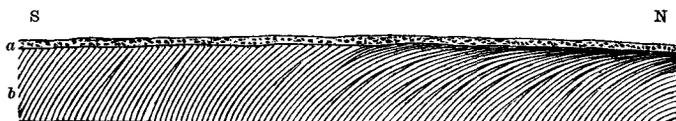


be a reversal of the beds, and that if there were a larger and clearer section, the Bagshot Sand would be seen to dip below the London Clay.

In the pits in that part of the brickyard nearer to the sea the clay c is rather sandy and finely bedded, perhaps because there the upper part only of the London Clay is shown. At one of



Section in Brick-yard, just West of Whitecliff Bay.

a. Soil.

b. Bedded sandy clay.

them the shallow section is as in the figure, from which it will be seen that the thin beds of sandy clay are folded over and squeezed up to the north. It may be observed also that the dip is to the south, and therefore disagrees with that of the coast-section close by, which is to the north.

Further north from the section shown in the figure, there is light-coloured and iron-shot sand; then a little brown clay; then a little greenish-grey clay; and then brown and buff sand up to the northern edge of the brickyard. A line of pebbles near the southern boundary of the last bed, as well as sundry layers of pipe-clay, show the dip to be still slightly inclined southwards. All these beds of course belong to the Lower Bagshot.

There may now perhaps be some clearer section in this brickyard; and if so, it would be worth the while of any geologist who might chance to be in the neighbourhood to pay it a visit, and try to make out the arrangement of the beds.

ABSTRACTS OF FOREIGN MEMOIRS.

MÉMOIRE SUR LA DISTRIBUTION GÉOLOGIQUE DES OISEAUX FOSSILES, ET DESCRIPTION DE QUELQUES ESPÈCES NOUVELLES. Par M. ALPHONSE MILNE-EDWARDS. Paris, 8vo. pp. 133-176.

IN the introductory remarks the author observes that it is very probable that both Mammals and Birds made their appearance on the earth for the first time during the Triassic period, although the only evidence in favour of the existence of the latter class at that time consists of the footprints of the Connecticut Valley.* He then discusses the probability of these footsteps being really ornithic, and notices the distinctive characters of the several genera—*Bron-*

* Dr. Emmons' fossil Bird-bone from the probably Triassic coal-beds of North Carolina should not be lost sight of.

tozoum, *Amblonyx*, *Grallator*, *Argozoum*, *Platypterna*, *Ornithopus*, and *Tridentipes*—into which the original group *Ornithichnites* has been divided by Dr. Hitchcock. The ornithic nature of the genera *Platypterna* and *Tridentipes* (the latter of which is remarkable for possessing four digits) the author considers extremely doubtful, the genus *Platypterna*, in fact, being characterized by a considerable enlargement behind the foot—a structure not known to exist in any recent Bird. Although the remaining genera really appear to M. Milne-Edwards to be the imprints of the feet of Birds, and although Professor Dana found a sufficiently large quantity of uric acid in a coprolite from the same strata to justify the conclusion that it might have been formed by a Bird, yet, in the absence of any bones of these animals, he thinks that their existence at this period cannot be considered perfectly established.

The author next adverts to the *Archæopteryx* of the Solenhofen Oolite, giving an analysis of the literature of the subject, and a résumé of the characters of the fossil, taken from the abstract of Professor Owen's paper in the Proceedings of the Royal Society; and concludes his observations on this subject by stating that the *Archæopteryx* was probably awkward in its gait, ordinarily perching, and a vegetable-feeder.

M. Alphonse Milne-Edwards then passes to the Cretaceous period, and admits that the bones, said to belong to Birds, found in the Cambridge Greensand (by the late Mr. Barrett and Mr. James Carter, of Cambridge), are really what they have been represented to be. He also considers the Bird-remains (*Scelopax*) cited by Dr. Harlan, from the Greensand of New Jersey, to be authentic; but with these two exceptions all the so-called fossil Birds from the Cretaceous and Wealden strata are considered to belong to other classes of animals.

The remains of Birds in Tertiary strata are stated to be extremely numerous, having been found in Eocene strata in the Isle of Sheppy* (*Lithornis vulturinus*, *Halcyon toliapicus*, and a Sea-gull, besides the *Lithornis* (?) *emarginatus* of Mr. Bowerbank), and a bird of the Heron family at Primrose Hill, by Mr. Wetherell; in the Plattenberg schists at Glaris; besides impressions of feathers in the strata of Monte Bolca, and indeterminate fragments in the Lower Eocene of France. The Paris Gypsum has furnished bones of the following genera and species:—*Circus*; *Strix*; *Sitta*? *Cuvieri*, Gerv.; *Centropus antiquus*, Gerv.; *Coturnix*; *Perdrix*, Blanch.; *Scelopax*, Cuv.; *Tringa*? *Hoffmanni*, Gerv.; *Pelidna*?; *Ardea*?; *Numenius gypсорum*, Gerv.; *Pelecanus* (2 sp.); and at least seven kinds of imprints. In a similar manner the author discusses the ornithic fauna of the succeeding periods, giving the distinctive characters of twelve new species of Birds from the Miocene strata of the Limagne.

