

REPORT OF
THE MAMMALS COLLECTED

BY THE FIFTH THULE EXPEDITION
TO ARCTIC NORTH AMERICA

VOLUME II-NOS. 4-5

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THE DANISH EXPEDITION TO ARCTIC NORTH AMERICA IN CHARGE
OF KNUD RASMUSSEN, PH. D.
VOL. II. NO. 4—5.

ZOOLOGY

I

MAMMALS

BY

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PETER FREUCHEN

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Part I. Systematic Notes.

By Magnus Degerbøl. Ph. D.

The Fifth Thule Expedition's mammalian material was in the main collected on the tundras, lying to the west of Hudson Bay and Fox Channel. Most of it comes from Melville Peninsula and the adjacent areas, but other localities have also produced valuable specimens, for instance two musk-ox skulls and skins from the country east of Cape Bathurst, and the skin and two skulls of walrus from the Bering Sea.

The climate and vegetation on the Barren Grounds have already been described in this series of publications (Vol. VI, No. 1 and vol I, No. 4), to which work readers may be referred.

The principal object of the Fifth Thule Expedition was archaeological, ethnological and ethnographical research, whereas zoological collections were a purely secondary consideration. Another point to be remembered is that in such difficult natural conditions it has not by any means been easy to make entirely satisfactory preparations of the zoological material on the spot, and also, that the road to civilization was a long one. Unfortunately, several cases of zoological material went astray and thus never reached the Museum in Copenhagen.

The collecting of zoological material was entrusted to *Peter Freuchen*, who for many years has lived in Thule, North Greenland, where he has had excellent opportunities of making biological observations of Greenland animals. There is also a comprehensive biological material of field notes from the Expedition's sojourn in arctic North America (vide Part II).

To the Zoological Museum of Copenhagen, which hitherto has had practically no mammalian material from those regions, the animals brought home have been of the greatest interest. The material indeed was of particular value, as the Museum already had a handsome collection of Greenland mammals, so that it now became possible to make direct comparisons of the mammals of the two arctic regions:

Gulo gulo luscus* (L.).Wolverine.*

The Expedition's specimens are:

- Iglulik*. Fragmented cranium, ♀, 1921. P. F., CN. 2053.
 — Skull (occipital part sawn off), skin, 1924. P. F., CN. 2057.
 — Skin, 12-7-23. P. F., CN. 2058.
Lyon Inlet. Lower jaw, ♂, Winter 1923. P. F., CN. 2052.
 — Skull. Skin, ♀, Feb. 1923. P. F., CN. 2054.
 — Skin, winter 1923. P. F., CN. 2056.
 — Skin, — — — P. F., CN. 2059.
Itivliarssuk. Melville Peninsula. Skin, ♀, Jan. 1922. P. F., CN. 2055.
Franklin Isthmus. Skin. Winter 1922-23. H. B., CN. 2060.
Mouth of Back River. Skin, 30-5-23. K. R.? CN. 2061.

As will be seen, ten specimens of *Gulo*: a lower jaw, a fragmented skull, a skull with the occipital part sawn off, an entire skull, and eight skins were brought home.

The complete skull has belonged to an old female and most of the sutures are closed; only the nasal bones for a length of 6mm at the fore end are unjoined, and their sutures against the maxillary and intermaxillary bones can also be seen; on the palate the sutures can just be seen in parts. The other two, incomplete skulls are of pretty much the same age. The measurements of these skulls are given in Table 7.

As long ago as in 1877 Coues (*Fur-bearing Animals: A Monograph of North American Mustelidae*) was able to advance the theory that the wolverines of the Old and the New World belonged to the same species. On p. 43 he writes: "In comparing numerous American skulls with one from Lapland, I detect in the former a tendency to less constriction of the cranium behind the postorbital processes. This is an interesting correlation with one of the more pronounced differences in the skulls of *M. martes* and *M. americana*. But this is the only discrepancy I find, and it is not, moreover, uniformly exhibited to any appreciable degree. The identity of the animals of the two continents is to be considered fairly established, whatever range of variation in size and colour either may present".

It is true that since then several new species of wolverine have been set up in America.

