The humerus, ulna, and radius resemble also considerably those of *M. sowerbiensis.* The epiphyses on both extremities are so well anchylosed, that scarcely the line of junction can be traced. The elements of the carpus are, with the exception of the magnum and trapezoid (which are united to one bone), all separate, thus resembling also the *M. sowerbiensis* and the New Zealand *Epiodon.* The same appears to be the case with the digits, which, however, have somewhat suffered, as the pectoral fins had been much lacerated before the skeleton was secured.

Pelvic Bone.

The pelvic bone for the attachment of the crura of the penis is of small size, and of rather irregular form. It is 4 inches long, 0·37 inches broad near both extremities, and 0·25 inches in the middle portion. It is rounded osteriorly, and flat anteriorly, getting gradually flatter as we reach the lower end of the bone. It is very light and spongy.

ILLUSTRATIONS EXHIBITED.

No. 12.	Skeleton of *Mesoplodon floweri.*		Pl. XXV., Fig. 2.
„ *13.*	Skull „ „ „	Side view.	Pl. XXVI., Fig. 2.
„ *14.*	„ „ „ „	Upper „	
„ *15.*	„ „ „ „	Lower „	
„ *16.*	Cavity of the trunk	As seen from the point.	
„ *17.*	Sternum.		Pl. XXVI., Fig. 5.

Art. LVI.—*On* Oulodon: *a new genus of Ziphioid Whales.*

By Julius von Haast, P.H.D., F.R.S.

[*Read before the Philosophical Institute of Canterbury, 6th September, 1876.*]

In the month of May of last year (1875) the Canterbury Museum received from W. Hood, Esq., of the Chatham Islands, three skulls of Ziphioid Whales, taken from specimens stranded with about 25 others during the summer of last year on the Waitangi beach of the main island of that group. They were described as "black fish," all belonging to the same shoal, by my informant, who moreover believes that the whole series belonged to the same species. Unfortunately the skulls were so badly separated from the body that the occipital portion has been cut off, so as to lay the brain cavity open, but as they were brought over with the greater portion of the skin still attached, some hitherto unknown and as I think peculiar characteristic features in the dentition of a ziphioid genus have fortunately been preserved.

These three skulls accord in many respects with the genus *Mesoplodon* of Gervais, of which I will point out only one, viz., that they possess one tooth in each ramus of the lower jaw opposite the posterior edge of the

symphysis, and of varying size and shape, either hidden below the gums or rising conspicuously above them, according to age and sex. They differ, however, from this and other ziphioid genera by possessing in the upper jaw, starting in a vertical line above the posterior border of that mandibular tooth, a series of small conical teeth, slightly incurved, which extends to near the gape of the mouth.

I may here at once observe that these teeth are neither rudimentary nor are they confined to young animals, because as I shall show in the sequel, these three skulls are derived from individuals of different ages, of which one is an aged (male ?) animal, in which the row of teeth is best developed. It is thus evident that this series of teeth is a functional portion of the animal, is constant and necessary for its proper nourishment, some of them being broken off, others evidently worn down from use. That these small teeth, of which the largest stands nearly half an inch above the gums, are only rooted in the latter, does not lessen their value as a specific character of some importance.

Of the species of Ziphioid Whales inhabiting the New Zealand seas I have obtained three, namely, *Berardius arnuxii*, three specimens, *Epiodon novæ zealandiæ*, and *Mesoplodon floweri*, none of which show the least sign or rudiment of teeth in the upper jaw. Moreover several others have been secured in New Zealand and Australia, but nowhere can I find that, except the teeth in the lower jaw, they possessed any, and I have looked carefully over all the different papers on the Ziphioid Whales of the Northern Hemisphere to which I had access without finding the slightest mention made of the occurrence of such a peculiar feature in their dentition.

On the contrary, Professor Flower, in his excellent paper on the recent Ziphioid Whales *, when enumerating their principal structural characters, begins by stating that they have no functional teeth in the upper jaw. I believe that this term functional is rather ambiguous when applied to their gums, and can scarcely be applied to the gums under consideration, as we are totally unacquainted with the food on which it subsists, or the manner in which the same is obtained. It is true these teeth do not grow from alveolar grooves in the premaxillaries, but only from a groove in the gums, and have their roots implanted therein, but nevertheless I have no doubt that they are always present and do perform as distinct and important functions as those of *Euphysetes*, or any of the Dolphins, which possess teeth of similar forms.

