

botany and zoology were so vast that a far larger number of workers than we had must be engaged before they could be fully explored. Meteorology was making great strides all over the world, and he was glad to see that soon New Zealand meteorologists would be able to co-operate with those of Australia. Until that was done they could hardly expect to reduce to laws the storms of these seas. He hoped soon every ship arriving in Australia would bring a record of all meteorological observations of the voyage, as was done with good results elsewhere. Pure and mixed mathematical sciences had yet no foothold here, but he hoped soon astronomy would here occupy the same status as it did in Australia. In conclusion, Mr. Chapman thanked the society for the indulgence with which he had been treated as president, and congratulated them on the selection made in his successor. Dr. Buller proposed a vote of thanks to the chairman for his services as president, and for his address. The year had not been so successful as it might have been, partly through Dr. Hector's long absence. Still the annual volume would be of great interest. Dr. Hector seconded. He thought the society was greatly indebted to Mr. Chapman for his services as president. Carried unanimously.

The following papers were read in abstract :—

1. "Alpine plants of Otago," by J. Buchanan, F.L.S.

Dr. Hector said this paper would describe the results of a botanical exploration of a district in Otago which he first collected from in 1862, and which then yielded many new and interesting species. He accordingly had sent Mr. Buchanan to join the geological survey party this season, which, under Mr. S. McKay, has been at work in this district. Mr. Buchanan had, with Mr. McKay's help, brought from the Otago ranges an enormous collection of 25,000 plants, many of which were wholly new, and about others very little was known. Among others there were some beautiful specimens of the alpine plants, which were brought alive, and were exhibited on the table. Dr. Hector explained these in a most interesting manner, they being a number of specimens of plants not higher than moss, but really miniature shrubs. Seen under the lens, they were remarkably beautiful, being covered with flowers. Dr. Hector said prior to this not five people had seen these plants alive, as they were only to be found in the Southern Alps, and were under the snow nine months a year. Among the plants brought Dr. Knight, F.L.S., had discovered a most interesting new species, of Lichen respecting which he furnishes a separate notice. (*Transactions*, p. 385).

2. "Notes on New Zealand Cetacea, Recent and Fossil," by Dr. Hector.

ABSTRACT.

Dr. Hector explained that the illustrations of this paper would not be ready for the forthcoming volume. The notes on the recent Cetacea give a detailed description of *Neobalena marginata*, two complete skeletons of which (adult and young) are now mounted in the Museum. The presence of 17 pairs of ribs and the permanency of the remarkable characters, afforded by the expanded and lammeller structure of the ribs and vertebral processes, thoroughly establishes the generic independence of this Whale as a form intermediate between the true Baleen Whales and the Rorquals.

Kogia breviceps: A cow and calf of this miniature sperm whale, cast ashore at Lyell's Bay, have been secured, and portions of the latter preserved in spirit for future examination.

Orca: Two examples of this genus have been obtained; the first ran ashore at Lyell's Bay, and the second, which appears to be a full adult example of *Orca gladiator*, was cast up on the beach near Wanganui.



J.B. del. et lith.

KEKENODON ONAMATA, Hector. Proc. p. 436.

Among the fossil Cetacea referred to is a skull of a whale, closely allied to *Balaenoptera*, from the middle miocene formation on the West Coast of the South Island. The matrix which encloses this fossil, is so hard that it is as yet only imperfectly displayed, but it comprises the occipital parietal and frontal bones.

The teeth and bone fragments of a *Zenglodont*—recently determined from a collection of fossils made by Mr. McKay, during the progress of the Geological Survey in the present season—forms an interesting addition to New Zealand Palæontology. Unfortunately the form of the skull cannot be determined, but the crowns of the teeth agree with that of the great American fossil. They were obtained from the upper eocene strata of the Waitaki valley, in Otago. Fragments of the lower jaw and some ten teeth are preserved, but only a few of the latter are perfect. The teeth are of two kinds, incisors and molars. The largest incisors, probably occupying the position of canines, are 6 inches in length, with a dilated and irregularly curved solid fang supporting a sharp-pointed conical crown $1\frac{1}{2}$ inches in length, and covered with a brown polished enamel having, a fluted surface, and two well marked ridges, so that the section of the tooth presents the same pointed elliptical form as in *Mososaurus* or *Liodon*. If only the detached conical crowns of these teeth had been obtained they might have been referred to such a reptilian type. The molars are from 4 to 5 inches in length, and have compressed conical crowns $1\frac{1}{2}$ inches wide, also covered with polished and fluted enamel, and having the cutting edges serrated by eight obtuse bluntly conical lobes. The crowns are supported on powerful fangs, which are, in some cases, distinctly double-rooted, although the roots are closely appressed, except at the extremities. In one tooth—the smallest and probably the anterior molar—the division of the fangs is only indicated by shallow grooves on the inner and outer surfaces, and it has a somewhat trilobate character, while in another, probably the most posterior, the fang is strongly curved. In this last case the crown of the tooth is triangular in section, and has its cutting edge directed obliquely inwards and forwards. All the teeth are solid, or have only a slight excavation at the points of the fangs, and consist of a lamminated cement layer .35 inches in thickness, enclosing the massive dentine.

