In the meantime, Dr. Hertzsprung announced a variation of about 0·15 mag., determined from photographs; so Mr. Stebbins again took up the observation of Polaris, using β Ursæ Minoris as the comparison star. This is some 17° away, and, as the correction for differential absorption becomes too great if the altitudes are not nearly the same, the time of observation was unusually restricted. However, Mr. Stebbins secured measures on seventeen nights between March 4, 1911, and April 8, 1912, and from these he finds a variation of 0·078 mag., thus fully confirming Hertzsprung's result, for the two light-curves are practically in the same phase. The difference in amplitude is probably explained by the fact that Hertzsprung employed the actinic rays, whereas the selenium photometer utilises those on the red side of the visual region, and variables of this type (Cepheid) usually show greater variations photographically than they do visually.

A photographic comparison made at Harvard last year by Mr. King showed a variation of about 0·10 mag.

The comparison star, β Ursæ Minoris, used by Mr. Stebbins, has been described as a variable, but the results give no indication of change while it was under observation during this research.

THE SOLAR ECLIPSE OF APRIL 17.—Two interesting papers dealing with the solar eclipse of April last are published as abstracts from the *Astronomische Nachrichten* by Prof. Schorr and Dr. Graff.

In the former, Prof. Schorr describes the observations made at the Hamburg Observatory, and reproduces a number of the excellent photographs taken by the various instruments. In the latter, Dr. Graff describes in detail the profile of the moon's limb at the time of mid-eclipse. He tabulates the elevations and depressions for every 2° of the limb, and then shows them, exaggerated ten times, on a drawing. They are also shown and named on a set of altitude curves covering the entire limb. The important part played by the lunar profile during this eclipse gives an added interest and importance to these deductions.

γ GEMINORUM A SPECTROSCOPIC BINARY OF EXCEPTIONALLY LONG PERIOD.—From observations made at the Ottawa Observatory, combined with earlier observations made at other observatories, Mr. Harper has deduced elements for the orbit of the spectroscopic binary γ Geminorum. The period comes out at about 2175 days (nearly six years), so that the star is unique among binaries discovered spectroscopically in having so long a period. Betelgeuse, a star of a very much later type, possibly has a similar period, but definitive elements have not yet been derived for its orbit. The spectrum of γ Geminorum is of the Sirian type, and the periods for other spectroscopic binaries of this type range from a fraction of a day up to 100 days, so that the star may be looked upon as bridging the gulf between the periods of the longest spectroscopic and the shortest visual binary. (The Journal of the R.A.S. Canada, vol. vi., No. 3.)

THE HAMBURG OBSERVATORY.—With the reports for 1910 and 1911 of the work done at the Hamburg Observatory, Prof. Schorr issues a most interesting brochure containing photographs of the new buildings and instruments at Bergedorf, where the work of the observatory is now carried on. Among the instruments now erected is a large refractor, a 7½-in. meridian circle, and a reflector of 40 in. aperture and 10 ft. focal length; but, according to the 1911 report, the objective of the refractor is still unmounted. The reports show that observations of comets and planets, the time-service for various ports, and a new reduction of the Hamburg star catalogue are occupying the attention of the staff.

REGIONAL GEOLOGY IN EUROPE.

J. J. SEDERHOLM'S summary of the prequaternary rocks of Fennoscandia, with its admirable coloured geological map of Norway, Sweden, and Finland, is now issued in French as Bulletin 24 of the Commission géologique de Finlande. Under the director's active guidance, six further bulletins were published in 1911. V. Tanner has drawn a number of interesting conclusions from his discovery of brachiopods, resembling Kutorgina or Acrotreta, in dyke-like masses of sandstone filling cracks in granite in the Åland Islands, at the entry to the Gulf of Finland (Bull. 25, p. 10). These fossils are probably of Lower Cambrian age, and the cracks were opened, perhaps through earthquake action, in a surface of pre-Cambrian rocks which had been already worn down to a peneplane. It is urged that the present Fennoscandian peneplane, which includes the surface of the islands, represents only a small further degradation of that which was formed towards the close of pre-Cambrian times.

