

**ANTHROPOLOGICAL PAPERS**  
**OF THE**  
**American Museum of Natural**  
**History.**

**Vol. V, Part II.**

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**CONTRIBUTION TO THE ANTHROPOLOGY OF  
CENTRAL AND SMITH SOUND ESKIMO.**

**BY**  
**ALEŠ HRDLIČKA.**

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# ANTHROPOLOGICAL PAPERS

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# AMERICAN MUSEUM OF NATURAL HISTORY

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### CONTRIBUTION TO THE ANTHROPOLOGY OF CENTRAL AND SMITH SOUND ESKIMO.

By DR. ALEŠ HRDLIČKA.

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## INTRODUCTION.

A thorough physical knowledge of the Eskimo may well be regarded as one of the fundamental necessities of American anthropology — in fact of anthropology in general. Such a knowledge will throw light not only on one of the most interesting phases of the peopling of this continent and on the original ethnic or blood relations of the Eskimo, but it will also substantially advance the study of the causes and mode of development of structural, particularly skeletal, modifications in man. For the Eskimo are a sub-race or type of people who came, apparently, from one parental stock; who live since many centuries, at least, under the extremes of environment; who, except in parts of Alaska and Greenland have mixed with none; and who present, we know already, some peculiar physical differentiations which, or some of which, seem to vary geographically.

In the presence of these highly favorable conditions for anthropological research, it becomes important to gather ample, detailed, and accurate observations on all the more distinct divisions of the Eskimo, observations on the living as well as on such body or skeletal remains as it may be possible to secure.

This desideratum, however, still remains to a large extent to be fulfilled. There are already extant a number of valuable studies on Eskimo crania, such as those of Davis,<sup>1</sup> Bessels,<sup>2</sup> Hansen,<sup>3</sup> Welcker,<sup>4</sup> Duckworth and Pain,<sup>5</sup> Pittard,<sup>6</sup> Sergi,<sup>7</sup> Brierley and Parsons,<sup>8</sup> Oetteking,<sup>9</sup> but a few of these are

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<sup>1</sup> Davis, J. B.—*Thesaurus craniorum*. 8vo, London, 1867, pp. 219–224; Supplement, London, 1875, pp. 48–49.

<sup>2</sup> Bessels, E.—*Einige Worte über die Inuit (Eskimo) des Smith-Sundes, nebst Bemerkungen über Inuit-Schädel*. *Archiv f. Anthropologie*, VIII, 1875, pp. 107–122.

<sup>3</sup> Hansen, S.—*Bidrag til Ostgrønlaendernes Anthropologie*. *Medd. om Grønland*, IX, 1886. *Contributions à l'anthropologie des Groënlandais orientaux*. *Bullet. Soc. d'Anthropol. Paris*, III<sup>me</sup> Ser., IX, 1886, pp. 609–619. *Bidrag til Vestgrønlaendernes Anthropologie*. *Medd. om Grönl.* XVII, 1893, pp. 163–248. *Bidrag til Eskimoernes Kranilogie*. *Medd. om Grönl.*, XIX, 1895, pp. 347–356.

<sup>4</sup> Welcker, H.—*Die Zugehörigkeit eines Unterkiefers zu einem bestimmten Schädel, etc.* *Archiv f. Anthropologie*, XXVII, 1900, pp. 37–106.

<sup>5</sup> Duckworth, W. L. H., and Pain, B. H.—*A Contribution to Eskimo Craniology*. *Jour. Anthropol. Inst. Gr. Britain and Ireland*, XXX, 1900, pp. 125–140.

<sup>6</sup> Pittard, E.—*Contribution à l'étude anthropologique des Esquimaux du Labrador et de la Baie d'Hudson*. *Bull. Soc. neuchâteloise de Géographie* XIII, Neuchâtel, 1901, separ. pp. 1–20.

<sup>7</sup> Sergi, G.—*Crani Esquimesi*, *Atti d. Soc. Romana d. Antropol.*, VII, 1901, separ. pp. 1–12.

<sup>8</sup> Brierley, J. & Parsons, F. G.—*Notes on a Collection of Ancient Eskimo Skulls*. *Jour. Anthropol. Inst. Gr. Br. & Ire.*, XXXVI, 1906, pp. 104–120.

<sup>9</sup> Oetteking, B.—*Ein Beitrag zur Craniologie der Eskimo*. *Abhandlungen & Berichte des Königl. Zoologischen und Anthropologisch-Ethnographischen Museums zu Dresden*, XII, 1908; sep. in 4, Leipzig, 1908, pp. 1–54. Gives further bibliography.

sufficiently detailed; and there is a poverty of precise observations on the living, and on other parts of the skeletons besides the crania.<sup>1</sup>

Furthermore, the data already collected apply very largely to the Eastern Eskimo, particularly to those of Greenland and Labrador, and less so to the western and especially to the hardly accessible central divisions of the tribe; so that many a pressing question concerning the physical characteristics of the people cannot as yet be answered.

Under these circumstances, every well identified Eskimo skull or skeleton which reaches our collections must be regarded as a valuable acquisition. This is particularly true of specimens from the central regions and those adjoining these to the westward, up to the Mackenzie. As fortune would have it, within recent years the American Museum of Natural History has received, through the good offices of Mr. George Comer, captain of a whaling ship, seventeen crania, in a fair state of preservation, from one of the most interesting areas in the territory of the Central Eskimo, namely, from Southampton Island and its neighborhood. These crania, sent to the writer for examination by Professor Hermon C. Bumpus, Director of the Museum, form the principal subject of this paper. At the same time, the writer will utilize the occasion to report on other valuable Eskimo skeletal material in the possession of the Museum, which he examined while connected with that Institution.

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<sup>1</sup> Among the more important contributions to the anthropology of the living Eskimo are Holm's and Garde's measurements, reported by Hansen (see footnote 3); A. J. Stone's Measurements of Natives of the Northwest Territories, reported by F. Boas: *Bulletin American Museum Natural History*, N. Y., XIV, 1901, pp. 53-68; and J. F. Tocher's, Note on Some Measurements of Eskimo of Southampton Island: *Man* II, 1902, 165-167.

The principal data concerning the long pelvic and other bones of the Eskimo skeleton are contained in Sir Wm. Turner's Report on the Human Crania and other Bones etc., *Challenger Reports*, Part XLVII, vol. XVI, 1886, pp. 1-136.

For Eskimo brains see Chudzinski, Th. — Sur les trois encéphales des Esquimaux, etc. *Bull. Soc. d'Anthrop. Paris*, 1881, 312-318. Hrdlička, A., An Eskimo Brain. *Proc. Amer. Medico-Psychological Assoc.*, 1899; *Amer. Anthropologist*, N. S., III, 1901, pp. 454-500; 8vo, N. Y., 1901, pp. 1-49. And Spitzka, E. A., Contributions to the Encephalic Anatomy of the Races: Three Eskimo Brains, from Smith's Sound. *Amer. Journ. Anatomy*, II, 1902, pp. 25-71.

## THE SOUTHAMPTON ISLAND CRANIA.

According to Captain Comer, his collection was made during two whaling trips. Fourteen of the skulls were secured during the voyage of 1903-5, three during that of 1907-9. The first lot all came from Southampton Island, some of the specimens being taken from near Manico Point, and others from Point Harding, north of Cape Kendall; however, the skulls were not marked on the spot and have become mixed. Of the three skulls secured on the last journey, two came from near Manico Point, and one from Lyon's Inlet (Melville Peninsula), not far from Winter Island.

Southampton Island, notwithstanding its extent, has, so far as known, been peopled by only one small tribe of the Eskimo: the Sagdlirmiut,<sup>1</sup> and this tribe has recently, through starvation, become extinct or nearly so. Captain Comer says that when he first met them, in the summer of 1896, they then numbered 18 men, 20 women, 8 boys, and 11 girls, in all 57 individuals. They have been known to visit, in small groups, Manico Point and other parts of the shore. They were poor and provided only with primitive weapons and were but little known to the mainland Eskimo, but Captain Comer was told that they occasionally visited the natives of Kings Cape, and that the latter also came over to Bell Island and visited the Sagdlirmiut.

The end of this tribe came about as follows, according to Captain Comer: "During the time from 1896 to 1899 I became well acquainted with these people and caught a number of whales along the shores of the island. This may have led to their extermination, as another whaling firm, seeing the success I had, in 1899 erected a station on the island and brought about 125 natives there from outside tribes.<sup>2</sup> Before this number of people, about forty active men, all armed with modern rifles, the Islanders, with their rude bows and arrows stood no show. They had all they could do before to get a living (as game and people keep pace with one another), and it is easy to see that under the new circumstances they would conclude

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<sup>1</sup> Discovered, or at least first reported by, Captain G. F. Lyon: *Narrative of an Unsuccessful Attempt to Reach Repulse Bay, etc.*, 8vo., London, 1825. See also Boas, F., *The Central Eskimo*, VI Ann. Rep. Bur. Amer. Ethnol., Washington, 1888, p. 451; same author — *The Eskimo of Baffin Land and Hudson Bay*. Bull. Amer. Mus. Natur. Hist., N. Y., XV, Part 1, 1901; and the *Handbook of American Indians*, Bull. 30, Bur. Amer. Ethnol., I, Washington, 1907, p. 435.

