

and belemnites, to Mr. H. Woods, Demonstrator in Palæontology, Cambridge; fossils of the Baton River and Reefton Series (Lower Palæozoic) to Mr. W. S. Dun, Sydney. In addition, several New Zealand geologists have signified their willingness to take parts of the Tertiary collections for study.

At the same time it must be pointed out that the specialist, like any other working-man, is worthy of his hire, and that many of those whose services it is necessary to secure before the collections can be worked out cannot afford, or object on principle, to give their services gratuitously. It will therefore be necessary to increase the funds at the disposal of the Survey for this purpose, if the collections are to be adequately described.

A revision of the Tertiary *Mollusca* being an immediate necessity, the services of Mr. H. Suter, of Christchurch, were secured for six months. His unrivalled knowledge of the Recent *Mollusca* of New Zealand renders him particularly qualified for this work. Mr. Suter has finished the revision of the types of Tertiary *Mollusca* in the possession of the Survey which illustrate Captain Hutton's Catalogue of 1873; and, in addition, has determined several hundred specimens from various Pliocene and Miocene localities. The results of his work are now awaiting publication.

As mentioned above, I have concentrated my efforts on establishing a succession of faunas from Cretaceous to Pliocene. The Cretaceous fossils from Amuri Bluff have been separated into genera and species, and I was about to commence their description when Mr. H. Woods, of Cambridge, who is so well known for his work on Cretaceous *Pelecypoda*, expressed his desire to describe the New Zealand material. Correspondence is proceeding with this end in view, and meanwhile I am now engaged with Mr. C. A. Cotton in revising the Tertiary *Brachiopoda*. It is desirable to have complete revisions of the Tertiary *Mollusca*, *Brachiopoda*, *Echinodermata*, *Bryozoa*, *Cirripedia*, and corals published as soon as possible, in order that New Zealand geologists may co-operate by work on other sections than the Waipara section, and thus assist in clearing up the disputed questions of stratigraphy.

THE MESOZOIC MARINE FAUNAS OF NEW ZEALAND.

As various specialists have made inquiries about the Triassic or Jurassic fossils of New Zealand, it will be well here to explain the present state of our knowledge. Hamilton* and Bœhm† have expressed the opinion that so far as the Mesozoic fossils are concerned, "there is little of permanent value on record except in the 'Voyage of the "Novara"' and one or two recent papers, and it will be necessary to make a fresh start in the description and correlation of the New Zealand species in the collection."

The fossils collected by Hochstetter, and described in the "Novara" records by Hauer, Zittel, and Suess, came from three localities—Waikato Heads; Kawhia Harbour, on the west coast of Auckland; and the neighbourhood of Richmond, near Nelson. The Waikato Heads and Kawhia beds were ascribed by Zittel to the Upper Jurassic or Lower Cretaceous, the Richmond sandstone to the Trias and probably Upper Trias.

After the inauguration of the Provincial and Colonial Surveys very many new localities for Mesozoic fossils were discovered, and a vigorous policy of collecting was carried out by Hector and his assistants, particularly McKay. A succession of faunas was described from many localities, of which the most important are: Nugget Point, Otago; the Hokanui‡ Hills, Southland; the Wairoa Gorge, Nelson; and Kawhia Harbour, Auckland. Many of the fossils collected were identified by Hector with European species, a few new species were described or figured, and many were given manuscript names. Haast relied chiefly on determinations by McCoy, while Hutton practically confined himself to the identification of the species described by Zittel. A complete list of the specific identifications published will be included in my forthcoming bulletin. It is to be regretted that few of the specimens determined by Hector or McCoy have been preserved with labels attached.

As a result of the different interpretations placed on the fossils by Hector and McCoy, and also of divergent views as to the stratigraphy, several controversies arose between Hector, Haast, and Hutton, and in consequence the literature on the beds is very diffuse, and not easy to follow. None of these controversies may be said to be settled yet, and fresh complications have arisen by the assumption of new positions by Park and Marshall. It is impossible to analyse these controversies in detail here, but the more important points may be noticed.

The most fundamental point at issue is the presence or absence of Carboniferous rocks in New Zealand. Hector and McKay, in 1878, recorded the occurrence of Carboniferous fossils in the Maitai limestone of the Nelson district. Elsewhere the only fossils found in supposed Carboniferous rocks are *Dentalium huttoni* and *Torlessia mackayi* (the "Mount Torlesse annelid"). These fossils have recently been described by Bather, who compares the latter with forms in the Lias of Alaska.§ In the last-published Bulletin of the Geological Survey (No. 12), Bell, Marshall, and Clarke, after a detailed survey of the Dun Mountain Subdivision, which includes the Maitai limestone and the Richmond sandstone of Hochstetter, have concluded that Carboniferous fossils are not there present, and that the Maitai limestone is an integral part of the Trias-Jura series. It should be remarked that the fossils on which Hector made his determinations were not examined in this recent survey, as the collections were then undergoing repacking. There is a fairly large collection of fossils from the Maitai limestone in the possession of the Survey, and the question of whether they are Carboniferous or Triassic is susceptible of a direct palæontological solution.

* Trans. N.Z. Inst., vol. 42, p. 55, 1910. † Neues Jahr. f. Min., &c., Jahrg., 1911, bd. i., p. 1. ‡ Also spelt Hokonui. Both are possible Maori place-names, but *Hokanui* is the more probable and has the advantage of priority in geological literature. Maori *hoka*, that which projects; *nui*, large. § Geol. Mag., Dec. 5, vol. 2, pp. 532-41, 1905; vol. 3, pp. 46-47, 1906. See also Bull. No. 6 (N.S.), N.Z.G.S., 1908, p. 20.