Col. W. D. Sutherland, I.M.S., Dr. Satis Chandra Vidyabhusana.

Visitors:—Mr. C. C. Bhattacharyya, Mrs. H. G. Carter, Mr. K. C. Chakravarti, Dr. S. Ghosh, Mrs. A. H. Harley, Mr. A. C. Shaha, Dr. W. H. Young and another.

The President ordered the distribution of the voting papers for the election of Officers and Members of Council for 1916, and appointed Maulavi Abdul Wali and Dr. C. P. Segard to be scrutineers.

The President ordered the distribution of the voting papers for the election of Fellows of the Society and appointed Babu Nilmani Chakravarti and Mr. H. C. Carter to be scrutineers.

The President announced that the Elliott Prize for Scientific Research for the year 1914 would not be awarded, as none of the essays received in competition was of sufficient merit to justify the award of the prize.

The Annual Report was then presented.



ANNUAL REPORT FOR 1915.

The Council of the Asiatic Society has the honour to submit the following report on the state of Society's affairs during the year ending 31st December, 1915.

Member List.

The number of Ordinary Members at the close of 1915 was 445, against 473 at the close of 1914. Twenty-seven Ordinary Members were elected during 1915. Out of these 6 have not yet paid their entrance fees. The number of Ordinary Members added to the list is therefore 21 in addition to 1 member, elected in 1914, who has paid his entrance fee during the year, making a total of 22 Ordinary Members added to the list. On the other hand, 25 withdrew, 8 died, and 17 were struck off under Rule 40.

The numbers of Ordinary Members in the past six years are as follows :—

YEAR.	PAYING.				NON-PAYING.			GRAND TOTAL.
	Resident.	Non-Resident.	Foreign.	Total.	Life.	Absent.	Total.	
1910	209	217	16	442	23	43	66	508
1911	200	225	19	444	22	53	75	519
1912	203	229	19	451	23	43	66	517
1913	200	211	19	430	23	46	69	499
1914	191	187	19	397	26	50	76	473
1915	171	188	21	380	25	40	65	445

The following members died during the course of this year :—

Mr. H. S. Bion, F.G.S., Mr. C. B. N. Cama, I.C.S. (Life member), Babu Raj Chandra Chandra, Lieut.-Col. F. J. Drury, I.M.S., Mr. E. D. M. Humphries, I.C.S., Captain J. G. L. Ranking, I.A., Mr. A. C. Rigo-de-Righie, and Mr. St. John Stephen, B.A.

The number of special Honorary Centenary Members remains unchanged.

During the year, we have elected Prof. Paul Vinogradoff, Mons. Jean Gaston Darboux, Sir Patrick Manson, Sir Joseph John Thomson and Sir William Turner as Honorary Fellows, the number now standing at 29.

The name of Rev. Father J. Hoffmann, S.J., has been removed from the list of Associate Members at his own request, and the names of Mr. E. Brunetti and Pandit Jainacharyya Shri Vijaya Dharmurishwarji have been added to the list. The number is now 15.

No members compounded for their subscriptions during this year.

Fellows of the Society.

At the Annual Meeting held on the 3rd February, 1915, Major E. W. D. Grieg, C.I.E., M.B., I.M.S.; Mr. G. H. Tipper, M.A., F.G.S.; Mr. D. B. Spooner, Ph.D., and Mr. H. H. Haines, F.C.H., F.L.S., were elected Fellows of the Society.

There were 31 Fellows on the list at the end of 1915.

Office-bearers.

Dr. E. P. Harrison continued Physical Science Secretary until September, when he resigned owing to his transfer to Bombay on military duty and Dr. P. J. Brühl was appointed in his place. In July Dr. N. Annandale resigned his office of Anthropological Secretary, as he was going on leave for 6 months out of India, and Mr. J. Coggin Brown took charge of his duties. There have been no other changes among the officers of the Society. Mr. F. H. Gravely held the post of the General Secretary and edited the Proceedings. Mr. R. D. Mehta, C.I.E., remained Treasurer. Mr. S. W. Kemp was Honorary Librarian throughout the year. Dr. W. C. Hossack continued to be the Medical Secretary. Dr. Brühl was Biological Secretary and edited the Biological portion of the Journal. Dr. A. Suhrawardy remained Philological Secretary, edited the Arabic and Persian part of the Philological Section of the Journal, and was in charge of the Arabic and Persian portions of the *Bibliotheca Indica*; he was also officer-in-charge of the Arabic and Persian search. Dr. Satis Chandra Vidyabusana carried on the duties of the Joint Philological Secretary and edited the Sanskrit part of the Philological portion of the Journal. He was also in charge of the Sanskrit portion of the *Bibliotheca Indica*, while Mahamahopadhaya Haraprasad Shastri continued officer-in-charge of the Bureau of Information and carried on the work of collecting and cataloguing Sanskrit Manuscripts. The Coin Cabinet was in charge of Mr. H. Nelson Wright, and either he or Mr. C. J. Brown has reported on all Treasure Trove Coins sent to the Society.

Office.

Mr. J. H. Elliott has continued as Assistant Secretary throughout the year, with the exception of three months from June to August, when he was granted privilege leave and Babu Balai Lal Dutt, B.A., the First Library Assistant, acted for him.

Maulavi Asaduz Zaman Khan, the Society's Maulavi, was granted sick leave for three months from 17th May to 16th August, and Maulavi Shah Moinuddin Ahmed acted for him.

There have been no other changes in the establishment.

Society's Premises and Property.

The building of new premises for the Society has not yet been taken in hand.

The Society has received from the Board of Trustees for the Improvement of Calcutta, a notice under section 45 of Bengal Act IV of 1911 relating to the acquirement of a portion of the land belonging to the Society for the purpose of widening Park Street. The area of land required is approximately 14½ cottahs and the compensation which the Board proposes to offer is Rs. 60,000.

The roof of the Society's building was in a very bad state of repair, and Rs. 145 has been spent for repairing leaks over the skylights, for mending other defects in the main roof, and for repairing a crack in one of the walls.

The room rented by the Automobile Association of Bengal was colour-washed and repainted at a cost of Rs. 79-12.

Permission was granted to Col. Sir S. G. Burrard, K.C.S.I., to make a replica of the Medallion of James Rennell belonging to the Society. The Medallion has been lent to him for the purpose.

Indian Museum.

No presentations were made to the Indian Museum.

During the year there has been no change in the Society's Trusteeship, and the Hon'ble Justice Sir Asutosh Mukhopadhyaya, Kt., C.S.I., D.Sc., F.R.A.S., F.R.S.E., continues to be a member of the Board of Trustees on behalf of the Society under the Indian Museum Act X of 1910.

Indian Science Congress.

The Second Indian Science Congress was held in Madras on January 14th, 15th, 16th, 1915, under the presidency of the Hon. Surgeon General W. B. Bannermann, C.S.I., I.M.S. The membership numbered about 150 and about 60 papers were communicated. An account of the Congress was published in our Proceedings for February, 1915.

It has been arranged that the third Indian Science Congress will be held at King George's Medical Hall, Lucknow, on January 13th, 14th and 15th, 1916.

His Honour Sir James Scorgie Meston, K.C.S.I., has consented to be patron and Col. Sir S. G. Burrard, K.C.S.I., R.E., F.R.S., has been appointed President with Dr. J. L. Simonsen and Prof. P. S. MacMahon as Hon'y. Secretaries. A preliminary programme and a programme of meetings have been drawn up and circulated. The Society has asked the Government of India to continue their support in connection with the meetings.

Meetings.

The Society's General Meetings have been held regularly every month with the exception of October, 1915.

Lecture.

Dr. H. H. Hayden, C.I.E., F.R.S., F.A.S.B., delivered a lecture on the Hindukush and the Russian Pamirs in the Society's rooms on 17th December, 1915. This was the only lecture delivered during the year.

Agencies.

Mr. Bernard Quaritch has continued as the Society's Agent in Europe, and Mr. Otto Harrassowitz has ceased to act as Agent.

Since the commencement of the war, no copies of the Society's "*Journal and Proceedings*" or "*Memoirs*," or of the "*Bibliotheca Indica*" have been sent to Mr. Quaritch, but it is intended that all the numbers issued since the last despatch shall be sent during 1916.

The two cases containing the Society's publications, sent to Mr. Otto Harrassowitz on the 9th July 1914 per SS. "*Katten-turm*," have not yet been recovered.

Barclay Memorial Medal.

On the recommendation of the Barclay Memorial Medal Special Committee, the Council awarded the Medal for 1915 to Mr. J. S. Gamble, C.I.E., M.A., F.R.S., late of the Indian Forest Department, in recognition of his biological researches.

Elliott Prize for Scientific Research.

Sixteen essays were received in competition for the Elliott Prize for Scientific Research during 1914, viz. two on Mathematics and fourteen on Chemical subjects. As the subject selected for the year was Mathematics only the two mathematical essays were referred to an expert for examination and report. The Trustees decided that neither of the two essays was of sufficient merit to deserve a prize. Moreover, they were ineligible in the terms of the notification which required that the essays should have been composed and published during the year.

No prize having been awarded for Mathematics for 1914, the prize available for that subject is offered for the year 1915, in addition to one offered for Natural Science. This notification was published in the *Calcutta Gazette* of the 15th December, 1915. In view of the delay in the publication of the notification, the Trustees have decided that the essays for 1915 shall be received up to the end of March, 1916.

At the request of the Hon. Mr. K. C. De., the Council

has agreed to take over the work now done by the office of the Director of Public Instruction, Bengal, in connection with the award of the Elliott Prize.

Finance.

The appendix contains the usual statements showing the accounts of the Asiatic Society of Bengal for the year 1915.

Statement No. I contains receipts and expenditure.

Statements Nos. II and III show how the money of Oriental Publication Funds Nos. 1 and 2 has been spent. These funds of Rs. 9,000 and Rs. 3,000 respectively are administered by the Society for the Government of Bengal.

In Statement No. IV will be seen the amount spent during the year from the special grant given by the Government of Bengal for printing an English translation of the Akbarnama.

Statement No. V shows how the yearly grant of Rs. 3,200 from the Government of Bengal towards the Sanskrit MSS. Fund has been used.

Statement No. VI shows how the Government of India's grant of Rs. 5,000 for the Arabic and Persian MSS. Fund has been used.

In Statement No. VII is shown the money spent in connection with the work of the proposed Bardic and Historical Survey of Rajputana, including Dr. Tessitori's salary of Rs. 6,000 granted by the Government of India.

Statement No. VIII shows how we have used the grants for the purchase of anthropological books and the publication of anthropological papers.

Statement No. IX refers solely to the salary of the officer in charge of the Bureau of Information.

Statement No. X shows the state of the Barclay Memorial Fund.

Statement No. XI gives an account of amounts due to and from the Society for subscriptions, books, manuscripts and contingent expenses.

Statement No. XII contains an account of the Society's investments in Government Securities which are held in deposit by the Bank of Bengal. We hold $3\frac{1}{2}$ % Government Promissory Notes of the face value of Rs. 2,48,700. They cost Rs. 2,45,564. the average purchase price being Rs. 98-12. The market price at the time of writing this report is nominally Rs. 79-8. Besides the above we have invested Rs. 10,100 in 4% Government Terminable Loan of 1915-16, at par. In addition we have $3\frac{1}{2}$ % Government Promissory Notes of the face value of Rs. 500, belonging to the Barclay Memorial Fund.

Statement No. XIII shows the sums invested in Government Promissory Notes known as the Trust Fund, the interest of which is applied to the payment of pensions to old servants of the Society.

Statement No. XIV gives an account of interest since 1911 on $3\frac{1}{2}$ % Government Promissory Notes for Rs. 40,000, earmarked for the Building Fund.

The cash receipts and expenditure of the Society, as well as those of the different funds, are summed up in Statement No. XV.

Statement No. XVI is the balance sheet of the entire account.

The Budget Estimate for 1915 was as follows: Receipts, Rs. 27,208; Ordinary Expenditure, Rs. 29,944; and Extra Expenditure, Rs. 500; making a total of Rs. 30,444. This, however, included certain funds granted to the Society for special purposes such as the encouragement of Anthropology, and these make the figures somewhat misleading. Omitting all such funds for which separate statements are being given this year, the figures will be as follows: Receipts, Rs. 20,608; Ordinary Expenditure Rs. 23,344; and Extra Expenditure, Rs. 500; making a total of Rs. 23,844.

The figures for ordinary receipts and expenditure are: receipts Rs. 20,320-1-10 or Rs. 287-14-2 less than was estimated; expenditure Rs. 20,775-13-1 or Rs. 3,052 less than was estimated. The expenditure includes Rs. 698-13-0, which was not provided for in the budget of 1915, but was sanctioned by the Council during the year under review for Dr. Tessitori's travelling expenses incurred in 1914.

There are increases in Receipts under the heads of Subscriptions for the Society's *Journal and Proceedings*, and *Memoirs*, Rs. 240; Interest on Investments, Rs. 300-3-9; and Admission fees, Rs. 96.

The falling-off in the Receipts from Members' Subscriptions is Rs. 179-12-0; from Sale of Publications, Rs. 424-11-0; and from Rent of Room, Rs. 350. The rent will be realized in 1916.

Our expenses have been well within the sanctioned Budget Estimate except in respect of salaries.

At the close of the year the Permanent Reserve Fund amounted to Rs. 1,66,200, and the Temporary Reserve Fund to Rs. 44,200, against Rs. 1,65,500 and Rs. 36,200, respectively at the close of last year.

The Permanent Reserve Fund has been increased by Rs. 700 from the admission fees received during the year, and the Temporary Reserve Fund has been increased by Rs. 8,000 by the purchase of Government Paper from the General Fund. The Trust Fund at the close of the year remained at Rs. 1,400. The Building Fund has increased by Rs. 1,400 from the interest realized on Rs. 40,000.

The expenditure on the Royal Society's Catalogue (including subscriptions of Rs. 224-12-6 remitted to the Secretary, Zoological Society of London) has been Rs. 786-1-9, while the

receipts from subscriptions received on behalf of Central Bureau has been Rs. 1,080.

The Budget Estimate of Receipts and Disbursements for the year 1916 has been calculated at—

			Rs.
Receipts	..	..	20,810
Ordinary Expenditure	..	Rs. 22,328	} 24,022
Extra Expenditure	..	„ 1,694	

In the Budget Estimates of Receipts for the year 1916 Interest on Investment is expected to be higher owing to the purchase of Rs. 10,100, 4% Terminable Loan of 1915-16; Rent of Room is expected to be higher owing to the fact that the rent due from the Automobile Association of Bengal has fallen into arrears since May, 1915; and Admission fees are expected to be higher on account of members having not paid their fees who were elected during November, 1915.

The Budget Estimate of Expenditure has been increased under several heads. Salaries have been increased owing to increment allowed to the office staff and for the appointment of a new Mali on a higher pay. The estimated cost of books has been heavily increased on account of an invoice for £123-2-8 received from Mr. Bernard Quaritch, London, for books supplied to the Society, and of the balance of Rs. 865 to be paid to Messrs. Johnston and Hoffmann, being the cost of nine Albums purchased last year. An extra expenditure of Rs. 1,694 has been budgetted for during the year 1916, this being the amount of the expenses incurred by Dr. Tessitori during 1915 in connection with the proposed Bardic and Historical Survey of Rajputana. The other items of Receipts and Expenditure are based upon the Estimate and Actuals of 1915.

The Excess Expenditure expected, viz. Rs. 3,220, will be met by drawing on the Temporary Reserve Fund, unless the income should prove larger than anticipated.

BUDGET ESTIMATE FOR 1916.

Receipts.

	1915.	1915.	1916.
	Estimate.	Actuals.	Estimate.
	Rs.	Rs.	Rs.
Members' Subscriptions ..	9,600	9,421	9,400
Subscriptions for the Society's <i>Journal and Proceedings</i> , and <i>Memoirs</i> ..	1,608	1,848	1,700
Sale of Publications ..	1,000	575	600
Interest on Investments ..	7,060	7,360	7,360
Carried over ..	19,268	19,204	19,060

	Rs.	Rs.	Rs.
Brought forward ..	19,268	19,204	19,060
Rent of Room ..	600	250	950
Miscellaneous ..	100	130	100
Admission fees ..	640	736	700
	<hr/>	<hr/>	<hr/>
Total ..	20,608	20,320	20,810
	<hr/>	<hr/>	<hr/>

Expenditure.

Salaries ..	6,600	6,930	7,092
Commission ..	600	541	550
Pension ..	180	180	180
Stationery ..	150	163	150
Lights and Fans ..	200	156	175
Municipal Taxes ..	1,495	1,495	1,495
Postage ..	700	594	700
Freight ..	225	22	150
Contingencies ..	600	317	400
Books ..	2,000	1,758	3,117
Binding ..	1,000	940	1,000
<i>Journal and Proceedings, and Memoirs</i> ..	8,000	5,391	6,000
Printing (Circulars, etc.) ..	500	381	500
Auditor's fee ..	150	150	150
Petty Repairs ..	100	7	25
Insurance ..	344	344	344
Grain Allowance ..	200	124	150
Furniture ..	300	287	150

Extra Expenditure.

Repairs ..	500	225	
Anthropological Instruments. ..		87	
Loan (Dr. Tessitori's travelling expense for 1914) ..		699	
Bardic Chronicles (Dr. Tessi- tori's travelling expenses for 1915) ..			1,694
	<hr/>	<hr/>	<hr/>
Total ..	23,844	20,791	24,022
	<hr/>	<hr/>	<hr/>

Library.

The total number of volumes and parts of magazines added to the Library during the year was 2046, of which 261 were purchased and 1785 were either presented or received in exchange.

A complete set of *L'Anthropologie* from Vols. 1 to 25 has been purchased for the Society's Library, and it has been decided to continue subscription to this periodical. In addition to this, copies of albums containing platinotype prints of photographs of archaeological interest taken at Budh Gaya, Udaigiri, Khandagiri and Dhauli Hill, Khajurahao, Brindaban, Muttra, Madura, Gaur and Pandua, Karli Caves and Nasik have been purchased for the Society's Library.

A large collection of Oriental books belonging to the late Mr. C. B. N. Cama has been presented to the Society's Library by Mrs. Cama and has been labelled "The Cama Collection of Oriental Literature."

Mr. W. H. Miles presented to the Society a number of books and other articles belonging to the Calcutta Microscopical Society.

In connection with the loan of MSS., the Council has resolved that in the case both of members and non-members, security must be furnished before a MS. is lent out. The amount and form of the security will be determined by the Council in each case. The question of the form of the indemnity bond to be used in this connection is under consideration. New rules have also been passed regarding the consultation of MSS. in the Society's rooms.

The compilation of the Catalogue of the Scientific serials available in Calcutta has now been taken in hand and specimen pages have been printed and approved by the Sub-Committee appointed to consider the preparation of the Catalogue. The number of slips received is about 3000; they come from more than 20 different libraries. It is hoped that the Catalogue will be published during the course of the next six months.

Publications.

There were published during the year ten numbers of the Journal and Proceedings (Vol. LXXV, Part 4; Vol. X, Nos. 9-11; Vol. XI, Nos. 1-6) containing 472 pages and 16 plates.

Two numbers of the Memoirs were published (Vol. V, No. 3, and Vol. V, extra No.) containing 168 pages and 36 plates.

Numismatic Supplement No. 24 was published in the Journal and Proceedings, Vol. X, Nos. 10 and 11, under the Editorship of Mr. H. Nelson Wright.

The Index to the Journal and Proceedings, Vol. VII, 1911, was also printed.

Owing to a demand for complete copies of the Society's Edition of Csoma de Koros' Tibetan Grammar printed in

1834, 26 copies which lacked the last five pages have been completed, and copies are now available for sale.

A revised edition of the Society's Rules and Regulations is in course of publication.

Exchange of Publications.

During the year no applications were accepted by the Society for exchange of publications.

On an application from the Librarian of the Johns Hopkins University, Baltimore, certain back numbers of the Journal and Proceedings of the Society were supplied to them.

Philology, etc.

Mr. W. Ivanow contributes a paper on the Persian Gypsies, a wandering tribe of mixed Aryan origin, who dress like Persian rustics, and are Muslims of the Shiah sect. They speak the Persian dialect of Qäinat, but still use some genuine Gypsy words to conceal their secrets. The paper specially deals with the structure of the Gypsy language.

Maulavi Ghulam Yazdāni attempts to prove that the tomb of Zeb-un-ni-sā, Aurangzeb's daughter, who died in 1709 A.D., is near the Kabul Gate at Delhi, and not at Lahore, as considered by some. He cites eye-witnesses, and further says that the tomb does not exist now, but was demolished when the Rajputānā Railway was constructed.

Rev. H. Hosten's paper on Western art at the Moghul Court contains five chapters. The first chapter deals with the Peacock Throne of Shāh Jahān described by Tavernier, and incidentally mentions several other thrones with peacocks. The writer says that the throne in question was not taken to Persia by Nādir Shāh. The second chapter deals with forgotten Europeans of Shāh Jahān's time, who were mostly artists. A list of their names is given. The last three chapters are on Indian architecture, as manifested in the structure of the Taj.

Rev. H. Hosten contributes another paper on the elephant statues which existed at Agra and Delhi in the reign of Akbar, some of which were destroyed by Aurangzeb.

Mr. H. D. Graves Law contributes 98 quatrains of Abu Sa'id bin Abul Khair obtained by him from two sources, *viz.* a MS. copy containing 161 quatrains, and a small volume of a lithographed edition containing 24 quatrains. From the former he has selected 84 quatrains, and from the latter 12 with 2 more found in both.

Khān Sāhib Maulavi Abdul Muqtadir describes a history of Herat by Sayfi. He shows that the well-known history of Herat, *viz.* *Rauzāt-ul-Jannāt* by Mu'in, is mainly based on this work.

“So-sor-thar-pa” is the title of a paper in which Mahamahopadhyaya Dr. Satis Chandra Vidyabhusana gives the Tibetan text with an English translation of a complete code of Tibetan monastic laws, which will enable scholars to compare it with the code prevailing in China as translated by Rev. Dr. Beal and that contained in the Pali language as published by Drs. Rhys Davids and Oldenberg in the Sacred Books of the East series. The same writer gives in English an explanation of a Tibetan scroll in the possession of Hon’ble Justice Sir John Woodroffe under the title of “Subduing an Enemy by Charm.” This scroll contains pictorial representations of certain magical processes adopted for the purpose.

“The Pālas of Bengal” is the title of a memoir in which Babu Rakhai Das Banerji brings together all essential evidences, epigraphical and bibliographical, published and unpublished, throwing light on an important epoch of the History of Bengal, *viz.* the administration of the Pāla Kings who flourished from about 750 A.D. to the beginning of the 12th century A.D. Under the title of “Four Forged Grants from Faridpur” the same writer defends, against Mr. Pargiter, his position as to the spuriousness of four inscriptions, *viz.* two of the time of Dharmāditya, one of the time of Gopa-candra and another of the time of Samācāra Deva.

Babu Nanda Lal De in his “Notes on ancient Anga” gives an elaborate account, historical and traditional, of the ancient kingdom of Anga, known to the Chinese pilgrims early in the 5th century A.D. as the country of Campā and corresponding to the modern Bhagalpur. A note on “Bodkamta Nartlesvara Image Inscription” by Babu Nalini Kanta Bhattasali gives a revised reading of an inscription published in the Journal of the Asiatic Society for March 1914, and confirms the conclusion that the country round Comilla was called Samatata in ancient times.

Anthropology.

The most important publication of the year was Sir George D. S. Dunbar’s memoir on the Abors and Galongs, which comprises not only an exhaustive account of the customs of these tribes, but a detailed description of their history and external relations as well. The memoir throws a flood of light on the little known regions of the Eastern Himalayas and is likely to remain for a long time to come the standard work of reference to the tribes in this portion of the Indian Empire. Messrs. Kemp and Coggin Brown contribute an anthropometrical supplement to the work.

It is to be regretted that the map which was to accompany the memoir was not printed in time to be published with it. It will be published in 1916, together with an account of

Sir George Dunbar's later explorations in the Upper Dihong Valley.

Five papers dealing with anthropological matters have appeared in the Journal of the Society. Pandit Hirananda Sastri's communication regarding prehistoric copper antiquities is of great interest and brings up to date our knowledge of this subject. Considerable interest is being displayed in prehistoric India at present, and the list of finds of stone and metal artifacts is a continually growing one. Papers of this nature serve a most useful purpose and are of great help to students of the subject.

Two other papers, though apparently of more local interest, are not without their bearing on the wider aspects of primitive religion and folklore. These are Bimala Charan Batabyal's account of Dakshindar, a godling of the Sunderbuns, and Sarat Chandra Mitra's note on North Indian folk medicine for hydrophobia and scorpion sting.

A paper by Dr. B. L. Chaudhuri deals with the weighing beam and various rural weights and measures in use in Orissa, while Mr. H. V. Nanjundlayya publishes a paper read at the second Indian Science Congress in Madras on "Some Aspects of Ethnographic Investigation."

Efforts have been made during the year to improve the Anthropological Section of the Society's library by the purchase of new books and serials, but there is still a great deal to be done in this direction before a reference library worthy of the importance of the subject has been brought together.

Zoology, Botany, and Geology.

ZOOLOGY.

Of the highly interesting report on the Biology of the Lake of Tiberias three papers, constituting the Fourth Series, had been read during the year 1914, but were published during the year under review. They are a paper on Hydrophilidae by Dr. A. d'Orchymont, a paper on Amphipoda and Isopoda by Mr. Walter M. Tattersall, and a paper on Chironomidae by J. J. Kiefer. The undoubtedly new species belong all of them to the Chironomidae. They are *Pelopia cygnus*, *Trichotanypus tiberiadis*, *Polypedilum genesareth*, *Polypedilum tiberiadis*, *Tendipes bethsaidae*, and *Tendipes galilaeus*. Dr. Annandale concluded this series of papers with a paper on the origin and distribution of the fauna which they described. He showed that the aquatic fauna of the Jordan river-system, and particularly that of the Lake of Tiberias, consisted mainly of species belonging to Palaearctic genera closely allied to forms from Eastern Europe and the Euphrates Valley. But among the fishes Ethiopian forms were also found, a fact of special interest in connection with the ancient history of the system. There are a

number of endemic species and one endemic genus, the latter being a sponge *Cortispongilla*.

To Mr. F. H. Gravely the Society owes an interesting paper on the evolution and distribution of Indian spiders belonging to the subfamily Aviculariinae. Of the eleven groups into which the Aviculariinae have been divided, five occur in the Oriental Region. These are the Ischnocoleae, Thrigmopoeae, Selenosmieae, Ornithoctoneae and Poecilotherieae. The Ischnocoleae found in the Indian Peninsula and Ceylon form a very compact group, probably related to those of other parts of the world through their most primitive species only. This group consists of a series of species leading up from these primitive ones to the Thrigmopoeae (confined to the Indian Peninsula) in which simple stridulating organs appear between the chelicerae and palps. On the other side of the Ganges the Ischnocoleae are almost extinct, having presumably suffered in competition with the Selenosmieae, a far more highly specialized group, which appears to have arisen from them in that part of the Oriental Region in much the same way as the Thrigmopoeae have in the Indian Peninsula. The stridulating organs of *Chilobrachys*, the most highly specialized genus of the Selenosmieae, are far more elaborate than those found in any genus of the Thrigmopoeae; and *Chilobrachys*, alone among the Selenosmieae, has spread into the Indian Peninsula and Ceylon. This suggests an explanation for the absence of the Ischnocoleae and Thrigmopoeae from the northern and eastern parts of the Indian Peninsula, the Parts in which *Chilobrachys* must have been longest established. The Poecilotherieae do not come into competition with the other groups of Aviculariinae, being arboreal instead of terrestrial in habit. It is concluded that they have originated from the Ischnocoleae as a result of their adaptation to a new environment in the Indian Peninsula or Ceylon, to which they are still confined. Only indirect evidence is, however, available either with regard to them or to the Malaysian terrestrial group Ornithoctoneae. In the absence of direct evidence to the contrary it may be supposed that the latter group also originated from the Ischnocoleae in the country which it now inhabits.

Mr. James Hornell published in the Journal an account of the Recent Pearl Fishery in Palk Bay. The acquisition from the Raja of Ramnad, of his fishing rights on the Indian side of Palk Bay, had permitted a systematic survey being made of the sea-bottom of this region with the result that the existence of two beds of pearl oysters was proved, the oysters being confined to the area of a bed of muddy sand between the $5\frac{1}{2}$ and $5\frac{7}{8}$ fathom contours. The oysters from the larger—the Tondi—bed were numerically deficient in pearls, but a small number of pearls were exceptionally large, whilst the oysters from the Kanangadu beds resembled those from Tinnevely and

Ceylon. The author believes that Palk Bay is the motherland of the Manaar pearl oysters. The comparatively narrow limits of the oyster-bearing area appear to be due to the fact that below the 6 fathom line the bottom consists of a soft mud, whilst the presence of oyster-eating starfishes above the $5\frac{1}{2}$ fathom line prevents the spreading of the oysters to higher levels. A second biological note contains the interesting results of the author's observation on the pearl oyster spat, three stages of development of the pearl oyster larvae being clearly established. A third note deals with the parasites found in the oysters of the Tondi beds.

BOTANY.

During the year under review the twenty-fifth part of the Materials for a Flora of the Malayan Peninsula has been published under the editorship of Mr. J. Sykes Gamble. Of the seven Families dealt with the Cytinaceae and the Balanophoraceae were described by Mr. H. N. Ridley, whilst the Juglandaceae, Myricaceae, Casuarinaceae, Fagaceae and Salicaceae were dealt with by Mr. J. S. Gamble. The following species are new:—*Rhopalocnemis ruficeps*, Ridley, *Pasania Kingiana*, Gamble, *Pasania Lampadaria*, Gamble, *Castanopsis malaccensis*, Gamble, *Castanopsis Scortechinii*, Gamble, *Castanopsis fulva*, Gamble, *Castanopsis Andersoni*, Gamble, *Castanopsis megacarpa*, Gamble, *Castanopsis Ridleyi*, Gamble. The new species had been previously described, with Latin diagnoses, in the Kew Bulletin.

Miss Maude L. Cleghorn presented an interesting note on the Floral Mechanism of *Typhonium trilobatum*, in which is described the trap-mechanism of the spathe, by means of which beetles are captured at night. The paper is illustrated by four photographs taken by the author.

Dr. W. Burns and Mr. S. H. Prayag gave an account of experiments on the artificial production of mixed inflorescences of *Mangifera indica* by grafting inflorescences either on a vegetative branch or on another inflorescence.

Mr. M. O. Parthasarathy Iyengar in his paper on the defoliation of some Madras trees comes to the conclusion that the leaf-fall of the trees referred to is due, not to the failure of water-supply, but possibly to the necessity of a replacement of the old by fresh and physiologically more efficient leaves, or, in some cases, to a successful competition of the growing young leaves for the supply of food materials. The author draws attention to the fact that prolonged wet weather may cause trees to shed their leaves.

In a note on the Flora of the South Indian Highlands, Mr. P. F. Fyson deals with the flora of those parts of the Nilgiris and the Palnis which rise above the 6500 feet level. Twenty-two of the species occurring in these regions had to be re-

named; ten entirely new species have been described in the Kew Bulletin.

Prof. S. C. Banerji described an instance of mechanical symbiosis of *Ficus bengalensis* with *Barassus flabellifer*.

Mr. I. H. Burkill, in a note on the Terai Forests between the Gandok and the Tista, discusses the influence which man, aided by fire, has exercised on the history of the Terai belt, and the part played by the river-deposited sand-cones in determining the trade routes from Tibet to the plains of Bihar and Bengal.

GEOLOGY.

In his highly interesting paper on the Geological History of Southern India Dr. W. F. Smeeth gives an account of the main components of the Archaean complex as exhibited in Mysore. The views expressed by the author differ considerably from those held by various other Indian geologists, in so far as he considers the Dharwars to be the oldest of the rocks exposed in the Mysore region, the conglomerates to be largely crush-conglomerates formed in shear zones in the schists or gneisses, and the banded ferruginous quartzites to represent possibly highly ferruginous sills subsequently altered, their banded character being largely secondary. He further suggests that many of the quartzites, which are sometimes felspathic and at other times micaceous, are crushed and recrystallized quartz-veins or quartz-porphyrries and that the aqueous origin of a number of the bands and beds of dolomite and limestone is doubtful. He holds that at the close of the Dharwar age the whole of Southern India was covered with a mantle of Dharwar rocks, which later on was penetrated and eaten into by successive intrusions of granite; and that the earliest of the post-Dharwarian granites and gneisses is a comparatively fine-grained micaceous rock, often characterized by the presence of grains of opalescent quartz; to this rock he assigns the name of Champion Gneiss. The latter appears to have been intruded into and cut out by rocks forming the great gneissic complex of Peninsular India, consisting of a great variety of granites. The author maintains that evidences of intrusion of the "Peninsular Gneiss" into the Dharwars are abundant, whilst the gneiss itself contains numerous lenses, patches, and fragments of Dharwars. The Peninsular gneiss is followed by the Charnockite Series, a huge plutonic complex characterized by the frequent presence of hypersthene. Whatever the views may be which finally will prevail, there is no doubt that Dr. Smeeth's paper will act as an incentive to further useful work in this highly complex field of research.

In his Palaeontological Notes from Hazara Prof. Hemchandra Dasgupta describes some fossils obtained from the Triassic, Jurassic, Gieumal rocks and Tertiary rocks of Hazara,

two new species being noticed, namely *Corbula middlemissii* and *Nautilus hazaraensis*.

Dr. G. E. Pilgrim exhibited a fossil jaw, possessing ancestral human characters, from the Miocene of the Punjab.

Physics and Chemistry.

Mr. J. Evershed's interesting paper on Sunspots and Prominences, read at the Science Congress at Madras, is being published in the Journal.

Medical Section.

Owing to the absence of so many of the members at the front, the work of the Medical Section has been almost negligible. On 10th March Col. Sutherland read a paper entitled "Some Cases of Rape"; on April 14th Sir Leonard Rogers read a paper on the treatment of Kala Azar; on December 8th Sir Leonard Rogers read a paper entitled "The Further Reduction of the Mortality of Cholera to 11 per cent by the Addition of Atropine Hypodermically to the Hypertonic Treatment: with an addendum summarizing the main points in the present system of treatment." Rai Harinath Ghose Bahadur, M.D., exhibited a case and read a paper on "The Speedy Recovery of a case of Kala Azar by Intravenous Injection of Sodium Antimony Tartrate with Sodium Cimamate and Berbarine Hydrochloride."

As was to be expected, the attendance at the meetings was very poor. The only exception was the meeting held on December 8th, which was attended by a large number of visitors from the Calcutta Medical Club and the Howrah Medical Club.

International Catalogue of Scientific Literature.

During the year 316 copies of the International Catalogue, completing the 10th annual issue and including parts of the 11th, 12th and 13th annual issues, were received, of which 302 copies were distributed. The Zoological Society of London has guaranteed the issue of the 14th annual issue of the volume of Zoology, and has asked for subscriptions at reduced rates from subscribers. Ten subscriptions have been despatched under these terms and one received at the end of the year has still to be remitted.

Catalogue slips numbering 1807 have been despatched during the year.

The expenses of the Regional Bureau for the year 1915 amounted to Rs. 786-1-2.

The Bureau of Information.

Since the publication of the Government notification issued on the 24th September, giving wider publicity to the

existence of the Bureau, enquiries are coming in from various quarters on a variety of subjects ; and they are being promptly attended to.

Search for Sanskrit Manuscripts.

As the staff was engaged in preparing the catalogue, very little new work was done in the search for manuscripts. A few Nepalese paper manuscripts were purchased.

Catalogue of Sanskrit Manuscripts.

The number of MSS. catalogued up to December, 1915, was 7768, the work of the year being represented by 630. A specimen volume of the catalogue, namely that of the Buddhist manuscripts, has been prepared and sent to the press. The preface to the second volume of the Catalogue of Palmleaf and Selected Paper Manuscripts of the Durbar Library of Nepal has been issued.

Bibliotheca Indica.

Of the six fasciculi of texts of different dimensions published in the *Bibliotheca Indica* series during the year under review, two belong to Brahmanic Sanskrit, one belongs to Kashmiri literature and the remaining three belong to Arabic and Persian literature. Among these, five are continuations of works taken in hand some years ago and only one is a new work published this year. The new work is "Farīdatu'l-'Asr"; it is a comprehensive index of persons, places, books, etc. referred to in the *Yatimatu'l Dahr*, the famous anthology of Tha 'Ālibi, and has been prepared by Maulavi Abū Musa Ahmādu'l Haqq of Dacca.

For want of funds a sufficient number of text books could not be published last year. As there are savings this year in the *Bibliotheca* Fund and as new rules have been framed for the guidance of the editors and the press, it is hoped that the *Bibliotheca* publications will be adequate and regular in the coming year.

Search for Arabic and Persian MSS.

During the year no MSS. were purchased on behalf of the Government. The efforts of the Officer-in-charge of the search were directed rather to ascertaining the existence and whereabouts of rare and interesting MSS. than to purchasing them, if in good keeping. To further this object, the first travelling Maulavi has been engaged in the preparation of short bibliographical account of MSS. in various libraries, book-stores, etc. in India which he has visited. Considerable progress has been made with the preparation of these notices, and the results of his labours will shortly be published monthly in

the Proceedings of the Society. The first instalment of the notices, which is already in type, is preceded by an introduction by the Officer-in-charge, containing short descriptions of the various libraries visited by the Maulavi.

As a preliminary step towards the compilation of a *catalogue raisonné*, the second Travelling Maulavi has been principally engaged in arranging and classifying the MSS. already acquired by the Society for Government. An additional Travelling Maulavi was appointed in June last, and was directed to prepare a Hand-list of the Government of India collection under the supervision of the Officer-in-charge. The Hand-list of the first collection (1903-07) is nearly complete, and will be sent to the press shortly.

Bardic Chronicles.

In this field, the precarious situation created by the scarcity of funds and want of local support have largely handicapped research work and prevented the publication of the materials prepared. Dr. Tessitori started the regular work of the Survey at Jodhpur from the 1st of January, in accordance with the suggestions made in his scheme published in the Society's Journal for December 1914, the Society guaranteeing him Rs. 1,000 to meet expenses during the first three months, pending the sanction of the necessary grant, which had been asked from the Government of India. For three months he was able to carry on his work without any serious hindrance, but in the beginning of April an unexpected difficulty arose, the Jodhpur Durbar suddenly changing their attitude, and refusing him their support, without which it is impossible to do any effective work in a country like Rajputana. Conditions were made even worse by the reply received from the Government of India in June, in which the Government of India stated that they were unable to guarantee any expenditure beyond the grant of Rs. 6,000 which they had sanctioned for Dr. Tessitori's pay, and suggested that the Rajputana States might consent to assist in the undertaking. The only immediate way out of the difficulty seemed to be for the Jodhpur Durbar to take upon themselves the expenditure involved in a work from which they would be the first to profit. The Agent to the Governor General in Rajputana tried to bring this about, but at the end of August the Jodhpur Durbar definitely refused, and intimated they did not wish any similar researches to be made, except by the Tawarikh Mehkma of the State. The disappointment was a bitter one, as Jodhpur was the State in Rajputana from which the largest help had been expected.

It then became necessary to try and make arrangements with some other State. An offer was made to Udaipur, for which State Dr. Tessitori prepared a new scheme, on a reduced scale. But before a reply was received H.H. the Maharaja of Bikaner

offered to employ Dr. Tessitori for at least four months, *i.e.* from the beginning of December to the end of March, to examine the bardic and historical materials of Bikaner, and suggest a plan for future work. Accordingly, Dr. Tessitori moved to Bikaner at the beginning of December, and will submit his plan in March, when the question of the continuation of his work in Bikaner will be decided.

In spite of the difficulties, some noteworthy results have been achieved. The edition of a bardic poem—the *Vacānikā Rāthōra Ratana Singhajī rī Mahesadāsōta rī*—has been prepared, and also that of a minor work—the *Uktiratnākara*; and both are ready to go to press as soon as the necessary funds are available. A *Descriptive Catalogue* has been started, and the first fasciculus is ready for the press. A *Progress Report on the Work done during the year 1915* has been submitted, and in an appendix to it articles have been given, which had been prepared for the proposed “Bulletin,” a publication which is unlikely to come into existence under present circumstances. A collection has been made of 100 bardic and historical manuscripts, out of which 16 were received, 16 purchased, and 68 copied under Dr. Tessitori’s supervision. Lastly a collection has been made of impressions of about 130 inscriptions, all from places visited in the Jodhpur State.

Coins.

Five gold, nine silver, and thirteen copper coins were presented to the Society’s Cabinet during the year. Among them were two silver coins of the Chandela King Madanavarman and ten copper coins of the Audambara series described in Numismatic Supplement XXII and XXIII respectively. The coins were received from the Madras (5 *A*), Central Provinces (2 *A* 3 *Æ*), Panjab (10 *Æ*) and Assam (3 *Æ*) Governments and from Bombay R.A. Society (3 *Æ*) and Rewah State (2 *Æ*).



Lieut.-Col. Sir Leonard Rogers, Kt., President, delivered an Address to the Society.

Annual Address, 1916.

The work of our Society has gone on steadily during the past year in spite of the war which is convulsing the world, and which has led to a further slight reduction in the number of our members, chiefly due to the loss of Indian Medical Service Officers who have gone to the front, while death has deprived us of Col. Drury, I.M.S., who was so long and honour-

ably connected with the Calcutta Medical College. The Annual Meeting of Fellows has recommended for election to-night to the Fellowship of the Society, Lt.-Colonel C. Donovan, I.M.S., joint discoverer of the Leishman-Donovan parasite of the dreaded kala-azar, the Hon'ble Mr. Burn, I.C.S., whose work at numismatics is so widely known, and Dr. Fermor, whose researches on Geology in India are of the greatest importance. The addition of these names will worthily maintain the reputation of our Fellowship. The Barclay Memorial Medal has been awarded to Mr. S. Gamble, F.R.S., who has devoted so many years of his retirement to work at the Flora of the Malay Peninsula, which our Society is publishing.

Much important work has been undertaken during the year. The cataloguing of the Sanskrit manuscripts has now reached a stage which will enable publication to be shortly commenced. New rules have been adopted by the Council regarding the publications of the Bibliotheca Indica, which are expected to have important results in the future. The Society has also financed Dr. Tessitori's expenses, other than his salary, which is paid by the Government of India, who were however unable to see their way to finding the money for other necessary expenditure, while the Rajputana States had not come forward with the help which was expected from them in support of a study of their own history. But for the Society's help which necessitated our drawing on our reserve funds this important work would have had to be suspended. Fortunately H.H. The Maharaja of Bikanir has now come forward with a proposal to support the work.

The general meetings of the Society have been well attended and many important papers have been published. The arrangement by which Philological and Scientific papers are respectively read at different meetings, has worked well. The Medical Section, however, has fallen on evil days owing to so many members having gone to the front. Only three meetings have been held with very poor attendance of members, although a number of visitors came to hear a paper on the treatment of cholera.

Some much-needed anthropological works have been added to the library.

Mrs. Cama has also presented to the Society a valuable collection of oriental works, which are being kept separately as the Cama bequest.

SOME THERAPEUTIC ADVANCES MADE IN INDIA AND THE NEED FOR FURTHER INVESTIGATION OF INDIGENOUS DRUGS.

As the work of our Society is fully set forth in the Annual Report which has been circulated to all our members, I do not

propose to review it further in my address to-night, but instead to deal with a subject which I do not think is receiving the attention it deserves at the present time, in the hope of stirring up renewed interest in it. I refer to the investigation of indigenous drugs, about which much has been said and written in recent years, but remarkably little accomplished. I shall first bring before you some examples of valuable work which has been done in India in the past in order to show the immense value of successful investigations of this branch of medical science, and then indicate the lines on which further similar results may be expected to be obtained, and point out what is necessary in order to allow of their being attained.

I will first deal with a very old and long-forgotten episode, which I came across when reading early works on medicine by Anglo-Indian writers (original and not the present incorrect official sense of the word) when preparing the historical section of my book on Fevers in the Tropics. It is one which has left its mark even on present-day practice in the rooted objection of Indian patients to take Quinine during a rise of temperature, which I was never able to understand until I studied the old medical literature. As many of you probably know, cinchona bark, from which the alkaloid quinine is prepared, was first imported into Europe from Peru as far back as 1632 by the Spaniards and was long known as Jesuits' bark, while as early as 1657 a Dr. Bogue used it with success in the fatal fevers of the rainy season in Calcutta. In 1765 James Lind treated some 500 cases of fever in Lower Bengal with large doses of cinchona bark with only two deaths, giving the drug during the slightest remission of the fever, while John Clark in 1768 treated a malignant malarial fever epidemic in Bengal with as large doses as the patient's stomach would stand **WITHOUT PAYING ANY REGARD TO THE REMISSIONS OR EXACERBATION OF THE FEVER.**

In September 1804 a Dr. James Johnson arrived in the Hoogly and as the result of the loss of a single case of malaria treated with cinchona without the precautions recommended by his predecessors condemned it as useless and, discarding the experience of a century and a half, he introduced copious bleedings and salivation with mercury. On his return to London after a very brief visit to the East he wrote a book on tropical diseases and edited a review, by means of which it is recorded that "all opposition was silenced and swamped by his slaughtering and withering criticisms and thus was accomplished a most wonderful revolution in the treatment of tropical fevers." In 1816 a Dr. Halliday drew attention to the very high mortality attending this spoliative treatment, and recorded that as much as 800 to 900 grains of calomel were given in a single attack of fever and that in a single month 13,337 grains of calomel were given in the General Hospital, Calcutta. His

protest only led to his being turned out of Calcutta and "suspended from his appointment in the service." Fortunately for the lot of reformers of medical treatment it is not now as dangerous as it was a century ago, even if it is not without some unpleasant experiences. As the result mainly of James Johnson's pernicious teaching, and in spite of the discovery of quinine in 1820 and its introduction into India in 1825, for forty years malarial fevers in India, and especially in Bengal, were treated mainly with the deadly excessive doses of mercury, and cinchona and quinine were only permitted to be used in small doses after the temperature had declined to normal. The story of the reintroduction of large doses of cinchona in the form of its active alkaloid quinine, given during fever, is a most interesting one. Edward Hare came to India in 1839 and in 1842 he had to treat malarial fever in the deadly Nepal Terai and found that his patients died before the mercury had time to affect them, and he wrote "no remissions took place, there were head symptoms, and I durst not give quinine. In fact it was so utterly forbidden by all authorities that it never occurred to me to give it." One day he was left a library by a medical man whom he had unsuccessfully treated for cholera, and in it he found the even then rare works of Lind and Hunter, and it at once struck him as remarkable that since the discovery of quinine no one had used it in large doses during fever in the way that they had formerly given cinchona bark, although quinine presented obvious advantages over the massive doses of bitter sawdust which the older physicians had to rely on. Soon after a European deserter was brought to Hare by villagers in the deadly coma of cerebral malaria, and with rare courage he proceeded to administer twenty-grain doses of quinine three times a day, and much to his surprise cured him in two days. During the next few years he patiently accumulated evidence of the value of quinine during fever in malaria and in 1847 he published a pamphlet in Delhi, which took the profession by surprise and created such a great sensation throughout India that the Calcutta Medical Board obtained the sanction of Lord Dalhousie to bring Hare down to Calcutta and placed him in charge of a wing of the General Hospital, where in a single year he reduced the death-rate from fevers to one-twelfth of its average rate for the previous twenty years. The Medical Board published an official report of the trial throughout India, and Hare's system of treatment has been used ever since, although the old prejudice against giving quinine during fever still persists in some lay minds. Hare became Inspector-General of Civil Hospitals in Bengal, but does not appear to have received any other recognition of his work, which must have saved more lives than any other discovery in the history of medicine in India. There is still, however, much to be learned regarding the therapeutical value of the

different alkaloids of cinchona bark, as the excellent investigations of Major MacGilchrist in Calcutta during the last two years have shown.

The next example I will take is that of ipecacuanha and its active alkaloid emetine, which also have an interesting and instructive history. Ipecacuanha appears to have been first carried to Europe from Brazil by Piso in 1648 and was brought into public notice by Helvetius, who used it successfully as a secret remedy in 1686, and, after he had cured the dauphin with it, the secret was bought from him by the French Government and made public. In those days it was used in large and effective doses of twenty to forty grains, but subsequently the usual dose was reduced to one to three grains. The drug has been much used in India during the last century, while the method of giving large doses was revived by Docker in Mauritius in 1858, although I find that Edmund Parkes as early as 1846 advocated equally large doses in the Madras Presidency. Docker received the practical reward of an increased pension, albeit a small one, from the Government for his rediscovery of the value of large doses of the drug in dysentery. Since his time it has retained its reputation in India, although up to the end of the nineteenth century there was much difference of opinion regarding the class of cases it benefited, as it was not then known that there are two totally different forms of dysentery, and that it is only useful in that which has now been shown to be due to a pathogenic amoeba. The amoebic form of dysentery was discovered by Koch and Kartulis in Egypt as far back as 1883 and in 1890 in America by Sir William Osler. In 1887 Kartulis also recognized the same organism in the pus of a liver abscess, while McConnel, the very able physician and pathologist of the Calcutta Medical College Hospital, was the first to confirm this observation in India, although curiously enough he does not appear to have recognized the occurrence of amoebic dysentery in India. When I came to Calcutta early in 1900 there was still great confusion and difference of opinion regarding the relationship, if any, between dysentery and liver abscess, and it was one of the first subjects which attracted my attention. I very soon discovered the presence of amoebic dysentery as a very common disease in India, and after two years' work established the fact that tropical liver abscess is always secondary to amoebic dysentery, and never follows the bacillary form of bowel disease. Next I showed that ipecacuanha has a specific action in the amoebic disease only, which at once explained the widely divergent views of physicians in different countries regarding the value of this drug as it is only effective in places where the amoebic form is prevalent. It was only a step further to recognize that ipecacuanha was also a specific in amoebic hepatitis which always precedes abscess formation, as had indeed been held by

some earlier physicians such as McClean and Norman Chevers, although their work had been largely forgotten. By also discovering the blood changes which allowed of the recognition with certainty of the early stages of hepatitis in the presuppurative stage and treating it with large doses of ipecacuanha, I established a simple method of preventing tropical liver abscess, which has now made that disease as rare among patients coming early under skilled treatment as it was formerly common only eight years ago, so that it may now be considered an almost absolutely preventable disease. The administration of the large doses of ipecacuanha by the mouth, which are necessary for its successful use in these diseases, is a troublesome and unpleasant experience and the greatest advance was still to come. An American physician, Dr Vedder, working in the Philippine Islands, recorded in 1911 some experiments showing that the soluble salts of Emetine, one of the alkaloids of ipecacuanha, would kill water amoebae in dilutions of 1 in 100,000, but curiously enough he did not realize the importance of his observations, and only suggested that it was advisable to analyse samples of ipecacuanha to see that they contained a good quantity of this alkaloid. The mixed alkaloids of ipecacuanha had been discovered as long ago as 1817 by the French chemist Pelletier, who had also assisted in the first isolation of quinine.

In 1891 Surgeon-Major Warden, I.M.S., working in the chemical laboratory of the Calcutta Medical College, prepared from ipecacuanha emetine mercuric iodide, which Surgeon-Major Tull-Walsh, I.M.S., administered by the mouth in the General Hospital in cases of dysentery, but he did not recommend it above other drugs, and concluded that it did not matter one straw what drugs were used or how they were given in dysentery, so it is not surprising that his paper led to no advance. When I first read of Vedder experiments on the harmless water amoebae with emetine I also failed to grasp their value. I had indeed some years previously attempted some unrecorded experiments with watery effusions of ipecacuanha on dysentery amoebae, but without obtaining any striking results, doubtless owing to the alkaloids being present in a relatively insoluble form. Late in 1911, while on a voyage back to India, I took advantage of the leisure to tabulate and analyse the notes of the amoebic dysentery cases I had treated during the previous two years in the isolation wards of the Medical College Hospital, which had been placed under my charge at my request in connection with my researches on cholera by Sir Pardey Lukis, I.M.S., to whom I am immensely indebted for these opportunities of carrying out my researches on practical lines. I was then struck by the fact that in cases proved to be amoebic in nature by microscopical examination, I had lost over twenty per cent in spite of very full doses of ipecacuanha,

and I realized a more powerful remedy was essential if more lives were to be saved. Vedder's experiments then came back to my mind, and I determined to try to obtain some soluble form of emetine which might be injected subcutaneously, for although I expected it would cause much sickness, I argued to myself that it could not be vomited out of the subcutaneous tissues, so ought to be more effective than the crude ipecacuanha by the mouth, which contains only about two per cent of emetine. I found that both a hydrochloride and a hydrobromide of emetine were available, and with some difficulty I obtained from England a few grains of the former. I had not long to wait for an opportunity of testing it, for a patient was admitted to my ward with a diagnosis of collapse from cholera, which I found by microscopical examination was a most severe case of amoebic dysentery. The patient could not retain even one grain of ipecacuanha, so I realized her only chance lay in hypodermic injections of emetine hydrochloride. To my surprise one-sixth of a grain, equal to fifteen grains of ipecacuanha, caused no vomiting, so I doubled the dose a few hours later and in two days the patient had recovered. My next case was a very chronic one of two and a half years' duration, in which the patient had lost over 50 lbs. in weight and was at death's door, but the result was equally astonishing and it was soon clear to me that a specific treatment of a common and deadly disease had at length been found, and one that I soon proved to be equally effective in the prevention of tropical liver abscess. One curious point regarding the history of ipecacuanha remains to be mentioned, namely the introduction of the so-called ipecacuanha sine emetine, in which an attempt was made to remove the specific alkaloids and give only the sawdust. Naturally the more completely the alkaloids were removed the less efficient was the result: a good example of the danger of incomplete knowledge of the composition and action of important drugs. I have dealt at some length with the history of these two alkaloids because they are the two most definitely specific remedies against very common and fatal diseases of India, and they illustrate very convincingly the point I wish to emphasise to-night, namely the immense value of researches on pharmacology, and therapeutics. Think what countless lives in Bengal alone have been lost through quinine and emetine, which were both discovered nearly a century ago, not having been efficiently used in the treatment of malarial fevers, amoebic dysentery, and hepatitis respectively until the middle of the nineteenth century in the case of quinine, and until 1912, 95 years after its discovery, in the case of emetine.

Are there not many other important indigenous drugs which might well repay scientific study? To take one example which has been engaging my attention during the last seven

months. The Indian drug, which has for very long retained its reputation as the best known remedy for leprosy, is chaulmoogra oil, but unfortunately on account of its nauseating qualities very few patients can tolerate sufficient doses to do more than check in some degree the progress of the affection. Dr. Heiser in the Philippine Islands has been injecting it into the muscles, and although this is a painful process, some of his patients, who persisted with the treatment for some two years, have been immensely benefited and a few are said to be practically cured. It was at Dr. Heiser's own suggestion that I took up work at this subject, and have been endeavouring to obtain the active principle of the oil in a form suitable for hypodermic injections. With the help of Rai Chuni Lal Bose Bahadur, I.S.O., Professor of Chemistry at the Medical College, I have obtained a product which causes very little pain on injection, and appears to have done some good in a few cases, as I am recording elsewhere, although it is too early to say more at present than that much further work is most desirable in this promising field.

Lastly, I come to the all-important practical question, namely what facilities exist in India and especially in Calcutta for investigations on these lines? For a number of years an Indigenous Drugs Committee has existed, but it can safely be said that the results of their labours have been disappointing. It is true that some voluminous reports have been published, and I shall never forget my astonishment on perusing one of the earliest of them, issued a good many years ago, and finding it to contain numerous routine office letters asking for or acknowledging the receipt of plants or drugs, all solemnly printed to swell the report to respectable dimensions. I have already mentioned the excellent work recently done on cinchona derivatives by MacGilchrist under the Indian Medical Research Fund of the Government of India, but I do not know of any other such work in recent years in Bengal, although Dr. Hari Nath Ghosh has reported the trial of some indigenous drugs at the Campbell Hospital. Although there is so little to report in the way of progress, I regret to have to call attention to a serious retrogression in one important respect. Up to two years ago we had at the economical section of the Indian Museum in Dr. Hooper, one of the Fellows of this Society, an able and experienced analytical chemist, but on his retirement under the inexorable age rules, his place was not filled, and the unfortunate Indigenous Drugs Committee is now deprived of one of their most valuable and essential workers. On the other hand I am glad to say that sanction has been accorded on the suggestion of Surgeon-General Harris, I.M.S., for so long Professor of Materia Medica at the Medical College, to the employment in the new laboratories of the School of Tropical Medicine when they are eventually opened at the end of

this terrible war, of a whole-time Professor of Pharmacology, while the Hospital for Tropical Diseases now being constructed entirely by public contributions, will afford additional and excellent scope for the very difficult work of testing clinically any drug whose physiological action may have been worked out by the pharmacologist. We also have at the Museum in Dr. Carter, who is kindly showing some specimens of medicinal plants to-night, an Economic Botanist to collect plants for analysis and search for alkaloids, etc. The one missing link is the retired and not yet replaced analytical chemist with a special knowledge of the highly technical subject of the chemistry of the alkaloids, etc., whose vacant post I sincerely trust will be adequately refilled without unnecessary delay. Then the investigation of indigenous drugs and the extraction of their active principles, to enable their physiological and therapeutical properties to be worked out in the Calcutta research laboratories and our great hospitals, may proceed on scientific lines at a greatly accelerated pace, and can hardly fail to furnish new and important additions to the armentarium of physicians all over India. If my address to-night helps forward this much-to-be-desired advance I shall not have spoken in vain.



The President announced the election of Officers and Members of Council for the year 1916 to be as follow:—

President :

Lieut.-Col. Sir Leonard Rogers, Kt., C.I.E., M.D., B.S.,
F.R.C.P., F.R.C.S., F.A.S.B., I.M.S.

Vice-Presidents :

The Hon. Justice Sir Asutosh Mukhopadhyaya, Kt., C.S.I.,
D.L., D.Sc., F.R.S.E., F.R.A.S., F.A.S.B.

Mahamahopadhyaya Haraprasad Shastri, C.I.E., M.A.,
F.A.S.B.

H. H. Hayden, Esq., C.I.E., D.Sc., F.R.S., B.A., B.A.I.,
F.G.S., F.A.S.B.

N. Annandale, Esq., D.Sc., C.M.Z.S., F.L.S., F.A.S.B.

Secretary and Treasurer :

General Secretary:—F. H. Gravely, Esq., D.Sc.

Treasurer:—R. D. Mehta, Esq., C.I.E.

Additional Secretaries :

- Philological Secretary :—A. Al-Ma'mun Suhrawardy, Esq.,
Iftikharul Millat, M.A., Ph.D., Bar.-at-Law.
- Natural History Secretaries : { Biology :—P. J. Bruhl, Esq., D.Sc.,
F.A.S.B.
Physical Science :—P. J. Bruhl, Esq.,
D.Sc., F.A.S.B.
- Anthropological Secretary :—J. Coggin Brown, Esq., M.Sc.,
F.G.S., Assoc. M.I.M.E.
- Joint Philological Secretary :—Mahamahopadhyaya Satis
Chandra Vidyabhusana, M.A., Ph.D., F.A.S.B.
- Medical Secretary :—W. C. Hossack, Esq., M.D., D.P.H.
- Honorary Librarian :—S. W. Kemp, Esq., B.A., F.A.S.B.

Other Members of Council :

- C. S. Middlemiss, Esq., B.A., F.G.S., F.A.S.B.
Major D. McCay, M.B., I.M.S.
H. R. James, Esq., M.A.
The Hon'ble Justice Sir J. G. Woodroffe, Kt., M.A., B.C.L.
The Hon'ble Mr. F. J. Monahan. I.C.S.
C. J. Hamilton, Esq.

The President announced the election of Fellows to be as follows :—

- Lieut.-Col. C. Donovan, M.D., I.M.S.
The Hon. Mr. R. Burn, I.C.S.
L. L. Fermor, Esq., A.R.S.M., D.Sc., F.G.S.

The meeting was then resolved into the Ordinary General Meeting.

The suggestion of Lieut.-Col. Sir Leonard Rogers, Kt., regarding the transfer of all medical journals to the School of Tropical Medicine, of which intimation had been sent to all resident members in accordance with Rule 64A, was brought up for discussion.

The following gentlemen were balloted for as Ordinary Members :—

Mr. Josef Orlando Ferrer, Cuban Consul, 5, Hastings Street, Calcutta, proposed by Mr. J. A. Chapman, seconded by Dr. F. H. Gravely; *Mr. W. E. Andrews*, B.A. (Oxon), La Martinière, 11, Loudon Street, Calcutta, proposed by Mr. H. P. Watts, seconded by Mr. A. C. Atkinson; *Babu Narendra Kumar Mazumdar*, M.A., Asst. Professor, Calcutta University, proposed by Hon. Justice Sir Asutosh Mookerjee, Kt., seconded by Mahamahopadhyaya Satis Chandra Vidyabhusana; *Rev. R. Oka*, c/o Messrs. Banjai & Co., 35, Park Mansions, Calcutta,

proposed by Mahamahopadhyaya Haraprasad Shastri, seconded by Babu Panchanana Mukhopadhyaya; *Mohammad Yusuf Hashmi*, M.A., Head Master, Calcutta Madrassa, and Superintendent, Baker Madrasah Hostel, Calcutta, proposed by Mr. A. H. Harley, seconded by Maulavi Hidayet Hosain.

The General Secretary reported the death of Monsieur Charles-Rene Zeiller, an Honorary Fellow of the Society.

The General Secretary announced the following changes and additions to the Library Regulations and an amendment of Office Regulation No. 1, passed by Council on the 26th January, 1916:—

To Library Regulations 4 and 10, the words “Honorary Librarian” to be substituted for “General Secretary.”

The following to be added to the Library Regulations:—

“22. A meeting of the Library Committee, which shall include the Sectional Secretaries as ex-officio members, shall be held at least once a quarter. No books shall be purchased except with the approval of the Library Committee obtained in meeting.”

Office Regulation 1 to be amended as follows:—

“No leave can be granted without the sanction in writing of the General Secretary on the report of the Officer to whom the applicant for leave is immediately responsible.”

The various regulations, duly revised, including the above, have been approved by the Council in the form submitted to the Council meeting held on the 26th January, 1916, and they are now in type and will be printed with the new edition of the Society's Rules.

The President called attention to the following exhibitions:—

1. Some important medicinal plants. By Mr. H. G. Carter.
2. Rock slides. By Mr. G. de P. Cotter.
3. Physical apparatus. By Mr. C. W. Peake.
4. Physical apparatus. By Prof. J. C. Bose.
5. Spiders. By Mr. W. H. Phelps.
6. Gas helmets, etc., from the war. By Dr. C. H. Elmes.
7. Some manuscripts from the Bishop's College Library (lent by the Rev. R. Gee). By Mahamahopadhyaya Haraprasad Shastri.
8. Arabic and Persian Manuscripts. By Dr. A. Suhrawardy.

9. A metal statuette from Tibet. By Mr. Percy Brown.
10. Specimens of ancient Indian iron from Konarak, Orissa. By Mr. H. G. Graves.

The meeting was then closed.

The President announced that there would be no meeting of the Medical Section during this month.

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LIST OF MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL.

ON THE 31ST DECEMBER, 1915.

LIST OF OFFICERS AND MEMBERS OF COUNCIL
OF THE ASIATIC SOCIETY OF BENGAL
FOR THE YEAR 1915.

President :

Lieutenant-Colonel Sir Leonard Rogers, Kt., C.I.E., M.D.,
B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S.

Vice-Presidents :

The Hon'ble Justice Sir Asutosh Mukhopādhyāya, Kt., C.S.I.,
D.L., D.Sc., F.R.S.E., F.R.A.S., F.A.S.B.

Mahāmahopādhyāya Haraprasād Sāstri, C.I.E., M.A.,
F.A.S.B.

H. H. Hayden, Esq., D.Sc., C.I.E., B.A., B.E., B.A.I., F.G.S.,
F.A.S.B.

N. Annandale, Esq., D.Sc., C.M.Z.S., F.L.S., F.A.S.B.

Honorary Secretary and Treasurer.

General Secretary :—F. H. Gravely, Esq., M.Sc.

Treasurer :—R. D. Mehta, Esq., C.I.E.

Additional Secretaries.

Philological Secretary :—A. Al-ma'mūn Suhrawardy, Esq.,
Iftikharul Millat, M.A., D.Litt., LL.D., Bar.-at-law.

Natural History Secretaries.	{	Biology :—P. J. Brühl, Esq., D.Sc., F.A.S.B.
	{	Physical Science :—E. P. Harrison, Esq., Ph.D. Succeeded by P. J. Brühl, Esq., D.Sc., F.A.S.B.

Anthropological Secretary :—N. Annandale, Esq., D.Sc.,
C.M.Z.S., F.L.S., F.A.S.B. Succeeded by J. Coggin
Brown, Esq., M.Sc., F.C.S.

Joint Philological Secretary :—Mahāmahopādhyāya Satis
Chandra Vidyābhūṣana, M.A., Ph.D., F.A.S.B.

Medical Secretary :—W. C. Hossack, Esq., M.D., D.P.H.

Honorary Librarian :—S. W. Kemp, Esq., B.A., F.A.S.B.

Other Members of Council.

C. S. Middlemiss, Esq., B.A., F.G.S., F.A.S.B.

G. R. Clarke, Esq., I.C.S.

W. Kirkpatrick, Esq.

Major D. McCay, M.B., I.M.S.

H. R. James, Esq., M.A.

The Hon'ble Justice Sir J. G. Woodroffe, Kt., M.A., B.C.L.

LIST OF ORDINARY MEMBERS.

R. = Resident. N.R. = Non-Resident. A. = Absent. L.M. = Life Member.
F.M. = Foreign Member.

An Asterisk is prefixed to the names of the Fellows of the Society.

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 Honorary General Secretary, 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 Honorary General Secretary.

Members who are about to leave India and do not intend to return are particularly requested to notify to the Honorary General Secretary whether it is their desire to continue Members of the Society; otherwise, in accordance with Rule 40 of the rules, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.		
1907 April 3.	N.R.	Abdul Ali, Abul Faiz Muhammad, M.A., Deputy Magistrate. <i>Netrokona, Mymensingh.</i>
1909 Mar. 3.	N.R.	Abdul Latif, Syed, Deputy Magistrate. <i>Patuakhai, Backerganj.</i>
1894 Sept. 27.	L.M.	Abdul Wali, Maulavi. 23, <i>European Asylum Lane, Calcutta.</i>
1912 Aug. 7.	N.R.	Abdulla-ul-Musawy, Syed, B.A., Zemindar. <i>Bohar, Burdwan.</i> [Calcutta.]
1909 July 7.	R.	Abdur Rahim, Maulavi. 51, <i>Taltolla Lane,</i>
1895 May 1.	R.	Abdus Salam, Maulavi, M.A., Presidency Magistrate. <i>Calcutta.</i>
1915 April 7.	R.	Abdus Subhan, Nawab Zada A.K.M., Khan Bahadur, 13, <i>Taltola Bazar Street, Calcutta.</i>
1903 April 1.	N.R.	Abul Aâs, Maulavi Sayid, Raees and Zemindar. <i>Langar Toli, Bankipore.</i>
1915 Feb. 3.	N.R.	Ahmad Ali Khan, Maulavi Hafiz, Superintendent, Rampur State Library. <i>Rampur.</i>
1904 Sept. 28.	N.R.	Ahmad Hasain Khan, Munshi. <i>Jhelum.</i>
1911 April 5.	N.R.	Ahmad Husain, Nawab, Khan Bahadur. <i>Rais of Pargawan, Partabgarh, Dist. Oudh.</i>
1903 Oct. 28.	R.	Allan, Alexander Smith, M.B. 17 & 18, <i>Esplanade Mansions, Calcutta.</i>
1913 Nov. 5.	N.R.	Aminullah, Maulvi, Pleader. <i>Ghazipore.</i>
1893 Aug. 31.	R.	Anderson, Lieut.-Col. Adam Rivers Steele, B.A., M.B., D.P.H., C.M.Z.S., I.M.S. <i>Presidency General Hospital, Calcutta.</i>

Date of Election.			
1912	July 3.	N.R.	Andrews, Egbert Arthur, B.A. <i>Tooklai Experimental Station, Cinnenara P.O., Jorhat, Assam.</i>
1904	Sept. 28.	A.	*Annandale, Nelson, D.Sc., C.M.Z.S., F.A.S.B. <i>Europe (c/o Indian Museum).</i>
1914	April 1.	N.R.	Ansari Amir Ahmad, B.A. <i>Begum Cothee, Meerut, U.P.</i>
1910	April 6.	N.R.	Ascoli, Frank David, I.C.S. <i>Dacca.</i>
1909	May 5.	R.	Ashgar, A. A., Barrister-at-Law. 8, <i>European Asylum Lane, Calcutta.</i>
1911	May 3.	R.	Atkinson, Albert Charles. <i>La Martiniere College, Calcutta.</i>
1904	July 6.	N.R.	Aulad Hasan, Sayid, <i>Khan Bahadur</i> , Inspector of Registration. <i>Dacca.</i>
1909	May 5.	R.	Azad, Maulavi Abul-Kalam Mohyuddin Ahmad. 13, <i>Macleod Street, Calcutta.</i>
1914	Mar. 4.	L.M.	Bacot, Mons. I. 31, <i>Quai d'Orsay, Paris.</i>
1870	Feb. 2.	L.M.	Baden-Powell, Baden Henry, M.A., C.I.E. <i>Ferlys Lodge, 29, Banbury Road, Oxford, England.</i>
1891	Mar. 4.	F.M.	Baillie, The Hon. Sir Duncan Colvin, K.C.S.I., I.C.S. 9, <i>Pall Mall, London.</i>
1909	Feb. 3.	N.R.	Banerji, Charu Deb, B.A., LL.B. <i>Allahabad.</i>
1910	Dec. 7.	N.R.	Banerji, Devendra Kumar. <i>Dacca College, Dacca.</i> [cutta.
1905	Mar. 1.	R.	Banerji, Muralidhar. <i>Sanskrit College, Calcutta.</i>
1907	Jan. 2.	R.	Banerji, Rakhal Das, M.A. 45/4, <i>Simla Street, Calcutta.</i>
1896	Mar. 4.	N.R.	Banerji, Satish Chandra, M.A., LL.D., Advocate, High Court. <i>Allahabad.</i>
1869	Dec. 1.	L.M.	Barker, Robert Arnold, M.D., F.G.S. <i>Thorncroft, Horndean Road, Emsworth, Hants, England.</i>
1885	Nov. 4.	R.	Barman, Damodar Das. 55, <i>Olive Street, Calcutta.</i>
1898	Mar. 2.	N.R.	Barnes, Herbert Charles, M.A., I.C.S., Deputy Commissioner, Naga Hills. <i>Kohima, Assam.</i>
1908	Nov. 4.	N.R.	Barnes, James Hector, B.Sc., F.I.C., F.C.S., Principal, Punjab Agricultural College. <i>Lyallpur.</i>
1914	June 3.	N.R.	Basu, B. K., B.A., I.C.S., Asst. Magistrate. <i>Burdwan.</i>
1903	Feb. 4.	N.R.	Batra, Bhawani Das, Rai Bahadur, M.A., <i>Lyallpur, Punjab.</i>
1909	July 7.	N.R.	Bazuz, Rangnath Khunraj. <i>Girgaon, Bombay.</i>
1895	July 3.	L.M.	Beatson-Bell, The Hon. Mr. Nicholas Dodd, B.A., C.I.E., I.C.S. <i>Calcutta.</i>
1907	Feb. 6.	N.R.	Bell, Charles Alfred, I.C.S. <i>Gangtok, Sikkim.</i>
1915	April 7.	N.R.	Belvalkar, Sripad Krishna, M.A., Ph.D., Prof. of Sanskrit, Deccan College. <i>Poona.</i>

Date of Election.		
1909 April 7.	R.	Bentley, Charles A., M.B., D.P.H. <i>Dum Dum, 24-Parganas.</i>
1876 Nov. 15.	F.M.	*Beveridge, Henry, F.A.S.B., I.C.S. (retired). <i>Pitfold, Shottermill, Haslemere, Surrey, England.</i> [putana.
1913 April 2.	N.R.	Bhatnagar, R. S., Civil Judge, <i>Shahpura, Raj-</i>
1908 Nov. 4.	N.R.	Bhattacharji, Bisvesvar, Deputy Magistrate, <i>Krishnagar. Nadia.</i>
1910 April 6.	N.R.	Bhattacharji, Ramakanta. <i>Madhupur.</i>
1909 July 7.	R.	Bhattacharji, Shib Nath, M.B. 17, <i>Mohan-bagan Road, Calcutta.</i>
1914 Nov. 4.	N.R.	Bhattacharji, Vireshwar. <i>Lahore.</i>
1910 May 4.	A.	Bishop, T. H., M.R.C.S., L.R.C.S., D.P.H. <i>Europe.</i> [ganas.
1893 Feb. 1.	L.M.	Bodding. Revd. P. O. <i>Dumka, Sonthal Par-</i>
1912 Oct. 30.	A.	Bolton. H. O. <i>Europe (c/o Messrs. Graham & Co., Calcutta).</i>
1912 July 3.	N.R.	Bomford, Capt. Trevor Lawrence, I.M.S., M.B., B.S., M.R.C.S., L.R.C.P. <i>Europe (c/o Rev. T. Bomford, C.M.S. House, Peshawar).</i>
1898 Feb. 2.	R.	Bose, Amrita Lal, Dramatist. 9-2, <i>Ram Chandra Maitra's Lane, Calcutta.</i>
1908 June 3.	R.	Bose, Hira Lall, <i>Dewan Bahadur, L.M.S. 10, Creek Lane, Calcutta.</i>
1895 Mar. 6.	R.	*Bose, Jagadis Chandra, C.S.I., M.A., D.Sc., C.I.E., F.A.S.B. <i>Presidency College, Calcutta.</i>
1914 Nov. 4.	N.R.	Bose, Thakur Birendranath. <i>Dacca.</i>
1910 July 6.	N.R.	Botham, Arthur William, I.C.S. <i>Shillong.</i>
1911 Nov. 1.	N.R.	Boyle. Lieut. Cecil Alexander, 11th King Edward's Lancers, Cavalry Lines, The Kurram Valley Militia. <i>Parachinar, Kurram Valley, N.W.F.P.</i>
1908 Jan. 1.	R.	Brahmachari. Upendra Nath, M.A., M.D. 19. <i>Grey Street, Calcutta.</i>
1913 Aug. 6.	N.R.	Brown, C. J. <i>Canning College, Lucknow.</i>
1906 July 4.	R.	Brown. Lieut.-Col. Edwin Harold, M.D., I.M.S. (retired). 4, <i>Harrington Street, Calcutta.</i>
1907 July 3.	N.R.	Brown, John Coggin, M.Sc., F.G.S., F.C.S. (c/o <i>Geological Survey of India).</i>
1909 Oct. 6.	R.	Brown, Percy, A.R.C.A. <i>Government School of Art, Calcutta.</i>
1909 Oct. 6.	R.	*Brühl. Paul Johannes, Ph.D., F.C.S., F.A.S.B. <i>Madrasa, Calcutta.</i>
1901 Sept. 25.	R.	Buchanan. Lieut.-Col. Walter James, I.M.S. <i>United Service Club, Calcutta.</i>
1901 June 5.	F.M.	*Burkill, Isaac Henry, M.A., F.A.S.B. <i>Botanical Gardens, Singapore.</i>
1896 Jan. 8.	N.R.	Burn, The Hon. Mr. Richard, I.C.S. Chief Secretary to the Government of United Provinces. <i>Allahabad.</i>

Date of Election.		
1913 Jan. 1.	R.	Burrard, Col. Sir S. G., K.C.S.I., C.S.I., F.R.S., Surveyor General of India. 13, Wood Street, Calcutta.
1913 Nov. 5.	R.	Burton, R. C., Assistant Superintendent, Geological Survey of India. Calcutta.
1900 May 2.	N.R.	Butcher, Flora, M.D. Lohaghat, Almora Dist.
1913 Apl. 2.	R.	Calder, Charles Cumming. Royal Botanic Gardens, Sibpur, Howrah.
1907 Apl. 3.	R.	Calvert, Lieut.-Col. John Telfer, M.B., M.R.C.P., I.M.S. Medical College, Calcutta.
1901 Mar. 6.	N.R.	Campbell, William Edgar Marmaduke, I.C.S. Mirzapur, U.P.
1895 July 3.	A.	Carlyle, Sir Robert Warrant, K.C.S.I., C.I.E., I.C.S. Europe (c/o India Office).
1912 Mar. 6.	R.	Carmichael, His Excellency the Right Hon'ble Thomas David Baron, of Skirling, G.C.I.E., K.C.M.G., Governor of Bengal. Calcutta.
1915 Jan. 6	R.	Carter, Humphry G., Economic Botanist to the Botanical Survey, Indian Museum. 27, Chowringhee Road, Calcutta.
1910 May 4.	A.	Carter, Capt. Robert Markham, I.M.S. Europe. (c/o India Office).
1905 May 3.	R.	Chakravarti, Dwarkanath, M.A., B.L., Vakil, High Court. Calcutta.
1890 June 4.	R.	*Chakravarti, Rai Monmohan, Bahadur, M.A., B.L., F.A.S.B., 14, Palmers Bazar Road, Entally, Calcutta.
1909 Mar. 3.	R.	Chakravarti, Nilmani, M.A. Presidency College, Calcutta.
1905 July 5.	N.R.	Chakravarti, Vanamali. Cotton College, Gauhati.
1906 Jan. 3.	R.	Chapman, John Alexander, Librarian, Imperial Library. Calcutta.
1195 Oct. 27.	N.R.	Chatterjee, Atul Chandra I.C.S. Lucknow, U.P.
1908 Feb. 5.	R.	Chatterjee, Gopal Chandra, M.B. Medical College, Calcutta.
1911 June 7.	R.	Chatterjee, Karuna Kumar, F.R.C.S. 74, Dharamtola Street, Calcutta.
1909 Mar. 3.	R.	Chatterjee, Manmatha Nath, M.B. 295/1, Upper Circular Road, Calcutta.
1907 Sept. 25.	R.	Chatterjee, Promode Prakas. 8, Dixon Lane, Calcutta.
1893 Sept. 28.	R.	Chaudhuri, Banawari Lal, B.A., D.Sc. (Edin.), F.R.S.E., F.L.S. (Lond.). 120, Lower Circular Road, Calcutta.
1911 Mar. 1.	N.R.	Chaudhuri, Charu Chandra, Rai Bahadur, Zemindar, Sherpur Town. Mymensingh Dist.
1914 April 1.	R.	Chaudhuri, Gopal Das. 32, Beadon Row, Calcutta.

Date of Election.		
1913 June 4.	R.	Chaudhuri, P., Bar.-at-Law. 2, <i>Bright Street, Ballygunge, Calcutta.</i>
1912 Aug. 7.	N.R.	Chetty, P. S. Ramulu. 5, <i>Strotton Muthia, Mudelly Street, Georgetown, Madras.</i>
1907 July 3.	A.	Christie, William Alexander Kynock, B.Sc., Ph.D. <i>Europe (c/o Geological Survey of India).</i>
1909 Nov. 3.	N.R.	*Christophers, Major Samuel Richmond, M.B., F.A.S.B., I.M.S. <i>Research Laboratory, Kasauli.</i>
1906 Nov. 7.	N.R.	Clarke, Geoffrey Roth, I.C.S., Postmaster General, <i>Punjab, Lahore.</i>
1915 Sep. 1.	R.	Cleghorn, Maude Lina West, F.L.S., F.E.S. 5, <i>Alipur Lane, Calcutta.</i>
1908 Nov. 4.	N.R.	Cook, Capt. Lewis, I.M.S. <i>Puri.</i>
1907 July 3.	R.	Cotter, Gerald de Purcell, Assistant Superintendent, Geological Survey of India. <i>Calcutta.</i>
1908 Jan. 1.	R.	Crake, Dr. Herbert Milverton, Health Officer. 15, <i>Loudon Street, Calcutta.</i>
1876 Mar. 1.	F.M.	Crawford, James, B.A., I.C.S. (retired). <i>Thornwood, Uddington, Lanarkshire, Scotland.</i>
1887 Aug. 25.	R.	Criper, William Risdon, F.C.S., F.I.C., A.R.S.M. <i>Konnagar, E.I.R.</i>
1895 July 3.	A.	Cumming, John Ghest, C.I.E., I.C.S. <i>Europe (c/o India Office).</i>
1873 Dec. 3.	F.M.	Dames, Mansel Longworth, I.C.S. (retired). <i>Ventnor, Wodeland Road, Guildford, Surrey, England.</i>
1915 Sep. 1	R.	Das-Gupta, Hem Chandra, M.A., F.G.S., Prof., Presidency College, <i>Calcutta.</i>
1896 Mar. 4.	R.	Das-Gupta, Jogendra Nath, B.A. (Oxon), Barrister-at-Law. 39, <i>Lower Circular Road, Calcutta.</i>
1912 April 3.	N.R.	Das, Kasi Nath, Prof., Ravenshaw College. <i>Cuttack. [cutta.</i>
1910 Jan. 5.	R.	David, David A. 55, <i>Free School Street, Cal-</i>
1895 Sept. 19.	R.	De, Kiran Chandra, B.A., I.C.S., Secretary, Government of Bengal, Revenue Department. <i>Calcutta.</i>
1906 Dec. 5.	R.	Deare, Lieut.-Col. Benjamin Hobbs, M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.P.H. (Cantab), I.M.S. 14, <i>Russell Street, Calcutta.</i>
1899 Aug. 30.	N.R.	Deb, Raja Saccidananda Tribhuban, Feudatory Chief of Bamra. <i>Deogarh, Bamra.</i>
1904 Sept. 28.	N.R.	DeCourcy, William Blennerhasset. <i>Leddlesdale Estate, Naduwatum P. O., Nilgiris.</i>
1912 May 1.	A.	Demetriadi, Stephen. <i>Europe (c/o Ralli Bros.).</i>
1906 Dec. 5.	N.R.	Dentith, Arthur William, I.C.S. <i>Shillong.</i>
1910 May 4.	I.M.S.	Dhavle, Sankara Balaji, I.C.S. <i>Purulia.</i>
1912 July 3.	R.	Digby, Everard, B.Sc. (Lond.). 1, <i>Garstin's Place, Calcutta.</i>

Date of Election.		
1907 Oct. 30	N.R.	Dixit, Pandit Sri Ram, B.A., <i>Dewan of Banswara, Rajputana.</i>
1898 Jan. 5.	R.	Dods, William Kane, Agent, Hongkong and Shanghai Banking Corporation. <i>Calcutta.</i>
1909 Nov. 3.	N.R.	Donovan, Lieut.-Col. Charles, M.D., I.M.S. <i>Medical College, Madras.</i>
1902 July 2.	R.	Doxey, Frederick. 9, <i>Queen's Park, Ballygunge, Calcutta.</i>
1909 Aug. 4.	N.R.	Drake-Brockman, Digby Livingstone, I.C.S. <i>Allahabad.</i>
1912 Nov. 6.	N.R.	Dube, Manan. <i>Tuhsildar, Domariaganj, Basti.</i>
1912 April 3.	A.	Duff-Sutherland-Dunbar, Capt. Sir George, Bart. <i>Europe (c/o India Office).</i>
1914 Sept. 2.	R.	Dutt, B. C. 172, <i>Municktola Street, Calcutta.</i>
1877 Aug. 30.	R.	Dutt, Kedar Nath. 1, <i>Sikdarpara Lane, Calcutta.</i>
1906 Nov. 7.	N.R.	Eadie, Capt. John Inglis. <i>97th Deccan Infantry (c/o Messrs. Grindlay & Co., Bombay).</i>
1910 April 6.	N.R.	Ebden, Capt. F. T. P. <i>73rd Carnatic Infantry, Trichinopoly.</i>
1910 April 6.	R.	Elmes, Dr. Cecil H. 1, <i>Middleton Row, Calcutta.</i>
1911 Nov. 1.	R.	Esch, V. J., Architect. <i>Grand Hotel, Calcutta.</i>
1915 Jany. 6.	N.R.	Fazl-i-Haqq, Q., M.A., Prof. of Persian Literature. <i>Govt. College, Lahore.</i>
1904 Aug. 3.	R.	Fermor, Lewis Leigh, A.R.S.M., D.Sc., F.G.S., Superintendent, Geological Survey of India. <i>Calcutta.</i>
1908 Sept. 2.	N.R.	Fida Ali, Syed. <i>Arrah.</i>
1906 Dec. 5.	N.R.	Finck, Herman, H. G., M.D., <i>Ahmednagar.</i>
1906 Oct. 31.	N.R.	Finlow, Robert Steel, Fibre Expert to the Govt. of Assam. <i>Dacca.</i>
1907 Mar. 6.	R.	Firminger, The Ven'ble Walter Kelly, M.A., B.D., F.R.G.S., Archdeacon of Calcutta. <i>St. John's House, Council House Street, Calcutta.</i>
1910 Sept. 7.	N.R.	Fortescue, Capt. Archer Irvine, R.A.M.C. <i>Benares.</i>
1913 Nov. 5.	R.	Fox, Cyril S., Assistant Superintendent, Geological Survey of India. <i>Calcutta.</i>
1910 April 6.	N.R.	Francis, Lieut. Reginald Frankland, Indian Army. <i>Jullunder, Punjab.</i>
1903 Mar. 4.	R.	*Gage, Major Andrew Thomas, M.A., M.B., B.Sc., F.L.S., I.M.S. <i>Royal Bot. Gardens, Calcutta.</i>
1893 Jan. 11.	N.R.	*Gait, His Honour Sir Edward Albert, K.C.S.I., C.S.I., C.I.E., I.C.S., Lieutenant-Governor of Bihar and Orissa. <i>Ranchi.</i>
1912 Mar. 6.	R.	Ganguli, Manmohan, B.E., District Engineer. <i>79, Cornwallis Street, Calcutta.</i>

Date of Election.		
1909 Mar. 3.	R.	Ganguli, Matilal, <i>Rai Bahadur. Currency Office, Calcutta.</i>
1909 Oct. 7.	R.	Ganguli, Ordhendhu Kumar. 12, <i>Ganguli's Lane, Calcutta.</i>
1908 Feb. 5.	N.R.	Gardner-Brown, John Gerald Gardner, M.A., Director, State Education. <i>Holkar College, Indore.</i>
1908 Jan. 1.	N.R.	Ghatak, Suresh Chandra, Depy. Magistrate and Depy. Collector. <i>Dacca.</i>
1905 July 5.	R.	Ghosh, Amulya Charan, <i>Vidyabhusana. 66, Manicktolla Street, Calcutta.</i>
1912 Aug. 7.	R.	Ghosh, Atal Behari, M.A., B.L. 59, <i>Sukea Street, Calcutta.</i>
1907 Oct. 30.	R.	Ghosh, Birendra Nath, L.M.S., Medical Practitioner. 109, <i>College Street, Calcutta.</i>
1912 Mar. 6.	R.	Ghosh, Harinath, M.D., Assistant Surgeon. 15/1a, <i>Balaram Ghosh Street, Calcutta.</i>
1905 May 3.	N.R.	Ghosh, Hemendra Prasad, Zemindar and Litterateur. <i>Prasad Lodge, Ohangalbha P.O., Jessore.</i>
1889 Jan. 2.	R.	Ghosh, Jogendra Chandra, M.A., B.L., Pleader. 25, <i>Hurrish Ohunder Mookerjee Road, Bhowanipore, Calcutta.</i>
1907 Mar. 6.	R.	Ghosh, Prafulla Chundra, M.A. <i>Presidency College, Calcutta.</i>
1869 Feb. 3.	N.R.	Ghosh, Pratapa Chandra, B.A. <i>Vindyachal.</i>
1912 Sept. 4.	R.	Ghosh, Tarapada. 14, <i>Paddapuker Street, Kidderpur, Calcutta.</i>
1902 June 4.	N.R.	Ghuznavi, The Hon. A. K. <i>Mymensingh.</i>
1913 Dec. 3.	A.	Godson, Capt. Charles Aubery, I.M.S. <i>Europe (c/o India Office).</i>
1909 April 7.	R.	Goenka, Briz Mohan. 24, <i>Banstolla Street, Calcutta.</i> [cutta.
1907 Mar. 6.	R.	Goenka, Roomall 57, <i>Burtolla Street, Calcutta.</i>
1905 July 5.	N.R.	Gossain, Hemchandra, Extra Assistant Commissioner. <i>Tezpur.</i>
1909 Jan. 6.	R.	Gourlay, William Robert, C.I.E., I.C.S. <i>Government House, Calcutta.</i>
1910 Sept. 7.	R.	Gravely, Frederic Henry, D.Sc., Assistant Superintendent, Indian Museum. <i>Calcutta.</i>
1905 May 3.	R.	Graves, Henry George, A.R.S.M. 1, <i>Council House Street, Calcutta.</i>
1910 Nov. 2.	N.R.	Graves-Law, H. D., I.C.S. <i>Abu.</i>
1907 June 5.	R.	Green, Lieut.-Col. Charles Robert Mortimer, M.D., F.R.C.S., I.M.S. 6, <i>Harrington Street, Calcutta.</i>
1910 Mar. 2.	R.	*Greig, Major Edward David Wilson, M.B., I.M.S. <i>United Service Club, Calcutta.</i>
1910 Sept. 7.	A.	Grey, Lt.-Col. William George, Indian Army. <i>Europe (c/o India Office).</i>

Date of Election.		
1900 Dec. 5.	L.M.	Grieve, James Wyndham Alleyne, Deputy Conservator of Forests. <i>Jalpaiguri.</i>
1901 April 3.	N.R.	Guha, Abhaya Sankar. Extra Assistant Commissioner. <i>Nowgong.</i>
1898 June 1.	R.	Gupta, Bepin Behari. <i>Hooghly College, Chinsura.</i>
1915 Aug. 4.	R.	Gurner, C. W., I.C.S. <i>United Service Club, Calcutta.</i>
1911 Aug. 2	N.R.	Habiber Rahman, Depy. Supdt., Telegraph Department. <i>Allahabad.</i>
1901 Mar. 6.	N.R.	Habibur Rahman Khan, Maulavi, Raees. <i>Bhikanpur, District Aligarh.</i>
1892 Jan. 6.	F.M.	Haig, Lieut.-Col. Wolesey, Indian Army. H. B. M.'s Consulate Genl., <i>Meshhed, Persia.</i>
1907 Aug. 7.	N.R.	*Haines, Henry Haselfoot, F.C.H., F.L.S. <i>Ranchi.</i>
1908 June 3.	R.	Hallowes, Kenneth Alexander Knight, B.A., A.R.S.M., F.G.S., Assistant Superintendent, Geological Survey of India. <i>Calcutta.</i>
1913 May 7.	N.R.	Haukin, E. H., M.A., D.Sc. <i>Agra.</i>
1912 May 1.	R.	Harley, A. H. <i>Madrassa, Calcutta.</i>
1906 Dec. 5.	N.R.	Harris, Lieut. G., 56th Infantry, F.F., <i>Hangu.</i>
1908 April 1.	N.R.	Harrison, Edward Philip, Ph.D., F.R.S.E. (<i>c/o Presidency College, Calcutta.</i>)
1897 Feb. 3.	R.	*Hayden, Henry Herbert, D.Sc., C.I.E., B.A., B.E., B.A.L., F.G.S., F.A.S.B., Director, Geological Survey of India. <i>Calcutta.</i>
1908 June 3.	R.	Herron, Alexander Macmillan, B.Sc., Assistant Superintendent, Geological Survey of India. <i>Calcutta.</i>
1911 April 5.	N.R.	Hiralal, Rai Bahadur, B.A., M.R.A.S. <i>Chhindwara, C.P.</i>
1908 April 1.	N.R.	Hirst, Captain Frederick Christian. <i>Indian Army, Shillong.</i>
1906 Dec. 5.	N.R.	Hirst, Reginald John. <i>Ranchi.</i>
1891 July 1.	F.M.	*Holland, Sir Thomas Henry, K.C.I.E., D.Sc., A.R.C.S., F.G.S., F.R.S., F.A.S.B. <i>Westwood, Alderley Edge, Cheshire, England.</i>
1908 July 1.	R.	Holmwood, The Hon. Mr. Justice Herbert, I.C.S. <i>Harrington Mansions, Calcutta.</i>
1898 Feb. 2.	F.M.	*Hooper, David, F.C.S., F.L.S., F.A.S.B. 1, <i>Glentworth Terrace, Weston Super Mare, England.</i>
1910 Jan. 5.	R.	Hope, Geoffroy D., B.Sc., Ph.D. 27, <i>Chowringhee Road, Calcutta.</i>
1914 Feb. 4.	R.	Hornell, The Hon. Mr. W. W., Director, Public Instruction, Bengal. <i>Writers' Building, Calcutta.</i>
1901 Dec. 4.	R.	Hossack, William Cardiff, M.D., D.P.H. 9, <i>Clyde Row, Hastings, Calcutta.</i>

Date of Election.		
1873 Jan. 2.	L.M.	Houstoun, George L., F.G.S. <i>Johnstone Castle, Renfrewshire, Scotland.</i>
1911 June 7.	R.	Husain, M. Hedayat. 7-1, <i>Ramsanker Roy's Lane, Calcutta.</i>
1908 June 3.	N.R.	Hutchinson, C. M. <i>Pusa.</i>
1911 Feb. 1.	R.	Insch, Jas. 101, <i>Clive Street, Calcutta.</i>
1915 April. 7.	N.R.	Ishak Khan Maulavi Mahomed, M. A. O. <i>College, Aligarh.</i>
1904 Jan. 6.	N.R.	Jackson, Victor Herbert, M.A. <i>Patna College, Bankipur.</i>
1908 Nov. 4.	N.R.	Jacob, Sydney Montague, I.C.S. (<i>c/o Messrs. King King & Co., Bombay.</i>)
1907 Dec. 4.	R.	James, Henry Rosher, M.A., Bengal Education Service. <i>Principal, Presidency College, Calcutta.</i>
1907 Sept. 25.	R.	Jenkins, Owen Francis, I.C.S. 1, <i>Council House Street, Calcutta.</i>
1912 Mar. 6.	A.	Jessop, W. <i>Europe (c/o Young Men's Christian Association, Calcutta).</i>
1908 June 3.	R.	Jones, Herbert Cecil, A.R.S.M., A.R.C.S., F.G.S., Asst. Supdt., Geological Survey of India. <i>Calcutta.</i>
1911 Sept. 1.	N.R.	Juggarao, Sree Raja Ankitam Venkata. <i>Zemindar of Shermahamadpuram, Dabagardens, Vizagapatam.</i>
1911 Nov. 1.	N.R.	Kamaluddin Ahmed, Shams-ul-Ulama. <i>Supdt., Govt. Madrassa, Chittagong.</i>
1915 Oct. 27.	N.R.	Kaushala, R. S. <i>Ambala City.</i>
1891 Feb. 4.	N.R.	Kapur, Raja Ban Behari, C.S.I. <i>Burdwan.</i>
1911 Jan. 1.	N.R.	Kaye, George Rusby, Registrar, Govt. of India, Dept. of Education. <i>Simla.</i>
1910 May 4.	R.	*Kemp, Stanley W., B.A., F.A.S.B., Senior Assistant Superintendent, Indian Museum. <i>Calcutta.</i>
1882 Mar. 1.	N.R.	Kennedy, Pringle, M.A., B.L., Vakil. <i>Mozufferpur.</i>
1906 Aug. 1.	R.	Kennedy, William Willoughby, M.A., M.D., D.P.H., M.R.S.C., L.R.C.P. 10, <i>Harrington St., Calcutta.</i>
1906 Sept. 19.	R.	Kesteven, Charles Henry, Solicitor to Government. 26, <i>Dalhousie Square, Calcutta.</i>
1909 April 7.	R.	Kilner, John Newport, M.B., L.R.C.S., L.R.C.P. <i>Garden Beach, Calcutta.</i>
1910 Mar. 2.	R.	Kirkpatrick, W. <i>Chartered Bank Buildings, Calcutta.</i>
1896 July 1.	A.	Küchler, George William, C.I.E., M.A. <i>Europe. (c/o India Office).</i>

Date of Election.		
1914 April 1.	N.R.	Laddu, Tukaram Krishna. <i>Queen's Colledge, Benares.</i>
1887 May 4.	L.M.	Lanman, Charles Rockwell. 9, <i>Farrar Street, Cambridge, Massachusetts, U.S. America.</i>
1889 Mar. 6.	L.M.	*La Touche, Thomas Henry Digges, B.A., F.G.S., F.A.S.B. <i>Alfriston Hills Road, Cambridge, England.</i>
1914 Aug. 5.	R.	Law, Bimala Charan, B.A. 4, <i>Sukea St., Calcutta.</i>
1911 Feb. 1.	R.	Law, Narendra Nath, M.A., B.L. 96, <i>Amherst St., Calcutta.</i>
1914 July 1.	R.	Law, Satya Charan, M.A., B.L. 24, <i>Sukea St., Calcutta.</i>
1909 Jan. 6.	A.	Leake, A. Martin, F.R.C.S., V.C. <i>Europe (c/o Bengal Nagpur Railway).</i>
1902 July 2.	N.R.	Leake, Henry Martin, M.A., F.I.S. <i>Narabgunj, Cawnpore.</i>
1889 Nov. 6.	R.	Lee, William A., F.R.M.S. 2, <i>New China Bazar Street, Calcutta.</i>
1907 Dec. 4.	N.R.	Little, James Henry, Assistant Master, Nawab Bahadur's Institution. <i>Murshidabad.</i>
1907 Mar. 6.	R.	Lloyd, Major Richard Ernest, M.B., B.Sc., I.M.S. <i>Medical College, Calcutta.</i>
1911 May 3.	R.	Lomax, C. E., M.A. 11, <i>Loudon Street, Calcutta.</i>
1906 Oct. 31.	N.R.	Luard, Capt. Charles Eckford, Indian Army, M.A. (Oxon). <i>Nimach.</i>
1910 April 6.	A.	Ludwig, Eugen. <i>Europe.</i>
1905 Aug. 2.	N.R.	Lukis, The Hon. Surgeon-General Sir Charles Pardey, K.C.S.I. C.S.I., M.B., F.R.C.S., I.M.S., Director-General, Indian Medical Service. <i>Simla.</i>
1913 Jan. 8.	A.	Luxburg, Count Graf. Karl L. <i>Europe.</i>
1870 April 7.	L.M.	Lyman, B. Smith. 708, <i>Locust Street, Philadelphia, U.S. America.</i>
1912 April 3.	A.	MacCabe, Surgeon Capt. Frederick. <i>Europe (c/o India Office, London).</i>
1905 Aug. 2.	R.	McCay, Major David, M.B., I.M.S. <i>Medical College, Calcutta.</i>
1893 Jan. 11.	L.M.	Maclagan, The Hon. Sir Edward Douglas, M.A., K.C.I.E., C.S.I., I.C.S., Secretary, Government of India, Education Department. <i>Simla.</i>
1912 May 1.	A.	McLean, David (<i>c/o Phoenix Assurance Co., Calcutta.</i>)
1913 Mar. 5.	N.R.	MacMahon, P. S., Canning College, <i>Lucknow.</i>
1893 Jan. 11.	L.M.	Madho Rao Scindia, His Highness Maharajah Colonel Sir, <i>Alijah Bahadur, G.C.S.I., G.C.V.O., A.D.C., LL.D., Maharajah of Gwalior. Jai Bilas, Gwalior.</i>
1906 Dec. 5.	R.	Mahalanobis, Subodh Chandra, B.Sc., F.R.S.E., F.R.M.S. 210, <i>Cornwallis Street, Calcutta.</i>

Date of Election.		
1911 Mar. 1.	R.	Mahatap, The Hon. Sir Bijoy Chand, K.C.S.I., Maharajadhiraj of Burdwan. 6, <i>Alipur Road, Calcutta.</i>
1898 Nov. 2.	N.R.	Maitra, Akshaya Kumar, B.A., B.L. <i>Rajshahi.</i>
1901 July 6.	A.	Malyon, Lieut. Frank Hailstone. <i>Europe (c/o India Office).</i>
1901 June 5.	N.R.	Mann, Harold Hart, D.Sc., M.Sc., F.L.S., Principal, Agricultural College. <i>Poona.</i>
1907 Dec. 4.	N.R.	Manners-Smith, Lieut.-Col. John, Indian Army, C.V.O., C.I.E., Resident, Nepal. <i>Khatmandu.</i>
1899 Aug. 30.	N.R.	Mannu Lal, Rai Bahadur, Retired Civil Surgeon. <i>Rai Bareli.</i>
1905 Dec. 6.	F.M.	Marsden, Edmund, B.A., F.R.G.S. 12 <i>Elerdale Road, Hampstead, London.</i>
1912 Jan. 10.	N.R.	Mazumdar, Rai Jadunath, Bahadur, Government Pleader. <i>Jessore.</i>
1913 June 4.	R.	Mazumdar, Ramesh Chandra, M.A. 16, <i>Chandranath Chatterji Street, Bhowanipur, Calcutta.</i>
1886 Mar. 3.	L.M.	Mehta, Roostumjee Dhunjibhoy, C.I.E. 9, <i>Rainey Park, Ballygunge, Calcutta.</i>
1895 July 3.	A.	Melitus, Paul Gregory, C.I.E., I.C.S. <i>Europe (c/o India Office).</i>
1914 May 6.	N.R.	Menon, K. Ramunni. <i>Presidency College, Madras.</i>
1884 Nov. 5.	R.	*Middlemiss, Charles Stewart, B.A., F.G.S., F.A.S.B., Superintendent, Geological Survey of India. <i>Calcutta.</i>
1905 Dec. 6.	R.	Midhut Mohamed Hossain Khan. 8, <i>Golam Sobhan's Lane, Calcutta.</i>
1884 Sept 3.	R.	Miles, William Harry. 21 <i>Old Court House Street, Calcutta.</i>
1912 June 5.	N.R.	Misra, Champaram. <i>Barabanki, Oudh.</i>
1911 July 5.	N.R.	Misra, Rai Sahib Shyam Behari, B.A., I.C.S., Revenue Member, Council of Regency. <i>Jodhpur.</i>
1897 Jan. 6.	N.R.	Misra, Tulsi Ram, M.A., Prof., D. J. High School. <i>Kanauj.</i>
1906 June 6.	R.	Mitra, Kumar Manmatha Nath. 34, <i>Shampukur Street, Calcutta.</i>
1915 Jan. 6.	R.	Mitra, Prakash Chandra, Engineer and Contractor, 101/1 <i>Olive Street, Calcutta.</i>
1910 July 6.	R.	Mohapatra, Srikrishna. 10/1, <i>St. James's Square, Calcutta.</i>
1908 Mar. 4.	R.	Moitry, Manmatho Nath, Landholder. <i>Seram-pore.</i>
1901 Aug. 7.	N.R.	Molony, Edmund Alexander, I.C.S. <i>Allahabad.</i>
1895 July 3.	R.	Monahan, The Hon. Mr. Francis John, I.C.S. 20, <i>Harrington Mansions, Calcutta.</i>
1910 Feb. 2.	R.	Monahar Lal, M.A. <i>Barrackpore.</i>

Date of Election.			
1906 Dec. 5.	N.R.	More, Capt. James Carmichael.	51st Sikhs. U.S. Club, Simla.
1906 Dec. 5.	N.R.	Morton, Captain Sidney.	24th Punjabis. Jhelum.
1908 Dec. 2.	R.	Moses, Capt. Owen St. John, M.D., F.R.C.S., I.M.S.	29, Theatre Road, Calcutta.
1909 Mar. 3.	R.	Mukherjee, Brajalal, M.A.	12, Old Post Office Street, Calcutta.
1909 Jan. 6.	R.	Mukherjee, Govinda Lall.	12, Old Post Office Street, Calcutta.
1899 Sept. 29.	R.	Mukherjee, Jotindra Nath, B.A., Solicitor.	3, Old Post Office Street, Calcutta.
1898 May 4.	R.	Mukherjee, Sir Rajendra Nath, K.C.I.E.	7, Harrington Street, Calcutta.
1894 Aug. 30.	R.	Mukherjee, Sibnarayan.	Uttarpara, Bally.
1886 May 5.	L.M.	*Mukhopadhyaya, The Hon. Justice Sir Asutosh, Kt., C.S.I., M.A., D.L., D.Sc., F.R.S.E., F.R.A.S., F.A.S.B., Judge, High Court.	Calcutta.
1908 Feb. 5.	R.	Mukhopadhyaya, Girindra Nath, B.A., M.D.	80, Russa Road North, Bhowanipur, Calcutta.
1892 Dec. 7.	R.	Mukhopadhyaya, Panchanan.	46, Bechoo Chatterji's Street, Calcutta.
1910 Nov. 2.	N.R.	Murray, William Alfred, B.A. (Cantab), M.B.	Chittagong.
1911 Sept. 1.	N.R.	Murtaza Hosein Khan, Nawab, Vakil and Zemindar, Katra abu Torabkhan.	Lucknow.
1908 Sept. 23.	N.R.	Muzaffur Ali Khan Bahadur, Syed, Zemindar and Rais.	Jausath, Dist. Muzaffarnagar.
1906 Mar. 7.	R.	Nabar, Puran Chand.	48, Indian Mirror Street, Calcutta.
1908 Sept. 23.	N.R.	Nande, Lala Jyotiprakas, Zemindar.	Burdwan.
1904 Dec. 7.	A.	Nathan, Robert, C.S.I., I.C.S.	Europe (c/o India Office).
1914 Feb. 4.	R.	Nawab Ali, Chaudhury, The Hon. Nawab Syed,	27, Weston Street, Calcutta.
1914 Feb. 4.	N.R.	Neogi, Panchanan.	Rajshahi College, Rajshahi.
1890 Feb. 5.	N.R.	Nesfield, Capt. Vincent Blumhardt, F.R.C.S., L.R.C.P., I.M.S.	Banda.
1901 Mar. 6.	N.R.	Nevill, Henry Rivers, I.C.S.	Etawah.
1889 Aug. 29.	L.M.	Nimmo, John Duncan (c/o Messrs. Walter Duncan & Co., 137, West George Street, Glasgow).	
1913 July 2.	N.R.	Norton, E. L., I.C.S., District Magistrate.	Allahabad.
1908 Feb. 5.	A.	Nott, Lieut.-Col. Arthur Holbrook, M.D., I.M.S.	Europe (c/o India Office).