The fragments of bone indicate a massive solid jaw, one portion showing the posterior part of the ramus as having a depth of 6 or 7 inches. One tympanic bulla was obtained. It has the sub-convolute form characteristic of toothed Cetaceans, such as *Berardius* or *Ziphius*. The arrangement and number of the teeth cannot be ascertained owing to the imperfect state of the fossil remains, but the general appearance suggests that this huge animal was allied to the earless seals with serrated molars, such as *Stenorhynchus*, rather than to Cetaceans, but this indication is contradicted by the teeth being solid and by the character of the tympanic bulla. The resemblance to the *Zeuglodon* is found in the serrated crowns of the double-fanged Molars, but the fangs are not so widely separated, nor do the crowns of the teeth show the hour-glass form in transverse section to the same degree as in the gigantic *Zeuglodon*, with which it is provisionally associated under the name of *Kekenodon onamata**

NOTE.—Since the foregoing was written I find that a very similar tooth fragment, from the eocene strata of South Australia, has been figured by Mr. E. B. Sanger, as *Zeuglodon harwoodii*.†—Also that the New Zealand teeth resemble those figured by Gervais and Van Beneden, as the *Phocodon*, from Saint Medard-en-Jalle, Bordeaux,‡ and the

* *Kekeno* (Maori), a seal. *Onamata* (Maori), of long ago.

† Proceedings Linn. Soc. N. S. W., Vol. V. p. 298, 1881.

‡ Ostéographie des Cétacés; p. 453.

Squalodon, from Dinan, Brittany,* but as these generic names and also *Zenglodon*, appear each to have been applied to several very distinct animals, I deem it advisable to retain the name *Kekenodon* for the New Zealand fossil.

On Plate XVIII., I figure the best preserved portions of this interesting fossil, of the natural size. It will be seen that the molar teeth have not the widely divergent and separately implanted fangs of the *Zenglodon* of Owen, while the enormous development of the fangs in proportion to the crowns of the teeth, at once distinguish them from the genus *Phocodon* of Agassiz, established on the Maltese fossil described by Scilla, in 1652, but which partly on account of this short-fanged character of the teeth, was referred by Owen to *Hippopotamus*.†

EXPLANATION OF PLATE XVIII.

- Fig. 1. Canine tooth (?) lower of right side, showing the roughly fluted inner surface of the conical apex, bounded by the cutting ridges, and the large bulbous solid fang. 1' is a section of the crown of the tooth, showing the enamel coating the dentine. 1" is a longitudinal, and 1''' is a transverse section of a segment of the fang showing the massive cement layer coating the solid ivory of the tooth.
- Fig. 2. The upper canine (?) of the left side, showing the comparatively smooth exterior surface of the crown.
- Fig. 3. First (?) molar, exterior aspect, showing at the extremity of the fang a trilobate character, illustrated by the transverse section.
- Fig. 4. Second (?) molar, exterior aspect, and 4' a lateral view of the same.
- Fig. 5. Third (?) molar, which has the fangs most widely separated of all the teeth.
- Fig. 6. and 6'. Two views of the fourth (?) molar.
- Fig. 7. and 7'. Two views, interior and posterior, of the fifth (?) molar, showing the strong unequal fangs, and the obliquely triangular crown.
- Fig. 9. Interior aspect of the tympanic Bulla, 9.' exterior surface.
- Fig. 10. Interior or opposing surface of the Periotic.
3. "Notes on New Zealand Fishes," by Dr. Hector.
4. "Descriptions of New Crustaceans," by T. W. Kirk. (*Transactions*, p. 236.)
5. "Notes on some recent Additions to the Collection of Birds in the Colonial Museum," by T. W. Kirk. (*Transactions*, p. 235.)
6. "Description of Maori Comb and Arrow Heads," by T. W. Kirk.
- Some time since, among the sand-hills at the southern end of the isthmus which connects Miramar peninsula with the main land, accompanied by Mr. Page, I found a tolerably complete skeleton of a man, and portions of several others of much slighter build, probably belonging to women, together with a quantity of chert and obsidian flakes, etc.
- Amongst the chert flakes I was struck with the unmistakeable arrow-head-like form of two pieces, that of No. 1, a flint, being most marked; No. 2, a chert, is broken, and may or may not have been a similar weapon.

I believe there are, both in the Christchurch and Auckland Museums, implements supposed to have been used as arrow-heads, but in no case do they possess so decidedly the characteristic features of such implements as in this instance.

* l. c. p. 437, Pl, xxviii. f. 19.

† Odontography, p. 565.