Like Coues I have not been able to find any decisive difference between the American and European wolverine skulls of the present material. It would seem, however, that upper m1 in the Ame-

TABLE 7

<i>Gulo</i>	5. Thule-Exp.				Sweden	Quikjock ♀ CN. 404	Quikjock ♀ CN. 405	Lappland Ljusfjäll	Sweden	Lapplmarken	Lapplmarken	The Zool. Garden CN. 402 ♀	The Zool. Garden
	Lyon Inlet CN. 2054 ♀	Iglulik CN. 2057	Iglulik CN. 2053 ♀	Lyon Inlet 2052									
	1	2	3	4	5	6	7	8	9	10	11	12	13
Total length	148.9	—	—	—	155.5	145	167	150.0	167.8	152.5	170.0	146.6	147
Basal length	124.5	—	—	—	129	125	142	129.0	142.0	127.0	142.0	126.7	130
Condylbasal length	134.5	—	—	—	140	135.5	153.5	138.6	153.7	139.5	153.7	136.8	140
Gnathion-Orbita	46.7	49.7	48.5	—	50	46.5	53.5	49.4	53.0	49.4	53.3	47.8	48
— anterior margin of for. infraorb.	36.5	39	37.2	—	40	36	43.0	38.8	40.5	40.0	43.0	38.8	38
Palatal length	74	75	—	—	73	70	80.5	72.5	80.0	73.0	79.0	73.7	72
Orbita-posterior border of for. infraorbitale	6.3	7.0	7.3	—	8.7	7.5	9.0	8.8	—	—	—	8.2	7
Breadth of rostrum, across canines	38.2	39	38.8	—	38	36.5	41.5	37.4	42.6	37.7	43.7	37.5	39
Interorbital breadth	35.9	39	39.2	—	38	35.5	41.5	37.8	42.2	38.6	42.2	35.7	36
Supraorbital breadth	42.2	47.5	46.5	—	47.5	42.8	50.0	44.8	50.0	46.2	51.7	44.0	45
Postorbital constriction	33.4	35.7	—	—	30.5	31.4	36.6	30.0	37.7	31.0	33.4	34.7	32
Zygomatic breadth	93.3	97	100	—	94.5	90.3	106.7	94.0	108.0	92.7	107.0	99.5	89
Mastoid breadth	76.3	82.2	—	—	81.0	76.0	92.3	82.5	91.7	78.0	89.6	77.7	77
Greatest breadth of meat. acust. ext.	66.5	—	—	—	73.0	66.0	81.1	73.8	—	—	—	69.3	70
Palatal breadth (p4-p4 outer border)	58.5	61.3	61.5	—	59.0	55.5	64.3	57.8	66.2	57.5	64.0	55.7	57
Length of p1	4.0	4.2	3.8	—	4.5	3.8	5.0	3.6	4.3	3.9	4.4	4.2	4
— p2	6.6	7.0	6.6	—	6.5	6.2	7.0	6.5	7.0	6.5	7.8	6.5	6
— p3	9.8	8.3	9.3	—	10.0	9.0	10.9	10.9	10.9	10.4	11.8	10.4	10
Distance from hind border of c-alveolus to anterior border of p4-alveolus ...	16.5	16.3	16.9	—	19.0	16.4	18.8	18.0	18.0	18.5	18.7	15.6	14
Index $\frac{p1 + p2 + p3}{c, post. border.-p4, ant. b.}$	123.9	119.6	116.6	—	110.5	115.9	121.8	116.7	123.3	112.4	128.3	135.3	145
p1-p3 (crowns)	20	20.3	19.8	—	21.5	19.0	21.6	20.5	22.0	21.0	23.1	20	19
Length of p4 (outer border)	19.5	20.0	19.5	—	19.5	18.4	20.3	19.0	20.7	19.4	22.0	19.5	20
Greatest width of p4, behind inner lobe	6.9	7.4	6.9	—	7.6	7.0	7.8	7.1	8.1	7.8	9.0	7.5	8
Greatest breadth of p4, across inner lobe	11.0	11.0	10.8	—	11.3	10.5	12.5	11.2	13.0	10.7	13.2	11.6	11
Greatest breadth of m1	13.0	13.9	13.0	—	12.3	12.0	13.5	12.7	14.0	13.3	14.0	12.2	13
Length of m1, outer side ...	6.7	7.0	7.0	—	5.9	6.2	6.6	6.5	6.6	6.9	6.7	6.5	6
Least length of m1, con- striction	5.2	5.4	5.6	—	5.6	5.5	5.9	6.1	6.3	6.0	6.8	5.8	5
Length of m1, inner side ...	7.8	7.8	7.5	—	7.0	6.7	7.0	7.5	8.0	7.5	8.4	7.0	7
p1-p4 length	37.5	39.0	39.0	—	39.8	36.4	41.0	38.2	40.7	39.0	43.3	38.1	38
<i>Mandible</i>													
Total length (middle of con- dyle)	91	96	95.5	94	98	93	106	92.5	106.0	97.0	108.5	94.5	97
Height of ramus ascendens.	46	48	46	48.5	48.5	47	55	46.5	55.0	43.4	53.2	48	51
Depth of jaw between m1 and m2	20.5	23.2	21	23	23	20.5	25	22.5	26.5	21.8	26.3	23.6	23
Depth of jaw between p4 and m1	19.5	21.6	20	20.5	20.5	19.0	21.5	19.4	22.6	19.3	22.4	19.5	17
p1-p4 length	26.4	27.3	28	26.5	27.6	27	29.5	26.8	29.5	29.0	31.0	27.2	26
Length of m1	19.8	21.0	20.2	20.0	20.8	19.2	21.0	20.0	22.2	20.0	23.0	20.6	21
Greatest width of m1	8.6	9.2	8.5	8.8	8.7	8.0	9.1	9.0	9.1	8.7	10.5	8.7	8
Length of m2	6.6	6.3	5.0	4.9	5.5	4.6	5.7	5.6	6.5	5.8	6.6	5.5	5
Width of m2	4.9	5.0	4.2	4.2	4.7	4.1	4.6	5.5	4.8	4.7	5.7	4.7	4