Date of Election.		
1906 Dec. 5.	R.	O'Kinealy, Lieut.-Col. Frederick, M.R.C.S. (Eng.), L.R.C.P. (Lond.), I.M.S. <i>Presidency General Hospital, Calcutta.</i>
1905 Nov. 1.	N.R.	O'Malley, Lewis Sydney Steward, B.A., I.C.S. <i>Rajshahi.</i>
1915 April 7.	F.M.	Otani, Count Kozui. <i>c/o Consulate-General of Japan, Calcutta.</i>
1907 July 3.	A.	Page, William Walter Keigley. <i>Europe (c/o Pugh & Co).</i>
1901 Jan. 2.	N.R.	Pande, Ramavatar, B.A., I.C.S.. District Judge. <i>Mirzapur, U.P.</i>
1901 Aug. 28.	N.R.	Panton, Edward Brooks Henderson, B.A., I.C.S. <i>Berhampore, Murshidabad.</i>
1904 Aug. 3.	N.R.	Parasnis, Rao Bahadur Dattalraya Balwant. <i>Satara.</i>
1910 April 6.	N.R.	Patuck, Pestonji Sorabji, I.C.S. <i>Narsinghpur.</i>
1899 Aug. 2.	R.	Peake, Charles William, M.A. <i>The Observatory, Alipur, Calcutta.</i>
1906 Dec. 5.	N.R.	Peart, Major Charles Lubé. <i>106th Hazara Pioneers, Quetta.</i>
1888 June 6.	L.M.	Pennell, Aubray Percival, B.A., Bar.-at-Law. <i>Rangoon.</i>
1877 Aug. 1.	N.R.	Peters, Lieut.-Col. Charles Thomas, M.B., I.M.S. (retired). <i>Dinajpur.</i>
1906 April 4.	R.	Petrocochino, Leonidar. <i>4, Clive Ghat Street, Calcutta.</i>
1915 Oct. 27.	R.	Phelps, William Heath. <i>Park House, 13 Park Street, Calcutta.</i> [Calcutta.]
1915 May 5.	N.R.	Philby, H. St. J. B., I.C.S. (<i>c/o Alliance Bank</i>),
1889 Nov. 6.	L.M.	*Phillott, Lieut.-Colonel Douglas Craven, PH.D., F.A.S.B. <i>Indian Army (retired).</i> <i>c/o Messrs. Grindlay & Co., 54, Parliament Street, London.</i>
1914 Nov. 4.	R.	Pickford Alfred Donald. <i>12, Mission Row, Calcutta.</i>
1904 June 1.	N.R.	Pilgrim, Guy Ellcock, D.Sc., F.G.S. (<i>c/o Geological Survey of India</i>).
1910 Aug. 3.	R.	Podamraj Jain, Raniwalla. <i>9, Joggomohan Mullick's Lane, Calcutta.</i>
1910 Feb. 2.	N.R.	Poplai, Sri Ram. <i>Jullundur City.</i>
1906 Aug. 1.	N.R.	Price, Charles Stanley. <i>Victoria Boys' School, Kurseong.</i>
1914 Mar. 4.	N.R.	Raffin, Alain. <i>Mirzapur.</i>
1880 April 7.	N.R.	Rai Bepin Chandra. <i>Giridih, Chota Nagpur.</i>
1895 Aug. 29.	N.R.	Rai Chaudhuri, Jatindranath, M.A., B.L., Zemindar. <i>Taki, Jessore.</i>
1913 April 2.	R.	Ramaswami, M. S., Curator of the Herbarium. <i>Royal Botanic Gardens, Sibpur, Howrah.</i>

Date of Election.			
1908	Feb. 5.	F.M.	Randle, Herbert Neil, B.A. <i>Ludgate Circus, London, W.C.</i>
1908	July 1.	N.R.	Ranganathasvami, S. P. V., <i>Aryavaraguru, Arshya Library, Vizagapatam.</i>
1905	Jan. 4.	N.R.	Rankin, James Thomas, I.C.S. <i>Darjeeling.</i>
1904	Mar. 4.	F.M.	Rapson, E. J. 8, <i>Mortimer Road, Cambridge.</i>
1890	Mar. 5.	R.	*Ray, Prafulla Chandra, D.Sc., F.A.S.B., Professor, Presidency College. <i>Calcutta.</i>
1887	May 4.	R.	Ray, Prasanna Kumar, D.Sc. (Lond. and Edin.). 7, <i>Ballygunge Circular Road, Calcutta.</i>
1905	May 3.	R.	Richardson, The Hon Mr. Justice Thomas William, I.C.S., Judge, High Court. <i>Calcutta.</i>
1910	April 6.	A.	Robertson, A. White, F.R.C.P. <i>Europe (c/o War Office).</i>
1913	Sept. 3.	A.	Rogalsky, P. A. (c/o <i>Imperial Russian Consulate General, Calcutta.</i>)
1903	Mar. 4.	N.R.	Rogers, Charles Gilbert, F.L.S., F.C.H., Forest Department (c/o <i>Grindlay & Co.</i>).
1900	April 4.	R.	*Rogers, Lt.-Col. Sir Leonard, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S. <i>Medical College, Calcutta.</i>
1901	Dec. 4.	F.M.	*Ross, Edward Denison, C.I.E., Ph.D., F.A.S.B., British Museum, Dept. of Oriental Books and MSS. <i>London.</i>
1909	Nov. 3.	N.R.	Roychaudhury, Mrityunjoy. <i>Shyampur P.O., Rungpur.</i>
1908	June 3.	N.R.	Roychaudhury, Surendra Chandra, Zemin-dar. <i>Koondi, Rungpur.</i>
1889	June 5.	N.R.	Roy, Maharaja Girjanath. <i>Dinagapore.</i>
1903	July 1.	L.M.	Roy, Maharaja Jagadindranath, Bahadur. 6, <i>Lansdowne Road, Calcutta.</i>
1915	Oct. 27.	R.	Roy, Kaviraj Jamini Bhusan, M.A., M.B. 371, <i>Upper Chitpur Road, Calcutta.</i>
1910	Sept. 7.	N.R.	Roy, Kumar Sarat Kumar. <i>Dayarampur, Rajshahi.</i>
1914	June 3.	A.	Roy, Dr. Satyendra Nath. <i>Europe (c/o War Office).</i>
1915	April 7.	R.	Roy, Hon Mr. Surendra Nath, Vakil, High Court. <i>Calcutta.</i>
1906	Feb. 7.	N.R.	Russell, Charles, M.A. <i>Patna College, Bankipur.</i>
1908	Feb. 5.	F.M.	Russell, Robert V., I.C.S. 54, <i>Parliament Street, London, W.</i>
1913	Apl. 2	N.R.	Sahay, Rai Sahib Bhagvati, M.A., B.L., Offg. Inspector of Schools, Patna Division. <i>Bankipur.</i>
1911	Nov. 1	N.R.	Sahni, Dayaram, M.A., Supdt. of Archæology. <i>Jammu, Kashmir.</i>

Date of Election.		
1910 May 4	A.	Sandes, Capt. J. D., M.B., I.M.S. <i>Europe (c/o India Office).</i>
1906 June 6.	R.	Sanial, Surendra Prasad, M.A., F.C.S. <i>Serampur.</i>
1899 June 7.	N.R.	Sarkar, Chandra Kumar. <i>Kanikaik, Moulmein.</i>
1898 Mar. 2.	N.R.	Sarkar, Jadunath. <i>Patna College, Bankipur.</i>
1909 Mar. 3.	R.	Sarvadhikari, The Hon. Mr. Deva Prasad, M.A., B.L. 2, <i>Old Post Office Street, Calcutta.</i>
1911 Jan. 4.	R.	Sarvadhikari, Dr. Suresh Prasad. 79-1, <i>Amherst St., Calcutta.</i>
1902 Feb. 5.	A.	Schulten, Joseph Henry Charles, Ph.D. <i>Europe.</i>
1900 Dec. 5.	N.R.	Schwaiger, Imre George, Expert in Indian Art. <i>Kashmir Gate, Delhi.</i>
1908 July 1.	R.	Seal, Brojendra Nath, M.A. <i>Presidency College, Calcutta.</i>
1915 Feb. 3.	R.	Segard, Dr. C. P. 86, <i>College Street, Calcutta.</i>
1906 Feb. 7.	R.	Sen, Girindra Kumar. 303, <i>Bow Bazar Street, Calcutta.</i>
1902 May 7.	R.	Sen, Jogendra Nath, <i>Vidhyaratna, M.A. 31, Prasanna Kumar Tagore's Street, Calcutta.</i>
1905 Jan. 4.	R.	Sen, Sukumar. 220, <i>Lower Circular Road, Calcutta.</i>
1914 April 1.	R.	Sen-Gupta, Dr. Nares Chandra. 3, <i>Duff Lane, Calcutta.</i>
1897 Dec. 1.	R.	Seth, Mesrovb J. 19, <i>Lindsay Street, Calcutta.</i>
1911 July 5.	F.M.	Sewell, Capt. Robert Beresford Seymour, M.R.C.S., L.R.C.P., I.M.S. <i>c/o Indian Museum, Calcutta.</i>
1885 Feb. 4.	L.M.	*Shastri, Mahamahopadhyaya Haraprasad, C.I.E., M.A., F.A.S.B. 26, <i>Pataldanga Street, Calcutta.</i>
1902 Dec. 3.	N.R.	Shastri, Harnarain Goswami. <i>Hindu College, Delhi.</i>
1912 Jan. 10.	R.	Shirazi, Aga Muhamad Kazim. 23, <i>Lower Chitpur Road, Calcutta.</i>
1909 Jan. 6.	N.R.	Shirreff, Alexander Grierson, B.A., I.C.S. Inspector of Schools. <i>Bareilly.</i>
1913 Dec. 3	A.	Shorten, Capt. James Alfred, B.A., M.B., B.Ch., I.M.S. <i>Europe (c/o India Office).</i>
1914 Mar. 4.	R.	Shrobbree, A. de Bois. 9/1, <i>Middleton Row, Calcutta.</i>
1908 Mar. 4.	R.	Shujaat Ali, Nasurul Mamalik Mirza, <i>Khan Bahadur, Acting Consul-General for Persia. 10, Hungerford Street, Calcutta.</i>
1902 Feb. 5.	N.R.	Shyam Lal, Lala, M.A., LL.B., Deputy Collector. <i>Naimudri, Agra.</i>
1899 May 3.	N.R.	Silberrad, Charles Arthur, B.A., B.Sc., I.C.S., <i>Gorakhpur, U.P.</i>
1913 Mar. 5	N.R.	Simonsen, J. L., D.Sc. <i>Presidency College, Madras.</i>

Date of Election.			
1909 April 7.	N.R.	Simpson, George Clarke, D.Sc.	<i>Simla.</i>
1894 July 4.	N.R.	Singh, Raja Kushal Pal, M.A.	<i>Narki.</i>
1895 Aug. 29.	R.	Singh, Lachmi Narayan, M.A., B.L., Pleader, High Court.	<i>Calcutta.</i>
1912 May 1.	R.	Singh Ray, Lalit Mohan, Rai Bahadur. 4, <i>Creek Row, Calcutta.</i>	
1893 Mar. 1.	N.R.	Singh, Maharaja Kumara Sirdar Bharat, I.C.S. (retired).	<i>Shankergar, Allahabad.</i>
1892 Mar. 2.	L.M.	Singh, Raja Ooday Pratab, C.S.I., Raja of Bhinga.	<i>Bhinga.</i>
1899 Aug. 29.	N.R.	Singh, H.H. The Maharaja Sir Prabhu Narain, Bahadur, G.C.I.E., Maharaja of Benares.	<i>Ramnagar Fort, Benares.</i>
1909 April 7.	N.R.	Singh, Raja Prithwipal, Talukdar of Suraj- pur.	<i>District Barabanki, Oudh.</i>
1889 Nov. 6.	L.M.	Singh, H.H. The Hon. Maharaja Sir Ramesh- wara, Bahadur, K.C.I.E.	<i>Durbhanga.</i>
1912 Mar. 6.	R.	Singh, Maharaja Ranjit, of Nasirpur. 58, <i>Chowringhee Road, Calcutta.</i>	
1913 July 2	N.R.	Singh, Rudradat, M.A., LL.B., Vakil.	<i>Lucknow.</i>
1894 Feb. 7.	N.R.	Singh, H.H. The Maharaja Vishwa Nath, Bahadur.	<i>Ohhatturpur, Bundelkhand. [bad.]</i>
1912 Sept. 5.	N.R.	Singhi, Bahadur Sing.	<i>Azimgunj, Murshida-</i>
1897 Jan. 6.	R.	Sircar, Amrita Lal. F.C.S., L.M.S. 51, <i>Sankari-</i>	<i>tolla Lane, Calcutta.</i>
1898 Aug. 3.	N.R.	Sita Ram, B.A., Depy. Magistrate.	<i>Allahabad.</i>
1913 July 2.	N.R.	Sivaprasad, B.A., Offg. Junior Secretary to the Board of Revenue, U.P.	<i>Allahabad.</i>
1911 Mar. 1.	N.R.	Smith, Major O. A. 27th Punjabis.	<i>Hazari-</i>
1907 Mar. 6.	N.R.	Sofiulla Saifuddin Ahmed, Maulavi, Supdt. of Excise.	<i>Nowgong.</i>
1912 Jan. 10.	R.	Southwell, T., A.R.C.S., F.Z.S., F.L.S., Deputy Director of Fisheries.	<i>Writers' Buildings, Calcutta.</i>
1901 Dec. 4.	N.R.	*Spooner, David Brainerd.	<i>Bankipur.</i>
1913 July 2.	N.R.	Srinivas Iyenger, P. T., Principal, M.A.V.N. College.	<i>Vizagapatam.</i>
1912 May 1.	A.	Stadler, George L. (48 Grand Marché, Maes- tricht, Holland).	
1912 Oct. 30.	N.R.	Stallard, Dr. Philip Lechmen, District Sur- geon, G.I.P. Railway.	<i>Igatpuri, Bombay.</i>
1904 Sept. 28.	N.R.	Stapleton, Henry Ernest, B.A., B.Sc.	<i>Dacca.</i>
1908 Dec. 2.	A.	Steen, Capt. Hugh Barkley, M.B., I.M.S.	<i>Europe (c/o India Office).</i>
1904 June 1.	A.	Stephen, The Hon. Mr. Justice Harry Lush- ington.	<i>Europe (c/o India Office).</i>
1900 Aug. 29.	N.R.	Stephenson, Lieut.-Col. John, I.M.S.	<i>Lahore.</i>
1907 Dec. 4.	A.	Stevens, Lieut.-Col. C. R., I.M.S.	<i>Europe (c/o India Office).</i>

Date of Election.			
1907	June 5.	N.R.	Stewart, Capt. Francis Hugh, I.M.S. <i>Bombay.</i>
1906	Dec. 5.	F.M.	Stokes, Captain Claude Bayfield, Military Attaché. <i>Teheran, Persia.</i>
1911	Feb. 1.	A.	Stonebridge, Arthur W. <i>Europe (c/o Messrs. Burn & Co.)</i>
1915	April. 7.	N.R.	Storey, C. A., Prof. of Arabic, M. A. O. College. <i>Aligarh</i>
1914	Jan. 7.	N.R.	Strauss, Dr. O. <i>Ahmednagar.</i>
1907	Aug. 7	N.R.	Subramania Iyer, Valavanur, Extra Asst. Conservator of Forests. <i>Coimbatore.</i>
1907	June 5.	R.	Suhrawardy, Abdullah Al-Ma'mūn, Iftikharul Millat, M.A., D.Litt., LL.D., Bar.-at-Law. 3, <i>Wellesley 1st Lane, Calcutta.</i>
1914	Mar. 4.	R.	Sutherland, Lt.-Col. William Dunbar, I.M.S. <i>U.S. Club, Calcutta.</i>
1907	June 5.	N.R.	Swinhoe, Rodway Charles John, Solicitor. <i>Mandalay, Upper Burma.</i>
1909	Jan. 6.	R.	Tagore, Kshitindranath, B.A. 6/1 <i>Dwarkanath Tagore Lane, Calcutta.</i>
1914	April 1.	R.	Tagore, Prafulla Nath. 1, <i>Darpanarain Tagore Street, Calcutta.</i>
1898	April 6.	R.	Tagore, The Hon. Maharaja Sir Prodyat Coomarr, Bahadur, kt. <i>Pathuriaghatta, Calcutta.</i>
1906	Mar. 7.	R.	Tagore, Kumar Shyama Kumar, Zemindar. 65, <i>Pathuriaghutta Street, Calcutta.</i>
1904	July 6.	F.M.	Talbot, Walter Stanley, I.C.S. 9, <i>Pall Mall, London, S.W.</i>
1910	Aug. 3.	N.R.	Tancock, Capt. Alexander Charles. 31st <i>Punjabis, Nowshera, N.W.F.P.</i>
1893	Aug. 31.	N.R.	Tate, George Passman, Assistant Superintendent, Survey of India. <i>Mussoorie.</i>
1906	Dec. 5.	N.R.	Tek Chand, Dewan, B.A., M.R.A.S., I.C.S., Deputy Commissioner. <i>Gujranwala, Punjab.</i>
1878	June 5.	F.M.	Temple, Colonel Sir Richard Carnac, Bart., Indian Army, C.I.E. 9, <i>Pall Mall, London.</i>
1914	Aug. 5.	N.R.	Tessitori, Dr. L. P. <i>Guest House, Jodhpur.</i>
1904	May 4.	N.R.	Thanawala, Framjee Jamasjee. 85, <i>Bazar Gate St., Fort, Bombay.</i>
1911	Mar. 1.	F.M.	Thomas, F. W., M.A., Ph.D., Librarian, India Office. <i>London.</i>
1909	Aug. 4.	N.R.	Thompson, John Perronet, M.A., I.C.S. <i>Lahore.</i>
1908	Nov. 4.	N.R.	Thornely, Major, Michael Harris, I.M.S. <i>Dur-bhanga.</i>
1898	Nov. 2.	R.	Thornton, Edward, F.R.I.B.A. 6, <i>Olive Street, Calcutta.</i>
1911	July 5.	A.	Thurston, Capt. Edward Owen, I.M.S., B.S., F.R.C.S. <i>Europe (c/o India Office).</i>
1904	June 1.	A.	*Tipper, George Howlett, M.A., F.G.S. <i>Europe (c/o Geological Survey of India).</i>

Date of Election.		
1912 Nov. 6.	A.	Tomkins, H. G., C.I.E., F.R.A.S. <i>Europe (c/o India Office).</i>
1907 Feb. 6.	F.M.	*Travers, Morris William, D.Sc., F.R.S., F.A.S.B. 43, <i>Warwick Gardens, London, W.</i>
1861 June 5.	L.M.	Tremlett, James Dyer, M.A., I.C.S. (retired). <i>Dedham, Essex, England.</i>
1894 Sep. 27.	R.	Vasu, Nagendra Nath. 20, <i>Visvakos Lane, Baybazaar, Calcutta.</i>
1900 Aug. 29.	N.R.	Vaughan, Lieut.-Col. Joseph Charles Stoelke, I.M.S. <i>Bhagalpur.</i>
1890 Feb. 5.	N.R.	*Venis, Arthur, M.A., D.Litt., C.I.E., F.A.S.B. <i>Benares.</i>
1902 June 4.	R.	*Vidyabhusana, Mahamahopadhyaya Satis Chandra, M.A., Ph.D. F.A.S.B. 26/1, <i>Kanay Lal Dhur's Lane, Calcutta.</i>
1901 Mar. 6.	F.M.	*Vogel, Jean Philippe, Litt.D., F.A.S.B. <i>The University, Leiden, Holland.</i>
1894 Sept. 27.	L.M.	Vost, Lieut.-Col. William, I.M.S., Civil Surgeon. <i>Secunderabad.</i>
1902 Oct. 29.	R.	*Vredenburg, Ernest, B.L., B.Sc., A.R.S.M., A.R.C.S., F.G.S., F.A.S.B. 27, <i>Chowringhee Road, Calcutta.</i>
1909 Jan. 6.	N.R.	*Walker, Gilbert Thomas, C.S.I., D.Sc., M.A., F.R.S., F.A.S.B., Director-General of Observatories. <i>Simla.</i>
1907 July 3	R.	Walker, Harold, A.R.C.S., F.G.S., A.M. Inst. M., Assistant Superintendent, Geological Survey of India. <i>Calcutta.</i>
1901 June 5.	N.R.	Walsh, The Hon. Mr. Ernest Herbert Cooper, C.S.I., I.C.S., Commissioner, Chota Nagpur Divn. <i>Ranchi.</i>
1911 Feb. 1.	A.	Waters, Dr. Harry George, F.R.I.P.H. <i>Europe (c/o East Indian Railway, Jamalpur).</i>
1905 Dec 6.	N.R.	Watson, Edwin Roy, M.A., B.Sc. <i>Dacca.</i>
1910 Sept. 7.	R.	Watts, H. P., B.A. (Cantab). 11, <i>Loudon Street, Calcutta.</i>
1909 Dec. 1.	N.R.	Webster, J. E., I.C.S. <i>Sylhet, Assam.</i>
1913 April 2.	R.	White, Bernard Alfred. <i>Chartered Bank Buildings, Calcutta.</i>
1915 Jan. 6.	N.R.	Whitehouse, Richard H., Prof. of Biology, <i>Agra College, Agra.</i>
1906 Sept. 19.	N.R.	Whitehead, Richard Bertram, I.C.S. <i>Rupar, Umbala, Punjab.</i>
1909 April 7.	A.	Wilkinson, Major Edmund, I.M.S., I.R.C.S., D. Litt. <i>Europe (c/o India Office).</i>
1915 May. 5.	N.R.	Williams, L. F. Rushbrook, B.A., B.Litt., Prof. of Modern Indian History, Allahabad University. <i>Allahabad.</i>

Date of Election.		
1914 May 6.	A.	Wilson, Major Horace Hayman. <i>Europe (c/o India Office).</i>
1913 Dec. 3.	R.	Wilson, Major Roger Parker, F.R.C.S., D.P.H., I.M.S. <i>Campbell Hospital, Sealdah, Calcutta.</i>
1909 April 7.	N.R.	Woodhouse, E. J., B.A. <i>Sabour.</i>
1912 Mar. 6.	R.	Woodroffe, The Hon. Justice Sir John George, kt. 4, <i>Camac Street, Calcutta.</i>
1906 Mar. 7.	N.R.	Woolner, Alfred Cooper, M.A., Principal, Oriental College. <i>Lahore.</i>
1908 April 1.	R.	Wordsworth, William Christopher, Asst. Director of Public Instruction, Bengal. <i>Writers' Buildings, Calcutta.</i>
1894 Aug. 30.	N.R.	Wright, Henry Nelson, B.A., I.C.S. <i>District Judge, Bareilly.</i>
1911 Aug. 2.	N.R.	Young, Gerald Mackworth, B.A., I.C.S. <i>Simla.</i>
1906 June 6.	N.R.	Young, Mansel Charles Gambier. <i>Dhanbaid.</i>
1910 April 6.	N.R.	Young, Capt. Thomas Charles McCombie, M.B., I.M.S. <i>Shillong, Assam.</i>

SPECIAL HONORARY CENTENARY MEMBERS.

Date of Election.		
1884 Jan. 15.		Dr. Ernst Haeckel, Professor in the University of Jena. <i>Prussia.</i>
1884 Jan. 15.		Revd. Professor A. H. Sayce, Professor of Assyriology, Queen's College. <i>Oxford, England.</i>
1884 Jan. 15.		Monsieur Émile Senart. 18, <i>Rue François Ier, Paris, France.</i>

HONORARY FELLOWS.

Date of Election.		
1879 June 4.		Dr. Jules Janssen. <i>Observatoire d'Astronomie Physique de Paris, France.</i>
1894 Mar. 7.		Professor Theodor Noeldeke. <i>O/o Mr. Karl T. Trübner, Strassburg, Germany.</i>
1895 June 5.		Lord Rayleigh, M.A., D.C.L., D.Sc., LL.D., Ph.D., F.R.A.S., F.R.S. <i>Ferling Place, Witham, Essex, England.</i>
1895 June 5.		Charles H. Tawney, Esq., M.A., C.I.E. <i>C/o India Office, London.</i>
1896 Feb. 5.		Professor Charles Rockwell Lanman. 9, <i>Farrar Street, Cambridge, Massachusetts, U.S. America.</i>

Date of Election.		
1899 Feb.	1.	Dr. Augustus Frederick Rudolf Hœrnle, Ph.D., C.I.E. 8, <i>Northmoor Road, Oxford, England.</i>
1899 Dec.	6.	Professor Edwin Ray Lankester, M.A., LL.D., F.R.S., <i>British Museum (Nat. Hist.), Cromwell Road, London, S.W.</i>
1899 Dec.	6.	Professor Edward Burnett Tylor, D.C.L., LL.D., F.R.S., Keeper, University Museum. <i>Oxford, Eng- land.</i>
1901 Mar.	6.	Professor John Wesley Judd, C.B., LL.D., F.R.S., F.G.S., Late Prof. of the Royal College of Science. 30, <i>Cumberland Road, Kew, England.</i>
1902 Nov.	5.	Monsieur René Zeiller. <i>Ingénieur en chef des Mines. École supérieure des Mines, Paris.</i>
1904 Mar.	2.	Professor Hendrick Kern. <i>Utrecht, Holland.</i>
1904 Mar.	2.	Professor Sir Ramkrishna Gopal Bhandarkar, K.C.I.E. <i>Poona.</i>
1904 Mar.	2.	Professor Ignaz Goldziher, Ph.D., D.Litt., LL.D. <i>Budapest, Hungary.</i>
1904 Mar.	2.	Sir Charles Lyall, M.A., K.C.S.I., C.I.E., LL.D. 82, <i>Cornwall Gardens, London, S.W.</i>
1904 Mar.	2.	Sir William Ramsay, Ph.D. (Tüb.), LL.D., Sc.D. (Dubl.), F.C.S., F.I.C. <i>University College, Gower Street, London, W.C.</i>
1904 July	2.	Sir George Abraham Grierson, K.C.I.E., Ph.D., D Litt., C.I.E., I.C.S. (retired). <i>Rothfarnham, Camberley, Surrey, England.</i>
1906 Mar.	7.	The Right Hon'ble Baron Curzon of Kedleston, M.A., D.C.L., F.R.S. 1. <i>Carlton House Terrace, Lon- don, S.W.</i>
1908 July	1.	Lieut.-Col. Henry Haversham Godwin-Austen, F.R.S., F.Z.S., F.R.G.S. <i>Nora Godalming, Surrey, England.</i>
1908 July	1.	Dr. H. Oldenberg. <i>The University, Göttingen, Ger- many.</i>
1911 Sept.	6.	Lieut.-Col. Alfred William Alcock, C.I.E., M.B., LL.D., C.M.Z.S., F.R.S., I.M.S. (ret'd.). <i>Heathlands, Erith Road, Belvedere, Kent, England.</i>
1911 Sept.	6.	Prof. Edward George Browne, M.A., M.B., M.R.C.S., L.R.C.P., M.R.A.S. <i>Pembroke College, Cambridge.</i>
1911 Sept.	6.	Dr. A. Engler, Prof. of Systematic Botany, Univer- sity of Berlin, <i>Prussia.</i>
1911 Sept.	6.	Sir Clements Markham, K.C.B., F.R.S., D.Sc. 21, <i>Eccleston Square, London, S.W.</i>
1911 Sept.	6.	Mahamahopadhyaya Kamukhyanath Tarkavagish. 111-4, <i>Shambazar Street, Calcutta.</i>
1915 Aug.	4.	Prof. Paul Vinogradoff, F.B.A., D.C.L. 19, <i>Linton Road, Oxford, England.</i>
1915 Aug.	4.	Monsieur Jean Geston Darboux. 3 <i>Rue Nazarine, Paris, France.</i>
1915 Aug.	4.	Sir Patrick Manson, G.C.M.G., M.D., LL.D., F.R.C.P. 21 <i>Queen Anne Street, Cavendish Square, London, W.</i>

Date of Election.	
1915 Aug. 4.	Sir Joseph John Thomson, Kt. O.M., M.A., Sc.D., D.Sc., LL.D., Ph.D. <i>Trinity College, Cambridge, England.</i>
1915 Aug. 4.	Sir William Turner, K.C.B., M.B., D.C.L., LL.D., Sc.D., F.R.C.S. 6, <i>Eton Terrace, Edinburgh, Scotland.</i>

FELLOWS.

Date of Election.	
1910 Feb. 2.	N. Annandale, Esq., D.Sc., C.M.Z.S., F.L.S.
1910 Feb. 2.	The Hon'ble Justice Sir Asutosh Mukhopadhyaya, Kt., C.S.I., M.A., D.L., D.Sc., F.R.A.S., F.R.S.E.
1910 Feb. 2.	I. H. Burkill, Esq., M.A., F.L.S.
1910 Feb. 2.	Mahamahopadhyaya Haraprasad Shastri, C.I.E., M.A.
1910 Feb. 2.	Sir Thomas Holland, K.C.I.E., D.Sc., A.R.C.S., F.G.S., F.R.S.
1910 Feb. 2.	Dr. D. Hooper, F.C.S., F.L.S.
1910 Feb. 2.	T. H. D. LaTouche, Esq., B.A., F.G.S.
1910 Feb. 2.	Rai Bahadur Monmohan Chakravarti, M.A., B.L.
1910 Feb. 2.	Lieut.-Colonel D. C. Phillott, Ph.D., Indian Army
1910 Feb. 2.	Dr. Prafulla Chandra Ray, D.Sc.
1910 Feb. 2.	Lieut.-Col. Sir Leonard Rogers, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., I.M.S.
1910 Feb. 2.	E. D. Ross, Esq., C.I.E., Ph.D.
1910 Feb. 2.	Mahamahopadhyaya Satis Chandra Vidyabhusana, M.A., Ph.D., M.R.A.S.
1910 Feb. 2.	M. W. Travers, Esq., D.Sc., F.R.S.
1910 Feb. 2.	A. Venis, Esq., M.A., D.Litt., C.I.E.
1910 Feb. 2.	G. T. Walker, Esq., C.S.I., D.Sc., M.A., F.R.S.
1911 Feb. 1.	The Hon. Sir E. A. Gait, K.C.S.I., C.S.I., C.I.E., I.C.S.
1911 Feb. 1.	H. H. Hayden, Esq., D.Sc., C.I.E., B.A., B.E., R.A.I., F.G.S.
1912 Feb. 7.	H. Beveridge, Esq., I.C.S. (retired).
1912 Feb. 7.	J. C. Bose, Esq., C.S.I., C.I.E., M.A., D.Sc.
1912 Feb. 7.	P. J. Bruhl, Esq., Ph.D., F.C.S.
1912 Feb. 7.	Capt. S. R. Christophers, I.M.S.
1912 Feb. 7.	Charles Stewart Middlemiss, Esq., B.A., F.G.S.
1913 Feb. 5.	Major A. T. Gage, I.M.S.
1913 Feb. 5.	E. Vredenburg, Esq., B.L., B.Sc., A.R.S.M., A.R.C.S., F.G.S.
1913 Feb. 5.	J. Ph. Vogel, Esq., Ph.D., Litt.D.
1913 Feb. 5.	S. W. Kemp, Esq., B.A.
1915 Feb. 3.	Major E. D. W. Greig, C.I.E., M.B., I.M.S.
1915 Feb. 3.	G. H. Tipper, Esq., M.A., F.G.S.
1915 Feb. 3.	D. B. Spooner, Esq., Ph.D.
1915 Feb. 3.	H. H. Haines, Esq., F.C.H., F.L.S.

ASSOCIATE MEMBERS.

Date of Election.	
1875 Dec. 1.	Revd. J. D. Bate. 15, <i>St. John's Church Road, Folkestone, Kent, England.</i>
1882 June 7.	Herbert A. Giles, Esq., LL.D., Professor of Chinese in the University of Cambridge. <i>Cambridge, England.</i>
1885 Dec. 2.	Dr. A. Führer. <i>Europe.</i>
1886 Dec. 1.	Sarat Chandra Das, Rai Bahadur, C.I.E. 32, <i>Creek Row, Calcutta.</i>
1899 Nov. 1.	Revd. E. Francotte, S.J. 30, <i>Park Street, Calcutta.</i>
1902 June 4.	Revd. A. H. Francke. <i>Niesky Ober-Lausitz, Germany.</i>
1908 July 1.	Babu Dinesh Chandra Sen, B.A. 19, <i>Visvakos Lane, Calcutta.</i>
1909 Mar. 3.	Rai Balkrishna Atmaram Gupte, Bahadur. <i>Belvedere, Calcutta.</i>
1910 Sept. 7.	Shamsul Ulama Maulvi Ahmad Abdul Aziz. <i>Azeez Bag, City-Hyderabad, Deccan.</i>
1910 Sept. 7.	L. K. Anantha Krishna Iyer, Esq. <i>Trichur.</i>
1910 Dec. 7.	Rev. H. Hosten, S.J. 30, <i>Park Street, Calcutta.</i>
1913 Feb. 5.	Ekendranath Ghosh, Esq., L.M.S. <i>Medical College, Calcutta.</i>
1914 Apl. 1.	Bada Kaji Marichiman Singha. <i>Bir Library, Nepal.</i>
1915 Mar. 3.	E. Brunetti, Esq., 27, <i>Chowringhee Road, Calcutta.</i>
1915 Dec. 1.	Pandit Jainacharya Vijayadharma Surisvaraji, <i>Yasovijaya Granthamal Office, Benares City.</i>

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

* *Rule 40.*—After the lapse of three years from the date of a member leaving India, if no intimation of his wishes shall in the interval have been received by the Society, his name shall be removed from the List of Members.

The following members will be removed from the next Member List of the Society under the operation of the above Rule:—

George William Kuchler, Esq., C.I.E.
 A. White Robertson, Esq., L.R.C.P.
 Major Edmund Wilkinson, L.M.S.

LOSS OF MEMBERS DURING 1915.

BY RETIREMENT.

Babu Surendra Chandra Banerjee.
 Norman Bonham-Carter, Esq., I.C.S.

Adrian Caddy, Esq., F.R.C.S., D.P.H.
 Hon. Mr. Justice Asutosh Chaudhuri.
 Alex. W. Davenport, Esq.
 Major William Donan, I.A.
 Capt. Henry Bertram Foster, I.M.S.
 Joseph Ernest Friend-Pereira, Esq.
 Kashi Prasad Jayaswal, Esq.
 Babu Saharam Kumar.
 Hon. Sir J. S. Meston, K.C.S.I.
 Babu Phani Bhusan Mukerjee, B.Sc.
 Dr. Indu Madhab Mallick, M.D.
 Babu Pramathanath Mallik.
 Lt.-Col. Ernest Alan Robert Newman, I.M.S.
 Lt.-Col. Fairlie Russell Ozzard, I.M.S.
 Babu Radhakrishna.
 Hon. Mr. Herbert Frederick Samman, I.C.S.
 John Hope Simpson, Esq., I.C.S.
 Charles Somers Taylor, Esq., B.Sc.
 Rev. J. Watt.
 Garfield Hodder Williams, Esq., M.B.
 Major Frank Needham Windsor, I.M.S.
 William Henry Arden Wood, Esq.
 Pandit Monohar Lal Zutshi.

BY DEATH.

Ordinary Members.

H. S. Bion, Esq.
 Camaji Byramji Navroji Cama, Esq., I.C.S.
 Babu Raj Chandra Chandra.
 Lieut.-Col. Francis James Drury, I.M.S.
 Edgar de Montfort Humphries, Esq., I.C.S.
 Captain James Ranking, I.A.
 Alceste Carlo Righo de Righi, Esq.
 St. John Stephen, Esq.

UNDER RULE 40.

Capt. Frank Powell Connor, I.M.S.
 Walter Noel Edwards, Esq.
 Babu Panchanan Ghosh.
 D. E. Gruble, Esq.
 Norman Leslie Hallward, Esq.
 Major Lionel Lees Hepper, Royal Artillery.
 Samarendra Maulik, Esq.
 James Mollison, Esq.
 Lieut. Henry Cuthbert Pulley, 12th Pioneers.
 Lieut. Emile Charles Seconde, I.A.
 Capt. H. Emslie Smith, I.M.S.
 Eugene Toth, Esq.

Godfrey Francis Thorpe, Esq.
 David Robb Wallace, Esq.
 Lieut. Arthur Denhan White.
 Capt. J. R. White, D.S.O.
 Rev. Edward Carruthers Woodley.

ELLIOTT GOLD MEDAL AND CASH.

RECIPIENTS.

1893 Chandra Kanta Basu.
 1895 Yati Bhusana Bhaduri, M.A.
 1896 Jnan Saran Chakravarti, M.A.
 1897 Sarasi Lal Sarkar, M.A.
 1901 Sarasi Lal Sarkar, M.A.
 1904 { Sarasi Lal Sarkar, M.A.
 { Surendra Nath Maitra, M.A.
 1907 Akshoyakumar Mazumder.
 1911 { Jitendra Nath Rakshit.
 { Jatindra Mohan Datta.
 1913 { Rasik Lal Datta.
 { Saradakanta Ganguly.
 { Nagendra Chandra Nag.
 { Nilratan Dhar.

BARCLAY MEMORIAL MEDAL.

RECIPIENTS.

1901 E. Ernest Green, Esq.
 1903 Major Ronald Ross, F.R.C.S., C.B., C.I.E., F.R.S., I.M.S.
 (retired).
 1905 Lieut.-Colonel D. D. Cunningham, F.R.S., C.I.E.,
 I.M.S. (retired).
 1907 Lieut.-Colonel Alfred William Alcock, M.B., LL.D.,
 C.I.E., F.R.S.
 1909 Lieut.-Colonel David Prain, M.A., M.B., LL.D.,
 F.R.S., I.M.S. (retired).
 1911 Dr. Karl Diener.
 1913 Major William Glen Liston, M.D., C.I.E., I.M.S.
 1915 J. S. Gamble, Esq., C.I.E., M.A., F.R.S.

[APPENDIX.]

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENTS
OF THE
ASIATIC SOCIETY OF BENGAL
FOR
THE YEAR 1915.

1915.

STATEMENT

Asiatic Society

Dr.

TO ESTABLISHMENT.

	Rs.	As.	P.	Rs.	As.	P.
Salaries	6,929	11	3			
Do. (Officer in charge for Researches in History, Religion, Ethnology and Folk- lore in Bengal)	3,600	0	0			
Commission	540	14	5			
Pension	180	0	0			
Grain Allowance	123	9	9			
				11,374	3	5

TO CONTINGENCIES.

Stationery... ..	162	10	0			
Taxes	1,495	0	0			
Postage	594	6	9			
Freight	21	4	6			
Auditing	150	0	0			
Light and Fans	156	4	11			
Insurance	343	12	0			
Petty Repairs	7	0	0			
Miscellaneous	318	9	5			
				3,248	15	7

TO LIBRARY AND COLLECTIONS.

Books	1,931	11	10			
Binding	939	13	6			
				2,871	9	4

TO PUBLICATION.

Journal and Proceedings and Memoirs ...	5,391	4	3			
Do. do. (Anthropology) ...	1,940	0	9			
To printing charges of Circulars, etc. ...	381	2	0			
				7,712	7	0
Government Allowances				9,600	0	0
Furniture				286	0	0
Repairs				224	12	0
Anthropological Instruments				86	4	0
Loan (Dr. Tessitori's travelling expenses for 1914) ...				698	13	0
To Personal Account (write-off and miscellaneous) ...				465	7	6

TO EXTRAORDINARY EXPENDITURE.

Royal Society's Scientific Catalogue				786	1	9
Balance				1,93,987	4	8
				2,31,842	7	6
TOTAL Rs.						

No. 1.
of Bengal.

1915.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Report				1,96,630	4	3

BY CASH RECEIPTS.

Interest on Investments				7,360	15	5
Rent of Rooms				250	0	0
Publications sold for cash				104	0	0
Allowance from Government of Bengal for the publication of papers on Anthropological and cognate subjects				2,000	0	0
Do. do. Chief Commissioner of Assam				1,000	0	0
Do. do. Government of Bengal for Researches in History, Religion, Ethnology, and Folklore in Bengal				7,200	0	0
Printing and Books				2,113	8	9
Miscellaneous				129	5	1
				20,157	13	3

BY EXTRAORDINARY RECEIPT.

Subscription to Royal Society's Scientific Catalogue					1,080	0	0
---	--	--	--	--	-------	---	---

BY PERSONAL ACCOUNT.

Members' subscription				10,446	0	0
Admission fees				736	0	0
Subscription to Journal and Proceedings and Memoirs				1,848	0	0
Sales on credit				433	5	0
Miscellaneous				11	1	0
				13,474	6	0

TOTAL Rs.				2,31,342	7	6
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E. & O. E.

R. D. MEHTA,

Hon. Treasurer.

Calcutta, 31st December, 1915.

STATEMENT
1915. Oriental Publication Fund, No. 1, in

Dr.

TO CASH EXPENDITURE.

	Rs.	As.	P.		Rs.	As.	P.
Salaries	1,987	3	2				
Grain allowance	23	5	9				
Printing	9,458	5	0				
Commission	55	3	4				
Postage	117	9	3				
Contingencies	47	7	0				
Editing	1,521	8	0				
Insurance	35	0	0				
Stationery	2	8	0				
Light and Fans	30	6	8				
Copying charges for MS.	44	0	0				
Freight	9	13	6				
					13,332	5	8
To Personal Account (write-off and miscellaneous)						162	4
Balance						2,300	3
TOTAL Rs.					15,794	13	6

STATEMENT
1915. Oriental Publication Fund, No. 2, in

Dr.

TO CASH EXPENDITURE.

					Rs.	As.	P.
Printing charges					995	10	0
Balance					5,109	3	0
TOTAL Rs.					6,104	13	0

No. 2.

Acct. with the Asiatic Soc. of Bengal. 1915.

Cr

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Report	3,035	9	3

BY CASH RECEIPTS.

Government Allowance	...	...	9,000	0	0	
Publications sold for cash	...	...	485	15	9	
Advances recovered	402	0	9		
			<hr/>			9,888	0 6

BY PERSONAL ACCOUNT.

Sales on credit	2,871	3	9
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TOTAL Rs.	...	<hr/>			15,794	13 6
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E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

No. 3.

Acct. with the Asiatic Soc. of Bengal. 1915.

Cr.

	Rs.	As.	P.
By Balance from last Report	...	...	...
	3,104	13	0

BY CASH RECEIPTS.

Government Allowance	3,000	0	0	
TOTAL Rs.	...	<hr/>			6,104	13 0

E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

STATEMENT
1915. Oriental Publication Fund, No. 3, in

Dr.

TO CASH EXPENDITURE.				Rs. As. P.
Printing charges	...	...	...	310 11 0
Balance	...	...	...	1,544 8 6
TOTAL Rs.				1,855 3 6

STATEMENT
1915. Sanskrit Manuscript Fund in Acct.

Dr.

TO CASH EXPENDITURE.				Rs. As. P.	Rs. As. P.
Salaries	...	...	...	1,598 13 6	
Contingencies	...	...	...	11 2 3	
Grain allowance	...	...	...	13 5 9	
Stationery	...	...	...	8 8 0	
Purchase of Manuscripts	...	...	...	100 0 0	
Insurance	...	...	...	125 0 0	
Light and Fans	...	...	...	30 5 11	
Bonus	...	...	...	210 0 0	
Balance				2,097 3 5	
TOTAL Rs.				5,708 3 7	7,805 7 0

No. 4.

Acct. with the Asiatic Soc. of Bengal. 1915.

Cr.

	Rs.	As.	P.
By Balance from last Report	1,855	3	6

TOTAL Rs.	1,855	3	6
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E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

No. 5.

with the Asiatic Society of Bengal. 1915.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Report				4,570	3	0

BY CASH RECEIPTS.

Government Allowance	3,200	0	0			
Publications sold for cash	8	0	0			
Advances recovered	2	4	0			
				3,210	4	0

BY PERSONAL ACCOUNT.

Sales on credit				25	0	0
TOTAL Rs.				7,805 7 0		

E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

STATEMENT

1915. Arabic and Persian MSS. Fund in

Dr.

TO CASH EXPENDITURE.

	Rs.	As.	P.		Rs.	As.	P.
Travelling charges	327	3	6				
Salaries	3,169	11	10				
Contingencies	16	8	9				
Stationery	4	8	0				
Insurance	31	4	0				
Binding	61	12	0				
Grain allowance	14	0	0				
Postage	0	8	0				
Printing	25	2	0				
					3,650	10	1
Balance					5,298	8	6
					<u>8,949</u>	<u>2</u>	<u>7</u>
TOTAL Rs.							

STATEMENT

1915. Bardic Chronicle MSS. Fund in

Dr.

TO CASH EXPENDITURE.

	Rs.	As.	P.		Rs.	As.	P.
Salary	6,500	0	0				
Travelling	698	13	0				
					7,198	13	0
Balance					1,666	10	9
					<u>8,865</u>	<u>7</u>	<u>9</u>
TOTAL Rs							

No. 6.

Acct. with the Asiatic Soc. of Bengal. 1915.

Cr.

By Balance from last Report	Rs. As. P. 3,949 2 7

BY CASH RECEIPT.

Government Allowance	5,000 0 0
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TOTAL Rs.	8,949 2 7

E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

No. 7.

Acct. with the Asiatic Soc. of Bengal. 1915.

Cr.

By Balance from last Report	...	...	Rs. As. P. 2,166 10 9

BY CASH RECEIPTS.

Government Allowance	...	...	6,000 0 0
Loan (from Asiatic Society)	...	...	698 13 0
			6,698 13 0

TOTAL Rs.	...	...	8,865 7 9

E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

STATEMENT

1915. Anthropological Funds in Account

Dr.

		TO CASH EXPENDITURE.					
		Rs.	As.	P.	Rs.	As.	P.
Journal and Proceedings and Memoirs	...	1,940	0	9			
Books	... ..	173	8	0	2,113	8	9
	Balance				886	7	3
TOTAL Rs.					3,000	0	0

STATEMENT

1915. Bureau of Information in Account

Dr.

		TO CASH EXPENDITURE.					
		Rs.	As.	P.	Rs.	As.	P.
Salary	... ..				3,600	0	0
	Balance				3,000	0	0
TOTAL Rs.					6,600	0	0

STATEMENT

1915. Barclay Memorial Fund in Account

Dr.

		Rs. As. P.			Rs. As. P.		
To Balance				537	9	6
TOTAL Rs.					537	9	6

No. 8.

with the Asiatic Society of Bengal. 1915.

Cr.

BY CASH RECEIPTS.		Rs. As. P.	Rs. As. P.
Bengal Government allowance	... ..	2,000 0 0	
Assam	.. ..	1,000 0 0	3,000 0 0
TOTAL Rs.		...	<u>3,000 0 0</u>

E. & O. E.

R. D. MEHTA, *Hon. Treasurer*

No. 9.

with the Asiatic Society of Bengal. 1915.

Cr.

BY CASH RECEIPTS.		Rs. As. P.	Rs. As. P.
Government allowance	6,600 0 0
TOTAL Rs.		...	<u>6,600 0 0</u>

E. & O. E.

R. D. MEHTA, *Hon. Treasurer.*

No. 10.

with the Asiatic Society of Bengal. 1915.

Cr.

	Rs. As. P.	Rs. As. P.
By Balance as per Alliance Bank of Simla, Ltd., Calcutta, Pass Book dated the 31st December 1915, as detailed below—		
3½% G. P. note (Face value)	Rs. 500 0 0	
Interest	.. .. 87 9 6	
		<u>537 9 6</u>
TOTAL Rs.	...	<u>537 9 6</u>

E. & O. E.

R. D. MEHTA, *Hon. Treasurer.*

STATEMENT

1915.

Personal

Dr.

To Balance from last Report	...	...	Rs. As. P.	Rs. As. P.
				6,132 6 3

TO CASH EXPENDITURE.

Advances for purchase of manuscripts, etc.	...	384 6 3
To Asiatic Society	...	13,474 6 0
„ Oriental Publication Fund, No. 1	...	2,871 3 9
„ Sanskrit MSS. Fund	...	25 0 0
		<u>16,755 0 0</u>

TOTAL Rs.	..	<u>22,887 6 3</u>
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STATEMENT

1915.

Invest

Dr.

			Face Value.			Cost.		
			Rs.	As.	P.	Rs.	As.	P.
To Balance from last Report	2,48,700	0	0	2,45,563	8	10
„ Purchase	...	...	10,100	0	0	10,100	0	0
„ 3½ % G.P. Notes	...	...	500	0	0	500	0	0
			<u>2,59,300</u>	<u>0</u>	<u>0</u>	<u>2,56,163</u>	<u>8</u>	<u>10</u>

FUNDS.	PERMANENT RESERVE.						TEMPORARY RESERVE.						Total Cost		
	Face Value.			Cost.			Value.			Cost.					
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Asiatic Society	1,66,200	0	0	1,64,885	0	8	44,200	0	0	42,395	13	2	2,07,281	0	10
Building Fund	47,000	0	0	46,982	12	0	...	...	...	...	...	...	46,982	12	0
Trust Fund	1,400	0	0	1,399	8	0	...	...	...	...	...	...	1,399	8	0
Barclay Memorial Fund	500	0	0	500	0	0	...	...	...	...	...	...	500	0	0
TOTAL Rs.	2,15,100	0	0	2,13,767	11	8	44,200	0	0	42,395	13	2	2,56,163	8	10

No. 11.

Account.

1915.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Cash Receipts					16,055	7 0
„ Asiatic Society					465	7 6
„ Oriental Publication Fund, No. 1					162	4 6

By Balance.	Due to the Society.			Due by the Society.		
	Rs.	As.	P.	Rs.	As.	P.
Members ...	5,404	9	0	59	3	3
Employés ...	30	0	0	100	0	0
Oriental Publication Fund, No. 1 ...	432	0	0	...	...	...
Sanskrit MSS. Fund ...	300	0	0	...	...	...
Miscellaneous ...	228	9	6	31	12	0
	6,395	2	6	190	15	3
					6,204	3 3
				TOTAL Rs.	22,887	6 3

E. & O. E.

R. D. MEHTA,

Hon. Treasurer.

Calcutta, 31st December, 1915.

No. 12.

ment.

1915.

Cr.

	Face Value.			Cost.		
	Rs.	As.	P.	Rs.	As.	P.
By Balance	2,59,300	0	0	2,56,163	8	10
TOTAL Rs.	2,59,300	0	0	2,56,163	8	10

E. & O. E.

R. D. MEHTA,

Hon. Treasurer.

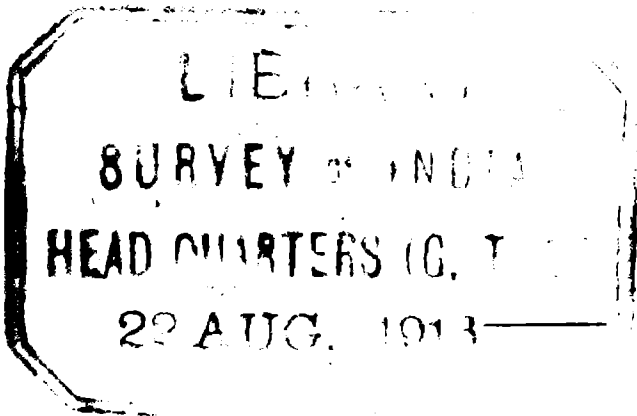
Calcutta, 31st December, 1915.

STATEMENT

1915.

Trust

Dr.		Rs. As. P.	Rs. As. P.
To Pension	...	52 0 0	
„ Commission for realising interest	...	0 4 0	
		<hr/>	52 4 0
Balance	...	...	<hr/>1,469 15 10
TOTAL Rs.	...	...	<hr/><hr/>1,522 3 10



STATEMENT

1915.

Building

Dr.		Rs. As. P.
TO CASH EXPENDITURE.		
To Commission for realising interest	...	3 6 0
Balance	...	<hr/> 46,982 12 0
TOTAL Rs.	...	<hr/> <hr/> 46,986 2 0

No. 13

Fund.

1915.

				Cr.		
				Rs.	As.	P.
By Balance from last Report	...	...	...	1,473	3	10
Interest	...	...	...	49	0	0
TOTAL Rs.				1,522 3 10		

E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

No. 14.

Fund.

1915.

				Cr.		
				Rs.	As.	P.
By Balance from last Report	...	...	...	45,586	2	0
BY CASH RECEIPTS.						
Interest	...	...	...	1,400	0	0
TOTAL Rs.				46,986 2 0		

E. & O. E.

R. D. MEHTA,

Calcutta, 31st December, 1915.

Hon. Treasurer.

STATEMENT

1915.

Cash

Dr.

				Rs.	As.	P.
To Balance from last Report	...	...	...	10,675	5	1

RECEIPTS.

				Rs.	As.	P.
To Asiatic Society	...	...	...	21,237	13	3
„ Oriental Publication Fund, No. 1	...	...	...	9,888	0	6
„ Do. do. No. 2	...	...	...	3,000	0	0
„ Sanskrit Manuscripts Fund	...	...	...	3,210	4	0
„ Arabic and Persian Fund	...	...	...	5,000	0	0
„ Bardic Chronicle MSS. Fund	...	...	...	6,698	13	0
„ Personal Account	...	...	...	16,055	7	0
„ Trust Fund	...	...	...	49	0	0
„ Building Fund	...	...	...	1,400	0	0
„ Barclay Memorial Fund	...	...	...	537	9	6
„ Anthropological Fund	...	...	...	3,000	0	0
„ Bureau of Information	...	...	...	6,600	0	0
				<hr/>		
				76,676	15	3
				<hr/>		
TOTAL Rs.	...	...	...	87,352	4	4

STATEMENT

1915.

Balance

LIABILITIES.

				Rs.	As.	P.	Rs.	As.	P.
Asiatic Society	...	...	...	1,93,987	4	8			
Oriental Publication Fund, No. 1	...	...	...	2,300	3	4			
Do. do. No. 2	...	...	...	5,109	3	0			
Do. do. No. 3	...	...	...	1,544	8	6			
Sanskrit MSS. Fund	...	...	...	5,708	3	7			
Arabic and Persian MSS. Fund	...	...	...	5,298	8	6			
Bardic Chronicle MSS. Fund	...	...	...	1,666	10	9			
Trust Fund	...	...	...	1,469	15	10			
Building Fund	...	...	...	46,982	12	0			
Anthropological Fund	...	...	...	886	7	3			
Bureau of Information	...	...	...	3,000	0	0			
Barclay Memorial Fund	...	...	...	537	9	6			
				<hr/>			2,68,491	6	11
				<hr/>					
TOTAL Rs.	...	...	...	2,68,491	6	11			

We have examined the above Balance Sheet and the appended detailed Accounts with the books and vouchers presented to us, and certify that it is in accordance herewith, correctly setting forth the position of the Society as at 31st December, 1915.

CALCUTTA,
21st March, 1916.

MEUGENS, KING & CO.,
Chartered Accountants.

No. 15.

Account.

1915.

Cr.

				EXPENDITURE.					
				Rs.	As.	P.	Rs.	As.	P.
By Asiatic Society	...	...	...	36,889	11	4			
„ Oriental Publication Fund, No. 1	...	...	...	13,332	5	8			
„ Do. do. No. 2	...	...	...	995	10	0			
„ Do. do. No. 3	...	...	...	310	11	0			
„ Sanskrit MSS. Fund	...	...	...	2,097	3	5			
„ Arabic and Persian Fund	...	...	...	3,650	10	1			
„ Bardic Chronicle MSS. Fund	...	...	...	7,198	13	0			
„ Personal Account	...	...	...	384	6	3			
„ Investment	...	...	...	10,600	0	0			
„ Trust Fund	...	...	...	52	4	0			
„ Building Fund	...	...	...	3	6	0			
„ Anthropological Fund	...	...	...	2,113	8	9			
„ Bureau of Information	...	...	...	3,600	0	0			
							81,228	9	6
Balance	...	...	...				6,123	10	10
							<hr/>		
				TOTAL Rs.		...	87,352	4	4
							<hr/>		

E. & O. E.

Calcutta, 31st December, 1915.

R. D. MEHTA, Hon. Treasurer.

No. 16.

Sheet.

1915.

ASSETS.

				Rs.	As.	P.	Rs.	As.	P.
Personal Account	...	...	...	6,204	3	3			
* Investment	...	...	...	2,56,163	8	10			
Cash Account	...	...	...	6,123	10	10			
							2,68,491	6	11
							<hr/>		

* The Government Pro Notes in the Bank of Bengal's Safe Custody and the Cashier's Security Deposit, Rs. 500.

TOTAL Rs.

2,68,491 6 11

E. & O. E.

Calcutta, 31st December, 1915.

R. D. MEHTA, Hon. Treasurer.

Liabilities up to 31st December, 1915.

FUNDS.				Rs.	As.	P.
Asiatic Society	...	...	...	4,660	11	3
Oriental Publication Fund, No. 1 (For printing and editing)			...	2,485	3	0
Do. do. No. 2 (For printing)			...	442	10	0
Do. do. No. 3 (For printing)			...	333	11	0
Sanskrit MSS. Fund	...	...	...	1,209	8	0
TOTAL Rs.				9,131	11	3

**The Third Indian Science Congress, Lucknow,
January, 1916.**

The Third Indian Science Congress was held in Lucknow on January 13th, 14th and 15th, 1916, under the presidency of Colonel Sir Sidney Burrard, K.C.S.I., R.E., F.R.S. The meetings were attended by over 300 members and visitors, and some 70 papers were communicated, abstracts of which are given below. A special feature of the Congress was the popularity of the three evening lectures delivered respectively by Dr. E. P. Hankin, Dr. J. C. Bose, C.I.E., C.S.I., and Professor Neogi.

His Honour Sir James Meston, Lieutenant-Governor of the United Provinces, was present at the opening Meeting and welcomed the visitors in the following speech :—

“Sir Sidney Burrard, Ladies and Gentlemen,—It is my pleasant duty to welcome the Science Congress to Lucknow, to offer you such hospitality as may lie in our power, and to do anything and everything that we citizens of Lucknow can accomplish to help you to enjoy your stay in our city. That is the only message that I have for the Congress this morning. I should not on such an occasion presume to address you on any subject in which the Congress is interested, even if I had the capacity to do so, which I have not. For to those of us who, like myself, date from the old bad days of education, when a Greek aorist was of greater value than all the marvels of nature, it is not given to do more than penetrate the outer courts of the tabernacle; to do more than to gaze with the admiration and envy of ignorance upon the worshippers within. But not even our most profound ignorance can blind any of us to the great work which scientific research is doing and has done for this country. There is no one of us who is in any way associated with the work of government in India who fails to recognize the supreme importance of adequate scientific advice and assistance in the problems which face him day by day. We sometimes may ask impossibilities of science. Many of you perhaps remember how a bumptious cross-examiner once tackled Lord Kelvin upon a subject in which he was the greatest master in the world, and perhaps you will remember his reply. “My dear Sir,” he said, “you might as well ask me the distance between London and Wednesday week.” That is the type, I fear, of the conundrums which we occasionally press upon our scientific advisers, and I can only ask them to treat such foolish questionings as evidence of our pathetic belief in their wisdom. For we do, ladies and

gentlemen, we do want your advice in every problem that comes before us. We want it most insistently on all the great questions of industrial advance, which are of high importance to India at this particular juncture of her history. We want your advice and help in questions of public health, in dealing with disease and in ameliorating the physical condition of the people. We want your psychology in what is possibly the most important and greatest of all our problems, the problem of education, and we want your help very particularly in the task of increasing the agricultural productivity of our land. In every one of these problems we have to thank science for the timely help that it has already given us.

It would probably be uncongenial to them if I attempted to express the indebtedness of this province to some of my own colleagues, such as Major Sprawson in his investigations in tubercular disease, or Mr. Leake in his enquiries into the cotton plant. I may, however, be permitted to express the indebtedness which we owe in this province to one institution that lies outside our borders, the great Research Institute at Pusa, worthily represented here to-day, which has laid its indelible mark of beneficence upon the welfare of our rural millions.

And now, ladies and gentlemen, I will not stand for another moment between you and the joys of the presidential address. I beg you once again respectfully to accept our greetings in Lucknow, our gratitude that you have selected it as your meeting place this year, and our hope that when your work is over, you will carry away some pleasant recollections of our fair city."

PRESIDENTIAL ADDRESS

THE PLAINS OF NORTHERN INDIA AND THEIR RELATIONSHIP TO THE HIMALAYA MOUNTAINS.

By COLONEL SIR SIDNEY G. BURRARD, *K.C.S.I., R.E.,
F.R.S., President of the Congress.*

Plates A and B.

When I learnt that the Committee of the Indian Science Congress had honoured me by electing me the President for the year and by asking me to give an address to this meeting, I decided to invite the attention of the Congress to the unsolved problems surrounding the formation of mountains. The scientific world is now divided into numerous branches of specialists following their own roads, but the study of mountains belongs to no specialist branch; it is not a road, but a junction of many roads, and geologists and astronomers, physicists and mathematicians, geographers and geodesists all meet at that junction for discussion. I have approached the question from the roads of geography and geodesy, and I

will tell you the lessons I have learnt; I do not, however, ask you to believe that the problems are solved. for although I may be led to place certain geographical and geodetic conclusions before you, I realize that no solution will be satisfactory, unless it proves acceptable to geologists, physicists and mathematicians.

You may think it peculiar that I should be speaking about mountains at a place where only flat plains are to be seen, but I may remind you that to the north of these plains stand the greatest mountains of the Earth, and one of the most interesting of the problems under consideration is, what is the relationship of these plains to those mountains.

This is an outline map of the United Provinces; you will see that these Provinces have three geographical divisions; there is the Himalayan area to the north, there are the level plains in the centre, and there is the ancient table-land on the south.

These great plains in the centre have been formed of loose sediment brought down by the Ganges, Gogra and other rivers: a borehole was sunk at Lucknow 1,500 feet deep, but no rock bottom was reached.

This is a section across the United Provinces. If you compare the rocky area lying to the south of the plains with that lying to the north, you will find on the south a massive table-land; the geologists have shown that this table-land belongs to a very remote past. The mountains on the north are totally different; here the rocks have undergone continued compression, elevation, and disturbance throughout the tertiary period, and our earthquakes prove that these movements of the Earth's crust in the north of the United Provinces have not yet ceased.

I ask you to consider how does this ancient table-land join on to these younger mountains that are always suffering from movements in the crust? If we could dig out from the Gangetic trough all the silt deposited by the Himalayan rivers, what kind of rocky junction should we find under Lucknow?

THE CONTRACTION THEORY.

A hundred years ago the accepted idea was that mountain ranges were due to the upward pressure of liquid lava and that their elevation had been caused by volcanic forces. But when geologists began to study the structure of rocks, they found that mountains had suffered from great horizontal compression which was evident from the folding of strata. This discovery led to the idea that mountains had been elevated not by vertical forces, but by horizontal forces which squeezed the rock upward. The wrinkling of the Earth's crust into mountains by horizontal forces was explained by the cooling of the

Earth: this is the well-known Contraction theory illustrated in this diagram ; the Earth's interior is held to cool and to contract, and the outer crust is supposed to get too large for the shrinking core and to wrinkle.

About 1860 the observations of the plumb-line in these Provinces brought to light a most important and totally unexpected fact, namely that the Himalaya were not exercising an attraction at all commensurate with their bulk.

This instrument is a plumb-line. It is a simple weight suspended on a string, and it hangs under the influence of the attraction of the Earth which pulls it downwards: you know from mechanics, that if one force pulls this weight vertically and if another force pulls it horizontally, the weight will hang in a resultant direction inclined to the vertical. Sixty years ago the question had to be considered, how will a weight hang near the foot of the Himalaya: here there will be two forces; the Earth's mass will be pulling the weight vertically, and the mass of the Himalaya will pull it horizontally. You may think that the mass of the Himalaya is very small compared with that of the Earth; that is true, but we can measure by the stars very small angles of latitude and longitude, and the question was, Will the Himalaya deflect the plumb-line sufficiently to affect the observations of the Survey?

The plumb-line was observed at Kaliana, a village near Muzaffarnagar in the United Provinces, 60 miles from the foot of the mountains: the observers found that the Himalaya were exercising no appreciable attraction. Archdeacon Pratt, the mathematician, then calculated from the known dimensions of the Himalaya mass the attraction that the Himalaya should exercise. Geographical exploration has taught us more about the dimensions of the Himalaya and Tibet than Pratt knew, and Major Crosthwait has now revised his actual figures. By the theory of gravitation the plumb-line ought to be deflected at Kaliana 58 seconds towards the hills; it is not deflected at all. It hangs vertically. This discovery was the first contribution made by geodesy to the study of mountains. The discovery was this, that the Himalaya behaved as if they had no mass, as if they were an empty eggshell; they seemed to be made of rock, and yet they exercised no more attraction than air. From the Kaliana observations Pratt deduced his famous theory of mountain compensation: he explained the Kaliana mystery by assuming that the rocks underlying the mountains must be lighter and less dense than those underlying plains and oceans. The visible mountain masses, he said, are compensated by deficiencies of rock underneath them. This is the theory of Mountain Compensation.

The compensation of the Himalaya is not believed now to be exactly complete and perfect: they seem to be compensated to the extent of about 80 per cent; their total resultant mass is

thus about $\frac{1}{5}$ th only of their visible mass standing above sea-level. The discovery of mountain compensation struck a blow at all theories which attributed the elevation of mountains to any additional masses that had been pushed in from the sides. The elevation of mountains by subterranean lava squeezed in from the side had to be rejected because it gave to mountains additional mass; the wrinkling of the Earth's surface by lateral horizontal forces had to be rejected because it gave to mountains additional mass pushed in from the sides. As the Himalaya possess only $\frac{1}{5}$ th of their apparent visible mass, I am led to suggest that the principal cause of their elevation has been the vertical expansion of the rocks underlying them, vertical expansion due to physical or chemical change. The name of Pratt and the name of Kaliaua have now permanent places in the history of science, and in this city of the United Provinces it is only right that I should recall to you that the great theory of mountain compensation, since found true in every continent, had its origin in the United Provinces, and that its author lies buried in these Provinces at Ghazipur.

You will understand from this diagram that if the Earth's interior shrinks and if the outer crust is squeezed up into wrinkles like this, the mountains must possess much additional mass: the theory of compensation forbids such additional mass.

The contraction theory was gradually becoming discredited under the attacks of Fisher, Dutton and others, and it seemed some years ago to be moribund, when it was given a fresh lease of life by the publication and translation into several languages of Professor Suess's great work, *The Face of the Earth*. This work is a critical history of all past geographical, geological and geodetic research; the wealth of its detail, the courtesy of its criticisms have won for Suess's work universal admiration.

But from the geodetic point of view it is disappointing; it accepts the contraction theory in its entirety, and it rejects the theory of Mountain Compensation. Suess does not obscure the issue, as some writers do, by the indefinite adoption of contradictory theories; being quite clear in his own mind he is quite clear to his readers. He states that he does not believe in the compensation of mountains by underlying deficiencies of mass. Now the compensation theory has been found to be true in India, Europe and America: nowhere do mountains attract the plumb-line as the law of gravitation would lead us to expect. So you see that the geodesists are sharply opposed to the school of Suess. Now what is Suess's reason for rejecting the theory of mountain compensation? It is this: he states quite clearly, "mountain compensation is inconsistent with all geological observations." Whilst I admit that mountain compensation is inconsistent with certain geological

theories, I do not believe that it is inconsistent with geological observations.

If the Himalaya had the uncompensated mass which they appear to have, and which the school of geologists who follow Suess ascribes to them, they would attract the waters of the Indian Ocean over India; the plains of Northern India would be a great sea; this sea would be 300 feet deep above Allaha-bad, 400 feet deep above Lucknow and Gorakhpur, and 800 feet deep above Pilibhit and Bahraich. Fortunately those mountains have not the power of attracting the Indian Ocean.

MOUNTAIN FLOTATION AND ISOSTASY.

But if the theory of compensation has suffered at the hands of its opponents, it has suffered also from its friends. Pratt's theory of compensation has been stretched into a theory of flotation: an iceberg floats, because ice is lighter than water; an iceberg is compensated in the water by its relative deficiency of density; Sir George Airy, the Astronomer Royal, suggested that mountains were compensated because they were floating upon a heavy subterranean magma. Pratt never went as far as this; he merely said, "the mountains are compensated." Airy went further; he said, "the mountains are floating." Distinguished geologists, Fisher, Dutton, Oldham, have developed the idea of flotation.

The theory of flotation lays down that the mountains are supported in their present positions by hydrostatic pressure, just as an iceberg floats upon water. I have no time to discuss this theory at length, but I should like to point out to you that if an iceberg floats upon water, its weight must be compensated by underlying deficiencies of density: the theory of flotation does not state this with regard to mountains; it states the converse, viz., that as mountains are compensated they must be floating. The principle of hydrostatic pressure demands that if any mass is floating it must be compensated; it does not, however, follow that if a mass is compensated it must be floating. The theory of flotation is based upon the assumption that the compensation of mountains is complete and perfect; but we have not found complete compensation in India: the outer Himalaya are compensated to the extent of 80 per cent. An iceberg would not float, unless its compensation were exactly complete; the fact that mountain compensation is nowhere quite complete or perfect is a serious argument against flotation. This imperfection of compensation differentiates rock from water: it denotes rigidity. What I have been calling the theory of flotation is frequently called the theory of Isostasy. I have however purposely avoided using the word *Isostasy*, as its exact meaning is open to question. *Isostasy* is a condition of approximate equili-

brium, not perfect equilibrium like the condition of flotation. Isostasy is a condition of compensation in a solid crust; it does not necessarily imply hydrostatic support, as flotation does. I therefore hesitate to apply the word Isostasy to the Flotation theory; for Isostasy can exist without flotation.¹

MOUNTAINS ORIGINATE AT GREAT DEPTHS.

A very important work has been that of Mr. Hayford who has recently discussed the results of the plumb-line at a large number of stations in America. He has confirmed Pratt. Hayford has investigated the depth to which the deficiency of density underlying mountains goes down, and he has found that that depth is between 60 and 90 miles. That is to say, he has shown that the depth of subterranean compensation is very great compared with the height of mountains. The discovery that mountains originate from the great depth of 60 to 90 miles is the second important contribution of geodesy to this study; the first was compensation, the second is great depth.

Most books are written on the assumption that mountains are surface wrinkles and that their structure can be determined by examining surface rocks.

The Satpura range runs east and west south of the Narbada; the plateaux of Hazaribagh and Chota Nagpore are the eastward continuation of the Satpura range. A high authority has stated that the Hazaribagh and Chota Nagpore plateaux can have no real connection with the Satpura range, because they are formed of different rocks. But if we regard this range as rising from a depth of 75 miles, its elevation will be seen to be due to a deep-seated cause that has nothing to do with the surface rocks. One deep-seated cause has lifted up this range from the Narbada to Hazaribagh irrespective of the kind of rocks lying on the surface.

THE GANGETIC TROUGH.

I have now discussed the two principal theories of Himalayan elevation, the Contraction theory and the Flotation theory. Let us consider for one moment how this deep Gangetic trough is explained by these two theories. For a great number of years the Contraction theory ignored this trough; it was, I think, Professor Suess who first recognised that the trough had to be fitted into the Contraction theory. His explanation of it was this: as the Earth's interior contracts, the surface of Asia is wrinkled, the wrinkles get pushed south-

¹ The idea of flotation has arisen because the question of mountain-support has been given precedence of the question of mountain-elevation. Questions of support and maintenance should be subsidiary to questions of formation and origin. If mountains are due to the vertical expansion of rock, a theory of flotation is superfluous.

wards against the Indian table-land, and the rock surface of Northern India gets compressed into a downward bend between the mountains and the table-land. This explanation is not satisfactory: if the surface of Asia is being pushed southwards in wrinkles against the table-land, it is difficult to understand how it is that a deep trough borders the table-land. Why should the solid crust be bent downwards by a horizontal pressure from the north: if the crust is being pushed against this table-land, it should be heaped up all round it.

The explanation of the Gangetic trough that is supplied by the Flotation theory is this: the Earth's crust is likened to a floating raft: the more weight you place upon a raft, the deeper it sinks into water. The Ganges and Jumna and other rivers are continually depositing fresh sediment upon these plains, and the crust according to this theory continually sinks downwards by the weight of the sediment. When we see the massive rocks of Kaimur and Mirzapur supported easily by the crust, it is difficult to believe that it cannot support a thin layer of silt without yielding.

You will see from this chart, that the Ganges and Indus have filled up their trough with silt, but that the Tigris and Euphrates are behindhand; the Persian Gulf is an unfilled trough which will be filled in time.

Here is a chart of Japan, showing the Tuscarora deep, a long submarine trough; it is over 24,000 feet deep, and it is continued to the north-east by further troughs lying in front of the Kuriles and Aleutian Islands, and attaining depths of 28,000 feet. How then can it be argued that the Ganges trough has been created by the weight of its own silt, when we see that the Euphrates trough and the Japanese trough are unfilled. These troughs exist before the silt comes to them. The idea that the weight of silt causes subsidence arose, I think, from the fact that the places where silt is being deposited are frequently found to be subsiding. But the truth may be this: a river carries its silt to the lowest hole in the crust it can find; the lowest holes near continents are those where the crust is subsiding; rivers thus deposit their loads in places of crustal subsidence, but their loads do not cause the subsidence.

SOUTHERLY DEFLECTIONS PREVAIL OVER THE GANGES PLAINS.

Now let me tell you of the third discovery due to this plumb-line. The Survey found that at 60 miles from the hills this plumb-line hung vertically, and Pratt deduced the Theory of Mountain Compensation. But when the Survey began to extend their operations, a new phenomenon came to light, which caused great surprise. All over the United Provinces at distances exceeding 70 miles from the hills, this plumb-line

was found to hang decisively away from the mountains ; at Fyzabad, Cawnpore, Benares, the plumb-line is deflected southwards : here at Lucknow it is deflected 9" to the south. If the Himalaya were simply compensated, this plumb-line should be hanging at Lucknow exactly vertical ; if the mountains were not compensated, it should be deflected here about 50" towards the north. But it is deflected 9" towards the south. The observers were astonished to find that at places in sight of Himalayan peaks the plumb-line turned away from the mountain mass ; that at Amritsar in sight of the Dhauladhar snows it was deflected towards the low Punjab plains ; that at Multan in sight of the Takht-i-Suleiman mountains it was deflected towards the desert ; at Bombay it was deflected seawards away from the Western Ghats ; on the east coast of India it was deflected seawards away from the Eastern Ghats (Plate A).

The new lesson to be learnt from the plumb-line is this : a hidden subterranean channel of deficient density must be skirting the mountains of India. Here in North India is a wide zone of deficient density, of crustal attenuation ; it is the presence of this zone of deficiency that accounts for the southerly deflection of the plumb-line. What is the meaning of this zone ? How has it come into existence ?

If you look at this section (Plate B) the Earth's crust in these outer Himalaya has been compressed laterally : of this there is no doubt. The area between the snowy range and the foothills is a zone of crustal compression. And I suggest for your consideration that the Gangetic trough, this zone of deficiency, is a zone of tension in the crust. The crust has been stretched here and attenuated. Here you have a compression, and alongside is the tension. The tension is the complement of the compression. I have pointed out that the Himalaya mountains are largely, but not completely compensated by their underlying deficiencies of density : their compensation is however rendered complete by the presence of the Ganges trough ; if the Himalayan compression and the Gangetic tension are considered together, it will be found that there is no extra mass.

Geodesy thus teaches that the Gangetic trough and the Himalaya Mountains are parts of one whole. The Contraction theory and the Flotation theory both treat the Gangetic trough as though it were a secondary effect of Himalayan elevation. But this Gangetic trough may have been the first and the decisive event ; the Himalaya Mountains may have been a secondary effect, a sequel to the opening of the trough.

HYPOTHESIS OF A RIFT.

I showed you on the evidence of the plumb-line that the Gangetic trough was a zone of crustal attenuation, a zone in

which the Earth's crust was deficient in density. I then took one step forward and suggested that it was a zone of tension. I will now take another step forward and suggest to you that there has occurred an actual opening in the sub-crust, and that the outer crust has fallen in owing to the failure of its foundation: I suggest that the Ganges plains cover a great rift in the Earth's crust.

The Earth is a cooling globe; an increase of temperature occurs as we descend into mines; and this temperature gradient is a proof that the Earth is losing heat by conduction outwards. The discovery of radium has not affected the argument.

The smaller bodies of the solar system, the Moon and other satellites seem to be cold; the Earth has a cold exterior and a hot interior; the larger planets are believed still to display heated surfaces, whilst the Sun is still a globe of fire. The inferences are warranted that all the bodies of the solar system were hot at one time, and that the smaller have lost their heat. So I say that the Earth is a cooling body. The rock composing the crust and sub-crust is however a bad conductor, and the interior of the Earth will not shrink away from its crust, as has been assumed in the Contraction theory. The inner core of the Earth is in fact not losing heat appreciably. The outer shell was the first to lose its heat, then the shell below it, and the sub-crust is now losing its heat more quickly than the interior core. As the outer shells contract from cooling, they become too small for the core, and they crack. Supposing we had here a great globe of rock, red-hot throughout; how would it cool? Can you imagine it cooling in such a way that the core became too small for the outer shell, and the outer shell became wrinkled? No; the outer shell would cool first, and would crack.

The outer shell of the Earth was the first to crack millions of years ago: now a lower shell, the sub-crustal shell, is cracking. When a crack occurs in the sub-crust, parts of the upper crust fall in.

You will see that this Indus-Ganges trough has the appearance of a crack. And there are reasons for believing that these Himalaya have been split off from this ancient table-land and have been moved northwards and crumpled up into mountains. This Assam plateau is stated by geologists to resemble in its structure and rocks the Indian table-land; Assam has been split off and moved away.

Here are the Bengal coal-fields, and just opposite on the other side of the trough are the Sikkim coal-fields; and the coal in the two places is similar. The rocks of the outer Himalaya have been very much crushed, but they still bear a resemblance to the rocks of the Vindhyan table-land.

Here are the Arravalli mountains which end now at the

Delhi ridge; Mr. Middlemiss has found signs of a transverse strike in the Himalaya on a continuation of the Arravalli alignment.

Similarity also exists between the rocks in Cutch and those on the other side of the Indus in the hills of Sind.

FROM THE BAY OF BENGAL TO THE MEDITERRANEAN.

Geologists have discovered that the ancient table-land of the Vindhya and Deccan is a remnant of a much greater table-land that in very early ages included Africa and Arabia. Africa and Arabia and the Deccan table-land are in fact fragments of one extensive and ancient continent. Hitherto I have been considering the peculiar trough that skirts the northern edge of the Indian table-land. Let us now consider whether this trough is continued to the east or to the west.

On the east we find one of the great linear deeps off the coast of Java and Sumatra. It is 24,000 feet deep. In 1883 the Krakatoa eruption took place in the Sunda Straits. Great depths have also been discovered off the Nicobar Islands and earthquakes have occurred on the Chittagong coast. In continuation of the Gangetic trough we thus find in the Bay of Bengal a line of seismic activity, and of submarine deeps.

To the west of Karachi we see the Persian Gulf, and the plains of the Tigris-Euphrates. The plains of the Tigris-Euphrates are very similar to those of the Ganges: they consist of mud, sand and sediment lying in a long trough between the ancient table-land of Arabia and the mountains of Persia.

Further west we find the Euphrates trough is continued by the Mediterranean Sea, and the Mediterranean is bounded on the north by the Taurus mountains, by the Balkans, Carpathians, Apennines and Alps.

Throughout the whole distance from Calcutta to Sicily we see that the old table-land India-Arabia-Africa is bounded on the north by a long trough, and that this trough is in its turn bounded by the younger mountain ranges from the Himalaya to the Alps. Geologists have discovered that all these mountain ranges were elevated in the same era; they are all of the same age.

I submit for your consideration that the Ganges-Indus-Euphrates-Mediterranean trough is an indication at the Earth's surface of a rift in the sub-crust.

When we get as far west as Sicily, we reach a region of active volcanoes, Etna and Stromboli. Italian Geologists believe that Sicily has been separated from Africa by recent subsidences.

THE EARTHQUAKE RECORD.

The whole zone from Java to Sicily has been visited by earthquakes throughout the historic period. And the recent

earthquakes in Shillong, Dharmasala and Messina show that seismic activity is continuing in our time. This is in fact one of the zones of the Earth, along which earthquakes occur most frequently.

In the last 300 years 64 destructive earthquakes are known to have occurred in India¹: there may have been others of which there is now no record. Of the 64 violent Indian Earthquakes 58 have occurred along the Indus-Ganges zone. These may be grouped as follows:—

Assam-Bengal.	20
Outer Himalayas	11
Northern Punjab and Kashmir	17
Southern margin of Gangetic plain	4
Cutch and Sind	6
Total	58

If we consider the whole zone from Bengal to Sicily, we find from Milne's catalogue that the numbers of destructive earthquakes since 1615 can be grouped as follows:—

India	58
Mesopotamia and Syria	28
Eastern Mediterranean	116
Italy	482

In the last 300 years a destructive earthquake has occurred in Northern India on an average once in every 5 or 6 years.

FROM LOB NOR TO THE BLACK SEA.

Let us now glance to the north of the long mountain zone that extends from China to France. You will see north of Tibet there is the large inland basin of Lob Nor; then here are the low-lying plains of the Oxus; then come the Caspian and Black Seas. Now all four of these depressions are believed to be subsidences of the Earth's crust. South of the line of mountains we see a long continuous trough: north of the line of mountains we find not a continuous trough, but a series of separate depressions. Now these depressions are separated from one another by fragments of mountain ranges which once ran parallel to the Himalayan-Alpine trends. Here you see the Pamirs. The high Pamir plateau consists of parallel ranges running east and west. The eastern and western continuations of the Pamir ranges seem to have foundered into the abyss, those on the east have fallen into Lob Nor, those on the west into the Oxus depression.

¹ Milne's Catalogue of Destructive Earthquakes.

Here again you will see that one of the chains of the Caucasus has foundered into the Caspian, and the western extensions of the Caucasus have fallen into the Black Sea.

Why are these mountain ranges collapsing? May it not be that the Earth's crust is cracking and these mountains are falling into the rifts?

THE BOMBAY COAST.

I must now invite your attention to the Bombay Coast. From the Tapti to Cape Comorin runs the range of mountains known as the Western Ghats. This range is parallel to the coast of India and about 40 miles inland; it rises suddenly with a steep scarp. The strata are almost as horizontal as when first laid down; they have never been compressed or folded.

The Survey has observed the plumb-line at different points along this coast; it is always deflected strongly towards the sea. To the west of Bombay and Mangalore there is the deep sea; and to the east there is a massive range over 4,000 feet high: yet the plumb-line will hang seawards. If the Western Ghats possessed the mass which they appear to possess and which the Suess school ascribes to them, then the Bombay plumb-line should be deflected 15 seconds towards them. If on the other hand the Western Ghats are compensated by deficiencies of mass underlying them in accordance with the compensation theories of Pratt and Hayford, then the plumb-line should hang vertically at Bombay. But the plumb-line takes neither of these courses: it hangs towards the sea. We have been puzzled for years by the plumb-line at Bombay; we used to think that the rock under the ocean must be so dense and heavy, that it was able to pull the plumb-lines towards the sea. Major Cowie, however, observed in the south of Kathiawar, and found that the plumb-line here had a strong landward deflection. The seaward deflections occur throughout the Bombay coast but not round Kathiawar. It is only quite recently that we have realized we have here at Bombay the same phenomenon as at Lucknow.

In Northern India the plumb-line will persist in hanging away from the visible mountains and at Bombay it takes the same course, and when I consider its constant seaward deflection I can only suggest to you, that there must be, between Bombay and the Western Ghats, a zone of subterranean deficiency, a zone of fracture and subsidence like that of the Gangetic plains.

The secret is hidden below the Earth's crust: you will see that the Ghats have been forced (possibly by underground fracture) into a decided curve just above Bombay harbour; it is significant that at this curve the Deccan Trap rises to its highest point, Kalsubai.

I suggest to you that a crack in the sub-crust has extended from Cape Comorin to Cambay, and that as this crack has occurred the Western Ghats have been elevated. The crack has been filled by masses of fallen rock and by alluvial deposits brought down by rivers.

Geologists have shown that this range consists, from latitude 20° to 16° , of the lavas of the Deccan, comparatively recent rocks, whilst from latitude 16° to 8° the range consists of ancient metamorphic rocks. The rocks of the northern part of the range are of a different age and structure and origin from the southern.

Nevertheless geodesists contend that this is one and the same range: the rocks composing it have had nothing to do with its elevation. The Western Ghats have been elevated after the Deccan lavas had become solidified into surface rocks. Their elevation has taken place in the Tertiary age.

Now I will turn to the Eastern Ghats (Plate A); at Madras and at Vizagapatam we find the plumb-line hanging towards the sea. Here we have the same phenomenon as we witnessed at Lucknow and at Bombay, the plumb-line turns away from the mountains. I will not repeat myself, but I suggest again that this coastal zone, like the western, covers a sub-crustal crack.

I told you just now that in the last 300 years there had been 64 destructive earthquakes in India: of these 58 had occurred along the Indus-Ganges trough. Where did the remaining six take place? Three of them occurred on the Bombay-Surat coast; the other three on the Madras coast. No destructive earthquakes are recorded as having occurred at Hyderabad, or at Bangalore, or at Nagpore.

The ancient table-land of India is in the shape of a triangle, but its two wings, Assam and Cutch, have been severed from the main body: this may have been due to the coast-line cracks.

Assam-Bengal has had 20 destructive earthquakes in the last 300 years, and though only 6 have been recorded in Cutch and Sind, yet this western fragment of the table-land is of seismic region. In 1819 Bhuj was destroyed and every town in Cutch was injured; numerous fissures were seen throughout the land. North of Sindhi a drop 16 feet deep and 50 miles long suddenly appeared on the plains which had hitherto been as level as the sea. On account of its sudden appearance across the old bed of the Indus it was named by the inhabitants the Allah Bund, and by this name it is now known in geography. It was due to the subsidence of a large area to the south.

Many of the destructive earthquakes of Sind have not been recorded in history, but the ruins of strong buildings with human bones buried below them are evidence of sudden destruction by earthquake.

THE DEPTH OF THE GANGETIC RIFT.

I have been describing zones of deficiency and have suggested that they are cracks in the sub-crust. I have now the task of discussing the possible depths of these cracks.

By the depth of the Gangetic rift I do not mean merely the depth of the loose sediment: I do not mean the depth at which solid rock is first met with. If a rift has extended to a considerable depth, it may in its lower portion have become filled by solid rock that has fallen in from the sides, or by volcanic eruptions. Even if the Ganges sediment continues down to a depth of some miles, it may itself become consolidated by pressure and heat.

I define the depth of the rift as follows: it is that depth at which the rocks under the Ganges plains are similar to rocks at the same depth under the table-land. There may be a solid floor to the Gangetic trough at a depth of 6 miles under Gorakhpur, but if the rocks which are deeper than 6 miles under Gorakhpur are different from and lighter than the rocks of the same depth under the Vindhyan plateau, the solid floor is not the bottom of the rift. When a crack occurs, volcanic eruptions are to be expected, and although there are no volcanic cones rising now from the trough of the Ganges, there probably were at one time. Dr. Pilgrim has discovered that there was great volcanic activity in the Persian Gulf at one time and that the islands now existing in the Gulf are isolated volcanic peaks. There exists also an old volcanic region in the Syrian desert between Baghdad and Damascus.

In considering the depth of the Gangetic rift we must appeal firstly to geodesy, and then to seismology. Now geodesy tells us that the compensation of the Himalaya (*i.e.*, the root of the Himalaya) extends downwards to a great depth: Mr. Hayford estimates 75 miles. We do not contend, and Mr. Hayford does not contend, that this value of depth is proved. The depth may be 60 miles: it is I think of that order. Geodesy says that the depth is great. I regard the Gangetic Plains and the Himalayan range to be the two parts of one whole; I believe that they have originated together, and if the depth of Himalayan compensation extends down to 60 miles, then I think that the Gangetic rift may extend down to that depth also.

Now let us turn to seismology: seismologists are able to form rough estimates of the depths of earthquakes. The earthquakes that visit Northern India seem generally to be most violent at places in the outer hills, such as Dharmasala, Katmandu, Shillong. But the line of fracture that occurs in the sub-crust at an earthquake may not be vertically under the place which suffers most. If for example a fracture in the sub-crust occurred at 60 miles depth under Gorakhpur, the

hills to the north might be raised, and this elevation, though a secondary effect, might do more damage at Katmandu than the earthquake itself could do at Gorakhpur, which is protected by some miles of soft blanket of sediment underneath. In the Dharmasala earthquake Middlemiss estimated its depth to be between 12 and 40 miles. Middlemiss's maximum value is not very different from the geodetic value.

It is an interesting question to consider whether a fissure in rocks could extend downwards to a great depth. From a place near the Indus in Kashmir it is possible to see a continuous wall of rock 4 miles in height, on the flank of Nanga Parbat. Mount Everest stands erect $5\frac{1}{2}$ miles above sea-level; its summit stands firm and rigid 11 miles above the depths of the Bay of Bengal. We have therefore evidence that the materials of the crust are strong enough to admit of the continued existence of great differences in altitude.

But Mount Everest is standing in air, whereas a crack in the sub-crust becomes filled with rocks falling in and with fluid rock magma from below; and the walls of the crack thus get a support that Mount Everest does not possess. It seems to me quite possible that a crack such as I have described may have extended down to a depth of 60 miles by successive fractures at increasing depths, the opening being filled by falling material.

INTERNAL CAUSES OF MOUNTAIN ELEVATION.

I have shown you how zones of subsidence in the crust are bordered by mountains, and I have now to discuss the relationship of subsidence to elevation, of troughs to mountains. The Red Sea is a zone of fracture, and it is bordered on each side by a zone of elevation. But along the Bombay coast the zone of subsidence is bordered only on the one side by a zone of elevation. The sub-crustal crack from Surat to Cape Comorin has been accompanied by a vertical uplift of the Ghats, and I suggest for your consideration that the vertical force which elevated the Ghats was the expansion of the underlying rock due to physical or chemical change.

Mr. Hayden informs me that the specific gravity of the rock composing the Neilgherries varies from 2.67 to 3.03, that is 14 per cent, and that the rock of the Hazaribagh plateau varies from 2.5 to 3.1, 24 per cent.

The Western Ghats appear to have risen about 4000 feet. Now we know that the Western Ghats are largely compensated by underlying deficiency of density: if the compensation of the Western Ghats extends downwards to a depth of 60 miles, then an expansion of two per cent would be more than sufficient to account for the elevation of the Ghats. Mr. Hayden finds variations of 14 and of 24 per cent in the densities of

surface rocks, and yet an expansion of only two per cent would account for both the elevation and the compensation of the Ghats. Geodetic observations show that the compensation is not perfect, and that the Ghats contain an amount of rock in slight excess of the normal crust: the vertical expansion of rock must thus have been accompanied by a slight horizontal compression insufficient to fold the surface strata, but sufficient to account for the imperfection of the compensation.

The heterogeneous rocks composing the Earth's crust are continually undergoing changes of structure, known to geologists as metamorphism. At a depth of 30 miles the temperature is sufficiently high to melt all known rocks; but increase of pressure raises the melting point, and the increase of pressure underground may be sufficiently great to counteract the effects of the increase of temperature. So that at a depth of even 60 miles rocks may still be solid and rigid, as geodesy leads us to believe they are.

We have to imagine how deep-seated rocks, that have been buried for millions of years under high temperatures and enormous pressures, how they would behave, if a crack penetrating downwards from the Earth's surface reached and disturbed them. I suggest for your consideration that two cracks, opening one on the West Coast and one on the East Coast of India, have compressed the Indian Peninsula between them. This lateral pressure was insufficient to crumple the table-land; but may it not have been the exciting cause that led deep and ancient rocks to expand vertically and elevate the Deccan? Petrologists will be better able to discuss this question than I am.

The main ranges of the Himalaya are composed of granite; this granite has protruded upwards from below. I suggest that the protrusion of granite is due to expansion of rocks in the sub-crust. The great Himalayan range is 5 miles high; and the compensation of this range, that is, its underlying deficiency of density, is estimated to extend downwards to a depth of perhaps 75 miles. An underground expansion of 7 per cent would be sufficient to account for the elevation of the Himalaya.¹

Many of the faults which intersect the Himalaya may, I think, be ascribed to the shearing, which must have ensued when certain areas of the crust were forced vertically upwards by the metamorphism of sub-crustal rock. Many distortions of

¹ If underlying deficiency of mass is greater than the excess of mass in a mountain, the plumb-line will be deflected away from the mountain. Over-compensation would therefore account for deflections *away* from mountains. But it would not account for tension or subsidence in the fore-deep. Pendulum observations in the outer Himalaya and at Ootacamund indicate not over-compensation but imperfect compensation.

surface strata may be ascribed to local variations in the vertical expansion of deep-seated rocks.

EXTERNAL CAUSES OF MOUNTAIN ELEVATION.

The Western Ghats are as mountains very small compared to the great ranges that stretch from China to France; the former are an example of vertical elevation without any obvious horizontal compression of the surface; the latter exhibit both vertical elevation and considerable compression by lateral thrust. In the Western Ghats expansion of the subterranean rock seems to have uplifted the surface strata without disturbing the latter, in the Himalaya the subterranean rock has expanded to such an extent that it has burst through the surface rocks in the form of granite, and in its protrusions it has pushed aside the surface strata and helped to crumple the latter. The troughs skirting the Western and Eastern Ghats may have been caused by the mere cracking of the sub-crust from cooling. But the Indus-Ganges trough is so large, and the mountains to the north of it constitute so unique a protuberance that the idea arises that some external force must have pulled the Himalaya northwards from India, and must have torn into a great rent the original line of tension that had opened under the Ganges plains.

The Earth possesses a figure of equilibrium. If the Earth was at rest, its figure would be that of a perfect sphere: as it is rotating, the velocity of rotation has caused much extra rock to be heaped up round the equator: the diameter at the equator is 27 miles longer than the polar diameter.

Sir G. Darwin thought that the Earth's velocity of rotation was constantly being decreased by the Moon's attraction upon our oceans; he thought that the tides were tending to stop our rotation, just as the Earth's attraction has entirely stopped the Moon's rotation. If our rotation velocity is decreased, the figure of the Earth changes and becomes nearer and nearer to a sphere: water can flow from the equator to the poles at once, and the oceans can immediately assume the new form of surface suitable to the decreased rotation velocity. But a superfluity of rock would remain at the equator, and the straining of this towards the poles might cause cracks in the Earth's surface. I do not presume to say that this is the cause of the rent in the Earth's crust hidden below the Ganges plains. All I wish to point out is that these mountains appear, as if they had been pulled northwards out of the Ganges-Euphrates-Mediterranean rent, and I show you some reasons for believing that the Earth's figure may have undergone deformations. The astronomical cause of these deformations is hidden in the past history of the Earth. In the Permian era an ice age occurred in equatorial regions; if the Earth's

rotation velocity were to decrease considerably now, Southern India and equatorial Africa would stand out as rock protuberances high above the ocean, and would exhibit snow and glaciers.

Every year the Earth is bombarded by swarms of small meteors; is it not possible that at certain times in the distant past the Earth received larger meteoric masses than in the historic period, sufficiently large perhaps to upset the Earth's equilibrium by displacing its centre of gravity. Its figure would then be forced to undergo readjustments. If the Earth meets a swarm of meteors in space, and if some of them approach within its attraction, it seems possible that almost all the captured meteors may fall upon that hemisphere of the Earth which first meets the swarm, whilst the other hemisphere may receive very few. This would interfere with the Earth's balance.

Whilst something may occur in one age to cause movements of rock towards the pole, another cause may arise at a later date that will tend to oppose those movements. Not very long ago a great ice age occurred, and all Northern Europe and America were buried under ice: an immense volume of sea-water must then have been transferred from the equatorial oceans to the north pole: this may have disturbed the Earth's equilibrium and have displaced its centre of gravity.

