myself to *Megalosaurus* in the 'Cat. Foss. Rept. Brit. Mus.' p. 167, under the name of *M. Dunkeri*. I am induced to make this new species because metatarsals obtained by Mr. C. Dawson from the Wadhurst Clay of Hastings are clearly specifically distinct from the above-mentioned specimen, and I provisionally refer them, on account of their larger size, to *M. Dunkeri*. The type of *M. Oweni* appears to belong to the right side, instead of to the left, as stated by its describer.

NOTICES OF MEMOIRS.

I.—On a possible Geological Origin of Terrestrial Magnetism.[1]

By Professor Edward Hull, M.A., LL.D., F.R.S., Director of the Geological Survey of Ireland.

THE author commenced by pointing out that the origin and cause of terrestrial magnetism were still subjects of controversy amongst physicists, and this paper was intended to show that there is cause for believing the earth itself contains within its crust a source to which magnetic phenomena may be traced, as hinted at by Gilbert, Biot, and others; though, owing to the want of evidence regarding the physical structure of our globe in the time of these observers, they were unable to identify the supposed earth's internal magnet.

The author observed that in the opinion of many geologists there exists beneath the crust an outer and inner envelope or "magma" the former less dense and highly silicated, the latter basic and rich in magnetic iron-ore. This view was in accordance with the views of Durocher, Prestwich, Fisher, and many others. The composition of this inner magma, and the condition in which the magnetic iron-ore exists, were then discussed, and it was shown that it probably occurs under the form of numerous small crystals, with a polar arrangement; each little crystal being itself a magnet, and having crystallized out from the magma while this latter was in a viscous condition, the crystalline grains would necessarily assume a polar arrangement which would be one of equilibrium. Basalt might be taken as the typical rock of this magma.

The thickness and depth of the magnetic magma beneath the surface of the globe were then discussed; and while admitting that it was impossible to come to any close determination on these points owing to our ignorance of the relative effects of increasing temperature and pressure, it was assumed tentatively that the outer surface of the effective magnetic magma might be at an average depth of about 100 miles, and the thickness about 25 or 30 miles. The proportion of magnetic iron-ore in basaltic rocks was then considered, and it was shown that an average of 10 to 15 per cent. would express these proportions; and assuming similar proportions to exist in the earth's magnetic magma, we should then have an effective terrestrial magnet of from $2\frac{1}{2}$ to 3 miles in thickness. The thickness, however, might be very much greater than here suggested.

[1] Read at the Royal Society, May 16, 1889.

Instances of polarity in basaltic masses at various localities were adduced in order to illustrate the possibility of polarity in the internal mass. Magnetic polarity had been found by the author to exist in segments of basaltic columns.

The subject of the polarity of the globe was then discussed, and it was pointed out how the position of the "magnetic poles" leads to the inference that they are in some way dependent upon the position of the terrestrial poles.

The author regarded the so-called "double poles" as merely *foci* of attraction due to protuberances of the magnetic magma into the exterior non-magnetic magma, and maintained that there was really only a single magnetic pole in each hemisphere, embracing the whole region round the terrestrial pole and the *stronger and weaker magnetic foci*, and roughly included within the latitude of 70° within the northern hemisphere.

It was pointed out that the poles of a bar-magnet embrace a comparatively large area of its surface, and hence a natural terrestrial magnet of the size here hypothecated may be inferred to embrace a proportionably large tract for its poles.

In reference to the question why the magnetic poles are situated near those of the earth itself, this phenomenon seemed to be connected with the original consolidation of the crust of the globe, and the formation of its internal magmas.

It was suggested that, owing to the differences of temperature which must have existed in the polar regions, as compared with those of the equatorial, the process of solidification may have been more rapid in the polar regions than elsewhere, and it was inferred that in the case of the magnetic magma the process of crystallization and the polar arrangement of the particles of magnetic iron-ore might have proceeded from the poles towards the equator in radial directions. The manner in which the phenomena of magnetic intensity, and of the dip of the needle at different latitudes, could be explained on the hypothesis of an earth's internal magnet, such as is here described, was then pointed out; and the analogy of such a magnet with a magnetic bar passing through the centre of the earth was illustrated. On the other hand it was conceivable that the process of solidification might have commenced at the Equator—extending towards the poles, and thus the polar arrangement would naturally arise.

The author then proceeded to account on geo-dynamical principles for the secular variation of the magnetic needle, and also endeavoured to show how the objections that might be raised to the views here advanced, on the grounds of the high temperature which must be assumed to exist at the depth beneath the surface of the magnetic magma, could be met by considerations of pressure; and on this subject read a letter which he had received from Sir William Thomson, F.R.S.

II.—Beitrag zur Kenntniss der Mikrofauna aus den oberjurassischen Feuersteinknollen der Umgegend von Krakau. Von Thaddäus Wisniowski. Jahrb. der k. k. geol. Reichsanstalt, 1888, Bd. xxxiv. pp. 657–702, taf. xii. xiii.

Notes on the Microscopic Fauna from the Upper Jurassic Flint-nodules in the Neighbourhood of Cracow. By Thaddeus Wisniowski.