Bulletins 27 to 30 are extracted from the Atlas of Finland, published in 1910, and form an illustrated summary of the surface-forms and geology of the country, drawn up by the director. No. 27, "Esquisse hypsométrique de la Finlande," includes a new contoured map in colours, which shows how large a part of the country lies below 300 metres. The contours, though the scale of the map is 1 : 2,000,000, even bring out some of the eskers, such as the fine ridge of Kangasala on the road from Tavastehus to Tammerfors. A geological map on the same scale accompanies No. 28, on "Les roches préquaternaires de la Finlande," and the extent to which the country is covered by glacial deposits is shown by that in No. 29, on "Les dépôts quaternaires." Here the eskers, and the huge terminal moraines from Hangö to Joensuu, some 600 kilometres in length, stand out prominently in red, and show the form of the great ice-lobe and the course of its subglacial waters at the epoch when stagnation set in. In common with many Scandinavian geologists, Sederholm pictures the eskers as formed in the late glacial sea as the ice shrank back, the south-eastern end of each being thus older than that towards the Gulf of Bothnia. The sandy marginal moraines, running across the course of the ice-movement, are described as "oses marginales." The words "ose" and "oses" have been adopted for the more difficult *ås* and *asar* in Fennoscandian literature, whether written in French or English (p. 6).

Bulletin 30 takes a still wider field, and deals with "La géologie quaternaire et la géomorphologie de la Fennoscandia." The coloured maps show the extension of the Scandinavian ice-sheets, the isobases indicated by the present positions of raised beaches, and the lines of fracture traceable in the prequaternary relief. The block-structure of so much of the Fennoscandian surface, and notably of the Finnish lowland, is referred to fracturing and faulting during the Alpine epoch of unrest. The scarps along the sides of fjords or rivers are held to be more often due to earth-movement than to ordinary erosion, though eroding agents have, of course, acted along the lines of weakness thus produced. As we write, we recall a granite cliff on the farm of Eskola by the Kyminjoki, and Wilhelm Ramsay's exposition of it as we sat upon the grass above the river. The gift of these excellent summaries to geologists is a further reminder of the hospitality of Fennoscandian lands.

Visitors to Norway will profit by the description of the Bergen district by C. F. Kolderup and H. W. Monckton, written in connection with the excursion of the Geologists' Association in 1911 (Proc. Geol.

Assoc., vol. xxii., 1912, p. 1). Some of the glaciers illustrated recently in NATURE (vol. lxxxviii., p. 460) are excellently figured here. Dr. Kolderup (p. 22), in dealing with the crystalline rocks, is faced with the same difficulty that arises in Scotland and in Ireland, where certain granites may be of post-Silurian age, or may be Archæan masses pressed up and rearranged during the Caledonian movements. The part containing these reports may be bought for 3*s.*, and includes a full bibliography. At the same date, Dr. Hans Reusch has contributed to *Naturen* an account of the Devonian beds of the Bergen coast (1912, p. 103).

N. O. Holst (*Sveriges geol. Undersökning, Årsbok*, 1910, No. 9, price 1 kr.) states the evidence for a preglacial flood, "Alnarps-floden," along south-west Sweden, which he compares with that which produced, as he believes, the Cromer Forest-bed in the delta of the Rhine.

The publications of the Geologische Reichsanstalt of Vienna continue to throw light on an empire of infinite variety. Short notes and criticisms often appear in the *Verhandlungen*, dealing with other publications on Austria-Hungary, while original contributions, like those of G. B. Trener on Adamello (1910, p. 91), add to our knowledge of regions that seemed at one time beyond reach of controversy. Especial interest attaches to the spread of geological surveying, under von Kerner and others, in the coast-lands of Istria and Dalmatia (see 1911, p. 111), while the attack upon areas once held to be Archæan, and the acceptance of contact-metamorphism upon a regional scale, give a new attraction to the rolling uplands of Bohemia. K. Hinterlechner (1910, p. 337) thus assigns a Lower Silurian age to a group of crystalline schists with graphite between Caslav and the Moravian border. The Lakes of Lunz, in a familiar region of Upper Austria, have furnished a detailed study in lacustrine sedimentation (G. Götzinger, 1911, p. 173).

