

THE OLD TURKISH INSCRIPTIONS IN MONGOLIA.¹

ABOUT 170 years ago it became known in Europe that there are, on the Upper Yenisei, inscriptions on stone monuments which are written in some unknown language, and are relics of an unknown population. Various hypotheses were made as to the origin of these inscriptions; but it was only in 1893 that the Copenhagen Professor, Wilhelm Tomsen, succeeded in deciphering them.² Although Prof. Tomsen attributes the discovery of these inscriptions to Heikel and Dr. Radloff, who visited the spot—the former in 1890–1891, and the latter in 1891—they were discovered in reality by the late N. M. Yadrintseff, who was sent out in 1889 by the Irkutsk Geographical Society for a journey to Mongolia.³ Heikel's collection was luxuriously edited by the Finnish-Ougrian Society,⁴ and the collection of reproductions made by MM. Radloff and Yadrintseff was published by the Russian Academy of Sciences.⁵ However, neither of these three explorers succeeded in reading the inscriptions, and it was only Prof. Tomsen who, taking advantage of the names of rulers, which were written in Chinese characters, and stood by the runic inscriptions, found the cue for reading the mysterious writings. It became thus known that the inscriptions belonged to a Turkish stem which formerly inhabited the upper parts of the Yenisei and the Orkhon. The cue having been discovered, Prof. Radloff set at once to decipher and to translate the inscriptions—a task which involved very great difficulties at the outset, as the vowels were not written in this alphabet; but with all that, Dr. Radloff succeeded in finding out the meaning of the inscriptions and in translating them, and his researches are now embodied in a work issued by the Russian Academy of Sciences.⁶ In this work Dr. Radloff analyses, first, the alphabet of the old Turkish monuments, and, next, the Chinese monuments on Lake Kosho-tsaidam; he then gives an eighty-page long list of words; the translation of the Chinese Kosho-tsaidam inscriptions, by Prof. Vasilieff; and the translations of the inscriptions found in different places of Mongolia and on the Yenisei, on both Chinese and Russian territory, followed by a study on the morphology of the old Turkish dialect. Thirty inscriptions in all have been deciphered; they are written phonetically, in vertical columns following each other from the right to the left. The letters are angular; they contain only four vowels and thirty-four consonants—different consonants being used in the words which contain guttural vowels, and in those words which have palatal vowels.

The Chinese inscription at Kosho-tsaidam was written on a monument erected in 732, to honour the Turkish ruler Kyul-teghin, under the Chinese Emperor Kai-yuang, who reigned A.D. 713 to 742. A people named "Turk" is mentioned in it, and the monument was erected on that people's territory, to order the inhabitants to live in peace with the Tibet, Kirghiz ("Kyrkyz"), Chinese ("Tapkach," or "renowned"), and Tatar peoples ("Tatar"). Another monument, unhappily broken in three pieces, stands to the south of the former; it dates from 733. A third monument of importance was found by Yadrintseff on the Onghin River, and it is concluded that it was erected in 692, in honour of Moghilian-khan. A monument on the Ikheaset seems to be of a later date than the two just mentioned. Twenty more monuments were erected in honour of different relatives of the Turkish Khan, Kyul-teghin, who resided at Kara-balgasan. They have been found in the Minusinsk region, by Stralenberg, in the early part of the last century, and have been described since by several explorers, including Castrén. The reading of these inscriptions offers many difficulties, and Prof. Tomsen and Dr. Radloff are not quite agreed together as to the proper way of reading; so that more materials are wanted, and the Irkutsk Geographical Society is now busily at work to collect them.

Dr. Radloff, who thoroughly knows the old and the new Turkish dialects, has edited the book in a thoroughly scientific spirit; and if his readings are doubtful in certain places, this

chiefly depends upon the incomplete preservation of the inscriptions themselves. From the dictionary and grammar given by Dr. Radloff, it appears that the language is a true Turkish dialect, quite harmonic, and nearly akin to the old Uigur dialect. In certain respects it even seems to be older than this latter, and the shades of sounds can be better rendered in the alphabet of the inscriptions than in the old Uigur alphabet. The old Turks had two alphabets in use: a variety of the Syrian, which goes under the name of Uigur alphabet, and the Arabian. A third alphabet must be added now to these two, and to the four which are in use amongst the modern Turks. It is worth noticing that, according to the Chinese historians, Indian writing was in use in East Turkestan; while in West Turkestan some other alphabet, "khu-shu"—i.e. barbarian—was in use. It was written in vertical columns, and it may have been the alphabet of the Orkhon and Yenisei inscriptions.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

By the will of the late Mr. Henry L. Pierce, Harvard University and the Massachusetts Institute of Technology each receive 50,000 dollars.

THE following are among recent announcements:—Dr. F. B. Peck to be associate professor of geology and palæontology at Lafayette College; Mr. Richard Rathbun to be assistant in charge of the Smithsonian Institution, in succession to the late Mr. W. C. Winlock.

