

M. BOUQUET DE LA GRYE has invented a multiplying seismograph. The instrument has been fixed at Puebla, and a series of observations made during November and December 1882 show twenty-two abnormal movements in one month, probably seismic, only one being felt at Puebla. The sun and moon have been proved to have a direct action on the pendulum, the sun repelling it and the moon attracting it.

M. A. RIGHI has published a paper in the *Journal de Physique* on "The Influence of Heat and Magnetism on the Electrical Resistance of Bismuth." He says that the resistance of bismuth increases between some temperatures and decreases between others. These variations can be drawn in a curve which shows a maximum at a low temperature, then a minimum, again another maximum just before fusing, and a second minimum whilst in a liquid state, this minimum being in value about one-half the foregoing maximum. The positions of these maxima and minima vary with the physical conditions of the bismuth; if the bismuth be cooled rapidly, the two maxima approach one another until they even merge together, and the curve becomes similar to a parabola. In the first case the two maxima occur at -40° C. and 240° C., the intervening minimum being at 115° C. In the case of rapidly cooled bismuth the single maximum is at 50° C. These results only occur in commercial bismuth, and are more exaggerated as the bismuth is hardened in the preparation, wire showing them more than castings, and cold drawn wire more than hot. Pure bismuth behaves like an ordinary metal. The resistance of bismuth either pure or commercial is increased in the magnetic field; in some experiments the increase has been one-eighth of the original resistance. The increase in resistances is generally proportional to the magnetic force, and decreases with a rise in temperature.

In a recent paper by M. Planté, he gives the result of some experiments made to arrive at the cause and explanation of ball lightning; he was led to these experiments by having one of his mica condensers destroyed by a similar phenomenon. He charged one of his condensers from his secondary battery of 800 pairs, when the condenser was pierced, and instead of a bright spark a small incandescent globule was formed, which moved slowly over the surface of the condenser, following the parts where the insulating layer had least resistance, and destroying the metal film; the path being most curious and erratic. This motion continued, and the globule lasted one or two minutes, until the batteries ran down. In the case of a condenser in which the insulating material was ebonite, a sound was emitted similar to a toothed wheel being rapidly rotated against a piece of cardboard or sheet metal; at the same time there was a strong smell similar to that produced when ebonite is burnt. M. Planté repeated this experiment with 1600 secondary cells, which gave an electromotive force of 46,000 volts, and obtained a similar but much more complicated result. The second experiment made was to make a condenser of two flat pads of filter paper moistened with distilled water and brought near together so as to form an air condenser; now on connecting this condenser with his battery he obtained an incandescent globule which moved about between the pads and passed from one to the other. In this case he noticed that if the pads became dry at any point the globule disappeared, but either appeared at some other point, or at the same point again, as soon as it again became damp. In this experiment he found that the globule lasted a much greater time than in the case of the mica condenser, which fact was owing to the greater resistance in the condenser plates which did not allow the battery to discharge so rapidly.

GEOGRAPHICAL NOTES

To the *Bolletino* of the Italian Geographical Society for September Prof. Bellio contributes an account of a curious manuscript by the Sicilian missionary Fra Teramo Castelli (1597-1659), who spent the better part of his life in Trans-Caucasia. This altogether unique work comprises seven thick folio volumes, originally preserved in the Theatine Convent, Palermo, but, after the suppression of the religious orders, rescued from destruction and removed by P. di Marzo to the communal library of that city. Its peculiar character will be at once evident when it is stated that there is no written text, all the volumes containing nothing but pen-and-ink sketches and other illustrations, accompanied by brief legends or explanations mostly in Italian or indifferent Latin, but occasionally also in