In the same ice age the Himalaya and Tibet became capped with greater masses of snow and ice than they now carry. The glaciers that now end at 12,000 or 13,000 feet descended in the ice age to 5,000 feet. This increase in the weight of the Himalaya was an additional deformation of the Earth's figure of equilibrium.

I suggest to you that the great mountains from China to France have been due, firstly, to a line of fracture from Bengal to Sicily, and, secondly, to adjustments of the Earth's figure.

The Andes trend north and south; they are of the same age as the Himalaya. If the Earth's figure is undergoing deformation, and a rent is torn in the crust along an east to west line under the influence of forces seeking to restore equilibrium, it seems possible that secondary cracks might occur and that the Andes may be the result of one of them. The Andes are shown to scale on this chart: you will see that in length they are not very much less than the China to France ranges, but in breadth and mass they are relatively insignificant.

You will notice from this chart (8) the peculiar curve of the northern Tibetan border, concave on the east, convex on the west. This sinuous curve is reproduced in the north of Persia, and again in the Carpathians. The Persian ranges all have a trend from south-east to north-west except that the Caspian subsidence seems to have pushed rudely in from the

north and forced the northern range into a sinuous curve. It is significant that at the point of the Caspian push stands the peak of Demavend, the highest point in all Persia. *Elevation is the companion of subsidence.*¹ Similarly the Lob Nor subsidence appears to have squeezed Western Tibet into what resembles the neck of a bottle, and on the edge of this subsidence stand the highest peaks of the whole Pamir region. Just as the Deccan table-land was squeezed between the western and eastern coastal cracks, so has the Tibet table-land been squeezed between the cracks of Lob Nor and the Ganges.

The conclusions which I have ventured to submit to this meeting may be summarised as follows:—

(1) The fundamental cause of both elevation and subsidence is the occurrence of a crack in the sub-crust.

(2) Mountains are compensated by underlying deficiencies of matter.

(3) Mountains have risen out of the crust from a great depth, possibly 60 miles.

(4) Mountains owe their elevation mainly to the vertical expansion of subjacent rock.

I have now had the great privilege of placing certain problems before you. My endeavour has been to point out to this Congress, and especially to its younger members, the many scientific secrets that are lying hidden under the plains of Northern India.

ABSTRACTS OF PAPERS COMMUNICATED TO THE CONGRESS.

SECTION OF AGRICULTURE AND APPLIED SCIENCE.

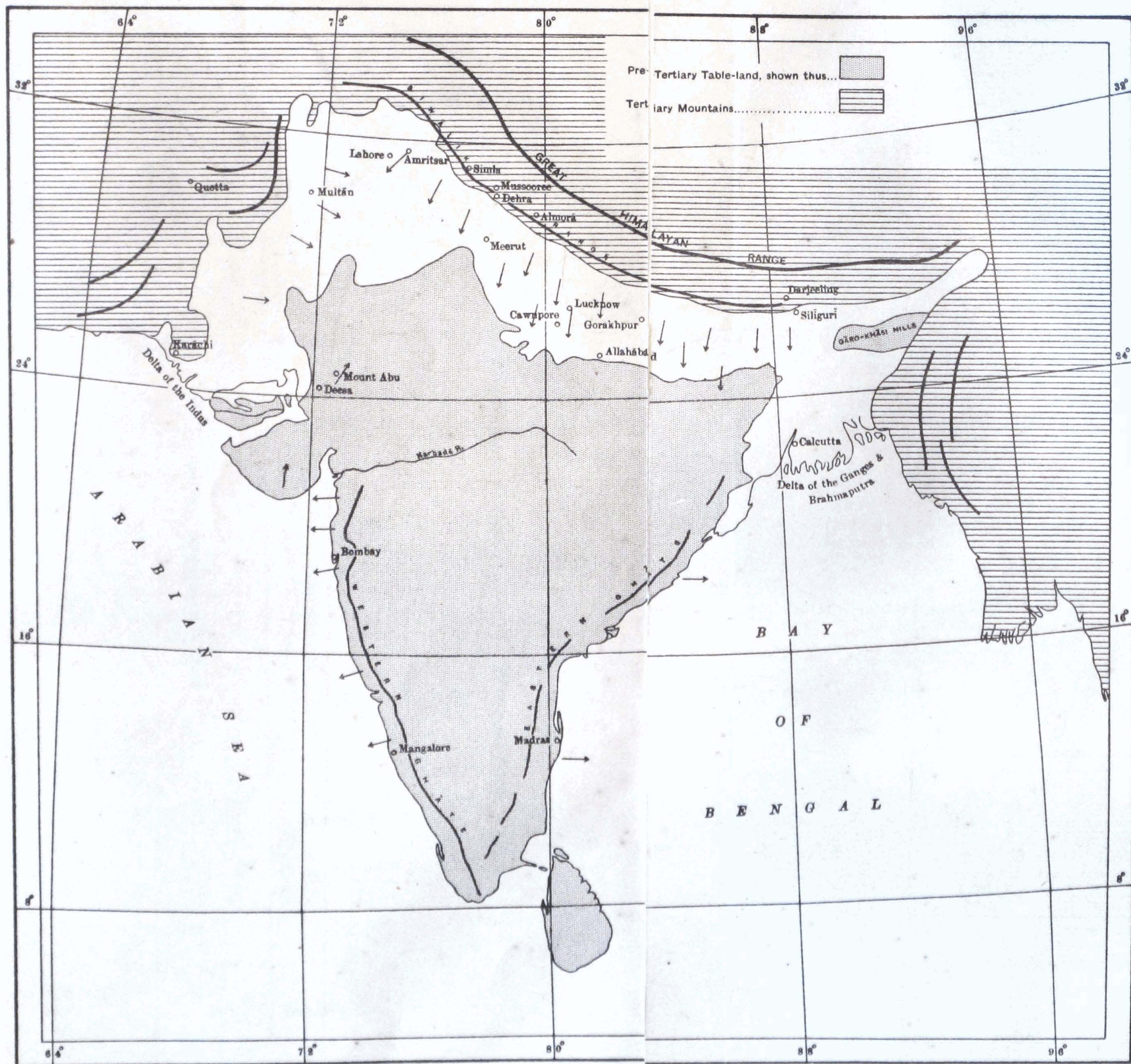
(*Chairman.*—MR. BERNARD COVENTRY, *C.I.E.*, *Agricultural Adviser to the Government of India and Director of the Pusa Agricultural Research Institute.*)

Education in its relation to Agriculture².—By BERNARD COVENTRY, *C.I.E.*

The population of British India comprises over 255 million souls. Of this vast multitude 80 per cent or over 200 millions, that is to say, 4 in every 5 are dependent on agriculture. Any educational system therefore which does not take into consideration the relationship it should bear to agriculture is likely to be at a disadvantage. Out of the whole population, 7½ millions or about 3 per cent are scholars, though 15 per cent or

¹ See "Sketch of the Geography and Geology of the Himalaya Mountains and Tibet," page 160. See also Records of the Survey of India, Vol. IV, page 3, "Note on the discovery of the peak of Namcha Barwa."

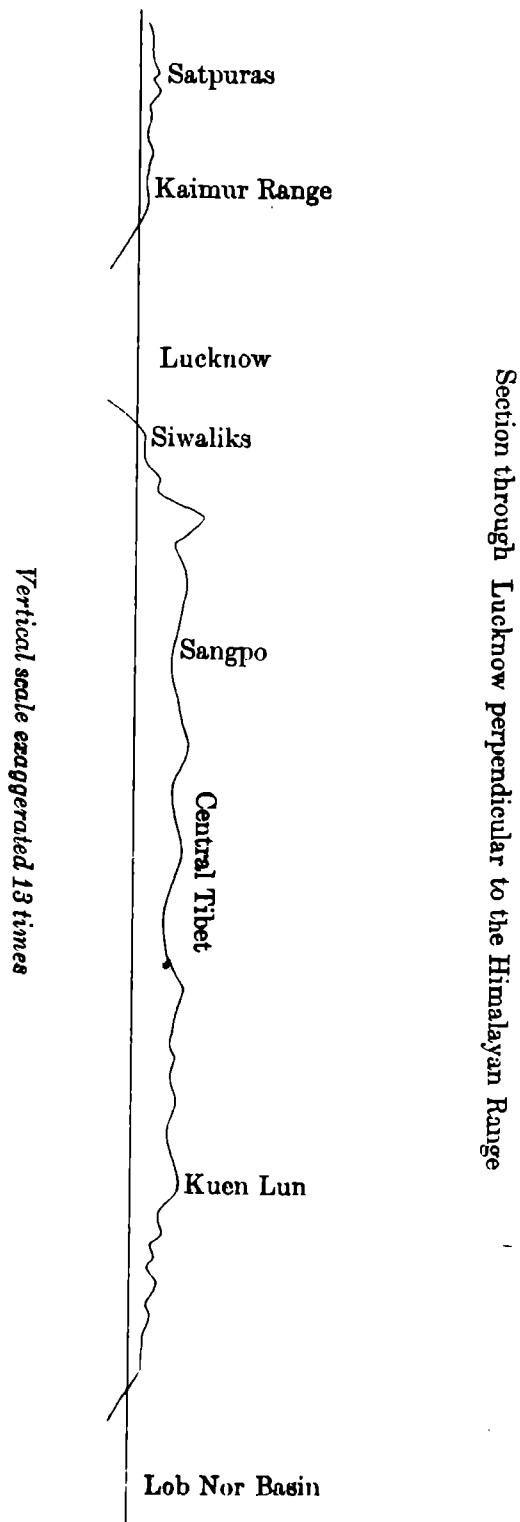
² This paper will be published *in extenso* in the Congress number of the Agricultural Journal of India.



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NOTE.

The arrows show the directions in which the plateaus are deflected.
The thick black lines show the principal mountain ranges.



36 millions are of the school-going age. Thus only 20 per cent of those of the school-going age receive any education at all. Of these 7½ million scholars, about 1 million proceed to secondary education and about 40,000 reach a University career.

In judging of these figures in relation to the agricultural industry it should be borne in mind that the percentage of scholars is much higher in the urban than in the rural areas and also that a very large number of rural scholars never get more than a mere smattering of the most elementary education; so that educational efficiency in rural areas is very much lower than the official returns of general education would indicate. Much has been done in recent years to improve our system of education, especially in its relation to agriculture, and the subject may be said to have received an unwonted measure of attention. In 1901 an important conference was held at Simla presided over by Lord Curzon which led to a complete overhauling of the existing educational machinery. A policy of reform was then started, the vitalizing influence of which is felt to this day. A department of education was created with a member of council in charge. Money grants were increased and they have still further increased, as a result of keen interest taken by the present Viceroy Lord Hardinge who has made education a special object of his attention. Thus the total expenditure which in 1901 was 4 crores, to-day is over 10 crores. The number of pupils in 1901 was 3½ millions, to-day it is 7½ millions.

Agricultural and rural education have had quite a fair share of attention, and the need which exists for connecting the teaching of the schools with our chief industry has been and still is fully recognized. But it cannot be said that these efforts have been crowned with the success one would have wished.

The occasion when agricultural education first seriously engaged the attention of Government and the people was in 1904, when the policy for improving the agricultural industry was started by Lord Curzon. At first it was the intention to restrict efforts to improving the industry itself, but later, influenced no doubt by the examples of advanced schemes abroad, the Government elaborated a policy under which not only research and experiment, but agricultural education proper, formed an important and integral part. Large sums of money were devoted to the erection of agricultural colleges in nearly all the Provinces. Syllabuses were prepared by the Board of Agriculture and the Colleges were empowered to grant a diploma of Licentiate of Agriculture. At first signs of success were not wanting. Candidates freely offered themselves for admission and there was found no difficulty in filling the colleges. However, as time rolled on, a decline in admissions became perceptible until the year 1913 when, in some colleges, the position became acute and the matter was brought up for consideration before the Board of Agriculture. The proceedings of the Board in that year indicate the general failure of the schemes drawn up in 1906 and 1908. The cause of this failure would appear to be explained in one of the resolutions which stated "that the general standard in the Matriculation or University Entrance Examination does not provide a sufficient basis to enable a student to take full advantage of the higher instruction obtainable in the existing agricultural colleges in India" and the Board recommended that a general higher education is necessary in all students admitted to such a course. In other words, it would appear that the standard of general education in the country was too low to afford suitable material with which to man colleges of such an advanced type as those which had been set up by the Agricultural Department. In fact the colleges as educational centres were ahead of the times—primary and secondary education was too backward. Consequently the Board suggested a compromise by lowering the standard of the college curriculum to meet existing conditions and expressed its approval of a two years' preliminary practical course, which had been prepared for the agricultural college at Coimbatore as an introduction to the more advanced course. Many of the colleges have

since adopted this, with the result that admissions have considerably increased. While the Department will benefit by an increase of recruits for filling its subordinate posts, it has yet to be seen how far the education of the cultivators will be influenced by the change. It is unlikely that these colleges as instruments for education will accomplish very much for the simple reason that they are ahead of the times and that there can be no real demand on the part of the youth of the country for an advanced agricultural course until considerable progress has been made in primary and secondary education and in the improvement of agricultural methods. Not until the industry is more highly developed and the standard of living has been raised, will there arise a demand for higher education amongst the agricultural classes.

The creation of agricultural colleges, however, is by no means the only effort that has been made to improve the education of our agricultural youth. Agricultural schools under the supervision of the Agricultural Department have been started in some provinces which were commended by the Board. They give considerable promise of success and deserve every encouragement. Also, there have been attempts in all provinces to set up a system of rural education by imparting instruction based upon the agricultural surroundings of the children, and endeavours have been made to use nature study as a means to that end.

But there is a form of education which is not included in those I have mentioned and is unknown in India. It is a form of education which has been adopted in certain parts of America and which has of late attracted a considerable amount of attention. It is applicable to the conditions existing in India and offers opportunities in which officers of the Agricultural and Educational Departments could profitably combine to make the problem of education of the masses easier and more efficient.

Ten years ago great interest had arisen in the upraising of the Southern States whose industrial and educational conditions had fallen very much behind those of the Northern States. Conditions in the Southern States resemble in many particulars those which obtain in rural India. About 80 per cent of the population is agricultural, depending for its livelihood almost entirely on the produce of the soil. There was great backwardness in both educational and industrial progress. Unfavourable economic conditions existed which were mainly the result of rural poverty. While the average annual earnings of agriculturists in the Northern States were more than 1,000 dollars, those in the Southern States were as low as 150 dollars. Under the auspices of the General Education Board an enquiry was set on foot to study the educational conditions in the Southern States and to devise the ways and means for improving them. Surveys were planned State by State, Conferences were held, Monographs were prepared, dealing with the various points on the organization of education. The conclusions which resulted from this enquiry are peculiar. To quote from the Report¹ it "convinced the Board that no fund, however large, could, by direct gifts, contribute a system of public schools; that even if it were possible to develop a system of public schools by private gifts, it would be a positive disservice. The public school must represent community ideals, community initiative, and community support, even to the point of sacrifice." The Board therefore resolved that assistance should be given not by foisting upon the Southern States a programme of education from outside, but by aiding them and co-operating with them in educating themselves. When, however, it proceeded to apply these principles it was faced with the following initial difficulties. They found the people had not enough money, "that adequate development could not take place until the available resources of the people were greatly enlarged. School systems could not be given to them, and they were not prosperous

¹ General Education Board, an account of its activities 1902-1914. 61, Broadway, New York.

enough to support them." "Salaries were too low to support a teaching profession. Competent professional training could not exist; satisfactory equipment could not be provided." The Board therefore came to the conclusion that it could render no substantial educational service until the farmers could provide themselves with larger incomes, and consequently they resolved that it was necessary first to improve the agriculture of the Southern States. Now mark what followed. The Board was first advised to address itself to the rising generation and to support the teaching of agriculture in the common schools. But after thoughtful consideration this plan was rejected. They found that in the absence of trained teachers, the effort was impracticable; moreover, there were no funds with which to pay such teachers, and the instruction itself would not materially contribute to its own support. Finally, it was impossible to force intelligent agricultural instruction upon schools whose patrons were not themselves alive to the deficiencies of their own agricultural methods.

"It was therefore deliberately decided to undertake the agricultural education not of the future farmer, but of the present farmer, on the theory that, if he could be substantially helped, he would gladly support better schools in more and more liberal fashion." As a result of this enquiry a movement known as the Co-operative Farm Demonstration was set up. A year was spent in discovering the most effective methods of teaching improved agricultural methods to adult farmers. Dr. Seaman Knapp of the United States Department of Agriculture was engaged to show farmers how to improve their agricultural methods and raise the standard of their industry. It was not long before successful results were obtained. Under improved treatment it may be roughly stated that the crop yields were doubled. Thus in 1909 the average yield in pounds of seed cotton was 503.6 per acre: on demonstration farms the average was 906.1 pounds; in 1910 the figures were 512.1 and 858.9 respectively: in 1911, 624.6 and 1081.8; and in 1912, 579.6 and 1054.8.

In the growing of corn similar results were obtained. In 1909 the ordinary average yield was 16.7 bushels per acre, while on the demonstration farms it was 31.7 bushels per acre. In 1910, 19.3 and 35.3, in 1911, 15.8 and 33.2 and in 1912, 19.6 and 35.4. It is further stated that the poorer the season, the more clearly did the demonstration methods prove their superiority. The work was also studied from the standpoint of the farmer's financial profit. "In Alabama, for example, in 1912, the average yield of lint cotton was 173 pounds per acre; but demonstration acres averaged 428.3 pounds. Demonstration methods, therefore, netted the farmer 255.3 pounds per acre. At the average price of 65 dollars a bale for lint and seed, the farmer made an extra 33 dollars per acre: as there were 8,221 acres under cultivation on the demonstration methods, the total gain was 271,000 dollars. In the same year 7,402 acres were under cultivation in demonstration corn. Demonstration acres averaged 26.9 bushels more per acre than the general average for the State. The demonstration farmers of the State pocketed 139,379.66 in consequence." This was of course in one State alone. These methods have not been restricted to cotton and corn, but have been applied to a very large number of crops and the propaganda is not limited to cultural methods, but is applied equally to the improvement in farm equipment, more comfortable houses, better barns, stronger teams, better implements and cleaner and healthier surroundings. Hence it is claimed that the beneficent results of this work are not limited to financial profit and cannot entirely be measured by money. Characteristic examples of the relief which the new system brought are cited, but one example will suffice. In Mississippi 5 years ago the value of a certain farmer's produce was one dollar per acre and he was 800 dollars in debt. In 1909 his entire farm was worked under the Government method. He averaged 1,100 lb. of cotton against his neighbour's 300 to 400 lb. He made besides 500 bushels of corn and from one special demonstration acre realized 152 barrels of high class seed

which he sold for 300 dollars. His debts are now paid and he has cash in the bank. So much for the education of the adult farmer. We now come to the effect this movement has had on the education of youth. We are told that the initiation of demonstration work and the application of the principle of co-operation has resulted in the disappearance of the disorganization characteristic of rural life. Colleges of agriculture, farmers' institutes, agricultural high schools, "Boys' Corn Clubs," "Girls' Canning and Poultry Clubs" and the like have been brought into existence where practically none of these things existed before, and that the social and educational awakening of the rural South is recognized as being a bye-product of the demonstration movement. Statistics show that the provision for schools has steadily increased.

We have seen how the experiment has succeeded. Might we not with advantage apply the same principles to India? Might we not invite the co-operation of the Agricultural Department in a general scheme and policy of education? Is there any likelihood of success without this? Can we hope to give the youth of this country an adequate educational service unless we go to the root of things, like the Americans have done, and enlist and increase the activities of the Agricultural Department in enlarging the resources of the cultivator and thus build our educational system on the increased prosperity of the agricultural classes? India is in no better position than the Southern States were 10 years ago. The average earnings of individuals in the Southern States at that time were 150 dollars. In India, according to some authorities, under the most optimistic calculations, they are as low as Rs. 30 per head. This gives little or no scope for self-help. It therefore seems plain that under present conditions we cannot expect the country to supply itself with the means for an advanced system of education. Nor can Government be expected to do so, for Government's resources are limited and depend upon taxation and that in turn depends upon the ability of the people to be taxed. All Government can do is merely to touch the fringe of the problem and supply a modicum of education: it cannot afford to do more.

The question then is whether we can, in any way, make the principles which have been so successfully applied in America, applicable to India. My belief is that we can. We have practically the same conditions here as obtained in the Southern States 10 years ago. Already in the Provinces a great deal has been done by the Agricultural Department in the way of demonstration of the character described and utilized by the American Board of Education. But it does not go far enough. It, however, forms a nucleus on which to expand and might well be used as a beginning. The work is on the right lines. But we require to do more. We want more men, more money, wider organization, but above all, we require the recognition amongst all classes that in this work lies the germ of future progress. This is a point which is not generally recognized, or, if so, it is certainly not acted upon. While the money spent to-day on education is over 10 crores of rupees, that on agricultural development is only 50 lakhs. That shows that we have not yet got to view these two important problems in their right perspective, and do not fully realize the important relation which agriculture bears to education. Many think that the development of agriculture depends on education, and we gave effect to that view when we started our agricultural colleges. But would it not seem that the truth lies in the opposite direction and that in a backward country like India the advance of education is really dependent on the development of agriculture, and that the best form of education you can give to the rural classes under existing circumstances is demonstration in improved agricultural methods? To carry out the idea it is not necessary to bring our present educational policy to an end. Government must supply a modicum of literary teaching and this must continue, but it would be an immense improvement if the Agricultural Department were called in to co-operate and demonstration were given a large share in the general scheme of education.

We could not be expected at first to progress with the same degree of rapidity as in America, because we have to do a large amount of research and experiment before we can demonstrate improved methods on a large scale. In America the advanced stage in the agricultural development of the Northern States supplied ready at hand the stock-in-trade required for at once setting in motion the demonstration movement in the backward Southern States. We are not so forward. Still we have achieved enough with our small band of workers to show that the same kind of work can be done out here and that all we require is expansion. Given the means for this and a recognition of demonstration as an integral part of a general scheme of education, we shall, by such a policy, lay the best and securest foundations for the advancement of education as well as of the prosperity of the people.

The Correlation between Rainfall and the Succeeding Crops¹.—By S. M. JACOB, I.C.S.

The aim of the paper is to establish formulæ by which not only the area sown with each class of crop can be forecasted, but also what will be the yield of each crop at harvest per unit of area. In both cases the attempt is to determine what are the quantitative relations of crops and rainfall, and to make more definite what we already know as to the dependence of plants on moisture.

The first problem, the prediction of sowings, is very largely an economic problem, and the effect of changes in prices, cost of production and population must be taken into account. In the case taken in this paper, that of well-irrigated wheat, the first correction to be applied is one depending on the number of wells. When this has been done and the extent of sowings is calculated from the rainfall in August, September and October, it is found, as was to be expected, that sowings fall off with increased rainfall, and *vice versa*, and the extent of this falling off was determined. The correlation co-efficient obtained is .89, which is high enough for very accurate predictions. A diagram was exhibited showing for the last 30 years the concordance between the actual areas sown and the amount given by calculations.

The next step is the determination of yield, and in examining the effect of rainfall in February, for example, on unirrigated wheat, it is clear that the benefit the crop will derive in that month will depend on whether the rainfall in September, October, November, December and January has been good or not. If there has been an excess of rain in January, for instance, it is obvious that an excess of rain in February can do little good and may do harm. A numerical scheme was adopted, based on a method applied with success to the yield of cotton in Texas by Kincer. A good agreement of actual and calculated values for the failed areas of unirrigated wheat in the Punjab is obtained. The correspondence was exhibited in diagrams. The method is thus valuable in dealing with a very important practical problem.

Agricultural Engineering in the United Provinces.¹—By F. H. VICK.

The Relation between Soil Bacteria and Fertility.—By C. M. HUTCHINSON.

¹ This paper will be published *in extenso* in the Congress number of the Agricultural Journal of India.

Scientific Methods in Agricultural Experiments ¹.—By A. C. DOBBS.

Mr. Dobbs' paper on Scientific methods in Agricultural Experiments was a plea for the more scientific adaptation of field experiments in India to Indian conditions. Referring to the classical experiments at Rothamsted he pointed out fundamental differences between English and Indian manurial problems and mentioned that sulphur which is brought down by rain at Rothamsted in sufficient quantity for most crops, is apparently a limiting factor in crop production in Chota Nagpur—even so small a quantity as 10 lbs. per acre producing a phenomenal effect on groundnuts.

He drew attention to Hall and Mercer's work, published in 1911, on the probable error in field experiments, and suggested that it had received insufficient attention on the part of those designing experiments in India—with particular reference to the number of plots employed for comparison. By taking a sufficiently large number of plots, conclusive results had been obtained in the course of a single monsoon season, and in spite of unfavourable conditions, on the Farm opened at Ranchi in May 1915.

The Saving of Irrigation Water in Wheat Growing ².—By ALBERT HOWARD, C.I.E., and GABRIELLE L. C. HOWARD.

Although one of the main directions in which Indian agriculture can be improved is concerned with the proper use of irrigation water, little work has hitherto been attempted in this direction. Overwatering is the rule throughout the Continent, with the result that irrigated crops are particularly liable to drought on account of their limited root range. Even in arid tracts like Baluchistan, where water is scarce and land abundant, nothing is done by the cultivators to increase the duty of irrigation water. Advantage was therefore taken of the creation of the new Fruit Experiment Station at Quetta to initiate a series of water-saving experiments and to discover how far the well-known Utab results are applicable to local conditions.

It was found that irrigation water produces the heaviest yield of wheat and straw (*bhusa*) when applied to the land prior to sowing. A single preliminary irrigation, combined with the subsequent use of the lever harrow in crust breaking, gave an average yield of 17½ maunds of wheat to the acre. This works out at 4½ maunds more than the local average yielded by similar unmanured land with seven or eight irrigations. The real difference between the Experiment Station results and those obtained by the people can best be realized, however, by comparing the produce from the same amount of water. The Zamindars water one acre seven times and obtain an average of 13½ maunds of grain. The same amount of water spread over seven acres, if used according to the method employed at the Experiment Station, would give seven times 17½ or 124½ maunds of wheat. The difference in favour of the experiments is therefore 110½ maunds of wheat. If the average irrigated acreage of wheat in the Quetta valley is multiplied by 100, the result would indicate, in maunds of wheat per annum, the present annual waste of water on this crop alone. On every 100 acres of irrigated wheat, the water now lost would produce 10,000 maunds of grain and a large amount of straw of a total value not far short of half a lakh of rupees.

Dyes indigenous to India ¹.—By J. P. SRIVASTAVA.

¹ This paper will be published *in extenso* in the Congress number of the *Agricultural Journal of India*.

² This paper appeared in full in the *Agricultural Journal of India*, vol. XI, 1916, p. 14.

The Re-alignment of Agricultural Holdings ¹.—By B. C. BURT.

It was pointed out that from time to time attention has been drawn to the waste of water which the present haphazard system of village holdings causes, but that the larger aspect of the question of the necessity for re-striping the holdings has been less considered. While action has been taken on the great new canal systems in the Punjab to avoid small scattered holdings and irregular fields and certain executive action has been taken in the Poona district of the Bombay Presidency to square up the fields on the small, but important, canals used chiefly for sugarcane irrigation, little general action has been taken to remedy the present unsatisfactory position. The obstacles presented by existing systems of land tenure—no less than by village custom—were pointed out, but it was shown that economic benefits to be derived from the re-striping were such as to justify the necessary measures. It was shown that the greatest disadvantage of the present system is that it prevents any tract of land from being treated as a whole or general measures taken for its improvement, and that until radical measures are taken to re-align holdings, much waste of valuable irrigation water, manure and labour must take place. It was also shown that the present small scattered holdings present a serious obstacle to the correct cultivation of the land. Nowhere is the necessity for the re-striping of holdings more clearly seen than in the problems of checking erosion and effecting adequate drainage, which is so important in the plains of India if the land is to give its maximum yield. It was suggested that as drastic legislation will be necessary to permit of the re-striping of holdings, it is necessary to educate public opinion first and it was suggested that the first step would be the acquisition of a few villages in different parts of the province, where the necessary improvements would be carried out, after which the new holdings would be re-let to the original tenants. It is considered that an object lesson of this kind would soon convince the land-owning classes of the need for general measures and, pending legislation, some might be able to assist in carrying out partial schemes on their own estates.

Milk Standards of the United Provinces ¹.—By P. S. MACMAHON and P. C. MUKERJI.

Contains the results of over one thousand analyses carried out in 1914 of the milk of a number of cows and buffaloes from the Government Military Dairy, Lucknow.

The Necessity of New Butyro-Refractometric Standards.—By P. S. MACMAHON and B. M. GUPTA.

The paper shows that the value 54.0 used in Europe to discriminate preliminarily between genuine and adulterated samples of butter is too high for Indian *ghee*.

SECTION OF BOTANY.

(Chairman.—Dr. ALBERT HOWARD, *C.I.E.*, *Imperial Economic Botanist, Pusa.*)

¹ This paper will be published *in extenso* in the Congress number of the *Agricultural Journal of India*.

The Application of Botanical Science to Agriculture¹.—By
ALBERT HOWARD, C.I.E.

In the application of botanical science to crop production, difficulties arise of a somewhat similar nature to those which universally occur whenever the attempt is made to adapt scientific knowledge to practical ends. In the first place, the dangers of specialization have to be avoided and the investigator has to study the scientific aspect of botany in such a way as to combine within himself a well-balanced and accurate grasp of all the main branches of the subject—*anatomy, physiology and systematy*. In the second place, he has to devote himself to the study of agriculture as an art and to be able to understand the physiological aspects of agricultural operations. Both the scientific study of the plant in the laboratory and the practice of agriculture in the field must then be merged into a connected whole in the mind of the investigator. In this manner practical agriculture attains a new meaning and a new significance and the traditional knowledge of the Indian ryot is seen to consist of simple lessons in plant physiology learnt by experience during the ages.

The main directions in which botanical science can be applied to crop production are three—(1) improvements in the efficiency of the plant as a working machine, (2) the treatment of disease, and (3) the creation of improved varieties. The place of science and of practice in attacking such problems was discussed in detail and the conclusion was reached that in all such work science must be regarded as the instrument which in the hands of an investigator possessing real agricultural insight can be utilized in rapidly improving the production of the world's supply of food and of raw materials.

The Aquatic Reeds of the Godaveri and Pravara Canals; a
Study in Applied Ecology¹.—By W. BURNS.

Irritability of the Bladders in *Utricularia*¹.—By T. EKAMBARAM.

The present views concerning the presence of animalculæ, such as crustaceans, etc., inside the bladders of *Utricularia* is:—

(1) that they make their way in by pushing the elastic trap-door of the bladder:

(2) that the bladder is passive and does not make any effort to capture the animalculæ:

(3) that the animalculæ enter in because they expect to find food or protection inside.

The object of this paper is to show that the bladders are irritable and actively suck in the animalculæ when they irritate a particular set of hairs. The observations were made on a species of *Utricularia* very near *U. flexuosa* and differing from it in having either very rudimentary or no floaters at the base of the flower stalk.

Under natural conditions the bladders that entrap insects occur in two distinct states, viz., (a) nearly 75% with the walls convex and with the cavity inside filled with water or with water and air and (b) nearly 25% with the walls closely adpressed and biconcave and with practically very little cavity inside. This state is called the 'hungry' state. The valve or trap-door is normally transversely convex. The margin of the valve is tightly pressed up against the "collar" or ridge round the mouth. On the upper surface of the valve, very near its free tip are 4 to 6 long pointed hairs which extend towards the base. These are the irritable hairs. When the irritable hairs of the *hungry* bladders are irritated with

¹ This paper will be published *in extenso* in the Congress number of the Agricultural Journal of India.

a needle or a soft brush, the valve opens suddenly and the concave walls become convex creating a cavity inside which is filled with water sucked in through the open mouth. Immediately the valve falls back to its original position. If an organism is the cause of irritation, it is forcibly sucked in with the water. During reaction to irritation, the valve becomes concave and the irritable hairs are laid in the hollow of the boat thus formed.

Darwin did not succeed in making the bladders react to irritation, because he failed to recognize that the bladders are irritable only when they are in the hungry condition and do not react when they are full. Since those in the latter condition form the majority, it is presumed that he experimented on full bladders. The bladders in which the particles of glass and pieces of boxwood suddenly disappeared, should have been in the hungry condition (*Ref.* Darwin, *Insect . . . Plants*, p. 328). The full bladders may be made to assume the hungry condition artificially by pressing out the contents carefully with a pair of pincers 3 or 4 times, after which they will be found to react to irritation.

The relation between the structure and function of the different parts of the bladders is under investigation.

The Floating Plants of Lower Bengal and their Adaptations.—

By M. S. RAMASWAMI.

An ecological account of the plants composing the floating Phanerogamic vegetation of the stagnant fresh-water ponds of Lower Bengal was presented. Those collected and studied by the author have been classified into groups—the classification being based primarily on the degree of flotation and secondarily on the nature and functions of the flotative adaptations. Several interesting kinds were described in detail.

Besides giving a rather comprehensive list of the floating species, the author also described a few plants which though not hitherto known to be floating were nevertheless seen by him to be actually so. These he found to have developed certain structures ordinarily adapted to a floating habit. Such apparatus were also described and compared with the land forms of the same species.

Importance of Soil-Aeration in Forestry¹.—*By* R. S. HOLE.

This paper, which was illustrated by lantern slides, emphasized a point which has not yet attracted the attention it appears to deserve, viz., the damage that may be done to the seedlings of forest trees in India by insufficient soil-aeration when the physical condition of the soil is apparently suitable for growth, and when the soil, although moist, is far from being saturated with water. The results of experiments recently carried out at Dehra Dun were described dealing with the causes of the death and dying-back of Sal (*Shorea robusta*) seedlings. All the facts hitherto ascertained indicate that an injurious soil factor is chiefly responsible for the unsatisfactory development of Sal seedlings by causing high mortality during the rains, and subsequently a high percentage of deaths from drought owing to poor root development. Clearing the forest growth and exposing the soil to sun and air produces the conditions necessary for the vigorous and thoroughly healthy growth of Sal seedlings, provided that the area cleared is sufficiently small to ensure the light side-shade necessary for protection from frost. As the injurious factor can be put out of action by sufficiently good soil-aeration it may, for the present, be conveniently termed bad soil-aeration. Further work

¹ This paper will be published *in extenso* in the Congress number of the Agricultural Journal of India.

is required for its more accurate definition and to indicate the precise way in which it acts. Successful water-cultures with *Sal* seedlings, however, have proved that the injurious action is not due merely to an excess of water in the neighbourhood of the roots. Other factors possibly concerned are the lack of sufficient oxygen for root respiration and the production and accumulation in injurious quantities in the soil of one or more substances which are directly poisonous to the roots.

**Some Irrational Aspects of Systematic Botany.—By
A. T. GAGE, I.M.S.**

The paper gave a brief sketch of the general conditions that have led to the development of the present irrational burden of synonymy in systematic botany; discussed in more detail certain of the conditions: referred to the views of Alphonse de Candolle and Thistleton-Dyer and offered suggestions for lessening the evil.

On the Occurrence of Endosperm in some South Indian Leguminous Seeds.—By M. O. PARTHASARATHY AYYANGAR.

It is not generally known that some of the Leguminous seeds possess endosperm, though its presence has been recorded in several floras and books on systematic botany. But none of these books gives a complete list of all the endospermous genera. Of the South Indian genera, only the following are referred to in these books as possessing endosperm:—

Mimosae: *Neptunia*, *Prosopis*, *Dichrostachys*, *Adenanthera*.

Caesalpinieae: *Bauhinia*, *Cassia*, *Parkinsonia*, *Poinciana*.

Papilionaceae: No genera are referred to.

It is found, however, that in addition to the above the following genera also possess endosperm:—

Mimosae: *Desmanthus*, *Leucaena*, *Mimosa*.

Caesalpinieae: *Caesalpinia* (partly), *Peltophorum*.

Papilionaceae: *Crotalaria*, *Trigonella*, *Cyamopsis*, *Indigofera*, *Sesbania*, *Aeschynomene*, *Teramnus*.

The presence of endosperm appears to be a fairly constant generic character, though an exception is found in the genus *Caesalpinia*, since some of its species possessed endosperm and some did not.

The endosperm tissue consists of cells with thickened cell walls and very small cell contents. The thickening of the cell walls is due to the deposition in them of a good quantity of reserve food material for the benefit of the germinating seedling. This reserve food material resembles in its reactions E. Schulze's Paragalactan, a name given by him to a reserve hemi-cellulose found in the thickenings of the walls of the cotyledon of *Lupinus luteus*.

Models to illustrate Segregation and Combination of Mendelian Characters¹.—By H. M. CHIBBER.

**Soil Aeration on the Alluvium¹.—By ALBERT HOWARD, C.I.E.,
and GABRIELLE L. C. HOWARD.**

The dominant factor in the internal economy of the Indian Empire is the monsoon. The well-being of the people, the commerce of the country and the revenue collected by Government all depend on the amount and distribution of the summer rainfall. It is not surprising,

¹ This paper will be published *in extenso* in the Congress number of the Agricultural Journal of India.

therefore, to find that the attention of the agricultural investigator in India tends to be concentrated on questions relating to the supply of water to crops. At the same time, the other factors on which yield depends are apt to be obscured and crop-production comes to be regarded almost entirely as a question of water-supply. After ten years' observation of the crops grown on the Indo-Gangetic alluvium, during which a good deal of first-hand experience in agriculture has been obtained—at Pusa in Bihar, at Lyallpur in the Punjab and at Quetta in Baluchistan—the conclusion has been reached that a full supply of air in the soil is quite as important as a sufficiency of water. While air is a necessary raw material for the soil organisms and for the roots of plants wherever they may be grown, efficient soil ventilation is found in practice to be particularly difficult on alluvial soils like those met with over large areas of the plains of India. Alluvial soils, like those of the valleys of the Ganges and Indus, pack very readily and always run together on the surface after heavy rain, forming a well-defined crust well known to any cultivator as the *papri*. Two chief factors are responsible for the ease with which these alluvial soils form surface crusts after light showers and lose their porosity altogether after a long continued rain. In the first place, the soil particles are small in size and exhibit no very great range in diameter and, in the second place, much of the rain comes in heavy continuous torrents quite unlike anything experienced in temperate regions.

Several examples of soil ventilation were discussed in detail. The yellowing of peach trees at Quetta, which at present sight appeared to be a disease, turned out on investigation to be due to defective soil aeration and could be reproduced at will either by deep planting or by over-irrigation. The factors on which success in green-manuring depends were then considered. Copious aeration has been found to be necessary in this operation, otherwise air becomes a limiting factor in the growth of the succeeding crop. It was also suggested that in maturation and in the development of quality, copious soil aeration is much more important than has hitherto been suspected.

SECTION OF CHEMISTRY.

(Chairman—PROF. J. J. SUDBOROUGH, *D.Sc., Ph.D.*)

Some Additive Compounds of Trinitro-Benzene.—*By* J. J. SUDBOROUGH.

Note on the Estimation of Iodine values by the Bromate-Bromide Method.—*By* J. V. LAKHUMALANI and J. J. SUDBOROUGH.

The authors have made a critical examination of Winkler's method of determining the Iodine values of fats and oils by an acidified bromate-bromide mixture (compare Weiser and Donath, *Zeit. Untersuch. Nahr. Genuss.*, 1914, XXVIII. 65).

The method gives excellent results with most fats and oils provided the reacting mixture is not exposed to light. In the presence of light the values come too high, probably owing to bromine being used up by a process of substitution.

Weiser and Donath claim that acids with olefine linkings also give good results by the method. According to the authors the esters—methyl or ethyl—of unsaturated acids give extremely low iodine values by the Bromate method under the usual conditions.

Effect of Ethylene Linkings on the Reactivity of Aldehydes and Ketones.—By J. J. SUDBOROUGH and T. WILLIAMS.

Compounds of the Disulphonium Series II. Nitromercaptides and their Interaction with the Alkyl Iodides and the Replacement of Methyl and Ethyl Radicles by their Higher Homologues.—By PRAFULLA CHANDRA RAY.

Methyl nitromercaptide by interaction with methyl iodide yields the expected compound $\begin{matrix} \text{Me}-\text{S} \\ \text{Me}-\text{S} \end{matrix} \cdot \text{HgI}_2 \cdot \text{MeI}$; if, however, the higher homologues of methyl iodide, e.g., ethyl—, propyl—, butyl—, and amyl—iodides be used in the reaction it is found that instead of the anticipated compounds, we get $\begin{matrix} \text{Me}-\text{S} \\ \text{Et}-\text{S} \end{matrix} \cdot \text{HgI}_2 \cdot \text{EtI}$; $\begin{matrix} \text{Me}-\text{S} \\ \text{Pr}-\text{S} \end{matrix} \cdot \text{HgI}_2 \cdot \text{PrI}$; $\begin{matrix} \text{Me}-\text{S} \\ \text{Bu}-\text{S} \end{matrix} \cdot \text{HgI}_2 \cdot \text{BuI}$ and $\begin{matrix} \text{Me}-\text{S} \\ \text{Am}-\text{S} \end{matrix} \cdot \text{HgI}_2 \cdot \text{AmI}$ respectively; in other words an intermolecular replacement of the light radicle methyl by its higher homologues takes place. Similar replacement also occurs in the case of ethyl nitromercaptide.

Bromination of Hydrocarbons and the Formation of Bromopicrin and Tetrabromoquinone by the Action of Bromine and Nitric Acid on Organic Bodies.—By R. L. DATTA and N. R. CHATTERJEE.

In continuation of the researches on the action of aqua regia on organic bodies, it has been found that on mixing nitric acid and hydrobromic acid, NOBr_3 separates in quantitative yield affording a rapid method for the preparation of this body. Bromine in conjunction with nitric acid has been found to be a very powerful and economical method of brominating the lower aromatic hydrocarbons. Benzene, Toluene, Ortho-xylene, Meta-xylene, Para-xylene, Mesitylene, ethyl-benzene have been brominated with the formation of both the higher and lower bromo-derivatives.

A mixture of bromine and nitric acid has a destructive action on most organic bodies, resulting in the general formation of bromopicrin. In the case of aromatic substances which possess or pass through a quinoid structure, tetra-bromoquinone is invariably produced and as tetra-bromoquinone also breaks up finally to bromopicrin, the formation of the latter also takes place in these cases. These have been found to be so from a study of a large number of cases.

Direct Iodination of Hydrocarbons by means of Iodine and Nitric Acid.—By R. L. DATTA and N. R. CHATTERJEE.

It has been found that in the presence of nitric acid, iodine directly enters into aromatic hydrocarbons with the formation of iodo-derivatives. Very good yields of iodo-derivatives ranging from 80% to 50% can be realized by this method. Benzene, Toluene, Ortho-xylene, Para-xylene, Meta-xylene, Mesitylene, Thiophene, Cymene have been found to give the monoiododerivatives readily. Napthalene gives a mixture of iodo- and nitronapthalene. Anthracene is oxidised to anthroquinone and no iodination takes place.

The direct iodination of some of the aliphatic hydrocarbons has been found to be possible though the yield is very small, due to the chance of hydrolysis of iododerivatives in the presence of nitric acid. Pentane and hexane give small quantities of the monoiododerivatives.

Note on the Constituents of the Bark of the *Hymenodyctyon excelsum*.—By C. S. GIBSON and J. L. SIMONSEN.

The authors described experiments which were carried out with the object of isolating the alkaloid hymenodyctine. They confirmed the work of Broughton who showed the bark to be non-alkaloidal and to contain the glucoside aesculin.

The Nitration of 2—Acetylamino—3 : 4—Dimethoxy benzoic acid.—By J. L. SIMONSEN and M. GOPALA RAU.

The authors isolated from the nitration of the above mentioned substance 6-nitro-2-acetylamino-3 : 4-dimethoxy benzoic acid and 3-acetylamino-4 : 5-dinitro-1 : 2-dimethoxy benzene. The former of these substances was converted into 5-nitro-2 : 3-dimethoxy benzoic acid which was found to be identical with the acid previously prepared by Cain and Simonsen. The 6-nitro-2 : 3-dimethoxy benzoic acid was also investigated.

The Root Bark of *Calotropis gigantea*.—By ERNEST GEORGE HILL and ANNODA PRASAD SIRKAR.

The authors have isolated two white solid crystalline esters melting at 140°C and 210°C respectively.

These on saponification gave two solid crystalline alcohols of the formulae $C_{30}H_{47}O.OH$ and $C_{33}H_{61}O.OH$. The melting points of these alcohols were 176°C and 215°C respectively.

The esters were the isovalerates of these alcohols.

From the alcohols the acetyl derivatives were prepared. These were also crystalline white solids melting at 195°–196°C and 222°C respectively.

Oxidation of the alcohols gave solid acids whose silver salts had the formulae $C_{30}H_{46}O_3Ag$ and $C_{33}H_{59}O_3Ag$ respectively.

Reduction of Aliphatic Nitrites to Amines.—By P. NEOGI and T. C. CHOWDHURI.

In an earlier paper the authors had shown that aliphatic nitrites are partially converted into the corresponding nitro-compounds when heated to about 130°–140°. In this paper they have shown that the corresponding amines are obtained in addition to ammonia when the nitrites are reduced by a current of hydrogen in presence of reduced nickel or iron heated to 130°–140°. The yield of amine is least in the case of methyl nitrite and is higher as the series is ascended. The formation of amines at a higher temperature is explained by the fact that the nitrites are first converted at that temperature into the nitro-compounds which are then reduced to amines.

Space Formulae of Organic Ammonium Compounds according to Werner's Hypothesis.—By P. NEOGI.

The author showed that the isomerism and stereo-isomerism of organic ammonium compounds are best explained by representing the nitrogen atom in the centre of a tetrahedron, the four positive valencies being directed towards the four solid angles and the fifth negative bond outside tetrahedron. This representation explains the isomerism of organic ammonium compounds much better than Van't Hoff's cube, Willgerodt's double tetrahedron and Bischoff's pyramidal formulae.

Chemical Action and Actinic Rays.—By P. NEOGI.

On repeating earlier experiments on the emission of chemically active rays from intensely exothermic chemical reactions such as the action of zinc and sulphuric acid, caustic alkalis and sulphuric acid, it was found that the photographic action is not due to chemical action, but due to heat rays. Such photographic action was given by hot water (70°) also. The author is also studying the photographic action of ionised gases and showed photographs of a tin star, iron key, etc., obtained by ionised hydrogen, air, and nitrogen.

Estimation of Calcium as the Sulphate.—By P. NEOGI.

As the estimation of calcium by the ultimate conversion of calcium oxalate into caustic lime requires very prolonged heating in platinum crucibles by means of a blowpipe, the author converts the oxalate into carbonate in a porcelain crucible by gentle heating and then into sulphate by the addition of chemically pure dilute sulphuric acid. The resultant sulphate is then moderately ignited and weighed. This method gives satisfactory results and takes much less time.

Disappearance of volumes by dissolution of substances in water.—By JITENDRO NATH RAKSHIT.

Disappearance of volumes when 100 gms. of some substances are dissolved in increasing quantities of water have been calculated on a basis of the determination of specific gravities of their aqueous solutions of different strengths.

Action of Chlorine on a Solution of Silver Nitrate.—By R. N. SEN.

Stability of Arsenious Sulphide Sols to Electrolysis in Presence of H₂S.—By J. N. MUKERJI.

The Production, Metallic Derivatives and Constitution of Guanidine.—By H. KRALL.

From a quantitative study of the bodies produced by the action of heat on ammonium thiocyanate, it was shown that guanidine thiocyanate is better obtained by heating at 200° for 4 hours than at 185° for 20 hours. (*vide J.C.S.* 1913, 103, 1378.)

The methods of obtaining potassium, silver and copper derivatives were explained and the isomerism of the silver derivatives was discussed. A tautomeric constitution was suggested which was claimed to be more in accordance with the chemistry of guanidine than the traditional formula. (*vide J.C.S.* 1915, 107, 1396.)

Equilibrium between Mercury and Copper Salts in Presence of Halogen Ions.—By J. C. GHOSH.**Reduction of Nitric Oxide by Contact Action of Metals and Metallic Oxides.—By B. B. ADHICARI.**

Some Weak Points in the Explanation of Radium Disintegration.—By T. C. CHOWDHURI.

Studies in Liquid Crystals.—By T. C. CHOWDHURI.

SECTION OF ZOOLOGY.

(Chairman—PROF. W. N. F. WOODLAND.)

Notes on some recent Enquiries concerning the so-called "Renal-Portal" System in Vertebrates.—By W. N. F. WOODLAND.

In 1906 the author published a paper (*Proc. Zool. Soc. Lond.*, p. 886; also *Nature*, June 13, 1907) which disputed the commonly accepted view that the "renal-portal" system, like the hepatic-portal system, is of functional value to the organ it traverses—in this case the kidneys. His reasons briefly stated were as follows: (1) that the "renal-portal" system is absent in all those hot-blooded active animals in which any such auxiliary excretory apparatus might be expected to occur; (2) that in all animals possessing this system a large proportion of the venous blood evades the passage of the kidneys by passing through the epigastric veins; (3) that in many fishes and some abnormal Amphibia in which one kidney is normal (portal) and the other non-portal (of the mammal type) there is no difference in size, this fact proving that it is the arterial supply which alone affects the kidney activity; (4) that the "renal-portal" system is radically different in development and histological structure from the hepatic-portal system and that therefore the fact that the liver utilizes the hepatic-portal blood does not necessarily imply that the kidney makes use of the "renal-portal" blood; (5) that Nusbaum and Beddard independently proved that the venous blood does not circulate through the glomeruli of the Malpighian bodies and that the kidney ceases to excrete if the arterial blood from the renal arteries be cut off; (6) that even when the venous blood of Nusbaum's and Beddard's experiments is oxygenated and powerful diuretics employed (Bainbridge and Beddard), the amount of kidney excretion produced is "too small to admit of a proper analysis" (Starling)—and probably this small amount is due to the oxygenated venous blood penetrating into the intertubular capillary plexus from which under normal conditions, i.e., when arterial pressure is present, it is excluded; (7) that perfusion experiments (*Rep. Brit. Assoc.*, 1906, p. 427) with oxygenated solutions can be held to confirm these experiments if we bear in mind the absence of an opposing (i.e., arterial) pressure to the penetration of fluid injected through the afferent renal veins; (8) that Hyrtl and others have stated that the "renal-portal" system is histologically distinct and separate from the intertubular capillary system and therefore there is no necessity to assume that the venous blood must penetrate into the latter, and finally (9) that Gurwitsch, having ligatured the renal afferent and the dorso-lumbar veins of a frog, found that the excretion of the kidneys was making allowance for the physiological disturbance due to the experiment, not appreciably affected.

The author has repeated the experiment of Gurwitsch on a number of toads, but instead of measuring the amount of excretion produced during a brief period subsequent to the experiment he has allowed the animals to live for several months to ascertain if they are as healthy with kidneys solely supplied (like those of mammals) with arterial blood as with kidneys possessing the normal blood supply. One result of these experiments is that when both renal afferent veins have been ligatured for two or three months the kidneys remain quite healthy and increase in weight to a varying extent—a result which certainly does not indicate lessened kidney activity. Another result is that though the animals remain quite active and feed well, yet owing to the conditions of the experiments, viz., that the whole of the blood from the hind part of the body is caused to pass through the liver (this of course does not happen in those few Fishes, Reptilia and abnormal Amphibia in which the "renal-portal" system is partially or wholly absent, the blood in these cases passing into the main

venous system), the liver sooner or later usually becomes diseased, numerous cysts being developed. When only one renal afferent vein is ligatured, the kidneys remain approximately the same size. The reason why the kidney which is relieved of venous blood does not increase in size is probably the penetration of the venous blood of the other kidney across the inter-renal vein into its relatively empty sinusoids and so it is but little better off as regards oxygenated blood than the normal kidney. The result of this experiment also is to cause a lot of additional blood to flow into the anterior abdominal vein and so through the liver, and this last organ usually becomes diseased. Since the two kidneys remain approximately equal in size in this experiment, it is evident that the presence or absence of a venous supply, i.e., of a "renal-portal" system, is of no importance—the arterial supply is all that matters.

One problem it is at present difficult to solve is why the anterior abdominal vein opens into the liver at all—why it does not retain its primitive connection with one or both of the precaval veins. Too much venous blood is, as we have just seen, bad for the liver and yet it would appear from other experiments (and from the fact that it always is connected with the liver) that the liver of frogs and toads at least needs *some* blood from the hind legs poured into the hepatic-portal vein, because in at least three toads in which the anterior abdominal vein had been ligatured (and so *all* the venous blood from the legs and pelvis forced through the "renal-portal" system) a *new connection* has become formed in the course of two or three months and some of the venous blood from the legs is therefore poured into the liver as before. However, more work requires to be done upon the subject before these results can be regarded as absolutely certain.

From the *a priori* standpoint and from the collective evidence derived from anatomical and physiological facts, we are justified in concluding that the "renal-portal" system is functionless. The fact that numerous hot-blooded active animals exist which are devoid of a "renal-portal" system alone proves that this accessory is not necessary to the cold-blooded inactive animals which possess it, and this conclusion is borne out by the physiological enquiries above described. What then is the meaning of the "renal-portal" system? Except in those animals in which the kidneys are small and therefore require but little room for their development (Cyclostomes, primitive Elasmobranchs and some bony fishes), the kidney in most animals is situated in a confined position, being surrounded above and at the sides by dense connective tissue and below by the peritoneum. Under these circumstances it is not surprising if the numerous developing tubules tend to encroach upon the adjacent space occupied by large thin-walled posterior cardinal sinuses, and as a matter of common knowledge, the successive developments of the kidney (pronephros, mesonephros and metanephros) do follow the paths of these venous sinuses, being, like the posterior cardinals, far apart anteriorly and close together in the median line posteriorly; in other words, *the kidneys appear to select the actual path of the veins as a site for their development for the simple reason that they have got more room in this region in which to develop.* It is this encroachment of the kidney-mass upon the lumen of the posterior cardinal veins which produces the so-called "renal-portal" system, which as the evidence shows has nothing whatever to do with the function of the kidney but is a *mere quasi-accidental mechanical product of the conditions of development.* For this reason the author has renamed the "renal-portal" system in his original paper as the "renal cardinal meshwork"—a term already adopted by Papin who has shown that one important reason why the veins of the mammal have not been caught by the kidneys, so to speak, is because the latter have shifted forwards and so away from the veins, though the author believes that the extreme concentration of the kidney substance and their divergence from the middle line have been equally important factors.

We conclude then that the "renal-portal" system, or as I prefer to

call it, the renal cardinal meshwork, is the characteristic of an imperfect kidney which being unconcentrated and yet bulky has had to encroach upon the lumen of the posterior cardinal vein in order to develop. In the active bird the femoral veins have resisted kidney encroachment to a large extent owing to the volume of blood to be returned to the heart and therefore only the smallest traces of a renal cardinal meshwork remain; in the Mammal, the kidney has become in the highest types very concentrated, the tubules being arranged so as to open into the ureter in the most convenient way possible. It has shifted outwards and forwards and by its peculiar abbreviated development has kept clear of the veins altogether.

Seasonal Conditions governing Pond Life in the Punjab.—By BAINI PERSHAD.

The seasons in the Punjab are quite different from those in Bengal and other parts of India, and it was with a view to ascertain the effects of the seasons on the pond-life that the work was begun. It was found that animals like *Hydra*, *Spongilla* and *Australella*, do not flourish in winter which is very severe, but during the latter part of summer—summer and winter being the only well-marked seasons in the Punjab, spring and autumn being short and ill-defined. During winter all these forms die, having developed resistant bodies like spiny eggs, gemmules or statoblasts for the preservation of the species.

In the case of *Daphnia* winter-eggs are formed at the beginning of winter. In the case of insect larvae like those of *Chironomus* and *Anopheles*, it was found that in winter the period of larval life is much prolonged and that they are very inactive.

The Aortic Ligament in Fishes.—By D. R. BHATTACHARYA.

Notes on Elasmobranch Blood Cells.—By R. H. WHITEHOUSE.

The history of the red blood cells is interesting in consideration of the following points. It seems most likely that they are produced through life in the spleen. Young cells are characterized by their comparatively large nucleus with widely separated chromatin and the very small envelope of cytoplasm which is basophile in its reaction. Haemoglobin is acquired comparatively late in development and when adult the nucleus occupies about $\frac{1}{3}$ the length and breadth of the cell, is compact and has an irregular outline. Frequent "Kernbrücken" or nuclear bridges were observed which corresponded to the structures described by Stauffacher and Knall in a variety of other cells. The disintegration of the cell begins by a basophile degeneration of the cytoplasm spreading from the nucleus radially and finally producing a structure much resembling a haemamaeboid parasite, and it was suggested that alleged cases of such parasites invading cells and causing the nucleus to be ejected should be revised for fear in reality they were only cases of basophile degeneration of the erythrocyte.

The leucocytes are of the usual type and show the eosinophilous forms to great advantage. "Kernbrücken" are also to be observed here.

The Indian Varieties and Races of *Turbinella pyrum* (Linn).— By JAMES HORNELL.

In this paper it was shown that the Indian representatives of the genus *Turbinella* are limited to a single species—*T. pyrum* (Linn.). The species is not an ideal one composed of a single predominant form, but must be considered a well-marked example of the collective species, as it comprises at

least five strongly characterised varieties approximately co-equal in taxonomic value, thus constituting definite co-varieties or sub-species.

Including Linnaeus' type as one, five varieties were enumerated and defined, namely:—Varieties *obtusa*, *acuta*, *globosa*, *comorinensis* and *fusus*. With the exception of the last named, these are new varieties.

Each of these five forms, if judged by isolated individuals possessing the mean of the different characteristics and proportions, may reasonably be classed as a distinct species. Study of large numbers—nearly 2 millions of these shells are imported into Calcutta annually—shows that this view would be incorrect.

The following key to the five varieties defines the principal characteristics of each:—

Spire elongate; shell widely fusiform. Breadth in length 1.75 to 2	Shoulder angular, prominent.....	var. <i>fusus</i> , Sowerby.
		Shoulder rounded, low.

Spire short; shell globose or top-shaped. Breadth in length, under 1.75	Spire moderately short; shell globose; periostracum rough and thick	var. <i>globosa</i> , var. nov.
		Spire often very short; shell inclined to be top-shaped, very wide at shoulder; periostracum thin in small and medium-sized shells.	var. obtusa, var. nov., with 2 forms:— (a) typica (b) rapa (Gmelin)

The peculiar geographical distribution of varieties *obtusa* and *acuta* (including *globosa* and *comorinensis* under the latter) is most illuminative upon the influence of differences in environment upon separated groups of an originally united species in stabilizing certain variations from the original stock.

Reasons were adduced for the belief that originally a single form inhabited the whole of the shallow waters that once extended uninterruptedly from what is now Cape Comorin to Madras. During this phase, no land connection existed between India and Ceylon. Later, a land barrier was formed along the line Pamban-Rameswaram-Adam's Bridge-Mannar. Two isolated groups of the species were thereby entailed; these diverged and two very distinct varieties were formed. Had the land barrier not broken down these two varieties would assuredly have hardened into separate species. But with the breaking down of the barrier—a very recent geological phase—a mingling of the two varieties, *acuta* and *obtusa*, has occurred. In spite of this, the author considers that the two varieties will continue to crystallize their respective characteristics and will end, as they were undoubtedly doing up to the time the land barrier became interrupted, in becoming distinct species.

The isolation of another section of the stock in the Andaman Islands has similarly resulted in the formation of a variety with well-defined differences from the continental form.

The paper was an attempt to give a reasoned account of the varieties of one of the dominant molluscs of Indian seas and to offer a working hypothesis for the explanation of the origin of some of the varieties which

exist; at the same time to define and demarcate the characteristics and limits of the chief varieties, a matter which till now has been in a distinctly chaotic condition.

The Geographical Distribution of Indian Earthworms.—

By J. STEPHENSON, I.M.S.

The modes of spreading in the Oligochaeta differ very considerably in the case of freshwater and terrestrial forms. Freshwater forms spread with such ease and so widely that the facts of their distribution are practically useless for zoogeography. The case is quite different with terrestrial forms.

The former connection by land of India and Australia, and India and New Zealand, is demonstrated by a comparison of the earthworm faunas; but it is not necessary to suppose, with Michaelsen, that the land connection must have extended across the Bay of Bengal; recent discoveries in the Abor country renders it possible to suppose that the Oligochaete immigrants took a path round the head of the Bay.

The former connection between India and Africa (Madagascar) is documented by fewer faunistic records; though these have recently been added to by the discovery in Bombay of a genus which may be looked on as a direct descendant of a form at present peculiar to Madagascar.

Indian Freshwater Prawns of the family Atyidae.—

By Stanley Kemp.

The author gave a brief account of the principal characteristics and distribution of the Atyidae in India and discussed Bouvier's theory of the mutational origin of certain forms. Recent investigations tend to show that the Atyid fauna of the Andaman Islands is one of peculiar interest, comprising a remarkable combination of forms similar in character to those on which Bouvier founded his theory.

PHYSICS SECTION.

(Chairman—MR. G. C. SIMPSON, F.R.S.)

The meetings of the Physics Section were very successful, but owing to the large number of excellent papers which had to be considered it was necessary to cut down as much as possible the discussion of each. Although the discussions were short they were very much to the point and considerable useful work was done in the section. The chairman prefaced his paper on "Some problems of Atmospheric Electricity" with a few general remarks on the effect of the war on the output of new research in physics and emphasized the necessity for taking the opportunity of a decrease in new work to review our present position.

Some Problems of Atmospheric Electricity.—*By*

G. C. SIMPSON.

Five problems of atmospheric electricity were discussed.

(1) It was shown that although there appears to be sufficient radio-active matter in the earth and atmosphere to account for the ionisation of the air over the land, this is not so over the sea where there is little radio-active matter in the air and practically none in the sea.

(2) Recent observations made in balloons indicate that a very penetrating radiation enters the earth's atmosphere from above: the origin and nature of this radiation were discussed.

(3) The difficulties connected with explaining the permanent charge on the earth were stated. It was shown that as the discharge current is constant to the greatest heights reached in balloons, the renewal cannot take place from electricity in the lower atmosphere. The possibility of a very penetrating radiation carrying a negative charge was considered, and the possibility of the spontaneous generation of negative electricity in the earth caused by e being the variable and not m in the ratio $\frac{e}{m}$ which is a variable function of velocity, was discussed.

(4) The question "What is ball lightning?" was next considered and it was stated that "active nitrogen" as prepared by Prof. Strutt was the nearest approach to ball lightning yet produced in the laboratory.

(5) The great importance of Prof. Stormer's work on the aurora was pointed out, and the consequences of Vegard's theory of the aurora, which makes the aurora due to a rays emitted by radio-active matter in the sun were described.

On Applications of the Kinetic Theory of Gases to Epidemiological Problems.—By MAJOR MCKENDRICK.

On the assumption that individuals interact amongst each other in a random manner, it was shown how it is possible to obtain solutions of problems, which depended upon contagion, immunity, etc. Conversely if suitable statistics are available, it is possible to obtain information regarding the mode of transmission of diseases—their tendency towards immunity—how they are affected by treatment—the degree of their epidemicity—their single or dual nature—and whether they were on the increase or the decrease. It was also shown how the notion of correlation arises naturally out of the consideration of two dimensional phenomena of this nature: and how there are two main types of correlation, which differ from each other fundamentally.

The Mechanics of the Violin Bridge and Mute.—By C. V. RAMAN.

The author discussed (with the aid of diagrams and lantern slides) a mechanical theory he has developed which closely predicts the mode of vibration of a string bowed at any given point with the specified pressure and velocity. An important feature indicated by theory and verified experimentally is that the bowed point does not generally move with uniform velocity whilst slipping past the hairs of the bow. The effect of muting on the vibrations of the violin-bridge was also shown. Prof. Raman remarked that his observations made the correctness of the views expressed by Giltay and De-Haas on the subject appear doubtful.

Winds at various Cloud Levels and their relation to the Monsoon.—By W. A. HARWOOD.

The object of the work described in the paper was to examine the monsoon currents at various heights above the earth's surface in relation to the character of the large atmospheric circulation of which the monsoons form a part, and also to discover any points requiring special attention in connection with the research work with balloons recently started in India.

It was explained that the form of clouds enables one to estimate their altitude, and thus observations of the directions and velocity of movement of clouds furnish a simple means of examining the winds at various heights above the earth's surface.

The south-west monsoon current was found to be on the average about $3\frac{1}{2}$ miles deep at Madras, $4\frac{1}{2}$ to 5 miles at Vizagapatam and Calcutta and about 5 miles over north-west India. Above it there appears to be a return current towards the equator; so that the air approaches India from south-west at the surface, rises and deposits its moisture in India, and then return southwards. The winter or north-east monsoon was shown to form part of the circulation of the same character, but in the reverse direction, and its strong resemblance to the north-east trade wind of the Atlantic was pointed out.

The effect of Tensile Stress on the Coefficient of Expansion of Nickel.—By E. P. HARRISON.

The instrument used in making these measurements was the same as that recently devised by the author for investigating Young's Modulus at high temperatures and exhibited to the Science Congress at the Madras meeting last year.

By deduction from the experiments a series of graphs is obtained showing the relation between the elongation of the wire and its temperature, each graph corresponding to a different tension.

From the whole series of expansion temperature graphs the average coefficient of expansion over different ranges of temperature and corresponding to different tensions can be deduced. These coefficients are plotted against the tension.

The following results emerge:—

(1) At temperatures below about 150°C the coefficient of expansion increases very slowly as a linear function of the tension in accordance with the known equation

$$\frac{d\alpha}{dT} = - \frac{1}{E^2} \frac{dE}{d\theta}$$

where α is the coefficient of expansion

T the tension in the wire in kilos per mm^2 ,

E the value at 0° of Young's Modulus for Nickel and

$\frac{dE}{d\theta}$ the temperature coefficient of E supplied by the author's previous experiments (Lond. Phys. Soc. Proc., Dec. 1914). This may be called the *normal* change in α with tension, and its value is about $2 \times 10^{-8} \text{deg}^{-1} \text{kilos}^{-1} \text{mm}^2$.

(2) For temperatures above about 150°C the coefficient of expansion increases linearly (as in case (1)) until a certain tension is reached, after which a very rapid increase of α takes place. This may be called the *abnormal* increase in α with tension, and begins to occur when the tension exceeds 15 kilos per sq. mm.

The conclusion drawn from the present research so far as it goes is that during the measurement of expansion coefficients especially at high temperature careful regard must always be paid to the stress conditions even though the latter are far below what is necessary to cause a permanent set. Only when the stress on the material is below a certain minimum value, depending (no doubt) on the material, can the true or normal coefficient be obtained.

Potential Difference and current in De la Rive (vacuum) tube.—By D. N. MALLIK and A. B. DAS.

In such a tube, so long as, and only when, there is a band discharge which alone rotates under the influence of Transverse Magnetic Fields),

the ratio of Potential difference to pressure remains constant both in air and in hydrogen. The Potential difference goes on decreasing as pressure decreases up to a certain point, but after that, it increases with decreased pressure.

The paper dealt with a mathematical theory which explained all these features.

The curve connecting current and pressure showed similar peculiarities, but that connecting current and potential difference (exhibited on the screen) was very complicated, showing one nodal point.

**On the Radio-activity of some of the Mysore Rocks.—By
W. F. SMEETH and H. E. WATSON.**

Determinations have been made of the amount of radium in a number of rocks collected from different parts of Mysore. The geological history of these rocks is known with some accuracy, and it is shown that certain geological groups contain similar amounts of radium.

**On the Cathode fall from various metals.—By
H. E. WATSON and G. PARANJPE.**

The cathode fall from as many metals as possible is being measured in the inactive gases. There appears to be a definite relation between the cathode fall and the position in the periodic table of the metal used as cathode.

**The Contribution of Arabs to Astronomy and Trigonometry
with Special Reference to El-Biruni and his Kanoon
Masudi.—By ZIA-UD-DIN AHMAD, C.I.E.**

**A New Method of observing the Zeeman Effect.—By
WALI MOHAMMAD.**

**The Potential Gradient at Patna.—By V. H. JACKSON, M.A.,
and S. K. MITRA, B.Sc.**

Continuous records of the potential gradient were commenced in January 1914, absolute values being obtained in the manner recommended by Simpson (*Phys. Zeitschr.* XIV, January 1913) by attaching a radium collector to the centre of a long insulated wire stretched horizontally 2.5 metres above a lawn. For satisfactory insulation under all weather conditions the surfaces of the sulphur insulators used have to be protected and electrically warmed. Preliminary results are as follows:—Harmonic analysis of the daily range for the whole year gives $P=125 + 70 \sin (\theta + 131) + 43 \sin (2\theta + 195) + 12.5 \sin (3\theta + 260) + 11 \sin (4\theta + 348)$. The mean gradient is lowest, about 75, in May, and reaches a maximum, about 200, in November. The diurnal variation shows an unusually marked double oscillation in all months, particularly in the cold weather, November to February, when the evening maximum about 9 P.M. often exceeds 400 v/m. A second record of the gradient over a flat roof 12.8 metres above the ground, commenced in October 1915, leads to the conclusion that at this level the diurnal oscillations are much less marked, e.g., analysis for December 1915 gives—

$$\begin{aligned} \text{At ground-level } P &= 207.4 + 121.5 \sin (\theta + 136) + 90.8 \sin (2\theta + 197) \\ &\quad + 26.7 \sin (3\theta + 303) \\ \text{At roof-level } P &= 153.3 + 65.6 \sin (\theta + 125) + 45.6 \sin (2\theta + 190) \\ &\quad + 6.5 \sin (3\theta + 318) \end{aligned}$$

In the hot weather months (March—May) very high negative gradients are frequently recorded between 8 or 9 A.M. and 5 P.M. These are due to clouds of dust raised by the westerly winds usual at this season. whenever the latter exceed about 15 miles an hour.

Utility of Desiccants in Electrostatic Measurements.—By
V. H. JACKSON, M.A., and A. T. MUKERJEE, M.A.

During most months in the year accurate measurements with sensitive quadrant electrometers cannot be made in India without special precautions, owing to the high temperature and humidity. In continuation of earlier work (*J.A.S.B.*, Vol. X, 1914) the authors find that leakage can be reduced to a very low and constant amount for an indefinite period if the electrometer is enclosed in a hermetically sealed metal case together with all accessories, and manipulated from outside by airtight connections, and if the air enclosed is kept dry by sulphuric acid which can be stirred or renewed when necessary. No desiccant other than sulphuric acid has been found suitable. The effect of sodium and phosphorus pentoxide is to increase the leakage above the amount usual in ordinary moist air. This appears to be due to increased ionisation caused by the chemical action of moisture, as noticed by Schenck when water vapour acts on yellow phosphorus (*Sc. Abstracts*, No. 1581, November 1915). Attempts to simplify the arrangements by keeping the case and its contents 10—15° above the air temperature without any drying agent gave no satisfactory result.

GEOLOGY SECTION.

Notes on some fish teeth from the Tertiary beds of Western India.—By H. C. DAS-GUPTA.

In this paper the author described some fish teeth obtained from the Tertiary beds of Kathiawar and Sind. Of these species one is new and it has been described as *Oxyrhina Feddeni*.

On the Hypersthenization of Monoclinic Pyroxenes.—By
KIRAN K. SEN GUPTA.

The alteration of hypersthene into garnet in the rocks of the charnockite series has been proved by Sir Thomas Holland, but later investigations point to the conclusion that hypersthene is also an alteration product of augite—a monoclinic pyroxene. In some specimens it seems as if the garnet has altered peripherally into a micropegmatite of pyroxene and felspar. Kelyphite rims round garnets are examples of the breaking down of garnets into other minerals, such as pyroxene, at least in some cases. If the change is in the direction as indicated above it is to be explained according to Dr. Fermor as due to a release of pressure. But the innumerable other instances go to show that the change is in the direction from augite to garnet and not *vice versa*.

Hypersthene is the most characteristic, though not an invariable constituent. Some charnockites are entirely free from hypersthene which is rather striking but not surprising in view of the supposition that both hypersthene and garnet are believed to be derived from augite. This granted, one or other of the ferro-magnesian minerals, such as augite, garnet, hypersthene, and secondary hornblende may be found missing in some rocks of the charnockite series. Although hypersthene is a characteristic constituent of the charnockites of South India as elsewhere, the green augite is the fundamental constituent. The bluish green colour of the rays vibrating parallel to the minimum axis of elasticity ϵ in the augite is similar to that of the rays vibrating parallel to the corresponding

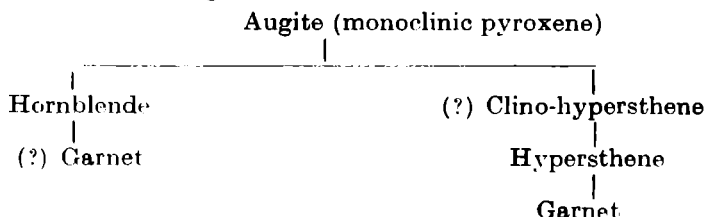
axis in the hypersthene, so that there may be a confusion between augite and hypersthene without a complete rotation of the nicols. Hypersthene may also be mistaken for garnet if the nicols are not rotated.

The question of the extinction of rhombic pyroxenes has puzzled many petrographers. Sir Thomas Holland, in his memoir on the charnockite series, writes that although he has examined hundreds of cases from the Salem district and from all parts of the Madras Presidency, he has never found a pyroxene in these rocks giving the pleochroism of hypersthene without at the same time, when definite cleavage lines are exhibited, showing a straight extinction. He has very carefully searched every specimen in the extensive collection made by his colleagues and himself, and has to confess his inability to discover a single instance of such a pleochroic monoclinic pyroxene. Dr. Walker in his memoir on the Geology of Kala handi State speaks of a mineral more or less resembling the rhombic pyroxenes in regard to inclusions, pleochroism and colour, but seldom extinguishing straight along the chief lines of cleavage, to which he ascribes the name clino-hypersthene. In several cases the angle of extinction of the mineral showing the same pleochroism as hypersthene has been found to be 45° , and this is perhaps the pleochroic pyroxene described by Lacroix in the pyroxene gneisses of Salem. There seems to be some confusion about the extinction of 45° on the clino-pinacoid. The clino-pinacoid (010) of Lacroix is perhaps the cleavage trace m (110) and if it is so, the monoclinic pyroxene becomes the rhombic pyroxene,—hypersthene. There is also a paper by Messrs. Allen, Wright, and Clement, entitled "Minerals of the Composition $MgSiO_3$: a case of Tetramorphism" in Vol. XXII, *American Journal of Science*, 1906, where one of the four forms of $MgSiO_3$ is a monoclinic pyroxene which may be regarded as a clino-enstatite, but there is no information concerning clino-hypersthene which would be the monoclinic form of $(Mg, Fe) SiO_3$. It is well known that rhombic minerals exhibit both straight and oblique extinctions. It is therefore a dangerous assumption to consider a mineral as clino-hypersthene when the hypersthene extinguishes obliquely. But the actual examination of some slides suggests that there is an intermediate and transitional alteration product between augite and hypersthene, showing oblique extinction but hardly approaching true hypersthene in all its characters.

In an acid charnockite, green pleochroic hornblende derived from a pre-existing augite is observed to pass into garnet which is present in the form of large blebs and stringers forming a complete network. The hornblende often occurs right inside garnet, occasionally at the margin. In a specimen of norite, green augite is observed to pass into pink hypersthene, the transitional stage being marked by a faint pink colour, occasionally by a dark pleochroic band. The peculiar cleavage lines of augite can also be traced in the altered form with which the augite is crystallographically continuous. The pleochroic mineral does not invariably show straight extinction, but often reaches as much as 26° . In another section, hypersthene is found in sparing quantity, but usually shows a pronounced pleochroism. It is altered from augite, where both the augite and hypersthene extinguish at an angle of 40° . In another specimen garnet apparently sends out vermicular blebs of augite, often of hypersthene, into the felspar which is also secondary, and where there is magnetite these blebs stretch out from garnet to magnetite. An extreme type of charnockite composed entirely of quartz and augite with accessory magnetite, graduates into a garnetiferous quartz rock with the production of hypersthene, felspar, and pyrite. There are transitional stages between the garnet and the light-green granular stuff, the disintegration product of augite. A single idiomorphic augite has been observed to alter into numerous hypersthene individuals, all differently orientated. Sir Thomas Holland mentions the occurrence of frequent intergrowths of rhombic (enstatite) and monoclinic pyroxenes in some exceptional hemicrystalline varieties of augite-norite. These intergrowths perhaps represent the

alteration of monoclinic pyroxenes into the rhombic forms. Before describing a set of fine-grained rocks which show a peculiar micrographic structure made up of sinuous blebs of augite-hypersthene and felspar, which ultimately alter and pass into garnet, it has been found desirable to show that the sinuous and centric arrangement of the blebs of augite-hypersthene are really derived from pre-existing large grains of augite, thus proving the direction of the change from augite to garnet and not the other way by which the micrographic augite-felspar is considered as being due to the destruction of garnets. The most peculiar structure is the radial arrangement of the vermicular augite-hypersthene from a common centre which is sometimes occupied by garnet. Garnet grains are often found in crystallographic continuity with hypersthene. In a specimen of norite the central and irregular micrographic augite-felspar does not proceed from garnet at all, but is observed to stretch out from hypersthene to hypersthene.

The alteration of augite is shown below :—



On the correlation of Augite-diorite and dolerite.—By KIREN K. SEN GUPTA.

The intrusive gabbro (augite-diorite) is typically developed in the Cochin State. It is essentially holocrystalline and granitoid, but homogeneous rock, the constituent minerals felspar and augite being distinct. From the microscopic characters it is reasonable to infer that these types are the coarsely crystalline dolerites. This view is strengthened by other evidence. At Thelikod Kunnu, north of Panamcheri village, there is an exposure of the intrusive flanked on both sides by dolerite. They also occur together at the foot of the hills (Tangal Kunnu) half a mile south-west of the eighth milestone on the way from Trichur to Pattikad and also at Nunnanchira, half a mile upstream from the Mudavarichal bridge. The dolerites may be considered as the result of marginal cooling of gabbro intrusives. But there are objections to this hypothesis as a regular gradation in structure from the central mass of gabbro to the marginal dolerite has not been observed so far in the rocks examined, and as isolated intrusions of dolerite are of frequent occurrence. All the exposures of gabbro and dolerite are found in parallel zones or belts running in a N-W. S.-E. direction. They are thus closely related or are separated by a short interval of time.

ETHNOLOGY SECTION.

Malabar Magic.—By L. K. ANANTAKRISHNA IYER.

Malabar, according to Mr. Iyer, is supposed to be the land of magic, sorcery and witchcraft, and even now there are persons practising various kinds of black art. There was a very mischievous imp who was capable of doing injury of all kinds if only set up by a sorcerer who had always to feed him in a material sense. In the absence of this propitiation to these imps, they were supposed to turn against the prompter and probably put him to death. Another interesting topic on this subject was, what was known as Odi cult. It meant the breaking of a man's body by some special device. The adept in the art was supposed to possess two

medicinal oils, one of which was extracted from boiling the foetus extracted from the womb of a woman in her first pregnancy and the other from the fruit of a particular tree. The processes of extraction were too elaborate for a detailed description. Suffice it to say that the sorcerer with a mark on his forehead prepared with this kind of oil, and rubbing it on his body and drinking some toddy, set up for this purpose during the night, believed himself to be transformed into any animal he liked and put his victim to death in no time.

The Thandapulayans.—By L. K. ANANTAKRISHNA IYER.

The Thandapulayans are one division of the agricultural tribes in Cochin and Travancore. They are in a most primitive state, wearing leafy garments.

On the Chronological sequence of some Megalithic monuments.—By KIREN K. SEN GUPTA.

It is a common occurrence to come across dolmens, locally known as "Muni-ara" (huts of sages and hermits) in the forests of the Cochin State. The capstones are frequently found lying on the ground resembling thereby graves of the Mundas. The Celts and Gauls ascribed the construction of dolmens and menhirs to gods and heroes, and subsequently the Gallo-Romans saw in them the intervention of saints. This probably is then the origin of the name "Muni-ara." The entablature stones are generally observed with their plain faces downward or inward. In France, the orientation of the dolmens is very variable, the entrance being directed to any point of the horizon, although according to Cartailhac it faces the east in some cases. In the Cochin State the entrance to the dolmens is invariably directed to the west, there being no doors either with a circular, oval, or rectangular aperture, the only exception being a dolmen with a parabolic opening. Most of the dolmens are simple, and no evidence has been observed as to their having been covered with a cairn or tumulus. There is a solitary instance of a menhir which consists of an irregular and flat upright monolith 13 feet high. The orientation of the menhir is N. 20° W. and there are three other small monoliths forming a straight row. In India, the form of menhirs varies greatly in widely separated localities. In Singhbhum, they are in rude obelisk forms fixed on end and arranged in straight rows. The dolmen of Kergavat in Brittany has a huge capstone propped on four stone slabs at the corners perhaps representing the intermediate stage in the evolution of dolmens from the flat stones almost lying on the ground supported on four chips at the corners, as in Singhbhum, to the highly developed forms represented by the South Indian dolmens consisting of smooth and flat slabs arranged in the form of enclosed cellars. Monoliths overtopping a tumulus are also observed in Singhbhum resembling the Bauta (grave or battle) stones of Scandinavia. In England and elsewhere menhirs and dolmens are often found at the centre of cromlechs or stone circles, and such enclosures were perhaps used, like many of the modern churches, for the double purpose of burying the dead and addressing the living. At Vellarakad, hat-stones and umbrella-stones are found associated together. The hat-stones consist of four stones, convex outside, forming the four segments of a truncated cone, the truncated top being capped by a huge circular plano-convex stone with bevelled edges. Hat-stones with flat capstones have not been observed in the State. Adjoining the hat-stones are some high conical structures made up of some eight or nine stones measuring seven feet long but without any capstones. The umbrella-stones associated with these monuments are, however, found flat on the ground. They are circular in shape and invariably made of laterite. Logan was perhaps not aware of the occurrence of *topkallu* (hat-stone) in association with *kuta-kallu* (umbrella-stone) and was thus

led to refer the *topi-kallu* to the "dolmen period." The hat-stones undoubtedly belong to an advanced type of civilization as could be made out from their excellent finish and graceful appearance. Architectural style is but the character of the nation and of the epoch expressed in wood, stone or brick. The chronological sequence of Logan thus modified would be as follows:—

- | | | |
|----------------------|---|--|
| Probably synchronous | } | I. Dolmens, menhirs, cromlechs. etc. |
| | | II. Excavated caves. |
| | | III. (a) Caves with massive urns (umbrella-stones), and massive sepulchral urns without caves: |
| | | (b) hat-stones. |
| | | IV. Modern sepulchral urns of a small size. |

No definite chronological sequence can be traced in the evolution of megalithic monuments of different countries, much less can their appearance, construction, and contents be said to indicate a phase of contemporaneity. The dolmens of Africa often contain objects characteristic of the Iron Age, whereas in India, the practice of erecting megalithic structures still obtains amongst some of the aboriginal tribes, such as the Mundas, Kuruvas, and Khasias.

LECTURES.

Dr. E. H. Hankin's lecture on "The Evolution of Flying Animals."

The wings of insects were shown to have developed from tracheal gills which were leaf-like appendages borne in pairs on each body-joint of the primitive insect. A picture was shown of one of the earliest known fossil insects. Each of the joints of the thorax carried a pair of wings. Consequently the animal was six winged. The succeeding joints of the abdomen were each provided with a pair of tracheal gills. The wings of these primitive insects have been shown to resemble in their structure in certain respects tracheal gills and to differ in the same respects from the wings of modern insects.

Passing on to the question of the origin of flying fishes it was pointed out that many fishes scuttle along the surface of the water to avoid their enemies. Fishes having such habits have in many cases evolved into flying fishes. An illustration was shown of a fossil flying fish in which the wings were attached below the level of the centre of gravity instead of above this point as is the case in modern flying fishes. One would expect such a position of the wings to conduce to lateral instability.

Reasons were given for believing that the ancestor of birds was a dinosaurian reptile. The most primitive bird known, the "Archaeopteryx," was described and its reptilian characters were explained. Each wing was provided with three claws which for reasons described in detail were supposed to be functional. In modern birds the second and third of these digits were provided with large quill feathers which are used in steering from side to side. Thus the muscles that moved the hand in the ancestral reptile were adapted for purposes of flight in the bird. The muscles that moved the hand were also adapted for this purpose in the group of fossil-flying reptiles known as pterodactyls. In these animals the wing is supported on an enormously enlarged finger. In bats also the hand is used to form the wing, all the fingers being elongated and enlarged to support the volant membrane.

In each case it is probable that the power of gliding preceded that of flapping and that the power of gliding in a straight line preceded the

power of steering during the glide. Movements in anticipation of seizing prey may have been connected with the origin of steering movements. Flapping probably originated from a repetition of certain control movements.

In flying lizards ribs have been enlarged to carry the membrane that functions as a wing. In flying squirrels the limbs with the omission of the hands support the membrane or patagium. In such animals the power of flight could not develop very far as the complicated hand moving mechanism was not available for adaptation to purposes of flight.

A description was given of the elbow and wrist joints of the larger pterodactyl. Their structure is such as to prove that they were capable of a number of interrelated movements: both in this and in other characters the pterodactyl appears to have been far more specialised for flight than any other animal of which we have knowledge. A study of the anatomy of the different joints of the arm shows that these animals could not walk as quadrupeds. It is difficult to understand how they could have walked as bipeds as they were unable to furl their wings. It is considered that after alighting on their hind feet they fell over on to their stomachs and pushed themselves along laboriously somewhat after the manner of a penguin. Reasons were adduced for believing that they could not hang from the branch of a tree by their hind legs as do flying foxes. It is very difficult to know how they caught their prey. It has long been held that they were fish-eaters. But they were unable to plunge into the water to catch a fish after the manner of fish-eating birds as so doing would be likely to break their wings and if they escaped this danger and caught the fish it is improbable that they would ever have been able to leave the water and regain the air. It was suggested that possibly they caught flying fishes. But if so they must have had a power of soaring flight as superior to that of the albatross as that of the albatross is to that of the sea-gull. Apart from the question of how they caught their food there are strong reasons for believing that they habitually used soaring as distinguished from flapping flight. The remarkably complicated movements of which their wrist joints are capable, which were certainly adapted and specialised for the purposes of their flight, furnish a proof that the phenomenon of soaring flight is one which is quite inexplicable in the light of our present knowledge.

Prof. Neogi's Lecture on "Manufacture of Iron in Ancient India."

Prof. Neogi showed photographs of the Delhi pillar, Dhar pillar, and Mount Abu pillar as well as the gigantic iron beams of Puri, Kanarak and Bhubaneswar temples and the enormous iron guns of the Moghuls—in fact, remarkable specimens of iron manufacture from the earliest times down to the 17th century. Various analyses of the specimens reveal the fact that the iron used was pure wrought iron "with low sulphur and manganese and high phosphorus." Prof. Neogi was of opinion that the pillars and beams were constructed by forging and then welding small blooms of wrought iron and that the chemical constitution of these iron specimens was responsible for their remarkable corrosion-resisting capacity.

He next dwelt upon Indian steel or woots which was the material from which the famous Damascus blades were made. A remarkable specimen of ancient Indian steel, dated as early as B.C. 150, has recently been discovered in Gwalior and analysed by Sir Robert Hadfield. The description of as many as more than 100 kinds of surgical instruments in the great Sanskrit surgical treatise *Sushruta*, the edge of many of which was such that they "could bisect a hair longitudinally" shows the knowledge of the use of steel (Sanskrit "*tikhna*" or sharp) as early as 3rd century B.C.

The evidence regarding the knowledge of cast iron in ancient India is very meagre.

Turning to the methods of manufacture of wrought iron and steel, Prof. Neogi showed that wrought iron was prepared by the "direct method," i.e., directly from the ores without the intermediate preparation of cast-iron by heating the ores with charcoal in small blast furnaces. Steel was made in small crucibles by heating wrought iron with certain plants and obtained as cast-steel. Prof. Neogi maintained along with Dr. Percy that the "crucible process of making steel by cementation" was really an Indian discovery rediscovered by Mushet in 1800 in Europe.

MARCH, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 1st March, 1916, at 9-15 P.M.

LIEUT.-COLONEL SIR L. ROGERS, K.T., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S., President, in the chair.

The following members were present:—

Maulavi Abdul Wali, Dr. F. H. Gravely, Mr. H. G. Graves, Rev. R. Oka, Dr. Satis Chandra Vidyabhusana, Dr. Annandale and Dr. Hossack.

Visitor :—Lady Rogers.

The minutes of the January Ordinary Monthly Meeting, the Annual Meeting and the February Ordinary Monthly Meeting were read and confirmed.

Sixty-nine presentations were announced.

The General Secretary reported that Mr. P. Mukerji had expressed a desire to withdraw from the Society.

The General Secretary also reported the death of Sir William Turner, K.C.B., an Honorary Fellow of the Society.

Dr. Annandale read the following obituary notice:—

*Obituary Note on Sir William Turner, K.C.B., F.R.S.,
Hon. F.A.S.B., etc., died 15th February, 1916.*

William Turner, patriotic Scotchman and citizen of Edinburgh as he became, was born at Lancaster in 1832. For well over half a century (1854-1916) he was on the staff of the University of Edinburgh, for thirteen years as Demonstrator of Anatomy, thirty-six years as Regius Professor of the same science, and finally for eleven years as Principal and Vice-Chancellor. For at least twenty years he dominated university politics, and even those who complained that his ideas were old-fashioned had no thought of questioning his whole-hearted devotion and the power of his personality. With his death a chapter in the history of the Scottish universities is closed.

Though a biologist rather than a medical man, he took a very prominent part in the work of the British Medical Association, of the General Council of which he was President from 1898 to 1904. He was President of the British Association for the Advancement of Science in 1900. The lucidity of his academic lectures was famous.

It was not only as an anatomist pure and simple that Turner

achieved enduring fame but still more in the capacity of anthropologist and student of the marine mammals—in particular of the whales, of which he accumulated a unique collection in the Anatomical Museum of his University. There also is preserved his series of human crania, a collection to which the gratitude of old students was continually adding specimens from all parts of the world.

Turner's most important contribution to original research was perhaps his account of the human skulls and other bones obtained in the course of the 'Challenger' Expedition. In this memoir, which was published in the Scientific Reports of the expedition in 1884, he evolved a method of investigation that forms the basis of most modern work. In the many papers he subsequently wrote on the same subject he departed in no important respect from the system there laid down. Among his later papers those on the craniology of the peoples of the Indian Empire were among the most valuable. He summarized his investigations into the anatomy of the whales and seals in his recent *Catalogue of the Marine Mammals in the Anatomical Museum of the University of Edinburgh*. Long after he ceased to be Professor of Anatomy he retained a working-room in the Anatomical Department of the University and continued not only to carry on his own original work, which was only terminated by his death, but to encourage the work of others. His range of subjects was perhaps broader in his old age than at any other period, and after he became Principal he did not hesitate to write on groups so far removed from those to which he had devoted his main scientific energies as the parasitic Copepoda and the Hexactinellid sponges. In recent years his papers, with few exceptions, were published in the *Transactions or the Proceedings of the Royal Society of Edinburgh*, in which his influence was almost as strong as it was in the University.

The President announced that Dr. N. Annandale had been appointed Anthropological Secretary in the place of Mr. J. Coggin Brown, resigned.

The General Secretary read the names of the following gentlemen who were appointed to serve on the various committees during 1916 :—

Finance Committee.—Dr. N. Annandale, The Hon. Justice Sir Asutosh Mukhopadhyaya, Kt., Mahamahopadhyaya Haraprasad Shastri, C.I.E., Mahamahopadhyaya Satis Chandra Vidya-bhusana, Hon. Librarian (Ex-officio).

Library Committee.—The Hon. Justice Sir Asutosh Mukhopadhyaya, Kt., Mahamahopadhyaya Haraprasad Shastri, C.I.E., J. A. Chapman, Esq., Dr. H. H. Hayden, Father H. Hosten, Major D. McCay, ex-officio (Library Regulation 22) Anthro-

logical Secretary, Biological Secretary. Physical Science Secretary, the two Philological Secretaries, Medical Secretary, Hon. Librarian.

Philological Committee.—Abdulla Al-Ma'mun Suhrawardy, Esq., Dr. Satis Chandra Vidyabhusana, The Hon. Justice Sir Asutosh Mukhopadhyaya, Kt., Mahamahopadhyaya Haraprasad Shastri, Rai Bahadur Monmohan Chakravarti, Babu Rakhal Das Banerjee, Babu Nilmani Chakravarti, A. H. Harley, Esq.

Hon. Numismatist.—Mr. H. Nelson Wright.

Hon. Joint Secretaries, Science Congress.—Dr. J. L. Simonsen and Prof. P. S. Macmahon.

The suggestion of Lieut.-Col. Sir Leonard Rogers, Kt., regarding the transfer of all medical journals to the School of Tropical Medicine, of which intimation had already been given by circular to all members, was brought up for final disposal.

The votes of the members were laid on the tables and the President requested any members who had not expressed their opinions to take the present opportunity of filling in voting papers.

The President appointed Mr. H. G. Graves and Maulvi Abdul Wali to be scrutineers.

The scrutineers reported as follows :—

For the proposal—92.

Against the proposal—1.

Carried.

The following gentleman was balloted for as an Ordinary Member :—

Mr. Prabhat Kumar Mukerji, Barrister-at-Law, 4, Chowringhee Road, Calcutta, proposed by Babu Rakhal Das Banerji, seconded by Dr. F. H. Gravely.

Dr. N. Annandale exhibited some Japanese pictures.

The following papers were read :—

1. *Some old Records of the Madras Army, 1757-1759.*—*Edited by the REV. H. HOSTEN, S.J.*

2. *A Tibetan Funeral Prayer.*—*By KAZI DAUSAMDUP. Communicated by the Joint Philological Secretary.*

These papers will be published in a subsequent number of the *Journal*.

The President announced that the next adjourned meeting of the Medical Section would be held on Wednesday, the 8th March, 1916, at 9-30 P.M.

APRIL, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 5th April, 1916, at 9-15 P.M.

LIEUT.-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S., President, in the chair.

The following members were present:—

Dr. N. Annandale, Dr. C. A. Bentley, Mr. H. G. Carter, Dr. B. L. Chaudhuri, Mr. G. de P. Cotter, Babu Hemchandra Das Gupta, Dr. F. H. Gravely, Mr. H. G. Graves, Dr. H. H. Hayden, Dr. W. C. Hossack, Mr. S. W. Kemp, Mr. R. D. Mehta, Mr. C. S. Middlemiss, Dr. Satis Chandra Vidyabhusana, Mr. E. Vredenburg.

Visitors:—Mrs. H. G. Carter and Mr. K. C. Ghose.

The minutes of the last meeting were read and confirmed.

Thirty-three presentations were announced.

The General Secretary reported that Mr. L. Petrocochino and Lieut.-Col. R. P. Wilson, I.M.S., had expressed a desire to withdraw from the Society.

The General Secretary reported the death of Raja Saccidanda Tribhuban Deb of Bamra, an Ordinary Member of the Society.

The following gentleman was balloted for as an Ordinary Member:—

Babu Radhanath Shaha, Medical Practitioner, No. 16, Lachmi Kunda, Benares City, proposed by Mahamahopadhyaya Haraprasad Shastri, seconded by Babu Nilmani Chakravarti.

The following exhibitions were shown:—

1. Dr. H. H. Hayden exhibited ores of tungsten and molybdenum.

2. Mr. G. de P. Cotter exhibited Teeth of Eocene Mammals from Burma.

3. Mr. H. G. Carter exhibited some samples of Asafœtida, showing unexplained differences.

The President announced that the next Adjourned Meeting of the Medical Section would be held on Wednesday, the 26th April, 1916, at 9-30 p.m., there being no Meeting on Wednesday, the 12th April, 1916.

The Adjourned Meeting of the Medical Section of the Society was held at the Society's Rooms on Wednesday, the 26th April, 1916, at 9-30 P.M.

LIEUT.-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S., President, in the chair.

The following members were present :—

Dr. U. N. Brahmachari, Dr. K. K. Chatterjee, Dr. W. C. Hossack, Major D. McCay, I.M.S., Lt.-Col. F. O'Kinealy, I.M.S.

Visitors:—Dr. B. Ganguly, Dr. N. H. Hume, Dr. R. P. Wilson, Dr. Tegart.

The minutes of the December meeting were read and confirmed.

Dr. K. K. Chatterjee showed some clinical cases.

Dr. W. C. Hossack read a paper entitled "German Influence on Modern Bacteriology—Need for Elimination."

Rai Bahadur Dr. Upendra Nath Brahmachari, M.A., M.D., Ph.D., read a paper entitled "Third Report on the treatment of Kala-azar with special reference to the use of Antimony and Formaldehyde."

MAY, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 3rd May, 1916, at 9-15 P.M.

MAHĀMAHOPĀDHYĀYA HARAPRASĀD SHĀSTRĪ, C.I.E., Vice-President, in the chair.

The following members were present :—

Mr. A. C. Atkinson, Babu Rakhāl Das Banerjee, Mr. J. A. Chapman, Mr. H. G. Graves, Mr. S. W. Kemp, Rev. R. Oka, Babu Radhanath Laha, Mr. Satis Chandra Vidyābhūṣaṇa.

Visitors :—Mr. A. C. Ghose, Mr. G. D. Sarkar.

The minutes of the last meeting were read and confirmed.

Twenty-eight presentations were announced.

The General Secretary reported the death of Mr. R. C. Burton of the Geological Survey of India and Mr. M. S. Ramaswami of the Botanical Survey of India, Ordinary Members of the Society.

The General Secretary reported that Capt. John Inglis Eadie, 97th Deccan Infantry, had expressed a desire to withdraw from the Society.

The following gentlemen were balloted for as Ordinary Members :—

M. van Geuns, Esq., Managing Editor of the Newspaper "Soerabajasch Handelsblad," Soerabaja (Java), Great Eastern Hotel, Calcutta, proposed by Mr. W. R. Gourlay, seconded by Mr. F. H. Gravely; *Babu Dharanidhar Dutt*, B.A., Nepal Educational Service, Katmandu, Nepal, proposed by Mr. B. L. Chaudhuri, seconded by Mr. Gopal Das Chaudhuri.

Mahāmahopādhyāya Haraprasād Shāstri exhibited a golden manuscript of a very rare work entitled Heruka Tantra, Section Sambarodoya only.

Dr. Satis Chandra Vidyābhūṣaṇa exhibited Nag-Sgron—a very early indigenous dictionary of the Tibetan language.

The following paper was read :—

Some traditions about Sultan 'Ala'uddin Husain Shah and Notes on some Arabic Inscriptions from Murshidabad. By G. D. SARKAR. Communicated by BABU RAKHAL DAS BANERJI.

This paper will be published in a subsequent number of the *Journal*.

The President announced that there would be no meeting of the Medical Section during this month.

JUNE 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 7th June, 1916, at 9-15 P.M.

LIEUT.-COLONEL SIR LEONARD ROGERS, KT., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., I.M.S., President, in the chair.

The following members were present :—

Maulavi Abdul Wali, Dr. N. Annandale, Dr. B. L. Chaudhuri, Miss M. L. Cleghorn, Mr. T. P. Ghose, Mr. S. W. Kemp, Mr. C. S. Middlemiss, Rev. R. Oka, Dr. Stasis Chandra Vidya-bhusana.

Visitors :— Miss O. M. Cleghorn and Mrs. B. M. Cooper.

The minutes of the last meeting were read and confirmed.

Fifty-seven presentations were announced.

The General Secretary announced the following additions and changes to the " Regulations regarding the lending out of manuscripts " and to the " Office Regulations regarding leave and late attendance " passed by the Council on the 31st May 1916.

The following to be added to the " Regulations regarding the lending out of manuscripts " :—

" 6. Applications for the loan of Government manuscripts in the charge of the Society shall be dealt with by the Hony. Librarian in the same terms as manuscripts belonging to the Society; the Officer-in-charge shall hand over to the Hony. Librarian the manuscripts required for this purpose and shall take a formal receipt from him in each case."

To the " Office Regulations regarding leave and late attendance," the following to be inserted instead of " All other leave shall be without pay " :—

" In cases of illness, leave on half pay for a period not exceeding fifteen days in the year may also be granted, provided a certificate is produced showing that treatment is being received from a recognized hospital."

The following gentlemen were balloted for as Ordinary Members :—

Mr. Suryya Prasad Mahajan, Honorary Secretary, Sri Mannu Lall Library, Murarpur, Gaya, proposed by Babu Nagendranath Vasu, seconded by Mahamahopadhyaya Hara-

prasad Shastri; Mr. Joseph Orlando Ferrer, Cuban Consul, 5, Hastings Street, Calcutta, proposed by Mr. J. A. Chapman, seconded by Dr. F. H. Gravely.

Dr. N. Annandale exhibited living specimens of *Campanulina ceylonensis* from brackish water near Calcutta.

The following papers were read :—

Zoological Results of a tour in the Far East.—By N. ANNANDALE, D.Sc.

Introduction.

