

observed to rise. Later on the scene changed to a landscape, the vessels now taking the form of islands in the lake, covered with more or less vegetation, and at last the mirage dissolved itself in a haze. The phenomenon, which lasted from 4 to 7 o'clock p.m., is said to have furnished a most magnificent spectacle.

THE additions to the Zoological Society's Gardens during the past week include a Yellow Baboon (*Cynocephalus babouin* ♀) from West Africa, presented by Mr. A. Collison; a Slender Loris (*Loris gracilis* ♂) from Ceylon, presented by Mrs. A. H. Jamrach; a Vulpine Phalanger (*Phalangista vulpina*) from Australia, presented by Mr. E. Meek; a Burmese Tortoise (*Testudo elongata*) from the Western Dooras of Bhotan, presented by Mr. B. H. Carew; a — Tree Snake (*Ahatulla liocercus*) from Pernambuco, presented by Mr. C. A. Craven; a Common Adder (*Vipera berus*), British, presented by Mr. F. W. Elliott; a Rude Fox (*Canis rudis*), a Common Rhea (*Rhea americana*) from South America, deposited; a Yellow Baboon (*Cynocephalus babouin*) from West Africa, received on approval; a Burrhel Wild Sheep (*Ovis burrhel*), born in the Gardens, eight Summer Ducks (*Aix sponsa*), six Swinhoe's Pheasants (*Euplocamus swinhoi*), bred in the Gardens. The following insects having emerged during the past week:—Silk Moths: *Actias selene*, *Samia cecropia*, *Attacus mylitta*; Moths: *Hypocheira io*, *Deilephila euphorbia*, *Deilephila vespertilis*, *Trochilium apiformis*, *Sciapteron tabaniformis*, *Sesia muscaiformis*, *Callimorpha dominula*; Butterflies: *Apatura iris*, *Vanessa xanthomelas*, *Vanessa artica*, *Aporia crabegi*.

OUR ASTRONOMICAL COLUMN

MASKELYNE'S VALUE OF THE SOLAR PARALLAX.—Mr. Dunkin has consulted the first edition of Vince's "System of Astronomy," published in 1797, and finds therein Maskelyne's article on a new method of determining the solar parallax, the same as in the second edition which appeared in 1814.

Mr. W. J. Davies, writing from Tyglyn, Cilian Aeron, Cardigan, asks, with reference to this value of the parallax, Is it not probable that this was first published in the *Philosophical Transactions*? Prof. Ball, in his "Elements of Astronomy" (Longmans, 1880), page 361, gives the value 8".723, and the authority for it, viz., *Phil. Trans.*, vol. lxi. p. 574, year 1771. On this point we may remark that Prof. Ball, according to the statement in his preface, has mainly relied for his numerical data upon Houzeau's "Répertoire des Constantes Astronomiques"—a work which, though excellently designed, would, according to our experience of it, benefit by a careful revision. There are a number of errors in the first edition, which are likely to be copied into more popular works, unless attention be drawn to them. In the present case, where reference is made for Maskelyne's parallax to the *Phil. Trans.*, 1771, p. 574, we find at that page a paper by Dr. Hornsby, entitled "The Quantity of the Sun's Parallax as deduced from the Observation of the Transit of Venus, on June 3, 1769, by Thomas Hornsby, M.A., Savilian Professor of Astronomy in the University of Oxford, and F.R.S.," in which the parallax from a number of combinations is found to be 8".78. Maskelyne's name is not mentioned in the paper, which appears to relate exclusively to Hornsby's own deductions.

Mr. Dunkin having traced the publication of Maskelyne's note to 1797, the only earlier work of Vince in which it would be likely to be found, is the first edition of his text-book, the "Elements of Astronomy," 1790. Mr. Davies remarks that Olinthus Gregory, in his "Treatise on Astronomy," published in 1803, refers to Maskelyne's method, and considered it the best that had been given; he explains it almost in the same words as in Vince, adding that the assumed value 8".83 was taken "agreeably to the result of observations on the transit in 1761."