<sup>2</sup> The measurements reported by J. F. Tocher in *Man*, 1902, pp. 165-167, were taken on these imported Eskimo, who came from Rowe's Welcome, Hudson's Strait, Repulse Bay, and Foxe's Channel.

that the Spirit to whom they had always looked for help had deserted them. In the spring of 1903, the whaling station having been a failure, it was removed to Repulse Bay, and all that survived of the Southampton Islanders, one woman and four small children, were taken along. Two of the girls were adopted by the natives who worked for me, and in 1908, as game had become plentiful again on Southampton Island, I took these at their request, and with them the two adopted children, and landed them on the island.

"The crania were taken from stone graves. There was a large stone near the head of each grave, to be used as a seat for the person who would come to the grave and talk to the spirit of the dead. Some of the graves looked as though the body had been placed in a sitting position, being high and short."

Upon examination, the series is found to consist of fourteen skulls of adults (including one nearly so), one young adolescent, and two children. Sexual identification has proven unusually difficult — a fact which has been noticed by other observers with the Eskimo — but after repeated trials the series was separated into nine males and six females (the latter including the young adolescent specimen). Of the two children's skulls one is almost certainly that of a male, the other is uncertain.

The specimens are completely free from all deformity and disease, with the exception of the female skull "y", which presents two osteoporotic (hard) patches on the superior aspect of the lower jaw and of skull 99-4660, which shows the results of an alveolar abscess on the right side. There is not the slightest indication of caries of the teeth, although it should be noted that the majority of these are now missing (lost post-mortem) and that in the majority of the adult crania there are indications of the loss of one or more teeth during life. However, in a series of 210 adult Eskimo skulls, from various localities, in the United States National Museum collections, only three show traces of caries, two in one tooth each and one in two teeth.

A preliminary inspection of the specimens establishes the fact that they are beyond any doubt all pure Eskimo; that they show an unusual range of variation in certain features; and that they include a considerable proportion of relatively shorter and broader forms than the average of the eastern contingent of this people. A detailed study and measurements bring forth many interesting results, a brief résumé of which is as follows:— Eight of the skulls, three males and two females and three of the young subjects, are mesacephalic; while eight, five males and three females, are moderately, and one male, pronouncedly dolichocephalic. With few exceptions, the specimens are high, both absolutely and in relation to breadth. Thus, in five of the males the basion-bregma diameter measures 14 cm.

and above, while in three of the females it ranges from 13.8 to 13.9 cm. and the height-breadth index is 100. or above in four of the male and two of the female adult individuals.

The face is high in its upper portion (alveolar point-nasion), so that notwithstanding the concomitant large bizygomatic breadth the upper facial index, according to Kollmann's classification, is leptoprosopic. The total facial index, however, is somewhat low, the height of the lower jaw not being in keeping with that of the upper part of the face.

When the breadth of the face (diameter bizygomatic maximum) is compared with the breadth of the head, it is found to exceed this in both the male and female adults.<sup>1</sup>

The orbital index is extremely variable, ranging in the adults from microseme to hyper-megaseme (92 to 105); the nasal index is generally leptorhynian; and the palatine index, determined by Turner's method, is predominantly brachyuranic.

Alveolar prognathism is usually well pronounced. The lower jaw is massive and shows important functional modifications which will be discussed later. Asymmetries of minor grades are frequent.

In relation to size, all of the skulls show thin parieties, large nasion-opisthion arc, and fair to large capacities. The foramen magnum is also generally large.

From the descriptive point of view, the skulls are characterized by a broad and flat face, small nasal bridge due to small nasal bones, spacious and rather sharply outlined orbits, a single median prominence of the forehead, a more or less scaphoid condition of the vault, only moderately prominent parietal eminences, somewhat protruding occiput, extensive planum temporale and broad base, lower jaw, and palate.

Taking everything into consideration, it appears that in the totality of their features, the Southampton Island crania approximate the more Western, particularly Alaskan, rather than the more Eastern Eskimo.

#### DETAILED MEASUREMENTS AND OBSERVATION.

*Measurements relating to the Form of the Skulls.* The length of the skull varies in males from 17.9 to 20.4 cm., in females from 17.4 to 19.0 cm. As an analysis of the several series of measurements will show, the variability of this dimension is greater than that of either the breadth or the height,

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<sup>1</sup> Compare Boas, A. J. Stone's Measurements of Natives of the Northwest Territories, Bull. Amer. Mus. Nat. Hist., XIV, N. Y., 1901, p. 60.

and that in both sexes. When it is contrasted with the other two principal diameters of the vault, its proportionate value appears to be less in the young than in the adults, which is but partly due to a greater prominence in the latter of the glabella and the inion, for these are throughout only moderately developed.

ESKIMO CRANIA FROM SOUTHAMPTON ISLAND—MEASUREMENTS RELATING ESPECIALLY TO THEIR FORM.<sup>1</sup>

Catalogue Number	Diameter antero-posterior maximum	Diameter lateral maximum	Basion-bregma height	Cephalic index	Height-length index	Height-breadth index
<i>Males.</i>						
"z"	cm.	cm.	cm.			
99/4102	17.9	14.0	13.9	78.2	77.6	99.3
'4104	18.9	13.8	13.4	73.0	70.9	97.1
'4652	18.7	14.4	14.1	77.0	75.4	97.9
'4652	18.3	14.0	14.5	76.5	79.2	103.6
'4653	18.6	13.9	13.9	74.7	74.7	100.0
'4654	19.3	14.1	14.3	73.1	74.1	101.4
'4659	19.0	14.2	14.0	74.7	73.7	98.6
'4661	20.4	14.0	13.5	68.6	66.2	96.4
'4662	19.1	13.9	14.5	72.8	75.9	104.3
Averages:	18.9	14.0	14.0	74.2	74.1	99.8
<i>Females.</i>						
"y"						
99/4107	18.1	13.8	13.9	75.7	76.2	99.3
'4655	19.0	14.2	13.5	74.7	71.1	95.1
'4655	17.4	13.4	13.1	77.0	75.3	97.8
'4656	18.3	13.4	13.8	73.2	75.4	103.0
'4660	18.6	13.7	13.8	73.7	74.2	100.7
Averages:	18.3	13.7	13.6	74.9	74.5	99.4
<i>Young.</i>						
99/4657 <sup>2</sup>	16.9	13.2	12.2	78.1	72.2	92.4
'4106 <sup>3</sup>	17.4	13.4	12.9	77.0	74.1	96.3
'4658 <sup>4</sup>	18.0	13.7	13.1	76.1	72.8	95.6

<sup>1</sup> All measurements not otherwise specified follow the Monaco agreement.

<sup>2</sup> About 5 years old; <sup>3</sup> about 11 years old; <sup>4</sup> about 15 years old.

The cephalic index manifests a decided tendency towards mesocephaly. It is practically alike in the two sexes, especially if the exceptional skull 4661 be excluded from the male series; but it is higher in the young, due to the relatively smaller value in these of the length.

The height of the skull, while absolutely larger in the adult males than in the females, is seen to be of much the same value in the two sexes when compared to the length and breadth. In the young, however, this measurement is smaller both absolutely and relatively, the latter condition resulting in a smaller height-breadth index.

The small series of specimens from the young affords, it is seen from the preceding, two indications, which, being exhibited by all the specimens, can scarcely be accidental, and which may prove to be of considerable value in throwing much needed light on the phenomenon of development of pronounced dolichocephaly in the Eskimo. If the Eskimo skull is decidedly shorter and lower, in relation to its breadth, in childhood and youth than it is in the adult life, then it is incumbent on the student to look for the causes of these manifestations. Now, there is no good reason to believe that such causes are inherent in the trophic nervous centers that control the skull development, for in that case their effects would in all probability appear earlier. But, if not due to these, then the relative elongation and heightening of the vault must be attributed to agencies extraneous to the bones.

There are several classes of such agencies. The first is the growth of the brain, the second the condition of the sutures, the third the external parts, particularly the muscles.

There is some evidence that there are changes in the shape of the brain during its growth, due to causes within the organ itself,<sup>1</sup> but apparently they are not very potential in regard to the shape of the vault. On the other hand, there are many illustrations of the fact that the brain accommodates itself readily and permanently to any shape which the skull may be artificially given or which it may assume as the result of pathological or other conditions. If the brain possessed any considerable tendency towards developing, after birth or the first few months of extra-uterine life, in a definite shape, such a tendency ought to become, it seems, perceptibly asserted in those instances of intentional or unintentional head compression which were produced in a limited time, often not exceeding a hundred days, in early infancy. The comparison of deformed heads or skulls of infants with those of adults among the same people, fails to show that any restitu-

<sup>1</sup> See Boas, F., *The Cephalic Index*, Amer. Anthropologist, N. S., I, 1899, pp. 459-461; and, A. Hrdlička, *Measurements of the Cranial Fossae*, Proc. U. S. National Museum, XXXII, Washington, 1907, pp. 177-232.

tion or any marked alteration in shape has taken place in the skulls of the latter after the deformation. An interference with the normal condition of the cranial sutures produces readily, it is well known, modifications in the shape of the vault. However, such modifications are quite characteristic, they are not perceptible in any of these specimens, and the sutures of these skulls appear to be in a normal condition throughout.