1. *Freshwater Lumellibranch Shells.*
2. *Polyzoa of fresh and brackish water.*
3. *Sponges of fresh and brackish water.*

The President announced that there would be no meeting of the Medical Section during this month.

PRINCIPAL PUBLICATIONS OF THE SOCIETY.

- Asiatic Researches, Vols. I—XX and Index, 1788—1839.
Proceedings, 1865—1904 (now amalgamated with Journal).
Memoirs, Vol. 1, *etc.*, 1905, *etc.*
Journal, Vols. 1—73, 1832—1904.
Journal and Proceedings [*N. S.*], Vol. 1, *etc.*, 1905, *etc.*
Centenary Review, 1784—1883.
Bibliotheca Indica, 1848, *etc.*

A complete list of publications sold by the Society can be obtained by application to the Honorary Secretary, 1, Park Street, Calcutta.

PRIVILEGES OF ORDINARY MEMBERS.

- (a) To be present and vote at all General Meetings, which are held on the first Wednesday in each month except in September and October.
- (b) To propose and second candidates for Ordinary Membership.
- (c) To introduce visitors at the Ordinary General Meetings and to the grounds and public rooms of the Society during the hours they are open to members.
- (d) To have personal access to the Library and other public rooms of the Society, and to examine its collections.
- (e) To take out books, plates and manuscripts from the Library.
- (f) To receive *gratis*, copies of the *Journal and Proceedings* and *Memoirs* of the Society.
- (g) To fill any office in the Society on being duly elected thereto.

HEAD OFFICE
22 AUG. 1916

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SURVEY OF INDIA
HEAD QUARTERS (G. T. S.)
11 SEP. 1916

JOURNAL & PROCEEDINGS

OF THE

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New Series,

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1916.

Issued August, 1916.

List of Officers and Members of Council

OF THE

ASIATIC SOCIETY OF BENGAL

For the year 1916.

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C. W. Peake, Esq., M.A.

Honorary Numismatist.

H. N. Wright, Esq., I.C.S. (offg. H. R. Nevill, Esq., I.C.S.).

6. A Progress Report on the Preliminary Work done during the year 1915 in connection with the Proposed Bardic and Historical Survey of Rajputana.

By DR. L. P. TESSITORI.

INTRODUCTION.

ERRATA.

Journal, Asiatic Society of Bengal, Vol. XI, Nos. 10-11, 1915.

P. 437, in the first line of the third paragraph: *for* "invertebrates" *read* "vertebrates."

P. 477, last line but one: *for* "of" *read* "or."

P. 478, line 8: *for* "or" *read* "and."

P. 478, line 15: *for* "prihīvī vijitvā" *read* "prithivī-vijitvā."

P. 478, note 3: *for* "virudda Mnatskr̥t" *read* "virudda matikr̥t."

THE WORK DONE.

The work now under report was started from the 1st January, 1915, in accordance with the plan laid down in my "Scheme for the Bardic and Historical Survey of Rajputana," except for a few differences imposed by the limited means at my disposal. My two assistants, Paṇḍit Rāma Karṇa and Cāraṇa Kiśora Dāna, were liberated from the Tawarikh and Bardic Mehkma, where they had been employed, only on the 26th of January, but I had been able to utilize their services even before, in their non-office hours. The travelling man, Bhāta Nānū Rāma, was regularly employed from the 1st of January, and so was the copyist. The two former assistants

6. **A Progress Report on the Preliminary Work done during the year 1915 in connection with the Proposed Bardic and Historical Survey of Rajputana.**

By **DR. L. P. TESSITORI.**

INTRODUCTION.

The difficulties which have made it impossible to commence the Bardic and Historical Survey of Rajputana in Jodhpur on the lines proposed in the scheme approved by the Council of the Asiatic Society in December 1914, and published in the Society's Journal for that month (Vol. X, pp. 373-410) have been briefly referred to in the Society's Annual Report for the present year (1915). These led, as there stated, to the transference of my work to Bikaner, where it is hoped that it may be possible to commence the Survey on similar lines, though probably on a smaller scale.

I moved to Bikaner on the 6th December, invited by H. H. the Maharaja, who had decided to employ me for four months in the first instance, i.e. from December to the end of March, to examine the bardic and historical materials in the Darbar Library in the Fort, and suggest a plan for future work. At the end of the four months, the advisability of a further employment in connection with the compilation of a History of Bikaner and the publication of the most important bardic poems referring to the State, will be taken into consideration together with the question of funds. The field is a rich and interesting one, and the intelligent and enlightened support of the present Maharaja, Colonel Sir Ganga Singh, affords good hopes of a complete success.

THE WORK DONE.

The work now under report was started from the 1st January, 1915, in accordance with the plan laid down in my "Scheme for the Bardic and Historical Survey of Rajputana," except for a few differences imposed by the limited means at my disposal. My two assistants, Paṇḍit Rāma Karna and Cāraṇa Kiśora Dāna, were liberated from the Tawarikh and Bardic Mehkma, where they had been employed, only on the 26th of January, but I had been able to utilize their services even before, in their non-office hours. The travelling man, Bhāṭa Nānū Rāma, was regularly employed from the 1st of January, and so was the copyist. The two former assistants

were placed at my disposal for a period of three months in the first instance, and when this period expired and I asked for a renewal of their leave, it was refused. So they remained with me only three months, Rāma Karna assisting me practically only till the beginning of May, when he fell ill, and Kiśora Dāna till the end of the same month. The travelling man, though eventually not always the same Bhāta Nānū Rāma, was employed till the end of October, and so also the copyist, but in the months of September and October I had two copyists instead of one. To proceed with order, I will divide the work under two heads, corresponding to the Editing and Local Superintending Department and the Searching Department in my Scheme. In the Publishing Department nothing was done, as in the beginning the Asiatic Society of Bengal withheld sanction for printing the results of the Survey till the decision of the Government of India was known, and afterwards there were no funds to meet the expenses of publication.

To begin with the editing, the most noteworthy result achieved is the preparation of the edition of the *Vacānikā Rāthōra Ratana Śiṅghajī rī Mahesadāsōta rī*, a bardic poem by Cāraṇa Khiriyò Jagò. A dozen manuscripts of this poem had been collected during the preliminary period August—November, 1914, and to these others were added subsequently, some of which dating from the end of the seventeenth century A.D. Of all the manuscripts thus collected, 13 have been taken into account in the edition prepared. The work was composed a few years after the battle of Ujain (1658 A.D.), fought by Mahārāja Jasavanta Śiṅgha of Jodhpur on one side, and Aurangzeb and Murad, the two rebel sons of Shāh Jahān, on the other. It is the aforesaid event that the poem celebrates, but special homage is paid to the heroism of Ratana Śiṅgha, Rājā of Ratlam, in Malwa, who was killed on the field. It is a work of a high literary value and enjoys a certain popularity, especially in Marwar, though the form of language in which it is couched, is far beyond the intelligence of the average reader. As proposed in my Scheme, the edition of the poem will consist of two parts: the one containing the Dīṅgaḷa text with different readings and critical notes, and the other the English translation with historical introduction and explanatory notes.

Besides the *Vacānikā*, the edition of another work has been prepared for the press, and this is the *Uktiratnākara* by Sādhu Sundara. It is not a bardic work, but a work on grammar in the form of an etymological glossary, and its chief importance lies in the fact that it throws a considerable light on the Old Mārwārī of the beginning of the seventeenth century A.D. I have shown elsewhere that the Dīṅgaḷa language of the bards of Rajputana is ultimately but Old Mārwārī, or, to use a more comprehensive term, Old Western Rājasthānī, hence the connection of the *Uktiratnākara* with our field of

research. It was first meant for insertion in the "Bulletin," but since, owing to the present impossibility of starting the Survey on an official and permanent footing, the "Bulletin" now has hardly any reason to come into existence, it might, like the *Vacānikā*, form a volume in the "Series of Bardic and Historical Texts." Incidentally, it may be observed, that as there are some grammatical and literary works, which are directly or indirectly connected with the bardic literature of Rajputana, though they cannot be described as bardic according to the strict meaning of the term, it is advisable that they should also be published in the aforesaid "Series." In this regard, it seems to me that if the "Series" was called "Bibliotheca Rajasthanica," the appellation would be a very appropriate one.

Some other materials, which had been prepared for the "Bulletin," will be found given as an appendix to the present Report. The monograph on Phalodhī was but one of six, the other five comprising similar accounts of Pohakaraṇa, Sojhata, Sivāṇò, Meratò and Jētāraṇa. These have remained incomplete as visits to the places with the object of collecting inscriptions, etc., were first postponed till more funds would be granted, and afterwards found impracticable. But where I have been wronged the most, is in the Chronicles, which I had begun to examine with a view to compile a History of Jodhpur. Here all my pains have been in vain, except for a portion of a *Descriptive Catalogue*, which is ready for the press and will be found of use in the compilation of the History of Bikaner and, eventually, the minor Rāthòra States. It is a description and classification of the historical information contained in sixteen huge volumes, almost all forming part of two rich private collections at Jodhpur. The work was interrupted when, in consequence of the Darbar's departing from its friendly attitude, people became afraid of lending me their books.

In the searching department of the work, I was a little better off, for in spite of the existence of the same difficulties as in the editing, namely want of help and scarcity of funds, I was able to employ men from the 1st of January to the end of October uninterruptedly. As proposed in my Scheme, I started with two officers in this department: a travelling man and a copyist, and this without taking into account the second assistant, Cāraṇa Kiṣora Dāna, whose services were also occasionally utilized for the search till he was allowed to remain with me. The appointment of Bhāṭa Nānū Rāma for a travelling man eventually proved a failure, the man soon revealing himself as unreliable and unfit for the search of manuscripts. He was dismissed at the end of January and another employed in his place, his name Candra Bhāṇa, a Puṣkaraṇā brahman who was a clerk in the Tawarikh Mehkma and had been recommended by the first assistant Paṇḍit Rāma Karṇa. But he also proved

unfit for the search of manuscripts and had to be dismissed in the beginning of April. I was more fortunate with the third man I employed, Ujala Rāma Dayāla, a Siṅdhāyaca Cāraṇa, whose services were at last found satisfactory.

The places explored by the travelling man are the following:—Phalodhi and environs (January 2nd—21st), Balarwa (January 24th—31st), Pali town and villages in the district (February 17th—April 5th), Bhandiyawas and environs (April 13th—20th), Phalodhi town (April 22nd—23rd), Godhwar province (April 27th—May 31st), Sojhat town and villages in the district (June 2nd—24th), Phalodhi district (July 10th—September 1st). From all the above-mentioned places, impressions of inscriptions were brought and bardic manuscripts borrowed. The last two months of September and October were spent by the travelling man solely in returning the manuscripts borrowed during the preceding eight months, except for a visit to Sitamau and Semalkher, in Malwa (October 19th—28th), the object of which was to collect information concerning the life and epoch of Khiriyò Jagò, the author of the *Vacani-kā*, whose descendants live there.

The places explored by myself in connection with the search for manuscripts and inscription, are the following:—Rani, Sadri and Ranakpur (January 7th—11th), Ghanghana and Jhanwar (January 30th), Phalodhi, Kolu, Jalora (February 21st—24th), Pali (March 29th—31st). Outside Marwar, I visited the following places, all in connection with the new arrangements which it became necessary to try to make after the Jodhpur disappointment:—Abu (April 8th—12th), Ajmer, Udaipur, Jaipur (May 30th—June 6th), Bikaner (November 8th—11th). During the visit to Jaipur, manuscripts of bardic interest were also purchased.

As a result of the search, a collection has been made of 129 impressions of inscriptions, and 100 manuscripts, of which 16 received, 16 purchased, and 68 copied in my office under my supervision. The manuscripts received and purchased are all original, except 7 which are modern copies, and they make a total of 32 manuscripts, which include not less than 60 different works. The manuscripts copied in my office contain only one work each. The following is a list of all the 100 manuscripts collected, in which *R* is used to mean "Received," *P* "Purchased," and *C* "Copied."

MANUSCRIPTS RECEIVED.

R. 1 : अजाज गाहणी री वात,
सदैवह साबलिफ़ा री वात,
गुडार्थ,

रिसालू राजा री वात,
वचनिका राठौड़ रतनसिङ्गजी री महेसदासौत री,
गोरा वादल री चौपई .

Size 11 " × 7 $\frac{3}{4}$ ". No. of leaves 72, of which many broken and crumbly. Unbound. Jaina. Fragmentary, all the works contained being incomplete. The last pages contain ordinary illustrations, in water-colours, sixteen in all.

The first two works were written at Nagòra, Saṃvat 1808; the fourth at Meratò, Saṃvat 1809.

Presented by Paṇḍit Pannā Lāla Bākalivāla, Nagòra the 9th September, 1914.

R. 2: चन्दकुँवर री वात,
सदैवक सावलङ्गा री वात,
जगदे पँवार री वात .

Size 8 $\frac{1}{4}$ " × 5 $\frac{3}{4}$ ". No. of leaves 72. Unbound. Jaina. The first work is incomplete owing to the first page being wanting.

Written at Rāyapura, in Saṃvat 1845.

Presented by Paṇḍit Rāma Karṇa, Jodhpur, 24th September, 1914.

R. 3: वचनिका राठौड़ रतनसिङ्गजी री महेसदासौत री
(extract),
गीत सिङ्गी जोधराजजी रा,
गिन्दोली री वात,
फुटकर वाताँ .

Size 6 $\frac{1}{2}$ " × 8 $\frac{1}{2}$ ". No. of leaves 140. Unbound. Jaina. Marwari script. Most of the works comprehended under the general title of फुटकर वाताँ are Jaina.

Written between Saṃvat 1842 and 1890 at Vanāra.

Presented by Paṇḍit Rāma Karṇa, Jodhpur, 24th September, 1915.

R. 4: उदैपुर री गजल .

Foolscap. No. of leaves 6. Loose.

Modern copy made at Kheravò, Saṃvat 1969. The original was composed Saṃvat 1757, under rāṇā Amara Siṅgha ii of Mewar.

Presented by the Jainācārya Dharma Vijaya Sūri, December, 1914.

- R. 5: धवलबत्तीसौ रा दूहा आसिया वाँकीदास रा कहिया,
 नायकानायकवरणन,
 भाषाचित्र महाराज गजसिङ्गजी रौ हेम सोमोर रौ
 कहियौ,
 नीसाणी गरीबदास रौ कह्यौ,
 आऊवै धरणी ऊवौ तिण रा कवित्त .

Size 5" × 7". No. of leaves 30. Unbound. About a hundred years old.

Presented by Cāraṇa Siṅdhāyaca Udè Rāja, Jodhpur, 24th March, 1915.

- R. 6: गीत साहपुरा रा राजा उमेदसिङ्गजी रा खिड़िया
 ऊकमचन्द रा कहिया,
 कुण्डलिया नाममाला रतनू सुरता रा कहियौ,
 कौरत लिखमी रौ संवाद साँदू संग्राम रौ कहियौ,
 फुटकर कविता .

Size 4½" × 6½". No. of leaves 97. Leather-bound; some leaves detached.

Written at Jūdhīyò between Saṃvat 1867 and 1874. The second work was written by the author himself.

Presented by Cāraṇa Siṅdhāyaca Udè Rāja, Jodhpur, 24th March, 1915.

- R. 7: विमल मन्वीसर रौ सिलोकौ विनीतद्वत .

Foolscap. No. of leaves 7. Loose.

Modern copy.

Presented by the Jainācārya Dharma Vijaya Sūri, April, 1915.

- R. 8: ओसवालाँ रौ उतपत रा कवित्त .

Foolscap. No. of leaves 4. Loose.

Modern copy.

Presented by the Jainācārya Dharma Vijaya Sūri, April, 1915.

- R. 9: समेतसिखरस्तवन जयविजयद्वत .

Foolscap. No. of leaves 8. Loose.

Modern copy.

Presented by the Jainācārya Dharma Vijaya Sūri, April, 1915.

R. 10 : समेतगिरितीर्थमाला जयसागरकृत .

Foolscap. No. of leaves 10. Loose.

Modern copy, made from a MS. written by Hetu Sāgara at Kisanagaḍha, in Samvat 1717.

Presented by the Jainācārya Dharma Vijaya Sūri, April, 1915.

R. 11 : दुदोड़ रा चाँपावत वीठलदासौताँ री तवारीख री खुलासौ .

Foolscap-size. No. of leaves 12. Unbound. Caused to be compiled by Nāthū Singha, *thākura* of Dudora, in Samvat 1968, and presented by the same on June 4th, 1915.

R. 12 : फुटकर कविता .

Size 5½" × 9". No. of leaves 95. Bound but uncovered. Some pages torn. Very bad writing.

About a hundred years old.

Presented by Cāraṇa Gāḍaṇa Lādhū Rāma of Dhāṇadò (Vāli), September, 1915.

R. 13 : कुन्दरनावली हरिरामदास कृत .

Size 8" × 6½". No. of leaves 13. Loose and fragmentary.

Written in the year Samvat 1852.

Presented by Cāraṇa Gāḍaṇa Lādhū Rāma of Dhāṇadò (Vāli), September, 1915.

R. 14 : महाराज अभैसिङ्गजी रा कविता खिड़िया बखताजी रा कहिया,

फुटकर कविता .

Size 8" × 6½". No. of leaves 51. Loose and fragmentary. Originally forming one body with R. 13.

About a hundred years old.

Presented by Cāraṇa Gāḍaṇa Lādhū Rāma of Dhāṇadò (Vāli), September, 1915.

R. 15 : करगीजी री रूपक लालस रामदान री कहियो .

Size 6½" × 10½". No. of leaves 14. Loose. Modern.

Copied and presented by Cāraṇa Lālasa Gaṇesa Dāna of Jodhpur, a descendant of the author. Jodhpur, 2nd November, 1915.

R. 16: गीत साह्यपुरा रा राजा उमेदसिङ्गजी रा खिड़िया
ऊकमचन्द रा कहिया,
फुटकर कविता .

Size $6\frac{1}{4}$ " \times $4\frac{1}{4}$ ". No. of leaves 82. Cloth-bound.

The first pages were written at Bhadorò by Sādhu Rāma Nārāyaṇa in Samvat 1912.

Presented by Cāraṇa Bārātha Kiśora Dāna, Jodhpur, November, 1915.

MANUSCRIPTS PURCHASED.

P. 1: फुटकर गीत कवित्त छन्द सेवग मब्का राम रा कहिया.

Size $5\frac{3}{4}$ " \times $6\frac{1}{4}$ ". No. of leaves 94. Bound.

Original MS., apparently all written by the very hand of the author, who lived in Godhavāra under Mahārāja Māna Singha of Jodhpur. One of the poems, the *Godhāna Pacīsī*, is dated Samvat 1862 and was written at Ghaṇerāva by the author himself.

Purchased at Jodhpur, the 24th September, 1914.

P. 2: ओसवालाँ री उतपत .

Size $5\frac{3}{4}$ " \times $6\frac{1}{4}$ ". No. of leaves 4. Unbound.

This MS. originally formed one body with the foregoing, but leaves being detached and subject different, it has been classed separately.

P. 3: रतनाँ हमीर री वात .

Size $6\frac{3}{4}$ " \times $4\frac{1}{2}$ ". No. of leaves 50. Unbound.

Purchased at Jodhpur, the 25th September, 1914.

P. 4: इबराहीँ अदहम वली का चरित्र, कबीरकृत .

Size 5" \times $6\frac{1}{2}$ ". No. of leaves 94. Cloth-bound.

Written in Samvat 1879.

Purchased at Jaipur, the 29th September, 1914.

P. 5: नाथचन्द्रिका .

Size 5" \times 7". No. of leaves 38. Bound.

Purchased at Jodhpur, the 25th September, 1914.

P. 6: सुन्दरशृङ्गार,
माताजी री सकत भक्त परकास .

Size $5\frac{1}{2}$ " \times $5\frac{3}{4}$ ". No. of leaves 126, of which the last 20 added subsequently. Marwari script. Bound but uncovered.
Purchased at Nagor, the 9th September, 1915.

P. 7: **ढलसंग्रह मुनिखेमहत .**

Size 4" \times $9\frac{1}{2}$ ". No. of leaves 9. Unbound. Jaina. Incomplete.

Date of composition Samvat 1745.

Purchased at Jaipur, the 30th September, 1914.

P. 8: **२४६ फुटकर गीत,
मेवाड़ रा महाराणाँ रा गीत,
आँनिर रा महाराज प्रतापसिङ्गजी री नीसाणी खिड़िया
ऊकमचन्द री कह्यी (incomplete),
राजनौति रा कवित्त कवि देवीदास द्त (incomplete),
दवावैत महाराज अजितसिङ्गजी री द्वारकादास
धधवाड़िया री कह्यी,
फुटकर कविता .**

Size $13\frac{1}{4}$ " \times 10". No. of leaves 168, of which about one half blank. Cloth-bound. Almost all in Devanāgarī, only a few pages in Marwari script.

About a hundred years old.

Purchased at Jodhpur in November, 1914.

P. 9: **अचलदास खीची री वचनिका .**

Size $8\frac{3}{4}$ " \times $5\frac{1}{2}$ ". No. of leaves 26. Incomplete, owing to the first pages being missing. Unbound.

Written in Samvat 1799.

Purchased at Jaipur, the 5th June, 1915.

P. 10: **भोजचरित्र अथवा पनरमी विद्या .**

Size $4\frac{1}{2}$ " \times $9\frac{3}{4}$ ". No. of leaves 16. Unbound. Jaina.

Written in Samvat 1919.

Purchased at Jaipur, the 5th June, 1915.

P. 11: **विक्रमादित्यचरित्र लक्ष्मीवल्लभदत्त .**

Size $4\frac{1}{4}$ " \times 10". No. of leaves 86, of which the first one missing. Unbound. Jaina.

Purchased at Jaipur, the 5th June, 1915.

P. 12: **रिसालू कँवर री वात .**

Size 4" \times 9". No. of leaves 6. Unbound. Incomplete.

Purchased at Jaipur, the 5th June, 1915.

P. 13: जगदे पँवार रौ वात .

Size 9" × 5½". No. of leaves 6. Unbound. Jaina. Incomplete.

Apparently about 150 years old.

Purchased at Jaipur, the 5th June, 1915.

P. 14: पना रौ वात,
ल्लोत्रमन्त्रसंग्रह .

Size 8¼" × 6". No. of leaves 110. Bound, but uncovered. Jaina. Beautiful writing.

Written in Samvat 1868.

Purchased at Jaipur, the 5th June, 1915.

P. 15: महाराज अभैसिङ्गजी रा कवित्त खिड़िया बखता रा
कहिया,
फुटकर गीत,
अभैगुण कवि पिराग रा कहिया .

Size 8¼" × 6¼". No. of leaves 192, of which many blank. Bound, but uncovered.

Written by Sevaga Rāya Canda of Jodhpur between Samvat 1853 and 1854.

Purchased at Jodhpur, the 12th September, 1915.

P. 16: सूरजप्रकास कविया करनीदान रौ कहियौ,
नाममाला कवि हमीर रौ कह्यौ,
पिङ्गलछन्दयज्ञ .

Size 6¼" × 8". No. of leaves 270. Bound.

Written by Sevaga Rāya Canda of Jodhpur between Samvat 1852 and 1853.

Purchased at Jodhpur, the 12th September, 1915.

MANUSCRIPTS COPIED.

C. 1: जोधपुर महाराज गजसिङ्गजी रा निर्वाण कवित्त, 2 leaves.

From a MS. about 100-150 years old, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 2.: जोधपुर रा देवस्थान तथा निवाणौ रौ विगत, 10 leaves.

From the MS. No. 11 (r-s) of *Descriptive Catalogue*, Sect. i, pt. i.

C. 3: तपागच्छ रौ पट्टावली, 33 leaves.

From a MS. written in Saṃvat 1889, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 4: अमरवत्तीसी भाट हरदास रौ कही, 12 leaves.

From a MS. written by Sevaga Pirāga at Ahamadābād in Saṃvat 1773, borrowed from Cāraṇa Sādū Riva Dāna of Tokarāsa.

C. 5: वीरमायण डाठी बाहदर रौ कही, 56 leaves.

From a MS. written by Bogasò Gaṅgā Rāma Panāuta at Saravari, in Saṃvat 1923, borrowed from Cāraṇa Āsiyò Gumān Siṅha of Sonāṇò.

C. 6: जैनतीर्थमाला श्रीलविनयकृत, 10 leaves.

From a MS. written in Saṃvat 1748, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 7: अकलगिड़ दाढाला रौ बात, 6 leaves.

From a MS. written by *jati* Moti Sāgara at Dudovara in Saṃvat 1766, borrowed from the Thākura of Lhasāṇi (Mewar).

C. 8: सोहमकुलरत्नपट्टावलीरास दीपविजयकृत, 35 leaves.

From a MS. being the autographic original written by Dīpa Vijaya himself in Saṃvat 1877, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 9: पातसाह्र हमायूँ रौ प्रसङ्ग, 7 leaves.

From a MS. about 50 years old, borrowed from Cāraṇa Āsiyā Gaṇesa Dāna of Jodhpur.

C. 10: चीतोड़ रौ गजल, 2 leaves.

From a MS. written by Paṇḍit Jñāna Vijaya at Sivapuri in Saṃvat 1765, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 11: जोधपुर रा राठौड़ राजा चारगाँ नूँ सासण दिया तिगाँ रौ विगत, 5 leaves.

From the MS. No. 11 (b-e) of *Descriptive Catalogue*, sect. i, pt. i.

C. 12: डोला मारवणी री चौपई, 16 leaves.

From a MS. written at Untālā in Samvat 1763, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 13: बारठ महेसदासजी री कविता, 45 leaves.

From a MS. of the Samvat-century 1700, borrowed from Cāraṇa Sādū Ghana Syāma of Hilorī.

C. 14: वीसलदे चौहाण कौ रास, 11 leaves.

From a MS. written in Samvat 1775, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 15: आठा दुरसाजी री कविता, 9 leaves.

From the same MS. as C. 13.

C. 16: साँदू मालाजी री कविता, 6 leaves.

From the same MS. as C. 13.

C. 17: पाबूजी रा कन्द चोटक बीठू मेहाजी रा कहिया, 3 leaves.

From a MS. written in Samvat 1806, borrowed from Bhāṭī Dōlat Singha, Thākura of Olavī.

C. 18: पाबूजी रा दूहा लधराज रा कहिया, 11 leaves.

From the same MS.

C. 19: संवत रौ विवरौ, 3 leaves.

From the same MS.

C. 20: ओसवालाँ री उतपत, 2 leaves.

From the same MS.

C. 21: चडवाण साँवलदासजी करमसिङ्गजी रा कवित्त मेहाजी
रा कहिया, 8 leaves.

From the same MS. as C. 13.

C. 22: अचलदास खीची री वचनिका, 17 leaves.

From the same MS. as C. 17.

C. 23: आढा दुरसाजी री कविता, 25 + 9 leaves.

From a MS, written in the first half of the Saṃvat-century 1700, borrowed from Cāraṇa Ādhò Saṅkara Dāna of Pācetiyo.

C. 24: आढा खुमाणजी री कविता, 11 leaves.

From the same MS.

C. 25: आढा महेसदासजी री कविता, 8 leaves.

From the same MS.

C. 26: पाबूजी रा कन्द चोटक वीठू मेहाजी रा कहिया, 4 leaves.

From a MS. borrowed from Cāraṇa Āsiyo Pābū Dāna of Bhāḍiyāvāsa.

C. 27: जगदे पँवार री वात, 28 leaves.

From the same MS. as C. 17.

C. 28: आढा दयालदासजी री कविता, 14 leaves.

From the same MS. as C. 23.

C. 29: गीत राठौड़ाँ री वंसावली रा, 8 leaves.

From a MS. borrowed from Bāraṭha Narahara Dāsa of Lolāsa.

C. 30: आढा किसनाजी री कविता, 16 leaves.

From the same MS. as C. 23.

C. 31: खावड़िया राठौड़ाँ री ख्यात, 7 leaves.

From the MS. No. 11 (a) of *Descriptive Catalogue*, sect. i, pt. i.

C. 32: भूलणा महाराणा प्रतापसिङ्गजी रा साँदू माणाजी रा कहिया, 9 leaves.

From a MS. written at Bhadorò by Sādū Haṅū Dāna in Saṃvat 1863, borrowed from Cāraṇa Āsiyo Sumera Dāna of Vasi (Pāli).

C. 33: राठौड़ाँ री खाँपाँ री पीडियाँ, 82 leaves.

From the MS. No. 8 (c) of *Descriptive Catalogue*, sect. i, pt. i.

C. 34: तपागच्छपट्टावली, 4 leaves.

From a MS. borrowed from Vyāsa Mīthā Lāla of Pāli.

C. 35: भूलाया महाराज रायसिङ्गजी रा साँदू मालाजी रा
कहिया, 8 leaves.

From the same MS. as C. 32.

C. 36: डिङ्गल रा सबद, 5 leaves.

From a MS. borrowed from Cāraṇa Āsiyò Pābū Dāna of Bhāḍiyāvāsa.

C. 37: राउ चन्द्रसेण रा रूपक बारठ आसा रा कहिया,
5 leaves.

From a MS. written towards the end of the Saṃvat-century 1600, borrowed from Mathena Jiva Rāja of Phalodhī.

C. 38: जैनतीर्थमाला मेघराजकृत, 4 leaves.

From a MS. borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 39: वाताँ मारवाड़ि री, 39 leaves.

From the MS. No. 15 (g) of *Descriptive Catalogue*, sect. i, pt. i.

C. 40: काँगड़ा बलोच ओटाणी री वात, 4 leaves.

From a MS. written in Saṃvat 1766, borrowed from Vyāsa Mīthā Lāla of Pāli.

C. 41: राव रिणमल खावड़िया री वात, 8 leaves.

From a MS. written at Balūdò by Paṇḍit Guṇa Candra about Saṃvat 1814, borrowed from Cāraṇa Jogajī of Dhāḍhariyò.

C. 42: गोगादेजी री रूपक आटा पहाड़खान री कहियौ, 24
leaves.

From a MS. borrowed from Cāraṇa Vaṇasūra Kirapā Rāma of Pāralāū.

C. 43: पञ्चसहेली रा दूहा कवि छीहल रा कहिया, 5 leaves.

From the same MS. as C. 37.

C. 44 : डोला माहू रा दूहा, 3 leaves.

From the same MS. as C. 41.

C. 45 : कवित्त ठाकुराँ सेरसिङ्गजी रा आढा पहाड़खान रा
कहिया, 4 leaves.

From a MS. written in Samvat 1881, borrowed from Cāra-
ṇa Bāraṭha Rudra Dāna of Indokali.

C. 46 : दातार सूर संवादौ, 3 leaves.

From a MS. written in Samvat 1863, borrowed from Cāraṇa
Lālasa Mūlò of Tolesara.

C. 47 : अकलगिड़ दाढाला री वात, 8 leaves.

From a MS. written at Pāli in Samvat 1810, borrowed
from Candra Vijaya Sūri of Pāli.

C. 48 : अचलदास खीची री वात, 6 leaves.

From the same MS as C. 41.

C. 49 : चीतोड़ री गजल, 3 leaves.

From the same MS.

C. 50 : कवित्त ऊमादे रा बारठ आसा रा कहिया, 3 leaves.

From the same MS. as C. 46.

C. 51 : चन्दनमिलियागिर री वात, 7 leaves.

From the same MS. as C. 41.

C. 52 : जोधपुर रा राठौड़ाँ री ख्यात, 144 leaves.

From the MS. No. 16 (first volume) of *Descriptive Cata-
logue*, sect. i, pt. i.

C. 53 : अचलदास खीची री वात, 4 leaves.

From a MS. written in Samvat 1775, borrowed from Can-
dra Vijaya Sūri of Pāli.

C. 54 : जोधपुर रा राठौड़ाँ री वंसावली राजा जैचन्द सँ
महाराज असवन्तसिङ्ग ताँई, 9 leaves.

From the MS. No. 14 of *Descriptive Catalogue*, sect. i,
pt. i.

C. 55 : विमल नौ सिन्नोकौ, 3 leaves.

From a MS. about 100 years old, borrowed from Candra Vijaya Sūri of Pāli.

C. 56 : भूलणा महाराणा प्रतापसिङ्गजी रा साँदू मालाजी रा कहीया, 4 leaves.

From a MS. about 150-200 years old, borrowed from Cāraṇa Sāidū Rāma Pratāpa of Bhadorò.

C. 57 : साँदू मालाजी रा फुटकर गीत, 9 leaves.

From the same MS.

C. 58 : भूलणा अकबर पातसाहजी रा साँदू मालाजी रा कहीया, 3 leaves.

From the same MS.

C. 59 : भूलणा महाराज रायसिङ्गजी रा साँदू मालाजी रा कहीया, 5 leaves.

From the same MS.

C. 60 : मारवाड़ि माहै राठौड़ रजपूत रावताँ रा उतन, 5 leaves.

From the MS. No. 15 (h) of *Descriptive Catalogue*, Sect. i, pt. i.

C. 61 : अचलदास खीची री वचनिका वणसूर सिवदास री कही, 13 leaves.

From a MS. written in Samvat 1918, borrowed from Cāraṇa Vaṇasūra Mahā Dāna of Jodhpur.

C. 62 : कुण्डलिया ठाकुराँ खीँवकरणजी रा आठा पहाड़खान रा कहीया, 5 leaves.

From a MS. written before Samvat 1918, borrowed from Cāraṇa Bārātha Likhamī Dāna of Angadosa.

C. 63 : जोधपुर रा राठौड़ाँ री ख्यात, 91 leaves.

From the MS. No. 16 (second volume) of *Descriptive Catalogue*, sect. i, pt. i.

C. 64: डोला मारवणी री वात, 28 leaves.

From the same MS. as C. 62.

C. 65: अकलमिड़ वराह री वात, 9 leaves.

From a MS. written at Barāṭiyò by Cèna Rāma about Samvat 1855, borrowed from Cāraṇa Sūraja Dāna of Khināvari.

C. 66: पदमणि चौपई लब्धोदय कृत, 19 leaves.

From a MS. 50-100 years old, borrowed from the Jainācārya Dharma Vijaya Sūri.

C. 67: गीत राठौड़ राजवंस री पीठियाँ रा, 4 leaves.

From the same MS. as C. 56.

C. 68: जोधपुर रा राठौड़ाँ री ख्यात सुरू सँ महाराज
अजितसिङ्गजी ताँई, 65 leaves.

From the MS. No. 11 (c) of *Descriptive Catalogue*, sect. i, pt. i.

APPENDIX.

1. THE *e* AND *o* SOUNDS IN MARWARI.

It is no exaggeration to say that in the Prākṛta, Apabhraṃṣa, Old Bhāṣā and Modern Bhāṣā languages, one of the most characteristic phonetical features is always found in the form taken by the two vowels *e* and *o*, and their diphthongal and compound representatives *ai*, *au* and *aī*, *aū*. In fact, the passing of *ai* and *au* into *e* and *o*, or *aī* and *aū*, is one of the chief characteristics distinguishing the Prākṛta and Apabhraṃṣa phonetical system from that of Sanskrit, whilst, on the other hand, the contraction of *aī* and *aū* into *e* and *o* is the most important phonetical feature of the Modern Bhāṣā, in comparison with the phonetics of all forms of speech belonging to the Apabhraṃṣa and Old Bhāṣā stage. In this connection, it is interesting to observe that of the four different stages in the development of the Modern Indo-Aryan Vernaculars, namely (1) the Sanskrit, (2) the Prākṛta-Apabhraṃṣa, (3) the Old Bhāṣā, and (4) the Modern Bhāṣā stage, the 3rd agrees with the 2nd in the elimination of the diphthongs *ai*, *au*, and the preservation of the hiatus in the vocalic combinations *aī* and *aū*. So, in the particular case of Māravāri, the contraction of *aī* and *aū* into *è* and *ò*, becomes the chief characteristic distinguishing it from the Old Western Rājasthāni.

Before proceeding, I must correct a mistake into which I have incurred in my "Notes on the Grammar of the Old Western Rājasthānī, with special reference to Apabhramṣa and to Gujarātī and Māravārī."¹ I am hardly responsible for it, as when I wrote the "Notes," I had never been in India and for all information concerning pronunciation in Gujarātī and Māravārī, had completely to rely on the accounts given by others, which I afterwards found to be incorrect. In the first chapter of the aforesaid "Notes," I had stated that the *ai* and *au* of Old Western Rājasthānī become *ê*, *ô* in Modern Gujarātī and *ai*, *au* in Modern Māravārī. This is inaccurate. In both Modern Gujarātī and Māravārī, the *ai*, *au* of Old Western Rājasthānī become *è* and *ò*.

What I mean by *è* and *ò* is a wide sound of the *e* and *o* vowels, approximately, not exactly, corresponding to the wide sound of *a* in the English word "hat," and *o* in "odd." The difference is mainly in the quantity, the Māravārī vowels *è* and *ò* being more prolonged in pronunciation than the corresponding vowels in the two English words quoted above. It is therefore, originally, a long wide sound. In contradistinction to it, Māravārī possesses also a narrow sound of the same vowels *e* and *o*, which I will mark by an acute accent, thus *é*, *ó*. This sound corresponds to the sound of *a* in "care" and *o* in "old," and can be quantitatively both long and short—the latter case is very rare,—whereas the wide sound can be only long. Now, in Māravārī—and so in Gujarātī—the distinction between the wide and narrow sound of *e* and *o* is of primary importance. There are many words, which are identical in form and differ only in that one contains a wide *e* or *o* and the other a narrow one. It is strange that no Gujarātī grammarian has ever realized that the real difference between the two sounds of *e* and *o* in Gujarātī is not one of quantity, but one of quality. The case here is very analogous to that of French and Italian, where we also find two sounds of *e* and *o*, one narrow and the other wide.

In Modern Gujarātī there is nothing to distinguish the two different sounds of *e* and *o* in the writing. Both are represented by a single *mātrā*, thus : के stays for both *kè* and *ké*, and कौ for both *kò* and *kó*. In Old Māravārī manuscripts, though the distinction is by no means generally observed, there is a tendency to represent the wide sound by two *mātrās* and the narrow by a single *mātrā*. Thus : *kè* = के, *ké* = के, *kò* = कौ, *kó* = कौ. This tendency is evidently based on an orthographical tradition, and the history of the language shows that the Māravārī spelling is the correct one.

From an etymological study of all words which contain

¹ *Indian Antiquary*, Vol. XLIII-XLIV (1914-15).

a wide or narrow *e* or *o*, the general law can be deducted that all Māravārī ès and òs are derived from Apabhramṣa and Old Western Rājasthānī aī and aīi; whilst all és and ós are derived from Apabhramṣa and Old Western Rājasthānī *e* and *o*. Thus

Mār. ऐ < O.W. Rāj., Ap. अइ; Mār. ओ < O.W. Rāj., Ap. ए;
Mār. औ < O.W. Rāj., Ap. अउ; Mār. औ < O.W. Rāj., Ap. औ.

A few examples will illustrate the law better :

Mār. ऐ "is" < O.W. Rāj. इइ < Ap. अअइ < Skt. अइति,

Mār. साथै "over" < O.W. Rāj. साथइ < Ap. मथइ < Skt. मथके,

Mār. चकवै "sovereign" < O.W. Rāj. चकवइ < Ap. चकवइ < Skt.* चक्रपति,

Mār. बैठी "seated" < O.W. Rāj. वरठउ < Ap. उवरइउ < Skt. उपविष्टकः,

Mār. पोतौ "grandson" < O.W. Rāj. पोतउ < Ap. पोतउ < Skt. पौत्रकः,

Mār. छौलवै "conceals" < O.W. Rāj. अउलवइ < Ap. अवलवइ < Skt. अपलपति,

Mār. दौड़े "runs" < O.W. Rāj. इउइइ,

Mār. मौड़ौ "slow" < O.W. Rāj. मउइउ < Ap. मउउउ < Skt. मडुकः,

Mār. बोरड़ी "jujube" < O.W. Rāj., Ap. बोरड़ी < Skt. बदर-टिका,

Mār. मोर "peacock" < O.W. Rāj., Ap. मोर < Pkt. मजर < Skt. मयूर,

Mār. ठाकुरो "o,thakurs!" < O.W. Rāj. ठाकुरो < Ap. ठकुरओ,

Mār. केल "plantain" < O.W. Rāj. केलि < Ap. केली < Skt. कदली,

Mār. रूपदे "Rūpade" < O.W. Rāj. रूपदे < Skt. रूपदेवी,

Mār. जिके "who" < O.W. Rāj. जिके < Ap. जे के < Skt.* जे के,

Mār. बेटे "by the sons" < O.W. Rāj. बेटे (< *बेटए) < Ap. बिहबहिं.

The distinction between è, ò and é, ó is, therefore, a fundamental one, and is accounted for by the existence of an etymological law, the very same law which is the chief characteristic marking the passing of the Old Western Rājasthānī into Gujārātī and Māravārī. Thus of the two sounds of *e* and *o*, the narrow one seems to be as old as the Apabhramṣa, whilst the

wide one has originated only in the interval between the Old Bhāṣā and Modern Bhāṣā period. The corollary that can be deducted from the above, with special regard to the Old Western Rājasthānī, is that the è, ò sound was unknown to this language, and consequently all es and os of the Old Western Rājasthānī were pronounced as narrow.

In my "Notes" above mentioned, I have held that the passing of the Old Western Rājasthānī vocalic groups *ai*, *au* into è, ò was effected simply through a process of contraction, that is through suppression of the hiatus, the intermediate step being the diphthongs *ai*, *au*. This was impugned by a distinguished Gujarāṭī scholar, N. B. Divatia, who proposed a different theory according to which *ai*, *au* passed into è, ò through an *anti-samprasāraṇa* process, the intermediate forms being *aya*, *ava*¹. The reasons for which I cannot agree with Mr. Divatia's theory and still hold to my explanation are the following:—

(1) There are no sure instances of any *ai*, *au* of the Old Western Rājasthānī having changed to *aya*, *ava* in any stage of the language. The three examples of this pretended change which are quoted by Mr. Divatia, viz. < वयर < वदर, वयरागौ < वदरागौ, and पयसार < पदसार, constitute no proof, when one knows that Old Western Rājasthānī manuscripts often write *ya* for *i*. Moreover, the two first examples are of a doubtful value, as they are *tatsamas* and the *aya* in them may be a corruption of Sanskrit ऐ instead of a modification of Old Western Rājasthānī षर. There remains, therefore, only one example to sustain Mr. Divatia's theory, and even that one is infirmed by the orthographical peculiarity mentioned above.

(2) The change of *ava* to *au* is one of the undoubted characteristics of the Old Western Rājasthānī, in contrast with the Apabhraṃṣa. Cfr. O. W. Rāj. कडडी < Ap. कवड्डी, O. W. Rāj. कडड < Ap. कवड, O. W. Rāj. गडड < Ap. गवडड, O. W. Rāj. षडड < Ap. षवडड, O. W. Rāj. नडड < Ap. णवडड, etc. Now, it is not admissible that a language, which has begun its existence by reducing every *ava* of the Apabhraṃṣa to *au*, should have brought *au* back to *ava* again, in its later stage.

(3) The diphthongal forms *ai*, *au*, which I explain as being derived from *ai*, *au*, are found in all the earliest manuscripts of both Gujarāṭī and Māravāṭī, and there can be no doubt that when *ai*, *au* began to be substituted for *ai*, *au* in the writing, the latter were pronounced as diphthongs, and only afterwards were reduced to long wide vowels. If *ai*, *au* had passed into *aya*, *ava* in the earliest Gujarāṭī-Māravāṭī stage, as Mr. Divatia holds, we do not understand why manuscripts—

¹ See *Ind. Ant.*, Vol. XLIV, Pt. DLII and DLVI, January and May 1915, and cfr. also N. B. Divatia's *गुजराती भाषा की ओडडी*, p. 6.

which otherwise show a tendency to write *ya*, *va* for *i*, *u*—should only in this particular case make an exception and write *ai*, *au* instead of *aya*, *ava*.

In connection with the general law formulated above, it is further to be noted that *è*, *ò* are not the resultants of *ai*, *au* only. Old Western Rājasthānī *aya* and *ahi* can also contract into *è*, and so can *ahu* into *ò*. All examples of the first case are Sanskrit or Prākṛta words. Take the few illustrations following: जै “victory” < जय. उभै “both” < उभय, गै “elephant” < गय, गैण “sky” < गयण, सोव्रनमै “golden” < सौवर्णमय, भै “fear” < भय. प्रलै “wordly destruction” < प्रलय, हँवर “horse” < हयवर, मेंगल “elephant” < मयकल, पवै “mountain” < पञ्चय. Here, in all probability, the passing of *aya* into *è* was effected through an intermediate step *ai*. The fact that in the manuscripts there seem to be no instances of any *ai* written for *aya* in similar cases, does in no way infirm the above explanation, but is easily accounted for by the remark that all words in which *aya* occurs, are *tatsamas*,¹ and therefore they continued to be written according to the traditional spelling.

The passing of *ahi* to *è* was also effected through *ai*, *h* being thrown back before the foregoing syllable, according to the well-known metathetical tendency of the Old Western Rājasthānī (“Notes,” § 51). Thus Old Western Rājasthānī पदिल्लड passed into Gujarātī and Māravārī पदेलौ through the intermediate form *पदरलड. The same happened with regard to the *ahi* of Persian and Arabic words, and जहिर “poison” was turned into जहैर, and सहिर “city” (for शहर) into सहैर. Other illustrations of this change are the two following:

Mār. सहैर “wave” < O. W. Rāj. लहिरि, लहरि,

Mār. पदैरावै “dresses” < O. W. Rāj. पदिरावद.

Quite analogously to the above, *ahu* has passed into *ò*, through metathesis of *h* and consequent coming into hiatus of the two vowels. Examples are:

Mār. पदोर “watch of the day” < O. W. Rāj. पडर, पुडर,
पहर.

Mār. लोडौ “small” < O. W. Rāj. लडडड.

Mār. न्योर “golden coin” < Ap. मडर, मुडर.

Turning now to consider the *é*, *ó* sounds, we find that these also are not the resultants of Old Western Rājasthānī

¹ The term *tatsama* is used here in a wider sense than it is commonly understood. From the Old Western Rājasthānī point of view, not only Sanskrit words, but Prākṛta words also can be styled as *tatsamas*.

e, o only. Old Western Rājasthānī *ī, ū* are occasionally seen to pass into *é, ó*, and so are the vocalic groups *ea, oa*, both when in hiatus and when separated by *yaśruti* or *vaśruti*. As illustrations of the former case I may quote Māravāri वल्ले, which is from Old Western Rājasthānī वल्ली, the conjunctive participle of वल्लवञ्च् generally used in the function of a conjunction, Diṅḡala कवेसर from Old Western Rājasthānī कवीसर, and Māravāri—Gujarāṭī धोम from *tatsama* धूम. In connection with this change of *ī, ū* into *é, ó*, it is, however, to be remarked that it is not a peculiarity of Māravāri and Gujarāṭī, but instances of a confusion between these four vowels are not uncommon in Old Western Rājasthānī and Apabhraṃṣa as well. (Cfr. “Notes,” § 7 (2).) Illustrations of *ea, oa* passing into *é, ó* are :—

Mār. देण “to give” < O.W. Rāj. देणण or देयण,

Diṅḡ. द्रुजोष “Duryodhana” < O.W. Rāj. द्रुजोषण or द्रुजोयण,

Mār. मण्डोर “Mandora” < O.W. Rāj. मण्डोषर or मण्डोवर,

Mār. मालदे “Mālade” < O.W. Rāj. मालदेव.

The last example is an irregularity, inasmuch as the *va* in °देव is not a *vaśruti*, but consonantal *ys* and *vs* are often treated as *yaśrutis* and *vaśrutis* even in Old Western Rājasthānī.

There remain still a few observations to be made in regard to the pronunciation of the *è, ò* vowels. They are not always pronounced in the same way. This had been already remarked by Sir George Grierson in his *Linguistic Survey of India*, Vol. IX, pt. ii, p. 4, and by Mr. Divatia in his paper cited above. The fact is that both Māravāri and Gujarāṭī show a tendency to pronounce *è* and *ò* less wide when they are final in a word, than when they are medial. Here by final I comprehend also an *è* or *ò* forming part of the penultimate syllable of a plurisyllable word ending in a quiescent *a*. Thus the *ò* in नेडो “son” is never pronounced as wide as the *ò* in मोर “mirror,” nor are the *ès* in सोवे रे “is sleeping” and वानेत “distinguished soldier” pronounced as wide as the *è* in नेडो “near.” Nay, and in some cases final *è* and *ò* are actually heard as narrow, as for instance in वीकानैर, which word—though नैर is from °नयर—is always pronounced as वीकानैर. In Māravāri popular songs, रे “is” is frequently pronounced रे. It would therefore seem that the language has a tendency to prefer narrow vowels, and that the process which once converted Sanskrit गौरी into गोरी is still at work.

The practical conclusion I wish to draw from the above note, is one in regard to orthography. I have incidentally mentioned that Gujarāṭī does not distinguish *è, ò* from *é, ó* in

the modern system of spelling, whilst Māravārī sometimes writes **वे, वो**, and sometimes **वै, वौ**. Etymology teaches us that in both the afore-mentioned languages we should write **वै, वौ** to represent the wide sound *è, ò*, and **वे, वो** to represent the narrow sound *é, ó*. Some Gujarātī grammarians have devised some awkward marks to distinguish *è, ò* from *é, ó*, and their attempts to introduce them into general use and make them popular, have failed. Let them resort again to the old spelling **वै, वौ**, which is not only the simplest, but also the only correct one.

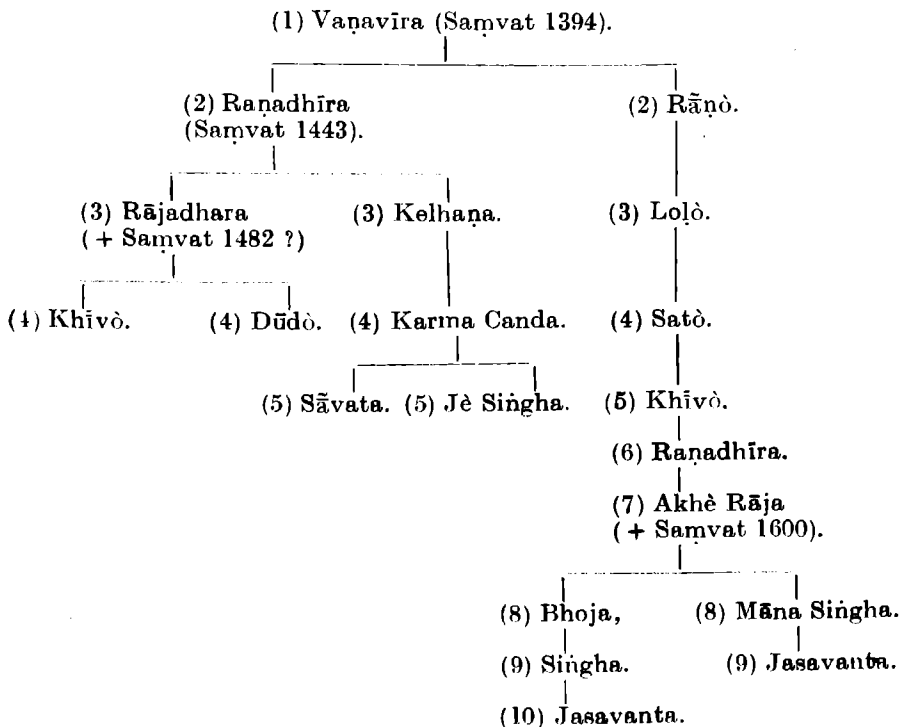
2. THE SONG OF JASAVANTA SONIGARÒ.

The following song belongs to the class of commemorative songs, which in the bardic literature of Rajputana are numbered by thousands and are generally found collected in manuscripts under the general title of *phutakara gīta*, or "miscellaneous songs." As the title implies, their subject may be a multiform one, and it may vary from a feat of gallantry to the grant of a village, and their character may also vary from eulogistical to satirical. A good many, not to say most, of these songs are anonymous, and have been handed down by tradition, the names of their authors having been lost. They are almost exclusively a production of the Cāraṇas, the high-class bards of the Rajputs, and most of them possess both a literary and historical interest.

The song of Jasavanta Sonigarò, which is given below, is one of those which commemorate a feat of bravery. Jasavanta, according to the explanatory note contained in MS. G, had gone to his wife's paternal house at Bhatanèra, the modern Hanumangadh, when a host of Muhammadans fell upon this city. Overcome by odds, the valiant Rajput had no other alternative left but die or surrender. Like every good Rajput, he chose the former, and to preserve his wife from the disgrace of falling into the hands of Muhammadans, cut off her head, which he suspended to his own neck, and in this way rushed into the thickest of the enemy throng and met a glorious death. This is the fact, which the Poet does not describe directly and plainly, however, but belabours in an imaginative way. Mahādeva has picked up the two heads from the field of battle and inserted them into his garland of skulls. When he goes back to Pārvatī, his wife, she notices the head of a woman amongst the others, which are all heads of warriors, and is naturally surprised at the strange discovery and inquires what the reason of it may be. At this point, one is tempted to find a resemblance between the fiction in this song and that in the admirable opening stanza in the *Mudrarāksasa*, where Pārvatī, stung with jealousy at seeing the Ganges on the head of her husband, asks him who the fair one is. But our Poet takes a different turn

here. Mahādeva explains that the head is that of the wife of Jasavanta, who unlike all other warriors, has given him two heads at one time. Pārvatī gets frightened : God forbid that my husband does the same to me !, but Mahādeva dispels her fears by the assurance, which sounds like a reproach, that he does not take the heads of cowards.

I have tried to identify the hero who forms the subject of the song, and ascertain his epoch, and have succeeded to an appreciable extent. The manuscripts, from which I have derived the *Diṅgala* text, do not supply any information concerning Jasavanta, except *G*, which has a few introductory lines, where it is stated that Jasavanta had married a Bhātī girl from Bhaṭanēra and was in this city when it was assailed by the Muhammadans, and on this occasion he fell in the fray in the manner related above. Much more precise information is supplied by the *Khyāta* of Mūhaṇōta Nēṇa Si. Here we can not only identify the personality of Jasavanta, but also trace his pedigree to Kīrtipāla, the founder of the Sonigarā branch of the Cāhamāna tribe, to which he belonged. As the genealogical tree of the Sonigarās, as far as Raṇadhīra, who is mentioned in an inscription dated Samvat 1443 has been given by D. A. Bhandarkar in his paper "The Chahamanas of Marwar"¹, I need report here only the portion of the genealogy which goes from Vaṇavīra to Jasavanta :—



¹ *Ep. Ind.*, Vol. XI (1911), pp. 26-79.

Of the two Jasavantas, with whom the above genealogy terminates, it is with the son of Siṅha that our hero is to be identified. According to Mūhaṇḍa Nēṇa Si, he was a vassal of Rāthōra Dalapata Rāya Siṅhōta, and owned a fief in Bhaṭanēra. Dalapata, as we know, succeeded his father Rāya Siṅha on the throne of Bikaner in Samvat 1668, and continued to rule till Samvat 1670, when he was dispossessed by his brother Sūra Siṅha. Whether it was during Dalapata's reign that the battle, in which Jasavanta lost his life, took place, or whether it was afterwards, we do not know, but certain it is that the event took place about Samvat 1670 or shortly afterwards. If we are allowed to make a conjecture, it is not unlikely that, when Sūra Siṅha marched against Dalapata with his own forces engrossed by an auxiliary army of imperials, Bhaṭanēra sided with Dalapata, and had to be reduced by the imperials, in consequence. If the conjecture is correct, the event commemorated by our song happened in the year Samvat 1670 or 1671 at the latest (1614-15 A.D.).

The date thus conjecturally arrived at, coincides with the period in which the author of the song lived. The name of the Poet is given only in one of the five manuscripts examined by me, namely *B*, and it is ThākuraSi Colāvata. Though the caste, to which this Thākura Si belonged, is in no way specified, yet from his patronymic, we have no difficulty in identifying him as a son of Colō, a famous Gāḍaṇa Cāraṇa who lived at Bikaner during the reign of Dalapata Siṅha and his successor Sūra Siṅha, and was rewarded by the latter with a *lākha-pasāva* in Samvat 1672.¹ The song must have been composed by Thākura Si soon after the fall of Bhaṭanēra or, at the most, a few years after it.

For the edition of the text, which is given below, I have utilized the five manuscripts following:—

B: A MS. of *Phutakara gīta*, in the Darbar Library of Bikaner (No. 5 of the Bardic Collection). Written in Samvat 1799 (see p. 221 *b*.) Our song is given p. 146 *a*, and contains only the stanzas following: 6, 7, 8, 9.

G: A MS. in the form of a huge *vahī*, containing different prose-chronicles and miscellaneous historical information, belonging to the Kavirāja Cāraṇa Āsiyō Gaṇesa Dāna of Jodhpur. (The MS. is described in *Descriptive Catalogue*, Sect. i, pt. i, No. 11). Our song is given pp. 233*b*—234*a*, and it contains only the six stanzas following: 1, 5, 6, 7, 8, 9. The pages containing the song were written, apparently, towards the end of the Samvat-century 1700.

H: A MS. of *Phutakara gīta* belonging to Cāraṇa Āsiyō Hamīra Dāna of Bhāḍiyāvāsa. About 100 years old. The

¹ The above information is derived from the *Khyāta* No. 1 in the Darbar Library of Bikaner, p. 225 *b* (see *Descriptive Catalogue*, Sect. i, pt. ii).

song is given p. 101, and it contains only six and a half stanzas in the following order : 6, 7, 8, 9, 1, 2, 3.

P : A MS. of *Phutakara gīta* belonging to Cāraṇa Āsiyò Pābū Dāna of Bhāḍiyāvasa. Also about 100 years old. The song, which is given p. 12a, contains only the four stanzas following : 1, 2, 4, 5.

R : A MS. containing the poems of Sādū Mālò and other miscellaneous songs, belonging to Cāraṇa Sādū Rāma Pratāpa of Bhadorò. About 200 years old. The song is given pp. 107b—108a, and it contains only the five stanzas following : 1, 2, 3, 4, 5.

In the text, which is given below, I have restored to their original form all the words which I have found to have been modernized in the MSS. The song was composed three hundred years ago, and it was, of course, composed in an archaic form of Dīngala, not in the Dīngala of the present day. Therefore, I have corrected राज into राजि, सह into सहि, सांभल into सांभलि, कायर into काइर etc. This will not be approved by the Cāraṇas and scholars in Rajputana, but I could not allow myself to deviate from the most elementary canon in philology, according to which any literary work that is to be edited, should be presented in the same form in which it was originally composed by its author.

(a) Text :

जुग पार पखै ग्या मुभ जवताँ
 राजि कन्है रहताँ दिन राति ।
 आज स हार विचै ओपावी
 जूनादेव नवी आ जाति ॥ १ ॥
 आहिव आहिव जतै आणिया
 सुज हँ जागूँ दीठ सहि ।
 कमला तयो कमल हे कश्या
 केथ आणियो साच कहि ॥ २ ॥

(१) R पार (पार), G गा, H जवती, रहती. H ओपावी, R ओपविथी,
 P को(आ);

(२) P सो (सुज), H सु जग घषा मे दीठ, HP से (हे), H कांता. P केम
 प्राणीथी (केथ आणियो), H केम जुड़ीथी सोव किह ;

मन्नि रामाइण सीस लिआ मै
 आखै ईस गवरि नै अम ।
 जाइ आणिया तान्हि स जाणौ
 कदे न आणै जाणौ केम ॥ ३ ॥
 उतवंग घणा अगै ही आणत
 नाथ कहै अे साँभलि नारि ।
 देवणहार न मिलिअौ दूजौ
 सिद्ध समोभम जिसौ संसारि ॥ ४ ॥
 आप तणौ त्रिअ तणौ आणिअौ
 भड़ भटनैर पड़न्ताँ भार ।
 सिर दोनूँ जसिअै सोनिगरै
 दीधा मूभ वडै दातार ॥ ५ ॥
 अरधङ्गा सिर कण्ठ ओपिअौ
 भिलताँ गठ विचि सार भर ।
 हरहरधङ्गा देखि घरहरी
 हर इणि पड़सी रखे हर ॥ ६ ॥
 वनिता कण्ठ बाँधि गलि विठिअौ
 हाथ दिखावे धीर हरै ।
 डरी तेण पारबती देखे .
 रखे कमाली अेम करै ॥ ७ ॥
 सीस घरणि चौ गलै माल सन्नि
 सिद्ध तणौ लडिअौ स जगीस ।
 सङ्कर घरणि देखि जे सङ्गी
 सङ्कर रखे लिअै मो सीस ॥ ८ ॥

- (३) R मन्नि (मन्नि) ;
 (४) R जसा (घणा), संभलौ निज नार, P जसौ (जिसौ) ;
 (५) G तिथ, P चौ आपरी, R आपिअौ (आणिअौ), GPR सोनिगरै, R
 दीना (दीधा) ;
 (६) H अणभाग (अरधङ्गा), BH कंठ सीस जसे उपावे, H भिड़ते
 (भिलताँ), ते देख, B तिण देख, H पड़सी रख, B रखे ;
 (७) BH कमल (कण्ठ), विठनै, दिसोलियोज (हाथ दिखावे), B रखे
 (८) H बिडीअौ (लडिअौ), B बिडीअौ सु, BH तिण (जे), B लिअै रखे

सती सोनिगरौ मुञ्चा घणै सति
 तीख घणौ देखाइ तिणि ।
 काइर कमल न लाँ न्है रुद्र कहि
 रही डरपती रुद्र घरणि ॥ ९ ॥

(b) Translation :

1. "Innumerable ages have lapsed away under my eyes, while I was staying by your side night and day, (but) this is a new sort of thing you have to-day inserted into your garland, of Junādeva.

2. (The heads which you) got in all the different battles, I have seen them all, I think. (But this) head of a woman, o (my) beloved, where did you get (it) ? Tell (me) the truth."

3. "In the midst of a battle I have picked up (these two) heads,—thus sayeth the Lord to Gauri,—(and) you also know that (I) got (them by) going (to a field of battle). How can you think that I would ever omit to take (them) ?

4. I used to get many heads even before,—sayeth the Lord,—(but) hear o my wife : another donor like the son of Singha I never met in the world.

5. His own (head and that) of his wife the hero offered (to me), whilst the weight (of the hostile army) was falling on Bhaṭanēra. Both the heads Jasiyò Sonigarò gave to me, (he) the great donor.

6. The head of (his) wife was shining at (his) neck, whilst the weight of the (enemy) swords was penetrating into the stronghold."—At seeing (this), the wife of Hara began to tremble : "God forbid that (my) Hara (also) gets into a similar desire !"

7. After tying the head of (his) wife to (his own) neck, the grandson of Dhīra fought showing (the bravery of his) arm. At seeing this Pārvatī was frightened : "God forbid that Kapālī (also) does so !"

8. After adjusting to his neck his wife's head, (like) a garland (as it were), that (gallant) chief, the son of Singha, fought. At seeing which, the wife of Śaṅkara got alarmed : "God forbid that Śaṅkara takes my head !" ¹

(e) B सती जखै वे मुचा बडे, H जसो वे. B तास नणो मेलियो तिण, H चौख तने मेली मण. B ल्य रुद्र कहियो; H लु रुद्र कहियो.

¹ It is difficult to avoid the suspicion that of the three stanzas 6-8, which contain the same and identical meaning, two might be spurious. But they are all found in the two oldest MSS.

9. "The Sonigarò and (his) faithful (wife) have died with great valour, and they have displayed a great determination. I do not take the heads of cowards!"—(Thus) spaketh Śaṅkara, and (Pārvatī), the wife of the terrible god, ceased to fear.

3. THE HISTORY OF PHALODHĪ AND THE LOCAL INSCRIPTIONS.

The oldest document in connection with the history of Phalodhī, that seems to be extant, is an inscription in the temple of Kalyāṇa Rāya, bearing the date Vikrama Samvat 1236 (= 1180-1 A.D.). From this inscription it appears that the old name of the place was something like *Vijayapura* or *Ajayapura*—the reading is doubtful—, and that, at the time mentioned above, this city formed part of the territory of Vikramapura (Bikampur), and was under the rule of *rāṇā* Katīa, a Pāvāra feudatory of *mahārāja* Prithī Rāja, the Cāhamāna ruler of Ajmer. This is in accordance with the tradition contained in the Jodhpur *MS.* 12,¹ where it is stated that the old name of the place was Vijayanagarī and that it was in the hands of the Pāvāras. The same *MS.* 12 mentions an inscription dated Samvat 1145 and referring to *rājā* Hatha Deva Pāvāra, as existing in the temple of Kalyāṇa Rāya, but here, apparently, there is a mistake in the reading, and it is the aforesaid inscription that is meant by it. In the text of the inscription, *rāṇā* Katīa is described as a son of the *mahāsāmanta* Pālhaṇa, a Pāvāra of the Kaundīnyasagotra. This Pālhaṇa is in all probability the same as Pālhaṇa Sī, the son of Sākhalò Chohala, the founder of the Rūṇecā branch of the Pāvāras. According to Mūhaṇòta NèṇaSī, Udaga, the son of Bhohò, a nephew of Chohala, was also one of the *sāmantas* of king Prithī Rāja.

The afore-mentioned inscription is possibly responsible for the origin of a legend referring to king Prithī Rāja, which is contained in a manuscript in the Darbar Library of Bikaner. The *MS.* dates as far back as the end of the Samvat-Century 1600, and is described in the *Descriptive Catalogue*, Sect. i, pt. ii, No. 2. The legend is found on pp. 37a-b of the *MS.* It says that there was a Dahiyāṇī maid, her name Ajiyā De, who was being taken to Ajmer to be married to king Prithī Rāja. On the way, the Dahiyās who escorted her, stopped in some part of the Jāgaḷū-country, and there Ajiyā De caused a stronghold to be made, which, after her own name, she called *Ajiyāpura*. In the course of time, Prithī Rāja came to

¹ *Descriptive Catalogue*, Sect. i, pt. i.

Ajiyāpura to hunt, and there he found Ajiyā De, whom he took with him to Ajmer. Afterwards the Dahiyās lost Jāgalū to the Sākhalās. The legend most probably originated from the above-mentioned inscription, in which there is a mention of king Prithī Deva and also of a city, the name of which can be read as [śrī] *Ajayapura*. The statement that the Sākhalās were in possession of the country is, evidently, correct.

When the place changed its old name of Vijayapura, or Ajayapura, into that of Phalodhī, we do not know. According to *MS. 12*, Vijayanagarī was successively depopulated by famines and incursions of Muhammadans, till lastly it became completely deserted when the Pāvāras lost their domain of Bāharamera. It was on the ruins of Vijayanagarī that the new city of Phalodhī was founded by *rāva* Narò. How far the above account is correct, it is difficult to say. Certain it is that the name of Phalodhī brings us back to a much earlier time than that of *rāva* Narò. *MS. 12* gives an explanation of the name of Phalodhī, which is grossly artificial. Phalodhī, as also proved by the inscriptions, is a derivation of *Phalavar-dhikā*, and there can be no doubt that the place had come to be called so long before *rāva* Narò settled there.

All the Jodhpur Chronicles agree in tracing the Rāthōra colonization of Phalodhī back to the time of *rāva* Sūjò, who was born in Samvat 1496 and succeeded to his brother Sātala on the throne of Jodhpur from Samvat 1546 to 1572.¹ The task of colonizing the place fell to Narò, the younger of the two sons Sūjò had had from his Bhatiyānī wife Likhamī, *alias* Sāraṅga De. According to the most popular account, it was after a serious quarrel Narò had with Ūdò, one of his step-brothers, that Sūjò resolved to send the former away, and gave him Phalodhī, where he established himself. Whatever amount of truth there may be in this statement, and there seem to be no reasons for suspecting it, we certainly need not resort to an incident of that kind to find an explanation for Narò's emigration. That was a period when the enormous growth of the progeny of Sihò, coupled with their increasing power and ambition of conquest, made it imperative for any prince of some enterprise who could not sit on the throne of his father, to find out a domain for himself in some unconquered part of the country. This fact is evidently implied in another version—the one contained in *MS. 12*—, according to which Sūjò sent Narò towards the West to inhabit some depopulated land. Narò went and discovered the vestiges of the old Vijayanagarī and the bed of the river, and decided to settle there. The place was deserted, but for a small spot, 400 feet from the modern fort, on the way to Khicūda, which was

¹ Some chronicles give slightly different dates.

named *Phulūdhī rō vāsa* from *Phulūdhī*, a *Pallivāla brāhmaṇī* who had come to live there. It is after the name of this *brāhmaṇī* that *Narò* called the new city *Phaḷodhī*. I have already dealt with the value of this explanation. *MS. 12* proceeds to describe how the new city was inhabited. It was *Narò's* good luck that just in those days a certain *Sīdhu Kalò*, formerly an inhabitant of *Āsaṇikota* in the territory of *Jesalmer*, owing to a difference he had with the *rāvaḷa*, left his country and emigrated eastwards with a train of 140 cars and a great number of followers. When he halted at *Phaḷodhī*, *Narò* entreated him to remain there, and he eventually accepted and populated the new city.

The chronicles give no date for *Narò's* settlement at *Phaḷodhī*. But from the inscription found under the porch of the innermost gate of the fort, which is dated *Samvat 1532* (see inscr. No. 2, below), we can conclude that it took place some time before this date. From the same inscription it also appears that the inmost enclosure of the fort was not erected by *rāva Hamīra*, as is generally believed, but by *Narò* himself. The tradition says that *Narò* was not satisfied with the possession of *Phaḷodhī*, a city deficient in water and gardens and situated in the midst of an arid desert, and looked with covetous eyes to the neighbouring *Pohakarāṇa*, ready to avail himself of the first opportunity for occupying it. Meanwhile, *rāva Sātala* had been killed at *Kosāṇò*—it was the year *Samvat 1546*—and as he had no sons, his brother *Sūjò*, the father of *Narò*, had succeeded him on the throne of *Jodhpur*. *Sātala* had founded *Sātalamera*,¹ some 5 miles from *Pohakarāṇa*, and since during his lifetime he had adopted *Narò* as his son, it is probable that at his death, if not before, the latter added *Sātalamera* to his domain of *Phaḷodhī*. So he was knocking at the very door of *Pohakarāṇa*. This city was, at the time, in the hands of *Rāthòra rāva Khīvò*, the son of *Varajāga Durajana Sālòta*. *Narò* had not long to wait for his opportunity. All accounts agree in showing that it was by surprise he was able to carry out his ambitious design. He had some spies at *Pohakarāṇa*—*Mūhaṇòta Nèṇa Si* says his chief instrument was his own *piro-hita*,—and when these one day reported to him that *Khīvò* had gone to a feast at *Ūgarāsa*, he lost no time and at the head of his horsemen fell upon *Pohakarāṇa* and occupied it. According to the tradition, the fort of *Pohakarāṇa* had no doors at the time.

The conquest of *Pohakarāṇa* brought no good luck to *Narò*. The dispossessed *rāva Khīvò* and his son *Lūkò* sought a refuge in the neighbourhood of *Bāharamera* and *Koṭarò* and from there

¹ According to the *Bhātī* chronicles, *Sātalamera* was founded by *Sātala*, the son of *rāvaḷa Kehara*.

started making inroads and pillage in the country all around. On one occasion, they fell with a great force on Sātalamera and carried away the kine that were grazing outside the city. Narò ran to the rescue, and overcame the raiders near Nādana-hāi, but in the struggle that ensued, lost his life. His followers fled and locked themselves up in the fort of Pohakaraṇa. Sūjò made an expedition to vindicate the death of his son and, being unable to catch Khīvò and Lūkò, appeased his anger by sacking Bāharamera, Koṭarò, Khāri and Nīlavò. Then he gave Pohakaraṇa and Phaḷodhī to Goyanda, the son of Narò.

It is stated that when Goyanda was installed on the seat of his father, he was still a boy, and Sūjò had to place him under the tutelage of *emīrs* or *thānedārs*, who for four or five years never allowed him to take the field. In the meantime, Khīvò died, whilst Lūkò continued to raid and pillage the country aided by a large band of followers. One day Lūkò ventured as far as the *dehurò* of Rāma De, near Pohakaraṇa; Goyanda ran after him and overtook him at Kodhaṇò, where a fight ensued in which 140 Pohakaraṇās bit the dust. Lūkò himself was reduced to great straits and was fleeing pursued by Goyanda, when he lost the garment that covered his loins. At the sight of his elderly relative fleeing half-naked, Goyanda was moved to a sense of pity and respect, and, says the chronicler, shouted to him to stop, that he would not kill him, and wrapped him in his own garment. Then he took him to Sātalamera and reconciled him and generously gave him half of his possessions, namely the territory of Bhuṇiyāṇò with 30 villages, whilst he kept for himself Sātalamera and Pohakaraṇa, also with 30 villages. I need hardly point out that all this story is an absurd fiction. The obvious fact, which is contained in it, is that Lūkò, with his continuous incursions, was a cause of immense trouble and anxiety, and Goyanda had no other alternative left but give him some territory to set him at rest. It appears that Goyanda had chosen Sātalamera for his capital. According to *MS. 12*, that was for Sātalamera a period of great prosperity, the city at the time numbering not less than 500 houses of *mahājanas*.

Then, continues the chronicler, Goyanda gave Phaḷodhī to his younger brother Hamīra. It is clear enough that this second act of generosity on the part of *rāva* Goyanda, is at least as absurd as the first. If there is some truth in the statement that Goyanda was a boy when Narò was killed, and that he was placed by Sūjò under a tutelage, it is probable that Sūjò himself arranged for Goyanda to inherit Pohakaraṇa and Sātalamera, and for Hamīra to inherit Phaḷodhī. This supposition is corroborated by the fact that Goyanda is never mentioned in connection with Phaḷodhī and there is absolutely no evidence that he ever ruled there. On the contrary, there

are inscriptional documents showing that Hamīra was ruling at Phalodhī at least as early as the year Samvat 1573. Another argument in favour of the above supposition, is in the tradition that Goyanda and Hamīra had a difference between each other in connection with the boundaries dividing their respective territories. The question was settled by the interference of their grandmother Likhamī, and it was agreed that the line of demarcation should run through the *Thorākunṭhī rī magarī*, near Khārī.

Hamīra is the ruler of Phalodhī who has left the most illustrious name in the local tradition. Though the foundation of the fort dates at least as far back as the time of Narò, yet the tradition is that it was built by *rāva* Hamīra.¹ MS. 12 states that Hamīra erected the *kota* in the year Samvat 1555—the date is probably incorrect—and the gates in the year Samvat 1573. The latter date is confirmed by the inscription No. 3 (see below). Besides, Hamīra is said to have dugged inside the fort a well (*kòhara*), which in the course of time was filled up, and outside the fort a tank which after him was called *Hamīrasara*. Again, the most conspicuous building that to this day is extant inside the fort, is designated as “the palace of Hamīra.” He also enlarged his territory, by taking from the Bhātīs Kuṇḍala and Kīrarò.

I have not been able to ascertain any precise date for the death of Hamīra, but from the indirect evidence supplied by the fragmentary inscription No. 4, which apparently refers to his successor, we can conclude that he must have died before the year Samvat 1589. He was succeeded by his son Rāma (Singha). Of this *rāva* the chronicles say very little, beyond the general statement that he was a man of great determination. He digged the *Rāmasara* tank to the west of the city, and the work was apparently completed in the year Samvat 1589. In the year Samvat 1600, Rāma was with his contingent in the army, which *rāva* Māla De of Jodhpur had brought against Šer Šāh, who had invaded Marwar. On that occasion, Rāma did not join in the onslaught which cost the life to Jètò, Kūpò and other chiefs, but moved off his tents after *rāva* Māla De, and it is stated that for this reason the latter took to dislike him. Rāma did not survive longer than one or two years after the aforesaid event. The chronicles say that he was poisoned by his own minister, Jaga Hatha Depāvata, and the fact is recorded in a commemorative verse, the meaning of which—though the reading of the text is somewhat doubtful—seems to be as follows:—“O Jaga Hathiyā! thou art a shameless man! After murdering (our) pearl of a *rāva*, thou weptest him!

¹ Chronicle C. 39 (see List of MSS. Copied, above) represents *rāva* Hamīra as the actual founder of Phalodhī.

With the death of Rāma was lost the *rāva*-ship, and the *thākura*-ship also fled away.”¹

Rāma was succeeded by his brother Dūgara Sī. It is difficult to refrain from the suspicion that he was the ultimate author of the murder of Rāma, and such a suspicion seems to be further confirmed by the fact that Jaga Hatha continued to occupy his high office under the new *rāva*. But it must be observed that a superstitious populace is always only too ready to attribute to poison any sudden death that may occur from a natural cause; and on this ground it would be unjust to throw on Dūgara Sī a blame which has no other foundation except on a mere rumour. However things may be, Dūgara Sī, who eventually was not a man of such energy as his brother, could not enjoy long his power, nor save his domains from the astute cupidity of *rāva* Māla De of Jodhpur, who was on his watch, ready to avail himself of the first opportunity for seizing Phalodhī and adding it to the fisc, as he had done with many other fiefs of Marwar. This time, the means employed by the *rāva* of Jodhpur were even more unfair and unscrupulous than on other occasions. The legend is that he invited Dūgara Sī to his quarters to take part in the Holī-sports, and then captured him unarmed and unsuspecting, after blinding him with an handful of *gulāla*. Then he fell with an army over Phalodhī, thinking he would find it an easy prey, but Jaga Hatha Depāvata had assembled his forces in the fort and prepared for a stubborn resistance. *Rāva* Māla De had to lay a regular siege, and five months passed and yet there were no signs that the fort was going to capitulate.

During the siege, the *rāva* of Pohakarāṇa, Jēta Māla, who had succeeded his father Goyanda since the year Samvat 1582, knowing that the ambitious Māla De would not be satisfied with Phalodhī, but march next against Pohakarāṇa and Sātalamera, tried to create a diversion and possibly relieve the besieged fort, but was unsuccessful. He had married a daughter of the *rāvāla* of Jesalmer, and it is from this chief he obtained a contingent of Bhātīs, under the command of *kūvara* Hara Rāja. With this contingent, engrossed by some other forces, *rāvata* Bhīvò, a subject of Jēta Māla, marched on Phalodhī, but on nearing Māla De's camp, realized the difficulty of the task and resolved to withdraw after raiding the camels in the neighbourhood. Māla De sent after him Jēsò Bhèravādāsòta with a body of horsemen, and the raiders were overtaken and decimated. *Rāvata* Bhīvò was taken prisoner by Prithī Rāja Jētāvata. *Rāva* Māla De at last succeeded in occupying Phalodhī,

¹ The text, as I have reconstructed it from the very incorrect reading of MS. 12, runs as follows:—

जगदधिष्ठातृं निजकुञ्जौ । राव मरि रतन रत्नौ ।
राम मरतां गई राई । गई भागे वाकुलाई ॥ १ ॥

but only with the help of Dūgara Sī who bartered his personal liberty with the sovereignty of the place. It is related that Dūgara Sī was taken under the ramparts of Phalodhī, and there shouted to brave Jaga Hatha to open the gates to Māla De. Jaga Hatha obeyed and Māla De entered the fort, which—says *MS.* 12—he kept for 15 years, till his death which occurred in Samvat 1619. It would therefore seem that Phalodhī fell into the hands of Māla De about the year Samvat 1604.

Rāva Māla De left two sons, by his Jhālī wife Sarūpa De : Candra Sena and Udè Sīngha. The former succeeded his father on the throne of Jodhpur, and the latter inherited Phalodhī. The facts in the long period of struggle and unrest that goes from the death of Māla De to the final establishment of Udè Sīngha as the only and undisputed ruler of Marwar, belong more to the history of Jodhpur, generally, than that of Phalodhī. But Phalodhī had a great part in the first period of the struggle. It was from Phalodhī Udè Sīngha made on Ghāghānī that bold raid, which was promptly and severely retaliated by Candra Sena and would have cost Udè Sīngha his life, but for the devotion of Khicī Hadò and the wisdom of the Rajputs who did not allow Candra Sena to pursue and kill his own brother. In the year Samvat 1627 Udè Sīngha sustained another serious defeat at Kuṇḍala at the hands of Dūgara Sī, the Bhātī ruler of Vikamapura. The cause of the contest was a caravan from Bikaner, which both Dūgara Sī and Udè Sīngha wanted to make pass through their own cities, to have the benefit of exacting toll. The last-mentioned fact and the fact of the raid alluded to above, combine to show that Phalodhī was not in a prosperous condition when in the hands of Udè Sīngha. The defeat of Kuṇḍala eventually made those conditions worse, for, it is stated, Udè Sīngha was not able to take shelter in the fort of Phalodhī, but had to retire and the Bhātīs plundered the country. Four years afterwards Phalodhī fell into the hands of Bhākhara Sī, a son of *rāva* Hara Rāja, and remained under him till the year Samvat 1635, when Akbar gave it to *rājā* Rāya Sīngha of Bikaner.

The rule of the *rājā* of Bikaner marks for Phalodhī a period of peace and prosperity. Rāya Sīngha first sent to govern the city the Rāthòra Kādhala Māla De Vaṇavīròta, and later the Mūhaṇòta Karma Canda Sāgāvata, who brought to Phalodhī a number of new settlers from Bikaner. It seems that the outermost wall enclosure of the fort had its foundations laid by *rājā* Rāya Sīngha, whose name is recorded in the oldest of the inscriptions incised on the same wall (*inscr.* No. 5, of Samvat 1650). Phalodhī remained under Bikaner for nearly forty years, till in Samvat 1672 Jahāngir assigned it to *rājā* Sūraja Sīngha of Jodhpur, as an allotment equivalent to the sum of Rs. 6,75,000 (*MS.* 12). Sūraja Sīngha deputed to govern the place the Mūhaṇòta Jè Mala—the father of Nèna Sī, the

famous chronicler—as *hākim*, and the Cāhamāna Śikharò as *thānedār*. But after two years, Sūraja Śingha asked the emperor to resume the *pargana* of Phaḷodhī, probably because he did not find it sufficiently remunerative, whereupon the emperor assigned it to *rājā* Sūra Śingha Rāyasiṅhòta of Bikaner. What followed affords us a conspicuous example of the jealousy then existing between the Rāthòras of Jodhpur and the Rāthòras of Bikaner, in spite of their being kindred in blood and descendants from a common ancestor. Sūra Śingha had hardly arranged for a *hākim*, in the person of Mūhaṇòta Bhāga Canda Karmacandòta, to go and take possession of Phaḷodhī, that Sūraja Śingha of Jodhpur, rather than see the place go to enlarge his rival's territory, resolved to retain it, and immediately despatched to Phaḷodhī his eldest son *kāvara* Gaja Śingha, with instructions for *hākim* Jè Mala not to consign the fort to anybody, as he had decided not to surrender his native place and was going to write to the emperor to have Phaḷodhī re-assigned to himself. This he did, and so Phaḷodhī was restored back to Sūraja Śingha.

When Sūraja Śingha died, in the year Saṃvat 1676, Phaḷodhī did not pass to his successor Gaja Śingha, but remained in the possession of Sabaḷa Śingha, a son Sūraja Śingha had had from his Āherī wife, Sulatāṇa De. Probably Sabaḷa Śingha had been assigned Phaḷodhī in fief by his father, some time before the latter's death. During the rule of Sabaḷa Śingha, which seems to have been a very brief one, Phaḷodhī once fell into the hands of the Muhammadans, but was eventually recovered. In the year Saṃvat 1680, or, according to *MS.* 12, 1679, Phaḷodhī was added to the *khālisā* of Gaja Śingha and except for a few temporary changes has ever since continued in the possession of the *mahārājas* of Jodhpur. In Saṃvat 1863 it was for a second time added to the domains of Bikaner by *mahārāja* Sūrata Śingha, who retained it till Saṃvat 1865. The history of Phaḷodhī from the time of Gaja Śingha to our days is too mixed with that of Jodhpur and unimportant to deserve any special notice.

Let us now turn to the study of the most noteworthy inscriptions which are extant at Phaḷodhī and serve to illustrate the concise historical sketch given above. They are the following:—

INSCR. No. I: An inscription incised on the left pillar of the inner shrine in the temple of Kalyāṇa Rāya. It consists of 28 lines of writing covering a space of 24½" high by 14¼" to 13½" broad. The text is in a mixture of corrupt Sanskrit and Bhāṣā, and the writing very incorrect and illegible at some points. The chief orthographical peculiarities of the inscription are: the representing of the *virāma* by the diacritical sign for *u*, and the writing of ञ for initial च, and च for र and ष.

The inscription is dated in the year [Vikrama-] Saṃvat 1236, the 10th day of the bright fortnight of the first month of Aṣā-

dha, Wednesday, and refers to the reign of *mahārāja Prithiva Deva* and the *mandaleśvara rānā Katia*. Then it records some privilege granted by the latter—who is further described as a *Pāvāra* of the *Kaundinyasagotra* and a son of *Pālhana*—to the temple (?) of *Lokeśvara* at *Vijaya (?) pura*, in the territory of *Vikramapura*. The text of the record proper ends l. 15, the last lines containing only bare names, apparently of witnesses. As already explained above, *Prithiva Deva* seems to be the same as *Prithī Rāja*, the *Cāhamāna* king of *Ajmer*, and *rānā Katia*, one of his feudatories. It also appears that the latter was ruling over *Vikramapura* (*Bikampur*), and that the old name of the place where the temple stands, was *Vijayapura (?)*, and it was included in the territory of *Vikramapura*. It is, however, to be remarked that there is some doubt in the reading of the word *Vijayapura*, the text actually having *Vīajayapura*.

1. ८० (?) ॥ सिधिविनायकप्रसादात् ॥ मांधाता सु
2. महीपति कृतजुगे अलंकारभूतो गतः ॥ सेतुर्येन महो-
3. दधि विरचितः ॥ क्वासौ दसास्यांतकृत् । अन्ये चापि जुधिष्ठिर-
4. प्रभितयो जावत् भवां भूपते ॥ नैकेनापि समं गता वसुमती
5. मन्थे त्वया जास्यति ॥ संवत् १२३६ प्रथमआसाढसुदि १०
6. [बु]धे ॥ श्रीमहाराजश्रीप्रथिवदेवराज्ये तेन सप्रसा[दि-]
7. श्रीमंडलेस्वरराणाकतीचराके (sic)¹ । विक्रमपुरे [स]माया-
8. त ते[न?] वी(?)अजयपुरे समाख्यातदेवश्रीलोकेस्वरडाहलौ-
9. असासने पिडमधे पीहिलापाउनामसलिलागम
10. च[तु]रघाटविसुधं विणकाठसहितं कौडिण्यसगो[त्र]
11. प्रवारवंसे महासावंतपाल्हाणसुतराणा[श्री]क-
12. तीयरजेन प्रदा[नं] (॥*) जावच्चंद्रस्व सूर्जस्व जाव तिष्ठति
13. मेदिनी (॥*) जवत् राम कर्त्ता लोके तावत् कालं तु सास-
14. नं (॥*) [ए]स खेत्रं ऊन्हालु सिखालु अ [धा]न्यपंचमभाग
15. लोकेस्वरभोगं दास्यति²

¹ For राज्ये.

² As the Sanskrit in the present as well as the following inscriptions is very corrupt, and in most cases so mixed with the *Bhāṣā* that it is impossible to make it agree with any grammatical standard, it has seemed desirable to give the text as it stands, and refrain from burdensome notes and amendments.

INSCR. No. 2 : An inscription incised on the base of a pillar in the porch of the third, or inmost, gateway of the fort, at the left. It consists of 12 lines of writing and covers a space of $16\frac{1}{2}$ " high by $9\frac{3}{4}$ " broad. Written in a corrupt mixture of Sanskrit and Bhāṣā. Letters very badly engraved and several of them utterly indecipherable.

The inscription is dated in the year [Vikrama-] Samvat 1532, the 2nd (?) day of the dark fortnight of Vaiśākha, Monday, and refers to the reign of Nara Singha De, the son of the Rāthavaṛa rāya śrī Sūrija Mala. Though a good part of the text is unintelligible, yet it is clear that the object of the inscription is to record that the erection of the gate in question was completed on the date above given, and the fort was also contemporaneously repaired. It would therefore seem that the fort had been built some years before Samvat 1532. Of the names given, Nara Singha De is the entire name of Narò, and Sūrija Mala the entire name of Sūjò, his father. Rāthavaṛa is evidently the same as Rāthòra.

1. ॥ - ० ॥ संवत् १५३२ व-
2. ॥ र्षे वैसाख वदि २ (?) सोम-
3. ॥ दिने राठवड राय श्री-
4. ॥ सूरिज[म]लसुत नर-
5. ॥ सींघदे राज्य प्रोलि प्र-
- वन
6. ॥ साद मस्त(?)गर श्री-
7. ॥ वड आसा चाहवाण
8. ॥ [दे]वरा । करियाइत
9. ॥ भ(?)र- मह-णा
10. ॥ सुत भोजा गड उ-
11. ॥ धरितं कलाण [मंग]-
12. ॥ [लं] भवतु श्री- ॥ .

INSCR. No. 3 : An inscription incised on the left pillar of the outer gateway of the fort. It consists of 9 lines of writing, covering a space of $7\frac{1}{2}$ " high by $18\frac{1}{2}$ " broad. Written in corrupt Sanskrit. Characters neatly engraved and well preserved.

The inscription opens with the date Vikrama-Samvat 1573, the 10th day of the bright fortnight of the month of Mārgaśira, Thursday, and then it records that the pillars of the above-men-

tioned gate—which was erected by *mahārāja Hamīra*, the son of *mahārāja Nara Singha* of the *Rāṣṭrakūta* family—were repaired in that year. Next follow the names: *pirohita* Divākara, *Cāhavāna* Selahatha *Ūdhā*, *Bhāṭī* Nibā, *mantriśvara* Gaṅgū, and *mantriśvara* Devā, and also the name of the architect, *Dhan-nāka*, son of *Lākhā*. Lastly, there comes a stanza on the instability of fortune, the same stanza with which the inscription *No. 1* begins.

1. ॥ ८० ॥ श्रीरामाय नमः खल्लि श्रीविक्रमार्कसमयातीतसंवत् १५७३
व्रषः
2. मागसिरमासे सुकलपक्षे १० तिथौ गुरुवारे अश्विनीनक्षत्रे
रवियोगे दिना
3. ई सिवयोगे इदृशे महामांगल्यमये शुभमहूर्त्त राकूटवंशे
महाराजश्रीनरसिंघ-
4. पुत्र महाप्रतापीक दाता भोक्ता सौभाग्यसुंदर भोगपुरंदर प्रजा-
पालक सेवकपोषक वय-
5. रौवर्गद[म]नः स्वकीयवर्गपालनः महाराजश्रीहमीरः कारित
प्रतोलीस्तंभ ऊधरितां पुरोहि-
6. त दिवाकर चहवाय सेलहघ ऊघाः भाटी नीबाः मंत्रीश्वर गंगूः
मंत्रीश्वर देवाः घटितः सूत्रधारः
7. लाषा पुत्र सर्ववास्तुशास्त्रनिपुण सूत्रधार धन्नाकेन शुभं भवतुः
वजीर गोवलः ॥ श्री
8. मांधाता स महीपति कृतयुगालंकारभूतौ गतः (।*) सेतुर्थेन
महोदधौ विरचितः कासौ दशास्यांतद्धत् (।*)
9. अन्ये चापि युधिष्ठिरः प्रभृतयो सर्वेपि चास्तं गताः (।*) नैकेनापि
समं गता वसुमती मन्ये त्वया वास्यति (।*).

INSCR. No. 4 : A very short and apparently fragmentary inscription, incised on a *kīrtistambha*, in red sand-stone, erected on the brim of the *Rāṇīsara* tank. It comprises only 5 lines of writing, covering a space of 9" high by 10" broad. Written in corrupt Sanskrit.

The record simply consists of a date, [*Vikrama-*] *Samvat* 1589, the 9th day of the bright fortnight of *Bhādravā*, Sunday,

and a name, namely *mahārāja Sūrija Mala* of the *Rāthavaṛa* family. No mention of the particular fact, which the *kīrtistambha* was originally meant to record. An explanation, which easily suggests itself, is that the fact meant to be recorded is the digging of the tank, close to which the *kīrtistambha* stands. In such a case, the inscription must be taken to be incomplete, and refer not to *Sūrija Mala*,—who was dead since *Samvat* 1572,— but to some of his successors, probably *Rāma Siṅha*, who, according to the local tradition, dug the *Rāmasara* tank, to the west of the town. The name of *Sūrija Mala* ought therefore to be followed by that of *Nara Siṅha*, his son, and *Hamīra*, *Nara Siṅha*'s son, and lastly *Rāma Siṅha*, *Hamīra*'s son. The strange is that no letters seem to have been erased at the end of the inscription, and therefore it must be assumed that the writing was left unfinished by the engraver himself.

1. ॥ संवत् १५८६ वर्षः भाद्र-
2. ॥ वा शुद्धिः ६ दिनेः र[ि]व-
3. ॥ वारेः राठवडवंशेः [म]-
4. ॥ हाराय श्रीसूरि[ज]-
5. [॥] मलः

INSCR. No. 5: An inscription incised on a stone on the outer wall of the fort, consisting of 7 lines of writing and covering a space of 8½" high by 16" broad. Written in the usual corrupt mixture of Sanskrit and Bhāṣā. Letters very deeply engraved and consequently broken in some places.

The inscription opens with the date [*Vikrama*-] *Samvat* 1650, the 9th day of the bright fortnight of *Āṣāḍha*, Sunday, and refers to the reign of *mahārājādhirāja mahārāja Rāya Siṅha* [of *Bikaner*], under whom the *bhuraja*, on which the inscription stands, was built. Last follow the names of *khavāsa Gopāla*, superintendent *Siṅhavi Likhamī Dāsa*, architect, etc.

1. संवत् १६५० वर्षे आसा[ठ]मा[सि] शु[क्लप]क्षे नवम्यां तिथौ र-
2. ववारे घटिका ५१ षि[त्रा]नक्षत्रे घटिका १ ऊ[प] ।
3. रंत स्वतिनिक्षत्रे महाराजाधिराज महाराजा श्रीश्री
4. श्रीरायसिंघजी वि[जइ]रा[ण्ये] । फल[व]र्धि[कानगर] सु-
5. रज कराविता । ह[स्ते] बवास गोपाल । व(?)रानी(?)[-]घा-
6. ड () पीया [संघ]वी लिखमीदास ऊपरठाई जगा सू-
7. त्रधार साहिबदो । हरबा लिखतं सीहा ॥

INSCR. No. 6 : An inscription in a *bhūmigṛha* in the Jaina temple of Śāntinātha, in the Phalodhī town, carved on a marble slab in the wall. It consists of 9 lines of writing, covering altogether a space of 7½" high by 15¼" broad. Written in mixed Sanskrit and Bhāṣā. Well preserved.

The object of the inscription is to record that in the year [Vikrama-] Samvat 1689, the 13th day of the bright fortnight of Mārgaśīra, Wednesday, during the victorious reign of mahārāj-jādhirāja mahārāja Gaja Simha [of Jodhpur], and his son mahārājakumāra Amara Simha, and while the Munanōtra Jaya Māla was holding the office of *mantriśvara*, the temple of Śāntinātha was repaired by the common accord of the *saṅgha*. At the end, the names are given of the superintendent on the work, architects and stone-carver.

1. ॥ ८० ॥ श्रीगणाधिपतये नमः ॥ ॥ संवत् १६८९ वर्षे मागसिर-
मासे शु-
2. क्लृप्तौ । त्रयोदशीतिथौ । बुधवासरे । महाराजाधिराजमहाराज
3. श्रीगजसिंहजी महाराजकुमार श्रीअगरसिंहजी विजयराजे ।
मुहणोत्र-
4. गोत्रे । मंत्रीश्वर श्रीजयमालजी विराजमाने । श्रीतपागळे ।
श्रीफलवर्द्धिकान-
5. गरे । श्रीसमस्तसिंह (sic) मिली श्रीशांतिनाथप्राशाद जीर्ण-
उद्धार कारिता । वैद्य-
6. गोत्रे । मुं[०] श्रीपाल । जेठाणी उपरठाइ उद्यम करी प्राशाद
उद्धारिता । सूत्रधार
7. आणंद हर्षा सुत फलवधीया । सूत्रधार साह अली मांमदी
कमालदी महमद वीकानेरीय
8. सर्व जणा २[०] प्राशाद कृत ॥ श्रीवृहत्खरतरगळे । वा०
श्रीसौहा शिष्य वस्ता लिपीकृत
9. ॥ शुभं भवतु ॥ ॥ कल्याणमस्तु ॥ ॥ श्रीरस्तु ॥ श्री ॥ श्री ॥ .

INSCR. No. 7 : An inscription in the same *bhūmigṛha* and the same temple as the foregoing, and also carved on the same material. It consists of 10 lines of writing, covering a space of 5¾" high by 12½" broad. Written partly in corrupt Sanskrit and partly in Rājasthānī Bhāṣā. Fairly preserved.

The inscription has the same object as the preceding one, and also bears the same date, [*Vikrama-*] *Samvat* 1689, and makes the same reference to *mahārājādhirāja Gaja Singha* and his son, *yuvarāja kūvāra Amara Singha*. But it contains in addition the name of the then *Tapāgacchanāyaka*, the *ācārya Vijaya Deva Sūri*, and those of the *ācārya Vijaya Singha Sūri*, and the *paṇḍit Jita Vijaya Gani* and his pupil *Vinaya Vijaya Gani*. It was as a result of *Vinaya Vijaya Gani's* preaching, during a rainy season when he halted at *Phalodhī*, that the *saṅgha* were persuaded to take upon themselves the expenditure involved by the repairs to the old temple of *Śāntinātha*. Next comes a short praise in recognition of the great pains taken by the superintendent on the work; and lastly the name is given of the *setha* who sustained the expenses of the festivity of the installation of the image of *Śāntinātha* in the newly rebuilt temple.

1. ॥ ८० ॥ श्रीपरमेश्वरजी सत्य कइ । राठोडकुलउद्योतका-
2. रक महारा[जा*]धिरा[ज*] श्रीगजशंघजी राने । युवराजा
कुंवार
3. श्रीअमरशंघजी सं० १६८६ वर्षे तपागळे भट्टा(?)क श्रीविजय-
देवस्व[री]-
4. स्वर । आचार्य श्रीविजयशंघस्वरीस्वर आज्ञाकारि पंडित श्री-
5. जीतविजयगणि शिष्य पंडित श्रीविनयविजयगणि फलबधि
6. र(?) चोमासुं रहि नइ श्रीशंघ नइ देहरा नो उपदेश देइ नि
श्रीशान्तिनाथ-
7. जी रो जीर्णउद्धार नवो प्रासाद कराच्यो इत्थ समस्त संघी(?)[-]
8. धरच्यो । ध[र्म]धोरिइ(?) तपागळे मं० श्रीपाल नेठांगि वैद्यइ
गोत्रि
9. भगइ उद्यमि उपरठाइपणइ प्रासाद निपाया ॥ साः नेता पुत्र वळा
10. ततपुत्र साः आसा श्रीशान्तिनाथबिंबप्रवेशमहोक्व कारितः पोष
वदि ५ बुधवासर .

INSCR. No. 8 : An inscription incised on a stone slab in front of the temple of *Kalyāna Rāya*, at the left, consisting of 11 lines, covering a space of 10" high by 10" to 12" broad. A few conventional phrases in corrupt Sanskrit, and the rest in *Rājasthani Bhāṣā*. Very well preserved, and exceptionally clear.

As regards orthography, it is interesting to note the use of a particular character--the same as is used in modern Marwari script--to distinguish ङ from ञ (line 7).

The inscription opens with the date [*Vikrama-*] *Samvat* 1696, *the 2nd day of the bright fortnight of Aṣāḍha, Saturday*, and refers to the reign of *mahārājādhirāja mahārāja Jasavanta Singha [of Jodhpur]*. It then records that in front of the temple of *Kalyāna Rāya, the Muhanòtra Nayana Singha Jè Malòta*, conjointly with all the *mahājanas* and *vrāhmanas* of the town, had caused a theatre (*raṅgamaṇḍapa*) to be built. At the end come the names of the architects and superintendent.

1. ॥ श्रीगणाधिपतये नम ॥ संवत् १६९६
2. वर्ष असाढ सुदि २ दिन श्रिनवासरे
3. महाराजाधिराजमह(सि)राज श्रीजसवंतसिं-
4. हज^१ विजयराज्ये श्रीफलवधकानगरम-
5. धे श्रीकलाणरायजी र देहरा आगे दृ(?)ता ॥
6. मुहणोत्र श्रीनयणसीह जेमलोत उद्यम
7. ॥ करि ने रंगमंडप करायो समस्त महा-
8. जन ब्राह्मणे भेले हुई ने उद्यम कायो
9. सूत्रधार आणंद सादा ॥ नेता ॥ केसा
10. घेरु जोसी उपराठाइ लिखतं
11. मथेन वसत ॥ शुभं भवत कल्याण .

INSCR. No. 9: An inscription incised on a stone on the outer wall of the fort, consisting of 10 lines, covering a space of 12 $\frac{3}{4}$ " high by 20 $\frac{1}{2}$ " broad. Mixed Sanskrit and Bhāṣā. Letters very deeply engraved and consequently broken in several places, especially in the first three lines and the fifth.

