

A New Species of Fossil *Arctocephalus* from Cape Kidnappers.

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PLATE 33.

THE fragments of bone and the teeth which are about to be described were found some years ago by the late Mr. W. D. Southcott, of Hastings, at a spot a little beyond the Black Reef on the way to Cape Kidnappers. They were imbedded in a cliff face about 20 ft. above sea-level and were overlain by about 200 ft. of shingle conglomerate. These deposits may provisionally be regarded as of early Pleistocene Age. The specimens were sent by Mr. H. Hill, of Napier, to the authorities of the Dominion Museum in Wellington, who very kindly placed them at my disposal for examination. Some of the differences noted in comparison with the adult skulls of the species *Arctocephalus Hookeri*, to which it is allied may be due to the fact that the fragments obviously belonged to a young, and possibly a female animal. Not enough material was available to determine what differences sex and age have in altering the various characteristics of the skulls of recent seals so that accurate comparisons could be made.

Fig. 1 is an X-Ray photograph of the fragments with the teeth in position.

Fig. 2 is an X-Ray photograph of the mandible of a female *Arctocephalus Hookeri* kindly lent me by the Dominion Museum authorities, and with which comparisons are made in the course of this paper.

The main fragment is a portion of the left mandible, which is incomplete anteriorly, being broken off obliquely downwards and forwards in front of the third post-canine tooth. It bears the three posterior teeth in position, and the fractured surface has exposed part of the alveolus for the second post-canine, and also part of the alveolus for a large canine tooth. The general shape and proportions of the mandible resemble somewhat that of *Arctocephalus Hookeri*. The jaw is smaller, is less markedly curved, and from the shape and size of the canines the symphysis and anterior portion must have been much more vertically placed. As will be seen from the X-Ray figure, the bone-tissue of the alveolus of the canine is denser and more sclerotic in appearance than in *Arctocephalus Hookeri*, due to the heavier strains that it would have to meet, although relatively to the size of the teeth the bone is extremely fragile. The coronoid process is relatively less in height, and its posterior border, which has suffered abrasion, formed a more obtuse angle with the apex, which is also much less rounded than in the *Arctocephalus Hookeri* shown

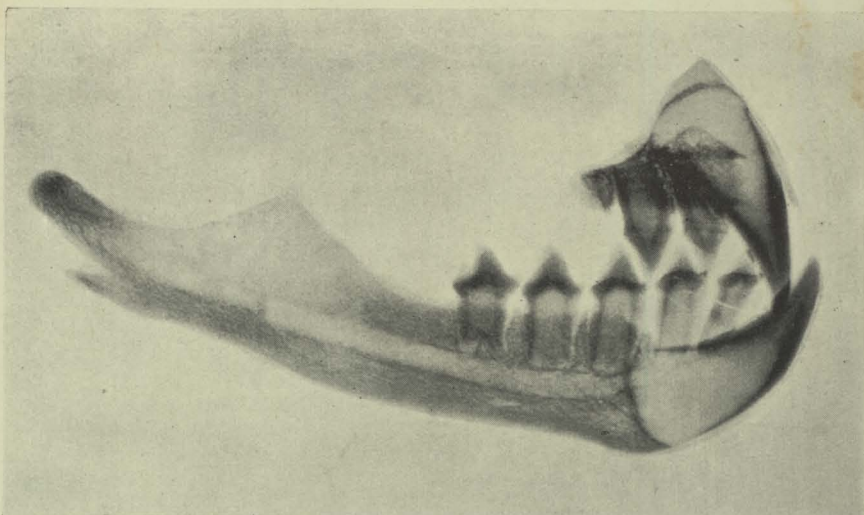


FIG. 1.—X-Ray photograph of fragments of *Arctocephalus caninus* n. sp.