The work published in the *Jahrbuch* of the same institute occasionally extends far afield, as when Franz Toula describes (1909, pp. 673–760) a late Tertiary molluscan fauna from Gatun on the Panama Canal. W. von Lozinski continues his studies of the Quaternary glacial deposits of Galicia with a description of the löss north of the Carpathians (1910, p. 133). The great plateau of detrital material cut into by the Vistula is well illustrated in plate vii. F. F. Hahn of Munich has undertaken a detailed examination of the mountainous region round the Sonntagshorn on the frontier south of Traunstein (1910, pp. 311 and 637). Radiolarian beds occur in the Middle Lias and in the Upper Jurassic of this area. Franz Kretschmer (1911, p. 172) concludes, from an elaborate study, that the "metamorphe Diorit- und Gabbromassiv" of the Zöptau area in Moravia is connected with the Hercynian movements. The schists surrounding the great laccolite are believed to be Algonkian, Silurian, and Devonian, and these new conclusions bring the basic intrusive mass of Zöptau, with its contact-aureole, into line with what is now known of the Erzgebirge gneiss and the granulites of Saxony. The Hercynian folding in Central Europe seems to have been accompanied by features of intrusion and metamorphism that recall those of the Caledonian folding in the British Isles. The intrusive gneisses of the Ötztal, described by Guido Hradil (1911, p. 181), have presumably a still later origin.

P. S. Richarz, writing of the "Umgebung von Aspang (Niederösterreich)" (1911, p. 285), enters the field as an opponent of the view that dynamic metamorphism has much to do with the origin of crystalline schists. He shows how composite gneisses were formed in his area on the margin of the granite of the Little Carpathians, where it works its way along the planes of foliation in the schist-mantle. He regards such conclusions as somewhat new (p. 331), though they have been held in France for thirty years. References are rare, however, throughout the *Jahrbuch* of the Reichsanstalt to papers published outside German-speaking lands.

We welcome (1911, p. 229) a further paper by Baron Nopcsa on Albania, although he scarcely considers the foreigner when he writes so many sentences more than a hundred words in length. He brings together the results of his work on the vilayet of Skutari between 1905 and 1909, and he regards the state of the country as now unsuited to scientific work. His warm words of gratitude to the mountaineers who were ready to lay down their lives for him (p. 280) show that his dangers did not originate with the regular—or irregular—inhabitants. The thrust of the Alpine movements here came from the north-north-east. Radiolarian deposits occur on a Jurassic horizon, but they do not seem to be associated with the "green rocks," serpentine, gabbro, and diorite, which appear about the same level in another part of the area. The photographs of the bare rocky highlands have a geographical interest of their own. F. Kossmat (1911, p. 339) reports on the geology of the mercury mining region of Idria, and suggests (p. 383) that the ores were originally imported during Triassic eruptions, and were brought into their present position by thermal waters under the influence of the Alpine movements.

Wiktor Kuźniar writes in German on the folding of the Flysch on the north side of the Tatra (*Bull. Internat. Acad. Sci. de Cracovie*, 1910, ser. A, p. 38). The Eocene Magura Sandstone in the upper part of the Flysch is regarded as part of a sheet thrust over the Tatra and over the earlier Flysch from the south, probably by post-Miocene movements. The base of the Eocene is now shown to have been laid down on an eroded surface of Triassic rocks (p. 40), and the Mesozoic and older strata of the Tatra at that time had much the same structure as they have now.