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rican animals has a tendency to be more indented at the middle than that of European animals.

To this comes the fact, that cingulum on the inner side of the tooth is more marked and forms a larger convexity, a rounding, in the American skulls than in the European. In the American animals cingulum forms almost a semi-circular arch, whereas in the European forms it does not go nearly so far round on the front and back of the tooth and is less arched. All in all, m1 in these three American skulls seems to be more constricted at the middle, more like an hour-glass in shape, than in the 16 European specimens I have examined. I have not seen this difference referred to in the literature, even if the rather poor figure in Coues (1877, Pl. I) indicates that the above-described m1 form is common to the American animals. It may also be observed that fig. 90 and 91 in Miller (Catalogue of the Mammals of Western Europe, in the Collection of the British Museum, London 1912) shows a m1 form such as that of the European skulls referred to; it is probable, however, that a larger material will eliminate these differences.

From the table of measurements it will be seen that the breadth over the canines is sometimes equal to the interorbital breadth (No. 2, 5 and 7), less (No. 3) or greater (No. 1, 6 and 11). In the American skulls the breadth of m1 is greater (relatively) than in the European. The same applies to the length of the outer and the inner side of this tooth, whereas the constriction at the middle measures less in the American than in the European. It is possible, indeed probable, that this difference would not be so pronounced if more teeth were to be included in the investigation.

The difference between the length of p1—p3 and of the carnassial in the upper jaw is less in the American specimens than in the European; here again, however, this may be accidental, due to the small number available to me. If in this investigation we include two specimens which have been in captivity in Copenhagen, it will be seen that one of them has a greater carnassial length than the total length of p1—p3. In this case the premolars are pronouncedly overlapping, p2 being very slanting. Thus the overlapping of the premolars sometimes found in wolves that are kept in close captivity (cf. Wolfgram) seems to apply to the wolverine too. In the American specimens the premolars are set more close together than in the European animals. This is an interesting correlation with the difference in the teeth of *Canis tundrarum* and *Canis lupus*. The greatest breadth of the upper carnassial behind the heel seems to be less in the American forms than in the European, these latter having a more pronounced bulge on the outside.