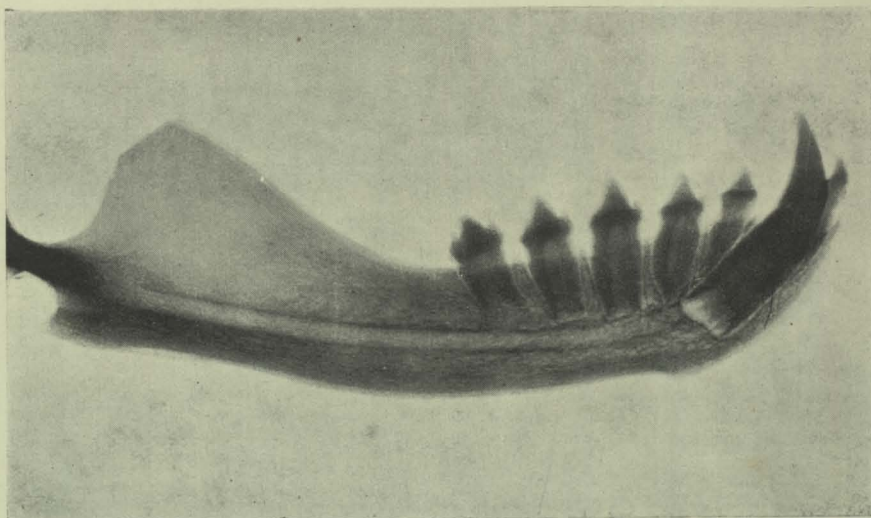
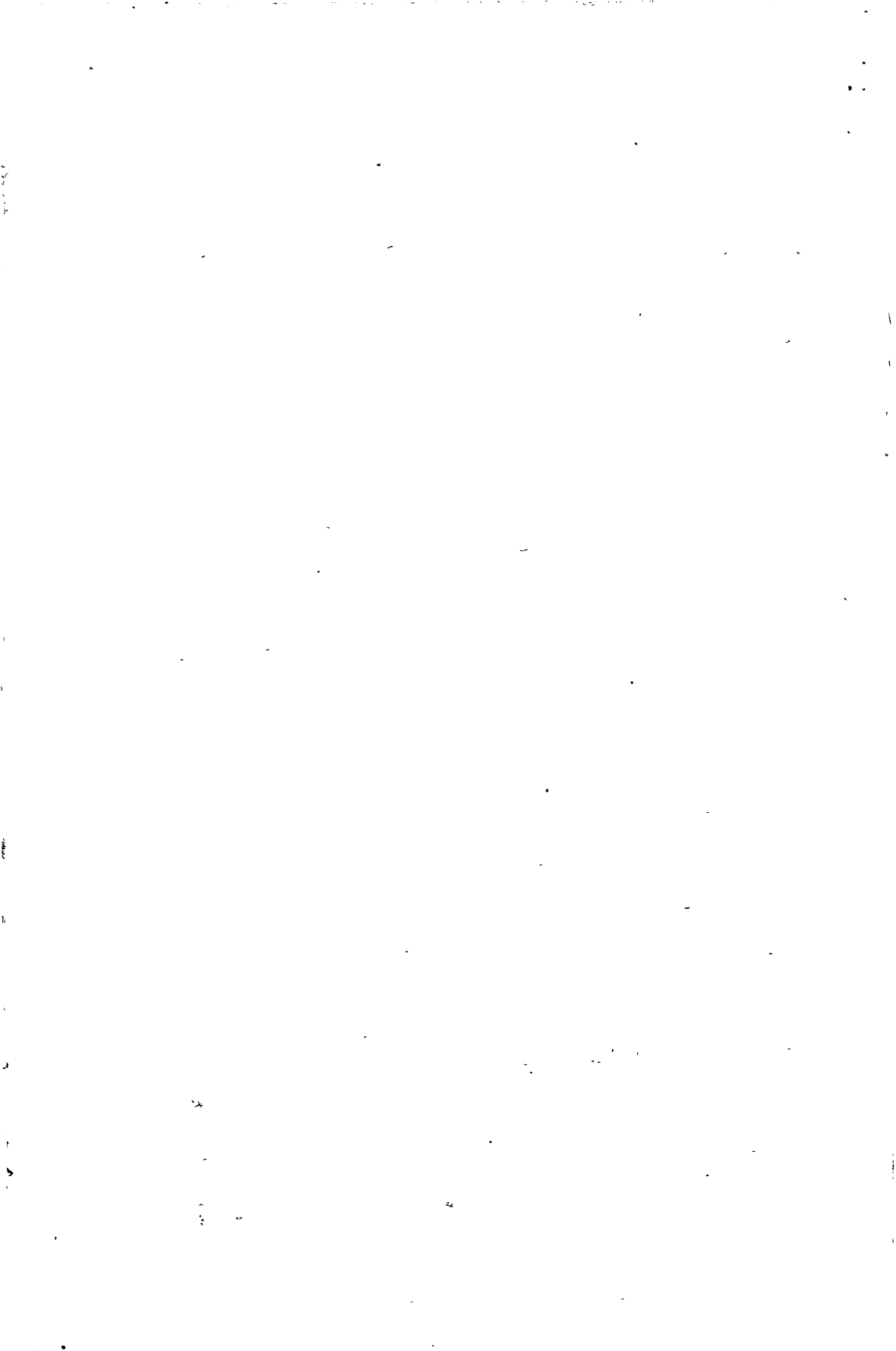