The details of Mrs. M. M. Ogilvie-Gordon's paper on the thrust-masses in the western district of the Dolomites (Trans. Edin. Geol. Soc., vol. ix., 1910, special part, price 7*s.*) cannot be fully discussed here. The work has involved the observation of very many miles of boundary, and the author concludes, as is well known from her other work, in favour of the isolation of the dolomite masses from their original surroundings by faults and thrust-planes. The contrast between their wall-like fronts and the bedded strata on their flanks is thus explained, without a resort to the theory of coral-reefs rising contemporaneously amid normal marine deposits. The thrust-plane over which the Schlern Dolomite is held to have moved is well photographed in plates ii., viii., and ix. The illustrations throughout are of a high order, and the boldly coloured sections recall those of the quarto publications of the early days of geological controversy. A comparison of the map of the Langkofl area (pl. xiii.) with that by Mojsisovics will show the extent to which slicing of the country has been invoked to account for the startling pre-eminence of the dolomite-masses in the scenery. Additional results published by the author in the *Verhandlungen der k.k. geol. Reichsanstalt* for 1910 were referred to in NATURE, vol. lxxxv., p. 280.

G. Steinmann (*Mitteil. der geol. Gesell.*, Vienna, 1910, p. 285) urges that the central gneiss of the Tauern area is pre-Permian, and that the "Hochstegenkalk" and other sediments associated with the gneiss are of later date, their metamorphism being due to the overfolding on them of the recumbent sheets of later

times. He suggests (p. 297) that an aplite "dyke" recorded by Becke in the Hochstegenkalk in reality results from a mechanical rearrangement of the older gneiss among the limestones.

Jan Nowak, of Lemberg, in a German paper, describes the structure of the limestone Alps of Salzburg and the Salzkammergut (*Bull. Internat. Acad. Sci. de Cracovie*, 1911, ser. A, p. 57), tracing the recumbent overfolds, and pointing out that in the eastern Alps faulting has played a greater part in cutting these asunder than it has in the more plastic masses of the west.

Fascicule iv. of vol. xxxvi. of the *Mémoires de la Société de Physique de Genève* (December, 1910, price 15 francs) is occupied with L. W. Collet's paper on "Les hautes Alpes calcaires entre Arve et Rhône." The author's personal observations extend over eight years. Numerous sections of folded strata are given, among which that of the Dents du Midi (p. 451) is conspicuous. The author believes (p. 577) that vegetation covered the karst-like surface of the Désert de Platé after glacial times, and that the organic acids originated the etching of the surface. The phototypes by Sadag, of Geneva, surpass almost anything that we have seen in the way of geological illustration. The panorama of the district on pl. 17, with its geological clue below, offers a superb study for the class-room.

The lands near the Rhine are not so largely visited by British geologists as they deserve. The neighbourhood of Trier (Trèves) is fully described in the *Sitzungsberichte vom naturhistorischen Verein der preussischen Rheinlande*, 1910, section D, pp. 1–108. L. van Werveke makes several contributions; that on the oolitic iron-ores of Middle Jurassic age (p. 50), which have so wide a distribution, has considerable petrographic importance. A bibliography of similar rocks is given, but no mention is made of the Cleveland ores of England, where the substitution of iron for calcium is obvious, or of the pisolitic ores with "greenalite" in North America. Van Werveke believes that the "Minette" ores of north-eastern France and western Germany were laid down in the sea, and result from the oxidation of iron salts washed from the pyritous Posidonia-beds, over which the Jurassic strata were unconformably deposited. The conditions also favoured the formation of glauconite.

In the *Verhandlungen* of the same society for 1909 (1910, p. 165), C. Mordziol places the Brown Coal Series of the Lower Rhine area on the horizon of the Lower Miocene strata of Mainz. In the next volume (1911, p. 237) he discusses the limits of the Upper Oligocene and Lower Miocene in the Mainz basin, with which his work is so closely identified. G. Fliegel (*ibid.*, p. 327) considers the effect of ice-lobes from the northern continental glacier in producing modifications, both in materials and in ultimate form, of the terraced drift of the Rhine valley.