The first of the accompanying photographs shows the three skulls in comparison with each other; the second, the middle portion of the second skull belonging to an aged (male ?) individual; whilst the following list

* "Trans. Zool. Soc.," Vol. VIII., Part 3.

gives the principal dimensions of these three skulls, with the soft parts attached and as far as they could be ascertained; but, as soon as they are macerated, I shall offer some further observations on their anatomical structure :—

TABLE of Measurements of Three Skulls of *Oulodon grayi*, with the greater portion of soft parts adhering.

	Skull I. Probably Female, full grown.	Skull II. Probably Male, aged.	Skull III. Probably Male, young.
	Ft. In.	Ft. In.	Ft. In.
Height of skull from top of nasals (skin preserved) to lower border of pterygoids, the latter lying exposed	0 11·13	0 11·38	0 9·12
Greatest breadth of skull across post-orbital processes of frontals	1 0·48	1 0·88	0 9·51
Length of skull from crest of nasal bones to anterior border of rostrum in a straight line	2 5·46	2 3·47	1 5·07
Length of ramus of lower jaw, soft parts preserved, on anterior border	2 7·52	2 6·03	1 7·75
From gape* of mouth to anterior border of lower jaw	1 6·50	1 4·87	0 10·05
From anterior border of lower jaw to centre of tooth	0 10·75	0 10·12	0 5·
From centre of tooth to gape of mouth	0 7·75	0 6·75	0 5·05
Breadth of lower jaw to centre of tooth	0 2·31	0 2·69	0 1·75
Distance from extremity of rostrum to first anterior tooth	0 11·06	0 10·75	0 5·62
Distance from gape to end of teeth	0 1·02	0 1·37	0 1·40
Eye, perpendicular diameter, about	0 2·25	0 2·27	—
Opening of blower, the two extremities slightly directed backwards, about	0 4·50	0 4·50	0 3·25
Number of teeth in upper jaw	19	17	17

I should have liked to give also in this list the breadth of the rostrum at the ante-orbital notches, as it would have given another important point for comparison; but the coverings prevented this. Also I was not able to give the total length of each skull, owing to the occipital portion being cut off, but the length of the skulls from crest of nasals to anterior border of the rostrum, as well as the length of the ramus of each mandible, will supply this deficiency, and offer us sufficient material for comparison. Examining the skulls separately we find that the one marked No. 1 is longer but narrower than No. 2. This is still more striking when we compare the two rostrums with each other, that of skull No. 1 being considerably narrower than that of skull No. 2. The same observation applies to the mandibles, which in No. 1 only widen very gradually, and are much narrower all along than those of skull No. 2. In fact, if both skulls had been obtained separately, I believe that they would probably have been assigned to two distinct species. When the skull of No. 1 was first examined by me

* The drying of the skin has been so unequal in the different specimens, and even on both sides of the same skull, that the position of the gape cannot be fixed with precision.

the sharp point of a tooth in each ramus of the lower jaw, when passing the finger over the gums, was discernible, but I doubt if this was to be felt before the gums were dried up.

In cutting a portion of the gums away the apex of a very flat tooth, rather acutely triangular as far as visible, was exposed, which stands about one-eighth of an inch above the upper surface of the ramus. This tooth is embedded in a very narrow alveolar cavity, situated near the posterior edge of the symphysis, the ramus here scarcely bulging out. This is still more obvious if we compare that portion of the ramus with that of skulls Nos. 2 and 3.

Above the posterior edge of the small tooth in the lower jaw, and which without doubt has to perform some function, notwithstanding it is covered by the gums, a row of small conical teeth, the apices slightly incurved, begins on each side of the upper jaw, reaching within an inch of the gape of the mouth, which, however, may have somewhat retreated by the drying of the skin. These small teeth are situated in a well-defined dental groove in the gums. There were nineteen teeth on each side, of which, however, several are broken off. They are from 0·20 to 0·40 inch long, and extend along a line 6·12 inches in length, standing nearly the eighth of an inch apart. Of the whole series the first anterior tooth is the smallest, the succeeding ones gradually getting larger till the eighth, and then maintaining the same size to nearly their termination.

The crowns of the teeth stand on about the same level with the central line of the palate. The opening along the upper surface of the rostrum is still unclosed, thus showing that the animal is not so aged as the next specimen, No. 2, and I may here add that the rostrum in all three skulls is half an inch shorter than the mandible, and that it lies in a well-defined groove in the latter.

Skull No. 2. (Pl. XXVI., Fig. 3.)