A NUMBER of professors of the University of Berlin have addressed the Senate in order to obtain its approval for a movement in the nature of University extension, and it appears that the same course has been adopted in Jena and Leipzig. The Berlin correspondent of the *Times* states that the movement has met with an unexpectedly strong and widespread opposition. Many members of the classes which have themselves enjoyed University education object to the proposed extension, on the ground that the persons who are likely to take advantage of it will only receive from their attendance at the proposed lectures a most superficial kind of instruction, both in point of quality and of quantity.

A SKETCH of recent progress of technical education in England forms part of the ninth annual report of the National Association for the Promotion of Technical and Secondary Education. From this we learn that, in spite of the efforts made from time to time to secure for general county purposes certain portions of the funds belonging to education, the total sum annually set aside and utilised for educational purposes increases year by year. Of the forty-nine County Councils in England, forty are now giving all, and nine are giving part of their grants to educational purposes; while of the sixty-one county boroughs, fifty-five are devoting all, and five are devoting part of the fund in a like manner. The county borough of Preston is the only instance of an authority devoting all its grant to the relief of the rates. In considering the total amount of money devoted one way and another, it appears that of the 742,000*l.* annually available in England alone, no less a sum than 662,000*l.* is being spent on education. This is an advance of 62,000*l.* upon last year's figures, and is chiefly due to the rapid development of the work of the Technical Education Board of the London County Council. There thus remains a sum of 80,000*l.* still unappropriated to the purposes for which the fund was originally intended. Of this sum, however, London is responsible for 51,000*l.*, an amount which, there is every reason to believe, will shortly be required for the organisation of technical and secondary education in the metropolis.

THE number of technical schools which have been transferred to local authorities for municipal management and control has increased by four during the year covered by the above report, thus bringing up the total to 44. The four schools referred to are at Bradford-on-Avon, Gloucester, Leicester, and Lichfield. In the county borough of Huddersfield this matter is under consideration. Attention may also be directed to the operations of those local authorities in England which, upon their own initiative, have built, or are building, or are about to build, in the aggregate 115 technical schools, 101 of which involve an expenditure of 1,317,000*l.* This sum is derived from (1) the accumulation of funds under the Local Taxation Act, (2) loans raised by local authorities, (3) local subscriptions; the greater

¹ From a paper by the Kazan Professor, N. Katanoff, in the *Izvestia* of the East Siberian Branch of the Russian Geographical Society, vol. xxvi. 4 and 5. Irkutsk, 1896 (Russian).

² Déchiffrement des Inscriptions de l'Orkhon et de l'Yenisei" (Copenhagen, 1893), in the *Bulletin* of the Danish Academy of Sciences.

³ "Memoirs of the Oriental Branch of the Russian Archæological Society," vol. viii. p. 324. St. Petersburg, 1894 (Russian).

⁴ "Inscriptions de l'Orkhon, recueillies par l'expédition Finnoise, 1890, et publiées par la Société Finno-Ougrienne" (Helsingfors, 1892).

⁵ "Atlas der Altherthümer der Mongolei, im Auftrage der Kaiserlichen Akademie der Wissenschaften herausgegeben," von Dr. Radloff.

⁶ "Die alttürkischen Inschriften der Mongolei," von Dr. W. Radloff. 460 pp. 4to. (St. Petersburg, 1895).

proportion, however, is undoubtedly raised by loan. At the same time it is pointed out in the report that in two or three localities the entire fund was raised by donations and subscriptions, and in one instance, that of St. Helens, a site and 20,000*l.* was presented by Colonel Gamble, C.B., to the corporation for the establishment of a technical school and free library. Of the large number of technical schools mentioned above, 57 are already at work, 32 new schools having been opened since last year's report. There remain, therefore, 58 schools which, according to the latest information, are still incomplete. Dairy institutes or agricultural schools or colleges have been established by nine English County Councils. In addition to these, the establishment of a central agricultural school is under consideration in Cornwall, and the County Councils of the East, North, and West Ridings of Yorkshire are taking joint action with a view to forming a rural agricultural centre.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 19, 1896.—“Preliminary Report on the Results obtained with the Prismatic Camera during the Eclipse of 1896.” By J. Norman Lockyer, C.B., F.R.S.

The author first states the circumstances under which Sir George Baden-Powell, K.C.M.G., M.P., with great public spirit, conveyed an eclipse party to Novaya Zemlya in his yacht *Otaria*, to which party was attached Mr. Shackleton, one of the computers employed by the Solar Physics Committee.

The prismatic camera employed, loaned from the Solar Physics Observatory, was carefully adjusted before leaving England, and a programme of exposures was drawn up based upon the experience of 1893. As the station occupied lay at some distance from the central line, this programme was reduced by Mr. Shackleton.

Two of the photographs obtained are reproduced for the information of other workers, as some time must elapse before the discussion of all the results can be completed. This discussion and Mr. Shackleton's report on the local arrangements and details of work, are promised in a subsequent communication.

The lines photographed in the “flash” at the commencement of totality—happily caught by Mr. Shackleton—the wave-lengths of which lines have been measured by Dr. W. J. S. Lockyer, show interesting variations from those photographed by Mr. Fowler in the cusp during the eclipse of 1893.

