

*rus Sedgwickii*, *Barrandia Cordai*, *Agnostus Maccoyi*, *Ampyx nudus*, and *Trinucleus fimbriatus* are found both at Builth and Abereddy; *Trinucleus Lloydii* at Builth and Llangadoc.

Of shells, *Bellerophon bilobatus* is found both in this subdivision and the lower one. Abundant in the Caradoc, this shell lived into the Lower Llandovery period. *B. perturbatus* occurs in the slates of Abereddy. A gasteropod, *Murchisonia simplex?*, has lately been found at Percerrig, near Builth.

From the same locality I have seen specimens of a *Lingula* very like *Lingula plumbea*, *Lingula Ramsayi* is a common fossil at Abereddy Bay; and a species of *Modiolopsis*, called *M. inflata* by M'Coy, represents the lamelli branchiate shells.

The notes on the Llandeilo flags that I have here brought before the notice of geologists were made during a tour in South Wales. I will add that I think it more than probable that if the group be carefully examined in Shropshire and North Wales, the same distinction will be found to exist between the Upper and Lower subdivisions of it.

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## NOTICES OF MEMOIRS.

### I. PALÆONTOLOGY OF ASIA MINOR.

ASIE MINEURE. Description physique de cette contrée, par P. de Tchihatcheff.—*Paléontologie*, par A. D'Archiac, P. Fischer, et E. De Verneuil. 8vo. Paris, 1866. Ouvrage accompagné d'un Atlas grand in 4to. 18 plates.

THE geological portion of this work, to be completed in two volumes, by M. de Tchihatcheff, was intended to have been issued at the same time with the Palæontological portion, but the latter having been completed first, it was thought desirable to publish it at once, as a delay of even a few months might have been very prejudicial to it. The Geology is expected to be published in the course of the present winter.<sup>1</sup>

An introductory chapter on the "General Palæontological Results" is given by M. D'Archiac, who prefaces it with a historical sketch of the labours of previous investigators into the geology of this region, from the times of Strabo, Aristotle, and Theophrastes, until when, towards 1835, it was first scientifically explored by Messrs. Hamilton and Strickland, Spratt, Edward Forbes, Ainsworth, and Ch. Texier.

Devonian, Cretaceous, and Lower and Upper Tertiary formations occupy the greatest geographical area; Jurassic and Carboniferous strata have only been observed in a few and very restricted localities, while rocks of Silurian, Permian, and Triassic age have not at present been determined. Quaternary deposits are spread over the country in many places.

DEVONIAN.—Beds characterized by fossils, mostly belonging to the Lower Devonian of Western Europe, are found in the North;

<sup>1</sup> Since writing the above the first volume of the "Geology" has been published; we shall notice it in a future number of the GEOLOGICAL MAGAZINE, after the issue of the second volume.

among the species are:—*Homalonotus Gervillei*, *Rhynchonella Gueran-geri*, *Spirifer macropterus*, *S. subspinosus*, *S. Davousti*, *Orthis orbicularis*, *Chonetes sarcinulata*, *C. Boblayei*, and *Pleurodictyum problematicum*. Two species, *Orthis Gervillei* and *Tentaculites ornatus*, are Silurian forms.

In the South, the presence of *Rhynchonella boloniensis*, *Spirifer Archiaci*, *S. Seminoi*, *Chonetes nana*, and *Productus subaculeatus*, would seem to indicate rocks of Upper Devonian age.

Of the 49 Devonian species, 37 are found in the rocks of the North, and 21 in those of the South.

**CARBONIFEROUS.**—The Carboniferous, like the Devonian formation, is developed in two widely distant localities, each of which presents a distinct horizon.

In Anti-Taurus (E.), have been found *Productus semi-reticulatus*, *P. Flemingii*, and *Spirifer ovalis*, which, though a very scanty fauna, suggests the representative of the Carboniferous Limestone; and on the shore of the Black Sea, in Paphlagonia, are coal-strata, which have yielded *Lepidodendron caudatum*, *Sigillaria Candollei*, *S. Schlotheimii*, *Stigmaria ficoides*, *Calamites Suckovii*, and *C. dubius*.