Lappmarken	The Zool. Garden CN. 402 ♀	The Zool. Garden CN. 400 ♀
11	12	13
170.0	146.6	147.2
142.0	126.7	130.0
153.7	136.8	140.0
53.3	47.8	48.0
43.0	38.8	38.0
79.0	73.7	73.0
—	8.2	7.0
43.7	37.5	39.0
42.2	35.7	36.0
51.7	44.0	45.0
33.4	34.7	32.0
107.0	99.5	89.0
89.6	77.7	77.0
—	69.3	70.0
64.0	55.7	57.0
4.4	4.2	4.0
7.8	6.5	6.0
11.8	10.4	10.0
18.7	15.6	14.0
128.3	135.3	145.0
23.1	20.0	19.0
22.0	19.5	20.0
9.0	7.5	8.0
13.2	11.6	11.0
14.0	12.2	13.0
6.7	6.5	6.0
6.8	5.8	5.0
8.4	7.0	7.0
43.3	38.1	38.0
108.5	94.5	97.0
53.2	48.0	51.0
26.3	23.6	23.0
22.4	19.5	17.0
31.0	27.2	26.0
23.0	20.6	21.0
10.5	8.7	8.0
6.6	5.5	5.0
5.7	4.7	5.0

The eight skins in this material vary considerably in colour and marking, especially in the case of the lighter forehead patch and side band, the extent and colour of which differ to a marked degree. As several species have been set up on the basis of similar colour variations, it will be of interest to examine the individual skins more closely.

Iglulik. CN. 2057. As in all these skins the muzzle is dark brown. This dark-brown patch surrounds the eyes in a belt 9—15 mm wide, terminating in a point behind each eye. Posteriorly this muzzle patch is sharply delimited against the light grey forehead patch which, between the eyes, extends forward to an imaginary line joining the foremost edges of the eyes and at the rear extending to a level with the ears. The underfur is brownish. From the ears the grey passes smoothly into the back of the neck, where more and more black tips appear. Over the shoulders the dark hairs are so numerous that they form a dark chestnut brown patch, although there still are lighter hairs among the dark ones. Posteriorly this patch becomes narrower and merges rather sharply with the dark chestnut brown spot of the hindquarters. On the sides of the dark shoulder-area in the axillary region the lighter hairs are more numerous than the dark ones and form a belt about 8 cm wide which passes smoothly into the yellowish-white or creamy-yellow side streak. Behind the forelegs it takes a sharp bend, passing down towards the belly and there is continued along the sides in the area between the fore and hind legs. The side streak is widest at the rear over the hind legs, about 15 cm, and finally surrounds the first part of the tail. This makes the back spot almost heart-shaped with the point turning rearwards, the breadth from side to side being about 25 cm. Its length is 32 cm. This very dark spot is sharply delimited by the light side-streak except forward in the medial line, where it passes into the dark shoulder area. The outer part of the tail, the hind legs and the fore legs are still darker than the back spot, almost black. Underfur orange-yellow. The underside is dark brown, interspersed with lighter hairs and with the lighter orange-yellow or yolk-yellow underfur shining through. In the front of the fore legs on the neck side are two transversal patches with ochraceous ground colour. From this, small light patches or streaks extend to below the ears, and two similar small patches are indicated under the chin.

What especially characterises this skin is thus the heart-shaped, sharply delimited, dark chestnut brown hindquarter back spot.

There is another skin from Iglulik, CN. 2058.

This is much lighter than the foregoing one, which it other-

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wise closely resembles. The impression it makes is almost that of a skin that has faded very considerably. The muzzle is the same. The forehead patch is narrower and divided, a darker stripe of brown hair running in the medial line right out to the muzzle. At its fore end this dark stripe is only 1 cm wide, but to both sides it slopes out to the ears. Thus between the muzzle and the ears there is a darker, brownish triangle. Behind this triangle the

CN. 2060 2059 2054 2055 2056 2057 2058 2061



Fig. 1. Skin of *Gulo gulo luscus*.

back of the neck is lighter, light brown or light amber brown. The shoulder patch and back spot are much lighter than on the skin already described: pale brown with a faintly rust-brown sheen, and the streak connecting these two patches is still lighter than the patches and narrower. This makes the area between the fore legs and the back spot very pale. The belly is rather more reddish than in the others and in the naval region has a thin ochraceous lengthwise stripe. There are no throat spots at all.

From Lyon Inlet there are three skins, CN. 2056, 2054 (♀, skull) and 2059. These skins are darker than the dark Iglulik skin (CN. 2057), having the dark back spot larger and spreading forwards without interruption right over the whole of the back.