With the exception of the lines visible in the spectra of hydrogen and helium, and the longest lines of many of the metallic elements, considerable differences of intensity from the lines of Fraunhofer are noticeable.

The coronal rings have been again photographed, and the results of 1893 have been confirmed.

EDINBURGH.

Royal Society, January 4.—Prof. Chrystal in the chair.—Mr. T. S. Muir read the report of the intermediate station on Ben Nevis. He was stationed there from September 1 to September 23, and during that time he took 186 observations, or eight readings per day. Out of twenty-two times that the barometer at the intermediate station (reduced to 32" and sea-level) read higher than that at Fort William, fourteen occurred close together during the first four days of the month, and were followed by a period of fine weather. On the average the intermediate barometer read one-hundredth of an inch lower than the Fort William barometer, and the weather of the month generally was bad. The mean day-difference of temperature between the intermediate, summit, and Fort William stations was as nearly as possible half of that between the summit and the base. But it is probable that during the night the intermediate temperature comes closer to that of the summit, and that the average for the twenty-four hours is closer to that of the summit than Fort William. When the station was enveloped in fog, or between two fog-systems, or close to the fog, the temperature approximated to that of the summit, and when there was no fog visible, or, if it were, at a great height, it approximated to that of the base. Also, when the sky was overcast, or nearly so, the middle temperature was closer to that of the summit; when the sky was clear, to that at Fort William. During the period, the rainfall at the summit was 6½ inches,

at the intermediate station 6 inches, and at Fort William 4½ inches.—Dr. Munro read a paper on intermediary links between man and the lower animals. He maintained that by the attainment of the erect posture and the consequent conversion of the limbs into hands and feet man became *Homo sapiens*, and inaugurated a new phase of existence, by means of which the manipulative organs became correlated with the progressive development of the brain. In the evolutionary career of man two stages were therefore to be recognised. First, that during which his physical transformation had been effected, so as to adapt him to bipedal locomotion; second, that during which his mental organisation had become a new governing force in the universe. The one, being readily effected according to the laws of morphological adaptation, had a short duration. The other, an extremely slow process, consisted of small increments to his knowledge, acquired by repeated experiences, and reasoning from causes to effects, and from means to ends. The one was merely an adjustment of physical contrivances to physical ends, comparable to that by which the bird, the bat, or the whale had converted its limbs to their special purposes. The other had to be relegated to the mystic laboratory where thought was converted into its material equivalent in the form of increased brain substance. The transition from the semi-erect to the erect posture could not, in point of duration, be at all paralleled with the ages during which this erect being had lived on the globe. It was also probable that this transformation took place in a limited area; so that the chances of finding the intermediary links of this stage were very small. On the other hand, the probability of finding erect beings with skulls in all grades of development, from a slightly changed Simian type up to that of civilised man, was enormously greater. He regarded the erect posture as the most conspicuous line of demarcation between man and the lower animals. From this standpoint, the Java skeleton would come under the category of human; but if this line of distinction was to be dependent in any degree on mental phenomena, Dr. Dubois was perfectly justified in regarding it as a transitional form, because it was a long time after the attainment of the erect posture, before his religious, moral, and intellectual faculties became human characteristics. Dr. Munro believed that many fossil remains of man were intermediary links which marked different stages in the history of mankind, and the further back such investigations carried them, the more Simian-like did the brain-case become. If the geological horizon of the Java man was correctly defined as the borderland between the Pliocene and Quaternary periods, they could form some idea how far back they had to travel to reach the common stock from which men and anthropoid animals had sprung. The lower races of to-day were also survivals of intermediary links which had been thrown into the side eddies of the great stream of evolution.

PARIS.

Academy of Sciences, January 4.—M. A. Cornu in the chair.—Researches on the physiology of muscular action, by MM. A. Chauveau and J. Tissot. When the weight sustained by a muscle and the amount by which it shortens increase together, it is shown experimentally that the respiratory exchanges which represent the energy spent, that is, the oxygen absorbed and the carbon dioxide exhaled, increase as the product of the shortening by the weight.—On a generating and distributing apparatus for acetylene, by M. H. L. Lechappe.—Observations on the new Perrine comet (December 8, 1896) made at the Observatory of Algiers, by MM. Rambaud and F. Sy.—On the consumption of water in locomotives, by M. E. Vicaire. On the basis of some experiments carried out on the Orleans system of railways, a general expression is deduced for the consumption of water on any given section.—Variation of the accidental double refraction of quartz with the direction of the compression, by M. R. Dongier. It is found that the same pressure, applied in two independent directions normal to the ternary axis, affects the wave-surface differently. The experiments will be continued with a view of determining the exact relation between the direction of pressure and the double refraction produced.—The action exercised upon solutions of the haloid salts of the alkalis, by the bases that they contain, by M. A. Ditte. An experimental study of the decrease of solubility of KBr by the addition of a solution of caustic potash, and of NaBr, by caustic soda.—Action of ammonia upon tellurium chloride. Tellurium nitride, by M. René Metzner. At 200°–250° C., TeCl₄ is slowly but completely reduced to metallic tellurium, ammonium chloride and nitrogen being formed. At