Mohamed had appeared to him in a dream, and informed him, as from Allah, that he was the long-promised Mahdi; that the Turkish supremacy was at an end, the reign of the Mahdi begun; requesting their assistance, and further predicting wars and insurrections for the Sudan. For himself, at the proper time, he proposed to go to Mecca to receive recognition from the grand sheriff. These predictions were circulated at Khartum a year before they came to the knowledge of the local authorities. Finally Raüf Pasha, governor-general, decided to send a deputation, headed by the famous Abu Suüd, to confer with the new prophet. The latter was found in a large hut surrounded by his dervishes, but declined to go to Khartum or to perform miracles, the time for which, he said, was not come. Abu informed him that he would be forcibly taken to the governor if he did not come willingly; but, discovering several men with drawn swords in his rear, he retreated precipitately to his despatch-boat and to Khartum. He was sent back with two hundred soldiers, commanded by an adjutant-major, to bring the Mahdi forcibly. These soldiers landed at night in mud up to their middles, lost all courage, and, arriving at the hut, were confronted by a mob of whirling dervishes. One of these was shot by the commander as a signal for attack, when the remainder, with thousands of Arabs who had remained in ambush, threw themselves upon the little troop, and exterminated them. The boat was next attacked, and was obliged to retreat to Cava. On the 20th of August, 1881, a large force was collected at Cava to crush the insurrection before it gathered strength. Meanwhile the Mahdi and his people left the Isle of Aba under the very eyes of troops who dared not oppose him, and made his way toward the mountains of Gadir. Here, in November, 1881, he was attacked by Rashid Bey and the king of the Shiluk tribe with five hundred soldiers, who were destroyed, almost to a man, in a few moments as it were. Raüf Pasha being superseded, Giegler Pasha, a European civil officer temporarily in charge, declared that he could preserve order with the troops at his command, and declined re-enforcements. In order to carry out this boast, he concentrated the garrisons of Kordofan, Kashoda, Sennaar, and Khartum, and despatched them from the latter place against the Mahdi, under command of Yusuf Pasha. They comprised about seven thousand men, mostly untrained conscripts, with six cannon.

Three days after their arrival at Gadir they were attacked by fifty thousand insurgents, commanded by the brothers of the Mahdi; and only about a hundred and twenty-four private soldiers escaped from the general massacre. The troops of the Mahdi suffered severely, and both his brothers were killed. Meanwhile the other provinces, from which the garrisons had been withdrawn, began to rise against the authorities. Sennaar revolted: the few soldiers there were slain, with all the Europeans, and their goods looted. El Kerim Bey came to the rescue of the government with three thousand Arabs. He was killed, his men slain or dispersed, his villages were burned, and all the inhabitants put to the sword, without regard to age or sex.

At this juncture Abdelkader Pasha was named to the governorship; and the Mahdi marched on El Obeid, capital of Kordofan, putting the inhabitants of the villages on his way to the edge of the sword. A Catholic mission, consisting of two priests, two sisters, and two lay brothers, were taken prisoners by the Mahdi, and tortured for three days, in a vain attempt to force them to renounce their religion. In September the Mahdi attacked El Obeid with a hundred and ninety-two thousand insurgents. Assisted by a trench, the defenders held their ground for two hours, after which the Mahdi retired, leaving twelve thousand of his men on the battle-field. He proceeded to invest the town, and in four months and a half reduced it by famine, on Jan. 17, 1883. All the Europeans were obliged to embrace Islamism to escape death. Their goods were confiscated. The mission was demolished; the missionaries, male and female, put to the torture. The archives were burned; the merchants of the town, and all the principal functionaries, sold into the interior as slaves. The females suffered rapine.

Before this, thirty-seven hundred soldiers, commanded by Ali Bey, had been sent to succor El Obeid. They were attacked by thirty thousand insurgents under Mama, the grand-vizier of the Mahdi. A thousand escaped to Bara, where they capitulated to the rebels two weeks before El Obeid. But the career of victory was not wholly unchecked. Karkodi on the Blue Nile, the headquarters of the trade in gum and lentils, was captured by the rebels, and partly burned. Four hundred soldiers and merchants were massacred. However, in thirty-five days, the rebels were driven out by the Egyptian troops, and order re-established. A revolt on the White Nile at two large villages, ten hours from Khartum, was crushed, with heavy loss to the rebels, and the death of their leader and his three sons.