The measures of this skull, as far as I was able to obtain them, show that, as previously stated, it was not so elongate as the former, but somewhat broader and more massive in all its proportions. The rami of the mandible widen much sooner than those of the former. About seven inches from their anterior extremity they expand considerably, in order to form the alveolar cavity for a large tooth, which is here rising conspicuously on both sides, having a vertical position. This tooth has a compressed triangular shape, is $2\frac{7}{8}$ inches broad at its base on the line of the gums, and $1\frac{3}{4}$ inches above them.

On the inner side near the top it is slightly abraded, and on the outside broken considerably, so as to suggest that the animal used it for the purpose of attack or defence. This injury has taken place on both teeth, so

that they have lost their point, and show a rugged horizontal apex, with a width of nearly a quarter of an inch. From behind the tooth the rami expand very little as far as the gape.

A similar row of small teeth, as described as occuring in the first specimen, exists also in the second skull, but there are apparently only seventeen of them. Their position is exactly the same as that in the foregoing, the first anterior tooth standing exactly above the posterior base of the large tooth in the lower jaw. The teeth have the same form as those previously described, except that they are generally thicker. This becomes conspicuous with the seventh tooth, after which they gradually increase to the thirteenth, which is one-eighth of an inch thick at its base, and stands 0·45 inch above the gums. They then keep nearly the same size to their posterior end. As the space on which these seventeen teeth stand is only 4·25 inches long, besides their greater stoutness, they are far more crowded than in the first described skull.

Owing to the fact that the gums have dried more effectually in this than in the two other skulls, in both of which the teeth stand erect with the curve of the apex directed inwards, the teeth in this skull are no longer in their normal position, but lie somewhat backward on the palate.

The groove on the upper surface of the rostrum between the premaxillaries, is filled by a convex ridge of dense bone with a small channel on each side. That this is only caused by age, and that it is neither a sexual nor a specific character, is proved by the fact that the next skull, No. 3, which is doubtless a half-grown specimen of the same sex as the one under review, has this groove on the top of the rostrum still open, and thus resembles the skull No. 1, although, in the latter, that groove is narrower and more shallow.

Photograph No. 2 has been added in order to show the relative position and size of the teeth in the upper and lower jaws of the specimen No. 2 (aged male ?)

The whole skull, when compared with the former, strikes us by its massiveness and stronger and stouter proportions. This will be still more conspicuous when the soft parts have been removed, so that its anatomical structure can be studied in detail.

Skull No. 3.

Assuming that the last-described skull belongs to an aged male, the measurement of the third skull under consideration must lead us to the conclusion that it is that of a young half-grown male. Beginning with the lower jaw, the same form as in the foregoing is observable, the rami expanding considerably as soon as we reach the neighbourhood of the alveolar cavity; and although the tooth in the same is only small, and stands only

0·25 inch above the edge of the ramus, that alveolar cavity is much more bulged out, and has a different form from the first (or female ?) skull described. The apex of the tooth was distinctly visible, and seemed to have already pierced the gums when the animal was alive.

The row of teeth in the upper jaw, which have the same form as in the skull No. 2, are, however, smaller and somewhat slenderer. They begin likewise above the posterior end of the alveolar cavity. There are, as in the preceding skull, seventeen teeth on each side, occupying a length of 2·48 inches. They stand more closely together than in the supposed female skull, No. 1, thus also agreeing with the second skull in that respect.

In Vol. VI., p. 86, of the "Transactions of the New Zealand Institute," Dr. Hector describes the lower jaw of *Oulodon* under the title, "Notice of a variation in the dentition of *Mesoplodon hectori* (Gray)."

It is difficult for me to conceive by what process the tooth in the lower jaw, which in *Mesoplodon hectori* stands at the anterior end of the ramus, could have travelled as far backwards as to stand now opposite the posterior edge of the symphysis. Hitherto I have believed that the position of the mandibular teeth was constant and a valuable specific character—an opinion which, as far as I am aware, is held by the most eminent Cetologists, and which the observations I was able to make on the three skulls under review amply confirms. Mereover, I wish to add that a comparison of these three skulls of *Oulodon* with the skull of *Mesoplodon hectori* (Gray), in the Canterbury Museum, and which is derived from an aged specimen, shows at a glance the distinct specific character, besides being much smaller in all its proportious.

We are only at the beginning of the study of our Ziphioid Whales, and I have no doubt that, year by year, new material will come to hand, so that by the lumping of two distinct species into one, as attempted by Dr. Hector, and for which no tangible reason can be assigned, only confusion will be created.

Finally, I wish to propose to add to this new cetacean the specific name of *Grayi*, in memory of the late Dr. J. E. Gray, to whom New Zealand is so much indebted for his contributions towards the better knowledge of its natural history.

Conclusion.