The Cotteswold Naturalists' Field Club remains true to geological research. In the Proceedings, vol. xvii., 1911, p. 195, L. Richardson describes the Chipping Norton district, where the Inferior Oolite covers much of a very hilly country. J. W. Gray (p. 257) considers the glacial epoch in the north and mid Cotteswolds, and regards much of the "drift" as imported before that epoch by Cainozoic streams that have been beheaded by the development of the Severn tributaries. Like many workers in central and southern England, he remains sceptical as to the invasion of that part of the country by glacier-ice.

W. Hewitt, in his address to the Liverpool Geological Society (Proc., vol. xi., 1911, p. 88), reviews the theories of the origin of the Triassic beds in England, and C. B. Travis and H. W. Greenwood indicate (p. 138), after an elaborate mineralogical research, a source for the north-western beds different from that which supplied the Trias of the south-west and the Midlands.

E. E. L. Dixon and A. Vaughan apply zonal principles to the Avonian (Lower Carboniferous) succession in Gower, Glamorganshire (Quart. Journ. Geol. Soc., Lond., vol. lxvii., 1911, p. 477). Interesting arguments are adduced (pp. 522 and 525) for regarding the "Lower Culm" radiolarian beds as formed in a lagoon phase, near the mouths of rivers, and not in a deep sea. The absence of lime salts and the presence of silica seem to have been more potent influences than depth.

Turning to the south of Europe, part iii. of the *Jahrbuch der k.k. Reichsanstalt* for 1910 is occupied by a paper by C. Renz on the stratigraphy of the Mesozoic and Palæozoic rocks of Greece, on which the author has worked since 1903. This memoir of 215 pages and its successors promise to be a text-book of the geology of the country from the Ionian to the Ægean isles, a region at one time supposed to be covered only by Cretaceous and Cainozoic strata. We now become acquainted with deposits as old as the Devonian.

Rudolf Hoernes has published a paper on the "Bildung des Bosporus und der Dardanellen" (*Sitzungsber. k. Akad. Wissen.*, Vienna, Bd. cxviii., p. 693), in which full credit is given to T. English's paper in the Quarterly Journal of the Geological Society of London for 1904. The author places the break-up of the Ægean plateau in the Upper Pliocene, when a river from the north-east was cutting a cañon along the line of the present Bosporus and Dardanelles. The further depression of the region, and the entry of the sea into the channel, occurred in early Pleistocene times (p. 756). Hoernes opposes the view of English that the Bosporus was originally cut by a river running eastward (see English's paper, p. 261).

Federico Sacco has written a useful account of "L'Appennino settentrionale e centrale" (*Cosmos*, ser. 2, vol. xiii., 1911, p. 145), in which he summarises the geological features and connects them with the settlements and occupations of the people, especially in regard to agriculture.

D. P. W. Stuart-Menteath, in "El Darwinismo en los Pirineos" (*Boletin Soc. Aragonesa de Ciencias naturales*, vol. ix., p. 197), continues to attribute the spread of new views on Spanish stratigraphy to the pernicious influence of evolutionary doctrines.

G. A. J. C.

THE LIFE-HISTORY OF THE HOOK-WORM.[1]

THIS somewhat ponderous volume is the continuation of a monograph of which the first volume was published in Cairo in 1905. Like its predecessor, it will be found of great value for the reference library of all helminthologists.

Agchylostoma duodenale and *Necator americanus*, the latter originally thought to be an indigenous American species of hook-worm, but now believed to have been imported into the United States from Africa by negro slaves, are both parasites peculiar to man, with the exception of anthropoid apes; the near zoological relationship between the hosts is of great interest. The horse, though often accused, is now known not to be a host, and this is also true of dogs, in spite of the fact that the author has succeeded in

[1] Ministry of Education, Egypt. Records of the School of Medicine. Edited by the Director. Vol. iv., "The Anatomy and Life-history of *Agchylostoma duodenale*, Dub." A Monograph, by Dr. A. Looss. Part ii., "The Development in the Free State." Pp. viii+163-613+plates xi-xix. (Cairo: National Printing Department, 1911.)