There remain then to be considered only the external parts, by far the most important of these are the temporal muscles. These are, mechanically, two pads applied to and exercising constantly certain amount of pressure against the temporo-parietal regions. During the activity of the muscles this pressure is much increased. The actual amount of force exerted upon the sides of the skull is proportionate to the development and use of these muscles. Two such pads, if applied with such force as they exercise later in life, to the head of the newborn infant, would without doubt soon effect a very perceptible bilateral compression of the vault, which would be accompanied by compensatory increase in the height and length of the skull. It is such an effect of these muscles on the skull that one finds occasionally referred to in literature.<sup>1</sup> However, the temporal muscles exercise scarcely any action on the bones of the vault during the first, and exert but a small amount of force on the same during the second year of life. Meanwhile, the fontanels have closed, the articulations have become more firm, and the bones of the vault present increased thickness as well as a convex, resistant surface to the muscles, and it is improbable that these can effect any compression. The skull, however, continues to grow to perhaps the thirtieth year of life, and in doing so it follows to some extent the law of least resistance, the importance of which in all growth is as yet too little appreciated. Throughout the whole length of this growth it meets on the sides with the resistance of the temporal pads, and the necessary result must be that, conformly to the amount of this resistance it enlarges disproportionately in one or both of the other two main directions, namely, height and length.

In the Eskimo, it is well known, the temporal muscles reach large dimensions, and if anywhere, it is in this people that their effects on the form of the skull should be perceivable. The small series of crania at hand seems to bear out this assumption, particularly in regard to the length. If these indications will be confirmed by future observations, there will be at hand a precious fact, which, while by no means the whole truth, will go far in helping to explain, not only the variation in cranial form among the Eskimo, but also in other groups of humanity and at different epochs.

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<sup>1</sup> See, for inst., Arthur Thompson, *On Man's Cranial Form*, Address delivered before the International Medical Congress held at Madrid, April 25, 1903, printed to the University, Oxford, 1903.



The tendency to mesocephaly observed in this group, seems from Tocher's data to be common to the Central Eskimo. Tocher obtained on thirty-five living males, who, as before mentioned, were from Rowes Welcome, Hudson's Strait, Repulse Bay, and Foxe's Channel, the average cephalic index of 77.2 (range 69.0-82.0), which on skulls would correspond to about 75., or very nearly the same value as that obtained on the Southampton Island skulls under consideration. This makes it also safe to conclude that the Islanders, notwithstanding their greater primitiveness and other differences, were an inherent part of the population of that general region.

*Measurements relating to the Size of the Skulls.* Judging from the measurements of stature secured among the Central Eskimo by Tocher<sup>1</sup> and those obtained on the Kinnepetu of the Chesterfield Inlet by Captain Comer,<sup>2</sup> and from the fact that the observers who came into contact with the tribe do not report it as exceptional in this respect, it may be surmised that the height of the Southampton Islanders averaged somewhere about 162.0 cm. in the men and 150.0 cm. in the women, which would class them among short people. Notwithstanding this fact, the nine male skulls under consideration give the average capacity of 1563 c. c.,<sup>3</sup> which is higher than that of whites and especially higher than that of Indians, many tribes among whom average considerably more in stature. The female skulls show, with one exception, a similar condition.

The other measurements relating to the size of the skulls are quite in accordance with the capacity. A very interesting associated feature is the small thickness of the parieties, which, considering the males, is even less than that in the American whites, and averages from 1 to 2 millimeters less than that in the American Indians of different tribes.

The fact that the Eskimo skull often presents a large capacity is well known from former observations, without the cause of the phenomenon being well understood. The people are doubtless apt and intelligent, and their brains at least so far as known from the several specimens described in this country and an additional one now in our collection, show good differentiation. Yet, on the whole, there are no signs of really superior mental powers that could of themselves explain the relatively large size of the organ. There are, however, indications that this characteristic in the Eskimo may at least in part have other significance.

<sup>1</sup> 1. c., average of 35 men, 162.0 cm.

<sup>2</sup> The Eskimo of Baffin Land and Hudson Bay. From Notes collected by Capt. George Comer, Capt. James S. Mutch, and Rev. E. J. Peck, by F. Boas. Bull. Amer. Mus. Natur. Hist., XV, N. Y., 1901, p. 8: average stature of 9 men, 162.0 cm. of 12 women, 151.8 cm.; average weight of the same, men 170 pounds, women 138 pounds.

<sup>3</sup> Measured according to the modified Flower's method described by the writer in Science, June 26, 1903, pp. 1011-1014.

**ESKIMO CRANIA FROM SOUTHAMPTON ISLAND — MEASUREMENTS RELATING ESPECIALLY TO THEIR SIZE.**

Catalogue Number	Capacity <sup>1</sup>	Cranial module (mean diameter)	Circumference (above supra-orbital ridges)	Nasion-opisthion arc <sup>3</sup>	Thickness of left parietal (1.0 cm. above and along the squamous suture)
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*Males.*

	c. c.	cm.	cm.	cm.	mm.
"z"	1495	15.27	50.1	36.3	3 to 5
99/4102	1410	15.33	51.8	36.4	4
'4104	1485	15.73	52.9	37.3	4 to 7
'4652	1455	15.60	51.8	36.1	4 to 5
'4653	1583	15.50	51.7	36.9	3 to 4
'4654	1725	15.90	53.7	38.7	2.5 to 4
'4659	1600	15.70	52.5	38.3	3 to 4
'4661	1775	16.00	55.0	38.7	3 to 4
'4662	1540	15.80	52.2	37.0	3 to 5
Averages:	1563	15.65	52.4	37.3	approxim. 4

*Females.*

		cm.	cm.	cm.	mm.
"y"	1450	15.28	50.9	37.0	3 to 6
99/4107	1580 <sup>2</sup>	15.57	53.2	38.4	4 to 5
'4655	1290	14.60	49.1	33.9	3 to 4
'4656	—	15.18	50.7	36.9	3 to 4
'4660	1515	15.36	51.1	36.1	3 to 4
Averages:		15.20	51.0	36.5	approxim. 4

*Young.*

		cm.	cm.	cm.	mm.
99/4657	—	14.10	48.1	34.7	2 to 3
'4106	1460	14.57	50.0	35.5	3
'4658	1500	14.90	50.0	37.3	2 to 4

<sup>1</sup> Measured with dry mustard seed by method referred to in footnote 3, p. 187.

<sup>2</sup> Positively female.

<sup>3</sup> The percental values of the three constituents of the arc average as follows: nasion-bregma, males 33.9 (32.1–35.2), females 34.0 (31–36), young 34.0 (32.4–35.4); bregma-lambda arc, males 33.4 (31.3–35.1), females 32.9 (30.9–33.8), young 32.8 (32–34.4), and the lambda-opisthion part, males 32.6 (30.3–35.4), females 33.1 (30.7–35.8), and young 33.1 (32.4–33.7).

The main point to be considered in this connection is, it seems to the writer, the large lumen in these crania of the foramen magnum, the average mean diameter ( $\frac{\text{greatest length} + \text{greatest breadth}}{2}$ ) of which amounts in the nine males to 3.52 and in the five females to 3.42 cm., which exceeds the general averages in both whites and Indians. This large size of the foramen indicates, in all probability, a stout spinal cord, which would mean either a large number of the conductive fibers, or an extraordinary amount of the non-nervous constituents, both of which conditions would tend to explain the excessive size of the brain without corresponding great mentality. All these, however, are mere suggestions made in the absence of exact histological and also chemical data, which alone can definitely settle the question. A reference to the young subjects shows that a large size of the brain is achieved early, and that it is a hereditary condition and not individual acquisition akin to that which takes place in whites as a result of mental training.

*Measurements relating to the Facial Parts.* In connection with these parts a number of important facts need to be added to what was expressed in the preliminary résumé.

The average upper facial height and, to a slightly less degree, the bizygomatic breadth are high even for Eskimo, and they exceed all similar averages obtained on other peoples, with the exception of a few groups of the Plains Indians and probably some of the mongolic natives of Asia.<sup>1</sup> The latter, in general, approach the Eskimo closer in these characteristics than any other anthropological unit, which is doubtless not without significance. The range of variation in the two measurements in the male series is unusually small.

The relation of the upper facial height to the basion-bregma height of the vault is in the males as 55, in the females as 52.2 to 100; that of the bizygomatic diameter to the breadth of the head being, respectively, 103.6 and 101.5 to 100.

The nasal height is considerable, due to the height of the upper face; on the other hand, the breadth of the nasal aperture is, with very few exceptions, decidedly small, the averages, while agreeing with those of other branches of the Eskimo, being less than those found anywhere else on the American continent. This narrowness of the external aperture of the nasal chambers in the Eskimo is a feature of special interest, for there are some indications that it may, together with the reduced nasal bones (which will be dealt with later), be a modification of functional nature and the result

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<sup>1</sup> For comparative data see especially Topinard, P., *Éléments d'Anthropologie générale* Paris, 1885, p. 929.

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND: MEASUREMENTS OF THE FACIAL PARTS.