FIG. 2.—X-Ray photograph of mandible of *Arctocephalus Hookeri* from Dominion Museum.



in Fig. 2. The post-condyloid process is more sharply marked. There are several mental foramina, the largest apparently lying between the second and third post-canines, instead of between the first and second post-canines, as is constant in *Arctocephalus Hookeri*. These foramina lie nearer the alveolar border than in adult animals.

Portion of the left maxilla is present and bears a canine and two post-canines. It has been broken off through a line of fracture that is frequent in recent skulls, viz., from within the nasal cavity posterior to the root of the canine, downwards and backwards to between the third and fourth post-canines. The general appearance shows a much steeper angle than in *Arctocephalus Hookeri*. The mesial aspect shows a roughened surface for the articulation of the praemaxilla, which is completely missing. The palatal process is present in part, and presents a suggestion of a foramen in the suture line between the praemaxilla and the maxilla, directly medial to the canine tooth. The estimated condylo-praemaxillary length was about 14 cm., while that between the outer borders of the upper canines was 3.8 cm.

Arctocephalus caninus n. sp.

Dentition of Lower Jaw.—From the scattered teeth that were present it was possible to place in series the positions of the lateral incisor, the canine, and the first and second post-canines. These teeth, while on the whole resembling *Arctocephalus Hookeri*, show slight but well-marked differences with the exception of the canine, which is markedly different.

Canine.—This tooth presents not only notable differences in its gross form, but also in its X-Ray appearances. It differs from the canine of the adult *Arctocephalus Hookeri* in being much shorter in relation to its width, and in the enamel crown not being so markedly recurved. The base of the root extends backwards as far as the anterior plane of the third post-canine, whereas in *Arctocephalus Hookeri* it usually ends between the first and second post-canines. From the tip of the tooth to its base along the convex border it measures 4.38 cm. in length. The base is obovate in section measuring 1.7 cm. in its antero-posterior diameter and 1.1 cm. in its transverse diameter. The enamel crown has an average length of 2 cm. extending, as is usual, further down on the superior surface than on the inferior surface, and further down on the lateral than on the mesial aspect. The X-Ray shows a large pulp-chamber extending much further towards the tip than in *Arctocephalus Hookeri*. The large size of the pulp-chamber is characteristic of all the teeth, and is probably partly explained by the immaturity of the animal. A characteristic of the genus *Arctocephalus* is the large inferior dental canal in order to provide adequate nourishment for the heavy dental battery. In this specimen the canal is actually and relatively much larger than in *Arctocephalus Hookeri*, due to the large size of the canine teeth. As is usual, the canal opens towards the upper border of the root. The enamel crown, as has already been mentioned, is not so markedly recurved as in *Arctocephalus Hookeri*.