Greek and Georgian. This method was deliberately adopted by the author or artist to convey his impression of men and things, because, as he naively remarks, "we thus see at a glance the fact, which, if written out, would take up much time both of the writer and of the reader." Of the designs, of which there are altogether 1176, 347 are of little value, being occupied with mystic, devotional, or ascetic subjects. But all the rest are highly interesting, especially to students of geography and ethnography. The two regions chiefly illustrated are Mingrelia (basins of the Rion and Ingur) and Georgia proper (basin of the Kur), jointly stretching from the Euxine to the Caspian, and bounded on the south by Armenia, on the north by "the kingdom of Astacan," that is, the Tatar khanate of Astrakhan. Mingrelia is identified with the ancient Colchis, while Georgia, "quæ Gurgistan barbaris dicitur," is said to comprise not only Iberia, but also a part of Greater Armenia and a portion of Atropatia, or Atropatene. Frequent allusion is made to the great fertility, rank vegetation, and moist climate of the low-lying tracts, whence arise "dropsy, extremely dangerous tertian and quartan fevers, causing worms to abound in the stomach and flesh of the people, on which account they consume vast quantities of salt." They are otherwise described as Christians of the Greek rite "with a little difference," very numerous and warlike, especially the highlanders, still sometimes wearing armour, and endowed with great physical beauty. There is a portrait of a certain Mamia "Gorielis Princeps Armatus," mounted on a charger, and dressed in a complete coat-of-mail, with high boots, helmet, plume, spear, and shield. It is curious that this practice of wearing armour still lingers among the Khevsur highlanders of the same region. A striking contrast to the Gorean warrior is presented by the picture of Vomnissa, a poetess wearing a simple robe, a double row of pearls round her neck, a head-dress also fringed with pearls, and a rich mantle lined with fur. She holds a quill in her right hand, a scroll of paper or parchment in her left, and round about are disposed an ink-bottle, more paper, a penknife, a pair of scissors, and a vase apparently containing perfumes. Another lady, the Princess Lipardiani, is provided with a fan somewhat in the shape of a violin, with a little square mirror let in at the narrow part, exactly of the same form as is still fashionable in the country. "According to the seasons they gather the harvests of barley, millet, grapes, and nuts," is a legend occurring under one of the numerous designs representing peasants reaping corn as high as a man and making sheaves such as are commonly seen in Italy. Elsewhere is figured a scene in a market town with the explanation: "Trade is carried on by barter; one hen for two pounds of salt, one sheep for two hens, one sword for two goats, one horse for three oxen," adding that all these values are determined by official tariffs. Amongst the sports is one called *trocus*, which from the accompanying description seems to be identical with the game of polo recently introduced into England from the East. "Four horsemen gallop about playing with a ball the size of an orange, which they endeavour to pick up from the ground, hurl into the air, and drive forward with a racket." Then it is added in Latin: "Equites ludentes hoc pacto ut aspici rarissimi sciunt se ipsos gerere, requirunt agilitas quadam cum certo determinato impulsu ita ut si plus aut minores ponuntur spiritus non bene ludunt sæpeque quasi novi *jetolontes* cadunt in terra ab aliis equis cursoribus." Under several characteristic portraits of natives occur Latin verses pointing out how the mental faculties and moral tendencies may be deduced from the form of the head and expression of the features, thus anticipating the doctrine of Lavater. Of forty-six designs figuring the Sultan and his Court, his army and chief subjects, several are of considerable ethnological interest, comprising portraits of Persians, Arabs, Tatars, Egyptians, Circassians, Indians, Chinese, Portuguese, and other nationalities. Appended to these figures is, for the times, remarkably liberal sentiment that all nations have good and bad qualities irrespective of their religions, and that the Chinese have a good system of philosophy and theology, although different from that of Christian peoples. Prof. Bellio's paper is enriched with a large number of facsimiles conveying an excellent idea of these curious volumes.