IN the limestone strata of the White or Upper Jura formation near Cracow there are layers of flint nodules similar to those in the Upper Chalk of this country. The flints vary from dark to grey in tint, in the latter a great variety of microscopic organisms can be distinguished. These principally consist of detached sponge-spicules, some of which are very perfectly preserved, whilst others have been dissolved and only the infilled casts of their canals remain. The spicules evidently belong to a variety of siliceous sponges, the monactinellid and tetractinellid forms predominating. There are also some minute forms resembling the flesh-spicules of existing hexactinellids. In the flints from one particular locality radiolarians appear instead of sponge-spicules; of these 19 different species have been recognized by the author, and ten are new. Foraminifera are also fairly abundant in the flints mingled with the siliceous organisms; but as only their infilled casts have been preserved, it has not been practicable to distinguish more than 10 species. In contrast to the abundant remains in the grey nodules, there are very few to be found in those of a dark tint; but as there are numerous gradations between these two varieties, it is reasonable to conclude that the silica in both has been derived from the same organisms, and that these have been completely dissolved in the dark nodules. Figures of the different forms are given in the accompanying plates. G. J. H.

III.—Ueber das Devon in Devonshire und im Boulonnais. Von E. Kayser in Marburg. Neues Jahrbuch für Mineralogie, etc. 1889, Bd. I. pp. 179–191.

PROF. KAYSER (in company with Prof. Gosselet, of Lille, and some other geologists) visited the classical region of North and South Devon last autumn under the guidance of Mr. W. A. E. Ussher, and in this paper he gives some details of considerable interest regarding the geological structure and fossils of these areas as compared with the corresponding strata in Germany. Prof. Kayser concludes that in South Devon there is the closest resemblance, alike in the Upper, Middle, and Lower divisions, to the Devonian succession in West Germany, and this is further shown by the occurrence of similar eruptive greenstones in both countries. On the other hand, considerable differences are shown in the North Devon Series. There are here no representatives in the Upper Division either of the *Clymenia* Limestone, or of the Adorf *Goniatite*, or the Iberg Coral-limestone; in the Middle Division the *Stringocephalus* and *Calceola*-limestones are wanting, and there is no near resemblance either in

the Rhenish or in the Belgian-French Devonian of the prevailing hard quartzitic sandstones and grauwackes of the Lower Division in North Devon. The Pilton beds and the Cucullæa zone or Baggy beds correspond rather to the Belgian than to the Rhenish Upper Devonian, and there is nothing analogous, either in the Rhine district, Belgium, or Northern France, to the Pickwell sandstones and the slates of Morte and Ilfracombe. Not only are the limestones of the South Devon Series almost entirely replaced by the slates and sandstones of the North, but there is further in this area a complete absence of the greenstone and schalstein.

IV.—On the Spinose Rhynchonellæ (Genus *Acanthothyris*, D'Orbigny) found in England. By S. S. Buckman, F.G.S., and John Francis Walker, M.A., F.G.S.—On *Terebratula bisinuata*, Lam., from the London Clay of Hampshire. By J. F. Walker, F.G.S.—On Oolitic Brachiopoda new to Yorkshire. By J. F. Walker, F.G.S. (From the Yorkshire Philosophical Society's Report, 1888, York, 1889.)

THE first of these papers gives a history and bibliography of the genus *Acanthothyris* as distinguished from *Rhynchonella*, and describes the species and varieties (ten in number) occurring in England, with their geological and geographical distribution.

In the second paper Mr. Walker records the occurrence of numbers of the hitherto rare *Terebratula bisinuata*, in beds, apparently of Bracklesham age, near Fareham, in Hampshire. The last paper contains a list and descriptions of sixteen new species and varieties of Brachiopods, some of them new forms, discovered in the Oolitic strata of Yorkshire since 1876.

REVIEWS.

I.—Bulletins of the Geological Society of France.

THE last number of the Bulletin of this Society (ser. 3, vol. xvi. No. 8, 1888) contains several papers of considerable interest.

We have the concluding portion of a paper by M. Œhlert on some Devonian Pelecypoda, and this is illustrated by phototypes of the author's drawings. Species of *Avicula, Pterinea, Cypricardinia, Sanguinolites, Goniophora, Pteronites, Modiomorpha, Ctenodonta, Palæoneilo*, and *Guerangeria* are described.

M. W. Kilian gives an account of a number of Cephalopoda and one Brachiopod, from the Lower Cretaceous strata of Provence. These include Ammonites, which are noted under the perplexing names of *Lytoceras, Silesites, Holcodiscus, Pulchellia*, and *Hoplites*; also species of *Heteroceras*, and a *Rhynchonella*.

M. R. Zeiller notes the presence in the *Grès bigarré* of the Vosges, of the fern *Acrostichites rhombifolius*.

M. H. Douvillé contributes some studies on *Caprina, Caprinula*, and *Plagioptychus*.

M. Hébert gives the second part of his paper on the Cretaceous formation of the Pyrenees, dealing with the Senonian stage.