Up to this time the insurrection had cost more than a hundred thousand lives in the Sudan. At the time this letter was written, Hicks Pasha and his army were just arrived, and were expected to restore order. Their rout and massacre occurred later. At this date the Egyptian government, under pressure from England, is about to abandon the Sudan to the hordes of the Mahdi; and the unfortunates who are holding a few outposts in the faith of rescue will be left to their fate. The story reads like a page from the middle ages; and it seems hardly credible that such events can characterize any part of the nineteenth century. Unless the strong arm of Abyssinia intervenes against the forces of the false prophet, it is quite possible that even for Egypt proper the end is not yet.

THE GEOGRAPHISCHES JAHRBUCH.

Geographisches jahrbuch. Vol. ix., 1882. Gotha, *Perthes*, 1883. 16 + 719 p. 12°.

This *jahrbuch*, an outgrowth of Petermann's *Geographische mittheilungen*, was first pub-

lished in 1866, under the editorship of E. Behm. On the death of Petermann, in 1878, Behm took charge of the *Mittheilungen*, and H. Wagner succeeded him in the preparation of the *Jahrbuch*, of which the ninth biennial volume has recently been issued. It is about double the size of the first number, and, as now conducted, covers a broad field in geography and allied departments of study, as the following abstract of the contents will show. Indeed, the range of topics reported upon by the thirteen specialists who aid Wagner in its preparation is now so extensive that the seven hundred pages of the present volume are no longer sufficient to contain abstracts of all of the three thousand papers quoted.

The more directly geographical part of the volume contains chapters on the exploration of Africa (42 pages), Asia (35), the polar regions (27), and the oceans (25), by Zöppritz and Lullies of Königsberg, Wichmann of Gotha, and v. Boguslawski of Berlin. From the last of these, we may note the following maps, as embodying the present state of our knowledge concerning the form of the sea-floor. An atlas of thirty-six maps, showing the physical relations of the Atlantic Ocean, was published in 1882 by the German 'Seewarte' at Hamburg. Its first plate shows the depth by eight contour lines at two hundred, a thousand, two thousand, etc., to seven thousand metres, the old fathom measure being discarded. The northernmost Atlantic and adjoining Arctic Ocean are represented in the maps by Mohn, published in supplement No. 63 to Petermann's *Mittheilungen* (1880). The Indian Ocean and the several seas between Asia and Australia are shown in two maps by Krümmel in Kettler's *Zeitschrift für wissenschaftliche geographie* for 1881 and 1882. The latter is especially valuable in illustrating the distribution of temperatures in the sea.

A very considerable share of the work is allowed to questions not simply geographical. Geological investigation is reviewed by v. Fritsch of Halle in seventy-one pages; but only three of these are allowed to the United States, showing a decided inequality of treatment. Studies on the distribution of plants (83 pp.) and animals (71 pp.) are summarized by Grube of Dresden and Schmarda of Vienna; and Gerland of Strassburg reports on ethnology (95 pp.) with satisfactory detail. Geographic meteorology (71 pp.) is safely intrusted to Hann of Vienna. Among the many important memoirs referred to, we may mention Supan's, on the distribution of annual variations of temperature; those by Teisserence de Bort and Wild, on the relation between isobars and thermic isabnormals; Spindler's paper on the strength and inclination of the wind in storms; and several others on meteorological cycles. Concerning the latter, Hann says, in effect, that the hope that such cycles might afford a foundation for long-range prognostics has proved delusive, and the problem is at present of purely scientific, not practical, interest. Whipple's inquiry into the periodicity of rainfall is quoted as proving the absence of any short cycles of between five and thirteen years' duration, so that it can be definitely said that predictions of wet or dry years on the basis of previous observations are quite worthless. So, also, Hoffmeyer's study of the North Atlantic tempests serves to show the inaccuracy, to say the least, of the *New-York herald's* cable-warnings to western Europe. Forty-four pages are devoted to questions of regional climate.

Dr. Zöppritz of Königsberg is allowed forty-two pages for the progress of terrestrial physics (*geophysik*). In commenting on Professor George Darwin's work on the effect of the tides upon the moon's distance, and on Mr. Ball's entertaining lecture, 'A glimpse through the corridors of time,' on the same subject, the reviewer accepts Professor Newberry's conclusion that the moon must have already attained its actual distance from us when our oldest Cambrian and Silurian strata were deposited. This seems an unnecessary adherence to doctrines of uniformity: for, in the spread of our paleozoic strata, there is evidence of much stronger submarine transportation than we now find; and even in Jurassic times there is a surprising area of cross-bedded sandstones in the region of the Colorado plateau. We agree more fully with the author, in his opinion that Mr. O. Fisher has, in his 'Physics of the earth's crust,' rather overvalued the strength of his conclusions, and again in objecting to the theory of the permanence of continents. Under glaciers, the discussion by Forel, of their periodic variations in Switzerland as dependent on preceding and not contemporaneous climatic irregularities, is regarded as of especial importance. Forel was preceded in this idea by Güssfeldt.[1]

