

in Berlin, then, for greater quiet, in the Astrophysicalisches Observatorium at Potsdam (it was very sensitive to vibrations). The interpretation of the results is that there is no displacement of the interference bands, and the hypothesis (which is presupposed in the commonly accepted explanation of aberration) is inferred to be erroneous.

THE expansion of solid sulphur has been studied by S. Scichilone of Palermo, in the case of natural crystals, and of such as had been heated after fusion to 140° and 240°. The tables (*Wied. Beibl.*, No. 7) show that the expansion depends essentially on the previous heating, inasmuch as different modifications of sulphur are thereby formed. In the first case we have the octahedral sulphur, in another the monoclinic, and in the third a mixture of the latter with that which is not dissolved in sulphide of carbon. In the first two cases the curve representing the volumes as a function of the temperature turns its convex side, in the third its concave side, to the axis of temperature.

GEOLOGICAL NOTES

THE recent geological exploration of the shores of Lake Baikal by M. Tchersky has been fruitful of important results for science. The rocks of which the mountains on the western shore are built up belong to three different ages: pre-Silurian (probably Laurentian), Silurian, and Jurassic. The Laurentian rocks afford several foldings running north-east, which enclosed basins of Silurian and Jurassic seas; as to recent formations they are only freshwater ones, and belong to the Tertiary and Post-pliocene; these last, which are remains of several smaller lakes, are found at a great height above the level of Lake Baikal. M. Tchersky's geological researches confirm the suggestion which was made several years ago on geographical grounds by M. Kropotkin, namely, that, like several other lakes, Lake Baikal consists of two longitudinal valleys, connected together in the middle part of the actual basin.

THE important coal-basin of the Don province of Russia has not hitherto been explored with accuracy. During last summer M. Domger undertook a thorough exploration of this interesting geological region, and, as we learn from a communication he has made at the December meeting of the St. Petersburg Mineralogical Society, his researches have led to important discoveries. Thus he discovered a great variety of crystalline rocks, porphyries, &c., and volcanic ores, within the coal-measures, which discovery thus extends the crystalline island of Southern Russia far eastwards as a strip about 500 miles long, which runs from north-west to south-east. At the same meeting the Society awarded its gold medal to M. Romanoffsky for his researches in Turkestan.

M. DOKOUCHAEFF's researches on the soils of Russia seem to establish a very interesting fact as to the distribution of black-earth. The typical black-earth occupies an elongated zone directed from south-west to north-east from Kishineff, through Kharkoff, Voronezh, Simbirsk, to Bougoulina in the province of Oufa; in this zone the black-earth contains from 7 to 12 per cent. of humus, and from both sides to north-west and south-east it is accompanied by two other elongated zones, where the black-earth contains only 5 to 7 per cent. of humus, whilst the other parts of Russia afford only sporadic spots of black-earth.

M. MOUSHKETTOFF's paper on the glacier of Zerafshan, which appeared in a recent number of the *Izvestia* of the Russian Geographical Society, contains further details about the expedition which has explored the glacier throughout its whole length, from its lower extremity to the sixteen miles distant and 13,800 feet high pass of Matcha, whence another glacier, that of the Zardala river, descends on the north-eastern slope for 2200 feet, by a series of mighty icefalls. The paper is accompanied with a pretty map which shows this grand ice-world, where no less than thirteen secondary glaciers are feeding the ice-stream of the Zerafshan. We notice in this paper that formerly the Zerafshan glacier descended far lower than now. M. Moushketoff says that thirty-three miles below its actual extremity, namely, at the village Diaminor, there is a beautiful terminal-moraine which crosses the valley and unites with three longitudinal moraines. Immense boulders, thirty-five and forty feet in diameter, and consisting of granite, syenite, and gabbro, cover the whole space between these old moraines and the actual ones, so that there cannot be the least doubt as to the glacier having descended

for at least thirty-three miles lower than now. But when we see how the composition of the drift changes lower down in the valley, the loess, which is the wealth of the inhabitants in the lower countries, changing into mighty conglomerates with immense boulders, we are much inclined to think, that the former glaciers descended yet far lower. Therefore we observe with some regret that M. Moushketoff gives too little attention to the diluvial formations of the Upper Zerafshan and to their relations to the loess.

GEOGRAPHICAL NOTES

WHEN Humboldt determined for the first time the average heights of continents, he could not, because of the want of data, determine that of Africa. Now Dr. Chavanne publishes, in the *Proceedings* of the Geographical Society of Vienna (vol. xxiv.), an elaborate paper on this subject, accompanied with a hypsometrical map of the African continent, which is based on no less than 8000 hypsometrical measurements. After a thorough discussion of the relative value of various measurements, Dr. Chavanne discusses the average heights of separate parts of Africa, and by how much each of them would raise the continent if its mass were distributed over the whole of the surface of Africa. He finds that the Atlas Mountains, if distributed over the surface of Africa, would produce an elevation of 26 metres; the Sabara, 122 metres; the plateaux of Soudan, 85 metres; those of Central and South Africa, 129 metres; and so on; and he accepts for the average height of the whole of the continent no less than 661·8 metres (with a probable error of ± 21 metres), which figure he considers to be rather below the truth. This very high figure obviously is the result of the very great extension of high plateaux, which we do not find to such an extent even in Asia.

IN the Annual Report of the Surveyor-General of India, which, though it has been printed for months, has only just been allowed to appear, prominence is given, under the heading of Trans-Frontier Exploration, to an attempt to determine the position of the head-waters of the Irrawaddy by Capt. J. E. Sandeman, through the agency of a native surveyor whom he had trained in imitation of the late Col. T. G. Montgomerie's renowned staff in India. This surveyor alleges that he ascended the river to Mung-poon, near the point where it divides into two great branches, the Malee and Mehka. The surveyor, we believe, gives as an explanation of his not having prosecuted his journey to a more successful termination, that he was attacked and robbed by wild tribes; but we hear privately that persons in Burma, well qualified to form an opinion, attach little credit to any of the surveyor's statements, and we fear, therefore, that the position of the head-waters of the Irrawaddy is still an unsolved problem.

THE Geographical Society of the Pacific is the title of a new Society formed at San Francisco. The Secretary is C. Mitchell Grant, F.R.G.S. The objects of the Society, it is stated, are to encourage geographical exploration and discovery; to investigate and disseminate geographical information by discussion, lectures, and publications; to establish in the chief city of the Pacific States, for the benefit of commerce, navigation, and the industrial and material interests of the Pacific Slope, a place where the means will be afforded of obtaining accurate information, not only of the countries bordering on the Pacific Ocean, but of every part of the habitable globe; to accumulate a library of the best books on geography, history, and statistics; to make a collection of the most recent maps and charts, especially those which relate to the Pacific coasts, the islands of the Pacific, and the Pacific Ocean; and to enter into correspondence with scientific and learned societies whose objects include or sympathise with geography. The Society will publish a *Bulletin* and an annual *Journal*.

WE learn from the Annual Report for 1880-1881 of the Swiss correspondent of the Geographical Society of Vienna that the following geodetical and geological work was done in Switzerland:—The Geodetical Commission has published the seventh fascicule of the "Nivellement de Précision de la Suisse," which contains the measurements done during the years 1877 to 1879 on the lines of Monte Cenero to Chiasso, Reichenau to Sargans and Andermatt, and Süss to Landquart and Chiavenna, uniting thus the Swiss measurements with the Italian ones. The Geological Commission publishes the fourth volume of its new series, containing the important work, by Dr. Balzer,