THE COMET OF MAY 17.—M. Trépied, in an account of his observations made in Egypt during the total solar eclipse of May 17, which was communicated to the Academy of Sciences on the 19th inst., has the following interesting note:—"Vers le milieu de la totalité, j'aperçus à droite du Soleil, par un angle

zénith de environ 90°, un trait légèrement courbé vers le bas, d'un effet singulier, et en discordance évidente avec le reste de la couronne. Je n'ai pas eu un seul instant l'idée que ce pouvait être une comète; je n'en ai reconnu la nature qu'une heure après l'éclipse, en comparant mon croquis à l'une des photographies obtenues par le Dr. Schuster. Cette photographie montrait nettement le noyau à une distance du bord du Soleil un peu supérieure au diamètre de cet astre; l'angle zénith et la direction de la queue s'accordaient bien avec ce que j'avais dessiné, mais j'avais arrêté le trait à une distance beaucoup trop faible du bord. Je n'ai pas cru cependant qu'il me fût permis de rien changer à mon dessin." The sketch referred to is copied in the *Comptes rendus* of the above sitting of the Academy. M. Trépied further remarks: "L'éclat de la comète m'a paru du même ordre que celui des parties extérieures de la couronne." The position of the observing station, as provisionally determined by M. Trépied, is in longitude 1h. 57m. 40s. east of Paris, and latitude 26° 33' 21", where the middle of totality occurred at 8h. 31m. 53s. a.m. local mean time. M. Trépied says in the week following the eclipse he searched for the comet many times before sunrise and after sunset, but without detecting it.

The comet has doubtless been sought for elsewhere, though unfortunately without success. The object notified as having become visible some ten days since in the Cape Colony, near the sun in the evenings, would be the comet 1882 a (Wells), March 17).

DAYLIGHT OBSERVATION OF COMET 1882 a.—Prof. Julius Schmidt writes to the *Astronomische Nachrichten* that on June 10 after 3 p.m., in an exceptionally clear sky at Athens, he observed the comet, though with difficulty, in the 6-foot refractor of that observatory. By ten observations (the instrumental corrections from previous determination) the approximate position was found to be—

h. m. s. June 10, at 3 59.7 M.T. Athens, R.A. 5 0 40, Decl. + 23 19.4.

This place differs from that inferred from the last orbit given in this column (on observations to May 21) by -5".5 in R.A. and +3".2 in declination. The comet's distance from the nearest limb of the sun was about 2".8.

PHYSICAL NOTES

PROFESSORS BELLATI AND NACCARI, of the University of Padua, have recently sent to the Academy of Sciences at Turin, a memoir on the heat developed in solid and liquid dielectrics by successive electrostatic polarisations. They find that when a dielectric, placed between two metal armatures, is subjected to successive polarisations by means of a Ruhmkorff's coil, the dielectric is warmed. This result had already been obtained by Siemens and Righi in the case of glass; the authors of the memoir have experimented also on liquid dielectrics. They have employed two methods: in one of these the heating was indicated by the dilatation of the liquid dielectric (or, in the case of a solid dielectric, of another liquid) observed in a capillary tube. In the other method, the liquid dielectric was contained in a glass vessel, in which were two concentric metallic cylinders serving as the armatures of a condenser. The outer one of these two cylinders was open above and below; the other was closed, and communicated with a horizontal capillary tube containing benzine. This cylinder, therefore, acted as the bulb of an air-thermometer, the heating of the dielectric being indicated by the displacement of the benzine in the capillary tube. This phenomenon must not be confounded with the electric expansion discovered by Fontana more than a century ago, and more recently studied by Govi, Duter, and Quincke. The true electric expansion is instantaneous, and ceases when the polarisation ceases; but the expansion due to the heat developed in the dielectric by repeated charges and discharges is progressive, and increases by prolonging the action of the induction coil. Professors Bellati and Naccari found no electrolytic decomposition in the dielectric, nor was the heating due to the passage of a feeble current through the dielectric.