Catalogue number	Chin-nasion height	Alveolar point-nasion height	Diameter bizygomatic maximum	Facial index, total	Facial index, upper	Nose: height	Nose: breadth	Nose: index	Orbits: height right	Orbits: height left	Orbits: breadth right	Orbits: breadth left	Orbits: index right	Orbits: index left	Palate, external length	Palate, external breadth	Palate, index
<i>Males.</i>																	
"z"	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
99/4102	12.2	7.4	14.2	85.9	52.1	5.6	2.2	39.3	3.80	3.75	3.85	3.80	98.7	98.1	5.7	7.0	122.8
'4104	12.4	7.6	14.5	85.5	52.4	5.35	2.2	41.1	3.45	3.50	4.10	4.10	84.1	85.4	6.0	6.4	106.7
'4104	12.6	7.7	14.5	86.9	53.9	5.55	2.15	38.7	4.20	4.20	4.30	4.25	97.7	98.8	5.4	6.5	120.4
'4652	?	7.7	near	?	53.5	5.4	2.35	43.5	3.60	3.60	3.90	3.90	92.3	92.3	6.0	6.8	113.3
'4653	?	7.6	14.7	?	51.7	5.3	2.15	40.6	3.70	3.70	3.95	4.05	93.7	91.4	5.5	7.0	127.3
'4654	?	7.8	14.3	?	54.5	5.3	2.4	45.3	3.65	3.60	4.15	4.20	87.5	85.7	5.9	7.2	122.0
'4659	12.8	7.8	14.2	90.1	54.9	5.2	2.2	42.3	3.55	3.55	4.10	4.00	86.6	88.7	5.9	7.5	127.1
'4661	near	7.5	14.7	85.7	51.0	5.6	2.55	45.5	3.50	3.50	4.25	4.10	82.4	85.4	6.0	6.8	119.3
'4662	13.2	7.9	14.8	89.2	53.4	5.6	2.5	44.6	3.55	3.55	4.05	4.10	87.7	86.6	6.2	7.3	117.7
Aver.:	12.6	7.7	14.5	87.2	53.0	5.4	2.3	42.3	3.67	3.66	4.07	4.05	90.0	90.3	5.8	6.9	118.8
<i>Females.</i>																	
"y"	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
99/4107	11.7	7.3	13.5	86.7	54.1	5.3	2.2	41.5	3.90	3.80	3.70	3.70	105.4	102.7	5.2	6.5	125.0
'4655	?	7.4	13.5	?	54.8	5.2	2.15	41.3	3.80	3.80	4.20	4.35	90.5	87.4	5.5	6.6	120.0
'4656	?	6.6	14.3	?	46.1	4.75	2.3	48.4	3.50	3.50	3.95	3.90	88.6	89.7	5.5	near	114.5
'4660	near	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
'4660	12.3	7.6	14.0	87.9	54.3	5.2	2.3	44.2	3.55	3.50	4.10	4.15	86.6	84.3	5.8	7.0	120.7
Aver.:	—	7.2	13.8	—	52.3	5.1	2.25	43.8	3.69	3.65	3.99	4.02	92.5	90.7	5.5	6.6	120.0
<i>Young.</i>																	
99/4657	9.2	5.6	11.3	81.4	49.6	4.0	2.0	50.0	3.40	3.45	3.50	3.55	97.1	97.2	4.0	5.6	110.0
'4106	9.9	6.1	11.1	89.2	54.9	4.3	1.75	40.7	3.55	3.55	3.50	3.45	101.4	102.9	4.0	6.2	155.0
'4658	?	6.3	12.2	?	51.6	4.6	2.35	51.1	3.45	3.50	3.75	3.75	92.0	93.3	4.9	6.5	132.7

of environment, particularly the arctic cold.<sup>1</sup> There is no doubt, however, that both characteristics are already, to a large extent at least, hereditary.

The heights of the face and particularly the height of the nose, compared respectively with the diameter bizygomatic maximum and the nasal breadth, show relatively greater augmentation with age than the latter dimensions, though there are apparently individual exceptions to this generalization.

The orbits, measured according to the procedure of Broca, are seen to be both spacious and variable as to individuals. Besides this, there are also perceptible the usual differences between the adults and the young, due to the relatively smaller breadth and the unaffected as yet (by frontal sinuses and supra-orbital ridges) height of the cavities in the latter, with some irregular differences in regard to sides; but as to sexes, the averages are much alike.

The palate, or rather the base of the facial portion of the skull, is remarkable by its great external breadth, which is due mainly to the breadth of the alveolar process in the molar regions. The palate in the young is relatively short. Sexual differences are perceptible in the actual measurements only, these being in the average somewhat smaller in the females than in the males. The palatine index is nearly alike in the two sexes.

*Other Measurements.* The three basio-facial lengths show values which indicate a good development of the frontal parts of the skull. The upper alveolar process is high. Prognathism, both facial and alveolar, closely approaches that in the Indians. It is very perceptibly lower in both determinations in the two younger subjects than it is in the adults, which is due to the imperfect state of the dental arch in the former and is common to all races.

The minimum frontal diameter is rather large in most of the specimens; its relation to the diameter frontal maximum is much alike in the two sexes and at different ages.

The foramen magnum, as mentioned before, for the most part is decidedly large in both sexes and at all ages.

The lower jaw is often characterized by great, and in one of the male skulls by enormous, bicondylar breadth and consequently by very high gonio-condylar index<sup>1</sup> by relatively moderate height, and by great thickness.

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<sup>1</sup> Oettking, O. C., p. 33, suggests the agency of the "Vorrückung und Geradstellung," i. e. the forward and level position of the orbits, in causing the narrowness of the nasal bones and also that of the nasal aperture, but the series of crania on hand and other comparative material offer no encouragement to such a view.

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND: ADDITIONAL MEASUREMENTS.

Catalogue number	PROGNATHISM						FRONTAL BONE			FORAMEN MAGNUM	LOWER JAW						Angle right left
	Basion-alveolar point diameter (a)	Basion-nasion diameter	Basion-middle of nasal notches diameter	Height from alveolar point to middle of nasal notches (b)	Angle bet. a and alveolar line	Angle bet. a and line b	Diameter frontal minimum (c)	Diameter frontal maximum (d)	Percentual relation of c to d $\left(\frac{c}{d} \times 100\right)$	Mean diameter	Bigonial diameter (e)	Biondylar diameter (f)	Percentual relation of e to f	Height of symphysis	Minimum breadth of the ascending ramus	Maximum thickness of horizontal ramus <sup>1</sup>	
"2"	cm. 10.3	cm. 10.5	cm. 9.4	cm. 1.9	° 70	° 56	cm. 8.9	cm. 11.3	78.8	cm. 3.45	cm. 11.3	cm. 12.0	94.2	cm. 3.35	cm. 3.9	cm. 1.7	° 120
99/4102	10.5	10.5	9.4	2.3	69	55	9.3	11.7	79.5	3.55	11.1	13.2	84.1	3.7	4.6	1.7	115
'4104	?	10.7	9.0	—	?	?	9.6	11.7	82.1	3.35	9.8	12.9	76.0	3.85	4.05	1.5	115
'4652	11.0	10.9	9.6	2.5	68	49	10.4	11.9	87.4	3.35	—	—	—	—	—	—	—
'4653	10.4	10.6	9.2	2.4	70	53	9.5	11.5	82.6	3.5	—	—	—	—	—	—	—
'4654	11.0	10.9	9.6	2.65	68	51	9.9	12.0	82.5	3.5	—	—	—	—	—	—	—
'4659	10.4	10.8	9.3	2.7	71	58	9.2	11.2	82.1	3.4	11.5	12.5	92.0	3.6	3.7	1.9	120
'4661	11.4	11.2	10.4	2.0	68	55	9.9	11.6	85.3	4.0	13.4	13.4	100.0	near 3.6	4.3	1.8	136
'4662	11.1	11.4	9.8	2.5	71	53	10.0	11.4	87.0	3.55	11.9	12.9	92.3	3.9	3.7	1.8	124
Aver.:	10.76	10.83	9.5	2.4	69	53	9.6	11.6	83.1	3.5	11.5	12.8	89.7	3.7	4.04	1.7	122

Males.

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND: ADDITIONAL MEASUREMENTS. (Continued.)

Catalogue number	PROGNATHISM				FRONTAL BONE			FORAMEN MAGNUM	LOWER JAW						right	left	Angle	
	Basion-alveolar point diameter (a)	Basion-nasion diameter	Basion-middle of nasal notches diameter	Height from alveolar point to middle of nasal notches (b)	Angle bet. a and alveolar point nasion line	Angle bet. a and line b	Diameter frontal minimum (c)		Diameter frontal maximum (d)	Percental relation of c to d $\left(\frac{d}{c} \times 100\right)$	Mean diameter	Bigonal diameter (e)	Bicondylar diameter (f)	Percental relation of e to f				Height of symphysis
<i>Females.</i>																		
"y"	9.9	10.1	9.0	2.1	67	53	9.5	11.5	82.6	3.25	10.3	12.0	85.8	2.9	?	3.5	1.5	130 126
99/4107	9.6	10.2	8.4	2.4	72	53	10.2	11.7	87.2	3.4	—	—	—	—	—	—	—	—
'4655	10.2	10.2	9.3	1.9	71	56	9.3	10.8	86.1	3.4	—	—	—	—	—	—	—	—
'4656	?	10.5	?	?	?	?	9.9	11.5	86.1	3.4	—	—	—	—	—	—	—	—
'4660	10.4	10.7	9.4	2.45	70	58	9.4	11.1	84.7	3.65	11.2	—	—	3.5	4.0 3.9	1.7	115 120	
Aver.:	10.0	10.3	9.0	2.2	70	55	9.7	11.3	85.3	3.4	—	—	—	—	—	—	—	—
<i>Young.</i>																		
99/4657	8.3	9.0	7.8	1.6	78	66	9.0	10.8	83.3	3.0	8.9	9.85	90.4	2.4	3.0 3.0	1.6	135 133	
'4106	7.6	8.8	7.2	1.8	79	70	9.2	?	?	3.5	9.6	9.6	100.0	2.55	3.0 3.0	1.5	127 134	
'4658	8.9	9.2	8.0	1.8	72	56	9.6	11.5	83.5	3.15	—	—	—	—	—	—	—	—

<sup>1</sup>Measured at right angles to the vertical axis of the ramus, includes the alveolar reinforcement or thickening, and occurs generally in the region of the bicuspid or first molars.