Post-Canines.—All show the same general characteristics as in *Arctocephalus Hookeri*. The height and width of the enamel crown is actually somewhat greater, and the length of root considerably less, than in the *Arctocephalus Hookeri* of Fig. 2. This latter relationship is due to immaturity. The principal cusps are similar, and they all possess a well-defined beaded cingulum. All have a distinct anterior accessory cusp particularly well marked in the three posterior teeth. These cusps become larger as they are traced backwards, and are directed almost horizontally forwards and inwards, whereas in *Arctocephalus Hookeri* they are directed upwards and tend to be recurved towards the principal cusp. The posterior accessory cusp is missing in the first and second post-canines, is definitely marked on the third post-canine (it is usually absent in *Arctocephalus Hookeri*); there is only a suggestion of its presence on the fourth post-canine, as in *Arctocephalus Hookeri*; and on the fifth post-canine it is large and well defined. The root of the first post-canine is single, the root of the second is double and has a longitudinal groove on its lateral aspect; while the third and fourth, which were imbedded in the bone, show evidence, on X-Ray examination, of similar grooves. The fifth post-canine shows two separate roots in addition, the anterior one directed forwards (as is usual in the *Arctocephalus Hookeri*), and the posterior one directed downwards and only partially developed. A very noticeable feature of all these teeth is the very large pulp-chamber—the posterior three show distinctly two nerve-roots entering from the inferior dental canal. In addition, the remnants of the dental sacs can be detected.

The lateral incisor is a much longer tooth, both in the root and in the crown than in the *Arctocephalus Hookeri*. It will be noted on referring to Fig. 2 that the vertical axes of the post-canines differ in relation to the long axis of the mandible. The third post-canine is the largest tooth and is almost vertically placed, while the two teeth in front are directed obliquely forward and the two posterior teeth are directed obliquely backwards, the first and last of the series having the greatest degrees of obliquity. The apical third of the anterior root of the last post-canine is curved forwards in relation to the long axis of the tooth and the root of the second post-canine is similarly curved.

In the fossil specimen, Fig. 1, there is only a suggestion of this fan-shaped disposition of the teeth, which is probably largely dependent on their articulation with the teeth of the upper jaw. The heavier teeth in the middle of the series would naturally tend to remain erect, while the smaller anterior and posterior teeth would tend, owing to the greater stress on one border (the teeth articulate by interdigitating), to tilt either in an anterior or in a posterior direction. The degree of inclination would be more pronounced in a mature than in an immature animal. The forward curvature of the roots of the 2nd and 5th post-canines may be explained by the forward growth of the mandible carrying the partially calcified roots with it. The alveolar process develops with the eruption of the teeth, and the erupted crowns consequently would not be influenced by the forward growth of the jaw to the same extent as the roots. The roots of the several teeth would be affected by this forward growth

in varying degrees, according to their position relative to the ossific centres of the mandible.

Dentition of Upper Jaw.—The canine has the same general shape as the lower canine, but its curve is less marked and it is somewhat smaller. The width at the alveolar border is 1 cm., and the length of the enamel crown 2.2 cm. The first and second post-canines present slight anterior cusps, as in *Arctocephalus Hookeri*. There is a slight diastema between the second and third post-canines, smaller than is usually present in adult *Arctocephalus Hookeri*. The two lateral incisors of the praemaxilla are also present. They are caniniform in character and present the same peculiarities as the canines. They measure 3 cm. in length, 1 cm. antero-posteriorly at the base, and 1.8 cm. transversely. Three other teeth are present—the lower canine of the right side, the second lower post-canine of the same side, and also the fifth left upper post-canine. This latter tooth is very similar to *Arctocephalus Hookeri*, but the accessory cusps are much more marked. All these teeth are the same in having very large pulp chambers, and a similar dental canal to that in the mandible. The dental formation may safely be assumed to have been—