THE utilisation of the earth's internal heat is a subject which is attracting the attention of scientific men in Japan just now. At a recent meeting of the Seismological Society, Mr. Milne introduced the subject for the consideration of the members. He first drew attention to the fact that philosophers have told us the whole available energy upon the surface of the earth had in some

way or other its action and its existence traceable to the sun. That there was an unlimited supply of energy in the interior of the earth was a circumstance which had, he said, been overlooked. In speaking of this energy, Mr. Milne first referred to that portion of it which crops out upon the surface in countries like Japan, Iceland, and New Zealand, in the form of hot springs, solfataras, volcanoes, &c. He stated that there was an unlimited supply of water in hot springs within a radius of one hundred miles around Tokio, and that the heat of these springs could be converted into an electric current, and the energy transmitted to the town. The second part of the paper referred to the possibility of obtaining access to the heat which did not crop out in the surface.

The whole behaviour of homogeneous colours is explained (according to Herr Albert, *Wied. Ann.*, No. 5), on the Young-Helmholtz theory, by this assumption: To a lessening of the intensity of vari-coloured light correspond various lessening of the strength of sensation, such that for rays of less wave-length, to whatever part of the spectrum they belong, it decreases more slowly than for rays of greater wave-length.

GEOGRAPHY IN RUSSIA

THE just issued "Annual Report of the Russian Geographical Society for 1881" shows that during last year the Society has again accomplished a good deal of useful scientific work. A subject to which much attention was given was the establishment of polar meteorological stations. The station at Novaya Zemlya has already been in operation, as is known, for two years, and a new one, which will be established at the mouth of the Lena, is provided with the best instruments, and is intrusted to persons who will be able to make of it a first-class meteorological observatory. During the summer the expedition will reach the shores of the Arctic Ocean, and begin the meteorological observations. The Dutch station will be erected at Port Dickson, at the mouth of the Yenisei.

Among the scientific expeditions undertaken by the Society, that of M. Polakoff, to Sakhalin, promises to give very interesting results. The rich ornithological collections made in the Alexandrovsk Valley, on the western coast, proved that the birds of Western Sakhalin have a remarkable likeness with those of Siberia and Northern Russia. The same is true with regard to the former inhabitants of Sakhalin, whose stone implements and remains of earthenware, discovered in great masses, are much like, or even identical to, those of European Russia; the presence of obsidian implements, however, originally from Kamschatka, or from the islands of the Pacific, hints that the inhabitants were in intercourse with these countries. M. Polakoff has also discovered dwellings of the same period, which were holes, like those of the Kamtchadales, the numerous stone pieces which were used to be attached to the nets, show that the nets of the prehistoric man were very large, and that fishing was carried on to a great extent at that period.

The result of M. Polakoff's explorations of the eastern shores of the island, as well as in its middle parts, are not yet known. M. Adrianoff's journey in very little known parts of the Tornsk and Sayan Mountains, during which the explorer crossed Lake Teletzekoye and the Shapshal Mountains, have given rich materials for the geology, zoology, and botany of these countries. The travels of A. E. Regel to the Pamir, M. Hedroitz's explorations of the alluvial deposits of the Amu-daria, M. Lessar's travel to Saraks, and M. Moushketoff's researches on Caucasus, have already been mentioned in NATURE.

A very interesting journey, mentioned in the "Report," was made by A. W. Eliseeff, who tried to follow the same route to Palestine which was followed by the Jews during their exode from Egypt. M. Eliseeff discovered during the journey numerous traces of man of the Palæolithic and of the Neolithic periods in Arabia Petrea, as well as in Egypt and in Palestine. The prehistoric man of the Sinai peninsula belonged to two different types: one, with light bones, of the Semitic type, and the other, with massive bones, of the Berber type; dolichocephalic skulls are predominant. Both had the custom of burning corpses, and did not neglect anthropophagy; however, their chief food consisted of wild animals, fishes, and molluscs. The disposition of these remains confirms the hypothesis of Owen, that the Sinai peninsula and lower Egypt were under water, excepting the higher terraces, after man inhabited the banks of the Nile. As to the present inhabitants, the Arabs of the peninsula afford two different types: a western one, more akin to the Fellah and