**JURASSIC.**—Four species of Ammonites (*A. tortisulcatus*, *arduenensis*, *plicatilis*, and *tatricus*), discovered in the grey limestones of Galatia, seem to indicate an extension of the Oxford-Clay horizon, which is one of the most constant of the Jurassic formations.

**CRETACEOUS.**—Yellow limestone, in the Province of Pont, with *Orbitoides*, *Pecten quadricostatus*, *Exogyra Pyrenaica*, *Ostrea vesicularis*, *O. larva*, and *Ostotoma*, represent the Upper Chalk of the West of Europe, and their identity, both zoologically and lithologically, with beds in the same parallel at the foot of the Pyrenees, is remarkable. White limestones, in Bithynia, with *Inoceramus Lamarckii*, *Ananchytes ovata*, and *Terebratula semiglobosa*, represent the white Chalk. The presence of *Rudistis* denotes the constancy of that zone.

**TERTIARY.**—*Lower Tertiary.*—The white and grey limestones of Thracia, Paphlagonia, and Cappadocia have furnished 164 species of Invertebrata, of which nearly half have also been found in the Lower Tertiary Deposits of Western Europe, and intermediate points.

A Crustacean (*Ranina Tchihatcheffi*) represents a type constant at this level in Europe, and probably also in Egypt and in India, as well as in the West Indies. Two large species of *Cerithium* are met with, but no small specimens. The absence of species of *Fusus* with prolonged canals, of *Pleurotoma*, *Turritella*, *Buccinum*, *Murex*, and the rarity of *Voluta* and *Mitra*, are noteworthy facts. The principal gasteropods are *Terebellum*, *Ovula*, *Natica*, *Sigaretus*, *Hipponyx*, and *Phasianella*.

The bivalves constitute a striking analogy with those of Europe.

Bryozoa are extremely rare; Echinodermata less so; a few species of Corals have been met with at some localities.

Thirty-eight species of Rhizopods occur, one only of which (*Nummulites Viquesneli*) is peculiar; 25 species of this genus have been found.

*Middle Tertiary.*—Deposits of this age occur on the borders of the

Mediterranean (South Coast). 116 species of Invertebrata have been determined, but their examination does not point to any particular horizon in Europe. 72 of the species are also found in Touraine, Aquitaine, Languedoc, Provence, Italy, the Vienna Basin, and Germany. Bryozoa are rare. Among the Corals are 5 species of *Heliastræa*, and of the Rhizopods, 2 species of *Operculina* predominate.

Seven species of plants (Monocotyledonous Phanerogams) have been determined, whose analogues are already known in the Middle Tertiaries of Styria, Croatia, and Switzerland.

*Tertiary Lacustrine Deposits* of different ages occur; the fauna of the whole comprise 33 gasteropods and 6 acephala; forms identical or closely related, are still living in the East.

QUATERNARY.—The absence of all vertebrate remains in these deposits renders their precise age uncertain; they do not however appear to be of very great antiquity. Many microscopic organisms occur, among which are many *Naviculæ* and *Pinnulæ*. All these deposits are believed to be freshwater.

The above observations are translated from M. D'Archiac's Introduction, and we may add that the Palæozoic Fauna is described by M. De Verneuil, and the Flora by M. Ad. Brongniart; the Secondary and Lower Tertiary Fossils are described by M. D'Archiac; the Middle Tertiary Fauna by M. Fischer, and the Flora by Dr. Unger; the Upper Tertiary and Quaternary Fossils, by M. Fischer.

H. B. W.

## II.—NOTE ON THE AFFINITIES OF THE *BELLEROPHONTIDÆ*. By F. B. MEEK.

[PROC. CHICAGO ACAD. SCIENCES. Vol. I., 1866.]

