

NOTICES OF MEMOIRS.

I.—TERTIARY GEOLOGY OF THE REGGIANO (CALABRIA).¹

IN a large quarto volume of the memoirs of the Accademia dei Lincei, Professor Sequenza gives a description of the geology of the province of Reggio in Calabria, and gives a classified list of all the fossils found in the Tertiaries, together with a description of new species, accompanied with numerous figures. The number of fossils reaches the astonishing figure of 2686, of which 994 are now known living, and 445 are considered new. The same author has already described and given lists of Sicilian fossils belonging to various classes, and while, as a rule, palæontological work is better where it is not spread over too wide a field, yet Prof. Sequenza stands very much alone in his Calabrian and Sicilian work, and therefore it is the more important to make the work as comprehensive as possible, and by the present communication he has erected a memorial of his industry, to be compared with the series of works on French palæontology published by D'Orbigny.

About one-half of the Reggiano consists of crystalline rock and most of the rest is Tertiary. After the "terrain primitive" and Palæozoic schists, Jurassic and Cenomanian beds are found in a few places; but when we come to the Cainozoic there is an almost uninterrupted series of all the Tertiary formations; the Eocene is, however, not so instructively developed as the Middle and Upper Tertiaries. The Parisian, Bartonian, and Ligurian, are found with but few fossils, and those mostly Protozoa; but as much attention has not been given to these as the Miocene and Pliocene beds, and Professor Sequenza thinks that with further study more may possibly be learnt about them.

The really fossiliferous beds begin with the Tongrian, in which nearly all classes are present; but the Aquitanian, Langhian, Helvetian, and Tortonian, are all much richer in fossils, both the Helvetian and Tortonian being extremely interesting, not only from the large number of fossils found, but also from the general character of the fauna, most classes being well represented. In the Helvetian 329 species are mentioned, 69 of which are living, and 893 species were found in the Tortonian, 23 per cent. of which are living. The term oligocæn is here dropped, as it is thought best to unite beds of that age to the Miocene. The Messinian was unfossiliferous, and the author of the memoir considers that there has been a misunderstanding about the Messinian, a name, he points out, first given by Carl Mayer for a zone at the close of the Miocene, which he erroneously placed as coetaneous with the Zanclean of South Italy, a formation deposited in a somewhat deep sea and now known to be of later age than the Messinian and certainly Pliocene. The Messinian is known through Italy and Sicily as the Congeria or Gypsum-sulphur beds. The Miocene covers a diminishing area

¹ Le Formazioni Terziarie nella Prov. di Reggio (Calabria), del Prof. G. Sequenza, Mem. Accad. dei Lincei, vol. cclxxvii., 1880. With Maps and Plates.

from the Langhian upwards, and the way the last formations are only found in patches show what great denudation has taken place.

The Pliocene is found at a much greater elevation than any of the other Tertiary series, reaching in the Zanclean to 1200 mètres above the sea, and as the conditions of deposition were quite different here from those which obtained in north Italy, the series in one part of the peninsula forms a complement to those in the other. It commences with the Zanclean, and this at the base is formed of a conglomerate; then follow fossiliferous beds with 650 species of various classes, among which 52 Radiolaria and 165 Bryozoa. A considerable amount of denudation also took place before the Astian, a formation which was frequently deposited in the depression caused by this denudation, and many mistakes have thus arisen, as the Astian found lower down has been taken for Zanclean, and thought to underlie it. The number of fossils in the Zanclean mounts up to 1175, of which 463 are Gasteropoda, 77 Bryozoa, and 190 Rhizopoda, and of the whole number 652 are now known living; but Professor Sequenza points out how such comparative lists are liable to variation, for in 1870 he published a note on the Astian fossil mollusca of southern Italy, found in the north Atlantic, and not in the Mediterranean, but since then seven of these have been discovered in the Mediterranean; he, however, now mentions 23 more species from the Calabrese known living, but not in the Mediterranean. The Sicilian is also found at a very considerable height above the sea, and the Saharian at an elevation of 832 mètres. Of the 702 species of fossils from this latter formation a few are tropical, but careful examination has reduced the number of cases which were at first thought to be identical with forms from warmer climates, and some occur in the recent Quaternary which had been found in the Tortonian, and then were not found in the Pliocene or Lower Quaternary, and it is considered that they emigrated to the south when the temperature became colder, and subsequently returned upon it becoming warmer; on the other hand, in the Astian, Sicilian, and Lower Quaternary, a number of northern species had been found indicating a colder climate. All the Saharian was a period of elevation, and as this took place the Mediterranean Sea became smaller, and thus the communication with the warmer seas became more restricted.

In most of the formations a conglomerate is found, but the latter ones seem to be derived from older ones, as shown by the lithological similarity, and in all a dioritic porphyry occurs, only found, *in situ*, by Catanzaro.

The changes of level are carefully followed, beginning with the Parisian, which was formed at a considerable depth, followed by elevation in the Bartonian, reversal again taking place at the commencement of the Ligurian, while at the close of the period there was elevation, which continued into the Tongrian, towards the close of which depression again commenced, and continued into the Aquitanian, and until the end of the Langhian the conditions were deep, when an elevation and formation of conglomerate took place, to be followed by a small depression in the beginning of the

Messinian, but through the rest of the Messinian an elevation continued. The greatest depression of all took place in the Zanclean, which was deposited in great depths, as shown by the fauna, by having such a large extension, and by occurring up to such a great height as 1200 mètres above the sea; through the Astian this depression continued, but at the Pliocene the elevation took place which gave to the province its present configuration.