The last named feature will be further discussed under descriptive notes. The ascending ramus is broad, sometimes excessively so. The goniac angle <sup>2</sup> is very obtuse in one of the males, and is quite unfit, so far as this series goes, for sexual identification.

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<sup>1</sup> Reaching 100 in '4661, which is the highest ever recorded.

<sup>2</sup> An accurate measurement of this angle, on the goniometers of either the French or German make, is not as easily secured as it may appear, and this is especially true in regard to the jaws of infants. The difficulty lies in the fact that, due to the form of the condyles, by shifting the jaw from side to side we obtain angles of different value. In the adult such differences rarely amount to much, but in an infant they may reach ten degrees and even more. The writer measures the angle with the condyles of the jaw parallel with the transverse marking of the goniometers hence without any tilting of the specimen to one or the other side.



## DESCRIPTIVE NOTES.

*The Vault.* The main feature of the vault, in these as in other Eskimo crania, is its scaphoid shape, (*lophocephaly* of Sergi), due to a more or less marked, dull to relatively sharp, sagittal elevation, which commences at various distances above the glabella and ends about the summit of the skull. This elevation, which in a lighter degree is often encountered among the Indians but in no known race attains the frequency and grade which it reaches in the Eskimo, may be in part hereditary, but aside from this it stands plainly in causal relation with the temporal ridges. It is almost absent in the child, is at best but moderately developed in the female, and reaches its greatest development in the male, particularly in those with exceptionally extensive temporal muscles. Morphologically, it consists in part of a strengthening of the bone along the median line, and in part of a more acute arching of the skull along this line, and its length corresponds nearly to the extent of those parts of the temporal muscles which exercise the greatest action.<sup>1</sup> It arises, in the opinion of the writer, on one hand and in the main, by the forced expansion of the cranial cavity upwards, in the direction of least resistance which was already mentioned in connection with the basion-bregma height and is due to the interference with the lateral growth by the extraordinarily developed temporal muscles, and on the other hand, by an accumulation of bone along the median line, due to increased tension along this line, where growth of bone is more rapid (at least so along the sagittal suture), due to the pressure of the temporal muscles while active. There is only an inconsiderable morphological relation between the elevation under question and the consequent keel-shaped vault and the antero-posterior median crest such as is found in the gorilla, orang, etc., and whose main function is that of an accessory to the *planum temporale*, affording on each side additional needed surface for the attachments of the temporal muscles.

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<sup>1</sup> The elevation is really resolvable into two elements, which under certain conditions may exist independently and have different significance, namely, the medio-frontal and the sagittal elevations; but in this particular series of specimens these two elements are so intimately connected and so interdependent, that they forcibly suggest the same causation and meaning and must needs be considered together.

An exhaustive presentation of the existing knowledge and views concerning these features will be found in Matiegka, J., "Über die an Kammbildungen erinnernden Merkmale des menschlichen Schädels," Sitzungsberichte d. k. Akad. d. Wissenschaften in Wien, CXV, Abt. 3, June, 1906, pp. 349-429.

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND:

Catalogue number	Norma frontalis	Norma verticalis	Frontal region	
			arching	eminences
Males.				
"z"	superiorly moderately scaphoid	elliptical	fair	single, median, pronounced
99/4102	pronouncedly scaphoid	" "	sloping	single, median, slight
'4104	moderately scaphoid	approaching elliptical	fair	moderate median with slight bilateral
'4652	quite pronouncedly scaphoid	" "	slightly sloping	slight bilateral
'4653	moderately scaphoid	" "	good	fair bilateral
'4654	quite pronouncedly scaphoid	" "	"	slight bilateral
'4659	moderately scaphoid	long ovoid	slightly sloping	moderate bilateral
'4661	quite pronouncedly scaphoid	long elliptical	fair	single, median, moderate
'4662	pronouncedly scaphoid	approaching elliptical	slightly sloping	single, median, moderate
Females.				
"y"	moderately scaphoid	approaching elliptical	good	single, median large
99/4107	slightly scaphoid	" "	very good	slight bilateral
'4655	moderately scaphoid	" "	sloping	traces of bilateral single, median,
'4656	quite pronouncedly scaphoid	nicely elliptical	fair	quite marked
'4660	moderately scaphoid	approaching elliptical	good	single, median, broad
Young.				
99/4657	nearly oval	approaching elliptical	good	single, median, marked
'4106	slightly scaphoid	" "	"	slight bilateral
'4658	moderately scaphoid	intermediary between pentagonal and elliptical	"	single, median, well marked

## CHARACTERISTICS OF THE VAULT.

Medio-frontal & sagittal elevation	Parietal regions : eminences	Temporal regions	Occipital region
<i>Males. (Continued.)</i>			
very moderate, dull, from below frontal eminence to summit	distinctly marked but moderate	rather bulging anterior half	quite smooth, no protrusion
pronounced, mid-frontal eminence to summit	very moderate	quite convex	medium, rough, somewhat protruding, square from above
quite pronounced, from above glabella to summit	medium	" "	but moderately rough, somewhat square from above
quite pronounced, from 3.0 cm. above nasion to summit, sharp	distinctly marked, but moderate	nearly flat	moderately rough, square from above, slight protrusion
slight, bregma to summit	somewhat diffuse, moderate	moderately convex	quite smooth, moderate protrusion
moderate, bregma to summit, sharp	medium	slightly convex	moderately rough, slight protrusion
slight, from above glabella to summit	rather pronounced	moderately convex	moderately rough, square from above, no protrusion
slight, frontal eminence to summit	very moderate	somewhat bulging, with adjacent part of sphenoid	inion large and protruding, muscular impressions marked
pronounced, frontal eminence to summit, sharp	rather pronounced	slightly convex	moderately rough, only slight protrusion
<i>Females. (Continued.)</i>			
moderate, upper part of frontal to summit, dull	well marked	moderately convex	slightly asymmetric, smooth, but slight protrusion
slight, middle of frontal to summit	" "	moderately convex	quite smooth, slightly protruding
moderate, upper half of frontal to summit	rather diffuse, moderate	moderately convex	moderately rough, no protrusion
moderate, upper half of frontal to summit	diffuse, but little distinct	slightly convex	moderately rough, no protrusion
moderate, bregma to summit	well marked	moderately convex	slightly asymmetric, slightly rough, moderate protrusion
<i>Young. (Continued.)</i>			
very slight over upper $\frac{1}{2}$ of frontal	diffuse, moderate	whole region somewhat bulging	smooth, square from above protrusion quite marked
very slight	well marked	slightly convex	smooth, square from above, somewhat protruding
moderate, middle of frontal to summit	well marked	whole region somewhat bulging	nearly smooth, protrusion quite marked

To show the actual vertical extent of the areas of the temporal muscles with their fascia, the writer took certain measurements, the results of which are given in the following table:—

ESKIMO CRANIA FROM SOUTHAMPTON ISLAND: VERTICAL EXTENT OF THE TEMPORAL MUSCLES.

Catalogue number	Transverse arc (crista to bregma <sup>1</sup> ) (a)	Smallest surface distance of superior temporal line from sagittal suture (over the anterior half of the parietal)		Smallest sur- face distance between the superior tem- poral lines (over the an- terior half of the parietals) (b)	Percental relation of b to a ( $\frac{b \times 100}{a}$ )	Degree of scaphoid con- dition of vault	Basion- bregma height (h)	Propor- tionate value of $\frac{h^3}{a^3}$
		right	left					
Males.								
	cm.	cm.	cm.	cm.				
"z"	29.2	5.3	4.1	9.4	32.2	moderate	13.9	30.3
99/4102	28.5	4.2	3.4	7.4	26.0	pro- nounced	13.4	29.1
'4104	30.1	4.2	3.7	7.9	26.2	quite pro- nounced	14.1	29.9
'4652	29.4	4.6	4.4	9.0	30.6	do.	14.5	31.0
'4653	29.8	4.6	4.1	8.7	29.2	moderate	13.9	30.0
'4654	30.2	4.5	3.7	8.2	27.2	quite pro- nounced	14.3	30.0
'4659	29.7	4.5	4.2	8.7	29.3	moderate	14.0	29.7
'4661	29.2	3.3	3.5	6.8	23.3	quite pro- nounced	(13.5) <sup>4</sup>	28.2
'4662	30.0	4.1	3.9	8.0	26.7	pro- nounced	14.5	30.5
Aver.:	29.6	4.4	3.9	8.2	28.3	—	14.0	29.8
Females.								
"y"	30.2	5.2	4.8	10.0	36.4	moderate	13.9	30.3
99/4107	30.1	4.0	3.7	7.7	25.6	slight	13.5	28.9
'4655	28.6	3.7	3.0	6.7	23.4	moderate	13.1	29.8
	near					quite pro- nounced		
'4656	29.2	4.9	4.9	9.8	33.6	quite pro- nounced	13.8	32.5
'4660	28.9	4.0	3.7	7.7	26.6	moderate	13.8	29.9
Aver.:	29.4	4.4	4.0	8.4	28.5	—	13.6	29.9
Young.								
99/4657	27.9	7.3 <sup>2</sup>	7.2	14.5	52.0	very slight	12.2	28.2
'4106	29.3	8.0 <sup>2</sup>	8.0	16.0	54.6	slight	12.9	29.5
'4658	29.5	7.5 <sup>2</sup>	7.5	15.0	50.7	moderate	13.1	29.2

<sup>1</sup> According to the Monaco agreement.<sup>2</sup> Only one line recognizable<sup>4</sup> Skull presents the greatest length of the series.
$$\frac{\text{Height} \times 100}{\text{Length} + \text{Breadth} + \text{Height}}$$

The data demonstrate that among the Southampton Island Eskimo the left temporal muscle, respectively its fascia, reaches almost generally higher, that is, nearer the sagittal suture, than the muscle of the right side; that the vertical extent of the *planum temporale*, barring individual exceptions, is less in the females than in the males; that it is decidedly smaller in the young than in the adults; and that both sexes among the adults present considerable individual variation in the size of these muscles.