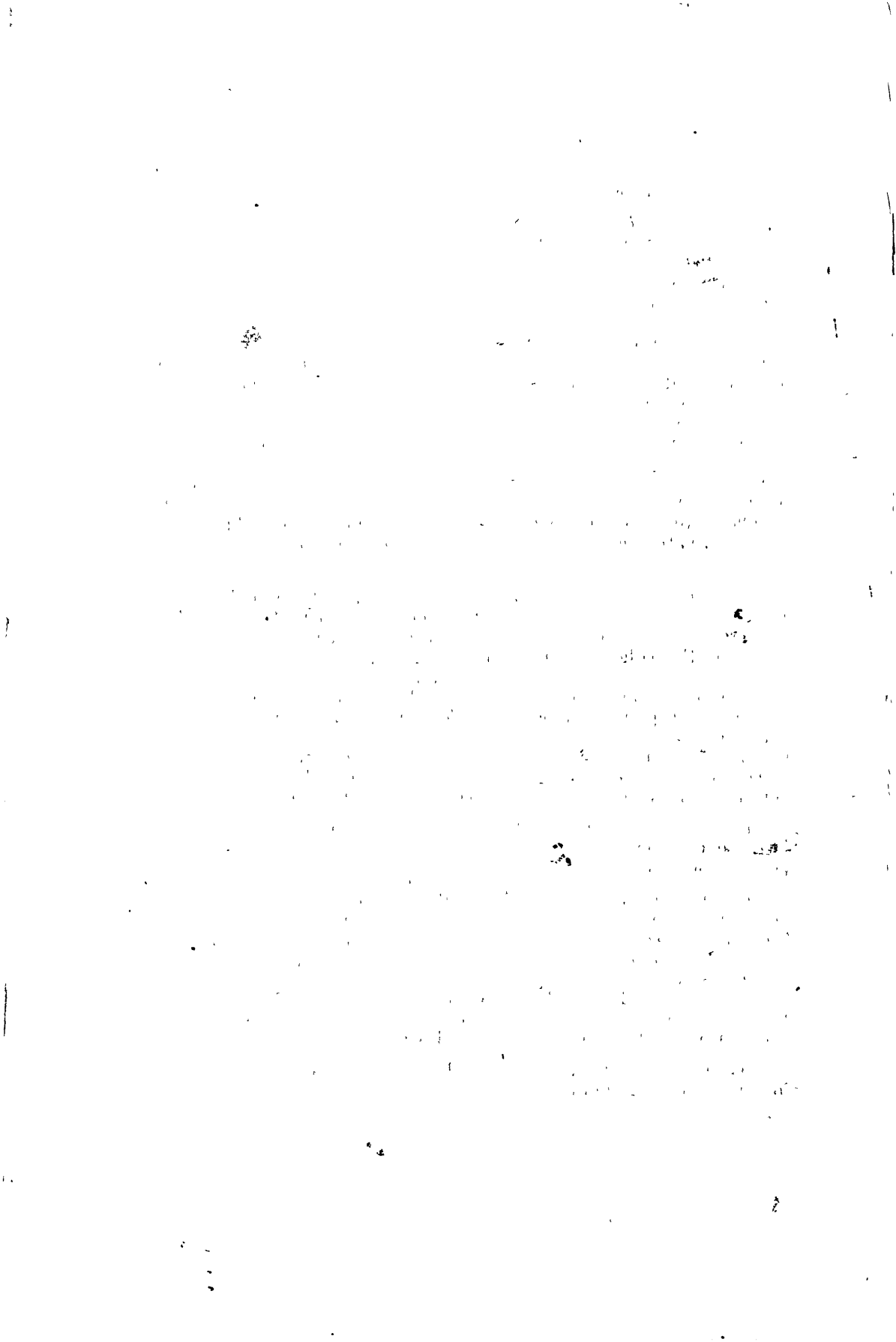
$$I \frac{3}{2} \quad C \quad \frac{1}{2} \quad PC \quad \frac{6}{5} \text{---} \frac{6}{5}$$

Articulation.—As would be expected from the shape of the teeth, the articulation presents marked differences from *Arctocephalus Hookeri*. On close examination of the enamel-crown on the outer aspect of the ridge which normally forms a border on the labio-distal aspect of the lower canine, is an area of attrition of about 2 mm. in length, and about 3 mm. from the tip of the tooth. On the labio-medial aspect of the corresponding upper canine is an area of attrition of about the same size, shape, and position. The lateral incisors of the upper jaw present slight areas of attrition on their mesial aspects close to the alveolar margins. On the lower incisor there is a corresponding attrition mark on the lateral aspect.

The various fragments described were submitted to Professor Wood-Jones, who agreed that they belonged to a new and distinct species of seal, for which the name *Arctocephalus caninus* is proposed.

The main points which differentiate this species are the shape of the snout which must have been much blunter than the modern New Zealand hair-seal and the canines which with the slighter differences in the other teeth, resulted in a somewhat different articulation. I have reason to believe that remains of fossil seals, although very rare in other parts of the world, are not uncommon in New Zealand, and that before long one may expect to find more complete remains on which to base a fuller description of this animal.

My thanks are due to Mr. A. R. Ford, B.D.S., for useful suggestions in preparing this paper.



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