CN. 2056 is the one that most closely approaches the Iglulik skin 2057. It has the same dark brown muzzle. The light grey

forehead band is very conspicuous, sharply delimited at the front against the darker muzzle as in the Iglulik specimen, but posteriorly too, on a level with the ears, rather sharply defined against the dark neck, whereas on the Iglulik skin the forehead band runs rather smoothly into the back of the neck. In the Lyon Inlet specimen the dark shoulder patch is much larger, on the sides passing into the forelegs and at the fore end right along to the light forehead band. Further back, behind the forelegs, it is mixed with some rather paler hairs, and the lower part of the other hairs becomes light, to pass further back into the very dark chestnut-brown back spot. On this, then, the sides behind the forelegs are if anything dark, but downwards along the sides somewhat lighter, as the light side stripe can be faintly followed along here; on the Iglulik skin it was the light hair that was most prominent on the sides behind the forelegs. In the Lyon Inlet specimen the side streak is less conspicuous on the sides; over the root of the tail it is of the same width as in the Iglulik specimen but is darker, with a more brownish-red tint.

The underside is darker than on the Iglulik skin, and on the chest in the front of the forelegs there is a yellow-white transversal band, broken here and there by dark stripes. Between this band and the ears there are several small yellowish-white spots and under the chin two similar spots.

CN. 2054 (Lyon Inlet), differs from the above in that the light side streak is still less conspicuous in the axillary region. On this, then, the original shoulder patch is still larger, but has not so much of the almost entirely black tone over it as was the case with No. 2056. At the front the brown colour passes fairly smoothly into the forehead band, which is if anything brown with scattered grey hairs. The forehead band, then, is only slightly conspicuous, whereas on 2056 it was particularly sharply defined and prominent. The limitation of the back spot in this individual is still visible on account of the rather darker colour and higher brilliancy.

Posteriorly the side streak is somewhat wider and less reddish than on the foregoing and consequently more like the Iglulik specimen, but does not extend nearly so far forward. Under the throat there are still more spots than on the foregoing. On the left forefoot the three middle toes are surrounded by some yolk-yellow hairs, and this is the case on the right foot for the third and fourth toes.

With 2054 we proceed quite continuously to the third skin from Lyon Inlet, CN. 2059. Here again the forehead band is not very prominent. The back spot runs smoothly into the shoulder

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region which without change extends into the back of the neck. The back spot is still recognisable by its black-darkbrown colour and greater sheen. At the front the side streak is rather brownish or brownish-red and at the fore end, a little behind the legs, passes smoothly into the colour of the body. At the hind-quarters and back spot this side streak becomes lighter, as on 2056. The underside is mostly the same as in the foregoing specimen. What characterises this skin is the dark back, where the reddish-yellow side streak only stands out towards the rear; thus the side streak does not spread out over the shoulders, and the forehead band, too, is only slightly conspicuous.

Very much the same as CN. 2059, from Lyon Inlet, is CN. 2060 from Franklin Isthmus. In this case the side streak is darker behind, posterior to the back spot. The total impression is consequently that this skin is still darker and is one of those on which the side streak is least conspicuous. On the side of the neck there is a row of yolk-yellow spots forming a stripe from below the eye to the fore leg. On the belly there are two similar spots, but larger.

A skin from Itivliarssuk, Melville Peninsula, CN. 2055, in all essentials is the same as 2054 from Lyon Inlet. Only the back spot is rather smaller and the side streak more reddish-brown. On the underside between the forelegs are two large, whitish-orange patches, only divided in the medial line by a dark band about 2 cm wide; these patches stretch forwards up under the ears like two whitish lengthwise bands, and between them are numerous smaller, whitish spots and a larger whitish spot under the chin. This specimen is thus much lighter under the throat than any of those described above.

A particularly light skin, 2061, comes from the mouth of Back River. On this the side streak is very wide, very light, almost white. The back spot is long and narrow, its widest part 15 cm and measuring about twice that in length; this dark, reddish-brown spot is faintly greyish, many of the hairs having a light tip. On the back, behind the fore legs, the side streaks almost meet, although the hairs along the medial line have brown tips; through these the back spot is connected with an almost circular, brownish neck patch. Forward, over the shoulders—i. e. below the brown neck patch—the side streaks continue right along to the ears, in fact they taper off under these and go right on to the light forehead band. Under the neck patch and around the ears the hair tips are reddish-brown, however. The forehead band is light, whitish-grey and wide, at the front sharply delimited against the brown

muzzle band; posteriorly it passes between the ears, where the hair tips become reddish-brown, over into the back of the neck.