The somewhat lower situation, with reference to sagittal suture, of the right temporal crest is, it was ascertained, often, though not invariably, associated with a perceptibly larger surface area, vertically, of the right side of the vault, giving a higher value to the right half of the transverse arc measurement, as will be seen in the underneath figures. Notwithstanding this, the height of the *planum temporale* averages slightly more in both sexes on the left than on the right, and if this slight difference in size extends to the volume and power of the muscle, which must be regarded as probable, it may explain the slightly greater bulging of the right side of the vault, as well as the frequently observed slightly greater protrusion of the left occipital region, associated with slightly greater length of the left cerebral hemisphere, which, on that side, might be of compensatory character due to the more restricted possibility of that half of the skull to grow in breadth.

Similar conditions in the above respects are found in Indians as well as in whites. Their exact significance cannot, of course, be definitely determined without further investigations directed to this subject.

The total surface distance between the superior temporal lines at the point of their closest approach anterior to the summit of the skull,<sup>2</sup> compared with the transverse arc gives rise to an index which has age, and also some racial, but, so far as this group goes, no decided sexual value.<sup>3</sup>

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<sup>1</sup> A. R. Anthony has shown by actual experiment on a dog that an early removal of the temporal muscle on one side is followed in the course of time by an excess of expansion of the vault on the side where the muscle is absent: "Introduction à l'étude expérimentale de la morphogénie; Modifications crâniennes consécutives à l'ablation d'un crotaphyte chez le chien etc." Bull. Soc. d'Anthropol. Paris, Vme Ser., IV, 1904, pp. 119-145. See also Anthony, R. and Pletkiewitz, W. B.—Nouvelles expériences sur le rôle du muscle crotaphyte, dans la constitution morphologique du crâne et de la face. C. R. Acad. Sc., Paris, tr. 149, 1909, p. 870.

<sup>2</sup> The temporal crest generally shows two localities of nearest approach to the sagittal suture, one a short distance posterior to the coronal suture and the other at a varying distance anterior to the lambdoid suture. Between these two points, above the parietal eminences and due to these, the crest very often dips slightly downward, away from the median line. The approximation is in many instances closest at the posterior approach of the crest to the suture, but the measurement at the anterior approach has the advantage of, greater distinctness on the whole, and the important possibility of comparison with the transverse arc, one of the standard measurements of the skull.

<sup>3</sup> J. Ranke determined, by closely related measurements and index, marked sexual and especially age differences in oranges: "Die überzähligen Hautknochen des menschlichen Schädeldachs," Abhandl. d. II. Cl. Akad. Wiss., München, XX, 1900, pp. 348-355.

ESKIMO CRANIA FROM SOUTHAMPTON ISLAND, COMPARISON OF THE  
TRANSVERSE ARC AND THE VERTICAL EXTENT OF THE PLANUM  
TEMPORALE, ON THE TWO SIDES.

Catalogue number	Right half of the transverse arc	Left half of the transverse arc	Greatest vertical surface extent of the right <i>planum temporale</i>	Greatest vertical surface extent of the left <i>planum temporale</i> <sup>1</sup>	Vertical temporal plane index height of <i>planum temporale</i> × 100 corresponding half of transverse arc	
					right side	left side

*Males.*

	cm.	cm.	cm.	cm.		
"z"	15.2	14.0	9.7	9.9	63.8	70.7
99/4102	14.2	14.3	10.1	10.9	71.1	76.2
'4104	15.5	14.6	11.1	10.8	71.6	74.0
'4652	14.6	14.8	10.0	10.2	68.5	68.9
'4653	15.1	14.7	10.5	10.7	69.5	72.8
'4654	15.3	14.9	10.8	11.0	70.6	73.8
'4659	15.1	14.6	10.4	10.3	68.9	70.6
'4661	14.6	14.6	11.1	11.0	76.0	75.3
'4662	15.0	15.0	10.9	11.1	72.7	74.0
Aver.	15.0	14.6	10.5	10.65	70.3	72.9

*Females.*

	cm.	cm.	cm.	cm.		
"y"	15.2	15.0	9.6	10.4	63.2	69.3
99/4107	15.1	15.0	10.7	11.1	70.9	74.0
'4655	14.7	13.9	10.8	10.8	73.5	77.7
'4656	?	?	?	?	?	?
'4660	14.6	14.3	10.8	10.9	74.0	76.2
Aver.	14.9	14.6	10.5	10.8	70.3	74.2

	cm.	cm.	cm.	cm.		
99/4657	13.9	14.0	6.6	6.8	47.5	48.6
'4106	14.6	14.7	6.7	6.7	45.9	45.6
'4658	15.1	14.5	7.2	7.4	47.7	51.0

<sup>1</sup> In the transverse arc line. The height of the muscle at this plane is only slightly less than its maximum height, which is generally reached a little more posteriorly.

This *temporal crest index* is decidedly smaller in the Southampton Eskimo than it is in the whites and moderately smaller than in the Indians. It averages, as could be expected, much more in the young than in adults; and, like the absolute height of the temporal muscle, it varies considerably in individuals.

The outline of the *norma verticalis* in the specimens under consideration, due to the only moderate protrusion of the parietal eminences, generally approaches the elliptical. It presents occasionally a rather characteristic feature in the squareness of the occiput, which is due to two dull elevations situated well above the external occipital protuberance and at some distance from the median line. The parietal eminence is invariably located in the middle of the free surface of the parietal from before backwards, and slightly below the middle in the vertical direction. Its moderate bilateral protrusion in these skulls is doubtless in part at least the effect of the powerful temporal muscles by which it is covered.

The frontal region is almost as a rule well arched and of good height. The rarity of sloping foreheads is in connection with the rather poor development in most of the specimens of the supraorbital ridges, and also with the fact that the frontal squama is in these skulls one of the parts offering less resistance than the parietes to expansion of the brain. An interesting feature is the frequently present single median, instead of a bilateral, frontal eminence.

In a number of these crania the temporal regions present a marked bulging anteriorly. This convexity usually involves a part of the adjacent sphenoid region and is due to the large development of the pole of the temporo-sphenoidal lobe of the brain.

The occiput, besides the occasional squareness referred to above, is characterized by slight to moderate protrusion, and by only a moderate roughness, indicating that the muscles attached to this part, particularly the *trapezii* and the *semispinales*, were not excessively strong.

Regarding additional characteristics of the vault, the supraorbital ridges have already been referred to partly. As the following tabulated details demonstrate, they are, as compared with those of average whites submedium in three and above medium in only one of the nine males, but on the other hand they approach masculine dimensions in two of the female specimens.

The mastoids, which ordinarily are among the most valuable aids to sexual identification, fail of this role in these Eskimo; they are in only two cases above what may be regarded as about the medium in whites of corresponding sex in the males, but are positively above such medium in the majority of the females, speaking for unusually developed sterno-cleido-mastoid muscles in the latter. A better acquaintance with the life habits

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND: ADDITIONAL FEATURES OF THE VAULT.

Catalogue number	Supraorbital ridges	Mastoids	Sutures: Serration	Obliteration	Sutural bones	Pterions
<i>Males.</i>						
"Z"	submedium <sup>1</sup>	about medium	quite simple	trace in left coronal above pterion	1 small in right squamo-mastoid angle	H-form, medium breadth
99/4102	medium	above medium	quite simple	nearly all coronal, anterior $\frac{1}{4}$ of sagittal, traces in lambdoid and temporo-occipitals	2 small in right lambdoid a few very small ones	H-form, medium breadth
'4104	medium	medium	submedium	most of coronal except about bregma, posterior $\frac{2}{3}$ of sagittal, uppermost part of lambdoid	1 moderate in each squamo-mastoid angle 1 small in left temporo-occipital	H-form, broad
'4652	medium	about medium	near simple	none	1 moderate in each squamo-mastoid angle	H-form, moderate breadth
'4653	submedium	medium	near simple	none	1 moderate in right naso-frontal	H-form, moderate breadth
'4654	submedium	medium	submedium	some in coronal, about temporal ridges; most of the middle $\frac{2}{3}$ of sagittal	3 small on each side in lambdoid	H-form, moderate breadth
'4659	medium	above medium	submedium	none	1 large epipteric on right	H-form, moderate breadth
'4661	medium	above medium	near medium	parts of all except temporo-parietal and temporo-sphenoidal	1 small in right lambdoid	H-form, medium breadth
'4662	somewhat above medium	medium	approaching simple	coronal: parts at and below temporal ridges	none 1 moderate in right squamo-mastoid angle	H-form, broad H-form, rather broad

<sup>1</sup> As compared to about the average in whites of same sex.