In conclusion M. Milne-Edwards remarks that the occurrence of remains of *Gastornis Parisiensis* in the Conglomerate of Meudon,

* Mr. Prestwich also mentions (Quart. Journ. Geol. Soc., vol. x. p. 157) the discovery by Mr. Delacondaminé, at Counter Hill, of a bone, which was determined by Professor Owen to be the first phalangeal bone of the foot of a bird.

and of the imprints of gigantic feet in the Paris Gypsum, shows that at the period of their deposition there existed an ornithic fauna at least as perfect as that of the present day; also that the Miocene Bird-fauna did not differ essentially from that of to-day; certain families, such as the *Phænicopteridæ*, being, however, rich in genera and species then, though poorly represented now: finally, the Birds of the Quaternary period are all of recent species; those apparently extinct having probably been exterminated through the agency of man.—H. M. J.

COLONIAL GEOLOGY: NEW ZEALAND.

GEOLOGISCH-TOPOGRAPHISCHER ATLAS VON NEU-SEELAND, BEARBEITET VON DR. FERDINAND VON HOCHSTETTER UND DR. A. PETERMANN. Gotha, Justus Perthes. 1863.

THIS book, which is published in a quarto form, consists of six chromo-lithograph Maps of the principal districts in the Provinces of Auckland and Nelson; and of twenty pages of descriptions and explanations by the authors, taken mostly from the scientific publications relating to the 'Novara' Expedition. The first map is a topographical one of New Zealand; but it contains also indications of the localities where certain useful minerals are found. The five remaining maps are purely geological, and tell much more of the geological structure of the provinces of Auckland and Nelson than was known before.

In the text of the work, Dr. Petermann describes the general topographical features of the Islands; and Dr. Hochstetter discourses (1) on the geological structure of the southern part of the province of Auckland, (2) on the extinct volcanos of the same region, (3) on the hot springs of Rotomahana (Auckland), (4) on the geology of the west coast of the same province, and (5) on the geology of the province of Nelson, in the Southern Island; these five chapters being, in fact, full explanations and descriptions of the five geological maps already alluded to. A very useful table of the heights of hills in South Auckland, and detailed sections of the different formations in the same district, are also given.

Dr. Hochstetter has done his work remarkably well, and since his return the fossils he collected have been examined and described by some of the most able Austrian palæontologists (see the following notices), so that the Colonial Governments of these provinces will almost be spared the expense of geological surveys.—H. M. J.

FOSSILE MOLLUSKEN UND ECHINODERMEN AUS NEU-SEELAND, BEARBEITET VON DR. KARL A. ZITTEL. NEBST BEITRÄGEN VON DEN HERREN BERGRATH FR. RITTER VON HAUER UND PROF. E. SUESS. 10 Plates.

THE oldest known fossiliferous rocks of New Zealand occur in the Southern Island, near Nelson, in the district of Richmond, and are probably of Triassic date, as they contain two species of Shells (*Monotis salinaria*, Bronn, and *Halobia Lommeli*, Wissm.) undistinguishable from known forms occurring in European strata of that

age, although they are associated with a species of *Spirigera* and certain other fossils considered Palæozoic by Professor M'Coy.

The probably Jurassic strata of the Northern Island, near Waikato-Southead, and at the Kawhia-Haven, contain an Ammonite (*Ammonites Novo-Zelandicus*, Hauer) intermediate between the species of the group *Dentati* and those of the groups *Flexuosi* and *Angulicostati*, and a deeply grooved Belemnite (*Belemnites Aucklandicus*, Hauer) belonging to the *Canaliculati*, with shells of the genera *Aucella*, *Placunopsis*, and *Inoceramus*. Dr. Zittel states that the evidence of the Belemnite, the *Aucella*, and the *Placunopsis* is in favour of these beds being of Jurassic age; while that of the Ammonite and the *Inoceramus* points to the Cretaceous period.

Tertiary deposits, very rich in organic remains, occur in both Islands; they may be divided into two groups, one of which contains no recent species amongst its fossils, and may therefore be considered to belong to the earliest portion of the Tertiary period; while the other contains fossils, some of which bear a striking resemblance to species of the same genera now found in the neighbourhood, while others are identical with them: thus showing the same kind of relation that the Sub-Apennine fossils do to the recent Mediterranean species. Many of the genera represented have a very limited geographical range, and thus the whole fauna has a peculiar facies, making it difficult to ascertain the age of the beds by comparing their fossils with those from the Tertiary strata of Europe.—H. M. J.