THE two last numbers of the *Russische Revue* contain articles on the little-known peninsula of Kamchatka, its geography, natural resources, and the history of its conquest. The districts adjoining the sea are so mountainous as to be almost uninhabitable. There is, indeed, one magnificent harbour in Awachinska Bay, and on this stands Petropaulovski. A chain of volcanic

mountains, some of them reaching to a height of 5000 feet, runs down the centre of the peninsula, and through this the large navigable river Kamchatka makes its way to the Pacific Ocean. The valley of this river is the most cultivated portion of the district. The hills are covered with forests of fir, larch, cedar, birch, &c., and in these are found numerous wild animals, such as the fur sable, the otter, foxes of all colours, and the bear, which latter, on account of the great supply of food, attacks neither man nor the domestic animals. It is curious to note that the squirrel, which is universal in Siberia, is not found here at all. Swans, wild ducks, &c., are found in great quantities in the lakes and marshes in the interior, and their eggs, as well as the birds themselves, are taken in great numbers by the people. The fish which through the rivers in enormous numbers in the summer form the principal food of the natives. For the most part they are salmon (*Salmo salar*), and are dried and stored up for the winter; but owing to the scarcity and dearth of salt the fish frequently become rotten, and the people suffer great privation. The rigour of winter is much softened by warm ocean currents, which create those thick continuous fogs that render the coast so dangerous to navigation. The total population of both sexes is put down at only 6500 souls, but owing to the total absence of agriculture, and to the primitive methods adopted for preserving food for the winter, these are frequently in a state of semi-starvation. For all except bare food they have to look abroad—clothes, utensils, tea, tobacco, &c., and all these they purchase by means of their fur sable, which is unequalled in any other part of the world. About 5000 of these skins are sold each year at 15 to 20 roubles each. At the beginning of the present century, cattle were introduced from Yakutsk, and, owing to the excellent grass and water, would have thriven well, but on account of the lack of industry or energy on the part of the natives, it was found impossible to lay in sufficient stores of fodder in winter. The question whether agriculture is possible in the peninsula has never yet been answered. Markets exist in the ports of Eastern Siberia, which are at present supplied with such articles as salt meat, butter, cloth, and hides from San Francisco. The main obstacle to agriculture is the excessively damp and constantly foggy climate. The sun seldom shines, and does not therefore give enough warmth for the growth of rye and wheat. The trade is almost wholly with California; and as there is little or no money there it is carried on by a system of exchange, the natives offering their sable skins in return for such goods as they require. The articles conclude with an historical sketch of the peninsula down to the annexation of the Amoor region to Russia in consequence of the treaty with China of 1860.

THE latest news from Col. Przevalsky communicated to the Russian Geographical Society is dated January 20 and March 22. In the first of his letters the Russian traveller writes from Dnyouan-in, where he was staying at the residence of the Prince of Alashan. After leaving Urga on November 20, he reached this small town in Alashan on January 15, after a journey of 740 miles across the desert of Gobi. The cold in the neighbourhood of Urga was very intense, and the mercury was sometimes frozen; in Alashan it was, on the contrary, quite warm when there was no wind. M. Przevalsky proposed to leave Dnyouan-in the next day, and *via* the Tchebsen temple reach Kuku-nor. He wrote his second letter from this place. He had crossed Southern Alashan and the Han-sou Mountains without difficulty. There he spent the month of February, principally in hunting and in zoological explorations, which yielded rich collections. On March 23 he was to leave Tchebsen for Kuku-nor. The Chinese authorities did not hinder his advance, but refused to give him a guide for the sources of the Yellow River (Hoang-ho); the indefatigable traveller did not, however, attach any importance to this refusal, being sure of finding the sources of the Hoang-ho himself. When the Tsaidam was reached, M. Przevalsky proposed to establish his first station there, and to continue his journey with a few men and provisions. His second station would be established at Ghast in Western Tsaidam. As to Thibet, he had decided to go to Lassa if the Thibetians did not oppose him. Otherwise he would explore only Northern Thibet as far as Lob-nor, endeavouring to penetrate as far south as possible.