ESKIMO CRANIA FROM SOUTHAMPTON ISLAND: ADDITIONAL FEATURES OF THE VAULT. (Continued.)

Catalogue number	Supraorbital ridges	Mastoids	Sutures: Serration	Obliteration	Sutural bones	Pterions
<i>Females.</i>						
'y'	small	medium	submedium	none (basilar still open)	none	H-form, medium breadth
99/4107	small	moderate	submedium	coronal about temporal ridges, traces in sagittal	2 small in right lambdoid	H-form, medium breadth
'4655	above medium	large	somewhat submedium	none	1 small in right, 1 small and 1 moderate in left squamo-nas-toid angle	H-form, above medium breadth
'4656	above medium	above medium	submedium	none	1 medium in right temporo-occipital	H-form, above medium breadth
'4660	medium	above medium	submedium	whole coronal and sagittal, larger parts of others	none	H-form, medium breadth
<i>Young.</i>						
99/4657	none	short, stout	about medium	none	none	H-form, rather broad
'4106	mere traces	moderate	near medium	none	1 moderate in left coronal, 1 in right spheno-parietal, 3 in right lambdoid	H-form, rather broad
'4658	small	short, stout	submedium	none	none	H-form, rather broad

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND:

Catalogue number	Position (level) of petrous portions in relation to surrounding parts	Middle lacerated foramina	Styloids	Paramastoid processes	Posterior condyloid foramina
<i>Males.</i>					
'z"	moderately depressed	submedium <sup>1</sup>	rudimentary	—	normal
99/4102	moderately depressed	small	medium	small on right, non-articular	"
'4104	medium depressed	submedium	submedium	moderate on left, spinous, non-articular	"
'4652	moderately depressed	submedium	rudimentary	?	"
'4653	medium depressed	medium	right-left rudimentary	moderate non-articular on each side	"
'4654	medium depressed	medium	medium	—	"
'4659	submedium depressed	submedium	diminutive	small, non-articular on right	"
'4661	submedium depressed	medium	medium	do., on left	left occluded
'4662	submedium depressed	submedium	right small, left submedium	do., each side	normal
<i>Females.</i>					
'y"	but slight depression	submedium	left base only, right rudimentary	moderate, each side, non-articular	normal
99/4107	but slight depression	"	rudimentary	—	"
'4655	submedium depression	medium	submedium	—	?
'4656	?	?	?	?	normal
'4660	submedium	submedium	right small, left medium	—	left absent
<i>Young.</i>					
99/4657	no depression	small	rudimentary on right, only base on left	—	normal
'4106	" "	"	only bases	—	left very small
'4658	but slight depression	"	" "	small conical non-articular on left	right very small

<sup>1</sup> All comparisons refer to average whites.

## OBSERVATIONS ON BASE.

Jugular foramina	Pterigo-spinous foramina	Dehiscences (defects) in floor of auditory meatus	Miscellaneous
<i>Males. (Continued.)</i>			
right larger	complete one on each side	—	a transverse foramen in summit of each spinous process
nearly equal	tendency to pterigo- sphenoidal on left	small, each side	—
left larger	tendency to inferior, each side	—	median wall of spinous foramina large- ly deficient; deep pharyngeal fossa
equal	—	—	medial pterygoid plates small
left larger	—	—	
right larger	complete low one on right, no trace on left	—	wall of foramen spinosum on each side defective mesially
do.	tendency to a low one on left	small on right, pin-point on left	—
do.	—	—	—
do.	tendency to low one on left	—	—

*Females. (Continued.)*

left larger	—	—	—
right larger	tendency to pterigo- sphenoidal on left	—	spinous (alar) processes small, espe- cially on left, their place being taken by unusually developed processes arising from the petrous portions
left larger	some tendency to one on left	—	—
equal	?	small on right	—
right larger	small low complete on right, tendency to high one on left	—	left spinous process large

*Young. (Continued.)*

equal	—	—	—
right larger	tendency to pterigo- spinous each side; pterygo-sphenoidal on left	moderate, left side	—
left larger	tendency on each side to temporo-sphenoidal	do, each side	—

of the Eskimo females ought to furnish an explanation of this fact; it may, however, be only a local condition.

The principal sutures of the vault on the whole show much simpler serration than the average skulls of whites, closely approaching the Indian in this respect.

The obliteration of the sutures, externally, begins apparently in the coronal, below or about the temporal ridges. Here again there can be assumed some influence of the temporal muscles, consisting perhaps of an interference in growth of those parts of the articulating borders of the frontal and parietal bones which are covered by the same. Such effects are, however, by no means peculiar to this group or race of people. The lambdoid and the temporo-occipital articulation ossify late; and the same is true for temporo-parietal. It is noteworthy that none of the skulls in this series comes from a really aged individual.

Sutural (Wormian) bones are scarce, and those that are present are mostly small and unimportant.

The pterions (spheno-parietal articulations) are all of good breadth and there is no perceptible tendency in any case towards a temporo-frontal articulation.

The base of the skull shows, in general, a rather flat and broad basilar process, petrous portions stout anteriorly, spacious glenoid fossae, and a development of the various processes, excepting the styloids, indicating strong musculature. Certain detailed notes have been tabulated, and from them it appears that the relative position of the petrous portions and the dimensions of the *foramen lacerum medium* approach, due to the good development of these skulls in size, the condition of these features in the whites. Small or no relative depression of these parts goes generally hand in hand with a small size of the middle lacerated foramen and both are signs of a lack of a higher grade of brain development, and are characteristic of the skulls of the young and of the lower (mentally less active) races.<sup>1</sup> The styloids are only exceptionally well developed. A number of the specimens present a more or less pronounced tuberosity at the point of insertion of the *rectus capitis lateralis* (paramastoid process). The posterior condylic foramina, which each transmit a vein to the lateral sinus, and one of which is often occluded in the whites, are both present in all but two cases. The jugular foramen is eight times larger on the right and five on the left side while in four cases the size of the canals on the two sides is about equal. Pterygo-spinous foramina in a complete form are un-

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<sup>1</sup> See writer's notes on the subject in *Science*, XIII, N. Y., 1901, p. 309; in *Proc. Ass. Amer. Anatomists*, *The Amer. Jour. of Anat.* I, 1901-2, pp. 508-9; and in the Report on an Additional Collection of Skeletal Remains from Arkansas and Louisiana, *Jor. Acad. Nat. Sci.*, Philadelphia, XIV, 1909, pp. 204-'5, and in other of his late publications.

usually frequent.<sup>1</sup> Defects in the floor of the auditory canal, which represent an infantile condition, are uncommon. Of the few miscellaneous anomalies none is important.

The inclination of the foramen magnum is such that its long axis, extended, in a large majority of the cases reaches the immediate neighborhood of the nasal spine; in a few the line passes well above the spine.

The upper alveolar arch and the palate present several interesting conditions. The arch is unusually broad in the region of the molars. As a result of this, its outer boundary presents a more or less circular outline, while the palate is U-shaped or slightly elliptical. A rather curious fact is that nearly one half of the adult skulls show patent and in some instances large remnants of the premaxillary sutures. (Plate XXIII, Fig. 1.)

In regard to the facial parts, the *nasion depression* varies in the adults from well marked to shallow. The *nasal bones* are decidedly narrow in their upper third, and the nasal bridge is in consequence never high, though in some cases the arching is fairly acute.

The *interorbital breadth* (measured between the dacryons) stands in no constant relation to the breadth of the nasal bones; it averages in the nine males 22.5 (19–24.5) mm. and in four of the females 22 (21.5–23) mm. In the female skull ('4655) where there is an absence of the nasals, the interorbital breadth is 21.5 mm., and in the child ('4106) where the smallest minimum breadth of each nasal bone is but 1 mm. the interorbital diameter is 18.5 mm. On the other hand, the male skull ('4654) which has the broadest nasal bones of the whole series, gives the interorbital distance of only 21.5 mm. It is evident that the nasal processes of the superior maxillae are broadened in these specimens and occupy the space which ordinarily is taken by the nasal bones. This is doubtless in the main compensatory, and the narrowness of the nasal bones is to a large extent hereditary and closely connected with the narrowing of the whole nasal aperture. Yet it is probable that a functional enlargement of the nasal process of the superior maxilla on each side, connected with the strength of the whole bone and due to its extraordinary use in these people, takes place irrespective of its compensatory enlargement, and exerts an additional influence towards narrowing of the nasal bones.

The *nasal process* of the frontal bone appears to be occasionally somewhat

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<sup>1</sup> There are three distinct foramina which may occur in this region, namely, a superior and an inferior one constituted by a spine arising high or low from the lateral pterygoid plate and uniting with a bony prolongation from the alar spine, or, occasionally, when the alar spine is not well developed, with a process arising from the posterior wall of the foramen ovale; and a pterygo-sphenoidal foramen, formed by a bony septum stretching from the inferior part of the lateral pterygoid process to the surface of the sphenoid anteriorly to the foramen ovale.