The inscription refers to the reign of *mahārājādhirāja mahārāja Jasavanta Singha [of Jodhpur]*, and *mahārāja kumāra Prithi Singha*, and next gives the date, [*Vikrama-*] *Samvat* 1715, *the fifth day of the bright fortnight of Vaiśākha, Tuesday*. It then records that the wall in question (*koṭa bhuraja*) was caused to be built by the *Muhanòtra mantriśvara Śāma Karana Jè Malòta* and the *Sāhani Jaga Nātha Khyāvata*. At the end, the names of the architects are given, as usual.

¹ For जी.

1. ॥ ८० ॥ श्रीरांमाय नमः ॥ [श्रीगणेशाय नमः] ॥ [स्व-]
2. स्ति श्रीमहाराजाधि[राज]मह[ाराज श्रीज]सवंतसंघजी
3. महाराजकुमा[र] श्रीप्रि[थी]संघजी [वचना]त(?) [संव]त् १७१५
4. वर्षे वैसाखमासे शुक्लपक्षे पंचमीतिथे भोमवारे श्रीफ-
5. लवधिपुर[मध्ये] मुह्योत्र[गोत्रे] मं[त्र]ी[श्वर] शामकरण जै-
6. मलौत सांघणी जगनाथ घी[याव]त [विराज]माने अ--
7. उदम करा कोटभुज कृत ॥ सूत्रधार आणंद हर्षा-
8. सुत ॥ सू० लूणा केसा नाटा ॥ शुभं भवत ॥ कल्या-
9. णमसत ॥ लिपीकृतं सा० जीवण हरवांणी
10. उ ॥ मोहड मेघराज .

INSCR. No. 10: An inscription incised on the outer wall of the fort, comprising seven lines, and covering a space of $9\frac{3}{4}$ " high by $19\frac{1}{2}$ " broad. Written completely in Rājasthānī Bhāṣā. Huge and deeply engraved characters.

The inscription refers to the reign of the *rājarājeśvara mahārāja Vijè Singha* [of Jodhpur] and *kāvāra Phatè Singha*, and records how the former defeated *Jogī Dāsa*, who had rebelled to his authority and had locked himself up in the fort. The means through which Vijè Singha achieved success, is stated to have been a subterranean mine, whereby he was able to enter the fort and recapture it, while *Jogī Dāsa* was killed in the struggle. To commemorate the deceased (?), the *Bhātī Māhu Dāsa* erected a raised platform (*cōtarò*) near the wall of the fort. Of this platform there seems to have remained no trace to this day. The date, which is given at the end, is [*Vikrama-*] *Samvat* 1809, the 1st day of the dark fortnight of *Māgha*.

1. । स्वस्ति(?) श्रीराजराजेश्वर माहाराजा श्रीवि-
2. [जै]सिंघजी कंवर श्रीफतेसिंघा तथा
3. -ते जोगीदास दरवार सु वाकी हुय नै कोट
4. -भी(?)यो थो ती ऊपरा दरवार सु फोज
5. आय नै कोट सुरंग जगाय ने भेलीयो जो-
6. गीदास काम आयो सं ॥ १८०६ रा माहा वद १ सां-
7. तरो भा । माऊदास करायो कोट [पासे ही ?] ॥ १ ॥

INSCR. No. 11: An inscription incised on the pedestal of a *mūrti* of *Sūrya*, the Sun-god, which is found in a small open

chamber within the enclosure of the temple of Kalyāna Rāya. It consists of only four lines of writing, covering a space 2½" high by 16" broad. Written in corrupt Sanskrit. Fairly preserved.

The inscription refers to the reign of *rājarājeśvara mahārājādhirāja mahārāja Bhīva Singha* [of Jodhpur], and then records that in the year [Vikrama-] *Samvat* 1852, corresponding to the Śāka-year 1719, on the fifth day of the bright fortnight of *Aṣāḍha*, Sunday, the image of Sūrya mentioned above was caused to be made by the Maheśvari Bhavaṛa Sāha Dhanarūpa Sarūpa Canda Kevala Rāmaka.

1. ॥ श्रीगणेशाय नमः श्रीराजराजेश्वर माहाराजाधिराजा माहाराजाजी श्रीभीवसिंघजी वि-
2. जैराज्येः संवत् १८५२ वर्षे श्राके १७१७ प्रवर्त्तमाने मितौ आसाढ
सुदि ५ तिथौ रविवासरे
3. महेश्वरीगोत्रे भवडसाद्य पंः साहजी [श्री]परमाणंदजी पुत्र
साहजी धनरूप सरूपचंद केव-
4. लरामकेन श्रीसूर्यबंब कराविताः लिखतूं मथेन सिर[चं]दः उसता[द-]
घान कारिताः ॥ श्री ॥

4. JHANVARA-INSRIPTIONS OF THE CĀHAMĀNAS GAJA SINGHA DEVA AND KELHAṆA DEVA (V. S. 1219, 1227).

The following two inscriptions were found in an old Vaiṣṇava temple lying outside the village of Jhāvara, about 12 miles to the west of Jodhpur. The temple is fairly well preserved and still in use. The two inscriptions are incised on the two frontal pillars of the inner shrine, one at each side.

The first of the two inscriptions is in corrupt Sanskrit, and comprises 15 lines of writing covering a space of 11" high by 5" broad. The letters are partially filled with whitewash, but only few of them are illegible. As regards the language, it is interesting to note some peculiarities, viz., the use of *āsīt* in the two phrases *Māṇḍavyapurāsīt* (ll. 3-4) and [*lā*]gamāne *āsīt* (ll. 11-12), and the words *ātmika* (ll. 6-7), *ābhāvya* (ll. 7-8), *ghāṇaka* (l. 10), and [*la*]gamāne (l. 11). *Ātmika* seems to be an equivalent of *ātmakīya* or *ātmīya*. *Ābhāvya*, *ghāṇaka* and *lāgamāna* have all been found by D. R. Bhandarkar in inscriptions from Nāḍalāi referring to the Cāhamāna Rāya Pāla, dated *Samvat* 1195, 1189 and 1202 respectively (see *Ep. Ind.*, XI, pp. 36-7, 34-6, 42-3).

The inscription opens with the date [Vikrama-] *Samvat* 1219, *Śrāvaṇavadi* 1, and then, after mentioning the *mahārāja*-

putra Gaja Singha Deva in connection with the city of *Māṇḍavyapura*, records that his general *Solaṅkī Ja[sadhavala]*, the son of *Dhāmodara*, granted to the god *Vāsudeva* a grant of 1 *dramma* from the income of his generalship of *Jhamara*, evidently the old word for *Jhāvāra*, the village where the inscription is found. Then follow other lines, the sense of which is not quite clear, but the object whereof is to record another grant, apparently of 1 *kalasa* of oil from the oil-mills, made by the same *Jasadhavala* for the lightening of a lamp in the temple. Both the grants were made in the presence of four representatives of the four *pādras* of *Māṇḍavyapura* (cfr. the second inscription).

The most important information supplied by the inscription, is in the mention of *Gaja Singha Deva* as a ruler of *Māṇḍavyapura* (*Mandora*). The name of *Gaja Singha* as a son of the *Cāhamāna Ālhaṇa* of *Nāḍola*, was already known from the *Kirādū*-inscription of V. *Samvat* 1209 (*Ep. Ind.*, XI, pp. 43-6), where his sign-manual is given after those of his father *Ālhaṇa* and his brother *Kelhaṇa Deva*. From this fact, *D. R. Bhandarkar* had concluded that *Ālhaṇa* had apparently given a share in the administration of his kingdom to his first two sons, *Kelhaṇa* and *Gaja Singha* (loc. cit., p. 71). *Ālhaṇa*'s third son was *Kīrti Pāla*, who, according to the *Nāḍola*-plates of V. *Samvat* 1218 (*Ep. Ind.*, IX, p. 69), had been assigned by his father, with the approval of *Kelhaṇa*, the territory round *Nāḍalāi*. Our inscription integrates the above information. *Gaja Singha* had been assigned the territory of *Māṇḍora*.

1. संवत् १२१६ आवाण-
2. वदि १ अद्येह महाराज-
3. पुत्रश्रीगजसिंघदेव मां-
4. इत्यपुरासीत् त[स्य] वल[र]-
5. धिपो सौलं[की] जस[धव]-
6. [ल] धामोदरसुतेन आत्मी-
7. कभूमरवलाधिपया[मा]-
8. थम[ध्यात् श्री]वासुदेव-
9. स्य प्रद[त्तं द्र]मेकं अंके १
10. अथ(?) - - - घाणकतैल
11. क १ वला-[ला]गमाने आ-
12. सीत् सोपि शीपकउद्योत्त-
13. नाथ - -जसधवसेन प्र-

14. [दत्तः] चतुर्भिः-हरैः(?) विद्य-

15. मान प्रदत्त ॥

The second inscription is also in corrupt Sanskrit, and contains 10 lines of writing, of which the first six cover a space of $4\frac{1}{2}$ " high by $10\frac{1}{2}$ " broad, and the remaining four only a space of $2\frac{1}{2}$ " high by 5" broad. Much like in the first inscription, here too the letters are spoilt by whitewash, especially in the centre, where they are also worn out. Interesting words are: *taddhita* (l. 3) which, if I am not mistaken, seems to be used in the sense of *tadīya*, and *lāya* (ll. 6-7), which is known from other inscriptions.

The inscription opens with the date [*Vikrama-*] *Samvat* 1227, *sudi* 10, and first of all refers to the victorious reign of the *mahārājādhirāja paramēśvara Kelhana Deva*, at *Nādūla*, the chief town in the *Saptaśatabhūmī*. Next it mentions the rule of the *mahārājaputra Cāmuṇḍa Rāja* over *Māṇḍavyapura*, and lastly records a grant of 1 *dramma* made by *Nānada*, the son of *Samagha* (?), from the amount of some cess, at *Jhāmara*, one of the four *pādras* in the *bhūmī* of *Māṇḍavyapura*. The donor is described as a *Rāṣṭauḍa*, i.e. a *Rāthōra* Rajput, but the meaning of *virau*, which is appended to *Rāṣṭauḍa*, is not clear to me.

Kelhana Deva, the *Cāhamāna* king of *Nādūla*, is well known from other inscriptions, bearing dates ranging from [V.] *Samvat* 1221 to 1249. *Saptaśatabhūmī* is undoubtedly the same as the *Saptaśataviṣaya* of the *Sevārī* copper-plates of *Ratna Pāla* (V.S. 1176) (*Ep. Ind.*, XI, pp. 304-13), and from the present inscription it is clear that this expression designated the whole of the territory then held by the *Cāhamānas* under their sway. Very interesting is the mention of the *mahārājaputra Cāmuṇḍa Rāja* as the ruler of *Māṇḍavyapura*. *Cāmuṇḍa Rāja* is a new name, not yet found in any other inscription, and so far it is impossible to decide whether he was a son of *Āhana* or of *Kelhana Deva*. Whoever he was, it suffices here to know that *Gaja Singha*, who was the ruler of *Māṇḍavyapura* in V. *Samvat* 1219, had been succeeded by *Cāmuṇḍa Rāja* in V. *Samvat* 1227. A few years later, in V. *Samvat* 1241, the ruler of *Māṇḍavyapura* was *Sodhala*, a son of *Kelhana* (see *Journ. As. Soc. of Be.*, X, 1914, pp. 406-7). We have thus an apparently continuous list of the *Cāhamāna* rulers of *Māṇḍora* from V. *Samvat* 1219 to 1241. *Jhāmara* is evidently the same as *Jhamara* seen above, and from the present inscription it is evident that this village was one of the four *pādras* included in the territory (*bhūmī*) of *Māṇḍavyapura*. The mention of a *Rāṣṭauḍa* as the donor, is of great importance inasmuch as it shows that *Rāthōras* were found at *Māṇḍora* at least as early as V. *Samvat* 1227. For other *Rāthōra* families living in *Rajputana*, even before this period, see D. R. Bhandarkar's note in *Ep. Ind.*, XI, p. 71.

1. ओं संवत् १२२७ भा[द्र]पदसुदि १० दिने श्रीसप्तस[त ?]भूम्यं
(sic) प्रधान[प]-
2. त[ने] श्रीना[ड]के महारा[जा]धिराजपरमेस्वरश्री[केल्ल]णदे[ववि]-
जयरा[ज्ये]
3. तद्वितभूम्यां मध्ये (sic) श्रीमांडव्यपुर महाराजपुत्रश्रीचांमुं[ड]-
4. राजराज्ये अस्य तु भूम्यां पादचतुर्णां मध्ये (sic) प्रधानपाद-
5. श्रीभांम[र]स्थाने देवश्रीमाह[ग ?]णस्वामि रा[ष्ट्रौ]डविरौ (?) श्री-
6. समघसुतनानडेन ग्राम(?)लागम[ध्यात् प्र]दत्त [द्र]° १ मे-
7. कं एष जागं [प्रदत्त] ॥ - - - का (?)
8. - भवति - - - - (?) पालनी-
9. यं ॥ यस्य जस्य [जदा भूम]ी त-
10. स्य [त]स्य तदा [फलं] ॥

5. EPIGRAPHICAL RECORDS OF THE TWELFTH CENTURY A.D.
AT PĀLA (JODHPUR).

[The first part of this article, describing inscriptions found amongst the ruins of the Jain temple of Ghāṅghānaka, was published in the "Specimen-pages" given in appendix to my "Scheme for the Bardic and Historical Survey of Rajputana." See *Journ. As. Soc. of Be.*, Vol. X, 1914, pp. 405-10].

The epigraphical records in the locality of the old *Dūgelāva* tank, are twelve *satī*-tablets, which bear inscriptions with dates ranging from V. Saṃvat 1218 to V. Saṃvat 1244. They are arranged in three lines, the first numbering seven inscriptions, the second one, and the third four. The third and sixth inscriptions in the first line, from the left, are illegible. The other ten are the following :—

- (1) 1. ओं ॥ संवत् १२२२ वैसाषासुदि ११ मं-
2. गलवारे जाति भिचि धाणासीहा व्रीकलौ (?)
3. या- जाया क्कोक्खि वीतिणि लोकांतरितः ॥
- (2) 1. ओं संवत् १२१८ का-
2. तिंकसुदि १२ घंघ-
3. लजाति घूषा पो-
4. घ(?)सुत [ज]ामके

5. गोवर्धन द्यतोः ॥
 6. सु० निवोनवल ।
- (3) 1. [अों ?] संवत् १२३६ वैसाषसुदि ११
 2. सहदे[व]सुत महण लज्ज(?)ठी वा(?)
 3. सुदेव स्वर्गं [ग]त[ः] (॥).
- (4) 1. अों ॥ संव[त्] १२४० माह-
 2. वदि १४ महणसुत
 3. काका वासुदेव निम्ब(?)
 4. सुत दरकटजाति वच(?)कसगोत्र (॥).
- (5) 1. अों ॥ संवत् १२४४ चेत्र वदि १
 2. सोमे धर्कटजाति दासारगो[त्र]
 3. कोलि[या] धणवासुत लोकांतरे
 4. गतः ॥.
- (6) 1. अों संवत् १२४२ माघसुदि ६
 2. सू[के] घंघलजाति घुष[सु]-
 3. [त] सोढासुत धुधा एसा (sic) जा-
 4. मके गोवर्धण मेहियाके-
 5. न करापितः ॥.
- (7) 1. अों संवत् १२३२ वैसाष वदि १२
 2. वृधदिने दर्कटजाति पोचस-
 3. गोत्र वांवाणसुत मोल्ह-
 4. ण स्वर्गं ग[तः] ॥.
- (8) 1. संवत् १२१८ भाद्रवासु-
 2. दि ८ धर्कटजाति पोचस-
 3. गोत्र वावण पाहडसुत
 4. भार्जा पुंनदेवि लोकांत-
 5. रे गतः [॥].

- (9) 1. [ओ] संवत् १२४४ पोसवदि १४ सोमदिने
 2. धार्कटजाति पोचसगोत्र समधरपुत्र
 3. मैइंधर जीवतभार्य महसत परम[लो]के(॥).
- (10) 1. संवत् १२२६ मार्गसुदि २ श-
 2. नौ [प्र]तीहार थांथादुहिता सो-
 3. नली लोकांतरितः । तथापि जो-
 4. जली [- - -] ॥.

The value of the above inscriptions is chiefly an ethnographical one, they having preserved to us some tribal names, concerning which there has been very scanty evidence to this day. Out of the ten inscriptions, six refer to the *Dharkata jāti* and its *gotras* the *Pocasa* (inscr. 7, 8, 9), the *Vacchasa* (inscr. 4, [3]), and the *Dāsāra* (inscr. 5); two to the *Ghaughala jāti* (inscr. 2, 6), one to the *Bhici jāti* (inscr. 1), and one to the *Pratihāra* tribe of Rajputs (inscr. 10). *Jāmaka* (for *Yāmaka*) in the 2nd and 6th inscriptions, is apparently the name of the cemetery on the brim of the *Dūgelāva*, where the deceased were burned and where the funeral stones are now extant. The two last-mentioned inscriptions are engraved on *govardhanas*, whereas all the others are on ordinary stone tablets. Each inscription is surmounted by the figure of the deceased, sitting at the left, with his *satī* standing at the right, and a *liṅga* between the two. In the sculpture over the inscription No. 1, the *satīs* are two.

6. PĀBŪ, A RĀṬHŌRA HERO.

One of the most popular heroes of Marwar, who has been elevated to the rank of a semi-god, is Pābū Rāṭhōra. From the current tradition it appears that he was the son of Dhādhala, and grandson of *rāva* Āsathāna, the son of *rāva* Sihò. He lived at Koḷū, a village some 18 miles south of Phalodhi, though apparently he was not the ruler of the place, and was associated with a band of Thoris, a wild tribe of pillagers of the desert, who accompanied him in all his daring enterprises. The legend says he was killed in the noble attempt of rescuing cows, which had been robbed by a Khici chief to some Cāraṇas in the neighbourhood. Therefore, he is worshipped as a protector of the cattle, and has little shrines devoted to him throughout the country, he being most commonly represented on horseback and the seven Thoris on foot arranged in a line behind him, all in the attitude of shooting an arrow from their bows. To this day, Thoris are found wandering about village to village and singing on the *sāraṅgī* the exploits of Pābū,

and whilst singing they display before the eyes of their auditors a long sheet of cloth on which the most salient events in the life of the hero are represented in colours.

So far, there seems to be no evidence extant for fixing any particular date in connection with the life of Pābū. But if he was the grand-grandson of *rāva* Sihò, as the tradition implies, we can safely, though approximately, place his life in the second half of the Samvat-century 1300, probably the seventh or eighth decades, a period roughly corresponding to the second and third decades in the fourteenth century A.D. The chief point of reference for the above calculation is the date in *rāva* Sihò's funeral stone, which is V. Samvat 1330 (= 1273 A.D.) (see D. R. Bhandarkar in *Ind. Ant.*, XI, 1911, pp. 181-3), and also the date of an inscription referring to Dhūhara, a brother of Dhādhala, which is V. Samvat 1366 (= 1310 A.D.) (*Ibid.*, p. 301).

Of no great help, because later in time, are some epigraphical records, which are found at Kolū, the village of Pābū. The three oldest amongst them refer to the V. Samvat years 1415, 1483, and 1515. There are two little temples, dedicated to Pābū, in the neighbourhood of the village, and it is here that these epigraphical records are found. The oldest record is engraved under a stone image of Pābū, and mentions the erection of the temples in the year *Samvat* 1415, when *Sohara*, a Dhādhala Rāthòra, the son of Sobha, the son of Khīvara, the son (?) of Devathāna (?), was the ruler or *ḡāgīrdār* of the place:—

- (1) 1. संब[त*] । १४१५ व्रषे भाद्रवा सुदी ११ वार^१ आदीतवा[र]
2. राठड आसथान्य सूत धाधल सूत पावू-
3. संघ देवथान घीवड सूत सोभ सूत सोहड-
4. राज्ये वावारा प्रसाद नीपज .

The second inscription is likewise engraved under a stone-image of Pābū, and records that the same was caused to be set up by *Dhādhala Pā(hā ?)*, in the year *Samvat* 1483, under the reign of *mahārājādhirāja Lavakhana (?)*:—

- (2) 4. ----- सवत (?)
5. १४८३ प्रवर्त्तमाने वैसाष वदि
6. ५ पंचमी बुध रे [पूर्वी]षाठा [न]क्ष-
7. त्रे महाराजाधिराज सव(?)षण-

^१ The stone seems to read वाळ .

8. राज्ये धांधल पाहा(?) पाबू जोग्य

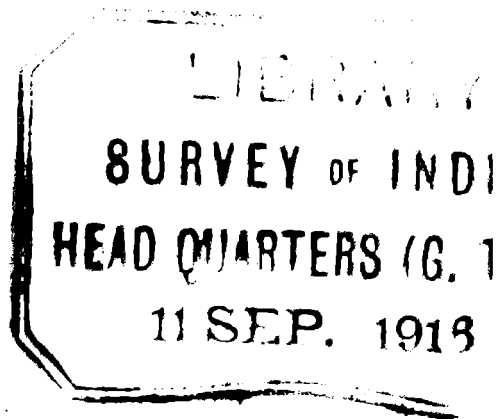
9. प्रतिष्ठा करावत - - - - -.

The third inscription is engraved on two faces of a *kirtis-tambha*, and records that the temples were repaired in the year *Samvat 1515*, by *mahārāja Cādò* and other *Dhādhalas*, during the reign of *rāya Sātala*, the son of *mahārāya Jodhò* :—

- (3) 3. -- संवत
 4. १५१५ वर्षे
 5. भाद्रवा सुदि
 6. ११ बुधवास-
 7. रे महाराय
 8. राठड धांध-
 9. ल सुत महा-
 10. राउत पाबू
 11. प्रसाद मू-
 12. ति कौर्त्ति-
 13. स्थंभ करा-
 14. वितं धांध-
 15. ल घौमड
 16. सुत सोभा
 17. पुत्र सोह-
 18. ड कामा म-
 19. ह[ग]राज चां-
 20. दा गिदा हा-
 21. जा सहिते-
 22. न प्रसाद
 28. उधरितः

1. महाराय
 2. जोधा सुत
 3. राय श्रीसा-
 4. तल विज-
 5. यराज्ये.

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Of little interest, from the historical point of view, are the names of the Dhādhala Rāthōras recorded in the three inscriptions quoted above. Pābū was killed when little more than a boy, and had no sons. His brother Būrò had a posthumous son, but it is not known if the latter had any descendants. There are still a few Dhādhala Rāthōras at Kolū, and they claim to have descended from Udè Singha, one of the sons of Dhādhala.¹ According to the tradition orally preserved by them, Dhādhala had 15 sons, of which Udè Singha was the first, Būrò the second, and Pābū the thirteenth. Jasavanta Singha and Bhūra Singha, the oldest and apparently best informed Dhādhalas in the village, gave me the following genealogical list of their ancestors:—(1) Dhādhala, (2) Udè Singha, (3) Rāma Singha, (4) Gaja Singha, (5) Likhamana Singha, (6) Deva Rāja, (7) Khīva Karana, (8) Sobhata, (9) Sohara and Kamò, (10) Godò, (11) Nètò, (12) Vāghò, (13) Sāi Dāsa, (14) Rūpò, (15) Nètò, (16) Hara Rāma, (17) Mahā Singha, (18) Anò, (19) Bhūrò. The list is evidently incorrect, as it gives too many names to fill the period between Dhādhala (about Samvat 1350) and Sohara (Samvat 1415), and too few for the period between Sohara (Samvat 1415) and Bhūrò (Samvat 1970). I wonder if Deva Rāja is the same as the Devathāna of the first inscription.

A short distance from the two temples, there is a well, called the *Gūjavò kùò*, which the local tradition identifies with the well near which Pābū was killed, after he had drawn water for the rescued cows. On the other side, between the temples and the village, there is a tank, which is called *Pābūsara*, after the name of the hero, and on its slopes there are some *chattrīs* and many funeral stones. One of the stones under the *chattrīs* bears an inscription, in which—though much of the writing is illegible—the date *Samvat 1563* can be safely read, and also the phrase: *rāva Sūrija Mala r[è] vārè* (=“ at the time of *rāva Sūrija Mala* [of Jodhpur]”), and the names Sohara, Godò and Ghara Si. The village of Kolū, which numbers only a few houses at the present day, seems to have been a rather populous one in former times. A *khyāta* of the time of *mahārāja Jasavanta Singha* of Jodhpur describes it as being inhabited by 20 Rajputs, 130 Banias, 210 Thoris, 300 Muhammadans and 210 Dhedhas (see *Descriptive Catalogue*, sect. i, pt. i, No. 12), and further states that the village was given in *śāsana* to the *bhopās* of Pābū by *rāva Gāgò* of Jodhpur.

¹ In most of the Bikanor chronicles, Pābū himself is represented as a son of Udè Singha. Cfr. the following account, which is taken from the *Khyāta* of Dayāla Dāsa (see *Descr. Cat.*, Sect. i, pt. ii, No. 1):—

धांधलजी री वेडा दोष उवा । वडो कदल होडो चासल । बीर कदल री
वेडा दोष उवा । वडो बूडो होडा पाबूजी (p. 47 b.)

The version of the legend of Pābū, which follows, was drawn up in accordance with the account in the *Khyāta* of Mūhanōta Nēna Sī.

Dhādhala Rāthōra, the son of Āsathāna, from his ancestral seat in Mahevò went once to Gujarāt. There he had the good fortune to surprise some heavenly nymphs who were sporting near a pond, and succeeded in catching one of them. The fair prisoner asked him: "Why do you detain me?" "Remain with me" he said. She agreed, but demanded the condition that he should never watch what she was doing when left alone. Dhādhala took her to Kolū, a village where there was a petty ruler, his name Pemò, whom he never cared to pay homage to. There Dhādhala had a separate palace built for the nymph, and in the course of time she made him father of two children, a girl, Sona-bāi, and a boy, Pābū. Now, whenever Dhādhala went to see the nymph, he used to give her notice before. But one day he could not resist the curiosity of spying what she might be doing, when unobserved, and went stealthily into the palace, and what did he see but a lioness giving suck to her cub. On noticing him, the lioness, who was but the nymph, resumed her proper form and disappeared into the sky. The cub also took his proper form, that is Pābū's, and Dhādhala gave him to a nurse.

In the course of a few years, Dhādhala died, leaving besides Pābū and Sona-bāi, two other children of an elder age, namely a youth, Būrò, and a girl, Pema-bāi. Pema-bāi was married to the Khīcī Jīnda Rāva, and Sona-bāi to the Devarò ruler of Sirohī. Being elder in age, Būrò inherited all his father's rights and property, and nothing was left to the younger Pābū. He had only a she-camel in his possession, and on this he used to go hunting about and earning his livelihood.

Somewhere south of Kolū there was ruling a Vāghelò chief by name Ānò, and he had seven Thoris in his service, their names Cādiyò, Deviyò, Khākhū, Penalò, Khemalò, Khañghārò, and Vāsalò. A famine befell over the country, and these Thoris slew a she-buffalo to satisfy their hunger. This aroused the anger of the son of Ānò and in the quarrel that ensued, he was eventually killed. The Thoris had to escape from the country, in consequence, and they were pursued by Ānò, who overreached them and engaged in a fight, in which the father of the seven Thoris lost his life. The seven brothers sought successively refuge in many places, but no one would accept them, out of fear of Ānò Vāghelò. At last, they went to Pemò, the chief of Kolū, and he sent them to the Dhādhala's. The Thoris then went to Būrò, and he told them to go to Pābū. Thus at last they went in search of Pābū into the desert, where he was reported to have gone to hunt. There they met a boy, who was hunting a deer, and

they asked him where Pābū was. He said Pābū had gone to hunt. The Thorīs said they would wait for him to come back, and meanwhile asked the boy for the she-camel, which he rode, to appease their hunger. The boy gave her to them, and went away telling he was going to Pābū. The Thorīs had scarcely eaten the she-camel, than the boy came back, and what was their surprise when they learned from the nurse that that boy was Pābū himself. The first question Pābū asked of them was: "To where have you taken my camel?" They said: "You gave it to us, and we ate it." Pābū said it was nonsense and sent them to see where they had left it. They went to where they had left the skeleton, and there they found the she-camel standing in flesh and bones. Then they understood the power of that little boy and became his servants.

From that day, the Thorīs never left the side of Pābū. Wherever he went, they accompanied him, ready to shed their blood in the defence of their master. And there was no lack of daring enterprises for men in the service of such a master, for hardly had any adventure occurred to his mind, he was already in for it. On the occasion of Būrò's daughter being married to Gogò Cāhuvāṇa, Pābū promised her as a marriage gift the she-camels of Devò Sūmarò. Now Devò was such a powerful chief, that people used to call him "a second Rāvaṇa." Everyone laughed at Pābū's promise, but Pābū was in earnest and sent Hariyò, one of his Thorīs, to find out the whereabouts of Devò. Meanwhile another task imposed itself on the hero, and this was one of revenge. His sister Sona-bāī, who had been married to Sirohī, had been insulted by her husband. One day, whilst she was playing at *cōpara* with her Vāgheli co-wife,—the daughter of Ānò,—the latter despised her on the ground she had had no ornaments in dowry and her brother used to eat with the Thorīs. To the latter remark, Sona-bāī replied that Pābū's Thorīs were better than the very emirs in the service of the *rāva*, her husband, whereupon the *rāva*, who overheard, gave her three cuts with his whip. On hearing of the insult suffered by his sister, Pābū at once prepared to go to revenge her.

Before setting out, he went to take leave of his elder brother, Būrò, at the head of his Thorīs, mounted on his Kālavī mare. This was a mare that had been born to the Kāchelā Cāraṇas by a mare fecundated by a marine horse. Being a mare of superior qualities, many chiefs, and amongst these Jinda Rāva Khīci and Būrò, had been longing to possess her, but the Cāraṇas had refused her to everybody, except Pābū, to whom they gave her at last on the condition he should draw his sword for them, whenever they happened to be in need of his help. On seeing Pābū coming on the Kālavī mare, his sister-in-law, Dōḍa Gahelī, blamed him for having accepted a horse that was desired by his elder brother, and scornfully

asked him whether he needed the horse for ploughing or for pillaging the country. Pābū answered that as for his brother's desire to have the mare, he was ready to give her to him, but as for the question concerning the use he would make of the mare, he was also a Rajput and needed the horse, and was brave enough to go to Dīdāvānò, his sister-in-law's native place, and bring to Kolū her brothers in fetters. Dōḍa Gaheli laughed, but not many days passed ere Pābū came back and called her to his palace and asked her to look out from a window. Dōḍa Gaheli looked out, and what did she see but her brothers, their hands tied behind their backs, their faces turned upwards, and their cheeks watered with tears, whilst the Thoris were pulling them by the hair and administering them a generous thrashing.

Meanwhile Hariyò came back and told that the proposed expedition against Dedò was impossible, not only because of the power of that chief, but also the impregnability of his positions. Pābū was by no means disheartened at the information, but thought he must first go against Sīrohī and revenge his sister. He set out with his seven Thoris all on horseback, and only Hariyò on foot. Now the seven Thoris had been always pressing him to revenge them on Ānò Vāghelò. The village of this chief was just on the way to Sīrohī; on reaching there, Pābū joined in fight with him and killed him. Ānò's son came to Pābū for submission and laid before him all his mother's ornaments. Pābū forgave him and installed him on his father's seat. Then Pābū proceeded to Sīrohī, where he fought with his brother-in-law and defeated him and caught him alive. It was only at the intercession of Sona-bāi, he released him. Then he gave her the ornaments of the wife of Ānò Vāghelò, and Sona-bāi's triumph was complete when she went to show them to her co-wife and at the same time told her that her father Ānò had been killed by valiant Pābū and his Thoris.

After thus revenging his sister, Pābū set out for the expedition against Dedò Sūmarò. On the way thereto, he came across the territory of Mirjā Khān and encamped in his orchards, causing much damage. The gardeners ran to inform Mirjā, but the latter, who had heard of the bravery of Pābū, came to make submission, bringing many rich presents, which Pābū refused to accept, to the exception of a horse, which he gave to Hariyò who had none. Then he continued his march towards the country over which Dedò ruled, but as he reached the *Pañcanada*, there there was an immense sheet of water, many fathoms deep, obstructing his way, and there were no means of getting across. He had recourse to his supernatural power and in no time brought himself and the Thoris to the other shore. There he found the she-camels of Dedò grazing, and ordered the Thoris to surround and capture them. Only one

camel was spared, and he sent on that a man to inform Dedò he was taking the camels away and was ready to meet him if he meant to come to the rescue. Then he conveyed the Thoris, the camels, and himself to the other shore and left for Sodarò, the village of Gogò. Dedò went to find Mīrjā, who advised him never to attempt to recover the camels from such a hero as Pābū was, and so he gave up every hope of revenge and took his way back to his domains.

Now the way from Pañcanada to Sodarò was through Ūmarakoṭa. On passing through the last place, Pābū was seen by the virgin daughter of the Sodhò ruler of the place, her name Phulavantī, who immediately fell in love with him and told her parents she had made a vow to get married to Pābū or nobody else. The father of the girl approved of her resolution and sent a man to offer his daughter in marriage to Pābū. Pābū accepted, but said he could not stop just then, but would come to marry after making over to Gogò the camels of Dedò. And continued on his way. When he reached Sodarò and brought the camels before Gogò, Gogò praised him, but a doubt arose in his mind, that those might not be the camels of Dedò, but camels wrested from somebody else. He therefore resolved to have a trial made and see if Pābū had really such a power as seemed to be necessary for the carrying out of a similar feat. He told him: "I have some wrong to revenge on a personal enemy of mine. Let us go to-morrow and take the auspices." Accordingly, the next morning, they both went into the desert, but had no auspices. They lay down under a tree to sleep, leaving their horses to graze. When they woke up in the afternoon, Gogò said: "Let us go home." Pābū went to fetch the horses, but found that both had their legs shackled with serpents. He understood it was a trick played him by Gogò, but kept quiet and came back saying he had not been able to find the horses. Then Gogò went for them, and what did he see but a large lake, with a small boat in the middle, and both the horses in it. Then he understood what the power of Pābū was, and went back to him, and this time both the heroes went for the horses and found them still grazing where they had left them.

On reaching Kolū, Pābū received the marriage invitation from the Sodhò chief of Ūmarakoṭa. Then he called his relatives Jinda Rāva, Gogò, Būrò, and the *rāva* of Sīrohī to come and join his marriage procession. The Thorī Cādiyò in those very days was celebrating the marriage of his seven daughters, and so Pābū exempted him from accompanying him. He took with him Deviyò instead. On the road, the procession met with sinister omens, whereupon all deserted Pābū and turned back, to the exception of Deviyò. Pābū, however, reached Ūmarakoṭa safely and married the girl and brought her to Kolū.

Now Jinda Rāva, after he left the marriage procession bound for Ūmarakoṭa, on his way home robbed the cows of a Cāraṇī, her name Viravaṛī. She went to Būrò to demand help, but he refused it, adducing the pretext that he had a pain in his eyes. Viravaṛī then went to Pābū, who readily undertook the task of revenge. At the head of the seven Thoris and the marriage guests of Cādiyò, Pābū ran after Jinda Rāva and rescued the kine. When he took them back to Koḷū, the poor beasts were dying with thirst, so he took them to the well and with his own hands drew up water for them. Meanwhile, the younger sister of Viravaṛī had gone to Būrò and rebuked him saying: "What do you think you have gained by refusing to go and rescue our kine? Lo, Pābū, your younger brother, has run to the rescue and lost his life at the hands of the Khīci." The news, of course, was false, but Būrò believed it and without further consideration went in anger after Jinda Rāva. The two met in the field and Būrò was killed. When Jinda Rāva saw Būrò dead, he was greatly alarmed, because he thought now Pābū would come to revenge his brother's death. He therefore resolved to anticipate the attack by going himself in search of Pābū and falling upon him by surprise. Accordingly, he hastened to Koḷū, where he went to see Pemò, the ruler of the place, and won him to his side by representing Pābū as scheming to dispossess him of the land. Pābū was still at the well, where he had drawn water for the cows, when he noticed a cloud of dust nearing from a distance. "What is that?" he inquired of Cādiyò. "It is the Khīci returning to the assault" was the answer. Pābū mounted his mare and prepared to meet the foe. He fought stupenduously, but could not escape his fate, and lost his life, and won himself a place in heaven. Jinda Rāva, however, was defeated by the gallant Thoris.

The Sodhī wife of Pābū immolated herself on the pyre to join her lord in heaven, and so did the Doda wife of Būrò, who was pregnant, after cutting her womb and extracting a child seven months old. This child she gave to a nurse, saying: "Take good care of him, for he will grow a man of supernatural power. Since he has been brought forth by practising a cut (*jhararò*), his name will be *Jhararò*." According to the prophecy, the child grew up, and on reaching the twelfth year of age avenged his father and uncle by killing Jinda Rāva Khīci, and ruled over the land. Subsequently, having met Gorakha Nātha, he became an immortal *siddha*, and as such is supposed to be still living on the face of the earth.

7. KOṬA-INSRIPTION OF RĀNĀ LĀKHĀ (V.S. 1445 ?)

The following inscription was found at Kota, near Desūri, in the Godhavāra province, incised on a pillar of a Jainā

dharmasālā. Originally, it formed part of a temple of Pārśvanātha, which is now seen in ruins outside the same village, and some of the stone material of which seems to have been used in the building of the said *dharmasālā*. I have not seen the place, but edit the inscription from two impressions taken by my travelling man Cāraṇa Ujaḷa Rāma Dayāla.

The inscription consists of ten lines of writing, and covers a space of 9" high by 10½" broad. The text is in a mixture of corrupt Sanskrit and Bhāṣā. It opens with the date [*Vikrama-*] *Samvat* 14[4]5, the third day of the bright fortnight of *Āśādha*, Monday, and after an allusion to the victorious reign of *rāṇā Lākhā* and the jurisdiction of *thākura Māḍana*, refers to the temple of Pārśvanātha at *Āsalapuradurga*. The object of the inscription is to record that the *Bālyanā-maṇḍapa*, apparently the same temple mentioned above, was repaired by *sāha Kaḍūā* of the *Upakeśavaṇṣa*, *Ligāgotra*, and his wife *Kamaḷa De*, his son *Jaga Simha* and others, for the sake of the increment of their spiritual merits. At the end the testimony is given of the whole *saṅgha* and the aforesaid *thākura Māḍana*.

Of the names mentioned in the inscription, *rāṇā Lākhā* is that of the famous ruler of Mewar, and *Āsalapura* the old name of the place where the inscription was found. Another inscription, also found at *Koṭa* and giving *Āsalapura* as the name of the place, was published by D. R. Bhandarkar in *Ep. Ind.*, XI, pp. 62-3. The *Samvat* year is not clear in our inscription, the third numerical figure looking more like 2 or 7 than 4, but from the fact that *Lākhā* ascended the throne in the year *Samvat* 1439 and was succeeded by *Mokala* in 1454, it seems impossible that the date should be anything but 1445.

The chief importance of the inscription lies in the fact that it is the first epigraphic document of the *rāṇā* of Mewar's direct rule over *Godhavāra*. The *Nādalāi*-inscription of *Cāhamāṇa Raṇavīra* (*loc. cit.*, pp. 63-4), which is dated in the year *Samvat* 1443, does not contain any allusion to *Raṇavīra*'s subordinacy to Mewar. It would therefore seem that as far as *Samvat* 1443—only two years before the date of our inscription—the *Godhavāra* province still remained in the hands of the *Cāhamāṇas*. Whether *Raṇavīra* and his father *Vanavīra*, whom *Tod* represents as having offered his services to *rāṇā Hamīra*, were still independent or had become tributaries of Mewar, it is so far impossible to know. But one thing is certain: that in the year *Samvat* 1445—the date of our inscription—the *Cāhamāṇas* were no longer on their throne and *Godhavāra* had been incorporated into the *rāṇā*'s domains.

1. ओं खल्लि श्रीसंवत् १४[४?]५ वर्षे आसाठ-
2. सुदि ३ सोमे राणाश्रीलाखाविजयराज्ये

8. प्रधानठाकुरश्रीमांडणथापारे श्रीआसल-
4. पुरदुर्गे श्रीपार्श्वनाथमंत्रिचैत्ये । उपकेशवं-
5. श्रे लिंगागोत्रे साह कडूआ भार्य कमलदे पु-
6. च जगसीह क - - - - केल्हा जगसीह भार्य
7. ताल्लणदे पुत्र खेठा (?) भार्य जयती पुत्र सु - - स-
8. ल्लसहितेन आत्मपुण्यश्रेयसे बा[ल्य]णामंडपजी-
9. शोर्धारः कारापितः । शुभं भवतु समस्तसंघ(?) मांड-
10. यठा[कुर] साक्षिका ॥

Bikaner, 2nd Jan., 1916.

7. Demon-Cultus in Mūndāri Children's Games.

By SARAT CHANDRA MITRA, M.A., B.L.

A theory has been recently propounded to the effect that a number of the games played by children are survivals of demon-worship. I have already shown¹ that the origin of several of the North Indian children's games may be explained by this theory. Take, for instance, the highly interesting and popular North Indian game known under the name of *Ankh Mundaul*. It has a very striking similarity to the German game of "Blind Cow," the French "Blind Man's Buff," the Dutch "Blind Cat," the "Blind Goat" of the Danes and the Swedes, and the "Blind Fly" of the Italians. The method of playing it is as follows:—One boy is selected to be blind and has to stand facing a wall. The other players conceal themselves, and, while the blind player is searching for them, try to touch the wall. Whosoever among the players is touched by the blind man becomes a "thief" or "blind man" in his place. Curiously enough, the Bengalis, like the Italians, designate this game with the name of *Kānā Māchhi* or the "Blind Fly." In the Bengali variant of this game, as in the English form thereof, the blind man has to touch one of the players who are sitting round, and, after feeling him, has to bawl out his name. In the *Dūndū-Khel* or the Mūndā version of this game, however, the "blind man's" playmates slap him one after the other. If the former succeeds in identifying the boy who slaps him, the covering is removed from his eyes, and the boy who has been caught slapping him and recognized, has at once to take the place of the former and is blind-folded. And the play goes on in the same way as before till he, in his own turn, succeeds in recognizing the boy who may have been slapping him.²

Applying our theory to the explanation of the foregoing North Indian game, we find that the "blind man" represents the masked demon of the German children's games, who tries to catch the rest of the players, while the latter try to evade being caught by him.

The essential component of these games is the evasion of the demon's efforts to catch one of the players. But there is not the least trace of the existence therein of any incident

¹ "North Indian Children's Games and Demon-Cultus," *Journ. Bombay Anthropol. Soc.*, vol x, pp. 1-7.

² *The Mūndās and Their Country*. By S. C. Roy, M.A., B.L. With an Introduction by E. A. Gait, Esq., I.C.S., C.I.E. Calcutta: The City Book Society. 1912. pp. 491-92.

which may be construed into a mimicking of the worship of the demon. The theory set forth above, therefore, seems to be defective.

The question, therefore, arises : Whether the theory is a plausible one and, if so, whether its plausibility is borne out by the evidence of any game, whether Indian or European, the main incident whereof is a travesty of the worship of the demon. Fortunately, we have found that a game answering to the aforesaid description and mainly based upon the incident of mimicking the worship of the demon, exists in Northern India and that among a people still living in a low plane of culture, namely, the Mūndās of Chhota Nagpur. Among their numerous dramatic games, that is to say, games which are intended to afford amusement with instruction at the same time and which are usually played in the evening, is one which goes by the name of *Kāntārā inū*, or the "Jack-fruit game." The mode in which it is played is as follows :—

One boy represents a jack-fruit tree. A certain number of boys and girls represent the fruits thereof. One boy acts the part of the owner of the tree ; another boy represents a dog set to keep watch and ward over the fruits ; while a third one personates a thief. The boys and the girls, who represent the jack-fruits, cling to the boy simulating the tree and bawl out at the top of their voices : "*Hētē tērē bāndā hūkā, hētē tērē bāndā hūkā.*" When the owner is fast asleep, the thief comes to the tree. The watch-dog, getting scent of him, barks at him furiously. Disturbed by the dog's yelping, the owner of the tree wakes up from his sleep and finds the thief stealing his jack-fruits—whereupon he raises a hue and cry. Thereupon the thief takes to his heels and carries away with him the jack-fruits he has helped himself to.

The next morning, the thief presents himself before the proprietor of the tree and asks for the loan of a knife. Thereupon the latter asks the former the purpose for which he wants it. The thief replies that, as he has slain a goat, he requires the knife to skin and dress the beast with. Satisfied with this reply, the proprietor lends him the knife. Chuckling over the success of his ruse, the thief goes home with the knife, cuts open the jack-fruit and helps himself to the toothsome contents thereof as much as he can. When he goes to return it to the owner, the latter smells it and enquires as to why it emits the smell of a jack-fruit. Scarcely have these words issued from the proprietor's mouth, the purloiner of the jack-fruit takes to his heels. On the ensuing night also, the jack-fruits are again stolen by the thief. As soon as the watch-dog observes the latter, it sets up a loud barking. Hearing the dog's yelping, the proprietor wakes up and, finding that his fruits have been stolen for the second time, raises a hue and cry. But the thief runs away as fast as his heels will carry him, taking with him his booty. The follow-

ing morning, the proprietor of the tree, who had by this time become a sadder but a wiser man owing to the theft of his fruits, says to himself: "I shan't leave any more of my fruits on the tree. The rascally thieves are stealing them all and taking them away." Just as he is thus soliloquising to himself, the thief, looking the very picture of innocence, once more presents himself before the owner and asks for the loan of a knife to kill a fowl with. The owner of the tree, believing his words to be true, lends him the same knife as he had done on the previous occasion. On getting it, the former goes away. During the night, however, the thief cuts down the jack-tree with it. The very next morning, he goes as before to return the knife to its owner. When, in the morning, however, the latter comes out of the house, lo! and behold his surprise at seeing his favourite jack-tree felled to the ground and lying prostrate on it.

He then goes to consult a *sokhā* or ghost-finder in order to ascertain from him as to what malignant spirit or demon might have played the mischievous prank upon him by cutting down his favourite jack-tree. It so happens that the ghost-finder, to whom he has betaken himself for advice, is no other than the wily purloiner of his jack-fruits. When the proprietor of the tree lays his case before him, the pretended ghost-finder, assuming an air of solemnity, directs him to bring one white hen, one black goat and one buffalo, besides rice and the other customary offerings to propitiate the offended *bhūt* (demon or evil spirit) with. The duped proprietor, taking his directions in all earnestness, duly brings the required offerings at the prescribed time. Then the travesty of worshipping the angry demon and making him the offerings to appease his wrath with, is gone through. When the mimic ceremony is finished, one of the boy-players catches hold of the legs of the boy who simulates the felled jack-tree; while another player takes hold of him by the hands—all bawling out the following rhyme at the top of their voices:—

“ *Sim darom joma chi ?*
Merom darom joma chi ?
Kera darom joma chi ? ”

TRANSLATION.

“ Will you eat fowl-sacrifice ?
 Will you eat goat-sacrifice ?
 Will you eat buffalo-sacrifice ? ”

The boy representing the tree then stands up again. Then all the other players join hands and dance round the tree.¹

¹ *The Mūndās and Their Country.* By S. C. Roy. (Calcutta : 1912) pp. 492-494.

It will thus be seen that, in this game, there is a clear mimicking of the worship of the demon with all its customary accompaniments. But in the European games and the North Indian one named *Āṅkh Mundaḷ*, which have been described, there is no such travesty of demon-worship. The main incident, on which these latter are based, is that one of the players, who is blind-folded and, therefore, called the "blind man," tries to catch the rest of his playmates. It has been suggested that the "blind man" represents the masked demon of German children's games who tries to catch the rest of the players, while the latter try to evade being caught by him. It has been further stated that the mask was unprovided with eye-holes either for the purpose of rendering the catching more difficult or for averting the "evil eye" of the demon during the imitation of his activities. All this is plausible enough. But the demon's attempt to catch the rest of the players and the latter's evasion of his efforts to seize them, cannot certainly be called relics of demon-worship. We, therefore, think that Professor Singer-Bern's theory, as propounded in the German *Folklore Journal* to the effect that many of the children's games, as played in Europe, are survivals of demon-worship, requires modification. We would suggest that they, as also the *Āṅkh Mundaḷ* of Northern India, are games embodying vestiges of the demon-lore of primitive times. So far as our investigations go, the Mūṅdārī dramatic game appears to be the only game, hitherto known, which embodies a travesty of demon-worship.

The offerings required for the propitiation of the demon in the Mūṅdārī game are a white hen, a black goat and a buffalo. Why are these beasts and bird of the colours specified requisitioned? The offering of a white cock or hen is very acceptable to a demon. On the occasion of the Holi festival, the tribal priest of the Dusādhs and Dhāngars—two menial tribes living in the Eastern districts of the United Provinces—has to climb up a ladder made of wooden sword-blades by placing the soles of his feet on the edges of the weapons. When he gets on to the summit thereof, he has to decapitate a white cock which is tied on the top.¹ It has been suggested that the white cock is sacrificed by way of propitiating the Sun-god. But we think that this is not plausible enough, for had it been an offering to the Sun-god, the sacrificial cock would have been a black one, as from our survey of the ceremonial customs of Northern India, we have found that a black fowl is invariably offered up by way of sacrifice to the benevolent deities. An examination, for instance, of the ritual of the Mūṅdās of Chhota Nagpur will bear out the plausibility of the suggestion

¹ *An Introduction to the Popular Religion and Folklore of Northern India.* By W. Crooke, B.A. Allahabad: 1894. pp. 10-11.

made above. On the occasion of the ear-boring ceremony of a Mündā baby, a black fowl is sacrificed on a spot marked with the figure of a parallelogram, and the blood of the fowl is sprinkled over the figure.¹ At the celebration of the Phagu festival, the Pāhan makes joint offerings of three pieces of rice-flour bread, one pot of rice-beer, and a black hen which are offered to all the Bōngās or deities presiding over the woods, hills, streams, fields and groves and prays for success in hunting.² When the Sohoraī festival is celebrated, a black fowl is sacrificed at the door of the buffalo-shed; and its meat together with rice-beer are offered up to propitiate the Goreā Bōngā—the deity who presides over cattle.³

Note the anomalous sacrifice, by the Asūrs, of a white cock to Sing-bōngā—the Supreme Deity of the Mündās—in their legend of Lutkum Haram and Lutkum Buria.⁴

Now we come to the offering of the black goat. The goat is an animal which is credited with the possession of mystic powers. It is invariably offered up by way of sacrifice. The authorities on cultural anthropology are divided in their opinion about the origin of this belief in the possession of its mystic powers and of the preference given to it as an animal fit for sacrifice. Some of them say that they are based either on its peculiar smell and its habits of butting, and of injuring plants by browsing upon them, or on its uncanny and shaggy appearance.⁵ Others think that these have originated from its possession of the curious habit of occasionally shivering, which is supposed to be caused by some divine afflatus or essence in it—some spirit residing within it.

This remarkable habit of shivering is, moreover, utilized by various peoples as an oracle for deciding boundary-disputes and the question whether or not the sacrifice to be offered to a deity is acceptable to the latter. The ancient Greeks would not sacrifice a goat if it did not shiver when it was besprinkled with water. The Thags of India also had recourse to the same device. Whenever they had to offer up a sacrifice to their grim goddess Devī—the deity who presides over malevolent spirits and was the patron-saint of their dreadful profession, they would select two goats, black and perfect in all their limbs, make them stand facing the west and then bathe them with water. If they shivered and shook the water from their shaggy coats, it was regarded as an omen that the sacrifice was acceptable to the goddess. The same procedure was also adopted in the sacrifice to the famous hill-demon Airi, who is

¹ *The Mündās and Their Country*, pp. 459-460.

² *Op. cit.*, pp. 474-475.

³ *Op. cit.*, p. 481.

⁴ *Op. cit.*, p. xxxi (Appendix II).

⁵ *Demonology and Devil-lore*. By M. D. Conway. London: 1879. Vol. I, p. 122.

believed to be the ghost of some hunter killed while in the pursuit of game. Like the Wild Huntsman of European legends, he haunts the forest in which the tragic incident happened and may be heard hallooing to his dogs. If the goat to be offered up as a sacrifice to this demon, when it is marked with vermilion on the forehead and rice and water are sprinkled over it, shivers and shakes off the water from its body, it is looked upon as an omen that the demon has accepted the offering; and it is forthwith slain.¹

A goat of a perfectly black colour is always preferred for sacrificial purposes. If it is "without a single spot of white," it is a very acceptable offering for demons and all malignant deities and spirits of the same ilk, as will appear from the Thags' selection of it for sacrifice to their demon-goddess *Dēvi*, and from its requisition for the worship of the demon in the *Mūndāri* children's game described herein. This practice is prevalent not only in Northern India but also in the Southern Presidency of which a marked feature is its demon-worship. The most famous festival in honour of a demon is held at *Puttoor*, a suburb of *Trichinopoly*, and is based on the following legend:—

Once upon a time, a demoness named *Kolomayi* had a temple in *Travancore*. She thirsted for human blood and could only be propitiated by the sacrifice of children. A large number of children were sacrificed to her; but still she was not appeased. Consequently, the people were afflicted by her with outbreaks of epidemics and the sufferings of a great famine; while the holocaust of children threatened to depopulate their land. In this strait, the sore-stricken people made up their minds to deport her to some other land and thereby free themselves from her visitations. With this object in view, they constructed a raft whereupon they placed the image of *Kolomayi* and set it adrift upon the waters of the *Cauvery*. The raft was at last stranded at *Puttoor* where it was buried under the ground. Some ryots, who were excavating earth, accidentally dug out the image of *Kolomayi*. Thereupon the grim goddess threatened to curse them if they did not instal her in a temple and arrange for her daily worship. This they did, and arranged for her *puja* with offerings of fruit, camphor, sugar and butter. But the demoness would not accept anything short of the sacrifice of children. Her demand struck terror into their hearts. As their women were not as prolific as those of *Travancore*, they could not afford to sacrifice their children. Therefore they made up their minds to deport her again and informed her accordingly of their decision. But *Kolomayi*, remembering the discomforts of the voyage on the raft and the long entombment under the ground,

¹ Crooke's *An Introduction to the Popular Religion and Folklore of Northern India* (Allahabad Edition of 1894), pp. 163-4.

relented and said: " You may substitute goats for children when you offer sacrifice to me. And I will bless your lands with double crops, *but the goats must be as black as your own children without a single spot of white.*" So she was allowed to remain in her temple; and a festival is held in her honour in the month of March every year.¹

In this connection, it may be stated here that a white goat appears to be the appropriate sacrifice for a beneficent deity. In the Mūndāri legend of *Lutkum Haram and Lutkum Buria*, the Asūrs are stated to have sacrificed a white goat to Sing Bōngā, the Supreme Deity of the Mūndās, when their supply of iron fell short, whereupon the deity is said to have provided them with an abundance of this metal.² In the same legend, two virgins are stated to have, on behalf of the Asūrs, worked the furnaces with bellows newly made of *white goat-skin*.³

Now I come to the subject of the offering of the buffalo. The buffaloes are invariably black; while albino ones are rarities. A black buffalo is a fit offering for Kālī or Devī, who presides over demons and malignant spirits, and is usually sacrificed to her. It is also offered up as sacrifice to the goddess Durgā who is said to have slain the buffalo-shaped Mahishāsura. Hence her appellation of *Mahishāsuraḡhātini*. The black buffalo is, therefore, very appropriately requisitioned for offering to the demon in the Mūndāri game referred to above.

The colours black, white, red and yellow are stated to be particularly dreaded by demons and malignant spirits, and are said to scare them away.⁴ If this be so, the offerings of a white hen, a black goat and a black buffalo, as mentioned in the Mūndāri children's game which has been described, would have scared the demon away instead of propitiating him. But from what I have stated above, it would appear that, as a matter of fact, white fowls, black goats and buffaloes are invariably sacrificed in India to propitiate demons and malevolent deities. This is one among the many anomalies in the popular customs and beliefs of India.

¹ *On the Coromandel Coast*. By F. E. Penny. London: Smith Elder & Co. 1908. pp. 288-291.

² Roy's *The Mūndās and Their Country*, p. xxxi (Appendix II).

³ *Op. cit.*, p. xxxiii (Appendix II).

⁴ Crooke's *An Introduction to the Popular Religion and Folklore of Northern India*, p. 201.



8. A New Species of *Tephrosia* from Sind.—*Tephrosia Falciformis*, *Ramaswami*.

By M. S. RAMASWAMI, M.A., B.A., F.L.S., of the *Botanical Survey of India*, Royal Botanic Garden, Calcutta.

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[With Plate I.]

Among the small collections of plants that were frequently sent by Mr. R. S. Hole, Forest Botanist, Dehra Dun, in the year 1913 to the Herbarium of the Royal Botanic Garden, Sibpur, for determination, was a curiously fruiting species of *Tephrosia*, found in the Mohibal dero forests, Nauhahro, in the province of Sind. This could not be identified with any species in the Calcutta Herbarium, and as the specimen contained no flower, Mr. Hole was requested to collect from the same source some specimens in flower. This he very kindly did, and the result was that later in the year a fairly good flowering specimen of this species was made available for study. A careful examination of this, together with the fruit-material already sent, revealed the existence of a hitherto undescribed species of *Tephrosia*. Moreover, there is already a specimen in the Herbarium, collected by Major Roberts in Rajputana, which is identical with the present one, but which was previously erroneously identified as *Tephrosia purpurea*, Pers. The available material thus allowed of a fairly complete description of the species being drawn up, which is presented below, with a short Latin diagnosis prefixed to it. One of the duplicates of the specimen was sent to Kew, and there the writer's determination was confirmed.

TEPHROSIA (? SECTIO NOVA) FALCIFORMIS, Ramas., *sp. nov.*

Species distinctissima, leguminibus falcatis vel prope circinalibus.

Herba perennis, rigida, 50-60 cm. alta. Folia imparipinnata, foliolo terminali lateralibus aliquanto majore, rhachi adpresse sericea, basi inconspicue pulvinata, 5.08 cm.—10.16 cm. longa; stipulae lineares, persistentes, 3 mm. longae; foliola 5-11, angusta, oblanceolata, basi cuneata, apice acuto sed distincte mucronato, lateralia 2.5 cm.—3.8 cm. longa, 4.2 mm.—6.3 mm. lata, terminalia 3.1 cm.—4.4 cm. longa, 6.3 mm.—9.5 mm. lata, albo-sericea; nervi laterales 11-13, paralleli.

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Herba perennis, rigida, 50-60 cm. alta. Folia imparipinnata, foliolo terminali lateralibus aliquanto majore, rhachi adpresse sericea, basi inconspicue pulvinata, 5.08 cm.—10.16 cm. longa; stipulae lineares, persistentes, 3 mm. longae; foliola 5-11, angusta, oblanceolata, basi cuneata, apice acuto sed distincte mucronato, lateralia 2.5 cm.—3.8 cm. longa, 4.2 mm.—6.3 mm. lata, terminalia 3.1 cm.—4.4 cm. longa, 6.3 mm.—9.5 mm. lata, albo-sericea; nervi laterales 11-13, paralleli.

Racemi terminales et foliis oppositi, laxiflori, 9 cm.—22·5 cm. longi, pedunculati. Flores gemini, 7-8 mm. longi; pedicellis 2·5 mm.—10·2 mm. longis, sericeis; bracteis minutis, subulatis, 2·1 mm. longis. Calyx extra albo-sericeus; tubus campanulatus 2·1 mm. longus 3·2 mm. diametro; lobi subulati, basi triangulari, 1·9 mm. longi. Vexillum purpureum, extra albo-sericeum, orbiculato-cordatum, apice breviter emarginato, 7·5 mm. longum 10·2 mm. latum; alae 6·3 mm. longae; carina 5 mm. longa. Ovarium albo-flavidum, sericeum; stylus incurvus, glabrescens; stigma penicillatum. Legumen omnino-falcatum vel paene circinnatum, mucronatum, 3·17 cm.—8·89 cm. longum, 6·3 mm. latum, tenuiter reticulatum, puberulum. Semina subreniformia, glauca, 5 mm. longa, 2 mm. lata.

A very low perennial, about 2 feet high, very rigid. Young branches angular, finely appressed—white-silky. Leaves imparipinnate, 2-4 in. long, the terminal leaflet somewhat larger than the rest; rachis appressed-sericeous; pulvinus inconspicuous. Stipules linear, persistent, $\frac{1}{8}$ in. long. Leaflet 5-11, very narrowly oblanceolate, base cuneate, apex acute and mucronate, lateral 1 in.—1 $\frac{1}{2}$ in. long, $\frac{1}{8}$ in.— $\frac{1}{4}$ in. broad, terminal 1 $\frac{1}{4}$ in.—1 $\frac{3}{4}$ in. long, $\frac{1}{4}$ — $\frac{3}{8}$ in. broad, argenteocanescent with appressed hairs on both surfaces; secondary nerves 11-13 pairs, parallel and very close together. Flowers in terminal racemes, laxly arranged, geminate, usually 1 long and 1 short-pedicelled. Bracts minute, subulate, $\frac{1}{12}$ in. long. Pedicels also white-silky, $\frac{1}{10}$ — $\frac{1}{2}$ in. long. Calyx white-silky; tube campanulate, $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. in diameter, lobes subequal, subulate from a triangular base, almost equalling the tube, $\frac{1}{4}$ in. long. Standard rich purple but white-silky outside, orbicular-cordate, apex emarginate, $\frac{3}{10}$ in. long, $\frac{2}{5}$ in. broad. Wings glabrous, $\frac{1}{4}$ in. long. Keel $\frac{1}{8}$ in. long. Ovary yellowish-white, sericeous, $\frac{1}{6}$ in. long. Style incurved and slightly bent, glabrous. Stigma penicillate. Pod completely falcate or sometimes even circinate, thin, flat; with reticulations above, 3-5 seeded, mucronate, 1 $\frac{1}{4}$ in.—3 $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, very sparsely appressed hairy. Seeds obscurely reniform, glaucous, $\frac{1}{3}$ in. long.

SIND:—Naushahro, collected in fruit in February and in flower in October, by the local Forest Officer and communicated by Mr. R. S. Hole.

RAJPUTANA:—Coll. Major Roberts (sheet in the Calcutta Herbarium).

The most important peculiarity of this species lies in the pod, the shape of which varies from falcate to circinate. Adopting the division into subgenera given in the Flora of British India, this species would seem to come under *Reineria*, DC. (with the exception of the pod), but the writer is inclined to regard this as forming the type of a separate subgenus distinct from the above. The key for facilitating the recognition of the

subgenera, as far as India plants are concerned, will then be as follows:—

A. Pods straight or very slightly incurved towards the end only;

(1) Leaves simple, calyx—teeth lanceolate. Macronyx.

(2) Leaves odd pinnate, calyx—teeth short deltoid. Brissonia.

(3) Leaves odd pinnate or simple, calyx—teeth narrow-subulate. Reineria.

B. (4) Pods completely falcate or nearly circinate. Calyx—teeth narrow subulate; leaves odd pinnate. (The present species which may form the type of the new sub-genus),

Of the Western India species, *Tephrosia falciformis*, Ramas., may be taken as nearest to *T. purpurea*, Pers., with which it roughly agrees in all other characters excepting the pod.

I take this opportunity of expressing my thanks to Major A. T. Gage, I.M.S., Director of the Botanical Survey, for having kindly looked over my Latin diagnosis.



K.P. Das, del.

A. Chowdhary, lith.

TEPHROSIA FALCIFORMIS RAMAS., SP. NOV.

9. NUMISMATIC SUPPLEMENT No. XXVII.

Note.—The numeration of the articles below is continued from p. 498 of the "Journal and Proceedings" for 1915.

166. SOME SMALL SILVER PIECES OF THE SULTĀNS OF DELHI.

[With Plate II.]

The scarcity of fractions of the silver *tanka* of the Sultāns of Delhi is well known. They number possibly not more than a score all told from the time of Altamash to the end of the Suri dynasty—a period of over 300 years.

Of the following six coins, five are from my own cabinet. The sixth, a half *tanka* of Naṣīru-d-dīn Maḥmūd, is in the collection of Mr. C. S. Delmerick, late of the Opium Department. All six coins are, so far as I know, unique and are published for the first time.

1. SHAMSU-D-DIN ALTAMASH

(or Altitnish).

Wt. : 83 grains.

S. : .95".

Obverse.—In double square within circle—three dots in each segment.

في عهد الاعام

المستنصر امير

المومنين

Reverse.—Area enclosed as on obverse, but no dots in segments.

السلطان الاعظم

شمس الدنيا والدين

ابوالمظفر التمش السلطان

This is the earliest half *tanka* of the Dehlī Sultāns known. It is well executed and in very fair preservation.

The circle exactly fits the flan of the coin and there is no room for any margin though probably the die contemplated one. The coin is of the type of I.M.C. No. 39 struck for issue in the cities of Hindustān (bilādu-l-Hind) with its tantalisingly defective marginal inscription on the reverse.

2. NĀṢIRU-D-DIN MAḤMŪD.

Date.: Nil.

Wt.: ?

S.: .9".

Obverse.—Within double square—dots in segments.

في عهد الامام
المتعصم امير
المؤمنين

Reverse.—Within double square.

السلطان الاعظم
ناصر الدنيا والدين
ابوالمظفر محمود
السلطان

This is of the usual crude type that one associates with the silver coins of this king, and its weight is its main point of interest.

3. MU‘IZZU-D-DIN KAIQUBĀD.

Date: 686 A.H.

Wt.: 56 grains.

S.: .87".

Obverse.—Within square—three dots in segments.

السلطان الاعظم
معز الدنيا والدين

Reverse.—Within square—four dots in segments.

ضرب بحضرت دهلي
في سنة ست
و ثمانين و ستمائة

This coin besides being the only one of its kind and weight known is unique in its design. The mint and date instead of being relegated to a usually defective margin occupies with commendable clearness the full area of the reverse. It was bought by me in a mixed lot at a sale in London of coins belonging to Mr. S. M. Johnston.

In the introduction to the catalogue of the coins of the Sultāns of Dehli in the Indian Museum (vol. II, p. 7) I mentioned that a single half rupee and two anna piece of this

sovereign were known. The latter which is also in my cabinet was published in J.R.A.S., July 1900, p. 484. The former is the coin above described. I now find I was mistaken in calling them a half rupee and an eighth of a rupee. Their weights are 56 grains and 27·3 grains respectively. Both coins are well preserved and appear to have lost but little from their original weight. Taking the weight of the full *tanka* as 175 grains, which is the generally accepted weight though specimens exceeding 170 grains are hardly ever met with and 168 grains is a high weight, there need be no hesitation in holding that a coin of 56 grains in fine condition is not a half but a third of a *tanka*. Similarly the piece of 27·3 grains would be a sixth, and the tiny coins of Nāsiru-d-dīn Maḥmūd, Ghiāṣu-d-dīn Balban and Jalālu-d-dīn Fīroz which weigh from 13 to 14 grains would be twelfths of a *tanka*, and not sixteenths or one anna pieces as hitherto they have been called.

4. SHER SHĀH.

Mint : Āgra.

Date : 948.

Wt. : 85 grains.

S. : ·9".

Obverse.—Within looped square.

The Kalima.

In the margin beginning from the bottom and working to the left.

ابوبکر | عمرو | عثمان | علي

Reverse.—Within looped square.

سلطان ۛ

شیر شا

خدا الله ملکہ

۹۴۸

Margins—bottom

ضرب اگرة

left

السلطان

top

العادل

right

ابوالمظفر

This exquisite little coin was till recently in the cabinet of Mr. H. R. Nevill, I.C.S., Collector of Etawah, by whom it was generously given in exchange to me. Thomas mentions a half rupee of Sher Shāh of the same date, but records no details or

mint-name. Where that coin is I do not know. Dr. White King also had a $\frac{1}{2}$ rupee in his collection of 948 H., but of the circular areas type and without any mint name (J.R.A.S. October 1900). A fourth is described below. I can call to mind no others. Thomas records a half piece of Islām Shāh, without giving details. I have never seen one myself or heard of any other. An eight-anna piece of Ibrāhīm Sūr (weight 88 grs.) was described and figured by the late Mr. C. J. Rodgers in his 4th Supplement to Thomas's "Chronicles" (J.A.S.B. 1886). The coin belonged to General Cunningham. Half rupees of the two other Sūrī Sultāns have yet to be found.

5. SHER SHĀH.

Mint (Shergarh).

Date : wanting.

Wt. : 83·5 grains.

S. : ·8".

Obverse.—Within double square.

The Kalima.

No margins visible.

Reverse.—Within double square.

شاه سلطان

شير

خلد الله ملكه

No margins visible.

The arrangement and character of the legends on this coin and its general appearance leave no doubt that it is of the Shergarh mint—Cf. I.M.C., Vol. II, 645.

6. SHER SHĀH.

Mint : *Nil*.

Date : 949.

Wt. : 7 grains.

S. : ·4".

Obverse.

[شاه]

شير

سلطان

Reverse.

الله

خلد ملاك

٩١٠٩

This tiny coin is much worn, and may well have lost 4 grains. This would make it a one-anna piece. I know of no other silver Sūrī coin of this weight.

In order to make this paper a little more complete I append a brief note of the other small silver pieces of the Sultāns of Dehlī which have been published or are otherwise known to me.

(a) *Nāṣiru-d-dīn Maḥmūd.*

(1) Wt. 13·2 grs. *Obv.* السلطان الاعظم

Rev. ناصر الدنيا والدين

Ref. C. J. Rodgers's 4th Supplement to Thomas's "Chronicles" (J.A.S.B. 1886), No. 15.

(2) Wt. 13·2 grs. *Obv.* السلطان المعظم

Rev. as on (1).

Ref. C. J. Rodgers's 5th Supplement (J.A.S.B. 1894), No. 21.

(3) Duplicate of (2), in the cabinet of Mr. R. B. Whitehead, I.C.S. Wt. 13 grs., size .4".

(b) *Ghiāṣu-d-dīn Balban.*

Wt. 13·8 *Obv.* السلطان الاعظم

Rev. غياث الدنيا والدين

Ref. C. J. Rodgers's 3rd Supplement (J.A.S.B. 1883) No. 20. Mr. Rodgers said of this coin that it was "the only small silver coin I have ever seen or heard of, of the early Pathāns."

(c) *Mu'izzu-d-dīn Kaiqubād.*

Wt. 27·3 grs. *Obv.* السلطان الاعظم

Rev. معز الدنيا والدين

Ref. J.R.A.S., July 1900. "Coins of the Pathān Sultāns of Dehlī: No. 7." This is in my own cabinet, and in 1900 was the only Pathān silver coin of this weight known.

(d) *Qutbu-d-dīn Mubārak.*

Wt.: 26.

S.: .45".

Obverse.

السلطان

بن السلطان

Reverse

شاه

مبارک

This is in the cabinet of Mr. R. B. Whitehead, I.C.S.

Bareilly.

H. NELSON WRIGHT

167. THE BIJĀPŪR RUPEES OF 1091 A.H.

I should like to say a few words about the rare Rupees of 1091 A.H. (24 R.), which were "issued in Aurangzeb's name six years prior to the capture of Bijāpūr" by the Mughals. (Wright, I.M.C. xxxviii). Dr. G. P. Taylor has shown in Num. Supp. XV, art. 92, that there is no reason for questioning the reading of the date, and Mr. Whitehead also has accepted the fact of the issue from Bijāpūr in that year of "Rupees and half Rupees of Aurangzeb's usual silver type." (P.M.C. lix). But our knowledge of the actual circumstances under which these curious coins were uttered is still far from being complete or free from doubt and surmise. Dr. Taylor has described how that city was closely besieged in 1090 A.H. by Aurangzeb's general, Diler Khān (*not* Dilāwar Khān), how the investment was vigorously pressed in spite of the noble sacrifice of Bādshāh Bibi, how the regent Mas'ūd Khān begged for the aid of Shiwāji, and how the Mughal commander was obliged to raise the siege in consequence of the Marāthās having cut off his supplies. Dr. Taylor has not mentioned his authority, but it was evidently Grant Duff (Bombay Reprint. 1873, pp. 126-130), though the same events are summarised with his usual skill in "the despatchlike narrative" of Elphinstone also. (Cowell's ed. 1866, pp. 646-7). Now Grant Duff says that "Diler Khān was compelled to abandon all hope of reducing the place," and that, when at the end of the rains, he attacked the open country and laid waste the Carnatic, Janārdhan Pant "completely defeated him, intercepted his parties, cut several of them to pieces and compelled him to retreat" (I, p. 130). But if the result of the siege was really so infructuous and abortive as Dr. Taylor's authority makes it out to have been, how can we account for this undoubted exercise by Aurangzeb of the sovereign right of issuing money? Dr. Taylor offers us the choice of two suppositions. He thinks it probable that "while the siege was proceeding, and while capitulation seemed imminent, the powerful Mughal faction in the city "caused these coins to be struck,

thinking to anticipate an inevitable surrender," but he also believes it to be "just possible" that they may have been issued from some mint accompanying the Imperial forces in the field." Dr. Taylor candidly admits that "no sufficient proof has come down to us that the Mughal assailants did actually capture the city in the year 1091," and it is clear that under the circumstances, the acceptance of some such hypothetical explanation is unavoidable. I am happy to be able to state that I have found in a contemporary Mughal historian, a passage which enables us to dispense with either of these conjectures, and which may be fairly said to be the "sufficient proof," for want of which they had to be advanced. It occurs in the *Maāsir-i-Ālamgiri*, of Muḥammad Sāqi Mustāid Khān, which was written in 1122 A.H. (1710 A.D.), that is, only three years after the death of Aurangzeb (*Bibliotheca Indica Text*, p. 8; Elliot and Dowson VII, p. 181). The author was Munshi 'Ināyat-ullāh Khān, Wazir of Bahādur Shāh, Shāh 'Ālam I, and a competent critic has said of him, that "although his style be too concise, I have never met in any other author, with the relation of an event of this reign, which is not recorded in his history." (Stewart, *Descriptive Catalogue of Tippoo Sultan's Library*, p. 16). This writer says, in the course of his narrative of the events of 1091 A.H.

پانزدهم ربیع الاول از عرضداشت شاه عالم بهادر شاه بمسامع بشایر مجامع

رسید که در بیجاپور خطبه بنام نامی بلند نامی یافت و سکه مبارک در زیب

سیم و زر افزود بساطبوسان بارگاه جاه و جلال تسلیمات مبارکباد بجای

آوردند *

[*Bibliotheca Indica Text*, p. 192.]

"On the fifteenth of Rabi I [1041 A.H.], it reached the Imperial ears (*lit.* ears around which the messengers of good tidings were always congregating), from the memorial of Shāh 'Ālam Bahādur Shāh that the Khutba had been in the renowned name [of the Emperor] in Bijāpur, and that the stamping of his auspicious coin-legend had added to the lustre of silver and gold. The courtiers (*lit.* Kissers of the Carpet) of the splendid and glorious audience-hall went through the salutations of congratulation."

It is perhaps necessary to add by way of explanation that Prince Mu'azzam or Shāh 'Ālam Bahādur Shāh had some time before (11 Sha'abān, 1089 A.H.) been appointed to the supreme government of the Dakhan (*Maāsir-i-Ālamgiri*. Bib. Ind. Text, p. 169), though "the command of the army in the field still remained with Diler Khān" (Grant Duff, *ib.*, p. 128).

Whatever the circumstances which postponed for six years the extinction of Bijāpur as a separate state, there can be *now*

no doubt that Diler Khān had been able in 1091 A.H. to extort from its ruler, at the point of the sword, the recognition of both these regal privileges—the *Khutbah* and the *Sikkah*—to which Musulman sovereigns have always attached an importance, which may appear to us exaggerated, but which is really based on the fact that in those times “Stamped moneys obtruding into every bazār constituted,” as Edward Thomas has forcibly put it, “the most effective Manifestoes and Proclamations that human ingenuity could have devised to make clear to the comprehension of all classes, the immediate change in the Supreme Ruling power” (Chronicles, ed. 1871, pp. 1-2).

S. H. HODIVALA.

168. THE GULKANDĀ RUPEES OF SHĀHJAHĀN.

The Gulkandā (Golconda) Rupees of Shāhjahān have been the subject of some speculation and difference of opinion among students of Mughal Numismatics. Mr. Nelson Wright finds it impossible to reconcile his reading of the date on I. M. C. No. 947 with the historical statements to which he attaches credit. Mr. Whitehead questions the reading itself and is not pressed by the weight of the divergence, because no coins “have yet been found bearing a *legible date*.” (P. M. C., p. xcviij). Having quoted Mr. Whitehead’s words, let me allow Mr. Nelson Wright also to state his own view of the matter. “Under Shāhjahān, the Qutb Shāhs came into collision with the Mughals, and in 1045 agreed to pay tribute and permit the *Khutba* to be read in the Emperor’s name. (E. D. VII. 51). Aurangzeb, when Governor of the Dakhan Sūbās, lost no time in picking a fresh quarrel which ended in 1067 in Abdullāh, the reigning King, consenting to strike coins in Shāhjahān’s name. * * * Of the Shāhjahān period, four coins are catalogued, but only one of them has anything resembling a date, and that a very doubtful one, for it would place the coin earlier than 1045.” (I. M. C. xlviij).

It will be seen that the difficulty centres round the figure ‘5’ which stands for the date on I. M. C. No. 947. If Abdullāh Qutb Shāh consented to strike coins in Shāhjahān’s name only in 1067 A.H., what does the ‘5’ mean? It cannot stand for any of the four digits of 1067, and it cannot be meant for the regnal year either, because the fifth year of Shāhjahān was 1041—1042, and not 1067 A.H. But is 1067 the correct date of the first striking by the Gulkandā ruler of coins bearing the name of his Mughal suzerain? I venture to say that it is not.

The terms of the treaty which Aurangzeb dictated to Abdullāh are stated in Elphinstone’s History. They were that he was to give his daughter in marriage to Sultān Muhammad, with a dowry in territory and money; to pay a crore of rupees (£1,000,000 sterling) as the first instalment of a yearly tribute,

and promise to make up the arrears of past payments in two years." (Cowell's ed. 1866, p. 589). "He was compelled," says Grant Duff, "to give his daughter in marriage to Sultān Muhammad, and to pay up all arrears of tribute fixed by Aurangzeb at the annual sum of one crore of rupees, but Shāhjahān, in confirming these proceedings, remitted twenty lacs of the amount." (Bombay Reprint, 1873, p. 69). There is not a word in either of these authorities about the striking of coin in Shāhjahān's name, nor is there any in the verbose account of the transactions of 1067 which is given in the contemporary "Shāhjahān Nāme" of Ināyat Khan, and which can be read in Elliot and Dowson VII. pp. 115-116. But if no such stipulation was made in 1067 A.H., when was it made, and how did these coins come to be issued at all?

The fact is that when the Gulkandā ruler was brought to his knees in 1045 A.H. he agreed not only "to pay tribute and permit the Khutbā to be read in the Emperor's name," but to strike coins also with the Imperial titles. The long and minatory rescript addressed to 'Abdullāh by Shāhjahān and the exceedingly submissive, if not abject, reply are quoted with evident pride and exultation by the official chronicler, 'Abdul Hamid Lāhori, in the Bādshāh Nāme. (Bibliotheca Indica Text, pp. 130-133, 178-180). Both these letters are specimens of the most florid and artificial style affected by cultured Persians in official correspondence, and have been left untranslated by Dowson, whose summary of three lines is filled out with a meaningless, if not misleading 'etcetera' (E. D. VII, 51), and who dismisses the "letter of homage from Kutb-ul-Mulk" in six words. (ib. 57). Fortunately the original text is easily available. Qutb-ul-Mulk first promises that he will have the Khutbā read in the Emperor's name and adds:

و پیدوسته بر زر سرخ و سفید سکه مبارک که از درگاه عالم پناه کنده
فرستاده اند می زده باشد *

[Bibliotheca Indica Text, Vol. I, Part ii, p. 178.]

"The red money and the white (gold and silver) will always be stamped with the auspicious coin-legend, which has been engraved and sent to me from the Court which is the Asylum of the Universe."

The 'Ahdnāme' or Treaty itself is afterwards quoted, and there also we find Shāhjahān saying about Qutb-ul-Mulk.

و وجوه دراهم و دنایر را بسکه مبارک ما آراسته و پیدوسته ساخته قرار
داد که همیشه بهمین دستور در تمام آن ملک خطابه میخوانده باشند و زر
را بسکه مبارک ما مسکوک می نمودند باشند *

[Bib. Ind. Text, Vol. I, Part ii, pp. 210-211.]

"And [Qutb-ul-Mulk] has promised that the faces of

dirhams and the dinārs (silver money and gold money) shall be adorned with our auspicious coin-legend and that in all parts of his kingdom, the Khutba shall be read in, and money stamped with, our auspicious name.’

We may therefore take it for certain that it was in 1045 A.H. and not in 1067 A.H. that Shāhjahān obtained from ‘Abdullāh not one, but *both* of those concessions which are regarded by Musulman potentates as the most direct and unmistakable proofs of supreme power. But if 1045 is the real date, the question arises, may not the ‘5’ of the coin be the unit of 1045? It is true that the figure is not so clear as might be wished, and Mr. Wright candidly admits it. But I venture to say that the above explanation removes the chronological objection he has raised to his own reading, and may help to finally solve the question if the reading can be substantiated.

One thing else is perhaps deserving of notice. It stands out clearly from ‘Abdullāh’s letter that the dies of the first issues were not permitted to be made in the local mints, and that they were sent to Gulkandā from the Imperial headquarters with the Imperial style and titles inscribed just as in the Akbar-ābad or Dehli mintages. Now it is not likely that new dies with altered dates were afterwards sent from the capital year after year, and it may be permitted to conjecture that I. M. C. Nos. 948-949 are later issues made from local dies, in which the titles are, as might be expected in such marks of unwilling homage, curtailed even to baldness and of which the execution also is decidedly inferior.

S. H. HODIVALA.

169. THE MEANING OF *Tanki*.

The copper coins of Akbar are perhaps too plentiful to be ever the subject of keen interest among collectors. The one, two and four Tānki pieces, of which the only specimens known belong to four mints (Āgrā, Ahmadābād, Kābul and Lāhor) have, however, rarity as well as novelty to recommend them. Mr. Whitehead says in the luminous mint notes prefixed to the ‘Catalogue of Coins in the Punjāb Museum’ (p. xxvi), that the *meaning of the word Tānki is obscure*. Apparently, it was a weight which had little or no connection with the Tankā.’ I venture to say that though Edward Thomas and Walter Elliot and William Erskine have held widely divergent views as to the *etymology* of the word Tankā (Chronicles ed. 1871, pp. 49 n. 224 n.), and though the *philological affinity* of *Tanka* with *Tānki* may or may not be a matter of doubt and difficulty, an attitude of suspense and reservation as to the *meaning* of either of these terms is a very different thing altogether, and is not necessarily incumbent upon the scholar in the present state of knowledge.

It is true that a lamentable confusion reigns in the different

parts and languages of this country in regard to the nomenclature of weights and measures. One has only to glance at a book like Prinsep's 'Useful Tables' to stand bewildered at the various equivalents of the *seer* and the *maund*, the *gaz* and the *Binghā*. The *Tānk* or *Tānk* also has several significations assigned to it in the Dictionaries. "Tanka, Sanscrit टंक," says H. H. Wilson, "is a weight of silver equal to four māshās; among the Marathās, the *Tānk* or *Tānk* (टंक, टंक) is variously rated at four or nine māshās, or as the same with a *tolā*, or the seventy-second part of a *pucca seer*; a coin, a stamped coin in general, whence it came to be applied, sometimes slightly modified, to specified coins in different metals. (Glossary of Judicial and Revenue Terms, s. v.). Two of the many meanings which टंक *Tānk* bears in Sanscrit are given by Monier Williams as (1) "a weight of silver equal to four māshās, or twenty-four *Raktikas*, and (2) a stamped coin." (Sanskrit-English Dictionary, s. v.). The author of a Gujarāti-English Dictionary says टंक, *Tānk*, is (1) the seventy-second part of a *sher* and also a standard of weight used in weighing pearls. (Belsāre, Gujarāti-English Dictionary. s. v.). Now it certainly does not make for lucidity or clarity to be told that a *Tānk* or *Tānk* is equal to four māshās, and also to nine māshās, and also to a *tolā*, and also to the seventy-second part of a *pucca seer*, but all this confusion notwithstanding, it is still possible to state with confidence what Akbar or Akbar's mint masters of Āgrā, Allāhābād, Lāhor and Kābul understood by the '*Tānki*', which they inscribed in his coppers. In other words, I submit that there can be no difficulty in saying which of these different equivalents of the *Tānk* was adopted by them as the standard. Just as, in spite of all the local variations of the *seer* and the *maund*, the *Gaz* and the *Bingha* which are recorded in the *Āin-i-Akbari* and elsewhere, it has been possible to determine with such certainty, as to leave, at the worst, a very small margin of error, the weight of the Akbari *ser*, and the length of the Akbari *gaz* (Thomas' Prinsep, II, pp. 88. Elliot, Glossary, Ed. Beams, II, pp. 177-8. Thomas, Chronicles, ed. 1871, pp. 429-430). So it is possible to declare, that whatever the variations of the *Tānk* among the Marathās or the Gujarātis, the *Tānk* or *Tānki* of Akbar was about 63 grains.

For this we are indebted to an equation in the *Āin-i-Akbari*, to which I invite the attention of Numismatists. "The *Dām*," he says. "weighs 5 tānks, i.e., 1 *tolā*, 8 māshās and 7 surkhs. It is the fortieth part of a rupee." (Blochmann, *Ain*. I. 31.) Now 12 māshās make a *tolā*, and 8 surkhs or ratis make a māshā. (*Āin*. ib. 16 note) A *Dām* of Akbar's was therefore equal to $20\frac{7}{8}$ māshās, and the *Tānk*, its fifth part, was $= \frac{162}{5} \times \frac{1}{5} = \frac{162}{25} = 4\frac{7}{25}$ māshās, = 4 māshās and $1\frac{3}{5}$ surkhs = 60 + $3\frac{1}{5}$ grs. at 15 grains to the māshā.

In other words, it may be predicated with confidence that the *Tānk* of Akbar was neither nine mashas, nor $\frac{1}{7\frac{1}{2}}$ nd part of a pucca seer, nor a tolāh, but 4 mashas and $1\frac{2}{3}$ surkhs or $63\frac{1}{8}$ grains. I need scarcely add that this tallies very nearly with the known weights of the *Tānki* pieces in our Museums which range from a maximum of $60\frac{3}{4}$ grs. to a minimum of 56 grs.

In fact, the *Tānki* appears to have been issued to provide a fractional currency of which the basis was the fifth part of the *Dām* or rather the *tenth* part of the *Tānka* of about 640 grs. Of the *Dām* and the *Tānkā* there were already in existence the halves, the quarters and the eighth parts. The idea appears to have occurred to some one of adopting the decimal system of division. The traditional weight of the *Tānk* happened to be exactly the tenth part of the heavy Akbari *Tānkā*, and so pieces were issued which might serve equally well as the fifth part of the *Dām* or the tenth of the *Tānkā*, the two-fifths of the *Dām* or the one-fifth of the *Tānkā* and the four-fifths of the *Dām* or two-fifths of the *Tānkā*.

S. H. HODIVALA.



1 Ob.



1 R.



2 Ob.



2 R.



3 Ob.



3 R.



4 Ob.



4 R.



5 Ob.



5 R.

PRINCIPAL PUBLICATIONS OF THE SOCIETY.

- Asiatic Researches, Vols. I—XX and Index, 1788—1839.
Proceedings, 1865—1904 (now amalgamated with Journal).
Memoirs, Vol. 1, *etc.*, 1905, *etc.*
Journal, Vols. 1—73, 1832—1904.
Journal and Proceedings [*N. S.*], Vol. 1, *etc.*, 1905, *etc.*
Centenary Review, 1784—1883.
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10. "The Seasonal Conditions Governing the Pond Life in the Punjab."

By BAINI PARSHAD, M.Sc., *Alfred Patiala Research Student of the Punjab University Government College, Lahore.*

Communicated by Mr. S. W. KEMP.

"Unfortunately the phenomena of periodic physical change have been little studied in the freshwater fauna of most parts of the country, and as yet we know very little indeed of the biology of the Himalayan lakes and tarns, the conditions in which resemble those to be found in similar masses of water in Europe much more closely than they do those that occur in ponds and lakes in a tropical plain."

The above passage is quoted from the introduction of Dr. Annandale's volume on the "Sponges, Polyzoa and Hydrozoa" in the Fauna of British India Series, and it was with a view to filling up this gap regarding the pond-life in the Punjab, and also to compare the conditions in the Punjab with those in Calcutta and its neighbourhood, that this work was started in 1914. Regular observations have since been made at Lahore at all times of the year, while casual ones were also made at Feroz-pore and Ludhiana.

Regarding the source of the material I may add that I refer chiefly to the natural freshwater ponds or pools formed, either as a result of the rains or left on the banks of the rivers and streams owing to the main parts of the river receding in autumn, when the quantity of water in them decreases. Occasionally I have examined the artificial tanks in the pleasure gardens; but these, much to the detriment of zoological studies, undergo a periodical cleansing and are useless for continued observations. In Lahore the number of such ponds is not very large; Ludhiana and Feroz-pore, however, afford very much better chances. At Ludhiana the number of natural freshwater ponds on the banks of the "*Budha*" stream is much larger, so also at Feroz-pore on the banks of the *Sutlej* and the *Beas* rivers; moreover, these ponds are very much deeper and larger in dimensions than the Lahore ones and do not dry up entirely. Owing to the lack of rain during the last year (1915), the ponds in Lahore this year are very few and in a very poor condition, but those of Ludhiana and Feroz-pore are in a condition to supply good material.

There are two well-marked seasons in the Punjab, summer and winter, which succeed each other quite abruptly, the

spring and the autumn being short and ill-defined. The winter lasts from November to March, somewhat longer in the northern than in the southern parts of the Punjab. This part of the year is very cold and practically rainless, except for a few showers in December and January. The daily temperature never rises above 70°F., but may go down to 40°F. or even lower. Towards the end of April the summer sets in, and the shade temperature goes up to 90°F., even reaching as high as 120°F. in June, remaining so till about the middle of the month of June, when the monsoon breaks and the rainy season begins. The rainy season lasts throughout August and September, during which time the atmosphere, up till now quite dry, becomes very moist owing to an increase in the atmospheric humidity, due to the heavy rainfall, as also an increased evaporation from the surface of the numerous ponds and pools resulting from the rains. The shade temperature during these months slightly falls, and the nights are rather cool. About the middle of October the nights become very much cooler, and the shade temperature during the day also decreases, till about the end of the month the winter becomes fully established.

Summing up, one may say that the climate of the Punjab during the winter is like that of most of the European countries and quite different from that of Bengal. During the summer, on the other hand, especially during May, June and July, it closely resembles that of many tropical countries. These climatic changes must exercise a very great influence on the aquatic Fauna of the Punjab; for it is clear, that the severe winter would be quite unfavourable to such animals as flourish in a tropical climate, while the equally severe summer must be quite detrimental to the animals that live in the temperate zones.

Dr. Annandale describes the climatic conditions in England on p. 3 of the work already quoted. He contrasts those that affect an Indian pond and points out that the seasonal crisis that takes place annually in the biology of the different species does not occur at the same time of year in the case of all species. With regard to an Indian pond or lake he says: "a similar crisis takes place in the case of most species, but not at the same time of the year in the case of all species. In Bengal some species flourish chiefly in winter and enter the quiescent stage at the beginning of the hot weather (that is to say about March)." The conditions in the Punjab, already described, differ considerably from those that occur in Bengal, the changes being both more sudden and more violent.

It may be stated that for any observations on periodic physical change only such animals can be selected as adopt any special means of resisting the unfavourable conditions of life for the preservation of the species.

The forms selected were (1) *Hydra oligactis*, Pallas: (2) *Spongilla carteri*, Carter (Bowerbank in Litt); (3) *Spongilla*

lacustris, subsp. *reticulata*, Annandale; (4) *Austrolella indica*, Annandale; (5) Two unidentified species of *Daphnia*; (6) Insect larvae of *Chironomus* and *Anopheles*, various species.

Hydra oligactis, as was observed, reproduces very actively by means of buds; this budding was observed to be the common rule, even daughter buds being formed by the buds while still attached to the parent form; this activity was continued from the middle of August to the beginning of November, when however all the individuals taken were without buds, being sluggish and rather smaller than those taken in September or October. Unfortunately after this time no more individuals could be got from the ponds, in which I had found them in abundance before, and all the individuals in my aquarium died, *Hydra* being the most difficult object to keep alive in captivity under artificial conditions. But it appeared that the individuals were at this stage preparing for the sexual phase to provide against the approaching winter; when, as in the European countries, they would produce the gonads, and later the fertilized eggs with a spiny covering. These eggs would lie dormant, till more favourable conditions set in for them to develop.

Regarding the *Sponges* (*Spongilla carteri* and *Spongilla lacustris* subsp. *reticulata*), it was seen that they flourish quite well from July to October, when the whole of the sponge mass begins to die, leaving the Spicule skeleton intact with a very large number of gemmules with their special coating of spicules entangled in it. Such dried sponge masses of *Spongilla carteri*, even as large as a man's head, are common sights at Ferozapore on the banks of the dried-up pools in December. These lie in this condition till the middle of June, when with the return of favourable conditions the gemmules germinate and cover up the old spicule skeleton with a new coating of the sponge substance; fresh sponge masses are also formed at this time from germinating stray gemmules.

In *Polyzoa* my observations were made on a new curious gelatinoid Polyzoon, *Austrolella indica*, Annandale, which I found for the first time at Lahore and later on at Ferozapore. This form, which is usually found infesting the leaves and stems of aquatic weeds, was seen to flourish from the beginning of July to the end of October, when it begins to die after producing free statoblasts (the only kind produced by this form) in large numbers. In November and December some individuals were still living, though the mass had died, but in January no individuals at all were living and the decayed gelatinous mass was full of statoblasts.

From the above it is clear that special devices like spiny eggs, gemmules and statoblasts are developed on the advent of the unfavourable conditions.

It may also be noted that, as long as favourable conditions last, the *Hydra* goes on reproducing asexually by budding;

the *Sponges* and *Polyzoa* sexually, to produce new independent individuals, and asexually, to form large colonies by proliferation, so that during this time the number of individuals may increase as much as possible. With the coming on of unfavourable conditions all these at once begin to produce the resistant bodies which are capable of lying dormant till the return of the more favourable weather. As on the approach of unfavourable conditions the number of individuals for the production of the resistant bodies is very large, a large number of such bodies is produced; and even though the individuals and a large number of these resistant bodies may perish, yet the race will be preserved, and with the return of favourable conditions a large number of new individuals will at once appear.

In the case of *Daphnia* it was seen that the individuals had the "winter eggs" in the brood-pouch in January. I have also taken individuals with such fertilized eggs from other places in February and March; in these cases the individuals were dead and there was a single egg in the brood pouch of each. Specimens of *Daphnia* taken in summer on the other hand had no eggs; they were probably breeding by means of unfertilized *parthenogenetic eggs*; but I am not in possession of further observations on this head.

The insect larvae that were regularly observed this year were those of three species of *Chironomidae* and of two species of the *Anopheles* mosquito. In the case of these insect larvae resistant bodies like the gemmules of sponges are not produced, with the advent of the unfavourable conditions; on the other hand it was found that the period during which a larva would be transformed into a pupa, and the latter into the imago, is very much increased, owing to the decreased vitality of the larva, due directly to the cold weather. To prove this experimentally a small jar containing the larvae of *Chironomus* was kept in an incubator at 90°F., when it was seen that these "blood-worms" became very active and pupated in three days; as a control experiment some others were kept exposed to the ordinary conditions, and it was seen that practically no change had taken place during this time and that the larvae were lying quietly in their mucous tubes, without showing any tendency whatsoever towards pupation. That the laboratory conditions had not brought about this change in any way was further proved by the larvae in open ponds being in the same condition and by the adult fly of *Chironomus* being quite scarce at this time. A similar condition was observed in the case of the larvae and adults of *Anopheles*.

It may be suggested here that this would really be the time to plan a campaign for the destruction of the mosquitoes, its larvae and the breeding places, for, owing to the much smaller number of breeding places and the inactivity of the mosquito

and its larvae, the cost of destruction would be much less as compared with that in the malarial season, when the mosquito is breeding with great activity, and practically every small pool and puddle serves as its breeding place.

Summing up, it may be said that the climatic conditions in the Punjab are quite different from those in Bengal, and that the season most congenial for the lower forms of life is not the winter, but the greater part of the summer, when all forms of life can flourish, and in this it resembles more the countries of Europe.

11. A Tibetan Funeral Prayer.

By DAVASAMDUP, *Head Master, State B. B. School.*

INTRODUCTION.

The authorship of this prayer is ascribed to the first great Tibetan Buddhist King-Srongtsan-sGampo during whose reign Buddhism was introduced into Tibet from Nepal and China. Srongtsan-Gampo himself was believed to have been the Incarnation of the eleven-headed Chenrezi (Avalokitesvara). And it was also Srongtsan-Gampo who first introduced the well-known Buddhist prayer of six syllables "Om-mani-padme hum." This present prayer or hymn is sung to the Refrain of "Om-mani-padme-hum." It is not only a funeral but also chanted on solemn occasions on fast days, and other Chenrezi—Holidays—on the 8th, 10th and full moon and new-moon days of the 1st, 4th, 6th and 7th months (Tibetan).

Refrain.

1.

Refuge mine and source of mercy, Teacher, Deity Protecting!
Whirled am I, yea, every being, on the Wheel of Births and
Dyings.

Were our bones heaped up, they surely would outweigh the
Triple Loka.

Then descend, O Lord, and grant me refuge, Thou my precious
Guru!

Save me from Samsara's whirlpool, highest, noblest Lord,
Chenrezi!

2.

Full nine months, the tenth preparing, in the womb my mother
bore me,

Till of heat and cold the working forced me down the bony
pathway.

Naked on the naked ground I fell and entered thus existence.
Then descend, etc., etc.

3.

Impious though garbed in yellow, I am Prince most hypo-
critic.

Come unto my stature's fullness, unto manhood's years
attained,

Still I find from birth and sickness, age and death no full
salvation.

Then descend, etc., etc.

4.

Straight and strong was this my body in the days of youth
and manhood,

Now it stoops and leans all forward, and from side to side it
staggers.

From my mouth my teeth have fallen; wish to chew my food
is bootless.

Then descend, etc., etc.

5.

My once handsome face is wrinkled, furrow deep o'erlaid on
furrow.

Dimmed the lustre, weak the vision, of mine eyes once bright
and piercing.

Forms and scenes I see but dimly. In my walk I halt and
totter.

Then descend, etc., etc.

6.

Hard of hearing am I rendered, laughed at, made a mock by
others.

My once strong and manly figure, reft of seemly form and
substance,

Now is but a bony framework with a flabby skin o'ercovered.

Hard for me to win by labour even the scantiest food and
raiment.

Then descend, etc., etc.

7.

Now grown weak and old and ugly, wretched, woeful my
appearance.

Never youth now heeds my counsel, rather do they jeer and
flout me.

Grieved and hurt I utter curses. Dead I wish myself and
others.

Then descend, etc., etc.

8.

By decree of Karma's mandate, piercing pangs of sickness
seize me.

As is solar, lunar splendour swallowed up by envious Rahu,

So the brightness of my visage fails and fades to sickly pallor.

Then descend, etc., etc.

9.

Now come friends and kinsfolk anxious round the bedside of
the sufferer.

Pressing on him food and dainties, which, alas! are left
untasted.

Vain their various arts to cure him; fail alike priest and
physician.

And the body's filth is voided, where it lies, upon the bed-
clothes.

Then descend, etc., etc.

10.

Rich foods only rouse his loathing. Shrinks his upper lip all
pallid.

Downward droop the nostril corners. All his teeth are full of
foulness,

Nothing is there that doth please him save a draught of clear,
cool water.

Draweth nigh the hour of parting, and his last requests he
stammers.

Then descend, etc., etc.

11.

Fondly, anxiously he gazes on the face of friend and kinsman.
Seek his hands the hands and clothing of all those he leaves
behind him.

More and more gives forth his body coming death's peculiar
odour.

Then descend, etc., etc.

12.

All his days and deeds are ended; nearer draw the pangs that
sunder.

Matter from its comrade Spirit, sure and certain as night's
coming.

Or like to a light that flickers, when, oil spent, it soon must
vanish,

He can stay no moment longer or withhold the parting spirit.

Then descend, etc., etc.

13.

Clutch and claw the nerveless fingers. "O, I die!" he cries,
appealing.

When has ceased the laboured breathing, then is known that
life has parted.

Friends and riches left behind him, he must go alone his journey.

Then descend, etc., etc.

14.

Sinks inert the earthly portion, and uncoils the nervous spiral
Situates in the navel region, and the limbs can move no longer.
Cold and clammy perspirations glaze the eyes, bedew the features.

Then descend, etc., etc.

15.

Then subsides the watery portion, and uncoils the nervous spiral
In the heart's recesses seated, and is lost the sense of feeling.
Nose and mouth outside are parched; dry are also both the nostrils.

