

## GEOGRAPHICAL NOTES.

A TELEGRAM from Mr. Joseph Thomson, dated Mogador, September 19, reports that he has been successful beyond expectation in his exploration of the Atlas Mountains. He left Morocco city on August 27, and after being driven back from the Urika Valley to the south-east of the city, he proceeded eastwards, and succeeded in crossing the range southwards from Imintan into the Sûs district. From Rezaya he ascended the main range to nearly 13,000 feet. Mr. Thomson intended to return to Hava for a few days, and afterwards to proceed northwards to Fez, Mequinez, and Tangier, returning home about the middle of December.

THE Report for 1887 of H.M.'s Special Commissioner for British New Guinea, contains information of considerable geographical interest. This is especially the case with the Report of Deputy-Commissioner Milman, who has charge of the western district, lying between the Dutch boundary and the Aird River. Mr. Milman refers to the discoloration of the sea about the coast between Talbot Island and the Fly River, due, doubtless, to the vast bodies of fresh water that empty into the sea from the Fly, Tait, Katoer, Mai-Kassa, and other rivers. The Fly River, as far as it has been ascended by Mr. Milman, is thickly populated with a purely agricultural and hunting people, living in large communities; while some houses in the villages are over 200 feet in length. As the river is ascended, traces of careful cultivation are seen here and there on the banks, the gardens or plantations being kept free from weeds, and planted with crotons and other bright-leaved shrubs between the bananas or other fruit-trees, besides being systematically irrigated by dykes cut at regular intervals, which, filling at high water, remain full as the water recedes. About 60 or 70 miles above Soomaioot several large creeks or rivers join the main river, but whether they are flowing into the river, or only form other mouths of this vast system, remains to be proved. The shores of the Fly River, as far as Mr. Milman ascended, are uniformly low, but owing to its great width he is inclined to think they are not subject to inundation. A tidal wave or bore, according to Mr. Milman, ascends the river, but only on the right bank, which accounts for previous visitors not having noticed it. A marauding tribe coming from the westwards have been in the habit of making attacks on the people in the neighbourhood of Sabai Island, but the exact locality they come from is a mystery. Their language and customs are entirely different from those of the Sabai Island people. They had probably never seen a white man until the Rev. E. B. Savage (who happened to be at Sabai when their lights were seen on the mainland) fearlessly visited their camp, and tried to hold some intercourse with them. He describes them as a much lighter race than the rest of the New Guinea natives, and as having long straight hair, while some of them have their nasal-bone pierced in three places, into which are introduced pieces of bone or shell. They appeared entirely unacquainted with fire-arms. Civilization has so far advanced at Port Moresby that a reading-room has been erected, in which the *Times* and other English journals are kept, a hotel has been opened, and a supply of water laid on by means of pipes to the native village.

A RUSSIAN scientific explorer, M. K. Nossilof, has recently returned to Archangelsk from Novaya Zemlya, where he spent a year, from the summer of 1887 to August 1888. He has brought with him rich botanical, zoological, and mineralogical collections, and means to return to the island soon, as he has resolved to devote five years to its exploration. M. Nossilof is reported to have discovered beds of iron, copper, coal, gold, and sulphur, some of which, he believes, could be profitably worked. Among other results obtained by him are many interesting observations on the animal, especially the bird, life of the island, thirteen months' meteorological observations, surveys covering 2500 square kilometres of land, observations on the ice-conditions of the east and west coasts, and 125 kilometres of coast survey. He has, moreover, discovered three new islands. During the winter and spring, M. Nossilof undertook excursions into the Kara Sea, and he hopes by-and-by to undertake a series of soundings as far as the River Yenissei. In the coming winter he intends to fix his station at the east end of Matotshkin Schar, and to establish there a second meteorological station, making excursions along the coast and into the interior.

## ELECTRICAL NOTES.

THE Volta Prize of 50,000 francs has been awarded by the French Institute to M. Gramme for his labours in introducing and perfecting the continuous-current dynamo. The prize is given to the inventor who has formed a memorable epoch in the history of electricity. M. Gramme is a Belgian by birth, but a Parisian by residence. He is entirely a self-taught, self-made man. Although Gramme was anticipated by Pacinotti, his invention was entirely independent, and Pacinotti's was completely dormant, and would probably have remained hidden and unknown but for Gramme's success. No one will contend that the prize has not been richly deserved.

CONSIDERABLE attention has recently been drawn to some experiments by Chappuis and Maneuvrier, in Paris, on the decomposition of water by alternate currents. It is well to point out that the whole question was thoroughly threshed out by Sir W. Thomson in 1853, and his paper in the June number of the *Philosophical Magazine* of that year gives all that is necessary to know on the subject. Jamin, in 1882, showed how electrolysis could be performed by alternate currents by inserting an arc in circuit, the opposing E.M.F. of the arcs producing a partial rectification of the alternate currents. Mr. J. F. Kelley has just repeated the experiment in Newark, U.S.A.

MR. LOWRIE (B. A., 1888), showed how the insertion of an opposing E.M.F. in an alternating-current circuit enables electrolysis to be effected and how it could be utilized to measure the electrical energy consumed in electric light installations. If a decomposing cell of copper sulphate, and a constant E.M.F. such as a secondary cell, be inserted in the circuit, the current in one direction is assisted, while that in the reverse direction is opposed, and the cell is acted upon by the difference: an average current flowing, depositing copper at the same rate as if no alternate currents were present. 0.23544 gramme of copper is deposited per kilowatt-hour, or every gramme of copper deposited means 4.205 kilowatt-hours expended.

PROF. EWING (*Philosophical Magazine*, September 1888) has published, with additions, the paper read by him and Mr. Low at the Manchester B. A. meeting, on the influence of a plane of transverse section on the magnetic permeability of an iron bar. A joint between two portions of an iron core possesses distinct magnetic resistance even when the surfaces are true planes. Compression reduces this resistance in the rough faces and eliminates it when the faces are true planes. In all cases the resistance greatly diminished as the point of saturation was approached. A film of gold leaf interposed between the faces and compressed has only a very little injurious effect. Compression, however, reduces the permeability of the solid core for moderate magnetizing forces, though the contrary effect occurs when the magnetization is strong. Villari found the same reversal in the case of longitudinal pull, but in the opposite direction.

LORD RAYLEIGH (B. A., 1888) has been endeavouring to discover if an electric current flowing through an electrolyte causes the velocity of light to vary through the liquid. He experimented with dilute sulphuric acid. The result was negative within the range of the experiment, which was extremely delicate. In  $H_2SO_4$  diluted, one ampere per square centimetre does not alter the velocity of light by one part in thirteen millions, or by 15 metres per second.

IT is estimated that in the United States there are 5351 electric light plants and stations working 192,500 arc and 1,925,000 glow lamps, and consuming 460,000 horse-power. There are thirty-four electric railways, 138 miles in length, run over by 223 motor cars using 4180 horse-power.

SIR WILLIAM THOMSON (B. A., 1888) dealt with the diffusion of rapidly alternating electric currents in the substance of homogeneous conductors. The surface is affected first, and the depth to which the disturbance penetrates depends on the frequency of the alternations. With a frequency of 150 per second a cylindrical copper conductor is said to be penetrated to a depth of 3 mm. Hence, if this be true, conductors for powerful alternating currents such as are used in the Gaulard and Gibbs system, should be tubes or flat bars with a thickness of 6 mm.

TROUVELOT has by photography obtained effects which lead to the conclusion that flashes of lightning may last several seconds. He gave his apparatus a slight horizontal displacement, and found a broad ribbon-shaped band on his plate.