Egyptian type, and the eastern one, which is of a purer Arabian origin. The nomad Bedouins belong to different sub-types, and there are in the Bedouin desert, traces of a fair-haired people, as well as representatives of Berberian and Ethiopian blood. Some very interesting material for a knowledge of prehistoric man was also discovered by M. W. Malakhoff, during his journey on the western slopes of the Middle Ural. The remains of this epoch are very numerous, especially on the shores of lakes, and they are the more interesting, as we find here the first vestiges of an epoch when the Neolithic man began to discover the properties of metals, and to manufacture metallic implements from the rich ores he found on the Ural. The skeletons of men of this period discovered, together with mixed implements of stone, bone, and copper, are most interesting, especially with regard to the skulls, which represent a very low stage of human development. The remains of a later epoch (implements and rock hieroglyphics) are also very numerous. M. Malakhoff concluded his researches by ethnographical observations on the present Permyaks, whom he considers as very nearly akin to the primary prehistoric inhabitants of this region. G. N. Potanin's exploration of the Votyaks, of their migrations, mythology, and customs, and an excursion of S. K. Kouznetzoff to the Tcherenisses of the Vyatka government promises to yield interesting results.

Among the new publications of the Society we notice the following:—The Anthropology of Mordvinians, by W. N. Mainoff, is printing, and will appear in the eleventh volume of the Ethnographical Memoirs of the Society; the anthropological researches of K. S. Mereshkovsky in the Crimea, preliminary reports of which have appeared in the *Izvestia*, will soon be ready to print; G. N. Potanin's work, "Sketches of North-Western Mongolia," being a report, in two volumes, of his first journey in Mongolia, is an important acquisition for the geography of Asia; the first volume contains abundance of valuable geographical information, and the second contains the ethnographical results, with twenty-six tables of drawings. Volumes iii. and iv. of this work, the third already being under press, will contain the results of the second journey of M. Potanin in Mongolia; the work of N. M. Prshevsky, "Travels in the Deserts of Central Asia" will consist of six volumes, with more than 120 drawings and maps, four volumes being devoted to the zoology, botany, and geology of these countries; the first volume is already finished by the author, as well as several parts of the following volumes:—An interesting map of Jungaria, drawn up by the Swedish Lieutenant Renat in the eighteenth century, after several months' imprisonment by Kalmuks, was published last year by A. S. Maksheef. Finally, the "Report" mentions also a series of pamphlets, in French, published for the Geographical Exhibition at Venice, which contains very good reviews of scientific work done in Russia in hydrography, zoo-geography, botanical geography, geology, and statistics during the last five years.

The ninth volume of the Memoirs of the Society for the Physico-Geographical Section contains an excellent work by A. W. Kaulbars on the delta of the Amu-daria—unhappily without the atlas of maps and drawings, which the Society was unable to publish. The tenth volume will contain the materials collected by the expedition of Karelin in 1830, which are not yet published.

PRELIMINARY NOTICE OF THE RESULTS ACCOMPLISHED IN THE MANUFACTURE AND THEORY OF GRATINGS FOR OPTICAL PURPOSES¹

IT is not many years since physicists considered that a spectroscope constructed of a large number of prisms was the best and only instrument for viewing the spectrum, where great power was required. These instruments were large and expensive, so that few physicists could possess them. Prof. Young was the first to discover that some of the gratings of Mr. Rutherford showed more than any prism spectroscope which had then been constructed. But all the gratings which had been made up to that time were quite small, say 1 inch square, whereas the power of a grating in resolving the line of the spectrum increases with the size. Mr. Rutherford then attempted to make as large gratings as his machine would allow,

¹ By Prof. H. A. Rowland. (Extract from Johns Hopkins University Circular, No. 16.) Communicated by the Author.