Then descend, etc., etc.

16.

Sinketh next the fiery portion. This uncoils the nervous spiral
In the throat's base situated, and departs all heat of body.
No more food or any liquid can adown the throat find passage.
Both the hearing organs fail him; outward sounds rouse no impression.

Then descend, etc., etc.

17.

Next gives way the aery portion; back uncoils the nervous spiral
Seated in the brain's recesses. Then doth fail the inward breathing,
And the rattling and the gurgling, tongue and utterance paralyses.

Then descend, etc., etc.

18.

Down doth fall the spark of Bodhi, white and bright and blinding, glaring;
Up ascends the life-spark vital; where they meet it gloweth fiercely.
Paralysed is central nerve-path; sight is sealed in gloom and darkness.

Then descend, etc., etc.

19.

Then the eighty powers of knowing gradually are extinguished.
 Mahamudra's light refulgent fills the chamber intellectual;
 Shines that light in its true nature, supersensuous, transcendent.
 Then descend, etc., etc.

20.

Then approach the Lamas pious, sanctifying rites performing.
 Food and drink from friends and kinsmen then receives the
 body lifeless,
 And the name it bore is shouted as their breasts with fists
 belabour.
 Then descend, etc., etc.

21.

Next the limbs are harshly doubled, bound with well-spun
 cordage hempen.
 Loving friends "Good-bye!" now utter, as their bitter tears
 are falling.
 From its customed bed is taken corpse to final place of resting.
 Then descend, etc., etc.

22.

Either then the form is carried to the top of rock or mountain,
 Chopped and quartered, flung to vulture, fox or dog or wolf or
 jackal,
 Welcome banquet thus providing bird and beast that live on
 carrion.
 Then descend, etc., etc.

23.

Or adown the stream'tis floated, down some torrent's rushing
 waters,
 Urine, blood and pus commingling with the element surround-
 ing;
 Flesh and fat there gnaw and nibbled by the greedy fish and
 otters.
 Then descend, etc., etc.

24.

Or the body is consumed, placed upon the pyre funeral,
 Changed into a heap of ashes, flesh and skin and bone entirely,
 And they sniff the smell of burning,—the Gandharvas and
 Apsaras.
 Then descend, etc., etc.

25.

Or below the earth 'tis buried, giving forth a stench most
loathsome.
Countless worms and hateful insects suck, and creep and crawl
about it,
In the skin and flesh delighting, on the carcase richly feasting.
Then descend, etc., etc.

26.

Seized is all the wealth and riches by the person gone up-
gathered.
But with Karmic fruit down-weighted of his ways that were of
evil,
He is to the awful presence of the Lord of Death conducted.
Then descend, etc., etc.

27.

Down the slope so deep and dizzy of the three most wretched
regions,
Aimless, cheerless, all uncertain, like a poor storm-driven
feather,
Karmic winds do drive the spirit whither dangers wait in
ambush.
Then descend, etc., etc.

28.

Wherefore now, though youth, the better part of life, has
passed all vainly,
Henceforth do I firm determine, well to spend my life's re-
mainder.
Staunch in aim while life shall last me, thou shalt ever be my
master.
Then descend, O Lord, and grant me refuge, thou my
precious Guru!
Save me from Samsara's whirlpool, highest, noblest
Lord, Chenrezi!

1.

༄༄ །། ལྷུབས་ཐུགས་རྗེའི་བདག་ཉིད་ལྷ་མ་ཡི་དམ་ལྷ། །། བདག་སོགས་སེམ་ཅན་སྐྱེ་འཛིན་འཁོར་ལོ་བསྐོར། །། འ་རུས་བསགས་པས་སྡོང་གསུམ་གང་ཡང་ལྷག། །། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། །། འཁོར་བ་ནས་རྡོངས་ཤིག་འཕགས་མཚོག་སྤྱན་རས་གཟིགས། །།

2.

ལྷན་གྱི་དོ་བཅུ་ལུས་ལ་འཁྱུར་བའི་མ། །། ཚ་གང་འཕབ་ནས་རུས་པའི་འཕྲང་ལ་བལྟར། །། ས་ཡི་ཁ་རུ་རྗེན་པར་སྐྱུར་བའི་ཚོ། །། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། །། འཁོར་བ་ནས་རྡོངས་ཤིག་འཕགས་མཚོག་སྤྱན་རས་གཟིགས། །།

3.

ཚོས་མེད་སེར་གཟུགས་ཟོག་པོ་རྒྱལ་སྤས་ང་། །། ལུས་ཀྱི་རྒྱང་རྗེགས་ན་སོ་དར་ལ་བབ། །། སྐྱེ་གན་འཛིན་འཕྲང་ལས་ཐར་བ་མེད། །། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། །། འཁོར་བ་ནས་རྡོངས་ཤིག་འཕགས་མཚོག་སྤྱན་རས་གཟིགས། །།

4.

དྲང་པོར་སྐྱེས་པའི་སྟོད་པ་སྐྱུར་ཞིང་འཁྱོགས། །། ཁ་ཡི་སོ་བྱུང་ཟས་ལ་ཡིད་སྟོན་བྱེད། །། ལྷ་དང་ཁ་སྐྱུ་དཀར་པོར་སོང་བའི་ཚོ། །། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། །། འཁོར་བ་ནས་རྡོངས་ཤིག་འཕགས་མཚོག་སྤྱན་རས་གཟིགས། །།

5.

མཚོས་པའི་བྱད་ལ་གཉེར་མའི་བང་རིམ་ཆགས། ། བལྟ་བའི་མིག་
 རྒྱིབ་བལྟས་ཀྱང་གཟུགས་མི་གསལ། ། བྲད་ཀར་ཕྱིན་ཀྱང་གོས་པ་
 འཁྱོར་བའི་ཚེ། རྒྱབས་ལ་བབ་པོ་སླ་མ་རིན་པོ་ཚེ། འཁྱོར་བ་ནས་
 རྩོངས་ཤིག་འཕགས་མཚོག་སྤྲོན་རས་གཟིགས། །

6.

ན་བ་འོན་པས་གཞན་གྱིས་བརྟམ་བཅོས་བྱེད། ། ལུས་ཀྱི་ཤ་ཤོར་
 རུས་འཁྱོར་པགས་པས་གཡོགས། ། ལྷོ་གོས་གཉིས་ལ་གལ་ཆུང་བྱེད་
 པའི་ཚེ། རྒྱབས་ལ་བབ་པོ་སླ་མ་རིན་པོ་ཚེ། འཁྱོར་བ་ནས་རྩོངས་
 ཤིག་འཕགས་མཚོག་སྤྲོན་རས་གཟིགས། །

7.

གས་ཤིང་གོགས་པས་ངོ་ཚ་རྒྱུག་གོ་བྱེད། ། པར་ལ་ལབ་ན་མི་ཉན་
 རྩེར་ལ་འཕལ། ། རང་གཞན་གཉིས་ཀར་ཤི་སྤོན་འདེབས་པའི་ཚེ། །
 རྒྱབས་ལ་བབ་པོ་སླ་མ་རིན་པོ་ཚེ། འཁྱོར་བ་ནས་རྩོངས་ཤིག་འཕགས་
 མཚོག་སྤྲོན་རས་གཟིགས། །

8.

ལས་ཀྱི་དབང་གིས་འཚི་ནད་དྲག་པོས་བརྩུང་། ། ཉི་རྒྱའི་དཀྱིལ་
 འཁྱོར་གཟུང་ཡིས་གཟུང་བ་བཞིན། ། ཤ་བཀྲག་བྱད་ཀྱི་གཟི་མདངས་
 ཡལ་བའི་ཚེ། རྒྱབས་ལ་བབ་པོ་སླ་མ་རིན་པོ་ཚེ། འཁྱོར་བ་ནས་
 རྩོངས་ཤིག་འཕགས་མཚོག་སྤྲོན་རས་གཟིགས། །

9.

བཟའ་བདུང་མི་འགོ་འཁོར་གྱིས་མཐའ་མ་བསྐྱེད། ལྷན་དཔུང་
 རིམ་གྱོ་འབད་ཀྱང་ཕན་པ་མེད། ཅུ་ཅུ་གཉིས་ཀ་གདན་ཁར་ཤེར་
 བའི་ཚོ། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཚོ། འཁོར་བ་ནས་རྩོངས་
 ཤིག་འཕགས་མཚོག་སྤྲུན་རས་གཟིགས། །

10.

བཅུད་ཚེན་ཟས་ལ་ཞན་པ་ལོག་པའི་ཚོ། ཅུ་བརྗེས་སྣ་ཞེས་སོ་ལ་
 དྲག་པ་ཆགས། ཡིད་ཁར་འོང་བ་ཕྱོན་མོའི་ཅུ་ལས་མེད། ཤི་གསོན་
 འབྲལ་དུས་ཁ་ཚེམས་འཛོག་པའི་ཚོ། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་
 པོ་ཚེ། འཁོར་བ་ནས་རྩོངས་ཤིག་འཕགས་མཚོག་སྤྲུན་རས་གཟིགས། །

11.

ཉིག་ཉིག་མིག་གིས་ཉེ་བའི་གདོང་ལ་ལྟ། རོམ་རོམ་ལག་པས་
 གྲོགས་དང་གོས་ལ་འཆང་། ལུས་ལ་གཤེན་པོའི་རྩི་མ་ཆགས་པའི་ཚོ། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཚེ། འཁོར་བ་ནས་རྩོངས་ཤིག་འཕགས་
 མཚོག་སྤྲུན་རས་གཟིགས། །

12.

ཚོ་ཟད་ལས་ཟད་པམ་རིག་བྲལ་བའི་ཚོ། དགོང་མོའི་གྲིབ་སོ་
 ལྷུམ་ཟད་མར་མེ་འདྲ། ཡུད་ཅམ་ཞིག་ཀྱང་ཕྱོད་དབང་མེད་པའི་ཚོ། ལྷུབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཚེ། འཁོར་བ་ནས་རྩོངས་ཤིག་འཕགས་
 མཚོག་སྤྲུན་རས་གཟིགས། །

13.

ཀྲད་ཀྲད་ཤད་ཤད་འཆི་འབྲས་ཡང་ཡང་འདོན། ། ལུས་སེམས་བྲལ་
 ཏུས་དབྱུགས་ཀྱི་འབྱུ་བ་ཆད། ། རོར་བཞུན་སྐྱུར་ནས་གཅིག་པོར་འགྲོ་
 བའི་ཚེ། ། རྒྱབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་
 ཤིག་འཕགས་མཚོག་སྐྱུན་རས་གཟིགས། །

14.

ས་ཁམས་ཐིམ་པས་སྡེ་བའི་ཙ་འཁོར་ཞིག། ། ལུས་ཀྱི་སྤྱོདས་ཤོར་
 ཡན་ལག་སྐྱུད་མི་ཐུབ། ། བྱེད་ལ་དུལ་ཆགས་མིག་གཉིས་དེབ་པའི་ཚེ། །
 རྒྱབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་
 མཚོག་སྐྱུན་རས་གཟིགས། །

15.

ཏྲ་ཁམས་ཐིམ་པས་སྡིང་ཁའི་ཙ་འཁོར་ཞིག། ། ཚོར་བ་ཉམས་པས་
 ཁ་སྐྱ་ཕྱི་ནས་སྡེམ། ། སྤྲིའི་བྱ་ག་གཉིས་པོ་སྐྱམ་པའི་ཚེ། ། རྒྱབས་ལ་
 བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་མཚོག་
 སྐྱུན་རས་གཟིགས། །

16.

མེ་ཁམས་ཐིམ་པས་མགྲིན་པའི་ཙ་འཁོར་ཞིག། ། ལུས་ཀྱི་དྲོད་
 བསྐྱོགས་ཟས་སྐྱོམ་འཇུ་མི་ཐུབ། ། རྣ་བ་གཡས་གཡོན་དབང་པོ་འགགས་
 པའི་ཚེ། ། རྒྱབས་ལ་བབ་པོ་ལྷ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་
 ཤིག་འཕགས་མཚོག་སྐྱུན་རས་གཟིགས། །

17.

རྒྱུང་ཁམས་ཐིམ་པས་སྤྱི་བོའི་ཙུ་འཁོར་ཞིག །། ངར་ངར་སོག་སོག་
 སྤྱི་དབྱགས་སྤྱད་མི་ཐུབ །། ཁ་སྐྱགས་ལྡེ་ཡི་དབང་པོ་ཉམས་པའི་ཚོ །།
 རྒྱབས་ལ་བབ་པོ་གྲ་མ་རིན་པོ་ཆེ །། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་
 མཚོག་སྤྱན་རས་གཟིགས །།

18.

བྱང་སེམས་ཐུར་བབས་དཀར་ལམ་ཤར་བ་དང །། རྟ་བྱེན་ལོག་
 དམར་ལམ་ཤར་བ་དང །། དབྱ་མ་འགྲེལ་དུས་ནག་ལམ་འཚུབ་པའི་ཚོ །།
 རྒྱབས་ལ་བབ་པོ་གྲ་མ་རིན་པོ་ཆེ །། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་
 མཚོག་སྤྱན་རས་གཟིགས །།

19.

རང་བཞིན་བརྒྱད་ཅུའི་དོག་པ་རིམ་གྱིས་འགགས །། འོད་གསལ་
 རང་བཞིན་ཕྱག་རྒྱ་ཆེན་པོའི་ངང །། བཅོས་མེད་རང་གི་རྒྱུད་ལ་ཤར་
 བའི་ཚོ །། རྒྱབས་ལ་བབ་པོ་གྲ་མ་རིན་པོ་ཆེ །། འཁོར་བ་ནས་དྲོངས་ཤིག་
 འཕགས་མཚོག་སྤྱན་རས་གཟིགས །།

20.

ཙུ་བའི་གྲ་མས་དབང་བསྐྱར་བྱས་ཚོག་བྱ །། ཉེ་འབྲེལ་འཚོགས་
 ཅས་རོལ་བཟུང་བདུང་ཕྱིར །། མིང་ནས་འབོད་ཅིང་བྱང་ལག་འཐབ་
 པའི་ཚོ །། རྒྱབས་ལ་བབ་པོ་གྲ་མ་རིན་པོ་ཆེ །། འཁོར་བ་ནས་དྲོངས་
 ཤིག་འཕགས་མཚོག་སྤྱན་རས་གཟིགས །།

21.

བཀྲའ་ལག་བཀུག་ནས་དྲེས་མེད་ཐལ་པས་བསྐྱེམ། ། མཐུན་པའི་
 གྲོགས་ཀྱིས་མཚེ་མའི་སྐྱེལ་མ་བྱེད། ། འཇམ་པོའི་མལ་ནས་དུར་ས་
 སྐྱོགས་པའི་ཚེ། ། རྒྱབས་ལ་བབ་པོ་སླ་མ་རིན་པོ་ཚེ། ། འཁོར་བ་
 ཉམས་དྲོངས་ཤིག་འཕགས་མཚོག་སྐྱན་རས་གཟིགས། །

22.

ཡང་ན་སྤང་པོ་རི་བོའི་ཚེ་ལ་སྐྱེལ། ། ཡན་ལག་སྐྱུག་བཞི་རྣམ་པའི་
 མཚོན་གྱིས་འཕྲལ། ། བྱ་དང་སྐྱུང་གི་ལྷ་ཁྱིས་ཟ་བའི་ཚེ། ། རྒྱབས་ལ་
 བབ་པོ་སླ་མ་རིན་པོ་ཚེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་མཚོག་
 སྐྱན་རས་གཟིགས། །

23.

ཡང་ན་སྤང་པོ་སྐྱོན་མེད་ཚུ་ཅུ་སྐྱུར། ། རྒྱག་དང་ཚུ་སེར་སྐྱོན་མེད་ཚུ་
 དང་འདྲེས། ། འ་དང་ཚོལ་བུ་ཉ་སྐྱུས་ཟ་བའི་ཚེ། ། རྒྱབས་ལ་བབ་པོ་སླ་
 མ་རིན་པོ་ཚེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་མཚོག་སྐྱན་རས་
 གཟིགས། །

24.

ཡང་ན་སྤང་པོ་མི་ཡི་དཀྱིལ་དུ་བསྐྱེལ། ། འ་རུས་བགས་གསུམ་
 ཐལ་བའི་སྤང་པོར་གདོར། ། དྲི་ཟ་པོ་མི་རྣམས་ཀྱིས་སྐྱོ་བའི་ཚེ། ། རྒྱབས་
 ལ་བབ་པོ་སླ་མ་རིན་པོ་ཚེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་
 མཚོག་སྐྱན་རས་གཟིགས། །

25.

ཡང་ན་སྤང་པོ་ས་ཡི་འོག་དུ་སྤོད། ། ཤ་རུས་པགས་གསུམ་རུལ་
 པའི་དྲི་མར་སོང་། ། འབྲུ་དང་གྲོག་མོ་སྤྲང་བྱས་འཇིག་པའི་ཚོ། ། རྒྱལས་
 ལ་བབ་པོ་གླ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་མཚོག་
 སྤྱན་རས་གཟིགས། །

26.

བསགས་པའི་ནོར་ནི་སྤུས་ཐོབ་སྤྲང་ག་བརྒྱག། ། རོར་བྱིར་བསགས་
 པའི་སྤིག་པ་རང་ལ་ཡོད། ། ག་ཤིན་ཇིའི་ག་ཤེད་མས་བྲིམས་རར་བྲིད་
 པའི་ཚོ། ། རྒྱལས་ལ་བབ་པོ་གླ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་
 འཕགས་མཚོག་སྤྱན་རས་གཟིགས། །

27.

ངན་སོང་གསུམ་གྱི་གཡང་སར་ལྷང་པའི་ཚོ། ། རྣམ་ཤེས་བདེན་མེད་
 བྱ་སྤོ་རྒྱང་བྲིར་འབྲ། ། དབང་མེད་བར་དོའི་འཕྲང་ལ་བྲིད་པའི་ཚོ། །
 རྒྱལས་ལ་བབ་པོ་གླ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་
 མཚོག་སྤྱན་རས་གཟིགས། །

28.

ཚོ་སྤོད་འདི་ནི་སྤྱོམ་ལས་ངང་ལ་སོང་། ། ཚོ་མེད་འདི་ལ་ལེ་ལེ་མེ་
 བྱེད་ཅིང་། ། ཚོ་དང་སྤྱལ་པ་མཉམ་པའི་ཞེ་བཅད་ཤོག། ། རྒྱལས་ལ་
 བབ་པོ་གླ་མ་རིན་པོ་ཆེ། ། འཁོར་བ་ནས་དྲོངས་ཤིག་འཕགས་མཚོག་
 སྤྱན་རས་གཟིགས། །

ཨོཾ་མ་ཎི་པདྨེ་ཧཱུྃ་ཧཱུྃ་ཧཱུྃ་ །

12. Note on the Constituents of the Bark of the *Hymenodactyon Excelsum*.

By CHARLES STANLEY GIBSON and JOHN LIONEL
SIMONSEN.

[Read at the 3rd Indian Science Congress.]

A large number of barks are made use of in this country for medicinal purposes, although their action is in many cases obscure, and only in a few cases has a therapeutically active principle been isolated. It has, therefore, seemed to the authors a matter of considerable interest to subject some of these barks to a more careful chemical examination in order to clear up many anomalies and contradictions.

The first bark selected for this purpose was the bark of the *Hymenodactyon excelsum*, a bark which according to the *Pharmacographia Indica* (Vol. II, p. 193) is used as a tonic, a febrifuge, and also as an astringent.

This bark was first subjected to a chemical examination by Broughton in 1870, and subsequently Naylor (*Pharm. Journ.* 1893, 14. 311, 1884, 15. 195) investigated it much more thoroughly. Broughton showed that it contained a glucoside, aesculin, and that on keeping the bark lost its bitter flavour owing to the hydrolysis of the glucoside with formation of aesculetin (scopoletin). Naylor, on the other hand, succeeded in isolating a crystalline alkaloid to which he gave the name hymenodactine and the formula $C_{24}H_{47}N_3$ and also an amorphous neutral substance of the formula $C_{22}H_{43}G_{10}$ ¹.

From the results obtained by Naylor it seemed possible to us that the alkaloid might be of therapeutic value and furthermore, since it was one of the few alkaloids which do not contain oxygen, it should be of considerable scientific interest, and we decided, therefore, to attempt its isolation.

For this purpose three different specimens of the bark were subjected to a careful examination. The first specimen was obtained from the Calcutta Museum by the kindness of Mr. I. H. Burkill, the then Reporter on Economic Products, whilst the other two specimens were obtained for us by Dr. J. R. Henderson, Superintendent of the Madras Museum, and we wish to take this opportunity of expressing our thanks to these gentlemen for their assistance.

¹ This formula is obviously incorrect, containing as it does an odd number of hydrogen atoms.

An examination of the bark by the methods described in the experimental part of this note has confirmed the results obtained by Broughton. We have isolated aesculin and scopoletin, but we have been unable to find any traces of an alkaloid. It would, therefore, appear that Naylor cannot have examined the bark of the *Hymenodictyon excelsum*, but must have been dealing with some other bark.

Experimental.

A preliminary extraction with Prollius fluid having shown the absence of any alkaloid, several methods were tried for the extraction of the bark, but as the results obtained were in each case practically identical, it will only be necessary to describe briefly one of the methods used.

The finely powdered bark (1 kilo) was thoroughly mixed with purified sand and extracted by percolation with hot alcohol, when a dark brown extract was obtained which showed a strong yellowish green fluorescence. After removing the alcohol, the residual oil was mixed with a little water and repeatedly extracted with ether. The combined ethereal extracts were washed in turn with dilute hydrochloric acid (A), sodium carbonate solution (B), and sodium hydroxide solution (C). The ethereal extract was dried and evaporated, when a viscous oil remained. This was subjected to distillation in steam, when a trace of oil passed over (0.5 gram) which possessed a distinctly camphoraceous smell. The residual oil remaining after the distillation was found to consist of a mixture of glycerides which were not subjected to a detailed examination.

The original aqueous solution which had been extracted with ether was concentrated, when a small quantity of a crystalline solid separated. This was purified by repeated crystallisation from hot water when it was obtained in fine needles which after drying at 100°, melted at 160° and evidently consisted of aesculin, since when mixed with a specimen of aesculin from another source the melting point was found to be unaltered.

The hydrochloric extract (A) was basified and extracted with ether, the ether dried and evaporated when a trace of a resinous substance remained. This substance could not be crystallized, but it showed no alkaloidal properties.

The strongly fluorescent sodium carbonate solution (B) was acidified, when a quantity of a thick brown oil was deposited. This was ground up with ether when the oil readily dissolved, leaving a colourless crystalline solid. This was collected and recrystallized from dilute alcohol, when it was obtained in colourless prismatic needles melting at 203°. The alkaline solution showed a beautiful blue fluorescence.

0.1063 gave 0.243 CO₂ and 0.043 H₂O : C = 62.4, H = 4.5.

C₁₀H₈O₄ requires C = 62.5, H = 4.2 per cent.

This substance was scopoletin, 4-hydroxy-5-methoxy coumarin (see Moore, Chem. Soc. Trans. 1911.99.1043). The correctness of this view was confirmed by the preparation of the *acetyl* derivative which melted, as stated by Moore, at 177°.

The ethereal solution from which the scopoletin had been separated was found to contain a mixture of fatty acids which have not so far been subjected to detailed examination.

The sodium hydroxide solution (C), on acidification, yielded a further quantity of scopoletin which had escaped extraction with sodium carbonate.

In conclusion we may mention that Capt. A. C. Ingram, M.D., I.M.S., very kindly tried the effect of the extract of the bark on two frogs (subcutaneous injection), but was unable to detect any physiological action.

13. Notes on a unique History of Herat, discovered in the Bûhâr Collection of MSS. in the Imperial Library, Calcutta.

By KHÂN SÂHIB MAULAVÎ 'ABDUL MUQTADIR, *Oriental Public Library, Bankipur.*

The Bûhâr collection of MSS., for Orientalists the most important section of the Imperial Library, Calcutta, consists of more than nine hundred Arabic and Persian MSS. representing the various branches of Muhammadan literature. Chance directed me to a Persian MS. containing a history of Herat, composed in the beginning of the eighth century, between A.H. 721 (A.D. 1321) and 729 (A.D. 1329), by an author who himself was an eye-witness of most of the events that he narrates.

I have seen no notice of the existence of this work in any of the catalogues of European or Indian libraries, and what is more astonishing it seems to have been unknown to the celebrated Hâjî K̄halifah as well as to many other bibliographers. It is however mentioned by the author of the Raudât-ul-Jannât as one of his sources. I have no hesitation in saying that this rare volume is the most valuable literary gem of the Imperial Library. That it should have remained hidden for the last six hundred years is surprising and obviously regrettable.

The MS. is of a folio size, measuring 12" x 9", and consists of 275 folios with 25 lines to a page. It is written in a beautiful bold and learned Naskh hand with fine rubrics, on creamy white paper. It is in a damaged condition but fortunately no page seems to be missing. The date of transcription is not given, but the nature of the handwriting and the general aspect of the MS. tend to suggest that the copy was made shortly after the composition of the work. The following note on the fly-leaf in the handwriting of 'Inâyat K̄hân (d. A.H. 1077 = A.D. 1666), the celebrated historian and Librarian of the Emperor Shâh Jahân, proves that this valuable MS. once belonged to, and was held in high esteem by, the aforesaid 'Inâyat K̄hân and his illustrious father Zafar K̄hân, Governor of Kâbul and Kashmîr (d. A.H. 1073 = A.D. 1663), both authors of distinction. 'Inâyat K̄hân says that this history of the Maliks of Herat, which belonged to his deceased father, reached Kashmîr from Lahore at the end of Ramadân, A.H. 1047 (A.D. 1664). The note runs thus :—

تاریخ ملکان هراته بابت اموال والد مرحوم سلخ رمضان المبارکی
سنه ۱۰۷۴ از لاهور بکشمیر رسید و داخل عاریت خانہ گردید حورہ
عنایت خان ظفر خان *

The same fly-leaf bears an illuminated star, now rather faded, and several notes, seals, and signatures of the nobles and *Amîrs* of the Timuride sovereigns of India.

The author does not choose any distinct title for the work but calls it in several places simply تاریخ نامہ or “ the book of history.” In ‘Inâyat *Khân*’s note, quoted above, it is called تاریخ ملکان هراته “ the history of the Maliks of Herat ”; while the author of the *Raudât-ul-Jannât*, who freely borrows his account from this work, designates it as تاریخ ملوک کرت and also تاریخ آل کرت.

The scanty time at my disposal has not permitted me to collect materials from external sources for a biographical notice of the author, and the following information has been gathered exclusively from the work itself.

In the preface the author designates himself Sayf ibn Muḥammad bin Ya‘qûb-ul-Harawî سیف ابن محمد بن یعقوب الهروی, but later on in the course of his narrative, he always calls himself by the simple name of Sayfî Harawî سیفی هروی, the first part of which he adopted as his poetical *nom-de-plume*. In recording the events of the year A.H. 687 (A.D. 1288) he tells us that he was then six years old. He must have been born then in A.H. 681 (A.D. 1282). He says that before composing this work he wrote a treatise on ethics called *Majmû‘ah-i-Giyâṣi* to secure himself an introduction to Malik *Giyâṣ-ud-Dîn Kurt*, the fourth King of Herat of the Kurt race, who ruled from A.H. 708 to 729 (A.D. 1308 to 1329). We also learn that he dedicated both these works to his patron, the aforesaid king. Later on he mentions that he wrote a poem of 20,000 lines in which he gave an account of the exploits of *Jamâl-ud-Dîn Muḥammad Sâm*, who killed *Dânishmand Bahâdur* in A.H. 706 (A.D. 1306). This he wrote for the aforesaid *Jamâl-ud-Dîn Sâm* after whose name he called it *Sâm Nâmah* سام نامہ. Sayfî was also a panegyrist of *Mailk Fakhr-ud-Dîn*, the third King of the Kurt race (A.H. 684-708 = A.D. 1285-1308) in whose praise he composed eighty *Qaṣîdahs* and one hundred and fifty *Qit‘ahs*: و جمع کنندہ ابن تاریخ نامہ را در مدح او هشتاد قصیده و صد و پنجاه قطعہ است *

On one occasion, we are told, Sayfî was arrested as a traitor by the order of *Bûjâi* and very narrowly escaped death.

This happened in A.H. 706 = A.D. 1306, when Bûjâi, son of Dânişmand, attacked Herat. It seems that some of his enemies brought to the ears of Bûjâi that there lived in Herat a poet called Sayfî, who had been a panegyrist of Malik Fakhr-ud-Dîn Kurt and had composed a book called Sârn Nâmah for Jamâl-ud-Dîn Muḥammad Sârn, the murderer of Bûjâi's father Dânişmand Bahâdur. It was full of the praise of the Harawîs and the Gûrîs and severely condemned the expedition of Bûjâi against Herat. Sayfî was arrested and bastinadoed and then taken before Bûjâi. Bûjâi sent for the Sârn Nâmah and examined it. He saw that it consisted of fifty juz and contained beautiful paintings and illustrations. At the place too where he opened the book he saw Sayfî had described the glory and grandeur of Bûjâi's father and his followers. This created a favourable impression upon Bûjâi's mind and he took it for granted that the book was devoted to the praise of his father. Nevertheless Bûjâi ordered the execution of the author on the ground that he was a panegyrist of his (Bûjâi's) enemies. Sayfî was then placed in the row of the criminals who were to be beheaded for joining the plot against Bûjâi's father, but happily he and another man, out of seventy-eight persons, were released after they had signed bonds of servitude to Bûjâi—

بنده را در سلک قاتلان دانشمند بهادر منخرط گردانیدند چون حیاتی
باقی بود از میان هفتاد و هشت تن بنده و شخصی حسن مقرب نام بعد
از آنک بیوجای خط بندگی و گناه کاری دادند خلاص یافتند باقی را بقتل
رسانیدند علیهم الرحمة و الرضوان *

He further states that after the arrest of his patron Jâmâl-ud-Dîn Sârn by Bûjâi, he (Sayfî) happened to meet one night the unhappy prisoner at Fâriyâb and saw that he had a chain of twelve maunds on his left leg fastened tightly to his right wrist.

We learn further that our author's teacher was Maulânâ Malik-ul-Hukamâ Sa'd-ud-Dîn Ḥakîm Munajjim Gûrî مولانا ملک
* الحکما سعد الدین حکیم منجم غوری who was at first a noble at the court of Malik Shams-ud-Dîn Kurt, on whose death in A.H. 705 (A.D. 1305) he composed a beautiful Qit'ah, quoted by Sayfî and several other subsequent authors. After Shams-ud-Dîn's death Sa'd-ud-Dîn became a favourite courtier of Sultân Giyâş-ud-Dîn whose favour and full confidence he enjoyed.

As to the reason for composing this work the author gives us to understand that after writing his Majmû'ah-i-Giyâşî, which earned the praises of his patron Giyâş-ud-Dîn, he was told by the said king that as there existed no historical record of the events that had taken place in Herat from the time of

Chingiz Khân down to his own, he (Sayfi) should write a history of that period basing his accounts exclusively on reliable sources.

The exact date of composition cannot be ascertained, but internal evidence tends to show that it was completed between A.H. 721 and 729 (A.D. 1321 and 1329) after a labour of two and a half years. In the beginning as well as towards the end of the work we find the name of his patron associated with such words as * حاجی - سلطان العجاج etc., from which it is reasonable to infer that the author began to write after the king's return from the pilgrimage he had undertaken in A.H. 721 = A.D. 1321, that is, in, or shortly after A.H. 721, and that he completed it before the death of his patron Malik Giyâş-ud-Din in A.H. 729 = A.D. 1329.

We are not in a position to form a definite idea of the real extent of Sayfi's history of Herat. The present volume ending with A.H. 721 (A.D. 1321) comprises about 140 chapters, while in the preface we are told that the author divided the work into 400 chapters.

و این تاریخ نامه را بر چهار صد ذکر ختم کردم *

Again, in the concluding lines of this copy, the author distinctly says that he completed this first volume (daftar) by the grace of God, and that he hopes to write the second volume within a very short time:—

تمام شد دفتر اول بعون ایزد دادگر بعد از تشبث باذیال الطاف الهی
امید واثق است بکرم عمیم ملک عادل عالم حاجی غازی غیاث الحق
والدین خلد ملکه و قدره و اطلع من افق الجلال بدره که من بنده کمترین را
بنظر عنایت بیغایت ملکی منظور دارد تا باندک روزگاری دفتر ثانی را در
کتابت آرم انشاء الله العزیز *

It is worth noticing that at the beginning, where the author states what period he intends to cover in his history, a blank space has been left for the insertion of the year down to which the narrative was to be brought. The passage stands thus in the text:—

تاریخ شهر هواة را از شهر سنه ثمان عشر و ستمایه که خرابی وی و بقتل
رسیدن سگانش درین سال بوده است در عهد بادشاه جنکیز خان تا شهر
سنه + + + + + نوشتم و آنچه محقق و مصدق بود الخ *

I am inclined to hold that when Sayfi commenced the work he had planned to divide it into four hundred chapters and to bring the history down to a later period than A.H. 721 (1321) with which the present volume closes. The space

seems to have been intentionally left blank by him. When he commenced the history he could not as a matter of fact positively say to what date he would be able to reach, and consequently left the blank, intending to fill it up after completing the work. It seems therefore quite probable that Sayfî died shortly after finishing this first volume, and that he did not live to fulfil his plan of adding a second. This theory receives considerable support from the fact that the author of the *Raudât-ul-Jannât*, who freely borrows from this work, while narrating the events of the year A.H. 721 = A.D. 1321 (with which the present work ends), distinctly gives us to understand that Sayfî's history of the Kurt kings does not extend beyond that date (A.H. 721 = A.D. 1321). He says further that although Sayfî promised a second volume he (the author of the *Raudât*) had not up to that time (A.H. 897 = A.D. 1492) succeeded in tracing its existence, and that in his opinion Sayfî did not live to fulfil his promise. The passage in the *Raudât* runs thus :—

ذکر ملوک کرت در تاریخى که سیفى هروى نوشته نا این محل پیش
 نیست و تتمه احوال ملوک کرت را سیفى مذکور حواله بدفتر دویم کرده
 که مسطور خواهد گشت و درین ایام از دفتر دویم تاریخ آل کرت هیچ کس
 نشان نداد غالباً وعده کرده بوده و بوقت نرسیده *

Since the dawn of Islâm there has hardly been a great civil war, or dynastic revolution, or foreign invasion in Central Asia in which Herat has not played an important part and suffered accordingly. It enjoyed peace and prosperity during the first three centuries of the Muhammadan era when the Tâhirides of *Khurâsân* (A.H. 205-259 = A.D. 820-873), the Saffârides of *Sijistân* (A.H. 254-290 = A.D. 868-902), and the Sâmânides of *Bukhârâ* (A.H. 261-389 = A.D. 875-999) were in power; but during the succeeding rules of the Ghaznavide kings it was eclipsed by the neighbouring capital of Ghazni until in the time of Sultân Sanjar of Merv about A.H. 552 = A.D. 1157 the barbarious Turkoman tribe of Ghuzz swept over Afghanistan and devastated the city. The most deplorable ravages were wrought in the city during the time of Chingiz Khân when the Mongol hordes invaded Persia and left the country a wilderness after levelling all its buildings, palaces, etc., to the ground. In A.H. 618 = A.D. 1221 Chingiz Khân sent two successive expeditions against the city which resulted in a general slaughter of its inhabitants. Out of several lacs of inhabitants our author names sixteen persons who alone survived the massacre and who were subsequently joined by another party of twenty-four survivors. The city began slowly to recover under the Ghorid kings (A.H. 634-642 = A.D. 1236-1244) and rose to distinction during the time of the Kurt Maliks until it

was once more laid waste by Timûr in A.H. 783 = A.D. 1381 and their dynasty extinguished in A.H. 791 = A.D. 1389. It was under the Timuride princes early in the 9th century that Herat regained its flourishing condition. It was then the capital of Khurâsân and, for about half a century, was celebrated, "not merely for the splendour and dignity of its Court, the architectural beauty of its mosques, tombs, colleges, and palaces, but as being the resort of the greatest divines, philosophers, poets and historians of the age" (History of the Moghuls of Asia, by E. Denison Ross, p. 193, footnote). During the centuries which intervene between the Timuride princes and the rise of the Afghans, the city was devastated four times by the Turco-man and Uzbeks, and consequently it never in these days attained to any thing like its former importance.

The contents of this volume, as stated above, are divided into about 140 chapters. The first chapter is devoted to an account of the foundation of Herat, the second describes its pre-eminence and is based on those traditions of the Prophet which refer to this city. The history proper begins with the third chapter and ends with the one hundred and thirty-eighth, covering a period of rather more than a century (A.H. 618-721 = A.D. 1221-1321). Chapters III and IV give an account of Tûlî Khân's expedition against Merv led by the order of Chingîz Khân in the middle of Rabî 'I., A.H. 618 = A.D. 1221.

Chapter V treats of Tûlî's expedition against Nîshâpûr and the general massacre of its people.

In Chapters VI and VII we read of the destruction of the fortresses called كورنيان and كوسويه respectively.

In Chapters VIII and IX Sayfî gives a detailed account of the two most sanguinary expeditions against Herat, the first of which was led by Tûlî, while the second was sent under Îlchîkdâi Nû'in نؤين ايلچيكدای who reached Herat in Shawwâl, A.H. 618 = A.D. 1221. He laid a heavy seige to the city which lasted for six months and seventeen days without any victory on either side, but succeeded at last after eight months in capturing it on Thursday, Jumâdâ I., A.H. 619 = A.D. 1222.

The following quotations from Chapter IX will give an idea of the author's narrative style : —

منگنای شهنه را در بای حصار شهر و ملک ابوبکر را در میان بازار
بکشند خروش و جوش از شهر برخاست و خلق شهر هراة با سلاح تمام
از در و بام نعره (شعر) ... بر آوردند از حشم و خدم ملک ابوبکر و منگنای
هر کس را که یافتند بقتل رساندند و ملک مبارز الدین سبزواری را که
از حصار فیروز کوه بهراة آمده بود بملکی نصب کردند و رئیس ولایت را

بخواجه فخرالدین عبد الرحمن غیزانی که مرد جلد و مبارز کار دیده بود مفوض گردانیدند و همه یک عزم دل بر رزم نهاد و راوی چنین گفت که چون خبر بقتل رسیدن ملک ابوبکر و مذکذای بسمع بادشاه چنگیز خان رساندند در غضب رفت و از سر تندی گفت که (شعر) روز دیگر ایلجیکدای نوئین را با هشتاد هزار مرد چذکی از سی فرسنگی غزنین به راه ناصرد کرد و کفت خلق کشته باز زنده شده اند درین نوبت باید که مردم را سر از بدن جدا کنید و ساکفان هراة را بکل بقتل رسانید ایلجیکدای بحکم بادشاه چنگیز خان در شوال سنه ثمان عشر و ستمایة برود خانة هراة فرود آمد و فرمود که سباه باید که درین یکماه کار کارزار و عدت (Sic) روزگار ترتیب دهند و از مواضعی که در حکم چنگیز خالیان بود مدد و ساز نبود طلبید باندی روزگاری از حدود خراسان و نواحی جبال ترکستان و شیورغان تا افغانستان قرب بنججاه هزار مرد از پیاده و سوار به راه آمدند و در شهر ملک مبارز الدین و خواجه فخر الدین و دیگر اعیان و اکابر مستعد حرب شدند و باهم عهد و میثاق بستند که بهیچ سبب از اسباب کسی از ارباب و اصحاب و نفی از شیخ و شاب خلاف ننمایند و بر موجب ^{قوله} اقتلوا المشرکین کافة تا جان دارد با زمره ملاحین و فرقه بی دین بکشند و چون کرت اول دورنگی و بی سذکی ظاهر نگذند ایلجیکدای نوئین بعد از یکماه دروازه را بر امرای سباه بخش کرد و بر هر جانب شهر سی هزار مرد بفرستاد و حکم فرمود که هر که در جنگ و آهنگ فتور و کاهلی و قصور و بد دلی پیدا گرداند بزخم تیغ جهان بروی چون شب دیجور گردانم و آنک در محاربت مبادرت نماید و در معنی الاکدام قتال نامل نکند بقشرف خاص ما مخصوص گردد و بصفات پیشوائی موصوف شود روز دیگر ایلجیکدای با چندان سباه کینه خواه از چهار طرف شهر جنگ در بیوست و مبارزان هراة قدم ثبات بنمودند و بر امید درک درجات و سعادات و نیل مبرات و حسنات و معو خطیبات و سیآت از دروازه ها بیرون آمدند و جمله حمله کردند و بیکبار با چندین هزار کافر ملعون در آویخت و از هر دو طرف نایره حرب در زیانه زدن آمد و دریای ضرب در جوش و مواجی جنانک خنجرها بر خنجرها راه یافت و نیزها از سینها گذر کرد و بالها از گویالها کوفته شد

و برزرها^۱ از خون معقد کرهها بدید شد و جوشنها در بدنها بجوش آمد و خود از سر مرد بر کین بزخم عمود آهین چون نان گورسی از هم فروریخت هر دو فریق بدین طریق که بذکر بیوست شش صاع و هفده روز باهم در محاربت و مقارعت بودند و هیچ یک بر دیگری مظفر و فیروز و منصور و به روز نمیشد در ماه هشتم در شهر سده تسع عشر و ستمایه ایلجیکدای حربهای عظیم کرد چنانک در هر جنگ قرب پنجهزارتن از عسکر او بقتل رسید و خری بسیار آنجا که بر خرغ است بنهادند و دیوار باره را سوراخها کردند باره دیوار از باره بمقدار پنجاه گز جدا شد و بر آن خرکها آمد و چهار صد مغول نامدار در زیر آن دیوار بماندند چنانک یک کس جان بیرون نتوانست برد *

روز آدینه در ماه جمادی الاول از قضای ربانی و تقدیر یزدانی ایلجیکدای نوئین لعین از جانب برج خای بر سر که خلیفش بغلطی برج خاکستر میخواند شهر هراة را بگرفت و بفرمود تا خلیفش را از زن و مرد بقتل رسانند بحکم ایلجیکدای نوئین لعین لشکریان جویهای خون از درون و بیرون روان کردند و خاق را از جوان و بزر و صغیر و کبیر بقتل رسانید و هیچ سری را برتن و بدنی با سر نگذاشتند و تمامت بناها و سراهای شهر را فرو کوفتند و خندق را بینباشند و شرفات و ابراج و بارو را خراب کردند هفت روز جز بکشتن و سوختن و کندن و خون ریختن بکار دیگر قیام نمودند (نمودند read) و افزون از هزار هزار و شش صد هزار و کسری از خلق هراة شهید شدند *

In Chapter X Sayfi draws a terrible picture of the ruinous condition to which the city was reduced by the disasters mentioned above. He names sixteen persons who survived the general slaughter by taking refuge in the caves of the mountains. These were subsequently joined by twenty-four more, thus making the number saved forty. He describes how this handful of survivors managed to subsist by plundering caravans and by other lawless means, while, people of even distant parts were reduced to eating the flesh of men, dogs, cats, etc.

چنین ش نمودم از راویان هراة که چون ایلجیکدای نوئین لعین خطه باک هراة را که از مشایخ و احابار اخیار و علماء اسلام و کرمای انام و عقلاء

^۱ I think it is a clerical mistake for برزرها

ایام چون بغداد آباد بود و چون کعبه معظم مکرم بر انداخت و زمینی را که خاک عنبر آکین او با مشک تبتی مقابلی میکرد از خون چندین هزار مسلمان باک دین آغشته کردانید و نزهنگاهی را که ریاحین بساتین او بر گلشن روشن فردوس اعلی و کواکب ثواقب کذب خضرا طعنه میزد چون خارسندان و صحرای کهستان کرد و دارالملکی را که فیلان توانا و نهنگان دریا و شیر و اژدها در کوه و هامون او گذر نتوانستی کرد بناه و جایگاه کرک و روباه ساخت *

(معزی)

جائی که بود آن دلستان با دوستان در بوستان
 شد کرک و روبه را مکان شد جغد و کرکس را وطن
 بر جای رطل و جام میع کوران نهادستند بی
 بر جای بانک و جنک نی آواز زاغست و زغن
 ابرست بر جای قمر سفکست بر جای کهر
 زهرست بر جای شکر خازست بر جای سمن
 بعد از هشت روز لشکر بطرف گالیوپین برد و از غنایم و اسپران هراة آنچه
 که لایق بادشاه جنکیزخان بود با چندین هزار دختران مالا عذار.....
 بفرستاد چون بقصبه اوبه رسید دو هزار سوار باز کردانید و گفت که بشهر
 هراة روید و از کریختگان و متواریان کسی را که بیاید بقتل رسانید آن سواران
 بهراة آمدند و دو روز در شهر مقام کردند و قرب دو هزار آدمی دیگر را بقتل
 آوردند و روز سیم مراجعت نمودند راوی جنین کوید که دران روزها
 قتل و نهب مولانا شرف الدین خطیب جغرتان و فخر حداد و اصیل معدل
 و شهاب کریم و خواجه مور و رشید برجی و شمس دباح و حمزه نوشنجی
 و مجید عصار و عماد مالانی و محمود سابق و زین الدین خنبه و علمشا
 بریانی و امیران سوبن و داود نجیب و حسام الدین نظیره این شانزده
 تن در کله کوه کمربی را که مهر صنیع و کذری معب داشت مفر و مقر خود
 ساخته بودند بعد ازان که در شهر هراة از مسلمانان آثار و از گافران

دیار نماند از کله کوه شرف الدین خطیب جفرتان و آن جماعت که ذکر ایشان بتقریر بیوست *

همه با ناله وزاری همه با چشم بر از نم
 همه با خاطر غمگین همه با سینۀ برغم
 در شهر آمدند در هر قدمی صدمی دیدند کشته و در هر خانه
 جالانۀ یافتند مرده - بعضی را برادران در خاک و خون غلطیده و گروهی
 را اقارب بیجان و بیجان شده و طائفۀ را فرزندان بقل رسیده و زمرۀ را
 احبا بدست کفار اسیر کشته بیست روز جز بناله وزاری بکار دیگر قیام
 نمودند و هر زمان از سر درد و سوز گفند *

یا حسرتی من فراق قوم
 کانهوا هم الکهف والحصون
 والهمزن والاسد والرواسی
 والامن والخفص والسکون

بعد از بیست روز در بیرون شهر بر طرف شرقی در جوار درب خوش
 حمام شرف الزمان را مسکن خود ساختند و چون جهل تن شدند بشهر
 در آمدند و در مسجد جامع در کنبد سلطان مغفور غیاث الحق والدین روح الله
 روحه . . . ساکن شدند و سر تسلیم و رضا بر خط قضای ربانی نهاد و بشیون
 وزاری و خون جگر روزگار می کرد چون ازین حالت دو ماه و نیم بگذشت . .
 . . . روز دیگر فخر آهنگر باده تن از عیاران بجانب قهستان رفت و رشید
 برجی بجانب غور و اصیل معدل بطرف کالیپین و شرف الدین خطیب
 با بیست تن در مسجد جامع ساکن شد و هر روز کلاه دانه را باک میکردند
 و از آن دانه حاصل میکرد و قوتی میساخت و بعضی از راویان چنین
 میگویند که در اول شرف الدین خطیب و اصحاب او به لحوم مردم و کلاب
 روزگار میکردند و از مولانا مرحوم خواجه ناصر الماته والدین جشنی طیب
 الله رسمه چنین شنیدم که او گفت از حدود بلخ تا حد دامغان یکسال

بیوسته خلق گوشت آدمی و سگ و کربه میخورزدند چه جنگیز خانیان
جمله انبارها را سوخته بودند *

Sayfi then tells us that after these expeditions the city of Herat remained a mere heap of ruins for sixteen years (A.H. 618-634 = A.D. 1221-1236) during which no king or governor attempted to build it again, till in A.H. 634 = A.D. 1236 Sultân Uktâi of the great Khâns directed his attention to restoring it. So, the author says, he has given but a brief account of these sixteen years and has written a detailed history from the 34th year (i.e. A.H. 634 = A.D. 1236) down to his own time in a regular and systematic manner, recording the events of each year in chronological order:—

و چون شانزده سال شهر هرات خراب بود و حاکمی بعمارت
و اصارت او نیامد از شهر سنه اربع و ثلاثین سال بر ترتیب نهادم *

After the account of the reconstruction of Herat by Uktâi in A.H. 634 = A.D. 1236 (Ch. XI) follows the history of its rulers and governors before the Kurt Maliks of Ghore from A.H. 634 to 642 = A.D. 1236—1244. The history of these nine years comprises Chapters XII—XX.

The remaining portion of the work, Chapters XXI—CXXXVIII, comprising a period of seventy years, A.H. 642-721 = A.D. 1241-1321, treats in detail of the reigns of the first four kings of the Kurt race of Herat, viz. Shams-ud-Dîn I, Rukn-ud-Dîn, Fakhr-ud-Dîn, and Giyâş-ud-Dîn and of the chiefs and nobles who governed the city during that period. The volume closes with an account of the expedition sent by Shams-ud-Dîn against Furâh in Rabî' I, A.H. 721 = A.D. 1321, the year in which his father, the King Giyâş-ud-Dîn, went on a pilgrimage to Mecca, leaving Shams-ud-Dîn in charge of the government. The history of Malik Giyâş-ud-Dîn, which is the main theme of the last portion of the book and which alone comprises foll. 187^a-275^b, is full and exhaustive. In narrating the events Sayfi enters into minute details and shows extraordinary precision. For instance, in mentioning the time when Baktût marched against Malik Giyâş-ud-Dîn, he says (fol. 243^b):—

سلطان و بکتوت با سباه آراسته بشکوه هرچه نامتمر مع جم الغفیر.....
روز جمعه خامسی زبیع الاول سنه مذکور (A.H. 718) باسم ناخت از
جوانب شهر هرات در آمدند *

Again on fol. 247^b

بکتوت روز دوشنبه بیست و دوم ربیع الاول سنه مذکور برود خانه
هرات فرود آمدند و روز جمعه بیست و ششم ربیع الاول سنه مذکور شاهزاده
یسور در مرغزار بشوران نزول کرد *

Now it seems to me impossible to overestimate the value of this "history of Herat" for two reasons. Firstly, it supplies an authentic and copious record of an important period of history; for that period it is the prime, written, documentary evidence we possess, and but for this it would have passed into oblivion; secondly, the author had a most rigid regard for truth and has displayed an immense industry in collecting information from all genuine and trustworthy sources; these are for the most part oral traditions and contemporary witnesses. It may be confidently asserted that as a contemporary of the greater part of the events which he describes, he had every opportunity for getting the best information at first hand.

In the preface as well as several times in the course of his narrative, the author draws our attention particularly to the aforesaid facts. Thus he observes in one place:—

بعد ازان فرمان اعلی لا زال عالیا بغداد بیوست که خطه معموره
 وبلده محروسه هراة صانها الله عن العاهات و الآفات که از امهات بلاد
 خراسانست بلک کهبه ثانی و بغداد مسلمانی از عصر بادشاه
 جنکیز خان تاریخ نامه ندارد و چون در جنب تواریخ واقعات و حوادث
 بلدان و امصار خراسان شهر هراة اکثر الحادثات و الواقعات است
 بواسطه آنکه شهرآ بعد شهر و سنه بعد سنه عساکر اقاایم در نواحی و اطراف
 آن جمع میشوند و صافان سخن آرای و سیاحان جهان پیمای چون از کلی
 احوال که در وی بظهور می پیدوند خبر ندارند و بر تواریخ آن عالم نیستند
 در مجالس سلاطین و ملوک آفاق و محافل مشاهیر و جماهیر خراسان
 و عراق و میان عاصه رعایا و کافه برایا بدروغ خود را فروغ میدهند
 بر وجه راستی اسامی و سیر تواریخ ملوک و امرا و صواحب و حکام که از
 عهد بادشاه جنگیر خان تا امروز در خطه هراة حمیت عن الافات بوده اند
 و بمضافات اورسیده در کتابت آور *

The above statement is confirmed thus in another place:—

بعد ازین بهون خالق لم یزل و فضل صانع بی بدل * (سذائی)
 آن سمیع و اهب قهار کز لطفش شود
 ابر نهسان دُر فشان و باد بستان مشکبار
 آن قدیم قادر قاهر که هست از راه قدر
 حکم او جاوید و ملکش بر دوام و برقرار

در تواریخ احوال ملوک اسلام غور طاب ثراهم شروع کدم و بروجه صدق آنچه حادث شده باشد بنویسم چه حکم عالی ملک اعظم ... غیاث الحق والدین بر آنچه بنفاز بیوست که قصص و حکایتی که درین تاریخ نامه ثبت خواهد شد باید که راست بود و از کذب و مقدماتی که در سایر کتب نوشته اند معرا و مبرا باشد تا ارباب دانش و اصحاب بینش بخواندن و نوشتن این حکایات مایل شوند مبنی برین امر واجب الامتثال بنده اضعف در تالیف این تاریخ چندانک امکان داشت کوشید و هرچه نوشت بر پیران و متقدمان شهر هراة و طایفه که بر قلم و قدم ایشان اعتماد کلی بود عرض کرد همه با اتفاق گفتند که آنچه در کتابت آوردی راستست و ما چنین دیده ایم و چنین دانسته و از ابا و اجداد خود نیز شنیده حق تعالی بکرم عمیم و لطف بی نهایت خود همه را از آنچه نباید و نشاید خاصه از کذب نگاه دارد بمحمد و آله الاخیار و اصحابه الابوار *

His love of truth and his correctness of information are apparent on every page, and he is scrupulously honest in quoting the sources from which he derives his statements. It is also remarkable that the author does not blindly follow his predecessors, but makes a critical use of them. Indeed he exposes and refutes the opinions of some of the best authorities whose credit and high reputation remain unquestioned even to the present day. For instance, in narrating the events of so early a period as A.H. 618 = A.D. 1221 with which he opens the history, he more than once contradicts the statements of the celebrated Minhâj-i-Sirâj, the author of the well-known historical work *Ṭabqât-i-Nâsirî* (c. A.H. 658 = A.D. 1259) whom as an almost contemporary chronicler of the said events, we might have looked upon as an indisputable authority:—

در تاریخ سراج منهاج چنین مذکور و مسطور است که بر هر طرف شهر ششصد هزار آدمی را بقتل رساندند و قرب صد هزار دختر چهارده ساله با سیری گرفت و آن روز تا نماز خفتن کشش کرد بعد از نماز خفتن شاهزاده تولی خان فرمان فرمود که بیش کسی را بقتل نرسانند از خلق هراة هنوز قرب دوست هزار باقی مانده بودند. اما اصح آنست که از پیران شهر هراة چون مولانا مرحوم شیخ الاسلام خواجه ناصر الدین جشتی و امیر کبیر

محمود بن خلیل ابن حسام الدین الب حاجب و خواجه ابوبکر خنبه شغردم که ایشان گفتند که ما از بدران خویش که در وقت شاهزاده تولی خان در هرات بوده اند چنین سماع داریم که شاهزاده تولی خان در مقابل دروازه فیروزآباد صف کشیده بود بعد از هفت روز که از طرفین مرد بی حد بقتل بدوست شاهزاده تولی خان با سوار دوپست بیش راند و چون بلب خندق رسید بایستاد و خود از سر بر گرفت و گفت ای هرویان بدانید که منم در شرف صدف دریا کهر بخششی جنکیز خانی و ثمره دوحه باغ اقبال جهان بانی اگر میخواهید که همه بجان امان یابید و خرمن حیات اوقات شما از جمرات آفات کین کش ما نسوزد و نهاد و بنیاد صحراوات و جبال این بلاد از قلع و استیصال محفوظ ماند دست از معاربت باز دارید و بای از مبارزت بس کشید و روی بسوی طاعت داری و انقیاد آرید و بضعف آنچه هر سال از متوجهات این ولایت بعمال سلطان جلال الدین میوسانده اید بنواب ما رسانید تا شما را از تربیت شاهنشاهی و مکرمت بادشاهی ما برخوردار میفور حاصل آید و بر آنچه که گفت سوکندهای سخت یاد کرد چون خلق شهر هرات از لفظ شاهزاده تولی خان آن بیدمان بشنوند همه مایل و راغب صلح گشتند اول امیر عزالدین مقدم هروی که بحکم سلطان جلال الدین والی جامه بافان بود با صد جامه بافی هریک با نه تا جامه قیمتی بیش شاهزاده تولی خان رفت و بعد از وی تمامت اعیان و سروران هرات از شهر بیرون رفتند شاهزاده دوازده هزار تن را که از متعلقان سلطان جلال الدین بود بقتل رساند و باقی خلق را بهیچ زحمتی متالم نکرداند و ملک ابوبکر صرحقی را در هرات نصب کردانید و از مقریان درگاه خود مغولی منگنای نام را بشکنکی نامزد فرمود و بعد از هشت روز عظفر و منصور با غنیمت بیقیاس مراجعت نمود *

Again, in recounting the events which led to the second devastation of Herat, he refutes the same historian and others, basing his own account on a more reliable authority:—

اکنون آمدیم بحکایت آنکه بجه واسطه شهر هرات بار دوم خراب کردند و خلق او را بقتل رساند درین معنی ثقات هرات را خلاف است بعضی چنین میگویند که چون مردم شهر هرات را قوت و مکنت و ذخیره بی اندازه حاصل شد بانفاق یکدیگر روزی فرصتی نگاه داشتند و ملک ابوبکر و منگنای

را در مسجد جامع بقتل رساندند و در تاریخ سراج منهاج آورده است که سبب خرابی شهر هرات کربت دوم آن بود که چون سلطان جلال الدین لشکر بادشاه جنکیز خان را در حدود پروان میان بامیان و غزنین منهدم کردانید چون آوازه این فتح بغراسان رسید در هر شهر که از دست جنکیز خانیان ملکی و شعبه و عاملی بود همه را بقتل رسانیدند بدان امید که بیش بادشاه جنکیز خان با سلطان جلال الدین مقابل نتواند شد - اما اصح آنست که از خواجه ابوبکر خندک شفیدم که او گفت که الخ *

He is constantly at pains to show us that his assertions are vouched for by the oral evidence of contemporaries:—

جنین میگوید بنده ضعیف که در تواریخ متقدمان مسطور و مذکور دیدم و از بیوان سخندان معروف و مشهور شنیدم *

In another place he observes thus:—

جنین شنودم از راویان ستوده صفات و از بیوان شهر معموره هرات که چون شاهزاده نولی خان با سباه کران بمرغزار بشوران رسید *

And where evidence is conflicting, no matter how insignificant the fact, he takes the precaution of enumerating all the sources of his information. For instance, in his account of the murder of Malik 'Ali bin Mas'ûd of Sijistân in A.H. 656 = A.D. 1258 he writes thus:—

چون ملک علی مسعود از در آمد و بر ملک شمس الدین سلام کرد و خواست که بیش رود و دست ملک بدوسد که در حال سرشی را بزخم تیغ بیدریغ از بدن بینداخت از ابوبکر خندک جنین شنودم که او گفت که ملک شمس الدین بیک زخم شمشیر سر ملک علی مسعود را از تنه بینداخت و امیر محمود بن امیر خلیل بن حمام الدین الب حاجب جنین گفت که مبارک علی یزدویی و نقیب علی و محمد بلنک غوری ملک علی مسعود را بکشتند و بابا کرد گفت که ملک تاج الدین کرد کوربان او بکرفت و اختیار الدین سالار سرشی بخنجر از بدن جدا کرد *

The style is flowing and elegant, graceful but free from superfluous ornament, and he can narrate facts in a plain, straightforward manner which induces a confidence in the truth of his statement and the accuracy of his knowledge.

He introduces with extreme felicity quotations from not

less than twenty-five poets, some famous, some hardly known. Here are some of their names : Firdausî, Anwarî, Sa'dî, Rabî'î Fûshanjî, Khâqânî, Sanâ'î, Zahîr, Safir Azhar, Fayyâd Harawî, Shâh Haydarî, Qâbûs, As'ad Kirmânî, Sa'idî, Rûhânî, Labîbî, Rûhî, Shihâb Bağdâdî, etc.

Sayfî himself was a poet of no mean order. We have already seen that he wrote a Sâm Nâmah of 20,000 lines and composed eighty Qasîdahs and one hundred and fifty Qit'ahs in praise of Malik Fakh'r-ud-Dîn Kurt. It will not be out of place to quote here as specimens some of his poetical compositions found in this text.

In praise of the wine (fol. 166a):—

امروز روز باده و جامست ساقیا
 امروز روز عشرت و کام است ساقیا
 در ده مدام جام شراب مذاپ لعل
 زیرا که وقت جام مدامست ساقیا
 بیش آر ان شراب که در تیرگی شب
 تابنده همچو ماه تمامست ساقیا
 آن می که بیش دردی دردی شعاع او
 صبح جهان فروز جو شامست ساقیا
 آن می که نزد نور صفای لقای او
 سیمای لعل همچو ظلامست ساقیا
 ان می که رخس عکس فرور جمال او
 براق همچو برق و حسامست ساقیا
 ان می که طعم و رنگ و ضیا و نسیم او
 مانند خمر دار سلامست ساقیا
 ان می که در نظر ز صفا و ثنا و لطف
 ماء العیوة و آب غمامست ساقیا
 ان می که بوی و لذت و دیدار و فعل او
 روح خواص و روح عوامست ساقیا
 ان می که بی وجود طرب بخش روشناست
 عیش حلال عمر حرامست ساقیا

The following poem of Sayfî is quoted in connection with Giyaş-ud-Din's brother Malik 'Alâ-ud-Dîn's death in A.H. 713 = A.D. 1313:—

کر شیری و کر روبهی کر فاضلی کر ابلهی
 کر بادشاهی کر شهی کر سروری کر باسبان
 کر انجمنی کر انجمنی کر فیدی و کر فیدلتن
 کر صفدری کر صف شکن کر بهلوی کر بهلوان
 کر آتشی کر سرورکشی کر ناخوشی و کر خوشی
 کر مهری و کر مه و شی کر دلبری کر دلستان
 از مرگ سرکردان شوی بیجان و بس بیجان شوی
 با خاک ره یکسان شوی کم کردت نام و نشان

In praise of God, fol. 175b :—

ای قاهر مقدر و ای قادر قدیم
 و ای صانع مجدد و ای رازق و حکیم
 قهاری و بصیری و رزاقی و سمیع
 ستاری و صبرری و رحمانی و رحیم
 غفاری و لطیفی و فتاحی و بدیع
 ثوابی و جلیلی و وهابی و کریم
 حیّی و ذوالجلالی و منانی و ملک
 قدوسی و عزیزنی و علامی و علیم
 ربّی و کردگاری و عدلی و رافعی
 ربّی و بی نیازی و دینانی و عظیم
 فضل تویی نهایت و لطف تویی حساب
 صنع تویی ضلالت و ملک تویی ندیم
 اکرام تو همیشه و افضال تو مدام
 احسان تو بیابی و انعام تو عمیم

These passages so rich in poetical subtleties and beauties are ample testimony to a rare genius. Many Arabic verses and sayings quoted from the best authors are another proof of his versatility.

Sayfi mentions (fol. 219a) that the only person from whom

he received any assistance in writing his history was *Khawâjah Shihâb-ud-Dîn*, the great scholar and *Munshî* of the 'Ulamâ of *Giyaş-ud-Dîn's* court, and that without his ungrudging help he could never have completed so lengthy a work, or collected so much authentic information within the short space of two and a half years :—

اگر تربیت و تفقد و انعام مترادف او نبودى این تاریخ که صد و بیست
 ناگذاست سالها بانجام نبیوستى و بى کرم و تقویت او چنین کتاب معتبر
 در دو سال و نیم بآخر نرسیدى غیر صدر معظم خواجه شهاب الدوله
 و الدین در مدت برداختن این کتاب از ارباب و اصحاب کسی در باب بنده
 بعبه حقى ثابت نکردانید *

Besides the help received from *Minhâj*, *Sayfi* says that he drew upon certain works, viz. *Târikh-i-Jahân Kushâ-i-Juwaynî* (c. A.H. 650 = A.D. 1252) mentioned in connection with his account of the destruction of *Nishâpûr* by *Tûlî Khân*, fol. 20*b* ; *Târikh-i-Gâzân* of *Rashîd-ud-Daulah* ¹ (c. A.H. 710 = A.D. 1310), quoted in the account of the reconstruction of *Herat* on fol. 36*b*. *Sayfi* also refers to two other works, viz. *تاریخ علای* and *تاریخ خراسان*, both in connection with the devastation of *Merv* by *Tûlî Khân*.

In the earlier part of the work *Sayfi* refers to two histories of *Herat*. The first by *Şiqat-ud-Dîn 'Abd-ur-Rahmân Fâmî*, a panegyrist of 'Izz-ud-Dîn 'Umar, the ancestor of the Kurts, who governed *Herat* under *Sultân Giyaş-ud-Dîn Muhammad bin Sâm* (c. A.H. 550-590 = A.D. 1155-1193). The second is the *Kurt Nâmah* of *Rabî'î Fûshanjî*, who wrote in the style of the *Shâh Nâmah* about A.H. 700 = A.D. 1300, and dedicated his book to *Malik Fakhr-ud-Dîn* of the Kurt race. But it is hard to see how either can have been of any material service to our author. *Fâmî's* work was written early in about A.H. 600 = A.D. 1203, while that of *Fûshanjî* is only a poetical account.

A third history of *Herat* and of later date, entitled *Rau-dât-ul-Jannât fi Auşaf-i-Harât* روضات الجنات فی اوصاف هرات was written by *Mu'in Zamchî* معین زمچي in A.H. 897 = A.D. 1492. Manuscript copies of this work are fairly common in the libraries of Europe and India. The Asiatic Society of Bengal alone possesses two.

¹ Dr. Rieu, in his Catalogue of the Persian MSS. in the Brit. Mus., vol. I. p. 74, *Hâjî Khalifah*, vol. II, p. 509, and several others call this author *Rashîd-ud-Dîn*, but here his name is given as *Rashîd-ud-Daulah* in conformity with the names of his father and grandfather, who were respectively called 'Imâd-ud-Daulah and *Muwaffiq-ud-Daulah*.

This Raudât of Mu'in enjoys a wide popularity as a valuable history of Herat, and Barbier de Meynard has given an account of it, with copious extracts done into French, in the *Journal Asiatique*, 5e série, vol. XVI, pp. 461-520. It may however be well to point out here that as an *original* source for the history of the years A.H. 618-721 = A.D. 1221-1321, Mu'in's work is of no value whatever, for he was obliged to depend almost exclusively upon Sayfi. That Sayfi's work was the only available source of Mu'in's history for the aforesaid period seems sufficiently clear from this fact:—

Sayfi's history closes with the year A.H. 721 = A.D. 1321, in which Malik Giyâş-ud-Dîn went on a pilgrimage. In Mu'in's history the next eight years suffer a total eclipse.

He does not even tell us when this king returned to Herat, although according to the *Mujmal-i-Fašihî*, he did so in the same year, but suddenly jumps to A.H. 729 = A.D. 1328 and the death of the said Giyâş-ud-Dîn and other events connected with the king's successors and descendants. The substance of Sayfi's history for the period A.H. 618-721 = A.D. 1221-1321 has simply been bodily transferred to Mu'in's Raudât. In borrowing Mu'in has abridged some portions and copied others verbatim. In the former case he is apt to be extremely brief, thus omitting a good many important facts of which, but for Sayfi, all memory would have perished. For example, the history of the first four kings of the Kurt race, which is the largest section of Sayfi's work, it fills 225 large folios, each containing 25 lines to the page. In the Asiatic Society's copy of the Raudât it fills but 57 folios, each with 17 lines to a page. The writing of both is of the same size. Again and again, Mu'in copies passages and even entire pages verbatim from Sayfi with hardly a new word. For instance, the passage relating to the murder of Manktâi and Abû Bakr, and the destruction of the city of Herat for the second time, which I have quoted from Sayfi earlier in this report (p. 6.), runs thus in Mu'in's Raudât:

منگکای را در پای حصار و ملک ابوبکر را در میان بازار بکشند
 و خروش و غوغا از شهر برخاست و از حشم و اتباع ملک ابوبکر و منگکای
 هرکس را که یافتند بتبع بیدریغ کذارانیدند و ملک مبارز الدین سبزواری
 را که از حصار فیروز کوه به راه آمده بود بمملکتی تعیین کردند و رئیس مملکت
 بخواجه فخر الدین عبد الرحمن غیرانی که دلاور و کار دیده بود دادند و همه
 یک عزم دل بر حرب و رزم نهادند بس چون کیفیت این احوال بسمع جنکیز
 خان رسید در غضب شد و روز دیگر ایلجیکدای نوین را با هشتاد هزار مرد
 جنکی از نواحی غزنین نامزد کرد و گفت مردم کشته ندهد کشته اند درین

نوبت باید که از ساکنان هرات کس را زنده نگذارند ایلیچیکدای در شوال سنه ثمان عشر و ستمایهٔ برودخانهٔ هرات نزول کرده فرمود که سباه باید که درین یکماه ساز و ادوات معاربه ترتیب دهند و از مواضعی که در حکم جدکیزخان بون مدد و آلات حرب طلبید باندک زمانی از حدود خراسان و جبال و شیورغان و افغانستان نزدیک بنجاه هزار مرد از بیاده و سوار بهرات آمدند و در شهر ملک مبارز الدین و خواجه فخر الدین عبد الرحمن و دیگر اکابر و اعیان هرات استمداد حرب ساخته باهم عهد و میثاق درمیان آوردند که مخالفت نکنند *

Till the discovery of this work the *Raudât-ul-Jannât* of Mu'in ranked very high both in Europe and Asia, but now—so far at least as the history of the years A.H. 618-721 = A.D. 1221-1321 is concerned—it must take its place as a mere abridgment of Sayfi and can have no claim to be considered an original authority.

I trust I have been able to convey some idea of the immense value and deep interest attaching to this rare manuscript, which has remained too long forgotten. Its publication would, I am sure, be welcomed by every Persian scholar and by every student of Asiatic history.¹

¹ I am much indebted to Mr. Scholfield who read through this paper and offered many helpful suggestions.

14. Some more Quatrains of Abú Sa'id bin Abí'l Khair.

Edited with a Translation and Notes by
H. D. GRAVES LAW, I.C.S.

§1. *On the Sources of the Text.*

In two comparatively recent issues ¹ of this journal Maulví 'Abd-ul Walí published 400 ² quatrains of the famous mystic and poet Abú Sa'id bin Abu'l Khair of Khorásán. These formed the first published collection of the Rubá'iyát of the Saint which could claim to be anything like complete or really authentic, and were an important addition to our knowledge of Súfí Literature. These quatrains were copied from two MSS., one in the Library of the Asiatic Society of Bengal, the other in the British Museum. The only other printed collection of Abú Sa'id's Rubá'iyát is that of Dr. Hermann Ethé, who in 1875 and 1878 published in a philological and literary journal in Munich 92 quatrains which he had found in various anthologies and memoirs, such as the *Haft Iqlím*, the *Nafahát-ul-Uns*, the *Khulásat-ul Afkár* and others.³

The chief difficulty which confronts the editor of 'Umar Khayyám—the multiplicity and extreme variety of the texts at his disposal⁴—does not exist in the case of Abú Sa'id. The materials for our knowledge of what the older poet wrote, far from embarrassing us by their richness, are meagre and scanty. But that fact makes matters no easier. For we have no really old and genuine collection of Abú Sa'id's writings to rely on, the oldest MS. having been written in the XVII century A.D., 600 years after the poet's death; and the more recent the MS., the greater the suspicion that attaches to it as an authentic collection of a poet's works. Not entirely, I venture to think, because the bulk of his utterances are forgotten, or their authorship lost sight of in the years that follow. On the contrary, when there is no old and authentic *Diwán*, the number of verses attributed by posterity to a great poet, instead of diminishing, seems to grow with the centuries as steadily as his fame. The earliest MS. of 'Umar Khayyám, for example, dating from the end of the XV century A.D., contains but 158 quatrains; the most recent has 801.

But a large proportion of the verses thus added by later ages are, we may be sure, the work of other hands. It is quite

¹ Vol. V, No. 11 (December 1909) and Vol. VIII, No. 10 (Nov. 1911).

² Actually 401; but one quatrain had been inadvertently repeated.

³ Of these 92 quatrains, 46 are also in Abd-ul Walí's collection.

⁴ See Introduction to "The Quatrains of Omar Khayyám" edited by E. H. Whinfield, page xiv.

possible that 'Umar Khayyám or Abú Sa'id composed a far greater number of verses than will ever be known. But it is difficult to imagine how their authorship, once it has been forgotten, can be re-discovered with any hope of certainty. We cannot say for certain that a really old text of Abú Sa'id's would give us much fewer than the 400 quatrains we now have. But it is at least very probable; and the fact remains that a considerable number of the rubá'iyát contained in these two MSS. of Abú Sa'id have, as we know, been attributed to other poets.¹ And as there is practically no internal evidence to guide us, it is quite impossible to say of many of the verses, with any hope of being accurate, who their author really was. All that can be presumed indeed as a general rule (though it does not take us very far), is that where one and the same quatrain is ascribed both to Abú Sa'id and to some minor poet, it is the work of the latter. For the editors of Oriental anthologies had no very strict regard for historical accuracy, and if they chanced to come across an apt quatrain of whose authorship they were ignorant, they would not hesitate to give it an honourable place among the work of some revered and famous master. But no one would have any object in ascribing a verse to a comparatively unknown poet, unless he felt sure of its origin.

If, then, we must guard ourselves against too readily accepting as genuine an authoritative collection like that of 'Abd-ul Walí, what is to be said about the quatrains now published? Alas, I have no startling discovery of an old and genuine MS. to proclaim. Indeed, I must confess that it is with considerable diffidence that I have thus publicly announced them as the quatrains of Abú Sa'id.

Their source is two-fold :—

- (1) A small volume in the State Library at Hyderabad (Deccan), which was lithographed at Bombay so recently as 1297 A.H. by Mírzá Muḥammad Shírání, and which contains along with some rubá'iyát of 'Umar Khayyám, Ansári, and Bábá Táhir, "24 quatrains of Prince Abú Sa'id bin Abú'l Khair, which have been proved efficacious for certain purposes."
- (2) A MS. copy containing 161 quatrains of Abú Sa'id which I found a year or two ago among the débris of an Oriental book-shop in Hyderabad City. This MS., which bears no date but is apparently quite recent, is the work of one Sayyid Qádiri Jilání, who united to his evident interest in the poet a

¹ Abd-ul Walí himself quotes about ten quatrains that are ascribed to other poets than Abú Sa'id.

The author of the *Riáz-ul-'Arifin*, Rizá Qulí Khán Hidáyat, gives no fewer than thirty.

somewhat slovenly manner of transcribing him. What and where the MS. was from which he copied, he does not tell us; and we shall never know.

These two texts then, between them, give us as many as 183 quatrains of Abú Sa'id (for two are common to both); and as the lithographed volume is probably extremely rare, and the MS. unique; and as they are both, practically speaking, inaccessible to orientalists, I think that the publication in the J.A.S.B. of such of them as have not already appeared in 'Abd-ul Wali's collection, may be not without interest.

I have omitted therefore 83 quatrains¹ which are among the 400 rubá'iyát previously printed in this journal; as well as two which are foreign to all that we know of Abú Sa'id and his work, and which have no literary value. Of the 98² quatrains which are now printed not all are "new" by any means. As many as 44 I have found attributed either to Abú Sa'id or to other writers in various memoirs, and elsewhere. But the remaining 54 I have not been able to trace to their source.³ It is certain that they are all to be found somewhere, scattered among *tadhkiras*, or in the *Diwáns* of quatrain writers, such as Kháqání, Sarmad, or Faríd-ud-Din 'Attár with his reputed 10,000 rubá'iyát; and were an indefatigable and systematic search to be made in all their possible hiding places, in all the oriental libraries, each one of the 54 would doubtless, in time, be hunted down.

Whether we should be much wiser or happier for the labour, I am doubtful. It is not at all likely that we should be any more certain than we are now of the authorship of the quatrains. But after all does that matter very much? As a poet has said, if the words are worthy why should we ask the author's name? We do not know so much of Abú Sa'id's life, that we could feel great regret at learning that some quatrains we had imagined to be his are the work of another poet. Nor would the quatrains themselves lose interest or value thereby. I think it may be said that they nearly all share in common a religious and emotional atmosphere, a certain poetic quality which are distinctive. If they are not, in fact, the work of Abú Sa'id, they might have been.

The truth is that at this distant date, the name of Abú Sa'id belongs not only to the individual but to a phase of thought and experience, sombre, austere, and devout, which gives its character to a certain period of Persian literature;

¹ 9 from the smaller collection and 74 from the MS.

² These 98 are made up as follows:—

84 from the Hyderabad MS.

12 from the lithographed volume.

2 which are common to both.

³ 37 of the 44 are attributed to Abú Sa'id; and 7 to other writers. The authority for each quatrain is indicated in the notes to the text.

and these quatrains are as much born of the spirit of that age, as the creation of any individual mind. So I think that no great harm will be done if they are allowed to remain, till that search is carried out, as the work of Abú Sa'íd, enjoying whatever measure of authority may be due to the names of these two zealous gentlemen of Shíráz and Jílán.

I am fully conscious that the two collections which we owe to their efforts, are of doubtful value¹; that in particular the MS. copy of Qádirí, from which the bulk of the present collection is taken, has but a slender claim to be regarded as genuine. But although the unknown original of this copy may have been a recent and valueless document, there is a possibility that it may have been an old and authentic MS.; and this much, at least, may be said in their favour, that a goodly proportion of the quatrains found in each of these two texts are supported by the authority of the only two MSS. of which we know, as well as by several reliable *tadhkiras*. Whether that fact justifies my presenting the remainder as new quatrains of Abú Sa'íd, I must leave it to others to decide. It will be allowed, I think, that they are not unworthy of the honour of being numbered among the works of the Shaikh.

§ 2. *On the Life and Writings of Abú Sa'íd.*

Abú Sa'íd's place in Persian literature and in the history of Šúfiism—the theosophy of Islám—can only be touched upon lightly here. He was, we know, the first great poet to use the quatrain; and he was among the first to express his religion and philosophy in that symbolical language which is so characteristic of the Persian mystics. But he is, as Daremsteter says, “more poet than philosopher.” He is silent upon most of the problems which vexed the great sages, such as the mystery of pain and evil, the nature of the soul, and the much-disputed question of free will and determinism. Nevertheless in some of the essentials of the classic Šúfiism of Jalál-ud-dín Rúmí or Jámí, in his view of the universe—which he regarded as a mass of phenomena, illusory, transitory as the waves of the sea, and like them ever being renewed—in his conception of a religion of love, of the true relationship between lover and Beloved, and of the Šúfi's path to “Union,” he anticipates to a remarkable extent the language and ideas of those masters.²

The facts of his life may be briefly told. He was born in

¹ A large number of the quatrains collected and published by Dr. Ethé have as a matter of fact no better credentials; as many as 65 out of the 92 being extracted from *anonymous* anthologies and memoirs.

² An attempt has been made in the notes to illustrate, however inadequately, some of these parallels. But it must be added that the quatrains in this collection do not by any means contain the best of Abú Sa'íd either as poet or philosopher; of his philosophy, indeed, it gives but a small part.

A.D. 967 in Maihana, a little village of Khorásán in the north-east corner of Persia; and he died there in 1049. Practically the whole of his life he spent in Khorásán, now living with his parents in his native village, now studying at Merv, or preaching at Nishápúr, with perhaps an occasional visit to distant Bokhárá¹; oblivious of, or at any rate untouched by, the violent events which were happening in those troublous times. The Turkish tribes which Maḥmúd of Ghazní (998-1030) had allowed to enter Khorásán, had overrun the pasture lands of that province which became the constant scene of raids, punitive expeditions, and rebellions during the reigns of Maḥmúd and his successor Mas'úd. These culminated at length in the definite conquest of Khorásán by the Seljúk Turkománs in A.D. 1037.

But of all this we hear little from his biographers, and nothing in his own poems.² He was busy with other things. He wandered in exile, he preached, and he debated with other dervishes, a fantastic crowd who pass to and fro across the stage with a strange and sombre dignity. He was reviled, he was revered; and on the whole enjoyed considerably more than the usual amount of honour that a prophet is supposed to acquire in his own land.

This is a bald enough picture; but if we seek to fill in the details, we must do so with a certain amount of caution. Abú Sa'íd has his biographers in plenty.³ But the records of his life which they give us, though extremely diverting and full of interest, consist for the most part of isolated anecdotes and sayings which are placed in no definite sequence, and which moreover leave a great deal to the imagination. A picture made up of these fragments would be something very like the patched garment the Shaikh himself must have worn, a thing of strange colours, with many gaps.

But authentic or not, these stories give us a clear enough picture of the man. Leaving aside the prodigies of his infancy—those early signs of greatness which are the usual tribute of

¹ The home of Avicenna the great philosopher who was born there in 987 A.D. (when Abú Sa'íd was 20 years old), and lived there at any rate for the first part of his life. But he and Abú Sa'íd first met in Nishápúr, not in Bokhárá.

² A somewhat unconvincing story is related by one of his biographers of how Abú Sa'íd once came across a party of Turkoman robbers in the desert, fresh from a successful raid; and of how, having converted them by a little opportune clairvoyance, he took them with him to sit at his feet in the Súfí monastery at Nishápúr!

³ The most valuable and the oldest of the biographies of the poet are the *Asrár ul Tauḥíd fi Maqámát-i-Shaikh Abú Sa'íd* written by a descendant in the second half of the 12th century A.D., and the *Hálat ú Sukhú nán-i Shaikh Abú Sa'íd* composed, as E. G. Browne conjectured, somewhat earlier. The latter is very much shorter. They have both been edited by Professor Valentine Zhukovski. For the rest there are notices of him in many memoirs and anthologies, such as the *Safinat-ul-Auliya*, the *Tadhkirat-ul-Auliya*, and others.

posterity—we know that from an early age he enjoyed a wide reputation for learning and piety. It is beyond doubt that he spent many years in solitary exile in the desert, thinking out the problems of life; that he underwent countless austerities; that he fasted; that he despised riches; that he took on himself vows of silence. We read of his occasionally taking part in those crazy orgies of dance and song whereby the dervish sought to induce a condition of religious excitement or “ecstasy.” Whatever we may think of such methods of obtaining “freedom from self” and “nearness to God,” or of the foolish forms of self-mortification he employed, the objects of these practices were perfectly clear to his mind. In one of his quatrains he likens the dervish swaying to and fro in the dance to a nurse rocking a child in its cradle: thus alone could he hope to “still the babe of his restless spirit,” or (by another metaphor) “quench the fires of his heart.”¹ Bodily suffering released the soul for contemplation, and lifted the veil which hung between man and his Creator. “Revelation” he said “is the handmaid of Austerity.”

By virtue of this self-imposed discipline he gained, it is said, an unusual power of working miracles, as the following story will testify. A merchant was once travelling from Nishápúr with a caravan bound for Bokhára. On the way, between Nishápúr and Merv, he fell asleep and lost the caravan; and after wandering in the sandy desert for some days he came at length, hungry, thirsty, exhausted, to a pool of water where he beheld a man performing ablutions, and praying, “tall of stature, of fair complexion, with candid eyes, and with a beard reaching to his waist. He had a stick and a vessel in his hand, and a razor and tooth-brush; he bore a prayer carpet on his back, and was wearing a Šúfí’s patched cloak, and on his feet rope-shoes.” This of course is our Shaikh, who on learning the man’s trouble, took him by the hand, and beckoning to a lion which had miraculously appeared, whispered a few words in the animal’s ear, and bade the merchant mount the beast, keep his eyes shut, and ride till the beast stopped. One hour later the merchant opens his eyes to find himself at Bokhára (about 150 miles distant) in the company of his delighted fellow-travellers who had just arrived. But this is not all; for some time later he learns that the great Shaikh Abú Sa’íd is in the city; he goes to hear this celebrated preacher; and discovers to his amazement that the Shaikh is none other than his benefactor of the desert, who had been in

¹ But in one of the quatrains which follow (22) he distinctly deprecates such spiritual “intoxication.” He would at any rate have viewed with horror the excesses to which the state of “ecstasy” sometimes leads: and on the whole it seems certain that he strongly favoured “sobriety” as a line of conduct for the dervish.

Bokhárá all the time! The result, of course, is another convert to Šúfiism.¹

The story of this adventure was, by the express wish of Abú Sa'id, not given to the world until after his death. Though the sceptic sees in this fact a convenient method of accounting for the posthumous origin of such tales, the believer may infer therefrom that Abú Sa'id was anxious not to advertise such powers as he possessed. We certainly have authority for saying that he had no inclination to practise them idly. To one who asked him for a miracle, by way of proof, he quoted another Šúfi who on a similar occasion had told his questioner that there were miracles everywhere around him, if he only chose to look; and that perhaps the greatest miracle of all was that he was allowed to be alive!

Clairvoyance however was the line in which Abú Sa'id may be said to have specialized; and by his disconcerting habit of reading men's secret thoughts he won a large number of disciples. He also had his enemies. For that, his uncompromising hostility to orthodox Islám, and his tolerance of Christians and other unbelievers were mainly responsible. Šúfiism, as an organized creed, was in his time in its infancy. It had but a handful of preachers, and these were widely regarded as dangerous heretics. In many of the places he visited he was subjected to scorn and active hostility: in Nishápúr, once, he came near to losing his life. It is not to be wondered at, therefore, if Abú Sa'id occasionally indulged in the very human sin of praying God to confound his enemies.²

It may be questioned whether it is at all possible that a life lived on the lofty plane of thought of the average Persian mystic can escape violent inconsistencies; whether the end is not inevitably "self-delusion and imposture."³ It must be admitted at once that Abú Sa'id was by no means always the "austere pietist." Many stories, in fact, tell of his extremely sane humanity. After one period of rigid austerity he came forth clad in fine raiment and attended by a slave girl who ministered to his wants, to the immense disgust of an ascetic whose criticism, however, Abú Sa'id sharply rebuked. To pleasant food and convivial dinners he was no stranger. Nor did he scorn human love; though he had qualms of conscience when he saw his family grow up round him; and, we are told,

¹ This version of the "miracle" is taken from the *Hálát-ú-Sukhúnán*. A fuller, and more sober account, is given in the *Asrár ut tauhíd* according to which Abú Sa'id was not in Bokhárá when the merchant arrived at that city. The latter did not in fact discover who his benefactor was until three years later when he saw him preaching in the Šúfi monastery at Nishápúr.

² As, for example, in quatrains Nos. 84 and 88 of this collection. But it would perhaps be hardly fair or safe to base an estimate of Abú Sa'id's character on the quatrains which appear solely in the Hyderabad edition.

³ See Whinfield's introduction to the *Maḡnavi* of Jalál-ud-din Rúmi.

felt he had to satisfy his scruples on that score by the grotesque feat of reading the Qurán head-downwards, suspended from a beam in the roof: a penance which, we are not surprised to learn, nearly caused his death by apoplexy.

On the other hand he had a very healthy view of man's duties and obligations in this world. "No man is perfect," he said, "who does not mix with other men." He was not above helping the temple servants in their menial work, and did not hesitate to prescribe that duty to others as a salutary lesson in humility. If Abú Sa'íd was inconsistent, we may be sure the world was all the better for it. Whatever faults he had, hypocrisy was not one of them. He preached sincerity towards God and man, and he was himself sincere. No one, I think, can read his verses without feeling that whatever he did, in whatever mood he might be, he was genuinely in search of knowledge of the Truth, and of spiritual perfection. Whether in the market-place or in the pulpit, whether in the monastery or in the desert, he was seeking that union with God which was his goal. To a dervish who asked him once where he could find God, he answered: "where have you sincerely sought Him that you did not find Him?" The certain conviction that God was everywhere, and that everything was God, is the key to his life and his philosophy.

The quatrains which follow are naturally not all on the same level of thought and expression. But there are some beautiful and moving poems among them. He has the depth of feeling of the Oriental, but at the same time is peculiarly free from those artificialities of expression that seem so strange to western ears; and when we remember that almost all the verses are purely "occasional," composed in response to a passing mood, or the need of a fugitive moment, it is remarkable that they should have such a permanent value; and that they should reach, on the whole, such a high degree of literary excellence. But perhaps the chief interest of this collection is the variety of characters in which it reveals our Saint. He is a victim of toothache, and other human ills; a sympathetic friend; a contrite sinner, a moraliser on life and age. But above all he is the mystic, eloquent of his devotion to the divine Friend. As we read him we forget that he lived 900 years ago, and that he is of alien race. Rather we realize that, like every true mystic, he belongs to no time and no place. As Báhá-'ud-Dín-i-Ámilí says:—

This land is not Egypt, nor 'Iráq, nor Syria;
It is a City that hath no name.

It is a curious irony that the name of Abú Sa'íd should have come to be associated with an art which is opposed to the whole spirit of his beliefs and teaching. Magic had no place in the creed of the Şúfí—least of all in the Şúfísm of Abú Sa'íd,

whose prayers are imbued with religious fervour and sincerity. It is impossible to believe that a poet whose whole doctrine of faith rested on the desire to achieve union with the Divine through love and self-sacrifice, could have seen any efficacy in mere repetition, or have sympathised with a system which displays nothing more than the vulgar wish to get from the gods something for nothing. Nevertheless his quatrains have acquired, after his death, a reputation for magical potency as charms and amulets no less wide than the fame he himself enjoyed during his life as a worker of miracles.

The introduction to the Hyderabad MS. describes the verses as a "Philosopher's stone (*qúgird-i-ahmar*) for the attainment of desires, for procuring daily bread, for vanquishing hearts, for driving away murrain, and for other purposes": and it goes on to give general directions for their due and fitting recital. Each quatrain that follows is prefaced by a few words describing in detail its object, and the particular method by which that object can be attained. To quote these instructions at any length would be tedious, and is foreign to my present purpose. One, however, is so curious that it may be given in full. That is the preamble to the first quatrain in the Hyderabad MS. (No. 17 in 'Abd-ul Walí's collection). It runs as follows:—

"For the use of one whose sweetheart is refractory or who is suffering from love, and burning in the fires of separation. He should have recourse to this quatrain for two days, reciting it seven times in one breath. He will attain his object in the following way:—

He must search for the lady diligently, and if he happen to see her passing by, must pick up some dust from the path she will tread, and after quietly performing an ablution, recite the quatrain seven times with one breath, and then fold the dust in a piece of paper, and taking his stand by the road she is passing, throw the paper at her back. Then he should enter into conversation with her, and after a while part from her. If she still persists in her coldness, he must repeat the procedure with extreme care, when he will gain his desire."

It is hardly necessary to say that such senseless rigmarole as this could not have been written by Abú Sa'id. There can be no doubt, in fact, that all these descriptions of the objects prayed for, and the directions for the proper recital of the quatrains, are the unauthorised work of later hands, and fairly represent the cloud of myth and romance that so often in the East trails after the name of any man distinguished in his life for great piety and austerity.

I feel I owe a word of explanation for the notes to the Translation. They are the very A B C of Súfíism, and will be perfectly familiar to every student of that phase of Islamic thought. But there may be some who will chance to read these pages to whom the terminology may be strange, and the mean-

ing dark. I hope that the notes will throw a little light on these things.¹

A word in conclusion as to the text. The MS. of Qádirí presented some difficulty. It has been so carelessly copied and contains so many obvious mistakes that I have had to take the liberty of emending it wherever that was necessary. Variations in the readings, where I have considered them worthy of record, and a few of the emendations in the text of the Hyderabad MS. and the source of each quatrain, are given in the Notes to Text.

¹ To those who are curious to learn something about Šúfiism, and its place in the history of the world's thought, there are ample opportunities.

Dr. E. H. Whinfield's translation of the Quatrains of 'Omar Khay-yám and the Mašnaví of Jalál-ud-dín Rúmí (both in Treubner's Oriental Series); of the Lawáih of Sámi, and especially of the Gulshan-i-Ráz of Shabistari; and Professor R. A. Nicholson's translation of the Diwán-i-Shams-i-Tabríz and his "Mystics of Islam," in the Quest Series,—form a rich mine of knowledge.

To these two Shaikhs of our own day every traveller in the path of Šúfiism owes—it goes without saying—profound obligations.

TRANSLATION.

1.

Come back to Me ; come back to Me, whoever thou art, come
back to Me ;

Unbeliever, or magian or worshipper of idols ; come back
to Me.

This Court of Mine is not the Court of Despair ;

Though thou hast broken thy vows a hundred times, come
back to Me.

To all religious forms the Šúfí, like every mystic, was indifferent. Sincerity of worship Abú Sá'íd held to be of more value than adherence to any particular creed. "The ways to God," he said, "are countless as the atoms." The demands of strict orthodoxy were indeed regarded as a positive snare. The author of the *Majális-ul-Ushsháq* (*The Assemblies of Lovers*) a book of memoirs of famous "lovers" written in A.D. 1502 quotes one 'Ain-ul-Qazá of Hamadán as declaring that he will destroy his religion, and take love in its place :

آتش زلم و بسوزم این مذهب و کیش
عشقت بنهم بجای مذهب در پیش

I'll set my creed afire, my faith I'll burn ;
And, quit of them, to love for Thee will turn.

2.

Pass, O morning breeze, through Her garden,
And tell that adorable Marjoram¹
To guide Her steps towards me, for a space,
And honour this desolate abode of my heart.

3.

Said I : ' O Beloved, tulip-faced One, Possessor of my heart,
Show Thy face to me in my dreams, but once.'

Said He : ' Thou goest to sleep without Me and then
Thinkest thou mayest see Me in thy dreams ?'

¹ Compare the *Diván-i-Shams-i-Tabríz* xxvi. 5, where the Beloved is referred to as a 'cyprus.'

4.

O God, turn aside this calamity
 Preserve us from this disaster.
 By the locks of Muhammad
 Confound thou our oppressors.

5.

I cry aloud for help from this love ;
 I have dealings with a strange sweetheart.
 If He hath done justice to my broken heart, I am content ;
 And if not, I will follow Love's course whatever the price.

“Love,” says Dr. R. A. Nicholson, “implying loss of self-hood and by that means perfect union with the Divine Beloved is the living rock on which all mysticism is based.” If Şúfiism can be said to have a definite creed, that creed is love.

“Love is all that exists,
 Without the dealing of love there is no Entrance to the Beloved.”

(*Diván-i-Şhams-i-Tabríz*, xxiii, 2.)

There is much pain, and little bliss in this love. It is a fire which burns, a poison which has no cure, a draught of wine which intoxicates. For the Şúfi however it is more than an occasional and bitter experience, it is his daily life : “ My bed is sorrow and my pillow love ” says Abú Sá'id ; and Manşúr-ul Halláj tells how this martyrdom is not only endured with patience, but eagerly welcomed :

سوخت جانم ز داغ غم لیکن
 شوقم از درد عشق افزون شد

My soul is cauterized by fierce desire,
 Yet still I long for love's relentless fire.

6.

I adjure Thee, O Lord, by Muhammad, by 'Alí, and by
 Zahrá ;
 By Hasan and Husain, by the family of the Mantle ;
 Of Thy bounty fulfil my desires in this world, and the
 Hereafter,
 But make me not beholden to other men, O Highest of the high.

Fátima, the daughter of Muhammed, was called *Fátimat-uz-Zahrá*, Fátima the shining. The “family of the mantle” are Fatima herself, 'Alí

her husband, and their two sons Ḥasan and Husein, who on one occasion were covered by the Prophet's mantle in obedience to a Divine command which signified that they were specially dear to God, and that whosoever invoked their names in prayer should obtain his wish.

7.

Live not O heart without that Beloved of ours,
He is better, I ween, than a hundred sweethearts.
The Beloved is not with me, and no sweetheart is in my
arms ;
O send me the Beloved, or take away my heart.¹

8.

Thanks be to God that thy body hath become a garden of
well-being,
That Health hath poured flowers of delight into thy lap.
It was an ill-chance that led the fever to thee :
God be thanked that it turned to sweat, and came dripping
from thy limbs.

9.

There is fat on the cow—but the cow is in the highlands.
Isinglass in the fish—but the fish is in the ocean.
The goat is on the hill, the panther in Bulghar.
Hard, hard it is to draw this bow.

The meaning of this quatrain seems to be that union is very hard to attain ; and the poet compares the difficulty with which the "traveller" reaches his goal to that experienced in worldly matters. Compare the couplet

آرزوی دوست دارم لیک دریا در میان
خانۀ ملاح در چین است و کشتی در فرنگ

which might be translated thus :

"I am longing for my sweetheart, but bet ween
us rolls the main,
And the boatman is in China, and his boat's
away in Spain!"

"Bulghar" in the third line is probably the ancient country of that name situated on the

¹ There are several possible ways of reading this quatrain. The merit of the original depends on a play of words which I have not even attempted to reproduce.

eastern banks of the river Volga. The city of Bulghar is said to have perished in the 15th century A.D. when the modern Kazan took its place.¹

10.

My love who broke her vows of friendship to me
Went; and as she passed I caught her skirt in my hands.
Said she: "After this thou wilt see me in thy dreams."
Did she think, forsooth, that after that I could sleep!

The subject of this verse may be the Divine Friend; but it is difficult to read such a reference into every one of Abú Sá'id's quatrains. Nor is it necessary. Human, or "profane" love (عشق مجازی) had a place even in the Súfí's austere faith. It could not very well be ignored; so it was justified, on logical grounds, by the argument that poor though it was it might kindle the true flame. "The false," says a *hadith*, "is the bridge which leads to the true." One of the lessons of Jámí's poem *Yusuf and Zuleikhá* is that just as Zuleikhá's beauty was "a single bud from the garden of His beauty," so her love for Joseph was the type of the divine love.

Magdalen in Mary Cholmondeley's novel "Prisoners" expresses the same idea: "The love of you is the cup of water; and 'the love of God the well it is taken from.'"

11.

An arrow sped from the curved bow of Thy eyebrow
My heart fancied it saw a ray of union;
Gladly, gladly through my heart it passed, that arrow, and
coily said
I cannot stay with one as unworthy as thee.

12.

He whom destiny hath numbered among the lovers
Is free of mosque and house of worship.
To him who is mad with love what is union or separation?
To him who hath left Self, what is Heaven—what is Hell?

¹ See Bretschneider's "Mediæval Researches" (Treibner's Oriental Series), pages 81 to 99.

In the creed of the Šúfí there was no place for either Heaven or Hell. Thoughts of the other world must be abjured as sternly as the distractions of this, by the truly disinterested "lover." To the orthodox Moslem Paradise may have been held out by Muḥammed—on the authority of Allah—as an end desirable in itself. To the Šúfí it was "not worth a straw."

13.

O heart, turn wholly to blood ; why hast thou patience ?
 Away with thee, O life ; what profits all thy beauty ?
 O eye, what is that pupil¹ of thine ? Shame on thee !
 Thou that cans't not see the State of the Beloved, of what
 avail is thy sight ?

14.

My heart acquired thy habit of fighting and striving ;
 My soul found the jewel of eager desire for thy street.
 I said to the down on thy cheek, ' Help me ' ;
 But it too fighteth on the side of thy comely face.

The meaning of lines 1 and 2 is that his heart and soul have rebelled against him, and deserted him.

15.

At the hour of Union from the fear of banishment deliver us ;
 In the time of Separation, from its intolerable pain deliver us.
 Alas, for this severance from my Beloved, alas !
 From this unendurable pain deliver us.

The ultimate goal of the Šúfí's journey was "Union," absorption into the world-soul of which his own soul was a part, or (to use a favourite metaphor) immersion in the Absolute, as a drop of water in the ocean.

This is simply another way of expressing their pantheism. For "in the world of unification," as the great pantheist Báyzid says, "all can be one: lover, beloved, and love, all one."

It was when they felt they had reached this exalted state of "union" that Báyzid and Mansúr uttered their splendid blasphemies. "As a snake from its skin I came forth from Báyzidness . . . I am no more, for *He* speaks with my

¹ مردمي in the third *misra* means "manhood," "courage" as well as "pupil of the eye."

tongue, and *I* have vanished. . . . verily, I am God: There is no God except me, so worship me! Glory to me! How great is my Majesty.”¹

Regarded more soberly, it demanded freedom from all “taint of self.”

تا از خود ناشده فالي نيابي وصلت باقي

“Till you die to self, you will not live in Union.”

16.

Thy glance doth immortalize the heart.
The pain of thy love turneth sorrow into gladness.
Were the wind to carry the dust of thy street to Hell,
Its fires would become the water of life.

Compare Háfidh:—

هرگز نمیرد آنکه دلش زنده شد بعشق

“He will never die whose heart is quickened by love.”

17.

To sell happiness is the desire of my destiny;
To wear coarse wool is my ambition’s aim.
Here one request will give you the two worlds;
But my proud spirit bids me keep silence.

18.

Whence hath he come this mischievous Gabr?
Whence hath this image of the grave appeared?
He has hidden my Sun from mine eyes.
Whence has appeared this patch of cloud?

Abú Sa’id seems here to be abusing his lower and sinful self. Like a cloud his passions obscure the “sun of truth” and hide it from his eye. The earthly part of man’s nature must, of course, be sternly suppressed. ‘Ain-ul-Qazá puts the position vigorously enough:—“Uproot the foundations of your earthly life, even as a courtesan who fleeth from her city.”