In summing up the evidence which these three skulls under review presents to us the following points may be accepted as fully established :—

1. That there exists a genus of Ziphioid Whales in the New Zealand seas, which possesses a mandibular tooth at the posterior edge of the symphysis, either hidden below the gums or standing conspicuously above them, according to age or sex.

2. That the skull of one of the sexes (probably the female) is longer but narrower and lower than that of the opposite (probably the male) sex, which latter possesses also a large triangular compressed tooth rising above the gums, which in the latter (probably the female) sex is much smaller and always hidden below the gums.

3. That both sexes of this genus possess permanently in the upper jaw a row of small conical teeth with the apex slightly incurved inwards, which although only rooted in the gums have to perform important functions in the nourishing process of the animal.

Further notes on Oulodon grayi.

In continuation of my former paper on the interesting genus *Oulodon*, it will be seen from the following notes that the presence of a row of small teeth in the upper jaw is of a constant character in this new genus, and unless it is shown by further researches that other species belonging to the genus *Mesoplodon* have similar rows of small teeth, and of a permanent character in the upper jaw, I think that the genus *Oulodon* ought to be maintained in the nomenclature of the Ziphioid Whales, as being distinguished by that peculiar feature, which as far as I am aware no other Ziphioid Whale possesses.

Since I had the pleasure to lay the description of the three skulls obtained on the Chatham Islands before the Society, four specimens belonging to the same ziphioid genus, and which with our local fishermen goes under the name of Cowfish, have been stranded on the coast near Saltwater Creek, about 30 miles north of Banks Peninsula. One of them, a small male (A), about 13 feet long, was washed ashore on the 15th December, 1876. On the 29th December another male, 12 feet 9 inches long, was stranded, together with a female (D) 17 feet 6 inches long, on the beach a short distance north of the entrance of Saltwater Creek estuary, whilst another male (C) 13 feet 8 inches long, ran the same day into that small estuary, and was left high and dry by the receding tides. As I was fortunate enough to obtain two of these skeletons complete, I shall be able to send one of them to my friend Professor H. J. Flower, as a type specimen, and for description, and therefore leave any osteological details to that distinguished anatomist. Although the bones are not yet quite macerated, I may, however, state that the female, exceeding by nearly four feet the largest male obtained, is a full grown animal, whilst the three males are all immature specimens. I measured the length of its lower jaw, and find that it is 2 feet 8·50 inches long, consequently nearly one inch longer than the lower jaw of the dried skull, No. 1, which I assigned to a full-grown female, and with which it bears a close resemblance.

The mandibular tooth could scarcely be felt when passing the finger over the gums, and its existence could scarcely have been proved in that way had I not known its exact position.

On the other hand, the point of that mandibular tooth in all the three male skulls protruded already, even in the smallest, through the gums and the more laterally extended size of that portion of the lower jaw was at once discernible.

I measured also the lower jaw of the male skull (B), and found it to be 1 foot 11·85 inches long. Consequently its size is intermediate between the two Chatham Island skulls, No. 2, of which the lower jaw measures 2 feet 6·03 inches, and of the immature, No. 3, which is only 1 foot 7·75 inches long.

All the four skulls possess seventeen to nineteen teeth on both sides of the roof of the mouth, so that now this character can be claimed as being constant and specific.

As to the external features of this species, its form may be described as being rather elegant. The head is tapering and the beak-like rostrum runs out to a point, so that it was not unappropriately compared by one of the workmen to the beak of a bird.

Colour of back black, getting a little lighter near the tail, where it assumes a dark slate tint, lower side reddish-brown, near the tail assuming on both sides a more blackish hue.

The blowhole is situated in the centre. It is about six inches in diameter, and the corners are directed forward.

It possesses a large falcate dorsal fin, situated rather backwards, and the pectoral fins are small and somewhat pointed.

The following measurements were taken from the immature male (C):—Total length, 13 feet 8 inches; girth round the body, 18 inches beyond the pectoral fin, where the animal is of the largest size, 9 feet; from point of rostrum to anterior border of pectoral fin, 3 feet 5 inches; from posterior end of dorsal fin to centre of tail lobes, 4 feet 3 inches.

ART. LVII.—*Description of a species of* Catocala, *new to Science.*

By R. W. FEREDAY, C.M.E.S.L.

[*Read before the Canterbury Philosophical Institute, 15th December, 1876.*]

CATOCALA TRAVERSII.

Proboscis, stout. *Antennæ*, moderately long, setaceous. *Labial palpi*, stout, pilose, moderately long, obliquely ascending; third joint, short, avellanate. *Body*, robust, greyish-dove colour. *Thorax*, thickly pilose,