ANOTHER traveller who has been sent out by the Russian Geographical Society, M. Potanin, wrote on April 17 from Tientsin. The expedition had reached Chefoo on April 13 on board the corvette *Shoboleff*, and continued the journey on

board a Chinese merchant ship. They proposed soon to reach Peking, and there to obtain authorisation for the journey to Ordos and Han-sou *via* Utay or Kuku-Koto.

IN a paper contributed to a recent issue of the *Revue de l'Histoire des Religions*, M. Léon de Rosny, the Japanese scholar, argues that one of the two chief chronological factors in the present Japanese race is the Aino. It has long been recognised that there was a certain intermingling of the original Japanese invaders with those whom they drove before them, and who now remain in parts of Yezo, the Kuriles, and Kamchatka; but M. de Rosny thinks that the Aino element is an exceedingly large one, and permeates the whole race. His arguments are based on an examination of the cosmogony described in the earliest works. He finds here two separate and distinctly marked mythologies, one of a transparently aboriginal character. The Japanese of to-day is, he believes, a mixture of the conquering yellow and the conquered white races.

THE Berlin Geographical Society heard a lecture on October 4 from Herr Robert Flegel, who has just returned from making an exploration in the region of the Niger, as agent of the German African Society. Herr Flegel's exploration has occupied the last two years, in the course of which he explored all Adamawa and discovered the sources of the Binuë; but his effort to travel from the Binuë to the Congo ended in failure, owing to the feuds and violence of the intervening tribes. Herr Flegel carried away with him the conviction that the Binuë is navigable for 1100 kilometres, and its chief affluents, as for instance the Taraba, for a distance of from fifty to sixty nautical miles during five or six months of the year. Herr Flegel is accompanied by two natives, who attended him on his travels, and who listened on bended knee and with crossed arms to the praise bestowed upon them by the President of the Geographical Society for their devotion to their master.

NEWS has been received from the leader of the German expedition in South America, Dr. von den Steinen. The expedition had arrived at Aldea dos Bacairis, on the Rio Paranaatinga, the ultimate point from which regular communication with the civilised world is possible. Their journey had been considerably delayed by untoward circumstances and difficulties. They left Cuyaba on May 26, and reached Rosario on June 2. There they stayed a few days to purchase provisions. On June 14 they reached the first Aldeamento of the Bacairis on the Rio Novo, a tributary of the Arino. There they remained a week, making anthropological and linguistic investigations. They continued their march on June 21, and arrived at Aldea on the 28th. On July 5 they were to cross the Paranaatinga.

A GEOGRAPHICAL SOCIETY is about to be founded in the Scottish capital; it is to be opened next month by Mr. H. M. Stanley.

A GIGANTIC EARTHWORM

IT is well known that earthworms exist in many parts of the world of enormous size compared to those with which we are familiar in this country.

Dr. Templeton mentions (see *Proceedings of the Zoological Society*, 1844, p. 89) large worms which are abundant after heavy showers in many parts of the island; this species, named by him *Megascolex caruleus*, is represented by a number of examples in the British Museum, some of which are certainly more than two feet long. In South America at least two distinct genera are to be found which attain to a very considerable size. Prof. Perrier, who is so well known as an authority upon the anatomy of the group, has given them the appropriate name of *Anteus* and *Titanus*. Dr. Horst of Leyden, also well known for his researches into the anatomy of earthworms, has published in the "Notes from the Leyden Museum" a description of two species belonging to another genus, *Acanthodrilus*, which measure three feet or so in length; they are natives of Western Africa. Australia and New Zealand are also inhabited by these gigantic creatures. Prof. Thomas, of Auckland, New Zealand, informs me that he has heard of a large earthworm two or three feet in length, which is to be found in the interior of the island, and one of similar size has lately been described from South Australia, by Prof. M'Coy, under the name of *Megascolides*. There is, however, a still larger species which inhabits South Africa. Forty years ago Rapp described