¹ Quoted by Dr. R. A. Nicholson in an article on Sufiism in the J.R.A.S. 1906, Vol. II.

19.

He Whom thou fanciest to be thy enemy is thy friend, sawest
thou what He did ?

Dids't thou plumb His depths and see that which He did ?

Said He : " All that thy heart desires will I do."

Sawest thou what He did ? Didst thou hear what He said ?

20.

Thou art too good for any man to think of Thee,

Or for such as I to ponder on thy state.

But God, thy Creator, glories in His work perchance,

And delights in gazing upon thy beauty.

21.

What can the lover do who humbleth not himself ?

How shall he spend the nights, when he goes not to thy street ?

If he kiss thy locks, be not angry ;

What can the madman do but search for a chain ?

To compare curled locks to a chain which binds the lover to his beloved is a common simile in Oriental poetry. Compare 'Iráqí :—

یار بزنجیر زلف مرا میکشد

در پیع او می روم تا به کجا می کشد

The Friend is drawing me by the chain of His
locks,

And I follow Him whithersoever He draws me.

22.

The men of His path have no thought of existence.

Self-regard they practise not, nor self-worship.

There where the men of God drink the Wine of Detachment,

They drain the tavern ; yet fall not into excess.

The *Gulshan-i-Ráz* of Maḥmúd-i-Shabistari (1250—1320) one of the great mystical treatises of all time, speaks of " the haunters of the tavern who are drunk with the wine of illumination from self."

By the words " commit no drunken excess" (in line 4) he means that they are not blinded to the Truth by loss of self-control. The composure of " sobriety" is, as a mental state, contrasted by the Súfís with the rapture of " intoxication."

23.

This life of ours passes like an April cloud ;
 The tears of these eyes are like unto a mountain-torrent.
 Live in such wise, good Sir, that after thy death
 Thy friends may bitterly regret thy loss.

Compare the lines quoted by Elizabeth Barrett in a letter to Robert Browning (*Browning's Letters*, Vol. I, page 372).

Like to the cloud upon the hill
 We are a moment seen.

As Thomas à Kempis says: "The end of all is death, and man's life passes away suddenly like a shadow."

Line 4.—Abú Sa'id once said: "Thou camest into the world weeping, and men laughed at thee. Strive to die laughing, that men may ever weep for thee."¹

24.

The men of God belong to a different world from ours,
 Those birds of the air come from a different nest.
 O look not on them with these eyes of thine.
 For they are free of the two worlds and dwell in a place other
 than ours.

These men of God are the dervishes, the "men of alchemy" as he calls them in another quatrain, who "turn the copper of existence into gold." The *Gulshan-i-Ráz* describes them in language reminiscent of this quatrain, as "birds of the soul" (*line 842*).

25.

O wind, I adjure thee by the sacred earth of the Prophet ;
 And thee, O rain, by 'Ali the chosen.
 The people are fallen to weeping—Stay, stay,
 O sea, I conjure thee by the martyr of Kerbela.

26.

When the love of my Idol first stole my heart,
 My neighbours could not sleep because of my cries.
 Now when I lament less, my pain has increased ;
 When a thing is wholly on fire, the smoke diminishes.

¹ *Asrār-ut-tauhīd*, page 317.

27.

They say there will be much debate on Resurrection day,
And stern will that dear Friend be.
From The Worker of good, naught but good can come.
Be glad : for in the end it will be well.

28.

Thou should'st not have shown thy face to me first.
So the fires of my grief might have smouldered elsewhere.
Now that thou hast appeared and snatched my heart from me,
Thou art compelled to become the thief of my heart.

29.

My heart can never cease to remember thee
Though my life pass—yet will the memory of thee remain.
The image of thy face has fallen on the mirror of my heart:
An image that can never be erased.

30.

Old am I ; but when Love comes as a friend,
The time of revelry and joy and blandishment returns.
I shall throw a noose made of her long tresses
Over the neck of my departed years, that I may bring them
back.

31.

When I go into the garden, I remember Thy street,
And every flower I gaze on recalls Thy face.
If I sit for a while 'neath the shade of the cypress,
Thy charming cypress-form comes back to my memory.

This quatrain suggests a good deal more than the thought that God has created everything. It embodies the mystical pantheism which saw in all the forms of the universe (man himself included) nothing but "the rays of His perfect beauty mirrored therein." These pantheistic ideas which were first preached by the great Báyazid, were enthusiastically taken up by Abú Sa'id. India was probably the land of their birth. It was the object of the Vedanta philosophy to teach men the true nature of Brahma, who pervaded the universe, and of Maya, the illusion which gave to all forms their appearance of reality. To the Vedantist, as to the Súfí, all nature is God; the world is simply a mirror in which God is reflected.

32.

If mine enemies array themselves against me, I will prevail;
 'Tis as if a handful of straw had slapped the sea.
 I am like to a naked sword in Destiny's hand;
 He is killed who dashes himself against me.

33.

The Beloved wants the gift of my weary heart;
 Let me send it to Him—if so He will.
 Then shall my eyes be fixed upon the road,
 Waiting for the glad news that my life, too, is wanted.

Junayd, the great mystic of Baghdád, who lived in the second half of the 9th century A.D., discovered one day that he had lost his heart. He asked God to give it back to him. But an unseen voice answered: "O Junayd, I stole from thee thy heart that thou mightest stay with Me. Dost thou wish it back so that thou mayest remain with other than Me?"

The "Law of Sacrifice," one of the great rules of the mystic path, demands not only abstinence and willing service but, in its esoteric sense, the "passing away" (فنا) of self; death that life may follow.

عاشق چو شوي تيغ بسر بايد خورد
 زهری که رسد همچو شکر بايد خورد

When you are a lover you must bow your head
 to the sword.
 You must drink the poison that is offered you
 as though it were sherbet.¹

34.

Thou should'st sorrow, my master, at the thought of the grave,
 Thy heart should burn, thy eyes weep.
 Thou hast a hundred opportunities for worldly affairs,
 Once, at least, thou should'st take thought of the grave.

Compare the *Qur'án* Sura 102:—"The emulous desire of multiplying riches employeth you until ye visit the graves. By no means should ye thus employ your time."

¹ Abú Sa'íd, quatrain 278 in 'Abd-ul-Walí's Collection.

35.

When the Huris were drawn up in their ranks to see the
 Beloved,
 Rizwán clapped his hands in amazement.
 But when that Dark Mole veiled their faces,
 The Abdál clutched the Book in terror.

This "riddle" is impossible to solve without the key. The following is the interpretation (contained in a commentary in the Oudh Library, a copy of which is also in the Hyderabad State Library): "The Huris are the 'Ayán-i-thabita', the epiphanies of the Divine idea, underlying each one of God's names and qualities. When these were first manifested in the world of phenomena, Rizwán—representing the denizens of Paradise—clapped his hands in joy and amazement at the marvel of creation. But on the last day when the world is blotted out by the "mole," which is the "point of unity" on the face of God's majesty, the men of God (Abdál) will clasp in terror the Book of the Prophet's existence for whose sake God created the world.

36.

On the day when I shall behold my Beloved's beauty,
 I shall be all eyes—from head to foot,
 So that I may gaze on Him with a thousand eyes:
 For how can the Friend be seen with but two eyes?

37.

Where Thou art, there can be no trace of grief.
 Where Thou art not, no heart can be glad.
 He who knows not a moment's separation from Thee,—
 His joy is greater than Heaven and Earth

38.

Said I 'Here are my eyes.' Said He 'Fix their gaze on the
 Path.'
 Said I 'Here is my heart.' Said He 'Let it burn with thy
 sighs.'
 Said I 'Here is my soul.' Said He 'What hast thou in thy
 soul?'
 'My passion, for thee' said I. 'Hold fast to that' He said.

“The beginning of the Path is the journey to God, and the journey in God is its goal,” (al Ghazálí. ob. 1111 A.D.). The adoption of a “path” with definite stages towards the goal marks the first attempt of the Śúfís to reduce their vague beliefs to a definite shape.

Of its philosophical side something has already been said. On its ethical, it meant asceticism, scorn of wealth, charity and similar virtues. To one who asked him what the path was, Abú Sa’id answered: “Sincerity and friendship; sincerity towards God, and friendship towards man.”

39.

Loose Thou the tangle of my wretched life, O Lord ;
Show me pity ; for the world has failed me in everything.
Save Thy Court what other court have I ?
O Thou who forgivest, turn me not from Thy door.

40.

By the two lights of the Prophet’s eyes, O Lord,
By the two lamps of Haidar’s house,
Look on me with the eye of favour, O Lord.
Let me not fall away from Thy sight.

41.

At thy feast, O my delight, I am wretched and a prisoner.
In slaying me thou dost no crime.
Speak with my rivals and bid me burn with envy ;
Look not towards me, and bid me die of rage.

42.

My heart journeys no road save that of Thy love ;
It seeks no bourne save labour and the sorrow of Thy love.
Thy love hath made the desert places of my heart a salt-marsh
Wherein no other love but Thine may grow.

43.

The heart of every Mystic hides Thy secret.
The door of Thy mercy is ever open to all.
Whosoever cometh to Thy Court, a suppliant,
Shall he ever return disappointed therefrom ?

44.

My poor heart is full of sorrow ; forgive it and ask not.
 A hundred disasters wait in ambush for me ; forgive me and
 ask not.
 Were Thou to ask me what I have done, I were ashamed.
 O Thou most merciful of the merciful, forgive me and ask not.

45.

O Thou who art a Friend to the friendless of the world,
 Whose bounty, though it be a grain's weight, sufficeth the
 whole world ;
 I am friendless ; and Thou art the helper of the friendless.
 Hearken, O Lord, to my lonely cry.

46.

O Thou who knowest the secrets of all men's hearts,
 Who art the help of all men in their distress ;
 O Lord, grant me repentance and accept my excuses,
 Thou who dost grant repentance and forgiveness to all.

47.

Join thou the ranks of My friends, and fear not ;
 Be thou dust at the door of My threshold, and fear not.
 If all the world seek thy life,
 Be not anxious ; come unto Me, and fear not.

48.

Thou art in my eyes : else would I flood them with tears ;
 Thou art in my heart, else would I drown it in blood.
 My soul hath only the hope of Union with Thee : were it not so,
 By a thousand devices I should drive it out.

Line 1 : literally, "I would make an Oxus of them." The "occasion" of this quatrain is stated by the author of the *Majális-ul-ushsháq*—probably without the least foundation—to be as follows :—"There was once an elegant youth whose father was a boatman on the river Oxus, and a servant of the Sultan Maḥmúd. On his heart, as upon a mirror, there fell suddenly the image of love for the ḥakím. None told the sage, but one day he sent the young man this quatrain." The ḥakím is *Hakím-i-Saná'í*, a celebrated Súfí poet who died in A.D. 1151. And as Maḥmúd died in

1030, it is obvious either that the story is nonsense, or the hero of it is some other Saint—it may have been Abú Sa'íd who lived during the reign of Maĥmúd of Ghazní.

49.

My heart looked long in the volume of love,
And saw nothing worthy of love save thy comely face ;
Even as thy face is a mole that adorns Beauty,
So the love of my tortured heart enriches Love itself.

50.

All Thy creatures are suppliant at Thy Court, O pure Creator,
Waiting in anxious grief for one drop of water.
Send down, of Thy clemency, the Water-carrier of the clouds
That he may pour rain over this patch of earth.

51.

Almighty God, who is the Lord of the world,
In the whole world there is none beside Him.
He uniteth us one to the other,
For He hath power to do that.

52.

O Thou of whom my need is, in whose hands is my Soul ;
I have left all alien thoughts, and turn me toward Thee.
My works are all evil, and shall nowise profit me,
So I come to Thee with my hope, and place my trust in Thee.

53.

The hand which amorously grasped thy locks,
In thy absence, beat stones against my breast.
The eye that saw thee and drove sorrow from my heart,
Without thee, bathed my face in blood.

54.

No trace of the Musulman bear I on my face,
A Feringhi's dog has more honour than I.
So black am I with sin that my presence there
Would bring disgrace on Hell and on Hell's denizens.

55.

Though I injure others less, the more afflicted am I.
The greater is my loyalty, the fewer are my friends.

The more I keep faith with men, and suffer them,
Praise be to God, the more despicable am I in their sight.

The true test of a man's worth is the world's
abuse. There is a "tradition" which says that "a
man's faith is not perfect till 40 men have called
him an unbeliever."

56.

Look Thou upon me for I am in sore plight.
Entrust me not to any man, for I have none save Thee.
Since Thou art the Lord of Bounty, my need is of Thee.
Since Thou overcomest all, I yield myself to Thee.

57.

If I raise my hands aloft in prayer,
I can move mountains from their very roots.
Yet because of the favours of the one God,
I bear in mind the words—"Endure with a beautiful patience."

58.

I am like an ancient treasure, the world knows of me, but
knows me not;
My light shines, yet is veiled; as a candle within its shade.
Yea, I am like the weeping-willow growing in the garden;
As I grow I bend low to the ground.

Daqiánús was an ancient mythical king of Persia.
The adjective "belonging to the days of *Daqiánús*"
is commonly used in the sense of "patriarchal,"
"antiquated." *Line 4*: that is, in humility.

59.

Think not that I am afraid of the world that is to come,
That I fear death, or the uprooting of my life.
Since death is sure, why should I fear it?
I worship myself—and it is that which I dread.

This quatrain may have been uttered by the
Shaikh on his death-bed. The sentiments are ex-
actly paralleled by several of the reported sayings
of his last days. While he felt a passing regret at
having to "set his face to the journey, and fold up
the carpet of love," yet in death he found true
unification; it was but "a curtain hiding the com-
munion of Paradise."¹ And he asked his disciples
to recite over his grave the following lines:—

¹ *Díwán-i-Shams-i-Tabríz* xxv.

دوست بو دوست رفت یار بر یار
خوشتو از این هیچ نبود در جهان کار

Can there be anything better in life than its
end,
When lover is joined to beloved, and friend to
friend ?

Line 4.—Shortly before his death he called one Hassan i-Muaddab to his bedside, and said to him:—"Remember that I called you not to self; I called you to the denial of self."¹

60.

Heartless She is, I know, and seeks excuses ;
Though I do not suffer, yet I know Her cruel ways.
Tyranny and injustice are Her only trade.
Well, well do I know the ways of my Beloved.

Compare the *Maṣnaví* (page 30. Whinfield's translation).

Let me then, I say, make complaint
Of the severity of that Fickle Fair One.
I cry, and my cries sound sweet in His ear ;
He requires from the two worlds cries and
groans.

(The famous mystical treatise called the *Maṣnaví* was composed by Jalál-ud-dín Rúmí, the greatest of all the Ṣúfis, who lived from A.D. 1207 to 1273).

61.

Nor garden, nor pleasaunce, nor lawn do I want ;
Nor cypress, nor rose, nor jasmine.
I only ask from my God for a retreat
Where I may be alone with Him whom I love.

62.

I had a fever, and I slew it in fire and water.
I killed it in a moment by writing and by spell.
Once again in my sweat I drowned it :
Drowned it, as though it were the hordes of Pharaoh.

¹ See *Hálát-ú Sukhúnán*, pp. 62-70.

63.

Last night when I was passing through the street of my love,
 Knowest thou what business I was after ?
 I was led astray, a victim of her broken promises ;
 I was wandering round the hill of my desire.

64.

Between my friend's two eyes—from nún to mím
 Thou seest an alif drawn on the silvern page of his face.¹
 No-No—I am wrong: by a wonderful miracle
 'Tis the Prophet's finger which has split the moon in two.

65.

For a long time we have been drunk with the wine of Unity
 We have broken the glass of Plurality that these people held
 out to us.
 They talk falsely who say there is 'Annihilation.'
 So long as there is God, we, too, 'exist' in this battle-field of
 life.

A whole treatise might be written round this quatrain which deals with some of the fundamental conceptions of Sufiism. The first hemistich of another of Abú Sa'id's rubá'iyát (211 in 'Abdul Walí's collection) has the same "argument":—

Till you leave Plurality, you cannot reach
 Unity;
 Till you leave your Self, you will never become
 a man of God.

That is, till you cease from regarding the diverse creations of the world as having each a separate identity, you cannot reach the stage when you will be able to realise the essential oneness of all things, and their identity with God; "the offshoots will hide you from the Tree whence they spring" (*Lawáih-i-Jámí*, page 22). 'Self' is one of the phenomena from which you must flee, else you will be blind to your true relationship with the One. This is the "annihilation," or rather "passing away," of Self.

What, then, does Abú Sa'id mean by this denial of that very "annihilation"? He cannot possibly have meant to reject the universal doctrine of

¹ Nún, Mím, and Alif are letters of the Arabic alphabet; the first two characters are like circles, the third is a straight line.

“Faná.” That conception which embraces the idea of “passing away” of all passions and desires, as well as of the cessation of all thought save of God, is, indeed, a basic doctrine of Sufiism.

He must be understood, I think, to be criticising only the extreme doctrine of *total* annihilation of the attributes which some Śúfís regarded as possible: the false theory that when a man’s qualities were annihilated, he entered into God’s. This involved the pernicious heresy of “incarnation” (Hulúl) which was odious to every right-minded Śúfí, who understood by the term “annihilation of attributes” nothing more than the submergence of man’s *will* in God’s, so that he no longer regarded himself, but became entirely devoted to, and conscious of nothing save, God.¹

66.

Appoint me to Thy service, of Thy mercy, O Lord.
 Acquaint me with the truths of Thy peculiar people.
 My heart is oppressed by tyrant Reason,
 Make me mad with Thee, and liberate me.

Line 4.—That is, liberate me from thoughts of other than Thee. “His Service” then “is perfect freedom.”

A dervish once asked Abú Sa’id the meaning of service. He answered: “God created you free; free you should remain”; which he explained by adding:—“Till you are free of the two worlds you will not become His servant.”

Line 3.—Reason is no guide to the truths after which Abú Sa’id was seeking. God is inapprehensible; there is no mark or trace of Him,² and neither knowledge nor conjecture can pierce the mystery, which can be revealed only to what St. Paul calls “spiritual vision.” “In addition to his reason,” says Láhijí in his commentary on the *Gulshan-i-Ráz*, “man has a certain faculty whereby he perceives hidden mysteries. This faculty is evoked by love of the Truth, and ends . . . in Divine illumination.”

This is the “inner light,” or “intellectual vision” of the Platonists.

A well-known story relates how after the great

¹ See Dr. R. A. Nicholson on *Faná* in the J.R.A.S. for 1913.

² ورائی عبارت and بی نشانی (Mansúr-ul-Halláj)

Avicenna had first met Abú Sa'id at Níshápúr, he told his disciples "Abú Sa'id sees all that I know." And Abú Sa'id said of Avicenna "All that he knows, I see."

67.

Turn my thoughts, O Lord, from this world and the next;
Exalt me with the crown of poverty.
Reveal unto me the mysteries in the way of the Quest.
Turn my steps from the road that leads not to Thee.

Mansúr-ul-Halláj was once asked : " What is the way to God ? " He answered : " Two paces, and you have arrived there ; one takes you out of this world ; and the other out of the world to come. Then you are with God."

We are reminded, too, of a passage in the *Gulshan-i-Ráz* which says that the world to come is of no account beside the " quitting of self," when man will be " most rich in uttermost poverty."

68.

Send me, O Lord, to the friend who has understanding,
Bring the sound of my grief to his echoing heart.
I am grief-stricken because of this separation,
Send him to me—and send me to him.

69.¹

A curse upon their impudent frolics !
Their black eyes, and negro forms !
From early evening till the last moment of the night
They are all a-dancing ; and I am the harp they twang !

70.

Hide Thou my evil deeds from the sight of men ;
Smooth for me life's difficulties.
Grant me happiness To-day ; and To-morrow
Do unto me that which befits Thy clemency.

71.

O Lament, if thou hast a voice, declare thyself ;
Inform that heedless drunkard.
O hand of Love and Saintship, come forth :
Help me, O heart of Muhammad's law.

¹ The object of the verse is said to be " to drive away insects and other pests."

72.¹

The sorrows of the world have fallen upon this house of mourning.

They have become the intimate dwellers therein.

O Lord of Thy bounty

Forgive these teeth of mine, by the soul of Uwais-i-Qarani.

73.

O Lord, enrich me with contentment,

Illumine my heart with the light of certainty.

I am burnt; I am perplexed. Fulfil Thou my desires :

But render me not beholden to other men.

Line 4. It is curious how often we come across the same idea in Abú Sa'id. Compare Nos. 6, 17 and 96 in this collection. God is the "*dihanda-yi-bè minnat*"—the giver who, unlike man, claims no return for every service He renders.

74.

Thy face is an ocean of beauty. Thy lips are the coral ;
Thy locks are amber ; thy mouth a shell ; thy teeth are pearls.
Thine eyebrow is a boat which rides on the waves of thy forehead ;

Thy chin is a whirlpool ; and thine eyes a storm.

75.

Until my heart is rejoiced by the ruby of thy lip

I shall do naught but sigh and burn with grief.

Thou said'st 'I shall come to thy house one day.'

When, when will that day be ?

76.

O mighty Creator, O Lord of pity,

Thou who accomplishest the desires of the destitute ;

Make Thou mine enemies subject to me,

And those that know not mercy, to show mercy.

¹ This quatrain is said to be a charm for toothache. For this purpose, it should be written out on a piece of paper which must then be folded into a small wad and packed into the offending cavity !

77.

Alas for the long nights, without Thee!
 Alas for the pain of separation from Thee!
 Thou art asleep in Thy disdain, and I am without Thee,
 I lie alone, fevered and in anguish.

78.

The melancholy of the destitute,
 The ruthlessness of this revolving earth,
 The anxious cares of the troubled in spirit,
 These are all naught—the pain of Love alone matters,

79.

O heart, that art banished from the Friend, weep tears of
 blood.
 O eyes, do ye likewise let an Oxus flow from you.
 O life, thou art not dearer to me than my Friend.
 Without Him I desire thee not—leave me.

80.

Who am I? One who hath set his heart a-fire,
 Whose gaze is fixed on the harvest of love.
 In the street of Constancy I go round like a millstone, restless
 as fire,
 Ever seeking the companionship of a perfect saint.¹

81.

The light of Thee is the source of light of men's eyes ;
 Without Thy light no man's eye hath power to see.
 All men's eyes are turned towards Thee ;
 Because of Thy light there are fountains of light in men's eyes,
 Line 2. "Send out thy light . . . for I am
 idle earth and void till thou illumine me." (*Imita-
 tion of Christ* III. xxvii.)

82.

Thou art pure and sinless, and without equal ;
 No man hath possessions like unto this fair world of Thine ;
 All men are asleep ; Thou art awake.
 O Lord, open the door of Thy mercy to us.

¹ Line 4 *سوخنة* literally means "one who is burnt," that is, in the fire of love; or one whose passions are burnt out.

83.

O Lord, my God, mighty Creator,
 How long shall I journey from door to door, from place to
 place?
 Either shut Thou against me once and for ever the dwelling of
 Hope,
 Or unlock for me now the door of my endeavours.

84.

O Thou who beatest down the enemy's pride,
 And sweepest away the rubbish of the age,
 My heart is oppressed, O Lord, by these miscreants.
 Confound them, and plunge them in tumult and disaster.

85.

Thou gavest me a dwelling in Thy street, and a refuge,
 A place at the feast of union with Thee
 In short—with a hundred sweet endearments
 Thou didst make me love Thee; Thou dravest me into the
 desert.

Compare the *Imitation of Christ* III. xi:—"But what art thou to thy lovers? . . . verily the sweetness of thy contemplation that thou grantest to thy lovers is unspeakable. . . . When I was not, thou madest me, and when I erred from thee, thou leddest me again . . . and thou commandest me to love thee."

Line 4. That is to the "secret places" in which, says à Kempis, "the great holy men, where they might, fled men's fellowship and chose to live in God." (I. xx).

86.

O Sovereign of the two worlds, help us,
 Give aid to our weakness and distress.
 O Lion of God come quickly to our appeal;
 To whom shall I cry save to thee who art our helper?

87.

Poverty and Need Thou hast made my companions,
 Thou hast made me want for an evening's loaf.
 This is the rank of those who are near Thy door.
 Why hast Thou so dealt with me? What service have I done
 Thee, O Lord.

“My need is that I should need nothing,” said Abú Sa'id.

Junayd of Baghdád thus explains why he adopted Šúfiism:—“I have not taken up this Šúfiism for debate nor for strife and contention; but it is hunger we seek and sleeplessness; we would renounce the world, and sever ourselves from that which we have loved, and which has seemed pleasant in our eyes.”

بسکندر و سلیمان بپرای صبا پیامی
بشماست ملک و دولت من و ملک بینوائی

“To the sovereigns of the world bear this message, O morning breeze,
‘To you belong empire and riches; mine is the kingdom of Destitution.’” (Íraqí.)

88.

A chain for the neck of this generation!
Destruction for this stiff-necked people!
These crows have flown high enough in their pride.
Sticks for them, and stones; the knife and gun and arrow!

89.

Knowest thou wherefore at the first pale streak of dawn
The cock so sadly croweth?
Why, the mirror of the Dawn telleth thee
That one more night of thy life hath passed, and thou art still
heedless.

Compare Jalál-ud-dín Rúmí in the *Maṣnaví*
(p. 294).

. . . “Whosoever passes away from the world
Does not grieve and lament over his
death,
But grieves ever over lost opportunities.”

90.

Hurt not my heart that lives only for thee,
Thou art its open and its secret love.
I am afraid lest by reason of thy oppression
My heart should turn to blood, while thou art within it.

91.

O Lion of God, prince Haidar, give me victory.
 O opener of forts, open the gate of our Khaibar.
 The doors of hope were shut in my face ;
 O Lord of Zulfiqár and Qambar give me victory.

Haidar (the lion) : a name given to 'Alí because he slew a snake when an infant in swaddling clothes.

Khaibar : a fort near Medina which Muḥammed captured from the Jews in A.H. 6.

Zulfiqár : the name of a sword taken by Muḥammed at the victory of Badr, and given by him to 'Alí

Qambar : a freedman of 'Alí's.

92.

O Thou who knowest the sorrows of the sorrowful,
 And canst give ease and balm to those in anguish :
 Why should I tell Thee of the state of my heart,
 Who knowest, though no word is uttered, of a myriad such as mine.

Compare the *Maṣnaví* :—

“ The omniscient God needs not to be informed of men's case for He knows all; nor to be reminded of it, for He forgets nothing.”

93.

Thou knowest the burden of the weary in spirit ;
 Full well thou knowest the sorrow of the broken-hearted.
 If from my burning heart I call to Thee, Thou hearest,
 And if I keep silent—Thou knowest the words of the dumb.

94.

Though thou art in Yemen, if thy heart be with me, thou art
 nigh me ;
 If thy heart know me not, though thou art with me, thou art
 in Yemen.
 Such is my nearness to thee, O dear one of Yemen,
 That I am myself in doubt whether I am thou—or thou I.

The poet, who is presumably addressing a friend of his living in Yemen, uses words believed to have been spoken by Mohammed concerning a famous saint, Uwais-i-Qaraní, whom the Prophet is said to have called the “ best of his disciples.”

95.

Let me not lean for succour, O Lord, against any man's door,
 Make me not beholden to King or beggar.
 My black hairs have turned white in Thy beneficence,
 Now that my head is white, make me not black with sin.

96.

Simple am I, and humble and poor ;
 As thou art proud and arrogant and selfish.
 If thou bid me sit on the fire, I shall obey.
 If I humble myself before thee, thou wilt spurn me.

97.

O God, had I the wings of a bird
 Every day I would get tidings of thee a hundred times.
 But for this misfortune which constrains me,
 How could I have torn my eyes from the sight of thee ?

98.

I am in pain; my breast is torn with suffering
 A love I have, and an eye wet with tears.
 A love—but what a love ? one which burns the world ;
 What is my pain ?—a pain that has no remedy.

Compare the lines quoted by Dr. R. A. Nicholson
 in his edition of the *Diwán-i-Shams-i-Tabriz* :—

خدای پہلوی هر درد دارویی داده
 چو درد عشق قدیم است ماند بی ز دوا

“God hath given a physic for every pain
 Since the pain of love is old (eternal), for it
 no remedy hath been found.”

LIST OF ABBREVIATIONS.

- H. Hyderabad MS. of Qádirí-i-Jílání.
- L. Small Lithographed Collection.
- A. The *Atishkada* of Mírzá Latíf 'Alí Azar.
- R. The *Riáz-ul-Arifín* of Rizá Qulí Khán Hidáyat.
- T. The *Tadhkirā-yi-Husseini* of Mírzá Hussein-i-Dúst Sambali.
- RR. The *Rúz-i-Raushan* of Muzaffar Husein-i-Şabá.
- E. Ethé's Extracts.

رباعیات



شیخ ابو سعید ابو الخیر

(۱)

باز آ باز آ هر آنچه هستي باز آ گر کافر و گبـرو بت پوستي باز آ
این درگه ما درگه نومیدی نیست صد بار اگر توبه شکستی باز آ

(۲)

نسیمـا جانب بستـان گذر کن بگو آن فـازنین شمشاد ما را
به تشریف قدوم خود زمانے مشرف کن خراب آباد ما را

(۳)

گفتم صمما لاله رخا دلدارا در خواب نما چهره باری ما را
گفتا که روی بخواب بے ما وانگه خواهی که دگر بخواب بینی ما را

(۴)

خداوندا بگردانی بلا را ازین آفت نگهداری تو ما را
بعق آن دو کیسوی محمد^ص زبون گردان زبردستان ما را

1. H.

2. H.

3. H. T. E. This is metrically not a rubá'í.

4. H. T.

(۵)

وا فریادا ز عشق وافر—ریادا کارم بیکی ط—رفه نگار افتادا
بگر داد من شکسته دادا دادا ور نه من و عشق هرچه بادا بادا

(۶)

یا رب بمعتمد و عالی و زهرا یا رب بعسین و حسن آل عبا
از لطف بر آر حاجتم در دوسرا بی منت خالق یا عالی الا علی

(۷)

ای دلبر ما مباش بی دلبر ما یکدلبر ما به از دو صد دلبر ما
نه دلبر ما نه دلبر اندر بر ما یا دلبر ما فرست یا دلبر ما

(۸)

صد شکر که گلشن شفا گشت تخت صحت گل عیش ریخت در پیرهن ات
تب را بغلط در تخت افتاد گذار منت که عرق شد و چکید از بدنت

(۹)

پیده در گاو است و گاو در کسار است ماهی سریشمی بدریبار است
بز در کوهست و یوز در بلغار است زه کردن این کمان بسی دشوار است

(۱۰)

آن یار که عهد دوستداری بشکست میرفت و مدش گرفته دامن در دست
میگفت که بعد ازین بخوابم بینی بیداشت که بعد ازین مرا خوابی هست

5. H. Metrically incorrect. This, like No. 3, is in the *hazaj* metre.

6. L. T.

7. L. T.

8. H. T.

9. H. A. R. In the second and third *misras* I adopt the reading of R.

10. H. The original text was

نخوام بینی - پیداست که بعد ازین مرا خوابی هست *

which is meaningless. I am indebted to a Persian friend for the emendation.

(۱۱)

تیری ز کمان خانۀ ابروی تو جست دل پیرتوی وصل را خیالی می بست
خوش خوش ز دلم گذشت و میگفت بنام ما پهلوی چون توی نخواهیم نشست

(۱۲)

آنرا که قضا ز خیل عشاق نوشت آزاد ز مسجد است و فارغ ز کاشت
دیوانۀ عشق را چه هجران چه وصال از خویش گذشته را چه دوزخ چه بهشت

(۱۳)

ای دل همه خون شوی شکیبائی چیست وی جان بدر آیین همه رعنائی چیست
ای دیده چه مردمیت شرمت بادا نا دیده به حال دوست بیفائی چیست

(۱۴)

دل عادت و خوی جنگ جوی تو گرفت جان گوهر همت سر کوی تو گرفت
گفتم بخط تو جانب ما را گیر این هم طرف روی نکوی تو گرفت

(۱۵)

در وصل ز اندیشه دوری فریاد در هجر ز درد ناصبوری فریاد
افسوس ز محرومی دیدار انوس فریاد ز درد ناصبوری فریاد

(۱۶)

دل از نظر تو جاودانی گردد غم با الم تو شادمانی گردد
گر باد بدوزخ برد از کوی تو خاک آتش همه آب زندگانی گردد

11. H.

12. H.

13. H. The text has *با* in line 4; *نا* is obviously the correct reading.

14. H.

15. H.

16. H.

(۱۷)

طالع سر عافیت فروشی دارد همت هوس پلاس پوشی دارد
 اینجا که یک سوال بخشند دو کون استغنا ایم سر خموشی دارد

(۱۸)

ابن کیدی گبر از کجا پیدا شد این صورت قبر از کجا پیدا شد
 خورشید مواز چشم من پنهان کرد این لگنه ابر از کجا پیدا شد

(۱۹)

آن دشمن دوست بود دیدی که چه کرد تا اینکه بغور او رسیدی که چه کرد
 میگفت همان کدم که خواهد دل تو دیدی که چه میگفت و شنیدی که چه کرد

(۲۰)

زان خوبتری که کس خیال تو کند یا همچو منی فکر حال تو کند
 شاید که ناآفرینش خود نازد ایزد که تماشای جمال تو کند

(۲۱)

عاشق که تواضع نماید چه کند شبها که بکوی تو نیاید چه کند
 گر بوسه دهد بزلف تو رنجه مشو دیوانه که زنجیر نجوید چه کند

(۲۲)

مردان رهش میل بهستی نکند خود بینی و خویشان پرستی نکند
 آنجا که مجروران حق می نوشند خمخانه تپی کفند و مستی نکند

17. H. T.

18. L. T.

19. H.

20. H.

21. H.

22. H. T. R. T. gives the reading میل بهستی which is, I think, preferable to the میل بهستی of H.

R. ascribes this quatrain to one Sanjar-i-Kháfí (ob. A.D. 1592).

(۲۳)

این عمر بابر نو بهاران ماند این دیده بسیل کوهساران ماند
ای دوست چنان بزی که بعد از مردن انگشت گزیدنی بهاران ماند

(۲۴)

مردان خـ ۱۵ ز خاکدان دگرند مرغان هوا از آشیان دگرند
منگر تو ازین چشم بدیشان گایشان فارغ ز دو کون و در مکان دگرند

(۲۵)

ای باد بخای مصطفـ^ص آیت سوگند باران به علی^ع مؤتضـ^ع آیت سوگند
افزاده بگریه خلق بس کن بس کن دریا به شهید کولایت سوگند

(۲۶)

اول که دلم عشق نگارم بر بود همسایه من ز ناله من بغم بود
اکنون کم شد چو ناله در دم بغزود آتش چو همه گرفت کم گردد دود

(۲۷)

گویند بعشـ^ر گفتگو خواهد بود وان یار عزیز تند خو خواهد بود
از خیر معضـ^ر جز نکـ^{وی} ناید خوش باش که عاقبت نکو خواهد بود

(۲۸)

اول رخ خود به ما نبایست نمود تا آتش ما جای دگر گردد دود
اکنون که نه بودی و ربودی دل ما ناچار ترا دلبر ما باید بود

23. H. R. R. ascribes the quatrain to Adá-yi-Yazdí.

24. L.

25. H.

26. H. This quatrain has to be amended pretty considerably.

In *misra* (1) H. has .. اول که مرا دل ; in (2) بغنود ; and in (3) خون, all of which are clearly incorrect.

27. H. Identical with No. 193 in Whinfield's Omar Khayyám.

28. H.

(۲۹)

هوگزدلـم از ياد تو غافل نشـود گر چـان برود مهر تو از دل نرود
افتاده ز روی تو در آئینه دل عکسی که به هیچ وجه زایل نشود

(۳۰)

پیریم ولی عشق چو دمساز آید هذگام نشاء و طرب و ناز آید
از زلف رسائی او کمندی نگذیم برگردن عمر رفتـه تا باز آید

(۳۱)

در باغ روم گویند تو ام یاد آید برگـلـ نگویم رویتـو ام یاد آید
در سایه سرد اگر دمی بخشـیم سرو قد دلجـوی تو ام یاد آید

(۳۲)

من صرفه برم که بر صقم اعدا زد مشتـی خاشاک لطمـه بر دریا زد
ما قیغ برهنده ایم در دست قضا شد کشته هر آنکه خویش را بر ما زد

(۳۳)

دلبر دل خسته رایگان میخـواهد بفرستم گر دلش چنان میـخواهد
و آنکه، نظاره دیده بر راه بنـم تا مرده که آورد که جان میـخواهد

(۳۴)

ای خواجه ز فکر گور غم می باید اندر دل و دیده سوز و نم می باید
صد وقت بر وی کار دنیـا اداری یک وقت بفکر گور هم می باید

(۳۵)

حـوران بنظـاره نگارم صف زد رضوان ز تعجب کف خود بر کف زد
آن خال سیاه بر آن رخاں مطرف زد ابدال ز بیم چنگ در مصـرف زد

29. H.

30. H.

31. H.

32. H. T.

33. H.

34. H.

35. H.

(۳۶)

روزی که چه مال دلبرم دیده شود از فرق سرم تا بقدم دیده شود
تا من به زار دیده رویش نگرم آری بدو دیده دوست کی دیده شود

(۳۷)

جائیکه تو باشی اثر غم نبود آنجا که نباشی دل خرم نبود
انرا که ز فرقت تو یک دم نبود شادیش زمین و آسمان کم نبود

(۳۸)

گفتم چشمم گفت براهش میدار گفتم جگرم گفت باهش میدار
گفتم که دلم گفت چه داری در دل گفتم غم تو گفت نگاهش میدار

(۳۹)

یا رب بکش شاگردی ز کار من زار رحمی که ز خلق عاجزم در همه کار
جز درگاه تو کی بودم درگاهی معروم ازین در نکام ای غفار

(۴۰)

یا رب بدو نور دیده پیغمبر^ص یا رب بدو شمع دودمان^ع حیدر
بر حال من از عین عنایت بنگر دارم نظری آنکه نیفتم ز نظر

(۴۱)

در بزم تو ای شوخ صام زار و اسیر در کشتن من هیچ نداری تقصیر
با غیر سخنی کنی که از رشک بسوز سویم نکنی نظر که از غصه بمیر

36. H.

37. H. This is also quoted in the *Asrar-ut-Tauhid* among a number of miscellaneous verses of Abú Sa'íd's.

38. H.

39. L.

40. H. T.

41. H.

(۴۲)

دل جزیره عشق تو نپـوید هرگز جز محنت و درد تو نجـوید هرگز
صحرای دلم عشق تو شورستان کرد تا مهر دگر کسی نروید هرگز

(۴۳)

ای سرتو در سینه هر صاحب راز پیوسته در رحمت تو بر همه باز
هر کس که بدرگاه تو آید بنیـاز مهر و موم ز درگاه تو کی گردد باز

(۴۴)

دارم دلکی غمین بیامرز و مپـرس صد واقعه در کمین بیامرز و مپـرس
شومنده شوم اگر بپـرسی عملـم یا اکرم اکرمین بیامـرز و مپـرس

(۴۵)

ای جمله یکسان عالم را کس بکجو کرمت تمام عالم را بس
من بیکم و تو بیکسان را یاری یا رب توفـریاد من بیکس رس

(۴۶)

ای واقف اسرار ضمیر همه کس در حالت عجز دستگیر همه کس
یا رب تو مرا توبه ده و عذر پذیر ای توبه ده و عذر پذیر همه کس

(۴۷)

اندر صف دوستان ما باش و متوس خاک در آستان ما باش و متوس
گر جمله جهان قصد بجان تو کنند فارغ دل شو از آن ما باش و متوس

42. H. E. R.

43. H. But this belongs more probably to Şaif-ud-din-i-Bakharzî, a celebrated Sufi, who died in 1259 A.D. It is the first of 51 quatrains contained in the old and unique copy of his rubá'iyát in the Bankipore Oriental Library.

44. H. E.

45. L.

46. H. Identical with No. 276 in Whinfield's Omar Khayyám.

47. H. R. R. ascribes this to Muḥammad Nasavî.

(۴۸)

در سیده توئی و گر نه جیـهون کنـمش در سیده توئی و گر نه پر خون کنـمش
امید وصال تست جانرا ورنه از تن بهزار حیلـه بیرون کنـمش

(۴۹)

دل کرد بسی نگاه در دفتر عشق جز روی خوشت ندیده اندر خورعشق
چندانکه رخت خال نهد بر سر حسن شوریده دلم عشق نهد بر سرعشق

(۵۰)

خالقان همه بر درگهت ای خالق پاک هستند پی قطره آبی غمناک
سقای سحاب را بفـرما از لطف تا آب زند بر سر این مـشتی خاک

(۵۱)

حق تعالی که مالک الملک است لیس فی الملک غیره مالک
میرساند بیدگرم را انسه قـادر علی ذالک

(۵۲)

یا مَنْ بِكَ حَاجَتِي وَ رُوحِي بِيَدَيْكَ عَنْ غَيْرِكَ أَعْرَضْتُ وَ أَقْبَلْتُ إِلَيْكَ
مَالِي عَمَلٌ مَالِحٌ اسْتَظَّهِرُ بِهِ قَدْ جَدِّكَ رَاجِدًا تَوَكَّلْتُ عَلَيْكَ

48. H. E. This quatrain which Ethé found in an anonymous and undated collection of rubá'iyát of ancient and modern poets (the most modern quoted is Mauláná Sháhábí-i-Astarábádí who died in 1601 A.D.) in the India Office Library is attributed by the *Majális-ul-Ushsháq* (composed in 1502 A.D.) to Hakím-i-Sanáí. But see the note to the translation.

49. H. E. This quatrain has been taken by Ethé from the same collection as No. 48, the India Office MS. (I.O. 1265). It is also found in the *Majális-ul-Ushsháq* where it is described as one of "Some strange quatrains expressing the extremity of devotion" contained in the Imámí Ghazálí's "*Shawániq-ul-Ushshaq*." Ghazálí died in 1111 A.D.

50. H.

51. H. T. This is not a correct quatrain. The first *misra* does not rhyme with the 2nd and 4th; and it is not in any of the *rubá'í* metres.

52. L. T.

(۵۳)

دستیکه زدی بناز در زلف تو چنگ چشمیکه ز دیدنت ز دل بردی زنگ
 آن چشم بشت بی تو ام چه ره بخون این دست بکوفت بی تو ام سینه بسنگ

(۵۴)

بر چه ره ندارم ز مسلمانان رنگ دارد بر من شرف سگ اهل فرنگ
 آن روسیه ام که باشد از بودن من دوزخ را ننگ و اهل دوزخ را ننگ

(۵۵)

آزده ترم گرچه کم آزار ترم بی یار ترم گر چه وفادار ترم
 با هر که وفا و صبر بیشش کورم سبحان الله بچشم او خوار ترم

(۵۶)

نظری فکن بحالم که ز دست رفت کارم یکسم مکن حواله که بجز نوکس ندارم
 تو چو صاحب عطا ئی طلب من است از تو چو توغالبی بهر کس بنو خویش می سپارم

(۵۷)

گر دست تضرع بدعا بر دارم بدیخ و بن کوهها ز جا بردارم
 لیکن ز تفضلات معبود احد فاصب و صبراً جمیلاً از بردارم

(۵۸)

مشهور و خفی چو گنج دقیانوسم پیدای و نهان چو شمع در فاسوسم
 القصه دین چمن چو بید مجنون میدالم و در ترقی معکوسم

53. H. E. An example of the *San'at-i-qalb*.

54. H.

55. H.

56. H. Metrically incorrect.

57. H. T.

58. H.

(۵۹)

تاظن بنری کز آن جهان می ترسم و ز مردن و ز کندن جان می ترسم
چون مرگ حقیقت من چرا ترسم ازو من خویش پرستم و از آن می ترسم

(۶۰)

بی مهری آن بهانه جو میدانم بی درد و سقم عادت او میدانم
جز جور و جفا عادت آن بد خونی من شیوه یار خود نکو میدانم

(۶۱)

بی باغ نه بستان و چمن میخوام بی سرو نه گل نه یاسمن میخوام
خواهم ز خدای خویش کنجی که دران من باشم وان کسی که من میخوام

(۶۲)

تب را کودم در آب و آتش کشتم یکچند بتعویند و کد-ابش کشتم
بازش یکبار در عرق کردم غرق چون لشک-و فرعون در آبش کشتم

(۶۳)

دیشب که بکوی یار میگ-ودیدم دانی که پی چه کار میگ-ودیدم
قربان خلاف وعده اش میگشتم گرد س-و انظ-ار مید-ودیدم

(۶۴)

ما بین دو عین یار از اون تا میم بیمنی الفی کشیده بر صفحه سیم
نی بی غلظم که از کمال اعجاز انگشت نبی است کرده مه را به دو نیم

59. H. Very similar to No. 319 in Whinfield's Omar Khayyám.

60. H.

61. H.

62. H. T. T. gives what must in the main be the correct reading.

H. in *mishra* (2) has میانش, which makes no sense.

63. H.

64. H.

(۶۵)

مدتی هست که ما از خم وحدت مستقیم شیشه کثرت این طایفه را بشکستیم
اینکه گویند غذا هست غلط می گویند نا خدا هست درین معرکه ما هم مستقیم

(۶۶)

یا رب ز کمال لطف خاصم گردان واقف بحدت ایق خواصم گردان
از عقل جفا کار دل افکار شدم دیوانه خود کن و خلاصم گردان

(۶۷)

یا رب ز دو کون بی نیازم گردان از افسر فقر سر فوازم گردان
در راه طلب محرم رازم گردان راهی که نه سوی تست بازم گردان

(۶۸)

یا رب تو مرا بیار دم از رسان آوازه درد من هم آواز رسان
آنکس که من از فراق او غمگین ام اورا به من و مرا باو باز رسان

(۶۹)

فویاد ز سنک روی و رنگی شان و ز چشم سیاه و صورت زنگی شان
از اول شب تا بدم آخر شب اینها همه در رقص و منم چنگی شان

(۷۰)

افعال بدم ز خلق پنهان میکنند دشوار جهان بر دلم آسان میکند
امروز خوشم بدار و فردا با من آنچه از کرم تو میسزد آن میکند

65. H. Metrically incorrect.

66. H.

67. H. I. This is quoted by Jami in his *Lawāih* (Whinfield's translation, p. 19) without any indication as to its authorship.

68. H. T. E.

69. H. The original of *migra* (1) is فویاد ز سبک روی این رنگی شان which does not scan.

70. L. T.

(۷۱)

ای ناله گرت دمیت اظهاری کن و آن غافل مست را خبرداری کن
ای دست محبت و ولایت بدر آ وای باطن شرع مصطفیٰ کاری کن

(۷۲)

نقداده بهم بگوشه بیست حزن عمهای جهان عونس غمخانه من
یا رب تو بفضل خویش دندان مرا بخشای بروح حضرت و بس قرن

(۷۳)

یا رب رقت اعظم توان گوگردان و ز نور یقین دلم مذور گردان
احوال من سوخته سر گردان بی صفت مخلوق میسر گردان

(۷۴)

رویت دریای حسن و لعلت مرجان زلفت عنبر صدف دهان در دندان
ابرو کشتی و چین پیشانی موج گرداب بلا غنغب و چشم طوفان

(۷۵)

قامل تو دلفروز خواهد بودن کارم همه آه و سوز خواهد بودن
گفتی که بخانه تو آیم روزی آن روز کدام روز خواهد بودن

(۷۶)

ای خالق ذوالجلال وی رحمان تو سامان ده کار بی سرو سامان تو
خصمان مرا مطیع من گردان تو بیرحمان را رحیم من گردان تو

(۷۷)

شبهای دراز ای دریغا بی تو دردی و فراق ای دریغا بی تو
تو خفته بنواز ای دریغا بی تو من در تب و تاب ای دریغا بی تو

71. H. T. *دمیت* in line 1 comes from T. H. has *دلیمت*.

72. H. T.

73. L. E.

74. H.

75. H.

76. H. T.

77. H.

(۷۸)

سو دای سربى سرو سامان یک سو بی مہری چرخ دور گردان یک سو
اندیشہ خاطر پریشان یک سو اینها همه یک سو غم جانان یک سو

(۷۹)

ای دل چو فراق یار دیدی خون شو وی دیدہ موافقت بکن جیعون شو
ای جان تو عزیز تر نی از یارم بی یار نخواہمت ز تن بیرون شو

(۸۰)

من کیستم آتش بدل افروختہ برخوردار من عشق چشم خود دوختہ
در راه وفا چو سزگ و آتش گردم شاید کہ رسم بصحبت سوختہ

(۸۱)

ای چشم تو چشم چشمہ چشم همه بی چشم تو نور نیست در چشم همه
چشم همه را نظر بسوی تو بود از چشم تو چشمہ است در چشم همه

(۸۲)

پاکی و منزهی و بی ہمتای کس را نبود ملک باین زیبای
خالقان همه خفته اند خود آگاہی با رب تو در لطف بما بکشای

(۸۳)

ای خالق ذوالجلال ای بار خدای تا چند روم در بدر و جای بجای
یا خانہ امید مرا در بر بند یا قفل مہمات مرا در بکشای

(۸۴)

یا سرکشی عدو را سر کوبی یا خار و خسی زمانہ را جاروبی
بگرفت دلم ازین خسیان یا رب حشوی نشوری قیامت آشوبی

78. H.

79. H.

80. L.

81. H. T.

82. H. T. E. RR.

83. H. L. E. T.

84. H. T.

(۸۵)

در کوی خودم مسکن و ماوا دادی در بزم وصال خود مرا جا دادی
 القصه بصد کرشمه و ناز مرا عاشق کردی و سر بصد مرا دادی

(۸۶)

ای شاه ولایتِ دو عالم مددی بر عجز و پویشانیِ عالم مددی
 ای شیر خدا زود بفریادم رس جز حضرت تو پیش که نالم مددی

(۸۷)

با فاقه و فقر همنشیدم کردی محتاج یک نان شینم کردی
 این مرتبه مقربان در تست یا رب بچه خدمت این چندم کردی

(۸۸)

با گوردن روزگار را زنجیری یا سر کشی زمانه را تدبیری
 این زاغوشان بسی پر بدند بلند سنگی چوبی گزی تفنگی نیری

(۸۹)

هنگام سفیده دم خروس سعری دانی که چرا همی کند نوحه گری
 یعنی که نمودند در آئینه صبحم کز عمر شبی گذشت و تو بیخبری

(۹۰)

نآزار دلیرا که تو جانش باشی معشوقه پیدا و نهانش باشی
 زان میت رسم که از دل ازای تو دل خون شود و تو در میانش باشی

85. H. R. E.

86. H.

87. H. E. I have also found this quatrain in a collection of Ansári's *rubá'iyát*.

88. H. Line 2 has بدسری . تدبیری is an obvious emendation.

89. L. T. This is No. 463 of Whinfield's Omar Khayyám. It is one of the so-called "Wandering quatrains"—that is to say, the quatrains, 82 in number, which Zhukovski found "wandering" through various *diwans* and anthologies, acknowledging no definite authorship. (See J.R.A.S. 1908).90. H. A. E. The readings differ. I have adopted that of the *Atishkada*.

(۹۱)

ای شیرخدا امید و حیدر فتعی وی قلعه کشای باب خیدر فتعی
درهای امید بر رخم بسته شده ای صاحب ذوالفقار و قذیر فتعی

(۹۲)

ای آنکه تو درد دردمندان دانی درمان و علاج مستمندان دانی
حال دل خویش را چه گویم با تو ناگفته تو صد هزار چندان دانی

(۹۳)

کمی تو که حال خسته حالان دانی احوال دل شکسته بالان دانی
ور خوانمت از سینه سوزان شنوی و مردم نوزم زبان لالان دانی

(۹۴)

گر در یمنی چه با منی پیش منی گر پیش منی چه بی منی در یمنی
من با تو چنانم ای نگار یمنی خود در غلطم که من تو ام یا تو منی

(۹۵)

یارب در خلق تکیه گاهم نکنی محتاج گدا و بادشاهم نکنی
صوی سیه ام سفید کسودی بکرم با صوی سفید روسیاهم نکنی

(۹۶)

از سادگی و سلیمه و مسکینه و از صر کشی و تکبر و خود بیایی
بر آتش اگر نشانیم بنشینم بر دیده اگر نشانمت نه نشینی

(۹۷)

حقا که اگر چو مرغ پر داشمی روزی ز تو صد بار خبر داشمی
این واقعه ام اگر نبودی در پیش کی دیده ز دیدار تو برداشمی

91. H. T.

92. H.

93. H. A. T.

94. L. T.

95. H.

96. H. Metrically incorrect.

97. H.

(۹۸)

دردی داریم و سینۀ بریانی عشقی داریم و دیدۀ گریانی
 عشقی چه عشق عالم سوزی دردی چه درد درد بی درمائی

98. H.

(مطبوعه بیست و نهمین پرسی کلکنه)

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15. Notes on the Pollination of Flowers in India.—
Note No. 8, Miscellanea.

By I. H. BURKILL.

Into my Indian diary many unpublished observations on flower pollination have been written, which I propose now to set out by way of concluding this series of notes.¹ The dates of the observations and the place will be given in every case that others may test seasonal and climatic departures in the behaviour of both flowers and visitors.

Birds visiting flowers.

The late D. D. Cunningham in his "*Some Indian Friends and Acquaintances*" (London 1903), p. 129, records that the common Honeysucker—*Arachnechthra zeylonica*—is a frequent visitor in Calcutta to the flower of *Hamelia patens*, Jacq., going from blossom to blossom, its long bill dusted with the pollen. He repeated this statement in his "*Plagues and Pleasures of Life in Bengal*" (London, 1907), pp. 23 and 275. In the first book (p. 130), he adds that the birds also visit *Haematocephala Hodgsoni*, meaning *Calliandra haematocephala*, Hassk.,² *Hibiscus rosa-sinensis*, Linn., and *Erythrina*, in the second book (p. 275) that they visit *Duranta*.

This same little bird has been seen by me also on the flowers of *Hibiscus rosa-sinensis*, Linn., and on those of *Ruselia juncea*, Jacq., at Pusa, Tirhut (3-viii-07). To the latter it paid particular attention.

Again I have a letter (dated Cawnpur, 1-x-07) from Mr. H. Martin Leake, in which he writes that he had frequently seen it on cotton flowers—*Gossypium*—visiting flower after flower,

¹ No. 1. The pollination of *Thunbergia grandiflora*, Roxb. in Calcutta. Journal, ii, 1906, pp. 511-514.

No. 2. The pollination of *Corchorus* in Bengal and Assam. Journal, ii, 1906, pp. 515-520.

No. 3. The mechanism of six flowers of the North-West Himalaya. Journal, ii, 1906, pp. 521-525.

No. 4. On cotton in Behar. Journal, iii, 1907, pp. 517-526.

No. 5. Some autumn observations in the Sikkim Himalaya. Journal, iv, 1908, pp. 179-195.

No. 6. The spring flora of the Simla Hills. Journal, iv, 1908, pp. 197-231.

No. 7. A few observations made in the Central Provinces and Berar. Journal, vi, 1910, pp. 101-107.

² Knuth observed a honey-bird visiting this flower in Java, as well as several large bees and a butterfly (*Handbuch der Blütenbiologie*, iii, part 1, p. 352).

hanging on to the stem if the flower faced laterally or was pendent, but never resting its whole weight, its wings all the time in motion.

Another bird, the Purple Honeysucker, *Arachnechthra asiatica*, is the more common species in drier parts of India, and has been seen by me on the flowers of the orange,—*Citrus Aurantium*, Linn.,—and the Hollyhock—*Althaea rosea*, Cav.—in Lahore (16-iv-07).

Three of the above plants—*Erythrina*, *Russelia*, and the orange—may be stated to have in common one special adaptation for attracting birds to their flowers, namely their excessively abundant honey. The others are not so specialised, and are to be classed rather as bee-flowers, under which head some will be referred to again.

An obvious bird-flower, but to which no bird-visits have been recorded, is *Mezoneurum cucullatum*, W. and A. Its blossoms

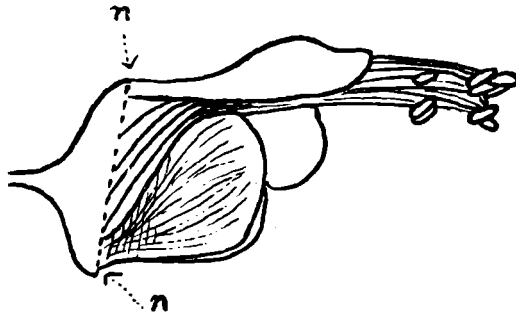


FIG. 1.—Flower of *Mezoneurum cucullatum* $\times 2$, two sepals and one petal having been removed to show the wide nectary which extends from *n* to *n*. The figure also shows the absence of a landing stage for insects.

contain an extraordinary amount of honey, just as do those of *Erythrina*; and they are so constructed as to afford but a poor foothold; such we know is not required by the honeybirds, nor by the similar humming birds of America. The annexed figure shows the extensive nectary and the small size of the lower parts of the flower. Many flowers are mature together; and when open the bees, *Apis indica*, F. (Pursua, Nepal terai, 26-xi-07; Bhainsa Duhan, Nepal, 1-xii-07) and *Apis florea*, F. (Kobo, Upper Assam, 5-xii-11) flock to them, the latter collecting pollen as well as taking accessible honey.

Momordica cochinchinensis, Spreng, also appears to be a bird-flower. The sexes are separated, so that an external agent is required to bring about fertilisation. The visitors find an abundance of honey in the rather large slipper-like boxes within the floor of flower, each covered by a lid. Nearly the whole of the bottom of these boxes is a rounded orange-coloured

nectary. The same orange colour marks the position of the box on the outside, the other parts of the base of the flower being grey. At Dinajpur (14-viii-09) where these observations were made, there had been formed an abundance of fruit. Two *Calliphora* flies were seen in the flowers.

Sphingid-flowers.

Datura fastuosa, Linn., is certainly a Sphingid-flower; but, as it persists through the day, other insects may visit it. Its

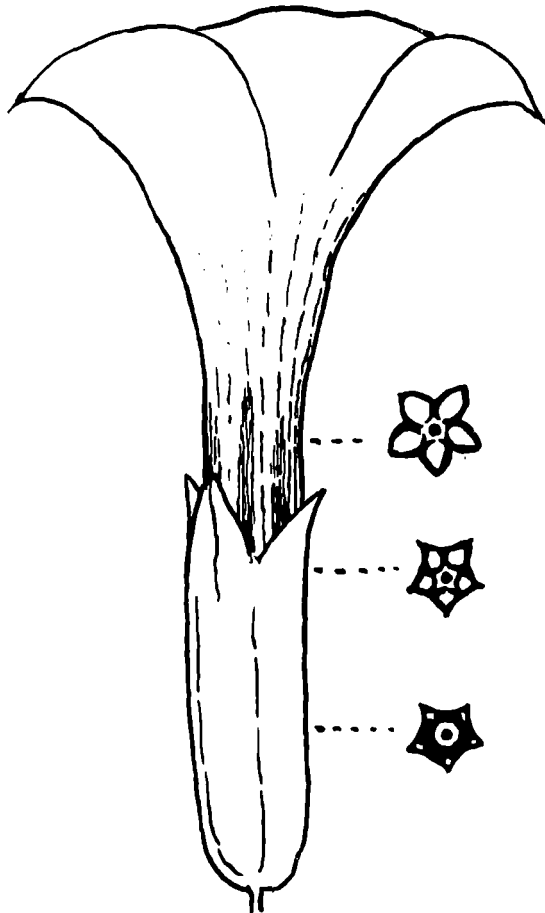


FIG. 2.—Flower of *Datura fastuosa*, reduced to $\frac{2}{3}$ nat. size, with sections indicating the nature of the deep pits containing the honey.

large flowers open at nightfall, and last for 20—24 hours. When they open, the anthers have already dehisced; these and the stigma lie a little below the level of the mouth of the corolla. Honey is plentiful in the lower part of five gradually contracted channels made by the adhesion of the filaments to the corolla. The figures on the preceding page show their nature and size.

The smell of the flowers is peculiar. In Calcutta (3-ix-01) an individual *Anthophora zonata*, L., was seen to settle on the anthers, to leave and return, to repeat this several times, and then to run down the tube, but to dart from the flower immediately in a great hurry as if the smell within forbade nearer approach. *D. fastuosa* fruits freely¹ and doubtless receives suitable visits.

Datura Stramonium, Linn., opens at the same time as *D. fastuosa* (Belgaum, 13-xi-08).

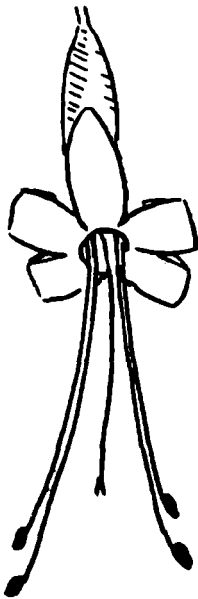


FIG. 3.—Flower of *Oleodendron infortunatum* from above. Nat. size.

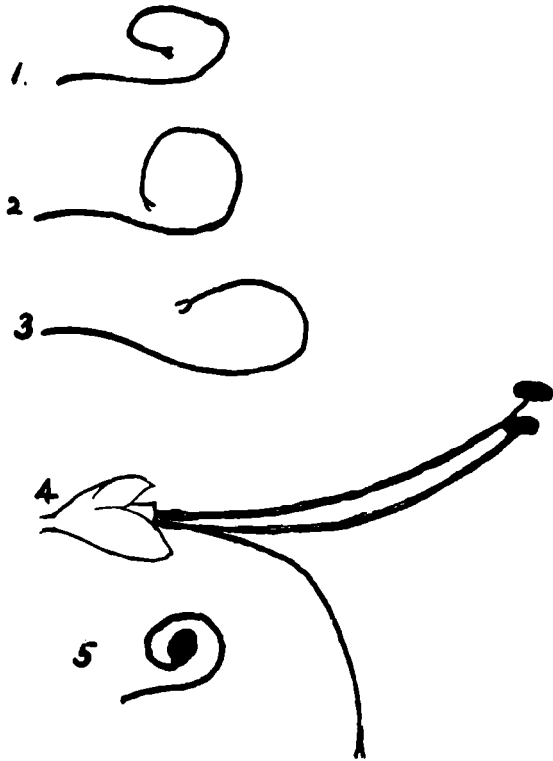


FIG. 4.—Nos. 1-4 indicate successive stages in the movement of the style: in the just-opening bud it is as in No. 1; then it moves through Nos. 2 and 3 to 4. In the just-opening bud, the stamens are as No. 5; then they move to stand as in No. 4. Nat. size.

Clerodendron infortunatum, Gaertn., begins to open its flowers at 7 p.m.; and the process continues into the night. It too has flowers open by day, for their duration is 36 hours or more. Before the corolla-lobes part, the filaments and style

¹ The American *Datura arborea*, Linn., seems to obtain no suitable visits in parts of the Pacific: Crosby recorded (Journ. Linn. Soc., Bot., xxxv, p. 49) that it never fruits in the Friendly Islands, and Hillebrand (Flora of the Hawaiian Islands, 1888, p. 311) that it rarely fruits in the Sandwich Islands.

lie curved: but no sooner does liberation occur than they commence slowly to uncurve, and to move the anthers or stigma to their appropriate places. The process of the uncurving of the stigma is represented in Figure 4 and the resulting position in relation to the anthers, vertically as well as laterally, is indicated if it be considered together with Figure 3, which is the flower from above.

Towards the twenty-fourth hour the style carries the stigma upwards to a position straight in front of the corolla, at the level first assumed by the anthers, and the filaments curve down and roll up loosely on themselves. The tube is 20 mm. long: and the anthers were found to be removed from its mouth by 35—45 mm. in specimens observed at Moulmein (22-ii to 3-iii-04).

The stigma at opening is thrust out beyond the anthers in *Clerodendron serratum*, Spreng. (Belgaum, 14-xi-02).

Differing from the above three flowers in not persisting at all by day is *Trichosanthes palmata*, Roxb.; for its corollas fall very soon after dawn; but on the other hand those of its congener—*T. cucumerina*, Linn.—persist through the day (Nattor, 26-viii-07; Asirgarh, 26-ix-09). Like *T. palmata*, *Gymnopetalum cochinchinense*, Kurz, drops its corolla soon after dawn (Maynaguri, N. Bengal, 27-viii-08): its flowers are very fragrant: but as its corolla is constructed so as to afford a good foothold, and its tube is relatively short, it is rather to be classed as a moth-flower than as a sphingid-flower. Yet another white-flowered Cucurbit—*Cephalandra indica*, Naud., is a bee-flower; but its bell-shaped white flowers, which are visited by *Anthophora zonata* diligently and also by another Apiid for the sake of honey (Calcutta, 18-viii-01 and 15-ix-01) are rather too small for the large *Xylocopas*.

Butterfly Flowers.

Narrow-tubed, upright flowers which afford to their visitors platforms facing the sky are usually suited for the visits of butterflies. The common introduced *Lantana Camara*, Linn., is a particularly good instance of this: for though many rather small flowers stand together, they make an even platform such as a settling butterfly prefers,—a platform where its large wings find ample space. Knuth (*Handbuch der Blütenbiologie*, III, part 2, p. 71) has observed that in Java butterflies are exceeding numerous on this plant.

Two Lycaenids, three Papilios, a Terias and a Hesperid have been recorded by me as visitors to the flowers on 21-vii and 2-viii-01 near Calcutta.

Phlox Drummondii, Hook., and *Verbena hybrida*, a garden hybrid, are two cultivated plants on the flowers of which *Plusia*

chrysis, L., was seen in great numbers (Lahore, 26-iv-07), and a butterfly was also seen on the first named.

Plumbago capensis, Thunb., was visited in a garden in Calcutta (25-x-07) by Sphingids.

In the sixth of this series of papers, I classed *Calotropis procera*, R. Br., as a butterfly-flower on account of its flat corymbiform inflorescence: but further evidence shows it to be bee-flower.

Mussaendas are truly butterfly-flowers and have an appropriate name in Burmese exactly meaning this; but a *Bombus* and a Bombylid fly happen to be the only insect visitors recorded in my notes to *Mussaenda Roxburghii*, Hook. f. Both were visiting for honey (Pedong, Sikkim Himalaya, 6-vi-09, and Dentam 23-v-09).

Compositae and some other massed flowers with hidden honey, whose upright heads are suited for butterflies, etc.

The Compositae vary as regards visitors through wide limits, some even being bird-fertilised, e.g. the Mutisias of South America, but most of the plains' species of India are little specialised. Some Dipsaceae are best classified with the Compositae.

The reader will find lists of visitors to species in the Simla Hills in Note No. 6, to species in the Sikkim Hills in Note No. 5, and to one further species in Note No. 7. The following are additional observations.

Ageratum conyzoides, Linn. DIPTERA. SYRPHIDAE. (1) *Syrphus balteatus*, Deg. Naxalbari, Darjeeling terai, 24-i-11, and Bagdogra, 15-ii-11. LEPIDOPTERA. GEOMETRES. (2) one species, Natran, N. Arakan, 7-i-07.

Anaphalis cinnamomea, Clarke. DIPTERA. SYRPHIDAE. Many individuals of two or three species, Sinchul, Darjeeling, 19-ix-09.

Dipsacus inermis, Wall. LEPIDOPTERA. RHOPALOCERA. *Vanessa urticae*, L., twice sucking honey, Sisagarhi, Nepal, 2-xii-07.

Tridax procumbens, Linn. LEPIDOPTERA. RHOPALOCERA. Many individuals of several species, Chalsa, Duars, 25-viii-07.

Vernonia cinerea, Less. LEPIDOPTERA. RHOPALOCERA. *Lycaena* sp. Jainagar, Nepal border, 29-xi-07.

Vicoa cernua, Dalz. HYMENOPTERA. ACULEATA. *Tetartonia Duvaulcisi*, Lep. Chanseli pass, W. Ghats, 2 and 7-x-09.

Bee-flowers of considerable specialisation.

In the first of these notes it was shown that *Thunbergia grandiflora*, Roxb., is very specially fitted for receiving the visits of the largest of the Indian boring bees—*Xylocopa latipes*, F., and is pollinated by it in Calcutta. Since that note was published I have seen *X. latipes* on the flowers in other places, e.g. Damdim, Duars (21-viii-07); Bombay and Bassein (26-viii-02): and in Singapore it is a very regular visitor. Though fruiting is rare in Calcutta for some reason not explained, ripe fruits have been seen there as well as in several other places.

Other visitors to the flowers which have been observed, are as follows:—HYMENOPTERA. ACULEATA. *X. aestuans*, Lep., Calcutta, 9-ix-07, and *X. flavonigrescens*, Sm., Calcutta, (12-ix-07). LEPIDOPTERA. RHOPALOCERA. One species, Damdim, 21-viii-07. DIPTERA. MUSCIDAE. *Calliphora* sp. feeding on pollen, Gauhati, 12-viii-09, and Goalpara, 3-ix-06.

Curcuma Amada, Roxb., has a flower into which *Xylocopa* creeps, as into those of *Thunbergia grandiflora*: and a species of this genus of bees as well as *Anthophora zonata*, and a third smaller Hymenopteron were observed visiting the blossoms at Dacca (7-v-11). The *Xylocopa* had to use force to make its entry into the throat of the flowers and came out of each copiously dusted with pollen.

Of very different appearance to the last two flowers are those of the genera *Cassia* and *Melastoma*, but the larger are equally dependent on the *Xylocopas* for pollination.

Xylocopa aestuans is a frequent visitor to them. It has been seen on *Cassia occidentalis*, Linn., in Calcutta (18-viii-01, 15-ix-01, 30-ix-01), whose flowers expand just before dawn, and close after dusk. On the flowers of *Cassia Sophora*, Linn., which also close after dusk, have been seen *Xylocopa latipes*, F (Nattor, 26-viii-07), *X. aestuans* (Calcutta, 30-ix-01; Nattor, 26-viii-07); and *Anthophora zonata* (Calcutta, 30-ix-01). On the flowers of *Cassia Tora*, Linn., have been seen *Xylocopa latipes* (Maynaguri, N. Bengal, 23-viii-08), *X. aestuans* (Gauhati, 9-viii-07; Dipu, Duars, 15-viii-06) and unrecognised species of the genus (Pachuria, Central Bengal, 30-viii-07; Kothar under the Akrani Plateau, 1-x-09).

Melastoma malabathricum, Linn., has been seen visited by *Xylocopa* ? *latipes*. (Korokpi, south of Amherst, 11 and 12-iii-08) and *X. aestuans* (Moulmein, 23-ii-08; Jalpaiguri, 5-viii-08). *X. latipes* is an insect which visits it also in Singapore.

Osbeckia crinita, Benth., has been seen visited by *Xylocopa latipes* at Sadiya, Upper Assam (25-viii-09).

In settling on *Cassias* and *Melastomas* the insects use the

stamens which they draw together, and having settled, as there is no honey, they collect pollen. The Cassias do not possess any hollows which promise honey, but *Melastoma malabathricum* possesses ten short dry tubes round the ovary in which the visiting bees may at times seek honey. On the other hand the Cassias have extrafloral nectaries which will be referred to again at a later place.

Both Cassias and Melastomas have received a considerable amount of attention from botanists who have visited the Dutch Indies. All unite in recognising the genera as containing specialised bee-flowers. Knuth, who particularly studied them (vide his *Handbuch der Blütenbiologie*, the posthumous volume iii, compiled by E. Loew, part 1, pp. 369-386) recorded that, in the Buitenzorg Gardens, *Xylocopas* are the fertilising agents of

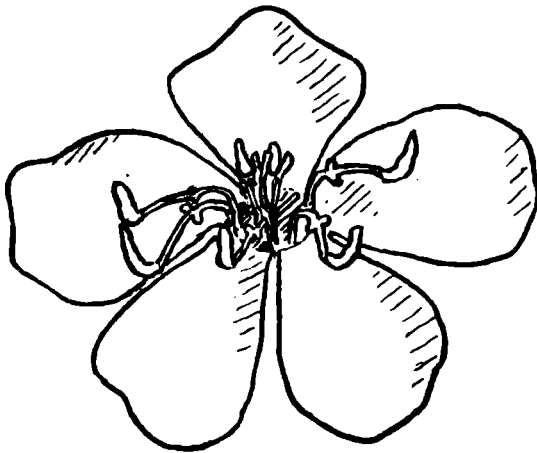


FIG. 5.— Flower of *Melastoma malabathricum*, Nat. size, showing the two kinds of stamens, the longer five of which serve as a landing place.

various Cassias, other insects attracted being the bees *Podalirius zonatus* and *Megachile opposita*. Burck (*Annales du Jardin Botanique de Buitenzorg*, VI, 1887, pp. 256-265) and Mrs. Nieuwenhuis von Uexkull have made similar observations in the same Garden.

Forbes in 1888 (*Nature*, xxvi, p. 536, quoted from Kunth, l. c., p. 538), named *Xylocopa* as a visitor to a *Melastoma* in Sumatra and in his *Naturalist's Wanderings in the Eastern Archipelago* (London, 1885, p. 228) says that *Bombus senex* was observed on a pink *Melastoma* in the Mountains of Palembang.

Melipona bees are common on the flower of *Melastoma malabathricum* in Tenasserim, collecting pollen (Moulmein, 27-ii-04; 23-ii-08; Amherst, 11 and 16-iii-08) and once another Apiid was seen (Moulmein, 8-iii-08). The flowers open at about 7 a.m. and close about 4 p.m.

Passiflora foetida, Linn., which is freely visited by *Xylocopa aestuans*, has its flowers open for still shorter hours than the preceding species; they expand before dawn and may wither as early as 9 a.m., all the stigmas having been pollinated (Calcutta, 13-viii-01). *Anthophora zonata* (Calcutta, 13-ix-01) and a skipper, *Theckla* sp. (Calcutta, 11-viii-01) were observed also to suck honey, but not to move all round the flower as *X. aestuans* does.

Petch in the *Annals of the Royal Botanic Gardens, Peradeniya* (v, 1914, p. 538) has remarked that *Xylocopa* pollinates *Calotropis* in those Gardens. Similarly *X. latipes* has been seen by me on *Calotropis procera*, R. Br., at Jajpur, Orissa (27-viii-06), *X. aestuans* at Bankipur (1-vi-07), and undetermined species of *Xylocopa* at Pachuria, Central Bengal (30-viii-04), and Bilaspur in the Sutlej Valley (13-v-06). In addition *Elis thoracica*, F., a Hymenopteron, has been seen on flowers at Arrah (8-vi-07), and a *Sphex* at Dalsing Sarai, Tirhut (20-v-07); and at Patiala in the Panjab I caught *Polistes hebraeus*, F., (22 iv-07) with seven pollinia adhering to its tarsi in such positions that its efforts at removing them with its mandibles were unsuccessful. An individual of *Elis thoracica* caught at Arrah had the tarsi of the fore and mid legs covered with the pollinia.

The flowers have been observed to open at various hours from 10 a.m. to midday (Myingyan, 12 to 15-ii-04) but it may be that they also open at other times.

Daemia extensa, R. Br., another Asclepiad, but differing from *Calotropis* markedly in possessing pendulous flowers, has been seen to be visited by *Papilio polytes*, L., (Jamod, 25-ix-09). But visitors more efficient than butterflies should be sought.

Xylocopas visit some of the larger *Crotalaria*s well. They have been seen in great numbers on the flowers of *Crotalaria juncea*, Linn., thus—*Xylocopa latipes* at Kyauktaw, Arakan (7-i-07); *X. aestuans* at Barnes junction (6-viii-07); *X. ? fenestrata* at the same place (6-viii-07); and *X. spp.* near Calcutta (1-ix-01).

On *Crotalaria striata*, DC., has been seen *X. aestuans* at Barnes junction, *X. ? fenestrata*, F., at Barnes junction (6-viii-07), and *X. sp.* at Poradaha, Central Bengal (11-viii-07). *X. aestuans* has been seen also on the flowers near Tampin in the Malay Peninsula (23-viii-14).

Petch says (l.c.) that *Xylocopa* visits *Crotalaria Walkeri*, Arn., at Hakgala, Ceylon.

Other visitors also go to the flowers, and I have recorded a Bombylid on those of *C. juncea* (Calcutta, 1-ix-01), and a Vespidae on those of *Crotalaria hirta*, Willd. (Kasod, Berar, 17-ix-09).

The flowers of *Crotalaria medicaginea*, Lamk., open after 6.30 a.m. and close at nightfall (Kasod, 17 to 18-ix-09), and those of *Crotalaria calycina*, Schrank, close at sunset (Chitowni, Tirhut-Nepal Border, 19-xi-07).

Phaseolus calcaratus, Roxb., was seen visited by *Xylocopa aestuans* for honey (Dalsing Sarai, Tirhut, 29-v-07), and *Phaseolus trilobus* Ait., by an undetermined *Xylocopa* and also by another Apiid (Parlakimedi, Circars, 15-ix-02).

An insect like *Xylocopa* would seem the most probable one of service to *Clitorea Ternatea*, Linn., especially as *X. latipes* is a very frequent visitor to the similar *Centrosema Plumieri*, Benth., in Singapore. The big landing stage, which these two upside-down Leguminosae afford, is peculiar and is a specialisation which would appear more appropriate to a butterfly-flower than to a bee-flower, were it not that such strength as butterflies do not possess, is necessary to force a way under the keel. A butterfly was seen at the flowers (Calcutta, 22-ix-01).

Caesalpinia Bonducelia, Fleming, at Gauripur, Mymensing (9-viii-07), and *Connarus paniculatus*, Roxb. on Bilugyan, Moulmein (3-iii-04) were noticed freely visited by *Xylocopa aestuans*.

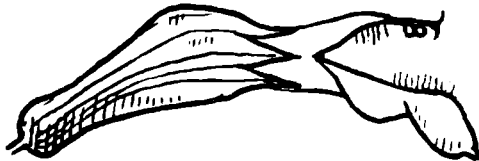


FIG. 6.—Flower of *Anisomeles ovata*.

Anisomeles ovata, R. Br., one of the Labiatae which is widely spread over the plains of India, seems largely to depend on this same insect. Its flowers have a fair supply of honey protected from unwelcome visitors by a ring of hairs 3 mm. from the base of the flower-tube at the point where the stamens are inserted. The tube is about 5—6 mm. long; and the stamens project from it and beyond the meagre upper lip, the anthers lying over the alighting place of the lower lip, with the stigma just beyond them, at about 15 mm. distance from the base of the flower. *Xylocopa latipes*, *X. aestuans*, *Anthophora zonata*, *Apis indica* and another Apiid as well as two species of Lepidoptera—a *Papilio* and a Hesperid—have been seen on the flowers in Calcutta (26—27-x-01). The second of the bees always carries abundant pollen as it visits.

Xylocopa visits the flowers of *Luffa acutangula*. Roxb., in Behar (Barh, 6-vi-07); and a Sphingid was seen on them at Anand, Gujerat (1-xi-02).

Ipomoea rubrocoerulea, Hook., has fairly plentiful honey in a tube 9 mm. deep, for which *Anthophora zonata* visits in Calcutta (8-15-ix-01). One of the five stamens equals the style; so that its anther may possibly pollinate the stigma. *Anthophora zonata*, in visiting the flower, settles on the sexual organs and scatters the pollen so that it may be found on the corolla after a visit.

Ipomoea paniculata, R. Br., was seen visited by *Xylocopa aestuans* persistently for honey (Calcutta, 29-vii-07, and near Bombay, 19-ix-08). *Xylocopas* are recorded as biting through *Ipomoea* flowers in Singapore and Java (Ridley in Journ. Roy. As. Soc., Straits Branch. No. 34, p. 229, and Kunth, Handbuch d. Blütenbiologie, III. part 2, p. 53); but in a general way these showy members of the genus appear suited better for their visits than for those of other insects.

X. latipes has been observed to rob *Torenia Fournieri*, Linden., of its honey by biting through the corolla-tube just above the calyx (Calcutta, 13-ix-01).

It will be useful, before proceeding, to enumerate the flowers upon which *Xylocopas* have been seen: they are:—

- Dillenia indica*, Linn. See below.
- Gynandropsis pentaphylla*, DC. See below.
- Gossypium neglectum*, Tod; and
- G. intermedium*., Tod. Note No. 4.
- Malachra capitata*, Linn. See below.
- Corchorus capsularis*, Linn. See Note No. 2.
- Corchorus olitorius*, Linn. See Note No. 2.
- Connarus paniculata*, Roxb. See above.
- Crotalaria juncea*, Linn. See above.
- Crotalaria striata*, DC. See above.
- Crotalaria albida*, Heyne. See Note No. 7.
- Sesbania aculeata* Pers. See below.
- Caesalpinia Bonducella*, Fleming. See above.
- Cassia occidentalis*, Linn. See above.
- Cassia Sophera*, Linn. See above.
- Cassia Tora*, Linn. See above.
- Lathyrus odoratus*, Linn. See Note No. 6.
- Phaseolus calcaratus*, Roxb. See above.
- Phaseolus trilobus*, Ait. See above.
- Acacia arabica*, Willd. See below.
- Rosa moschata*, Mill. See Note No. 6.
- Melastoma malabathricum*, Linn. See above.
- Osbeckia crinita*, Benth. See above.

- Oenothera rosea*, Sol. See Note No. 6.
Passiflora foetida, Linn. See above.
Luffa acutangula, Roxb. See above.
Zinnia elegans, Jacq. See Note No. 7.
Gerbera lanuginosa, Benth. See Note No. 6.
Cnicus argyranthus, C.B. Clarke. See Note No. 6.
Calotropis procera, R. Br. See Note No. 6 and above.
Ipomoea paniculata, R. Br. See above.
Solanum xanthocarpum, Schrad. and Wendl. See Note 6.
Sopubia delphinifolia, G. Don. See Note No. 7.
Justicia Gendarussa, Linn., F. See below.
Adhatoda Vasica, Nees. See Notes Nos. 3 and 6.
Thunbergia grandiflora, Roxb. See Note No. 1 and above.
Caryopteris Wallichiana, Schau. See Note No. 6.
Leucas linifolia, Spreng. See below.
Anisomeles ovata, R. Br. See Note No. 7 and above.
Celosia cristata, Linn. See Note No. 7.
Antigonum leptopus, Endl. See below.
Curcuma Amada, Roxb. See above.

The greatest heights, at which *Xylocopas* have been observed by me, are 7,000 ft. in Simla (14 and 15-v-11) and 6,000 ft. at Kasauli (11-v-07). They seem to hibernate for a very short period in Calcutta, or at any rate to have restricted working hours about the commencement of the year; and probably to hibernate for longer periods where it is colder: but in Akyab I found no hibernation. Generally the common species, such as *X. latipes* and *X. aestuans*, commence their day's work at 6 a.m. and cease at nightfall; but there are rarer species at least in Burma which work on moonlight nights. In the lower parts of the Himalaya their distribution overlaps that of some species of *Bombus*, e.g. *B. haemorrhoidalis* (vide Note No. 6, p. 230); upwards they gradually give place to them.

I have observed and recorded the visits of Bombi in the Simla-Himalaya to the following plants:—

- | | |
|---|--------------------------------------|
| <i>Papaver somniferum</i> , Linn. | <i>Lactuca Heyneana</i> , DC. |
| <i>Viola serpens</i> , Wall | <i>Pieris ovalifolia</i> , D. Don. |
| <i>Sarothamnus scoparius</i> , Koch. | <i>Carissa spinarum</i> , A. DC. |
| <i>Rosa moschata</i> , Mill. | <i>Buddleia paniculata</i> , Wall. |
| <i>Pyrus Pashia</i> , Buch.-Ham. | <i>Gentiana argentea</i> , Royle, |
| <i>Punica Granatum</i> , Linn. | <i>Evolvulus alsinoides</i> , Wall. |
| <i>Viburnum foetens</i> , Decane. | <i>Celsia coromandeliana</i> , Vahl. |
| <i>Lonicera angustifolia</i> , Wall. | <i>Salvia lanata</i> , Roxb. |
| <i>Cnicus argyranthus</i> , C. B. Clarke. | <i>Scutellaria linearis</i> , Benth. |
| <i>Taraxacum officinale</i> , Wigg. | <i>Roylea elegans</i> , Wall. |
| <i>Launaea nudicaulis</i> , Hook. f. | <i>Duranta Plumieri</i> , Jacq. |

To these I have now to add *Aesculus Hippocastanum*, Linn. (Simla, 12-v-09).

As was pointed out on p. 236 of Note No 6, *Punica Granatum*, *Rosa moschata*, and the Labiates such as *Roylea elegans* are visited by *Bombus haemorrhoidalis*; while at higher levels *Lonicera angustifolia* and *Viburnum foetens*, and perhaps other horizontal or pendulous flowers, depend for fertilisation on *Bombus tunicatus*. Under date of 17-vi-07, Mr. C. E. C. Fischer was so good as to communicate to me a statement that the latter *Bombus* particularly affects *Salvia lanata*, Roxb., in Jaunsar.

Salvia fulgens, Cav., in Darjeeling Gardens is robbed of its honey by a *Bombus* which there constantly bites through the corolla tube (25-ix-09); but it is pollinated freely by *Apis mellifica* which approaches the corolla-tube from the front (14-x-04; 25-ix-09). The same *Bombus* goes to the flowers of *Tropaeolum majus*, Linn., in great numbers (14-x-04; 25-ix-09). On *Digitalis purpurea*, Linn., also in gardens, *Bombus eximius* works diligently even in light rain (Darjeeling, 13 and 14-vi-09: and Lopchu, Darjeeling Himalaya, 9-vi-09).

In Note No. 5, I recorded further visits of Bombi in the Sikkim Himalaya thus, to:—

<i>Aconitum spicatum</i> , Stapf.	<i>Saussurea uniflora</i> , Wall.
<i>Aconitum heterophylloides</i> , Stapf.	<i>Senecio diversifolius</i> , Wall.
<i>Corydalis chaerophylla</i> , DC.	<i>Cnicus involucratus</i> , DC.
<i>Impatiens bicornuta</i> , Wall.	<i>Strobilanthes pentstemonoides</i> , T. Anders.
<i>Impatiens asymmetrica</i> , Hook. f.	<i>Crawfordia speciosa</i> , C. B. Clarke.
<i>Impatiens Gagei</i> , Hook. f.	<i>Elscholtzia strobilifera</i> , Benth.
<i>Polygonum amplexicaule</i> , D. Don,	

Unidentified Bombi have been observed since that Note was published to visit the following wild flowers, in the same mountains:—

<i>Saurauja nepaulensis</i> , DC.	..	Pedong, 6-vi-09
<i>Piptanthus nepaulensis</i> , D. Don	.. ..	Chiabangan, 22-v-09.
<i>Mussaenda Roxburghii</i> , Hook. f.	.. ..	Pedong, 6-vi-09.
<i>Rhododendron cinnabarinum</i> , Hook. f.	.. ..	Chiabangan, 22-v-09.
<i>Ellettaria Cardamomum</i> , Maton	.. ..	Pedong, 6-vi-09.

I have seen the visits of Bombi in the Nepal Himalaya to:—

<i>Clematis grewiaefolia</i> , DC. . .	Sisagarhi, 2-xii-07.
<i>Prunus Puddum</i> , Roxb. . .	Chitlong, 3-xii-07.
<i>Lindenbergia grandiflora</i> , Benth. . .	Bhainsa Duhan, 14-xii-07.
<i>Elaeagnus latifolia</i> , Linn. . .	Patan, 15-xii-07.

on the last named with particular diligence and in considerable numbers.

By no means are all these specially *Bombus*-flowers, though most of them have a considerable specialisation.

Rhododendron Falconeri, Hook. f., was found to be bitten through at the base of the corollas by some insect not detected, but probably a *Bombus* (Tonglu, 10-vi-09).

Leaving the Bombi, *Anthophora zonata*, L., may be specially considered. It is a common plains' insect, and a regular flower-visitor. In size it differs but little from the Bombi; and it tunnels into the flower of a *Costus* in exactly the same way as a *Bombus* tunnels into the flower of an *Iris*. It appears to be partial to the plains' Labiates just as *Bombus* is to those of the hills.

I have recorded its visits to:—

<i>Corchorus capsularis</i> , Linn.	<i>Roylea elegans</i> , Wall.
<i>Gossypium neglectum</i> , Tod., or <i>intermedium</i> , Tod.	<i>Leucas linifolia</i> , Spreng (in the C.P).
<i>Trichodesma indicum</i> , R.Br.	<i>Leucas urticaefolia</i> , R. Br.
<i>Dicliptera bupleuroides</i> , Ness.	<i>Teucrium Royleanum</i> , Wall.

and now add the following as visited also by it:—

<i>Impatiens tripetala</i> , Roxb. . .	Patgram, N. Bengal, 26-viii-07, trying to rob the flowers from the side.
<i>Cephalandra indica</i> , Naud. . .	Calcutta, 18-viii-01.
<i>Datura fastuosa</i> , Linn. . .	Calcutta, 8-ix-01.
<i>Ipomoea rubro-coerulea</i> , Hook. . .	Calcutta, 8 and 15-ix-01.
<i>Ipomoea Batatas</i> , Lamk. . .	Calcutta, ix-01.
<i>Martynia diandra</i> , Glox. . .	Bardwan, 10-ix-04.
<i>Ruellia prostrata</i> , Lamk. . .	Calcutta, 12-viii-01.
<i>Leonotis nepetaefolia</i> , R. Br.	Calcutta, 1-ix-01.
<i>Leucas urticifolia</i> , R. Br. . .	Arrah, 8-vi-07.
<i>Leucas linifolia</i> , Spreng. . .	Kutupur, Dalsing Sarai and Barh, Behar, 1 to 5-vi-07; Natan, Northern Arakan, 7-i-07.
<i>Scutellaria linearis</i> , Benth.	Dharpur. Simla Himalaya, 2-v-09, failing to get honey.
<i>Costus speciosus</i> , Sm. . .	Calcutta, 2-ix-01 abundantly, Narayanganj, 2-ix-04.

With *Anthophora zonata* all through the forenoon, was seen on *Martynia diandra* at Bardwan *Anthophora violacea*, Lep.; and at one time the butterfly *Telchinia violae*, F., visited but failed to reach the honey (10-ix-04).

Impatiens tripetala also received visits from a *Parnara* (Patgram, 20-viii-07) and a *Papilio* (Sadiya, Upper Assam, 25-viii-09): *Leonotis nepetaefolia* those of a bee of the genus *Crocisa* and of a Bombylid fly (Calcutta, 1-ix-01); *Leucas linifolia* those of *Xylocopa fenestrata* (Dalsing Sarai, 29-i-07); *Apis dorsata* (Dacca, 7-v-11; Thakurganj and Tulsea, Northern Bengal, 31-i-11 and 3-ii-11); Natran, Northern Arakan, 7-i-07); *Elis* (Barnes Junction, 18-vi-09); a Lycanid butterfly (Pusa, 26-v-07) and *Terias*, and a *Parnara* (Barnes Junction, 18-vi-09), a Sphingid (Dacca, 7-v-11), a *Syrphus*, probably *S. balteatus*, Naxalbari, N. Bengal (24-i-11) and as above recorded of *Xylocopa*.

Costus flowers open between 7 and 9 a.m.

Strobilanthes Mastersii, T. Anders., is certainly well suited for the visits of the larger bees; but *Apis dorsata* only has been seen on it. This insect visited persistently at Kobo, Upper Assam (30-xi-11 and 4-xii-11).

Irregular flowers suited for Apis and other small bees.

Capparis tener, Dalz., is strikingly adapted for the visits of the more intelligent insects, such as the bees, on account of the neat way in which its honey is hidden in a little lenticular cavity made by the apposition of nectaries on the bases of the upper petals. The accompanying figure shows the appearance

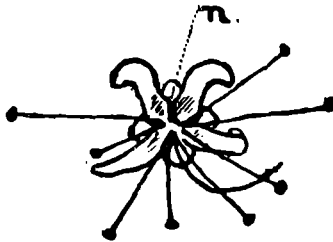


FIG. 7.—Flower of *Capparis tener*. The lens-shaped cavity containing the honey is indicated by the letter *n*.

of the flower, the letter *n* indicating where this double nectary is. Visiting insects alight on the stamens and style, stigma and anthers being mature together. An Apiid was seen on the flowers at Kawkareik in Tenasserim (3-iii-04).

Indigofera glandulosa, Willd., was seen to be visited by the butterfly *Papilio polytes*, L., at Jalgaon, Berar (26-ix-09).

Sesbania aculeata, Pers., received visits from *Xylocopa aestuans* and from a butterfly at Jamod, Berar (24-ix-09).

Aeschynomene indica, Linn., was seen to be visited by a *Terias* butterfly at Calcutta (12-ix-09).

Centranthera hispida, R. Br., has been seen to be visited by a butterfly of the genus *Terias* at Gauripur, Mymensingh (6-ix-06).

Rungia repens, Nees, has flowers which persist for three days. During the first and part of the second they are in a male condition with the two anthers side by side occupying under the narrow hood such a position that a visitor is likely to touch them with its head. At the end of the second day, the filaments begin to curve in a lateral direction carrying the anthers outside the flower, as shown in the annexed figure. Then the stigma occupies alone the place where the head of

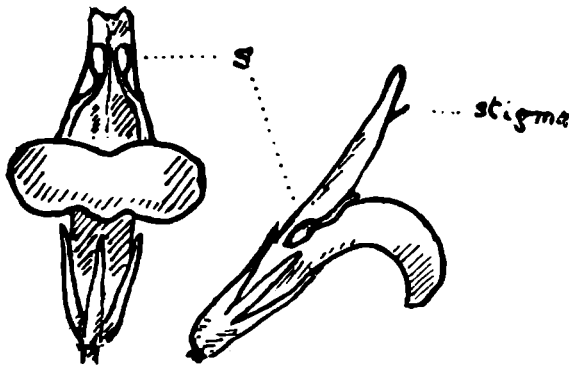


FIG. 8.—Flowers of *Rungia repens*, that seen from in front in the first or male position, that seen from the side in the second or female position. S indicates a stamen.

the visitor touches, and pollination may be expected to occur from a younger flower. The following visitors have been observed:—HYMENOPTERA, ACULEATA. *Apis* sp. (Calcutta, 3 to 18-viii-01), an Apiid (Calcutta, 3-viii-01), DIPLOPTERA. *Odynerus* 2 spp., very abundant (Calcutta, 3 to 18-viii-01), a Vespid (Miraj, near Kolhapur, 12-xi-02). LEPIDOPTERA, 5 or 6 species, (Miraj, 12-xi-02) DIPTERA. SYRPHIDÆ *Syrphus* sp. (Miraj, 12-xi-02). SARCOPHAGIDÆ. *Sarcophaga* sp. (Miraj, 12-xi-02). All at honey.

Justica Gendarussa, Linn. f., has the same mechanism as the last. The tube is 12–13 mm. long, and affords abundant honey. The two anthers stand under the upper lip side by side, with the lobes one above the other. The lower of these two lobes is shortly spurred, the better to come into contact with a visiting insect's head; the upper dehisces by what is almost a pore in a line just above the spur and so above the visitors' heads; the lower dehisces outside and above the spur. The spurs

slightly narrow the way to the honey. After the male stage of the flower is over, the filaments carry the anthers outside the flower as in *Rungia repens*. At the close of the female stage of flowering, the corolla falls, but there is still much honey on the



FIG. 9.—Stamens of *Justicia Gendarussa* showing how the anthers are constructed.

remaining parts to which visiting insects continue to go. *Apis dorsata* was seen visiting in considerable numbers and appears to be of the right kind of insect to effect fertilisation.

HYMENOPTERA. ACULEATA. *Xylocopa aestuans*, Lep., *Apis dorsata*, F., and several similar bees. **LEPIDOPTERA. RHOPALOCERA.** Several species. (Padoung, south of Prome, 24-ii-04). All at honey.

Peristrophe bicalyculata, Nees. The butterfly *Terias* has been seen visiting the flowers at Simulbasa in the Nepal terai (27-xi-07).

Vitex trifolia, Linn. f., has been seen to be visited by the butterfly, *Papilio polytes*, for honey at Jamod, Berar (25-ix-09). At Tampin in the Malay Peninsula, a *Xylocopa* visits it.

Duranta Plumieri, Jacq. **HYMENOPTERA. ACULEATA.** 4 species—**LEPIDOPTERA. RHOPALOCERA.** 2 species (Damdim, Duars, 21-viii-07).

Ocimum gratissimum, Linn., is fitted for the visits of bees. but has ultimate self-pollination, for the stamens, which at first diverge somewhat, laterally close together, and the stigma is raised by the style to the anthers. The flowers were seen to be visited by *Apis indica* at Pursua in the Nepal terai for honey (28-xi-07).

Plectranthus ternifolius, Don, has its stamens quite hidden in the boat-shaped keel which visiting insects are intended to depress. Although it is suited for the visits of small bees, butterflies only have been seen on it (Parsua, Nepal terai, 22-xi-07).

Plectranthus gerardianus, Benth., was seen to be visited by a *Bombus*, *Apis indica* and several butterflies at Bhimpedi, Nepal (1 and 14-xii-07).

Elsholtzia strobilifera, Benth., is visited by *Apis mellifica*, L., in Darjeeling (20-ix-09).

Commelyna benghalensis, Linn., as is well known, has cleistogamic flowers underground. Its half horizontal above-ground chasmogamic flowers carry one fertile stamen above the centre of the flower in the middle line, and two stamens laterally which face inwards and upwards. Some flowers are ♂ only: in the ♀ flower the stigma lies below the anthers, but is usually obliquely directed, projecting 1.5 mm. beyond the lower anthers, and 4 mm. from the unpaired upper anther (Calcutta, —1901; Parlakimedi, Circars, ix-1903).

The flowers of *Commelyna Forskalii*, Vahl, open at 7-30 a.m. (Sangli, near Miraj, 9-x-02).

In Note No. 6, the constancy with which the spur of *Delphinium denudatum*, Wall., is bitten through, was remarked. Another opportunity of observing the flowers occurred at Kasauli (9-v-11); but though bitten spurs were again found, the robber was not detected.

The spur of *Utricularia Wallichiana*, Wight, was observed bitten through in the Dawna hills (4-iii-08).

Various flowers with many stamens.

The large pendulous flowers of *Dillenia indica*, Linn., open in the night, apparently towards dawn, and last until the afternoon of the same day, when the petals first fall and, later at dusk, the calyx closes. Great numbers of *Apis dorsata* and *Apis florea* go to the flowers to collect pollen, and on one occasion a single individual of *Xylocopa aestuans* was seen first to seek honey, and not finding any, to collect pollen. One fly of the genus *Calliphora* was seen on the flowers (Calcutta, end June, 1911).

The flowers of *Dillenia pulcherrima*, Kurz, fall at midday. Before that a *Melapona* visits them (Moulmein, 2-iii-02).

On the rather smaller, but similar, flowers of the tea plant—*Camellia Thea*, Link—a Hesperid moth was seen sucking honey at Thansing, Nepal (11-xii-07).

Mesua ferrea, Linn., opens its flowers in the night. They are very fragrant, and *Apis indica* is attracted to them in considerable numbers (Moulmein and Korokpi, south of Amherst, 2-ii-04 and 12-iii-08).

Barringtonia pterocarpa, Kurz, opens its horizontal flowers in the late afternoon, from which time they last only until dawn. Honey is abundant, and no sooner are they open than *Melapona apicalis*, Dall., commences to visit in large numbers (Dawna hills near Kawkareik, Tenasserim, 1-iii-02).

Callistemon speciosus, DC., obtains the persistent visits of *Apis indica* in the Royal Botanic Gardens, Calcutta; but this bee can pass between the stamens without touching the anthers (25-xii-05).

Opuntia flowers are dissimilar to the foregoing in that they face upwards. Those of *Opuntia elatior*, Mill., have self-pollination in their closing at the end of the day: and self-pollination is possible in *Opuntia cochinelifera*, Mill.; but it is unlikely in *Opuntia Dillenii*, Haw., because the style carries the stigma well above the anthers.

Apis was seen collecting pollen in the flowers of *Opuntia monacantha* at Dharmpur in the Simla Hills (16-v-11). *Halictus senescens*, Smith, was observed pushing a way down among the stamens of *O. elatior* (Bankipur, 2-vi-07), and also of *O. Dillenii* (Barh, Behar, 5-vi-07), being abundant on the flowers. *Ceratina viridissima*, Dall., was doing the same at Barh (4 to 8-vi-07).

On *Rosa damascena*, Mill., the race which is grown for the manufacture of Attar, *Apis florea*, was seen collecting pollen (Patiala, 22-iv-07).

The small downwardly directed flowers of *Eurya acuminata*, DC., get the visits of species of *Andrena* and *Syrphus* (Chitlong, Nepal, 7-xii-07).

Rubus rosaefolius, Smith, has downwardly directed flowers, which receive the visits of *Apis* at Shillong (16-vi-11). The flowers of *Rubus ellipticus*, Smith, do not face downwards in the same way, but are much visited by *Apis* in the Himalaya above Palampur, Kangra Valley (10-iii-02). On the flowers of *Rubus moluccanus*, Linn., have been seen several individuals of a Bombycid moth at Dumpep, Khasia Hills (30-v-11).