Die FORAMINIFEREN-FAUNA DES TERTIÄREN GRÜNSANDSTEINES DER ORAKEI-BAY BEI AUCKLAND. VON FELIX KARRER. (Novara-Expedition, Neu-Seeland: Abtheilung; Palæontologie.) 4to. Vienna, 1864.

THE fossil Foraminifera found at Orakei Bay (or Creek), near Auckland, in the North Island of New Zealand, have already been briefly alluded to in the appendix to a paper by Mr. C. Heaphy, published in the Geological Society's Journal, 1860, vol. xvi. p. 251; and this bed of fossiliferous green sand, or 'friable argillo-calcareous grit, full of green grains (the casts of small organisms, especially of Foraminifera),' has yielded the numerous beautiful casts of *Amphistegina* figured and described in Dr. Carpenter's 'Introd. Study Foram.' (Ray Soc.), 1862. These facts appear to have escaped Dr. Karrer's notice.

Dr. Karrer's nomenclature of Foraminifera permits nearly every difference of feature in individuals being taken as the basis for 'specific' distinction, as is still usual with some Rhizopodists; but, if his 'species' be more strictly correlated with known forms, according to the English plan (see Carpenter's 'Introduction'), we shall find many old acquaintances on his beautiful plate of fossil Foraminifera from Orakei Bay, although he admits but very few accepted names. With regard to generic relationship, we believe that he is mistaken as to fig. 9, which is *Lituola globigeriniformis* (not a new species of *Textularia*); fig. 10, *Orbitoides* (not *Orbitulites*), and probably, like fig. 21, the representative of *O. Mantelli*;

fig. 11, *Bigenerina nodosaria* (not *Clavulina*, n. sp.); fig. 12, *Pulvinulina elegans* (not *Rotalia*, n. sp.); fig. 13, *Planorbulina Haidingeri* (not *Rotalia*, n. sp.); fig. 14, *Rotalia Beccarii* (not *Rosalina*, n. sp.); and fig. 20 is a *Polystomella*, near some South American and West Indian forms, and not a new species of *Amphistegina*. Dr. Karrer met with no *Miliolæ* in his samples of the deposit; but *Triloculina* is noted in the appendix to Mr. Heaphy's memoir above-mentioned; and *Rotalia Schroeteriana* and *Nodosaria Raphanistrum*, also included in that list, may be added to Dr. Karrer's, which, if named on the same plan, would comprise—

1. Foraminifers that Dr. Karrer met with, but has not figured:—

Nodosaria spinicosta (?).	Uvigerina pygmæa.
Cristellaria rotulata.	Polymorphina lactea.
Cr. cultrata.	Globigerina bulloides (rare).

2. Figured forms:—

Dentalina communis; fig. 1.	Bigenerina nodosaria; fig. 11.
Vaginulina Legumen; figs. 2 and 4.	Pulvinulina elegans; fig. 12.
Lingulina costata; fig. 3.	Planorbulina Haidingeri; fig. 13.
Cristellaria Cassis; fig. 5.	Rotalia Beccarii; fig. 14.
Cr. Vortex; fig. 6.	Polystomella macella; figs. 15 and 16.
Textularia agglutinans; figs. 7 and 8.	Nonionina umbilicata; fig. 17.
Lituola globigeriniformis; fig. 9.	Amphistegina vulgaris; figs. 18 and 19.
Orbitoides Mantelli; figs. 10 and 21.	Polystomella, sp. (?); fig. 20.

Looked at in this light, these little fossils from New Zealand will be seen to be, for the most part, very closely allied to Foraminifera now living, in warm seas, at depths of about thirty to forty fathoms and more; and any peculiarity of *facies* they may possess, scarcely gives them even *subvarietal* characteristics. *Lingulina costata*, and the *Orbitoides* (which we think should be referred to *O. Mantelli*), are well known in Miocene strata; most of the others range throughout the later Tertiary formations, and still exist.—T. R. J. and W. K. P.

NOTES ON FOREIGN GEOLOGY AND MINERALOGY.

By Dr. T. L. PHIPSON, F.C.S., &c.

Distribution of the Mineral Springs of Belgium.—Devonian Fossils from Thibet.—Presence of the New Metal Thallium in Pyrolusite.—The Mineral Schorlomite in Europe.—The New Metal Cesium a Constituent of Pollux.—On the Mean Density of the Earth.—A New Fossil Crocodile.

AT a recent meeting of the Academy of Sciences, Paris, a letter was received from M. Dewalque, of Brussels, 'On the Distribution of Mineral Springs in Belgium.' The author having made an excursion in the neighbourhood of Liège, in company of M. Ch. Ste.-Claire Deville, this geologist remarked to M. Dewalque that the thermal spring of Chaude-fontaine and the acidulated ferruginous springs of Spa and Malmédy lay upon the same straight line, a fact which appeared to indicate a line of dislocation. Following up the subject, M. Dewalque now addresses to the Academy details concerning seven of these mineral springs, giving the direction in which they