Professor Sequenza considers that as yet only the Mollusca have been sufficiently studied to permit of a satisfactory comparative list of fossils and living Mediterranean species being drawn up, and even with this class he points out fresh discoveries are being made. In one group, the Bryozoa, we know of several additions as yet unpublished to be made to the Mediterranean fauna, which will considerably alter the proportion of living to extinct.

The various zones of the Miocene are found to be well characterized by the *Clypeasteridæ*, of which different characteristic species are found in the Tortonian, Helvetian, Aquitanian, and Tongrian, almost each form being limited to a single geological zone.

A. W. W.

II.—JURASSIC CORALS OF NORTH ITALY.¹

PROF. D'ACHIARDI, in this important memoir, divides the subject into three parts; the first treats of the Corals of Monte Pastello, in the province of Verona. The *Madreporaria* *aporosa* of this district consist of one or perhaps two species of *Montlivaultia* (the doubtful species *M. ? cavuli*, being new). Of the *Stylosmilinæ*, *Placophyllia elegans* is described as new. The *Polyastrææ* consist of a new species of *Diplocænia* (*D. profunda*), one of *Stylina* (*S. taramellii*, a *Stephanocænia*, five *Isastrææ*, one *I. Montispastelli*, being new to science), four *Latimæandrinæ*, of which three are new and peculiar to this formation, but related most nearly either to Miocene or Middle and Lower Secondary forms, and a new species (*ampli-stellata*) of *Comoseris*, a genus which similarly ranges from the Great Oolite to the Miocene. The stratigraphical position of the beds from which these corals were obtained, as determined from their fossil contents, is placed between the Great Oolite and the Coral Rag, but the exact place is rather uncertain.

From various other localities near Verona are described a *Montlivaultia*, a *Stylina*, a *Thamnastræa*, and three new species referred, with doubt, to the genera *Latimæandrina*, *Oroseris*, and *Beaumontia* respectively; the correctness or not of the identification of the last-named species is important, as the genus *Beaumontia* is mainly Palæozoic in range, and hitherto represented by one species—viz. from the Australian Tertiaries—in any later rocks.

The beds in this locality appear to belong to the Dogger group.

The neighbourhood of Mentone furnishes fourteen species of corals from a coarse, friable, calcareous rock.

Besides single unnamed species of *Montlivaultia*, *Rhabdophyllia*,

¹ Atti Soc. Toscana Sci. Nat. (Pisa) Mem. iv. (1880), pp. 233-310, 4 pls.

and *Stylina*, a species is referred to *Calamophyllia Stokesi*, already known from the Coral Rag, and one, with doubt, to *C. radiata* of the Great Oolite, and two species, described originally under the genera *Astrocænia* and *Holocænia* respectively, are referred to *Stylina*. The remaining eight species are new to science, and consist of *Calamophyllia Mentonensis*, most nearly related to two Coral Rag species, *Thecosmilia spadae*, with allies in the Coral Rag and Inferior Oolite, *Cladophyllia Mentonensis*, *Pachygyra costata*, and *Stylina nicoensis*, an octomeral species, which is intermediate between *S. pistillum* and *S. octonaria*. A new genus is found in the family Astræniæ, named *Diplocæniastræa*, for a new species called *D. Italica*, it differs from *Diplocænia* by the toothed character of the septa and the spongy texture of the columella. Among the Cladocorallæ a new species is described as *Pleurocora ? Roccabrunæ*, a new Tabulate is named *Cryptocænia incerta*. The rock evidently belongs to the Coralline Oolite, and is consequently more recent than that of Monte Pastello.

From the sandstone of Monte Cavallo, of the Friuli district, twenty species were obtained, of these fifteen were *Madreporaria* aporosa, four were Tabulata, the remaining one was the Upper Coralline Oolite species *Microselena tuberosa*. Eight out of the fifteen species were hitherto undescribed, and are named *Calamophyllia substokesi*, *Septastræa colturensis*, *Phyllastræa forojulensis*, and *P. dubia*, *Stylina irradians*, *S. stipata*, *S. arborea*, *Isastræa Italica*. The Tabulates were all new and are named *Cryptocænia subbrevis*, *C. colturensis*, *C. ? incerta*, *Cyathophora Pirova*. The affinities of the species are chiefly with those of the Coralline Oolite. In the calcareous rock immediately underlying the sandstone were found ten species, including the above new species *Phyllastræa forojulensis*, the new species *Stylina digitiformis*, and two species possibly identical with two forms described from the before-named bed,—in all nine Aporosa, and one species of Porosa. The Coral fauna of this group of rocks, as well as their Mollusca, have already been determined to be Upper Coralline Oolite.

Note.—It should be observed that the names of a few of the new species were given by Prof. Meneghini, but as he appears not to have published any description of them, the author's name in their case also should stand as "D'Achiardi."

REPORTS AND PROCEEDINGS.

INTERNATIONAL GEOLOGICAL COMMISSION.

AT meetings held by the Committee of Organization for Great Britain and Ireland (Prof. T. Mc K. Hughes, M.A., President), the following definitions have been agreed upon.

SYSTEM.—The word *System* shall be applied to a group which stands by itself, easily and clearly distinguishable from the rocks above and the rocks below, and is generally bounded above and below by a well-marked break in stratigraphical sequence, and is characterized by special forms of life.