As will be seen from these descriptions, the skins vary a good deal. In some the forehead band is very conspicuous, light, greyish, and sharply delimited at both back and front (Lyon Inlet, 2056); or it passes smoothly into the darker crown and neck (Iglulik 2057 and 2058, Back River 2061); in others the forehead band is very little conspicuous, only a little lighter than the other parts of the face. The side streak may be more or less prominent: in the Back River skin it is exceedingly pale, flaxen yellow, or almost white, and begins right forward on the head; it is more yellowish white and begins somewhat farther back in the Iglulik skins. In these three individuals the side streaks are more or less marked over the shoulders, where two light shoulder patches are formed, separated by a darker patch in the medial line of the back. In the other skins the side streak is darker, begins farther back, behind the forelegs, and extends only very little over the shoulders, so that the shoulder patches are absent or only faintly indicated.

If, according to Matschie (Sechs neue Arten der Gattung *Gulo*. Sitzber. Gesellsch. naturf. Freunde, Berlin 1918, p. 141—155), we endeavour to place these skins under some of his twelve species, it will give us the greatest difficulty. There are, as we have seen, considerable variations in colour; by means of more skins, however, we are able to show smooth transitions between the extremes of the different deviations. It is not easy to separate all the various tints mentioned by Matschie according to description alone; especially as they seem to run into one another. It would be much more interesting to establish the individual colour variations by means of a larger material than to set up new species on the basis of few and slightly differing skins.

American authors, too, usually maintain that the wolverine varies a good deal both with regard to colour and markings; in his work "List of North American Recent Mammals", 1923, p. 128, Miller has included the new species based by Matschie upon a few individuals (*Gulo auduboni*, *G. bairdi*, *G. katschemakensis* and *G. niediecki*). Anthony, however, holds another opinion; in his "Field Book of North American Mammals", 1928, p. 113, he writes on these four species: "They all appear to be synonyms of *Gulo luscus* since they are indistinguishable from that animal".

I have been able to make a comparison between the American skins and 25 European skins. These last skins, too, vary a good deal. The European animals however have not the light greyish-

white and clear markings displayed by several of the American skins. The underfur is in the American specimens yellowish-brown, in the European dull greyish. In this connection it is worth mentioning that Collett, who has had the Oslo Museum's wolverine collection at his disposal, has come to the same conclusion. In "Norges Pattedyr", 1911, p. 337, he writes: "Specimens in Christiania Museum from Boothia Felix, collected by Roald Amundsen in 1905, are vigorously coloured, with almost whitish backspot, but in species not differing from ours".

It will appear from what has been stated above that the conception of the systematic position of the wolverines has been rather varying. No doubt, the widely separated distribution of the animals—America, Europe—has played a certain part in this respect. In my opinion the differences between the American and European animals really are so slight, — perhaps no cranial differences and only slight colour differences — that there is no reason, on a merely morphological point of view, to regard them as anything but sub-species. *Gulo gulo luscus* of the northern America, and *Gulo gulo gulo* of the Old World.

***Odobenus rosmarus* (L.) and *Odobenus divergens* (Illiger).**

Atlantic Walrus and Pacific Walrus.

The following walrus specimens were brought home:

Frozen Strait. Skull, ♀, jun., December 1922, P. F., CN. 479.

— Skull, ♂, jun., December 1922, P. F., CN. 480.

Roes Welcome. Skull. P. F., CN. 481.

Bering Strait. The waters between Diomedé Island and East Cape, nearest the latter, skull. CN. 482.

— skin with facial parts. K. R., CN. 483.

? Two loose canines. CN. 484 and 485.

The Pacific Ocean walrus has been set up by Illiger as a separate species, *Odobenus divergens*. It is said to resemble the Atlantic form, but differs from it especially by having longer, thicker, and more diverging tusks. Of this form we have the facial parts, CN. 483, with exceedingly powerful tusks; behind the cheek teeth the skull has been sawn away. The tusks are badly worn at the points, in fact the left tusk is almost flat there. Obviously it has once been broken, but the edges of the fracture have since been somewhat rounded by wear.