Hopea odorata, Roxb., has been seen to be visited by a *Melipona* at Moulmein rather freely. Its slightly fragrant flowers were noted to open at very varying hours between midnight and midday (Moulmein, 15-ii-02).

Grewia Microcos, Linn., opens its flowers between 7 and 8 a.m.; then the citron-yellow petals bend back giving space for the stamens with golden-yellow anthers to spread in the form of a spray. Among these anthers the stigma lies, and is touched by them in the closing of the flowers at dusk. *Melipona* is a common visitor in Moulmein (23 and 24-ii-04).

Grewia arbutifolia, Juss., has flowers differing slightly in that the stigma lies beyond the anthers. These anthers dehisce as the flower opens (Parlakimedi, Northern Circars, 2-x-02).

Grewia asiatica, Linn.,¹ was seen to be visited by *Xylocopa* at Saharanpur (26-v-06).

Malvaceae.

Although the devices for securing pollination which can be found in the Malvaceae vary with the size of the flower in suitability to a great variety of visitors, there is considerable similarity in their flowers: and I find it convenient to put together here in one place all the notes that I wish to make. From *Hibiscus lasiopetalus* which is a true bird-flower though *Althaea rosea* and cotton which, as given above, obtain bird-visits, there is a gradual diminution in the size of the flower and of the suitable insects, which somehow has left but little mark on the shape of the parts of the flowers.

Note No. 4 of this series was on the pollination of cotton detailing observations made in Behar and a part of Note No. 7 dealt with observations on cotton in Berar. I was anxious when writing those two notes to prevent a deduction being made from Professor Gammie's observations at Poona to the effect that cotton is widely self-pollinated. Since then the Howards, A. and G. C. L., in the *Memoirs of the Department of Agriculture of India*, Botanic series, iii, p. 261, have written that they have proved cross-fertilisation to occur at least sometimes at Pusa. To the visitors already recorded *Papilio polytes* may be added (Nandurbar, Tapti valley, 29-ix-09).

The yellow flowers of *Gossypium intermedium*, Tod., and *G. neglectum*, Tod., open about 7 to 8-30 a.m. and may persist to the next morning: but those of the races of the same two species of *Gossypium* which have white flowers go through the processes of expanding and withering about two hours later.

Sida cordifolia, Linn., opens its flowers about 8 a.m. (Cuttack, 22 to 24-viii-06; Damdim, Duars, 22-viii-02); and they close at noon, when the styles have bent so as to have brought the stigmas among the anthers. *Sida acuta*, Burm., opens its flowers at about 8 a.m., the anthers dehiscing afterwards, and later in the morning self-pollination becomes not improbable (Calcutta, 15 to 19-ix-01). *Sida rhombifolia*, Linn., opens its flowers between 9 and 10 a.m. (Akrani plateau 2 to 10-x-09) or later up to noon (Nandurbar, 29-ix-09). *Sida spinosa*, Linn., opens an hour after the last on the Akrani plateau.

Hibiscus vitifolius, Linn., opens its flowers soon after dawn. Later in the day the stigmas are brought into contact with the anthers by the recurving of the styles (Calcutta, —.01; Bardwan, 20-ix-07). *Hibiscus cannabinus*, Linn.,

¹ I am indebted to Mr. R. S. Hole for naming this, my field number 27223. He adds that it is the form of the species, *sensu ampliore*, which is common in the plains of Northern India.

has been studied by the Howards (l. c., p. 261), who record that the flowers open early. I found them to open at 7 a.m. in observations made at Nandurbar (1-x-09). *Hibiscus ficulneus*, Linn., opens its flowers towards 10 a.m. (Myingyan, 12-ii-02; Monywa, 10-ii-04). *Hibiscus panduraeformis*, Burm., opens its flowers at 8 a.m. (Belgaum, 14-xi-02). *Hibiscus sabdariffa*, Linn., has been observed by the Howards to open its flowers late in the morning and to close them again after only three hours. *Hibiscus venustus*, Bl., opens its flowers at 7 a.m. (Dawna Hills, Tenasserim, 4-iii-02). *Hibiscus fragrans*, Roxb., opens its flowers at nightfall, and they last for twenty-four hours, withering at 5 p.m. on the next day (Kobo, Upper Assam, —xii-11). *Abutilon indicum*, G. Don,¹ opens its flowers at 2–3 p.m. and closes them at 8 p.m. (Waltair, 2-vii-02; Kyaukse, Central Burma, 11-i-04; Myingyan, 15-ii-04). *Abutilon hirtum*, W. and A., opens its flower at about 10–11 a.m. and closes again at sunset (Monywa, 10-ii-04). *Abutilon graveolens*, W. and A., opens its flowers from 2 p.m. to 3-30 p.m. and the stamens dehisce as it opens (Kyaukse, 10 to 11-i-04).

The above series of observations requires amplifying, and is only published now because I am obliged to leave the amplification to be done by others. I never had the leisure myself in India when in the field to do this line of work full justice, nor facilities for cultivating the plants under my own observation.

To the flowers of *Sida acuta* butterflies were seen to be visitors near Calcutta (15-ix-02). Butterflies also seem to be the chief visitors to the flowers of *Urena lobata*, Linn., thus:—

HYMENOPTERA. ACULEATA. One Apiid, Calcutta, 20-x-01. **LEPIDOPTERA. RHOPALOCERA.** *Papilio* spp. Calcutta, 20-x-01. Pierid. Calcutta, 29-x-01, *Terias* sp. Pursua, Nepal terai, 26 xi-07; an undetermined species, Natran, Northern Arakan, 7-i-07. **HETEROCCERA.** *Theckla* sp. Calcutta, 26-x-07, Sphingid, Natran, 7-i-07.

To the flowers of *Malachra capitata*, Linn. *Xylocopa* ? *latipes* has been seen visiting, but not persistently, as well as black ants (Calcutta, 27-x-01). The staminal column is usually bent somewhat to one side of the flower.

Unspecialised flowers.

I arrange the following observations by the systematic position of plants.

Argemone mexicana, Linn. Not a single visitor has been

¹ I am much indebted to Mr. H. G. Carter, my successor in Calcutta, for this determination.

seen on the flowers of this plant although it has been under observation repeatedly¹ in many different parts of India; but self-fertilisation is accomplished in the closing of the flowers at nightfall. They set a full complement of seed. I found as many as eighty capsules on a single plant, and an average of 44 per plant at Dalsing Sarai in Tirhut. The petals close on the anthers between 6 and 9 p.m.; and fall off at dawn on the next day.

Gynandropsis pentaphylla, DC., has been seen to be visited by *Xylocopa latipes* for honey (Calcutta, 15-ix-01). Early in the morning the stigma is thrust out of the closed petals and so exposed before the anthers. Soon after this the petals expand. Later the anthers come into contact with the stigma. Monteiro says in his "*Angola and the River Congo*" (London, 1875), ii, p. 205, that a Sphingid fertilizes this plant in Portuguese West Africa.

Flacourtia Ramontchi, L'Her., was seen to be visited by *Apis indica* at Parsua in the Nepal terai (27-xi-07).

Melochia corchorifolia, Linn., has flowers which close towards midday. A butterfly was seen to visit them (Bardwan, September, 1903).

Corchorus capsularis, Linn. To this plant visitors were recorded in Note No. 2. Since that note was published Mr. R. S. Finlow and I have observed *Apis florea* to be a most abundant visitor for honey at Pusa and Dacca (*vide* Memoirs Department of Agriculture, India, Botanical series, IV, 1912, p. 90).

Tribulus terrestris, Linn., has flowers somewhat variable in size, which open fairly early in the morning and may wither at noon. Every flower sets fruit, probably by pollination in its closing, for when they open the anthers and the stigma are separated. *Apis florea* and a smaller Apiid, Lycaenids, a moth, and Coccinellid beetle were seen in the flowers (Myingyan, 14-ii-04).

Oxalis corniculata, Linn., has been seen visited by Lycaenids and after their visits the stigmas were observed to be pollinated (Calcutta, 22-iv-01).

Glycosmis pentaphylla, Correa. The five petals arch over

¹ The villagers in Behar use the oil of *Argemone mexicana* considerably, picking the capsules with iron or wooden tongs. They get their supply of seeds from off the fallows, where the plant grows as a weed freely. And if we could find a race with spineless capsules, I see no reason why we should not make a cultivated plant of it. In the hope of finding some sport promising the needed race, I have had *Argemone* much under observation: but I regret to say that I have not found the desired condition.

the sexual organs and also narrow the way to the honey. The Hymenopteron *Scolia aureipennis*, Lep., was seen twice on the flowers (Plassey, 3-ix-07) sucking honey; and the Hymenoptera *Eumenes conica*, F., and *Sphex lobatus*, L., were seen doing the same in Calcutta (2-xi-01), the latter diligently.

Toddalea aculeata, Pers., was found to be visited by a small bee at Pongging in the Abor Hills. The anthers do not touch the stigma at all.

Aegle Marmelos, Correa, has very sweet-scented flowers which attract a considerable variety of insects (Dacca, 2-vi-11).

Zizyphus Jujuba, Lamk., by reason of its abundant free honey attracts a variety of visitors. The flowers are at first male, and later female, just as those of the *Euonymus* figured in Note No. 7. They lie close to one another; and neighbours are more likely to be in different stages than in the same, so that fertilisation of neighbouring flowers can be accomplished easily. Their duration is about three days. *Polystes hebraeus*, F., and another Hymenopteron have been seen as visitors, an ant, a small Dipteron and a beetle (Calcutta, 15-ix-01); the same species of *Polystes* and other insects were seen on the flowers at Nandurbar, Tapti valley, sucking honey (27-ix-09).

Zizyphus nummularia, W. and A., which is very similar to the last, was seen visited by the Hymenopteron *Megaspis crassus*, F., at Nandurbar (27-ix-09).

Vitis trifolia, Linn., is very well visited at Calcutta for the sake of its freely exposed honey by HYMENOPTERA. ACULEATA. *Apis florea*, L., diligently. *Polystes hebraeus*, F., and another Vespid. LEPIDOPTERA. RHOPALOCERA. small butterflies. DIPTERA. SYRPHIDÆ, *Helophilus* sp., *Syrphus*, sp., SARCOPHAGIDÆ. *Sarcophaga* sp. (15 to 18-viii-01).

Tapiria hirsuta, Hook. f. is visited by Bibionids and other small flies at Kobo, Upper Assam (25 to 26-ii-12).

Mimosa pudica, Linn. The honeyless flowers open at dawn and fade at midday. They obtain abundant visits for pollen from *Apis dorsata* (Bardwan, 10-ix-02; Banarhat, Duars, 24-viii-07). *Apis indica* (Bardwan, 10-ix-01), and *Apis florea* (Bardwan, 10-ix-02). The first named has been seen as a visitor in the Malay Peninsula on many occasions.

Acacia arabica, Willd., was seen to be visited by HYMENOPTERA. ACULEATA, *Xylocopa* sp. (Akot, 17-ix-09). LEPIDOPTERA. RHOPALOCERA. *Papilio polytes*, L., abundantly (Akot, 17-ix-09; Jalgaon, 26-ix-09), *Danais* sp. (Jalgaon,

26-ix-09), *Catopsilia crocale*, Cramer (Jalgaon, 26-ix-09), *Terias* sp. (Jalgaon, 26-ix-09).

Sedum rosulatum, Edgew., was observed by Dr. N. Annandale at Simla on 16-v-09, and he has been so good as to communicate to me the following list of visitors taken on the flowers :—

DIPTERA. BOMBYLIDAE. *Anthrena himalayensis*, Brunetti; *A. aperta*, Walker; *Usia sedophila*, Brunetti; *U. marginata*, Brunetti; SEPSINAE. *Sepsis cynipsea*, L.; *S. fulvolateralis*, Brunetti; *S. bicolor*, Wiedemann.

Pentapanax Leschenaultii, Seem., was seen to be visited by numerous individuals of *Apis* at Ripshing Showing in the Abor Hills (3-iii-12).

Vanquiera spinosa, Roxb., was visited by *Apis indica* at Pagnat, south of Amherst (12-iii-08).



FIG. 10.—Flower of *Evolvulus nummularioides*, seen from the side.

Evolvulus nummularioides, Linn., is a simple upwardly directed flower, which opens about dawn and closes before midday. There is no visible honey; but *Apis florea* is a constant visitor for pollen through May, June and September, and perhaps in other months in Calcutta. Self-pollination is not improbable as the anthers dehisce just after the opening of the flower and the stigmas lie among them with no constant relative positions.

Heliotropium indicum, Linn., was seen to be visited by a butterfly (Calcutta, 3-viii-01).

Cynoglossum micranthum, Desf., was seen to be visited by a Syrphid at Bhamo (2-ii-04).

Cynoglossum lanceolatum, Forsk., was seen to be abundantly visited by a butterfly of the genus *Lycaena* and by a Vespid at Barnes Junction, Northern Bengal (18-viii-09).

Gentiana capitata, Ham., var. *strobiliformis*, C. B. Clarke, was found to be cleistogamic on Phallut, Sikkim Himalaya (20-v-09).

Gentiana bryoides, Burkill, which grows with the last, opens its flowers in the sunshine but is self-pollinating (21-v-09).

Solanum verbascifolium, Linn., was seen visited by *Anthophora zonata*, seeking honey in vain (Calcutta, 15-ix-01).

Scoparia dulcis, Linn., is visited by small bees for pollen in Calcutta (3-viii-01).

Lippia nodiflora, Rich., attracts but few visitors. *Apis* was seen on it sucking honey at Pusa, Tirhut (26-v-07).

Boerhaavia repens, Linn., has been seen visited by two species of butterflies, and by one species of the Syrphidae. (Calcutta, 11-viii-01; 11-ix-01, 14-ix-01 and 20-ix-01).

Achyranthes aspera, Linn., was seen to be visited by *Apis dorsata* at Dacca (9-v-11).

Antigonum leptopus, Endl. The following visitors have been noticed in Calcutta (8-ix-01):—*Xylocopa aestuans* and *Apis indica*, the latter most abundant. *Apis florea*, *Xylocopa aestuans* and *X. latipes* have also been seen on the flowers in large numbers in Malacca and Singapore.

Polygonum capitatum, Ham., has self-pollination in the closing of the flowers (Rengging, Abor Hills, 27-i-12). It is however freely visited by Syrphids at Cherrapunji (31-v-11), and by the Syrphid *Eristalis*, as well as by the bee *Apis florea* at Kobo in Upper Assam (10-iii-12).

Polygonum chinense, Linn., was seen to be visited by a *Lycaenid* at Kobo (4-xii-11).

Jatropha gossypifolia, Linn., was seen visited by a *Papilio* at Plassey (3-ix-07), and also by an *Apiid*.

Sapium insigne, Benth., gets the visits of a *Melipona* to the large extra floral nectaries which are associated with its inflorescences (Amherst, 12-iii-08).

Euphorbia pilulifera, Linn., is not uncommonly run over by a black ant which obtains honey from the glands round the flowers (Domohani, North Bengal, 19-vi-09).

Asparagus filicinus, Ham., has flowers pleasantly scented by day, but they seem scentless at night. The anthers are about 3 mm. from the stigmas. *Apis florea* and two species of Syrphidae, as well as a *Calliphora*, have been seen on the flowers (Calcutta—01).

Cyanotis axillaris, Roem. and Schultes, opens its violet flowers in the morning and the anthers and stigma are 2 mm.

apart at first, but after a short time the stigma inclines to one side and falls against the hairs of one or another of the filaments, after which the flower withers (Calcutta, 24 to 28-ix-01). *Cyanotis fasciculata*, Roem. and Schulte's, opens its flowers at the same hour (Sangli near Miraj, 9-x-02).

Arenga saccharifera, Labill., and *Caryota urens*, Linn., drop to the ground their male flowers in enormous numbers, where after the fall they are very diligently visited by *Apis indica* and *Apis florea* for pollen (Calcutta, on many occasions). Barbosa Rodrigues in his *Noces des Palmiers* (Bruxelles, 1903, p. 21) records how he observed that a bee in Rio de Janeiro visits the fallen male flowers of the palm *Gulielma speciosa*, as they lie on the ground and flies up into the inflorescences above where are the female flowers, so bringing about fertilisation: but I have not observed the bees to fly up onto the female flowers of these two eastern palms, perhaps from want of opportunities. The male flowers of *Arenga saccharifera* which fell on a Monday in Calcutta were still affording pollen to bees on the following Sunday.

Andropogon Sorghum, Brot., and *Pennisetum typhoidum*, Rich., have been seen to be visited by small bees for pollen in the country near Bellary (26-xi-02).

Araceae.

Typhonium trilobatum, Schott, I examined a few years ago in Dacca. The mechanism was found to be exactly as described by Miss Cleghorn in this Journal, X. 1914, pp. 421-424. The following beetles were taken within the lower chamber, and kindly named for me by Mr. F. M. Howlett.

COLEOPTERA. SCARABEIDÆ. *Onthophobus* sp.; *Cacobius vulcanus*; *Cacobius* sp., *Aphodius moestus*, F. STAPHYLINIDÆ. 2 or 3 spp. NITIDULIDÆ. *Carpophilus* sp. (Dacca, 6 to 10-v-11). Four species of beetles, unidentified, were also taken within the chamber near Calcutta (27-v-01).

Amorphophallus campanulatus, Blume, was found to be visited by flies of the genera *Calliphora* and *Sarcophaga*, attracted by the foul smell (Calcutta, 22-v-04).

Alocasia fornicata, Schott, of which the smell was not offensive, had within its lower chamber many small Diptera, which were not being held prisoners (Chuadanga, Lower Bengal, 22-viii-07).

Colocasia antiquorum, Schott. On spathes of this plant many beetles and flies were observed; they congregated about the entrance from the upper to the lower chamber (Haflong, N. Cachar, 29-viii-09). Miss Cleghorn has described in this

Journal the mechanism by which pollination is brought about : and to her remarks the only thing that I find to add is, that I suspect the presence in the chamber of two smelling compounds on account of the way in which the odour of the inflorescence is at one time strongly offensive and at another not exactly offensive.

Arisaema speciosum, Mart. Small Diptera were found within the spathe on the mountain of Tonglu, Sikkim Himalaya (18-v-09).

Sauromatum guttatum, Schott. At Pathankot in the Panjab the following visitors to the flowers were observed : HYMENOPTERA. ACULEATA. Apiidae, 1 sp.; LEPIDOPTERA, 1 moth; DIPTERA, several spp.; COLEOPTERA, several spp. (7-iii-02).

Ant-patrols and extrafloral nectaries.

Mention has been made above of the ant-bodyguard of the *Cassias*. On *Cassia hirsuta*, Linn., the extrafloral nectaries at which the ants feed are particularly well developed, not being in any way diminished in size as the leaves pass over into bracts. Ants were observed on them at Dibrugarh (20-xi-11), and in addition a small winged Hymenopteron was obtaining food from them. A black ant has been observed at the corresponding extrafloral nectaries of *Cassia occidentalis*, Linn. (Dinajpur, 15-viii-06). At the same place and on the same date a wasp was seen visiting the extrafloral nectaries of *Cassia Tora*, Linn.

The species of ant making the patrol varies; and on *Impatiens tripetala* two different species have been noted in the same neighbourhood (Goalpara, 3-ix-06). The ant which lives in Calcutta on the inflorescences of *Thunbergia grandiflora*, Roxb., is again a distinct species from these, being also of much smaller size; but an ant of the same size lives on them at Gauhati (2-ix-06).

16. A note on the Terai Forests between the Gandak and the Teesta.

By I. H. BURKILL.

The Terai from the Gandak to the Teesta is a sill with a very slight slope from north to south, most rainy in the east, and decreasingly so towards the west, furrowed throughout from back to front in a parallel manner by many rivers.

Remote from the influence of man, it had been forest in all its length. But man, the one animal with the power of applying and in some measure of controlling fire, has by this means partially overcome nature; to date and from the south he has driven back the trees before wide stretches of rice fields in the areas which happened to be most easily burned clean, and which, on account of the position of administrative centres were also most persistently attacked.

It is fairly evident that some of the rivers,—those with longer courses,—have played a great part in helping him to make history; for these bring down sand and gravel, and on the top of the plains' silt, build cones of deposit which afford a percolation and a reduced fertility sufficient to modify the nature of the surface of the soil and the density and character of the vegetation which covers it, so that the surface of the soil on the cones is made more easy to travel over at seasons when rainy conditions prevail than that of the silt; and the vegetation is less tangled, one conspicuous element in it being the sal tree (*Shorea robusta*, Gaertn.). Now it happens that a little firing favours the sal tree by doing less injury to it than to most of its competitors, so that by fire, applied in moderation, it is caused to be more dominant than otherwise, producing a rather open forest. Such firing has certainly occurred; and the sal having been thereby encouraged, and growing only on the sandy soils, the diversity naturally existing between the vegetation on the river cones and in the lower hollows has acquired yet more marked dissimilarities. Man has undoubtedly applied this firing through centuries; he has always been in a hurry to burn; and where particularly he came and passed into the forests, the more marked has his influence been, progressing from the first stage where the sal is encouraged, to the second, where the firing being too frequent, it is destroyed; and the forest gives place to savannah, to grass, and then is ready to come under the plough.

The rivers did more than determine where the forest should

be eaten into from its south edge: they determined where the through roads should lie. Two main trade routes from time immemorial have traversed the Terai: and though the passes on the Thibetan frontier have fixed the upper ends of their course in the mountains, their trend towards the plains has in both been towards a great river, not for the sake of river-carriage, but because the rivers' spill afforded the way into the low country. It is most noticeable that the one route coming from the Kuti and Kirong passes inclines westward towards the old course of the Gandak, and that the other coming from the Tang-la crosses the Jalep-la and descends with a westward trend *via* Daling (now *via* Kalimpong) towards the Teesta.

Trade cuts for itself a channel like a river; and its opportunities beget opportunities: the strongest and most enterprising of peoples take possession of the routes; they cause the channel to be cut deeper, to be better, to be of more use. The trans-terai trade-routes have been no exception to this. The greatest enemy on them was malaria. But with the opening of the ways through the forest the danger from this became less, and the routes gradually more and more excelled any possible rivals as the means of passing through the beast-infested, unhealthy belt.

There are other sand-carrying rivers between the Gandak and the Teesta, such as the Bagmati, the Kumla, the Kankai, the Mahananda, and largest of all, the Kosi; and there is reason to believe that man has at times made more headway against the forest on their sand-cones than between them. Thus, though the Bagmati now emerges from the great 'bhaver' or forest so far in Nepal that I have not been able to get an exact idea how the forest limit lies, in Rennell's *Atlas* of 1783 it is recorded that it then made a wide bay, into the head of which the river came. The Kumla, whatever the forest line may be like at the present time, enters British territory near the head of a wide bay in the frontier line, which seems to be evidence of a former limit of administration (i.e. reclamation from forest). On the Kankai the forest now recedes to 26° 34' in a deep bay, which has deepened much since 1783. The Mahanada, almost as soon as it leaves the hills, enters cleared land. Lastly, on the Kosi Rennell shows a deep inlet in the forest along its western side. These bays in the bhaver or forest point to a relative success by man in forcing his colonization over their sand-cones. All the rivers named are much smaller than the Gandak and Teesta except the Kosi; in which connection it is most interesting to refer to Captain Hirst's contention (this *Journal*, 1908, p. 468) that the last-named has only attained its present dimensions in times absolutely modern and far more recent than that date at which the Gandak and Teesta acquired their importance.

Having attained the plains, the trade routes bent round towards the best marts. The western route, for instance, inclined south-eastwards at one period to Vaisali, and afterwards to Vaisali's rival and conqueror, Patna, only 27 miles distant. The eastern route at one period ended at Mahastan on the old Karatoya, due south of its exit from the hills, and then was deflected south-westwards to Gaur, and later to Murshidabad. These marts were far from the Terai,¹ too far to prevent the growing up of towns there, if only the climate would permit it. The climate did. Flourishing on the conditions brought about by the opening up of the land about the western route rose Semraon, and similarly on the eastern route rose Kamartipur. Large places such as these could only exist in the midst of wide fields; and we may safely assert that over the centuries of their existence the forests of the Terai must have been very much interrupted about their longitudes.

When Mohamed Bakht-i-yar Khilji had conquered Bengal and established himself at Gaur, the richness of the hill-trade aroused his cupidity,—most especially was the trade large in ponies,—and he determined on that marauding expedition against Burdhan-kot (Bhut-tang-kot or Bhut-boundary fort), which was his undoing. In 1216, in the spring apparently, he set out, was defeated by men in bamboo armour²; and a swollen river completed the disaster. Minhaj-ud-Dowla, the historian of forty years later, recorded from more than one source what he could learn of this great defeat; but he mixed into the story the geography of the western trade-route, whereas it was up the eastern that the expedition went. Some Kuch chief, called by Minhaj the Rai of Kamrud, with a bone to pick of his own, proposed to join in it if only it could be delayed, which suggests that there was already being felt by the Kuches in the hills, the Thibetan pressure from behind the Himalaya before which they were ousted ultimately so thoroughly that Bhutan invaded Kuch Behar in 1772.

In the year after this expedition took place, and up to the year 1226, the Muhammadans were occupied in reducing the kingdom of Tirhut on the other route. Only in 1352 did they penetrate so far as to destroy Semraon, which by that time and in spite of the grandiloquent account of its overthrow must have lost much of its importance. Only about 1500 was Bettiah made an outpost fort against the hill kingdoms.

Gaur was at this date or shortly afterwards a city of 1,200,000 inhabitants. Yet petty Rajput chiefs ruled the marches so near to it as northern Purneah, and were not

¹ The earlier markets were north of the Ganges; but the last south of it—an interesting fact which historians must take account of.

² This type of Bamboo armour may be seen in the Indian Museum, the Thibetans still using it.

brought under the Muhammadan yoke, until Saif Khan became faizdar of Purneah in 1738. Their long immunity from suppression, and the rarity in the whole countryside of ruins of permanent habitations, indicate the folk as having been too poor for the administration to spread over them. Population must have been very scanty; cultivation very backward: and when Saif Khan is recorded as having brought half of the land between Purneah and the mountains under cultivation, the Raja of Morung beyond is recorded as paying tribute in game, not having other means wherewith to do so. Likewise on the northern side of the Terai the inhabitants of the hills seem to have been feeble folk, for we have no knowledge of them in history; and when the Gurkhas had won their life-and-death struggle with the Newars, the whole of the wide stretch up to Sikkim was overrun with apparent ease. Thus in review does it seem that the want of a trade route through the Terai anywhere between the two important ones of the Gandak and Teesta left the development of the land on either side of the Terai belt in a backward state.

Saif Khan's work was helped forward by another circumstance, unconnected with his own ability: Newars who had fled before the Gurkhas, settled at the southern limits of the bhar and commenced to clear land (*vide* Buchanan-Hamilton in Montgomery Martin's "Eastern India," iii, 1838, p. 197).

At a little later date we find that the East India Company's Trade Agent at Patna maintained a buying subagent at Kaliyaganj on the Mahananda, whose duty it was to obtain sacking, made there from jute, and to send it down country. The existence of the subagency shows that the country on the eastern trade route was much cultivated. But I have no knowledge of any such subagent being placed along the southern side of the Terai towards the west.

It is probably written in Buchanan-Hamilton's unpublished manuscript at the India Office how much of the north of Purneah in 1811 was in forest, how much was in grass and how much was under the plough. Such information would be most interesting, if extracted. As it is, Montgomery Martin's account of Purneah is a very incomplete reproduction of what Hamilton wrote.

Hamilton (as reproduced) records the existence of a sal forest of small extent in the north-west corner (north-east was printed by Martin in error) of the Purneah district, and of several similar woods on the northern border of Bahadurganj and Udrai, producing in the last more *Butea frondosa*, Roxb., and *Bombax malabaricum*, DC., intermixed, than sal. Bamboos, he reports, to have been scarce, especially north of Araria, though slightly more abundant south-eastwards. *Dalbergia Sissoo*, Roxb., he records as planted on the lower Mahananda and west of the Kosi. Now conditions are changed. Every-

where north of Bahadurganj bamboos and mangoes abound ; but the mango trees are rarely old. Other trees are in no variety and rare everywhere, or are often entirely absent over large areas. The patches of sal south of the Nepal border have almost disappeared. *Bombax malabaricum* is rare ; *Butea* is only a little more common ; *Odina Wodier*, Roxb., occurs sometimes in the east. In 1911 I passed through the country near the border of north-eastern Purneah, and examined the vegetation. As remains of forest south of Nepalese territory were seen, one sal tree north of Thakurganj, a dozen trees at the place marked on the map¹ by the appropriate name of Salguri, a third clump at Garbandanga, and a fourth, north of Bibiganj. Regeneration is almost absent from these ; and they are doomed. In 1907 I visited the northern parts of Darbhanga and parts of Champaran. There the mango trees are older than in Northern Purneah. *Bassia latifolia*, Roxb., and *Dalbergia Sissoo* are sparingly present ; *Bombax malabaricum* and *Butea frondosa* are local. The sal which until, say, twenty years ago existed in a narrow strip along the Tiurnadi has been removed, leaving scrub. *Acacia arabica*, Willd., is absent all along the whole border.

The little variety in the woody vegetation over these wide tracts is evidence of periodic and severe firing at no very remote date, whereby the forest was destroyed first to a savannah, and then to what remains now through such a state as we see at the present time on the great gravel bank of the Eastern Duars towards Nagrakata.

The appearance of the forest which has gone, we can in part picture from the northern parts which persist. A short account of what is to be found in Nepal on the western trade route may be read in the *Records of the Botanical Survey of India* (Vol. iv., 1910, p. 67), and of what is under the Darjeeling Himalaya in articles by Mr. J. S. Gamble in the *Indian Forester*, i., p. 73, and Messrs. J. W. A. Grieve and E. O. Shebeare in the same, xl., 1914, p. 147.

At a very remote period the bhaver may have merged southwards gradually into a third type of forest having *Barringtonia acutangula*, Gaertn., as its most prominent member. Such a forest, up to a quite recent date, lined the northern bank of the Ganges in Purneah and is described by Buchanan-Hamilton as three to twelve miles wide when the nineteenth century came in (Montgomery Martin, *Eastern India*, iii., 1838, p. 195). It was more tiger-infested in the seventies and eighties, than the Terai ; but has been swept away by the northward migration of the Sontals.

¹ This map is dated 1857. additions to 1895. How old the name Salguri is, consequently does not appear from it.

CONCLUSIONS.

1. The natural vegetation of the Terai between the Gandak and the Teesta is forest.

2. The sand-carrying rivers which traverse it, by altering the nature of the surface soil promote the growth of the sal tree, *Shorca robusta*.

3. This effect is local, and determines the distribution of sal forest and diverse forest.

4. Man finds it easier to burn in the sal forest than in the diverse forest: and by moderate burning he encourages the growth of the sal, thus intensifying the differences between the two kinds of forest.

5. But as the pressure of man becomes heavier, the whole forest is destroyed by the firing; and, the pressure varying according to population, the south limit of the Terai forest exhibits bays where this attack has progressed most. Both from the greater ease of burning the areas covered by sal, and from the greater population which the neighbourhood of the rivers is able to support in comparative health, these bays are on the courses of the sand-carrying rivers.

6. The Gandak and the Teesta, the largest rivers of this part of the Terai except the perhaps-very-modern Kosi, have had from time immemorial trade routes connected with them, as a consequence of the suitability of the neighbourhood of the banks of a big river for travel in a land annually subject to flooding: and by the frequent coming and going, along these trade-routes the Terai forests have been particularly open to the attack of man.

7. This attack on the Terai forests, in the time before the Mohammedan irruption into Bengal, was effective enough for towns to spring up in the Terai belt, near the trade routes,—towns which by their size would need large clearings about them.

8. But between the trade routes both north and south of the Terai forest, want of a through traffic kept the land from developing, and the inhabitants of Northern Purneah and of the Himalaya north of Purneah, remained economically backward.

9. In the eighteenth century, Northern Purneah emerged into a transition phase between forest and cultivation, such as we can see in the Eastern Duars at the present time.

10. In the process nearly all the formerly existing tree growth was burned off, and although we find now that the landscape is full of trees, they are bamboos and mango-trees whose planting is certainly very recent.

17. Some old Records of the Madras Army
(1757-1759).

Edited by the REV. H. HOSTEN, S.J.

On December 21, 1910, the Army Department, Government of India, sent to the Honorary Secretary of the Asiatic Society of Bengal a list of old records of the Madras Army, which were then being disposed of, and asked whether our Society would care to print any of them before they were lost sight of in Government Record rooms. On February 9/10, 1911, the Army Department, Fort William, Government of India, (in its No. 49 A.D./Camp), instructed the Officer in charge of the Records of the Government of India, Calcutta, that the records of the old Madras Army, which were then in his custody, should be disposed of as follows:—

LIST OF OLD RECORDS.

<i>Books.</i>	<i>Orders as to disposal.</i>
1. Roll of recruit and pension to boys of— 4th Madras Light Cavalry, dated 1848, 1 volume. 8th Madras Light Cavalry, dated 1854, 1 volume. 18th Madras Native Infantry, dated 1851, 1 volume.	} To be sent to the Madras Government Record Office.
2. Letter book, Adjutant General's Office, Madras, dated 1784-86, 1 volume.	
3. Portion of an Invaliding Roll, Madras, dated 1872.		} To be sent to Major G. R. Oakes, 88th Carnatic Infantry.
4. 1 paper-covered book of coloured pattern drawings of regimental badges for knapsacks.	
5. 1 paper-covered lithographed book of elephant artillery mountings, Madras.	} To be sent to the Secretary, United Service Institution of India, Simla.

Documents.

1. List of English prisoners in Pondicherry, dated 1759 (in French).
2. List of French prisoners at Fort St. George, dated 1759.
3. General abstract of English prisoners at Pondicherry, dated 1759.
4. List of English and French prisoners exchanged, dated 1759.
5. List of French ships at the Cape and Mauritius in February 1759.
6. Copy of a letter from Colonel Clive to Admiral Watson, [dated 1757].
7. Copy of a letter from Admiral Watson to Colonel Clive, dated 1757.

To be sent to the Asiatic Society of Bengal for publication on the... understanding that the originals will be returned.... to be preserved in the Imperial Library.¹

Coloured Plates.

1. 1 bundle coloured drawings of regimental colours of Madras regiments.
2. 1 bundle coloured drawings of Queen's colours of Madras regiments.
3. 1 bundle coloured drawings of pairs of regimental colours of Madras regiments.
4. 1 small coloured plate of regimental colour of H. M.'s 55th Foot, dated 1843, approved and apparently signed by Queen Victoria.
5. 2 water colour sketches of men of 14th Sikhs and 20th Punjabis, dated 1877.

To be sent to the Secretary, United Service Institution of India, Simla.

Drawings in colour and ink of articles of dress.

1. 1 brown paper covered bundle of drawings of dress, badges, etc., of Madras regiments.
2. A quantity of odds and ends of articles of dress, equipment, badges, etc., of Madras regiments. (Such of these as can be identified have been sorted into separate covers, by regiments).
3. 1 lot drawings of breast plates, Madras regiments.

¹ "Imperial Library" was changed to Imperial Record Department by No. 63 A.D. Camp. Government of India, Army Department, Fort William, 22nd February, 1911.

On February 23rd, 1911, Dr. E. Denison Ross, the Officer in charge of the Records of the Government of India, addressed to the Asiatic Society of Bengal the seven papers detailed above under "Documents."

Our Society was anxious to have the "Documents" edited. Accordingly, Mr. G. H. Tipper, our then Honorary Secretary, deciphered some of them, but he had not completed the work when he joined the Indian Army Reserve. Recently, Mr. Stanley Kemp, who has been several times our Honorary Secretary, heard of these papers, and, on my offering him my help, he invited me to edit them.

As a search into the most likely books, such as S. C. Hill's *Bengal in 1756-57* (3 vols.), C. R. Wilson's *Old Fort William in Bengal* (2 vols.), his *Early Annals of the English in Bengal* (3 tomes), and H. Davidson Love's *Vestiges of Old Madras, 1640-1800* (3 vols.), shows that these papers were unknown heretofore, we publish them here in their chronological order. The works just mentioned furnish the historical setting and dispense us from further comment.

DOCUMENT I.

*Copy of a Letter from Colonel Clive to Admiral Watson
(Calcutta, 24th February 1757).¹*

SIR,

I should be wanting in my Duty to the President and Council of Madrass if I was not to return you thanks in their Names for the eminent Service you have rendered the East India Company in this Province; Services of such a Nature as will be remembered² as long as there is an India Company subsisting in England.

The Honorable peace lately concluded with the Nabob of Bengal ratified in the most firm & sacred Manner and the Certainty of a Neutrality with the French Guaranteed by him will I make no doubt put the Company's Affairs upon the securest footing in these parts and I am persuaded that attention you have hitherto bestowed on India in General will induce you not to forget the Company's Interest on the Coast. It is not impossible, Sir, but the Dispatches sent//by the 20 Gun Ship, may countermand those lately received at the Coast, this seems to be the Opinion of the President and Committee of Fort St. George. It is not unlikely but a French Squadron may already be arrived there, [in such case?] I must confess I shall be under Great Concern for the consequences. All the Company's extensive & valuable Acquisitions run the Risque of being

[P. 1.]

[P. 2.]

¹ Two leaves 12½ x 7½ inches.

² Si.

taken from them, for the want of your Squadron and the large Reinforcement of Military sent from the coast for the Recovery of the Company's Rights & Privileges in this Kingdom.

Give me leave therefore in the Name of the united East India Company to desire the¹ of all the Assistance you can possibly spare the Gentlemen on the Coast of Chormandell.

[P. 3.] My instructions from the President and Committee, desire I will apply to you for // a Passage for some of the [re]turning Force. Should you therefore think proper to send any of the Squadron upon the Coast, give me leave to make this application.

I am,

Sir, with the greatest Respect,

CALCUTTA: Your most obedient hum. Serv^t ,
24th Feby. 1757.

ROBERT CLIVE.

CHARLES WATSON, Esqre., &c., &c.

[*Endorsement*]: N. 4. Copy of Letter from / Colo¹ Clive to Adml. Watson / to be entd. in Comm. 18th Apr. / Entd. / Charles Floyer / S. L. Douglas.²

DOCUMENT II.

*Copy of Admiral Watson's answer to Col. Clive
(Fort William, 27th February 1757).³*

[P. 1.] SIR,

Being in the midst of my Dispatches for Europe when I had the Favour of your Letter of the 24th Inst., and since having been taken up with the Deputies from Chandinagor I have been prevented doing myself the Pleasure of thanking you sooner for the Opinion you are pleased to entertain of the Service his Majesty's Squadron has been of to the Company's Affairs in this Province. If my mite has contributed anything to their⁴ I am well pleased: But I cannot think their Affairs here are on so secure a footing yet as to be able to part with any of that Force brought here for their Relief and Protection without its being attended with very ill consequences to the Settlement; and from the Opinion of everybody here, I believe they woud⁵ be in as much danger of being driven out again as ever they were if the Squadron and Troops were to go

¹ One word illegible.

² S. J. Douglas? S. P. Douglas?

³ Two leaves 12½ × 7½ inches.

⁴ One word illegible. Probably: success.

⁵ Sic.

out of the River, before every Article of the Peace was fulfill'd and their Fortifications put into a better Posture of Defence.

The Apprehensions you are under for the Compy.'s Settlements on the Coast are so very different from the Opinion of the Governor and Council at Madrass; that I cannot help sending you an Extract of their Letter to me in Answer to representations I made them relating to their Settlement if the whole Squadron should proceed on this Expedition and a French Squadron arrive in my absence. They say:

“We are obliged for your Representations of our Situation here; we have seriously reflected on the Subject, we shall leave ourselves with a Garrison sufficient for our Ground, and with the Rise of [a ?] Fortifications cannot say that we fear even an Enemy [as ?] powerful as has been represented to us from Europe.”

From such an opinion founded too after a Serious Reflection on their Situation I can have no good great Reason to suppose they have need of any Assistance from this Squadron. However give me leave to assure you if everything here was settled in the manner you represent, there was also a possibility of getting the large ships ready to go out of the River this Season, and if tho^t my Appearance at Madrass would be of service to the Company I would with Pleasure proceed there. But considering the time of Year and the Condition of the Squadron, it is now become impossible to get the necessary Repairs done to enable them to proceed to the Coast, and the Imprudence of such a step.....¹ before the Neutrality was firmly se(ttle)d with the French, would be the height of Folly, it being so far from a certainty that such a Treaty will be concluded that the Council at Chandernagore are not invested with Powers to settle it.

I believe I shall have occasion to send the twenty Gun Ship and Sloop to Madrass very soon, if you have any commands to the coast that I can comply with, I will gladly give their Captains orders accordingly.

I am,
Sir,

FORT WILLIAM. Your most obedient humble Servant,

27th Feby. 1757.

CHAS. WATSON.

To COL^L CLIVE.

[*Endorsement*]: No. 5. Copy of Admrl. Watson's / Answer to Colo^l Clive / To be entd. in Comm. 18th Apr. / Entd. Charles Floyer / S. L. Douglas./²

¹ Two words illegible.

² S. J. Douglas ? S. P. Douglas ?

DOCUMENT III.

*List of French Ships at the Cape and Mauritius in February, 1759.*¹*At the Cape.*

		<i>Men.</i>	<i>Guns.</i>
Illustre, King's Ship	.. De Ruis ..	600	64
Fortune	.. De L'Obry ..	600	64
Centaur	.. De Surville Ancié ..	650	66
Duc D'Orleans	.. De Surville Cadet ..	500	60
Vengeur	.. Palliere ..	500	64
Condé	.. Rosbo ..	336	50
Achilles, King's ship	.. Mariniere ..	..	64
Syren Do. Frigate.	.. ..	..	32
Zephir Do. do.	.. Le Grass ..	..	30
Renommé, Frigate	.. St. Martin ..	100	18
Balleine	.. dela Londe	} Vessels of burthen called Flutes of 145 feet keel carrying 130 Men each, and have ports for 30 guns on one Deck.	
Chameau	.. Ommeral		
Elephant	.. Winceslaus		
Hermione	.. Murphy		
Penelope	.. Iremogen		
Grantham, Prize	.. ..	

At Mauritius.

		<i>Guns.</i>
Minotaur, King's Ship	.. L'Aiguille chef d'Escadre ..	74
Actif Do.	.. Beauchain ..	64
Zodiaque Do.	.. D'Aché, Lieut ^t -General ..	74
Comte de Provence	.. La Chaise ..	74
Duc de Bourgogne	.. Bouvet ..	60
St. Louis	.. Johannes ..	60
Moras	.. Begdeloire ..	50
Sylphide	.. Marian ..	30

Argenson, the same as the Condé (at Madagascar) Sechelle and Duc de Berry are also at the Island, but unmann'd.

The Condé is said to be intended for an Hospital Ship, the Moras being old to be laid up, and the Vengeur in a bad Condition.

The Men & Guns in the above Account are agreeable [*sic*] to the List [?] deliverd to the Dutch upon the Arrival of the Ships at the Cape. They have many more Men on board than their Complement which they sent them to be Victualled as Provisions were exceedingly Scarce at the Island.

Jonathan Melling, Mate of the Betsy, a Guinea-ship taken

¹ Two leaves, each 12 x 7½ inches.

by the Fortune and Argenson on their Passage to India, on the 16 March 1758, declares that as many men as possible were turned over from the Ships at the Islands on board those sent to the Cape, and that he judges there could not be more than 1600 men left on board//the different ships at the Islands which were preparing to careen and that they had besides only¹ marines. The Ships at the Cape were not expected to get Careen'd so as to get up on the coast in Time.

[P.3.]

The Penelope sail'd from the Cape to the Islands the latter end of Janry.—and the Chameau, Hermione and Elephant the 10th Febry. loaded with Corn, Wine, &c^a.

The Achilles, King's ship, with the Syren and Zephir, Frigates, left Brest the 14th Octr. 1758 and arrived at the Cape the 15th Janry. 1759 where they Victualled with great Expedition and saild from thence the 17th Febry. They are supposed to be intended for a cruising Squadron, their Destination not being known, Mr. de la Marinere, the Commander, having seal'd Orders which were to be open'd 15 Leagues to the Westward of the Cape. It was also Reported that the French expect further the Brillant of 64 Guns & two more Ships. There are no certain Accounts of any Reinforcement of Land Forces being arrived at the Islands.

[*Endorsement on the back of the second leaf*]: Account of the French / Squadron destin'd for India / in 1759. /

¹ Number illegible.

DOCUMENT IV.

*A General Abstract of the English Prisoners at Pondicherry.*¹
[8th March 1759].

A GENERAL ABSTRACT OF THE ENGLISH PRISONERS AT
PONDICHERRY.

	1 Serjeant-Major.	}	Fort St. David, Viza- gapm., & Chettipett.
	34 Serjeants.		
	27 Corporals.		
	2 Drum Majors.		
	2 Drummers.		
<i>Train.</i>	210 Centinels.		
	7 Serjeants.		
	3 Corporals.		
	7 Bombardiers.		
	10 Gunners.		
	39 Matrosses.		
<i>Pensioners.</i>	10 Serjeants.		
	5 Corporals.		
	46 Centinels.		
	1 Bombardier.		
	2 Gunners.		
	3 Matrosses.		
<i>Supernumerary.</i>	5		
	1 Serjeant-Major.	}	Madrass, &c.
	4 Serjeants.		
	5 Corporals.		
	90 Centinels.		
	1 Topas.		
	1 Carpenter.		
	516		
	166	}	Officers & Seamen belonging to His Majesty's late Ships.....isyr [?]. upon. ²
	15			Seamen taken on the Coast of Guinea.
TOTAL	..		697

Pondicherry, 8th March 1759.

Geo. Dawson.

N.B.—Casualties since the Month of November not In-
cluded.³

¹ Two leaves, 14½ × 10 inches. Second leaf blank.

² Illegible. What appears to be the names of 2 or 3 ships.

³ Endorsement on p. 4 illegible; paper pasted over it

DOCUMENT V.

List of English and French Prisoners exchanged
 [29th July 1759]¹

PRISONNIERS ANGLAIS.

PRISONNIERS FRANCOIS

Messieurs.

Morse	..	..	..	Denis.
Dawson	..	..	..	Panou. ²
Smith	..	..	..	Dorée. ³
Thomas Minchin	..	..	..	Ferriere.
John Blake	..	..	..	Sainé. ⁴
Richard Garnour	..	..	..	Deshave.

Creuzé mort en juillet 1758 échangé en
 8bre suivant contre Mr. Ballandine.

Son échange devenant nul doit avoir
 lieu pour un autre et peut être accepté
 pour Mr. De St. Martin.

a Pondichery Le 29 Juillet 1759.

Deval De Leyrit

[*Endorsement*]: Act of Exchange. / Reced. with Mr. Lally's /
 Letter dated 3rd Sep^r. 1759./

¹ Two leaves, 12 × 7½ inches ; second leaf blank.

² Panon ? The wife of one J. J. Panon died at Patna, year unknown
 (Patna Cathedral Inscriptions).

³ Dorés ? † Lainé.

DOCUMENT VI.

*List of French Prisoners at Fort St. George, October 10th, 1759.*¹

1. Bellehumeur, Serjeant.	27. Lisle D'amour, Centinel.
2. Beaucard, Volontier.	28. Econe, Do.
3. Lachaux, Trooper.	29. Orleans, Do.
4. Merville, Do.	30. La Tulipe, Do.
5. Gasterpold, Hussar.	31. Sans Souçis, Do.
6. Kayzeley, Do.	32. St. Leger, Do.
7. Perrick, Do.	33. La Sagesse, Do.
8. Vincent, Do.	34. La Tendresse, Do.
9. Posse, Do.	35. Belle Rose, Do.
10. Frantz, Do.	36. Carlx, Do.
11. La Violette, Centinel.	37. Le Beaux, Do.
12. Vaqueville, Do.	38. Alexandre, Do.
13. Piquar, Do.	39. Foy, Coffrey.
14. Le Cadre, Do.	40. Lorent, Topass.
15. La Pauruve, Do.	
16. Berger, Do.	
17. Boy Sant Soif, Do.	
18. Belle Etoile, Do.	
19. Courgeron, Do.	
20. Delorier, Do.	
21. Lapidaire, Do.	
22. Renboury, Do.	
23. Il Vidieu, Do.	
24. Navains, Do.	
25. Luxus, Do.	
26. Blaing, Do.	

Abstract.

1 Serjeant.
 1 Volontier.
 2 Troopers.
 6 Hussars.
 28 Centinels.
 1 Coffrey.
 1 Topass.

—
 Total 40 [changed to] 37.²

[*Endorsement*]: List of French Prisoners / at Madras / sent with the President's / Letter to Mr. Lally / dated 10th October 1759. /

¹ Two leaves, 14½ × 9½; the second blank. We have put numbers before the names. Nos. 12, 13, 38 are struck out.

² The number 40 is crossed out and 37 substituted, but corresponding corrections have not been made in the detailed numbers shown in the abstract.

DOCUMENT VII.

Four folio leaves, 16½ × 11 inches; title-page elaborately engrossed.

[*Title-page*]: Etat / Des Prisonniers Anglais / Détéuus dans Les Prisons / Du Fort Louis / A Pondichery : [P. 2 blank.]

Etat des Prisonniers / Anglais détenus dans / Les prisons de Pondichery. [P. 3.]

SCA VOIR.¹

TROUPPES DE ROY.

1. Richard Aleau, Sergent.
2. Jean Berge, Sergent.
3. James Rotekeind, Capl.
4. Jean Storé.
5. Thomas Eekesse.
6. Edouard Clak.
7. Martin Steller.
8. Thomas Hesseune.
9. Jean Jauberton.
10. William Flaite.
11. Robert.
12. Nicolas dejousse.
13. James chizette.
14. James Woaledé.
15. Benjamin Sader.
16. Mathieu honjoue.

17. Samuel Crosse.
18. Ricard Cortesse.
19. James Meloc.
20. Jean Robinson.
21. Joseph Robinson.
22. Daniel Angliche.
23. William Denis.
24. Francis Matesse.
25. Jean Guillaume.

ARTILLERIE.

26. Jacques Merisy, Sergent.
27. William Ritchelle.
28. Robert Nol.
29. James Gris.
30. Daniel Brond.
31. William Selisse.

¹ We have put a number near each of the names and we add here under them alternative readings. Many of the names are difficult to read. We make a guess at the proper spelling of some of the names. Many are baffling: they look more like French, Breton or Dutch than English.

1. Alcan? 3. Rotekemnd? 5. Tekesse? Zekesse? 6. For Clark? 15. Sadler? 19. Melou? For Mallock? 22. For English? 30. Brond? Brand? 34. For Baker? 42. Merne? 44. For Watt? 45. Probably Robinson is intended. 47. Brauson? 49. Guerine? 50. McHugh? intended. 52. Macquinezé? 55. For Oliver? 56. For Woollett? 57. For Day? 58. Waten? 59. Kenue? 60. Brice? intended. 63. Hamilton? intended. 64. Kichener? intended. 65. For Drew? 66. Hallam? intended. 68. Kervaylé? 72. Moore? intended. 74. Howell? intended. 79. Marsann? 84. Gaesse? 85. Brahou? Brahon? 86. For Smith? 87. For Taylor? 88. Fudeles? Fredeles? 89. For Camel? 93. For Chandler? 94. For Dean? 98. Voldiguié. 100. Saouse? For Youd? 105. For Bellamy? 106. For Davies? 107. For Anderson? 113. For Richard? 114. Benegraus? 118. Bron? 119. Soleq? 121. Boulimune? 122. Micaut? 124. Heltem? 126. For Good? 127. Honbres? 128. Tornem? 135. For Valentine? 140. Melev? 146. Calvere? for Calvert? 156. Lams? for Lamb or Lambs? 157. James (probably for the Christian name. 167 and 169. For Anderson? 170. For Hallam? 173. For Jardine? 174. Matekijf? Mateksf? 184. For Wilford? 185. Houlrodre? Honbrodre?

32. Jacob Chehatenne.
33. Samuel Zeller.
34. Jean Beker(s).
35. Jacob Desso.

[P. 4.]

TROUPPES DE COMPAGNIE.

36. John Guillo.
37. Thomas Pau.
38. Thomas Woeles.
39. Jean Carete.
40. Georges Stamere.
41. Georges Zamsen.
42. William Merue.
43. William Senne.
44. Alexandre Ouatte
[Oualle?]
45. Thomas Rabincon.
46. Samire Dare.
47. Joseph Branson.
48. Jean Randelou.
49. James Guerme.
50. Jean Maguene.
51. William Imisse.
52. Jean Macquiniéré.
53. Jean Forbroacq.
54. Benjamin Barjet.
55. Jean Olevé.
56. Jean Wolette.
57. Johan Daij.
58. Georges Waten.
59. Adjonas Kenne.
60. Thomas Briuce, mort.

FUSILIERS.

61. James Valer.
62. Abraham Baterosse.
63. Henry Emelton.
64. Mathieu Kechenau.
65. Nicolas Droo.
66. William Halem.
67. Richard Frost.
68. Thomas Kerdaglé.
69. Jean Brand.
70. Jean Guillaume.
71. Jean Gaspard Habicq.
72. Jean Moere.
73. Alexandre Laly.
74. Thomas Hoelle.

75. Samuel May.
76. Jean Redek.
77. Samuel Youlse.
78. Guillaume Rao.
79. Joseph Marsaun.
80. Thomas tabré.
81. Thomas Michel.
82. Jean Prainne.
83. William Halem.
84. Thomas Guesse.
85. Jean Brazon.
86. André Smath
87. William Teller.
88. Georges Fredelee.
89. Jean Camole.
90. Jean Philippe.
91. James Melbé.
92. Jean Fros.
93. Georges Choudelour.
94. Edouard dienne.
95. James Brekner.
96. Yanne Mahon.
97. Thomas Lagouelle.
98. Jean Voldiquié.
99. William Kedelec.
100. Thomas Jaoude.
101. André Morte.
102. Charles Revenel.
103. Thomas Quebenne.
104. Ante. Cheamen.
105. Jean Belomé
106. Robert Devisse.
107. Jean Andresson.
108. Samuel Gestenne.
109. Robert Smith.
110. Jean Bameesse.
111. Thomas Guiemsel.
112. Thomas Spouly.
113. Richer Herouade.
114. James Benegraur.
115. Richard d'Artemie.
116. Georges Chapette.
117. William Tauson.
118. James Brou.
119. Thomas Fbleq.
120. Jacob Cheloume.
121. Jean Boulimusse.
122. Thomas Micaur. [P. 6.
123. Thomas Demonte.

Sergens.

Caporaux.

- | | |
|---|--|
| <p>124. Thomas Hettem.
 125. Jean Mayelle.
 126. Ante. Goude.
 127. Jean Houbres.
 128. Jean Torneuv.
 129. Robert Beché.
 130. Jean Wiliam.
 131. Wiliam Hequemam.
 132. Kovard Devé.
 133. William Nape.
 134. Richard Valinton.
 135 Charles Nit.
 136. Thomas Smith.
 137. Games Stoker.
 138. Jean Deeson.
 139. Barny Kraneston.
 140. Jean Melev.
 141. William Lucas.
 142. Jallax Not.
 143. Johan Berchette.
 144. Karvé Halbode.
 145. Martin Hiouque.
 146. Richard Calveve.
 147. Barbe Stine.
 148. Jean Dresson.
 149. Chretiens Stophe.
 150. Jean Crafo.
 151. André Auké.
 152. William Bevesse.
 153. Charles Stamesse.
 154. Jeremaé Stenne.
 155. William More.
 156. Jacques Lanes.
 157. Jaur Fines.</p> | <p>158. Charles Fine.
 159. David Houecq.
 160. Jean Prete.
 161. Kautilen Smith.
 162. Jean Wohette.
 163. Thomas Partiton.
 164. Thomas Chingueme.
 165. Leopold desse.
 166. Michel Waldenne.
 167. Jean Andreson.
 168. Thomas Fox.
 169. Jean Andreson.
 170. William Halem.
 171. Jean Fiederhard.
 172 James Saess.
 173. Robert Jardenne.
 174. Barny Matekf.
 175. Guillaume Repingal.
 176. Richard Tournem.
 177. Thomas Michel.
 178. Jean Grosse.
 179. David Grains.
 180. Thomas Wopx.
 181. Thomas Skenne.
 182. Guillaume Stané.
 183. Benjamin Pieter.
 184. Hervé Wilforte.
 185. Jean Georges Houbradic.
 186. Jacob Desso.
 187. Jean Devc.
 188. Conderan Spenerqueke.
 189. Alexandre Courmier.
 190. Thomas Pour Dieu.</p> |
|---|--|

RECAPITULATION.

TROUPPES DE ROY.

Sergens	..	..	..	..	..	2
Caporal	..	..	..	..	..	2
Fusiliers	..	..	..	..	..	22

TROUPPES DE COMPAGNIE.

Sergens	..	..	10			
Caporaux	..	..	15	dont 1 de mort.		
Fusiliers	.	..	130	..	..	155

ARTILLERIE.

Sergens	..	..	1		
Canonniers	..	..	9	..	10
Total général :					190 hommes. ¹

[P. 8.] [*Endorsement*]: List of English Prisoners / at Pondichery /
 Reced. with M. Lally's Letter / of the 23rd Octr. 1759.

¹ We reach a total of 191. Thus: Troupes de Roy: 2 sergeants, 1 corporal, 22 others (total 25); Troupes de Compagnie: 10 sergeants, 15 corporals, 130 fusiliers (total 155); Artillerie: 1 sergeant, 10 others (total 11); grand total: 191.

18. Note on the Ta'rikh Salāṭīn Afāghīnah.

By H. BEVERIDGE, I.C.S. (Retired).

Aḥmad Yādgār's history of the Afghān Kings of Delhi and Agra has been described by Elliot and Dawson at the beginning of vol. V of their History of India. There is a modern and undated copy of the work in the Library of the Asiatic Society of Bengal, MS. No. 137, and this appears to be the only one in existence.¹

In his preface, Aḥmed Yādgār says he wrote his book at the suggestion of a king whom he calls Bādshāh 'Ālampanāh Abu'l-Muzaffar Dāūd Shāh. This has been taken to mean the young and dissipated son of Sulaimān Karrānī of Patna, and the last of the Afghān princes of Bengal. He was defeated and put to death in July, 1576. But the titles are rather grandiose for a prince who had so short and inglorious a reign. The magnificent titles might not be out of place if Aḥmad Yādgār wrote as a bigoted partizan of the Afghāns, but this is not the case, for his sympathies seem to be with Bābur and his descendants. And this would be natural, for his father was in the service of Humāyūn's brother Mirzā 'Askarī. He tells us that he wrote his book because the histories of Minhājād-diñ Jurjānī and Ziyā-i-Barnī were discussed at an interview he had with the king, and that the latter remarked to him that no one

¹ The Imperial Library (Bohar collection), however, possesses a complete copy of the work. The Imperial Library copy (MS. 3887) comprises 198 folios and is written in ordinary *ta'liq* by one 'Abd al-Rahmān. It is free from the errors of spelling I have noticed in the Asiatic Society's copy and is a better copy than that in our possession.

Like our copy it begins thus :—

شکر و سپاس واجب الوجودے را سزد - الخ

The concluding words are :—

بدست مبارک شمشیر بران انداخته سر از تن ناپاک او جدا ساختند -
تمام شد - الکاتب فدوی عید الرحمن *

Spaces for headings and insertion of introductory words like شعر (verse), حکایت (story), etc. are left blank throughout.

The passage containing the *raison d'être* of the work runs thus :—

کہ روزے در محفل ہمایون بادشاہ عالم پناہ ابوالمظفر داؤد شاہ - الخ

I feel no doubt that the word *humāyūn* ہمایون in the above passage is an adjective meaning 'auspicious,' etc., and cannot mean, as suggested by a distinguished Orientalist, the Emperor Humāyūn.—*Philological Secretary*.

had written the history of the Afghān princes who had sat on the throne of Delhi from the time of Amānat Khān (?), and that it would be good if Aḥmed Yādgār would undertake such a work. The author adds that as he had long been a servant of the court, he felt bound to comply with the king's request, and so wrote the history of six kings, beginning with Bahlūl Lūdī. In fact, he has written the history of six Afghān kings, viz. Bahlūl, Sikandar, Ibrāhīm, Shīr Shāh, Islām Shāh and 'Adlī, but has interpolated, after the account of Ibrāhīm, the history of Bābur and Humāyūn. He writes like a gossiping old man, and does not give the date of his composition, except in one place, p. 89b of MS., and there the text seems to be corrupt. He is describing the destruction of a tribe of Mundahārs and of their village in Pargana Kaithael in the year 935 A.H. (1528-29) by Bābur's officers, and says the place has remained a desert ever since though 160 years have elapsed since then. This would make the year of writing 1095 (935 + 160) or 1684 A.D. But such a date seems impossible, for in describing the reign of Humayun the author says that his (own) father was Mirzā 'Askarī's vizier in the Gujarat campaign, that is, in 942-43 A.H. or 1536-37 A.D. The passage is at p. 99 of the MS. and is as follows: "*Īn Za'īf az pidar-i-khud ke darān waqt wazīr-i-Mīrzā 'Askarī būd shunīda būdam*" (It is worth noting that Professor Dowson never saw the passage in the original, see his note at p. 1 of vol. V, but obtained the reference from Mr. Blochmann.) At this time Aḥmad Yādgār's father must have been a man approaching middle life, if not past it, and in all probability he was dead long before the end of the 16th century. And as Aḥmad Yādgār was old enough to hear from his father about the Gujarat campaign of 1537, it is impossible that he could have been living and writing history more than a century after his father's death. For, as I have said, his father must have died considerably before the end of the 16th century (viz. 1570-80), and the 160 years spoken of by Aḥmed Yādgār bring the date of writing down to 1684. Moreover, Dāūd Shāh was put to death in 984 (July 1576), and if he be the person who suggested the work, Aḥmed could not have been alive and writing history in 1684. Of course, it would be still more impossible if Aḥmed's interlocutor was Humāyūn, for he was killed in January, 1556. Dāūd Shāh died, as we have seen, in 1576, but the conversation may have taken several, if not many, years before and when Dāūd was only a younger son of Sulaimān. And it is to be presumed that Aḥmed Yādgār did not long delay to comply with a royal request. It will be seen from Professor Dowson's note at p. 42 of vol. V that he saw the difficulty about the 160 years, and remarked, "if this be correct, the date of the composition of this work is later than has been supposed." There is a difficulty caused by Aḥmad Yādgār's reference to the

Ṭabaqāt Akbarī, the author of which did not die till 1003 A.H., 1595, though he may have been writing his history for many years previously. Aḥmad Yādgar's references to and his copying from Nīzām-ud-din's history relate, I think, to the history of Humāyūn, and I would suggest that this history, which was no part of Daud Shah's suggestion, may have been added afterwards. However, whatever be the date of Aḥmad Yādgar's history, he must, as his father's son, have had access to good sources of information. Perhaps, the most valuable part of his book is his account of the last two years of Bābur's reign. It supplements the Memoirs of Bābur, and also Ferishta and Abul-Faḥl, for, as Professor Dowson remarks in a note to p. 42, there is no mention elsewhere of the expedition against the Mundāhirs. If we had not Aḥmad Yādgar's work, we should not know that Bābur marched to Lahore in the third year after his accession, i.e. in 935, or that he met the Rajah of Kahlūr at Sirhind, and sent a punitive expedition against the Mundāhārs of Kaithal (in the Karnāl district).

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Honorary Numismatist.

H. N. Wright, Esq., I.C.S. (offg. H. R. Nevill, Esq., I.C.S.).

19. Talcher Plate of Gayādatuṅgadeva.

By R. D. BANERJI, M.A., *Indian Museum, Calcutta.*

(With Plates III—IV.)

This copper-plate was sent to me in March, 1911, by Mr. L. E. B. Cobden Ramsay, I.C.S., Political Agent, Orissa Feudatory States, in connection with the work of editing the posthumous works of the late Dr. T. Bloch, Superintendent, Archaeological Survey, Eastern Circle. I found that the plate had not been seen by Dr. Bloch. According to the information supplied by Mr. Ramsay, the plate belongs to the Talcher State, and it has been edited by Babu Nāgendrānāth Vasu, *Prāchya-vidyāmahārṇavā*.¹

The inscription is incised on a single plate of thick copper measuring $5\frac{1}{2}'' \times 4''$ with a projection on the top to which is attached a seal, elliptical in shape, major axis measuring $2\frac{1}{4}''$ and the minor $1\text{-}13/16''$. The seal seems to be cast in some lighter metal, probably brass. The credit of discovering the first copper-plate inscription of Gayādatuṅgadēva, in very prosaic surroundings, belongs to Prof. Nilmani Chakravartti of the Presidency College, Calcutta, who found it in the library of the Asiatic Society of Bengal. This inscription has been edited by Prof. Chakravartti in 1909.² The present inscription is much smaller than the Asiatic Society's plate and refers to the reign of the same king. The seal is identical with that of the Asiatic Society's plate, but the letters are no longer legible. On the top of the letters we have the crescent and below, the bull Nandi and a tree to its left. The inscription on the first side of the plate is almost identical with that on 11. 1-18 of the Asiatic Society's plate. It records the grant of a certain village made to three Brāhmaṇas by a king named Gayādatuṅgadeva, who claimed to have descended from the Tuṅga (Rāstrakū'a?) family and belonged to the Sāṅḍilya gotra. The family is said to have come from Rohitagiri, modern Rohāsgarh in the Shāḥābād District of Bengal, which is mentioned in an inscription from the same locality, now in the Indian Museum as *Rohitāśva*.³ Gayādatuṅga's titles are *Parama-māheśvara-samadhigata-*

¹ *The Archaeological Survey of Mayurabhaṅja, Vol. I, pp. 152 ff., with plates.*

² *J. & P. A.S.B., Vol V, p. 347.*

³ *Rohitas Inscription of the Tomara Mitrasena—J.A.S.B., Vol. VIII, p. 695.*

pañchamahāśabda,' but he does not use Royal or Imperial titles. At the same time I must note that the mere mention of the Yamagarta *maṇḍala* does not prove that he was a *Mandalādhipati*.¹ About the language and the genealogical portion of the inscription, I have but to reproduce the remarks of Prof. Chakravartti. The language is hopelessly corrupt Sanskrit. The inscription records the grant of the village of Vāmaitālla in the Tuṅkerā *vishaya* to three Brāhmanas, *viz.*, Devaśarma, son of Padama; Vṛṣṭideva, son of Lallāḍa and his son Rāmadeva. Half of the village went to Devaśarma, one-fourth to Vṛṣṭideva and the remaining fourth to his son Rāmadeva. The family of Devaśarma had emigrated from the Varendra *maṇḍala* of Bengal to the Odra *Vishaya* or more particularly from the Utharuthabhata village of the Varendra *maṇḍala*. It should be noted in this connection that this is the first specific mention of the Varendra *maṇḍala* in an inscription. Devaśarma was an inhabitant of the village of Sāvira bhata in the Odra *vishaya* and he belonged to the Kāśyapa gotra, the *pravaras* being Vātsāyana and Naidhruva. Evidently the first name of the *pravaras* of the Kāśyapa gotra, *Kāśyapa*, has been omitted. Devaśarma's grandfather was Dhanaśarma and his father Padama, and he was a student of the Kānva branch of the Yajūrveda. Vṛṣṭideva was a student of the Kānva branch of the Yajūrveda like Devaśarma, but he belonged to the Vātsya gotra. His father was Lallāḍa and his grandfather Dhaḍukā, his family having emigrated from Sāvathi, *i.e.*, Srāvasti. At the time of the grant they were inhabitants of the Yamagarta *maṇḍala*. No special mention is made of Rāmadeva as it is apparent that he is a son of Vṛṣṭideva just mentioned. On palaeographical grounds the inscription may be referred to the eleventh century A.D. I edit the inscription from the original :—

TEXT.

First Side.

- 1.—Om² svasti [l*] Āva [d*] dho [d*] dhata dvipa-gaṇḍa-sthala-galad-avirala-ma.
- 2.—da-malita³-madhukarāvali-jha [m*] kṛṇe (t-ai)ka-prado-ṣāt = pravudha-⁴.
- 3.—teya-vipra-varai Rik-sāma-yajur-vēda dhvanībhir =⁵ nivaha-pra-
- 4.—tikṛta-sakala-janapadāt⁶ ānavarata-dviya-huta-hu—

¹ J & P. A.S.B., Vol. V, 1909, p. 348.

² Expressed by a symbol.

³ Read *malina*.

⁴ Read *pravṛddha-tējō-vipra-varair* = rik—.

⁵ Read *dhvanībhir* =.

⁶ Read *padād* = ana—.

- 5.—ta-dhūma-saṁchayo¹-prahasita-samasta-risi²-vāsakāt.
 6. Mahāparvatābhīdhāna-parvato-da (?) rindatā (?) tuṅga
 narendrām—
 7.—kita tano[h] Yamagarta maṁḍale gata-dūrvārārāti³
 mā—
 8.—dya [d] = dvirada-vara-ghatā-kumbha-piṭha-prahāra-
 vyālagna-muktā—
 9.—phala-nikara-karāl = āsi-dhārā sphurantī dṛishtvā bha-
 gne
 10.—nivārīta prahasitavati yasyā⁴ grāme bhumau sa Śrī
 (Śrī).
 11.—Gayādatuṅga prathita-prṭhu-yaśas = tuṅga-vamśād =
 vabhūva sa—
 12.—dviry =⁵ āścarya-bhūto nija-bhuja-mahimō-rjita pu-
 jitaśrī (Śrī)
 13. rājā vāṇāryaśatro satatam = api-chalā niśchalā yasya-
 14. lakshmi⁶ Sāṁḍilya-gotrād = utpan (n) a ROHITĀ-
 GIRI nirga—
 15.—ta rājā Śrī (Śrī) Jagattuṅga rūpa-viryā⁷ valānvida
 tasyānvaye.
 16. Salānatuṅga Śrī (Śrī) mān = urjita-vikrama tasyā
 vabhūva dha[rmma*].
 17. jño dugdh = āvdher-iva chandramā [1] PARAMA-
 MĀHESVARA-SAMADHI—
 18. GATA-PAÑCHA-MAHĀŚAVDA ŚRĪ-GAYĀDATUṅ-
 GADEVA kuṣ (ś)ali
 19. Etan = maṁḍale-smīna⁸ bhāvino sāmanta-sāmavājini.
 20.—jana janapadā yathārīha [m]⁹ vodha[ya]ti kuṣa (śa)
 laya-ty = ā—
 21. disayati¹⁰ cha viditam-astu bhavatām

TEXT.

Second Side.

- 22.—Tuṅkerā vishaya samva[d]dha Vāmāitālo grāmoyam
 cha—
 23.—tu sima¹¹ paryanta Varendra-maṁḍale Mutharutha-
 bhaṭa grāma.
 24.—vinirgata Odra-vishaye Sāvira-bhaṭa grāma vāstavya
 Kā—
 25.—śa (śya) pa gotra Vatsyāyana¹²-Naidhruva-pravara
 Yajurved = āchara—
 26.—ṇa Kanva — śākhādhyāyina¹³ bhaṭaputra Devaśarma
 Paḍama su —

¹ Read—*saṁchay-ōpahasita-samastarsi-vāsakān.*

² Read *Rshi.*

³ Read *durvārārāti.*

⁴ Read *yasya.*

⁵ Read *Sad=vīrya.*

⁶ Read *Laksmīh*

⁷ Read *vīrya.*

⁸ Read *°smīn*

⁹ Read *yathārham.*

¹⁰ Read *ādīśati.*

¹¹ Read *Catuḥ-sīmā.*

¹² Read *Vātsyāyana.*

¹³ Read *°dhyāyine.*

- 27.—ta Dhanaśarma naptre grāmordha amśa Sāvathi vinirgata Ya—
 28.—magarta-maṇḍala-vāstavya Vastyā¹ gotra pañch-ārsha prava—
 29.—ra Yajūr-vedācharaṇa Kanva-²śākhādhyāyina³ bhata-pu—
 30.—tra Vṛṣṭideva⁴ Llalāḍa-suta Dhāḍukā naptre amśa cha—
 31.—turtha māla bhā'apūtra Vṛṣṭidevasuta⁵ Rāmadeva
 32.—amśa chaturtha māla tṛiṇodaka rūpya 40 chatvāri
 33.—aṅke rūpya 40,4 tāmbrāsāṇi⁶-kṛtya prada [t] to-s [mā]—
 34.—bhi [h] yāva [ch] chandrārka-tārakā achatabhaṭ-āpravesā sva—
 35.—dātā paradatam = vā⁷ yo harati⁸ vasundharā⁹ sa vish^h [ā]—
 36.—yām kṛimi [r*] bhutvā pitṛibhi [h*] saha pachyate iti.

NOTE.—Māla seems to mean high or cultivable land; cf. Bloch in J.A.S.B., Vol. V, 1909, p. 348, for other mentions of the word in inscriptions.

TRANSLATION.

Om, Svasti. From the mountain entitled *Mahāparvata*, having many valleys, with its body marked by the Kings of the Tuṅga dynasty, (where) the evenings are made to resound with the hum of bees, dirtied by the temporal juice constantly flowing from the cheek of elephants, newly captured and (for that reason) restive; where all the towns have been fully purified by the sound of the Ṛk, Sāma and Yajur-vedas (proceeding) from great Brāhmanas, whose spiritual power has been awakened, where all the residences of the sages had been made smiling by the accumulation of smoke (!!!) arising from constant offerings of clarified butter, to the fire, by the twice-born.¹⁰ When the Yamagartta *maṇḍala* was destroyed at the sight of the flash of swordblades, bristling with pearls adhering to it (at the time of) striking hard on the head of mighty and restive elephants of the invincible enemy that are no more.¹¹

In the lands of a village smiling after the conquest, from the family of the Tuṅgas, whose great fame spread from Gayādatunga, was born the illustrious King Jagattuṅga, who came from the Rohita mountain and who belonged to the Sāndilya *gotra*, whose great prowess was wondered at (i.e., was a subject of wonder), whose prosperity was honoured as it was acquired by the greatness of his own prowess, who held five long and

¹ Read *Vātsya*.

² Read *Kāva*.

³ Read *dh āyine*.

⁴ Read *Vṛṣṭideva*.

⁵ Read *Vṛṣṭideva*.

⁶ Read *tāmbrāsāṇi*.

⁷ Read *Sva-dattām paradattām*.

⁸ Read *haret*.

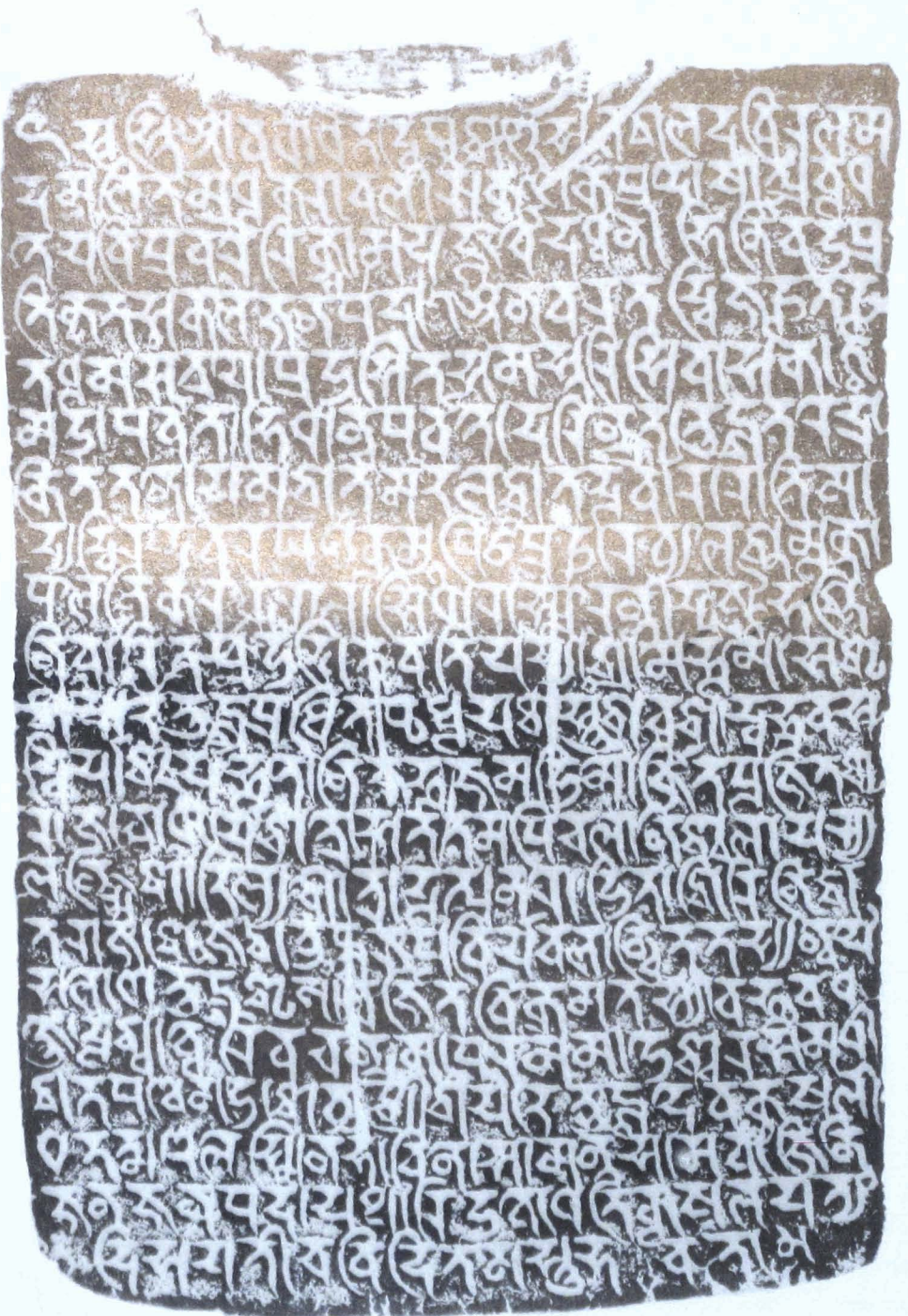
⁹ Read *vasundharām*.

¹⁰ This sentence is not complete.

¹¹ This sentence also is incomplete.

honoured sessions of sacrifices, and in whose case fortune, though fickle (in the case of others), was steady. In his family, possessed of beauty, prowess and strength (was born) Salāṅgatuṅga; from him was born the illustrious and prosperous Gayādatuṅga, the devout worshipper of Śiva, who had acquired the five great sounds, whose prowess was brilliant, who was proficient in law, who, like the moon, was born in the ocean of milk.

In this *maṇḍala*, the future feudatories of the towns, whose people conquered are being made to understand, according to their rank, are asked about their health, and ordered that: Be it known to you (that) this village of Vāmāitālla up to its four boundaries attached to the Tuṅkerā *viṣaya* (is being given) half of the village to Bhaṭaputra Devaśarma, an emigrant from the village of *Mutharutha*, in the Vārendra *maṇḍala*, an inhabitant of the village Sāviraḥata in the Odra *viṣaya*, of the Kāśyapa *gotra*, whose *pravaras* were Vātsyāyana and Naidhruva, who belonged to the Kāṅva *śākhā* of the Yajurveda, (and) who was the son of Padama (Padma) (and) the grandson of Dhanaśarma; a quarter share of the *māla* is given to Bhaṭaputra Vṛṣṭideva, who was an emigrant from Sāvathi (*Srāvasti*), an inhabitant of the Yamagartta *maṇḍala* (who belonged) to the Vātsya *gotra* (who had) *pravaras* with names of the five sages, (who belonged) to the Kāṅva *śākhā* of the Yajurveda, (and) who was the son of Lallada (and) grandson of Dhalukā. A quarter share of the *māla* (is being given) to Rāmadeva, son of the *bhaṭaputra* Vṛṣṭideva, with grass and water, *Rūpya* (? price) forty-four, in figure *rūpya* 44; is given by us by means of this copper-plate-grant. (Let it be) un-enterable by Chātas and Bhaṭas so long as the moon and the star last. (Here follows one of the usual imprecatory verses).



TALCHER PLATE OF GAYĀDATUNGADEVA

20. A New Persian Authority on Babur ?

By L. F. RUSHBROOK WILLIAMS.

The discrepancies between the Indian and the Persian historians who deal with the relations between Babur and *Shāh Isma'il*, are well known, and capable of a more or less satisfactory explanation. But the discrepancies between *Khwāndāmīr* and *Haidar Mirzā* are of a different order. Each writer was exceptionally well-informed: each gathered his information at first hand, yet the contradictions are often glaring. This is the more to be regretted, in that each is a source of the utmost importance for Babur's history during the years A.D. 1510-11. I have some hopes that a third writer has come to light, who may perhaps help to clear up some of the disputed points.

While I was working in the famous library of H.H. the Nawab of Rampur, I was fortunate enough to make the acquaintance of Nawab Sahib Abdussalam Khan, father of the Chief Secretary of Rampur State. From time to time this gentleman, who possesses an excellent collection of historical works, has been kind enough to furnish me with excerpts which he thinks will help me in my investigation of Babur's career. One of these excerpts was from a work quite unfamiliar to me, the *Āhsanal-Siyar* of Mirzā Barkhwardār Turkmān. The extract was of great value for the events of A.D. 1510-11, although it was quickly apparent that the author was greatly indebted to the *Habībal-Siyar*.

A subsequent visit to Rampur put me in possession of the following particulars. The volume consists of 411 pages numbered in a modern hand, each page measuring 6" by 9 $\frac{3}{4}$ ". The writing is a fairly clear semi-nasta'liq—the hand of a scholar rather than of a scribe. There are twenty-two lines to the page. The volume was purchased by the present owner in Lucknow some years ago, and the flyleaf bears a note that it had been purchased twice before, once in Shahjahanabad, once in Lucknow. One of the previous owners has written a Persian couplet, expressing his appreciation of the fact that his ownership is but transitory. The general condition of the volume is good, although the illuminated head-piece on the page bearing the *bi'smi'llāh* has been cut away, and the page itself is neatly mounted upon modern paper, glued into the binding. Worms have wrought little damage.

The original work was apparently in four volumes, of which the present is the fourth and concluding instalment: for on p. 306 there is mention of the author's second volume, and on

p. 322 of his third volume. The whole seems to have been dedicated to Shāh Isma'il Šafawī, and the present volume, which is plainly the conclusion of the whole, closes with an account of the perfections of this monarch and a recital of his praises.

The contents are as follows :—

Pages 1-6 *Preface* in which the author states that he, being a Shi'a, has been led to combat some of the errors made in *Khwāndāmīr's* account of this period. It is noteworthy that the date of composition of the *Habībal-Siyar* is stated to be A.H. 927.

Pages 6-280. A detailed history of Shāh Ismā'il's reign.

Pages 280-305. An account of the poets and philosophers then flourishing in Persia.

Pages 306-411. A collection of curious stories, geographical descriptions, and the like, mainly borrowed from *Khwāndāmīr*, the *Maṭla'al-Sa'dāin*, and other sources.

The date of composition of the work was A.H. 930, as is shown by the *ta'rikh*.

آثار الملوك والأنبياء and خبر از جهانيان

I hope to publish before long some extracts from *Mīrzā Barkhwardār's* book, illustrating the extent of his indebtedness to *Khwāndāmīr*. My object in giving this premature and imperfect account of the fragment I have examined is to obtain, if possible, particulars of any other MSS. of it which may be in existence. It would appear from the catalogues that there is no copy in the British Museum, the India Office or the Bodleian.

JULY, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 5th July, 1916, at 9-15 P.M.

LIEUT.-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., F.R.S., I.M.S., President, in the chair.

The following members were present:—

Maulavi Abdul Wali, Dr. N. Annandale, Babu Nilmani Chakravarti, Dr. F. H. Gravely, Sir Thomas Holland, K.C.I.E., Dr. W. C. Hossack, Rev. H. Hosten, S.J., Rev. R. Oka, Mahamahopadhyaya Haraprasad Shastri, C.I.E., Dr. Satis Chandra Vidyabhusana.

The minutes of the last meeting were read and confirmed.

Twenty-four presentations were announced.

The General Secretary reported that Babu Ramakanta Bhattacharyya had expressed a desire to withdraw from the Society.

The General Secretary also reported the death of Mr. Edward Thornton.

The following gentlemen were balloted for as Ordinary Members:—

Mr. J. MacKenna, J.C.S., Agricultural Adviser to the Government of India, Pusa, Behar, proposed by Dr. N. Annandale, seconded by Mr. S. W. Kemp; Colonel H. T. Pease, C.I.E., M.R.C.V.S., Principal, Punjab Veterinary College, Lahore, proposed by Dr. N. Annandale, seconded by Mr. S. W. Kemp; Mr. W. S. Street, Merchant's Assistant, Messrs. Shaw Wallace & Co., proposed by Mr. R. D. Mehta, C.I.E., seconded by Dr. F. H. Gravely; Babu Ganapati Sarkar, Zemindar, 69, Belia-ghata Main Road, Calcutta, proposed by Mahamahopadhyaya Haraprasad Shastri, seconded by Babu Nilmani Chakravarti; Syed Naseer Hosein Khankhayab, Zemindar and Landholder, 78, Prinsep Street, Calcutta, proposed by Maulavi Aga Muhammad Kazim Shirazi, seconded by Mr. O. F. Jenkins; Mr. Z. R. Zahid Suhrawardy, M.A., B.L., Barrister-at-Law, 3, Wellesley 1st Lane, Calcutta, proposed by the Hon. Justice Sir Asutosh Mukerjee, Kt., seconded by Mahamahopadhyaya Haraprasad Shastri, C.I.E.

Mahamahopadhyaya Haraprasad Shastri exhibited a MS. of Buddhist Tantric Sanskrit of the tenth century in which Bombay is mentioned.

The President announced that there would be no meeting of the Medical Section during the month.

AUGUST, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 2nd August, 1916, at 9-15 P.M.

LIEUT.-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., F.R.S., I.M.S., President, in the chair.

The following members were present:—

Dr. N. Annandale, Dr. P. J. Bruhl, Dr. B. L. Chaudhuri, Dr. G. C. Chatterjee, Miss M. L. Cleghorn, Babu Hem Chandra Das Gupta, Dr. F. H. Gravely, Mr. H. G. Graves, Dr. W. C. Hossack, Mr. S. W. Kemp, Rev. R. Oka, Mr. W. H. Phelps, Dr. Satis Chandra Vidyabhusana, Mr. E. Vredenburg.

Visitors:—Mr. C. Cleghorn, Miss O. Cleghorn, Mr. A. Clark, Mrs. Kemp.

The minutes of the last meeting were read and confirmed.

Twenty-three presentations were announced.

The General Secretary reported the death of Sir Clements Markham, K.C.B., an Honorary Fellow of the Society.

The following gentleman was balloted for as an Ordinary Member:—

Pandit Ashwani Kumar Shukla, B.A., LL.B., Revenue Officer, Mewar State, Udaipore, proposed by Pandit Shiam Bihari Misra, seconded by Pandit Sri Ram Dikshit.

Dr. B. L. Chaudhuri exhibited a remarkable new Goby in which the male carries the eggs in a pair of pouches.

Dr. N. Annandale exhibited a new genus of limbless skink from an island in the Chilka Lake.

Dr. F. H. Gravely exhibited some Indian trap-door spiders and their nests.

Miss M. L. Cleghorn exhibited a living specimen of a very rare Indian toad (*Kaloula pulchra*).

The following paper was read:—

Zoological Results of a Tour in the Far East. 1. The Molusca of Lake Biwa, Japan.—By N. ANNANDALE, D.Sc., F.A.S.B., *Zoological Survey of India*.

This paper is being published in the *Memoirs*, Vol. VI.

The President announced that there would be no meeting of the Medical Section during the month.

NOVEMBER, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 1st November, 1916, at 9-15 P.M.

LIEUT-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., F.R.S., I.M.S., President, in the chair.

The following members were present :—

Maulavi Abdul Wali, Dr. N. Annandale, Rev. H. Hosten, S.J., Hon. Mr. F. J. Monahan, Mr. M. J. Seth, Mahamahopadhyaya Haraprasad Shastri, C.I.E., Dr. Satis Chandra Vidya-bhusana.

Visitors :—Major H. M. Cowie, R.E., Mr. E. Stephen, Mr. J. H. Stephen.

The minutes of the August meeting were read and confirmed.

Seventy presentations were announced.

The General Secretary reported the death of Sir William Ramsay (an Honorary Fellow) and of Babu Satis Chunder Banerjee, Rai Bhawri Das Bhatra, Capt. S. Morton, 24th Punjabis; Mr. R. V. Russell, Maulavi Sofiulla Saifuddin Ahmed, Major H. H. Wilson, The King's Own Royal Lancaster Regiment : Nawabzada A. K. M. Abdus Subhan, Khan Bahadur (Ordinary Members) of the Society.

The General Secretary also reported that Dr. P. K. Ray, Babu Moti Lal Ganguly, Dr. Manmatha Nath Chatterjee and Sir Pardey Lukis, K.C.S.I., had expressed a desire to withdraw from the Society.

The President announced that in accordance with Rule 38 of the Society's Rules, the names of the following eight members had been posted up as defaulting members since the last meeting, and their names had now been removed from the Member List :—

Maulavi Habibur Rahman Khan, Allahabad.
Babu Chandra Kumar Sarkar, Kowkanik.
Babu Sukmar Sen, Calcutta.
Babu S. P. Sanyal, Maghaule.
Pandit Tulsi Ram Misra, Kanauj.
Mr. R. S. Bhatnagar, Shapur.
Babu Briz Mohan Geonka, Calcutta.
Mr. R. S. Ramulu Chitty, Madras.

The following two gentlemen were elected Ordinary Members during the recess in accordance with Rule 7 :—

Rev. W. S. Sutherland, D.D.

Rev. Hilarion Basdekas.

The following gentleman was proposed as an Honorary Fellow :—

Dr. G. A. Boulenger, F.R.S., LL.D., British Museum.

He is universally acknowledged as the greatest living authority on reptiles and has written one of the most valuable volumes in the "Fauna of British India"—it appeared 26 years ago, and he is still contributing papers to Indian Journals of Zoology.

The following gentleman was balloted for as an Ordinary Member :—

Mr. Adar Chandra Mitra, B.L., Law Publishing Press, Calcutta, proposed by Mahamahopadyaya Satis Chandra Vidya-bhusana, seconded by Mahamahopadhyaya Haraprasad Shastri.

Rev. H. Hosten, S.J., exhibited two pictures showing Akbar with a Christian girl, whose name is given as Maryam Zamani Begam.

Mahamahopadhyaya Haraprasad Shastri exhibited a palm-leaf manuscript in Valte-lu-ttu character.

The manuscript belonged to the family collection of Sir Sankaram Nair, the Education member of the Viceregal Council. It is written in Valte-lu-ttu character, which is a very rare kind of writing. Only one other document in this script is known to the antiquarian, and that is a document dated in the eighth century. It confers on a Jew named Iussuf Rabbani a principality in Cochin. The language in which the work is written, is old Tamil, like that of the Cochin document, but the numerals in which the leaves of the MSS. are marked belong to a later date, viz. fifteenth or sixteenth century. There are about a hundred leaves consecutively marked. There is a blank space on the reverse side of leaf 13.

The word Valte-lu-ttu means round hand as opposed to Kore-lu-ttu or the square hand. It is not known when the round hand went out of currency. A Nambubari Brahman at Benares says that it ceased to be a current character more than a hundred years ago. Dr. Busnell says it went out in the seventeenth century. Perhaps this is one of the last MS. written in that character. The Kore-lu-ttu, or square hand, is still current.

The following papers were read :—

1. *Ormuri or Bargista Language.*—By SIR GEORGE GRIERSON, K.C.I.E.

This paper will be published in the *Memoirs*.

2. *Nahapana and the Saka Era.*—By RAKHAL DAS BANERJI, M.A.

3. *The Malda Diary and Consultation Book, 1680-1682.*
Edited by THE VEN'BLE W. K. FIRMINER.

4. *Folklore in Caste Proverbs.*—By RAI BAHADUR B. A. GUPTA.

5. *On some Indian Ceremonies for Disease Transference.*—
By SARAT CHANDRA MITRA.

6. *A New Persian Authority on Babur?*—By L. F. R. WILLIAMS.

Papers 3, 4, 5 and 6 are being published in the *Journal*.

The President announced that there would be no meeting of the Medical Section during the month.

DECEMBER, 1916.

The Monthly General Meeting of the Society was held on Wednesday, the 6th December, 1916, at 9-15 P.M.

LIEUT.-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., F.R.S., I.M.S., President, in the chair.

The following members were present :—

Dr. N. Annandale, Rev. H. Basdekas, Dr. H. G. Carter, Miss M. L. Cleghorn, Babu Hem Chandra Das Gupta, Maulavi Mahomed Kazim Shirazi, Dr. Satis Chandra Vidyabhusana, Mr. E. Vredenburg.

Visitors :—Mrs. Carter, Miss O. Cleghorn, Mr. C. Cleghorn and two others.

The minutes of the last meeting were read and confirmed.

Forty-one presentations were announced.

The General Secretary reported that Dr. David Hooper and Mr. B. K. Basu, I.C.S., had expressed a desire to withdraw from the Society.

The President announced that the following twenty-six members being largely in arrears of subscriptions had been declared defaulters and that their names would be posted up in accordance with Rule 38 :—

Maulavi Abdus Salam, Presidency Magistrate, Calcutta.

Maulavi Abul Aas, Bankipur.

Munshi Ahmed Hosein Khan, Jhelum.

Maulavi Abdur Rahim, Calcutta.

S. A. Ashgar, Esq., Bar-at-law, Calcutta.

Babu Jogindro Chunder Ghose, Pleader, Calcutta.

Babu Abhoy Sankar Guha, Nowgong.

Babu Bepin Behari Gupta, Chinsurah.

Babu Hem Chandra Goswami, Tezpur.

S. C. Ghatak, Esq., Dacca.

R. J. Hirst, Esq., Ranchi.

W. A. Lee, Esq., Calcutta.

Maulavi Midhat Hosein Khan, Simla.

Babu Manmatha Nath Moitra, Serampur.

Syed Muzaffar Ali Khan, Mazaffarnagar.

Babu Gobin Lal Mookerjee, Calcutta.

Rai Sahib Srikrishna Mohapatra, Puri.

Nawab Murtaza Hosain Khan, Lucknow.

Babu Manahar Lal, Barrackpur.
Capt. V. B. Nesfield, I.M.S., Banda.
Babu Jyoti Prakas Nandi, Burdwan.
Babu Surendra Chandra Rai Chaudhuri, Rungpur.
Babu Girindra Kumar Sen, Calcutta.
Syed Fida Ali, Arrah.
Babu Sri Ram Poplai, Jullundur City.
Kumar Shyma Kumar Tagore, Calcutta.

The following gentleman was balloted for and elected an Honorary Fellow :—

Dr. G. A. Boulenger, F.R.S., LL.D., British Museum.

The following gentlemen were balloted for and elected Ordinary Members :—

The Anagarika Dharmapala, General Secretary Mohabodhi Society, No. 4A College Square, Calcutta (for re-election), proposed by Dr. Satis Chandra Vidyabhusana, seconded by Mahamahopadhyaya Haraprasad Shastri ; Sri Baman Dasji Kaviraj, Ayurvedic and Unani Physician, 152, Harrison Road, Calcutta, proposed by Dr. Satis Chandra Vidyabhusana, seconded by Dr. F. H. Gravely.

Maulavi Aga Muhammad Shirazi on behalf of Dr. A. Suhrawardy read the following obituary notice of the late Shams-ul-Ulama Shaikh Mahmud Gilani :—

The death of His Eminence Shamsul-Ulama Shaikh Mahmud Gilani removes a prominent figure from the Muslim world of letters, and oriental scholarship once more suffers an irreparable loss.

Shaikh Mahmud Gilani was the fifth son of Shaikh Nasiruddin Gilani, the renowned Mujtahid of Persia. On account of the high esteem in which Shaikh Nasiruddin Gilani was held, Shah Muhammad, the premier nobleman of Gilan, gave his daughter in marriage to him. Six sons were born of this marriage, of whom Shaikh Abdullah and Shaikh Muhamud attained fame outside Persia.

Uniting in his person the traditions, influence and learning of one of the noblest families of Persia, Shaikh Mahmud came on a visit to India in his youth after a distinguished career in Persia, Mesopotamia and Arabia. Whilst in Calcutta he was persuaded to accept the position of the spiritual head of the Shaikh community. The Board of Examiners, Fort William, having come to learn of his stay in Calcutta offered him the appointment of Persian Instructor to the Board, which he accepted in 1880, and soon he was appointed a Fellow of the Calcutta University. The late Marquis of Dufferin and Ava, who was one of the pupils of the Shaikh, conferred upon him the title of Shamsul Ulama (the sun of the Ulama). He was

the first recipient of this title, which, indeed, was especially created for him by Lord Dufferin. The Shaikh was further selected by his Lordship for the office of a minister in the Hyderabad State, but he declined to accept the appointment as unsuited to one of his retiring disposition and pious nature. He was one of the oldest Fellows of the University of Calcutta. For nearly twenty-five years he had been Examiner in Arabic and Persian to the various Indian Universities. Though he lived in retirement and seldom left his residence, the Calcutta University recently appointed him University Lecturer in Arabic and Persian, and the Government of Bengal granted him a literary pension only last year in recognition of his erudition.

Of commanding presence, stately figure and gifted with natural eloquence he stood unrivalled as a preacher, spiritual leader and scholar. A high priest of the Shiah, he was held in high esteem and reverence by Shiah and Sunnis alike. A man of retiring disposition, he never cared to have his name on a title-page, but his great scholarship was unstintedly placed at the disposal of other distinguished orientalist like Jarrett, Ranking, Phillott and others, who had acknowledged in their works their indebtedness to him. However, a work on Muslim jurisprudence written in his youth was published in Najaf (Mesopotamia) and is still exclusively used there.

For many years he was a member of the Philological Committee of this Society which benefited by his valuable advice and mature counsels.

After a short illness he died on Friday, the 22nd September, 1916. The Office of the Board of Examiners, the University classes and the Madrasah were closed in his honour.

Mr. E. Vredenburg exhibited some Indian fossil shells of *Turbinella* for comparison with the recent Indian "Chank."

The following papers were read:—

(1) *On Secrecy and Silence in North Indian Agricultural Ceremonies.*—By SARAT CHANDRA MITRA. *Communicated by the Anthropological Secretary.*

This paper is being published in the *Journal*.

(2) *Zoological Results of a Tour in the Far East. Batrachia and Reptiles.*—By DR. N. ANNANDALE.

(3) *Zoological Results of a Tour in the Far East. Aquatic Hemiptera from Tale Sap, Peninsular Siam.*—By C. A. PAIVA. *Communicated by DR. N. ANNANDALE.*

Papers 2 and 3 are being published in the *Memoirs*, Vol. VI.

The President announced that the next adjourned meeting of the Medical Section would be held on Wednesday, the 13th December, 1916, at 9-15 P.M.

The Adjourned Meeting of the Medical Section of the Society was held at the Society's Rooms on Wednesday, the 13th December, 1916, at 9-15 P.M.

LIEUT.-COL. SIR LEONARD ROGERS, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., F.R.S., I.M.S., President, in the chair.

The following members were present :—

Dr. U. N. Brahmachari, Dr. Harinath Ghosh, Col. C. R. M. Green, I.M.S., Lt.-Col. R. E. Lloyd, I.M.S., Major D. McCay, I.M.S.

Visitor :—Dr. H. Douglas Cameron.

The minutes of the April meeting were read and confirmed.

Lieut.-Colonel Sir Leonard Rogers, Kt., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.A.S.B., F.R.S., I.M.S., read a paper entitled "Chronic Splenomegaly in Lower Bengal with special reference to the prevalence and clinical differentiation of Kala-azar."

Rai Bahadur Dr. Upendra Nath Brahmachari, M.A., M.D., Ph.D., read a paper entitled "Fourth Report on the treatment of Kala-azar."

PRINCIPAL PUBLICATIONS OF THE SOCIETY.

Asiatic Researches, Vols. I—XX and Index, 1788—1839.
Proceedings, 1865—1904 (now amalgamated with Journal).
Memoirs, Vol. 1, *etc.*, 1905, *etc.*
Journal, Vols. 1—73, 1832—1904.
Journal and Proceedings [*N. S.*], Vol. 1, *etc.*, 1905, *etc.*
Centenary Review, 1784—1883.
Bibliotheca Indica, 1848, *etc.*

A complete list of publications sold by the Society can be obtained by application to the Honorary Secretary, 1, Park Street, Calcutta.

PRIVILEGES OF ORDINARY MEMBERS.

- (a) To be present and vote at all General Meetings, which are held on the first Wednesday in each month except in September and October.
- (b) To propose and second candidates for Ordinary Membership.
- (c) To introduce visitors at the Ordinary General Meetings and to the grounds and public rooms of the Society during the hours they are open to members.
- (d) To have personal access to the Library and other public rooms of the Society, and to examine its collections.
- (e) To take out books, plates and manuscripts from the Library.
- (f) To receive *gratis*, copies of the *Journal and Proceedings* and *Memoirs* of the Society.
- (g) To fill any office in the Society on being duly elected thereto.

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