Geodesy and cartography are also discussed; and a list is given of geographic societies, which now number seventy-nine, and of geographic journals, which have recently increased rapidly to the number of one hundred and nineteen. Among the societies, the Royal geographical society of London leads the list

[1] Ueber die eisverhältnisse der hochgebirge. Verh. ges. erdk. Berlin, vi., 1879, 86.

with a membership of 3,373, and an income of about nine thousand pounds sterling.

There remain still two chapters to which we hope later to call attention in special notices, — one by Egli of Zurich on the present condition of geographic onomatology, or the study of names; the other, by the editor, on the development of the study and method of teaching of geography, a matter discussed with much seriousness in Germany, though receiving small attention here.

In concluding the present notice, it may be said, that while the *Geographisches jahrbuch*, like other works of its class, by no means serves the purpose of final reference, it is of the greatest value as an aid in all geographic studies; and the special feature of arrangement according to place makes it a most valuable supplement to other bibliographic works in which the classification is according to subjects.

MASCART'S ELECTRICITY AND MAGNETISM.

Leçons sur l'électricité et le magnétisme. Par E. Mascart et J. Joubert. vol. i. Paris, 1882. 8°.
A treatise on electricity and magnetism. By the same; translated by E. Atkinson. vol. i. London, *De la Rue*, 1883. 662 pp. 8°.

One feels, in reading Maxwell's treatise on electricity and magnetism, that the author had a grip upon the subject which has only been approximately attained by other writers. Although the style is obscure, and the arrangement often merits the word 'atrocious,' — for equations are taken for granted which are afterwards proved, and other equations are referred to in general without particular specification; so that the student who comes to the book with mediocre preparation, and is determined to master it, cannot fail to have a feeling allied to bitterness with the author who has led him over such a corduroy road to a promised land, — nevertheless, the grip is there, and one always feels it; and each paragraph is full of suggestion.

The treatise of Mascart and Joubert is Maxwell's treatise very much simplified. It has the Gallic flow, but it has not the Scottish grip. It is Cummings's admirable little elementary treatise on electricity, treated by the calculus, and amplified with some of the harder portions of Maxwell. It has the appearance of a collection of excellent professorial notes on Maxwell's book.

The volume now printed contains the mechanical theory of electricity; and a second volume on the phenomena and electrical apparatus is promised. The portion on thermo-electricity is more extended than the chapter on the same subject in Maxwell's treatise; although, curiously enough, Tait's ingenious method of measuring thermo-electric relations is not given. Much space is devoted to the propagation of what are termed, for convenience, 'electrical waves;' and the action of the telephone is theoretically considered. In the treatment of electro-dynamics the principle of symmetry is often employed in a clear manner. It is noticeable throughout the work that the authors are patriotic, and the special investigations of Frenchmen are often alluded to. We miss, however, full notices of contemporaneous investigations by Germans and by Americans. Perhaps these will appear in the following volume. The chapters on magnetism are very suggestive, and in them the various theories are presented in a clear manner. Thomson's papers on magnetism are given at considerable length, mainly as they are contained in his 'Papers on electro-statics and electro-magnetism.' The view that diamagnetism is merely the difference between the magnetic character of the medium in which the small diamagnetic substance is suspended, and the magnetic character of the substance itself, is popularized by presenting the analogy between this phenomenon of magnetism and the action of bodies floating in fluids of different specific gravities. This hypothesis makes the ether of space a magnetic medium, with a greater coefficient of magnetization than that of any known diamagnetic substance. The analytic processes of the authors are, in general, simple. Laplace's and Legendre's coefficients are used only in a limited way in the subject of magnetism. Perhaps this may be regarded as an advantage in the treatment. What is needed at present is an extended treatise on the application of spherical harmonics to practical problems in electricity and magnetism, and to problems of attracting forces in general, in order to show the availability of this method of analysis.

The authors treat the subject of electro-magnetic induction in a clear way. The retarding effect of induction on the swing of a galvanometer needle is clearly set forth, and the work of electrical motors receives some attention. More will probably be given in the next volume. Hall's phenomenon is treated in a far-off manner. The authors state that "Hall's phenomenon would seem to be in contradiction with the opinion generally adopted, that in electro-magnetic phenomena the action