THE family *Bellerophontidæ* (of McCoy) includes a most interesting group of extinct shells, almost, if not entirely confined to the Palæozoic rocks. If we exclude the little Cretaceous genus *Bellerophina* (the relations of which to this group may be at least regarded as very doubtful), and include *Porcellia*, the range of the family will be from the Lower Silurian to the Trias.

Mr. Meek recounts the various opinions in regard to the affinities of this ancient type of Mollusk, entertained by Von Hupsch, Montfort, DeFrance, D'Orbigny, McCoy, Deshayes, De Koninck, and others. In 1844, Prof. De Koninck, who viewed these shells as Gasteropods, placed them in the Scutibranchiate order of the Prosobranchiata—regarding them as *Emarginulæ*, with a greatly extended, and strongly involuted apex.

In 1864 a new fossil genus, *Tremamotus*, was described by Prof. Hall, and placed as the type of a sub-genus under *Porcellia*, but such a striking resemblance does it bear to *Bucania*, that Mr. Meek is of opinion that it should be placed under that genus; it only differs from it in the peculiar and interesting character of having along the middle of the dorsal side a row of isolated, oval siphonal openings; while it differs from *Porcellia*, not only in that important character, but in the greater thickness of the

shell, and its strongly dilated mouth. And, from the fact that the genus *Bucania* is so nearly allied to *Bellerophon* that few Palæontologists regard it as generically distinct, it must be manifest that these three types must go together, wherever we place them. Now as there are no examples, so far as known to the author, of a shell with isolated siphonal openings, except amongst the Prosobranchiate Cephalopoda,—for instance, the *Haliotidæ*, *Fissurellidæ* and *Pleurotomariadæ*—it indicates, for the family, a position near the *Fissurellidæ* and *Haliotidæ*, and between these groups and the *Pleurotomariadæ*.

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## REVIEWS.

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I.—PRINCIPLES OF GEOLOGY, OR THE MODERN CHANGES OF THE EARTH AND ITS INHABITANTS, CONSIDERED AS ILLUSTRATIVE OF GEOLOGY. By SIR CHARLES LYELL, BART., M.A., F.R.S. 10th and Entirely Revised Edition. In two vols. Vol. I. Illustrated with Maps, Plates, and Woodcuts. London, JOHN MURRAY, 1867.

OF all the Books upon the natural sciences, written within the present century, we may safely affirm that none have had so great an influence upon any particular subject as has Sir Charles Lyell's "Principles" upon the progress of geology.

In evidence of the avidity with which the teachings of this great master have been received, we need only state that from its first appearance in January 1830, to June 1853, the "Principles of Geology" had run through nine editions, and it had, by 1838, become the parent of another work, now equally well known, "The Elements of Geology." This thriving child of so good a stock arrived last year at its sixth edition. And, this year, Volume I. of its parent's Tenth Edition was cut by many an anxious inquirer after truth. Nor is this all the family with which Sir Charles Lyell's "Principles" has been blest; for, in 1863, he issued another most welcome volume, entitled the "Antiquity of Man," which enjoyed a privilege (shared by few efforts of penmanship, we imagine,) of three editions in one year. Lyell's "Principles" has been so often reviewed, that it is unnecessary to do more than notice some of the more important additions and modifications which one would expect to find in it, as nearly fourteen years have elapsed since the publication of the last edition. That consisted of one volume of 835 pages, whereas the first volume of this new edition contains in itself no less than 671 pages. The actual increase, as regards corresponding chapters in the last edition is about 275 pages, but a part of this is due to the use of larger type.

The chapter on the progressive development of organic life has been entirely re-written. In speaking of the introduction of man, the author states that "little or no progress has been made in discovering fossil remains which indicate any inferiority in the cerebral development of man in the paleolithic era."

A new chapter on the proofs of former vicissitudes in climate,