## ESKIMO CRANIA FROM SOUTHAMPTON ISLAND:

Catalogue number	Nasion depression	remarks	Nasal bones smallest diameter right	mm. mm. left	Nasal bridge	Inferior borders of nasal aperture
<i>Males.</i>						
"z"	moderate	narrow	mm. 3.0	mm. 3.0	moderate	sharp
99/4102	well marked	very narrow	2.0	2.5	"	"
'4104	medium	narrow	3.5	3.5	fairly well developed	dull
'4652	well marked	"	2.5	3.0	quite low	very dull, approach to simian gutters
'4653	submedium	quite narrow	4.0	4.0	submedium	somewhat dull, well marked subnasal fossae
'4654	"	do.	5.5	5.0	"	large simian gutters
'4659	medium	quite narrow	3.5	4.0	moderate	somewhat dull, tendency to subnasal fossae
'4661	"	do.	4.0	4.0	"	dull, on left tendency to gutter
'4662	"	narrow	3.0	3.5	submedium	somewhat dull
<i>Females.</i>						
"y"	none	narrow	3.0	3.0	low	somewhat dull
99/4107	moderate	quite narrow	4.0	4.0	submedium	somewhat dull, with a tendency to subnasal fossae
'4655	well marked	absent for 7 mm. from nasion then a 4 mm. long narrow groove, which may have held a rudimentary bone			low	somewhat dull
'4656	medium					
'4660	moderate	quite narrow	4.0	4.0	submedium	dull
<i>Young.</i>						
99/4657	scarcely any	narrow	3.5	3.0	low	dull
'4106	slight	very narrow	1.0	1.0	"	fairly sharp; tendency to subnasal fossae
'4658	medium	narrow	3.0	3.5	submedium	dull

## FACIAL PARTS.

Anterior nasal spine	Alveolar prognathism	Orbital borders	Malars	Zygomae	Suborbital ("canine") fossae
<i>Males. (Continued.)</i>					
no height, small protrusion	quite marked	rather sharp	antero-inferior angle protruding, posterior incisure each side	broad	right very slight, left absent
no height, grooved, moderate protrusion	" "	moderately sharp	antero-inferior angle somewhat protruding	well developed	right submedium, left medium
submedium	moderate	rather sharp	do.	medium	moderate
depression in its place, a slight protrusion	pronounced	moderately sharp	do.; strong	strong	shallow
no height, submedium length	quite well marked	sharp	do.; large; posterior incisure each side	quite strong	well marked
submedium	very pronounced	moderately sharp	do.	" "	moderate
no height, submedium length	pronounced	do.	do.	strong	"
submedium	quite well marked	do.	do.	broad	well marked
depression in its place, but a fair projection forward	moderate	dull	do.; rather large	quite strong	shallow
<i>Females. (Continued.)</i>					
small	quite marked	sharp	antero-inferior angle slightly protruding	medium	very shallow
"	pronounced	"	do.	"	well marked.
submedium	"	moderately sharp	antero-inferior portions prominent	"	" "
little height, fair projection	pronounced	slightly dull	antero-inferior portions strong and protruding	above medium	quite deep
<i>Young. (Continued.)</i>					
only small height, moderate protrusion	trace	sharp	antero-inferior angle projecting downward and little forward	moderate	none
no height, moderate protrusion	moderate	"	do.	"	fairly well marked
no height, small protrusion	well marked	moderately sharp	do.	medium	shallow

longer than in the whites and some other races. It measures, from a line connecting the uppermost points in the superior boundaries of the two orbits (exclusive of the notch of the supraorbital foramen) to nasion, in the average 9.5 (6.5–12) mm. in the adult males, 10.4 (8–12.5) mm. in the adult females, and 11.7 (10.5–13.5) mm. in the young. According to these measurements the nasal process is absolutely, and especially in relation to the facial height, shortest in the males, somewhat longer in the females, and longest in the young. These conditions are due to the relative height of the orbits in these three groups, and to the differences in the development of the frontal sinuses and the supraorbital ridges; according to the writer's experience, they are not peculiar to the Eskimo.

The fronto-nasal suture contains in '4104 one moderate and two small sutural bones, and in '4652 one moderate ossicle of that nature. Besides these, skull '4658 shows a moderate Wormian in the lower end of the remnant of the metopic suture.

The inferior borders of the nasal aperture are in a large majority of the cases more or less dull, and three of the males show more or less developed simian gutters, while several other specimens present mostly in an imperfect form, the nearly equivalent subnasal fossae.

The anterior nasal spine in none of these skulls attains the dimensions which it presents in average cases in whites. The defect involves particularly its height.

The alveolar prognathism is in most of the specimens well manifest; it is due, of course, to the size and alignment of the teeth.

The borders of the orbits are generally sharp or fairly so. The supra-orbital foramen is complete on both sides in five of the seventeen skulls and complete on one side in five additional ones. There are dorsally two foramina, one large and one smaller, in four skulls or seven instances. In eight crania (15 instances) there is seen within the external mouth of the supraorbital foramen an opening of a canal penetrating into the frontal bone.

The infraorbital foramen or canal is accompanied by a smaller canal, situated more superiorly and nearer the median line, in seven skulls or nine instances. The accessory foramen is more frequent on the left side (both sides 2, right only 1, left only 4).

The malar bones are generally large, strong, and prominent at their antero-inferior angle. The latter feature, in which the adjacent process of the superior maxilla participates, is due to the attachment of apparently powerful masseters. The tuberosity is rather deficient. The marginal process, while well marked, is in no case excessive. The zygomæ average in strength and breadth above the medium in whites. In connection here-with the supramastoidal crest is generally rather pronounced.



The suborbital fossæ vary from absent or nearly so to well marked. On the whole, the face is more flat than in the whites or Indians.

The lower jaw presents a moderate to fairly prominent, and not rarely square chin, medium height, very strong build, and broad ascending branches. A marked and general feature is a pronounced bony reinforcement of the alveolar arch extending above the mylo-hyoid line from the canines or first bicuspid to or near the last molars. This physiological hyperostosis presents more or less irregular surface and is undoubtedly of functional origin, the result of extraordinary pressure along the line of teeth most concerned in chewing, yet its occurrence in infant skulls indicates that at least to some extent the feature is already hereditary in these Eskimo.

A remarkable individual variation, due to a great development and activity of the masseter muscles, has taken place in the male lower jaw 99-4661. The attachments of the muscles have not only ridged the external surface of the ascending ramus (four parallel nearly vertical lines on the right, three on left), but they effected a very marked eversion or flaring of the angles of the jaw and secondarily produced a pronounced obliquity of the horizontal rami in the vertical direction. (Plates x, xi.) The coronoid processes of this jaw are very thick (8 mm. at the distance of 12 mm. from the extremity), indicating equally powerful temporal muscles.

The *teeth* present but one instance of a developmental defect and none of excess in numbers. Notwithstanding the exclusive flesh diet of the people, they show slight to pronounced wearing off, according to the age of the individual. In size, they are generally slightly larger than the average teeth of whites. The sockets of the upper molars are markedly oblique. The cuspid formulæ and arrangement resemble, so far as determinable, those of the whites. The only anomalies are a case of diminutive last molar, a case of congenital absence of one of the upper bicuspid, two instances of displacement of a tooth backward and inward, and one of a partial turning of the upper canines, due to slight crowding on their axis.

As to pathology, there is not the slightest trace of caries. Nevertheless some teeth were lost in life. In thirteen upper adult jaws such losses comprise two median and one lateral incisor, one canine, one posterior bicuspid, two first, three second and two third molars, while in eight lower jaws there were one median and one lateral incisor, one anterior bicuspid, two posterior bicuspid, three first, two second and one third molar. In the majority of these instances there are more or less marked signs of suppuration about the roots of the lost teeth.

## ESKIMO CRANIA FROM SOUTHAMPTON

Catalogue number	Prominence of chin	Lower Jaw: Buccal reinforcement	Other peculiarities	Teeth: Dentition
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*Males.*

"z"	moderate	moderate, canines to 3rd molar	shallow notch; slightly asymmetric	32
99/4102	medium	do. 1st bicuspid to 3rd molars	chin somewhat square	31
'4104	"	slight, do.	uncommonly slender for an Eskimo	probably 32
'4652	?	?	?	upper 16
'4653	?	?	?	" 16
'4654	moderate	?	?	" 16
'4659	"	pronounced, canines to 3rd molars	chin square	32
'4661	medium	pronounced, do.	great flaring of angles and obliquity, from above downwards, of rami	probably 32
'4662	moderate	moderate, do.	—	32

*Females.*

"y"	moderate	moderate, lateral incisors to 3rd molars	chin square, ends of square line each marked by a tubercle; somewhat asymmetric	32 (last molars not fully erupted)
99/4107	?	?	?	upper 16
'4655	?	?	?	" 16
'4656	?	?	?	?
'4660	quite pronounced	quite marked, 2nd bicuspid to 3rd molars	chin pointed	32

*Young.*

99/4657	moderate	well marked, opposite 2nd bicuspid	—	all teeth of 1st dentition, with all 1st molars of 2nd
'4106	"	well marked, 1st bicuspid to 2nd molars	eversion of angles already distinct; chin square	2nd molars at level of their sockets
'4658	?	?	?	all permanent teeth except last molars

## ISLAND: LOWER JAW.

Teeth:		Size	Cuspid formulae of molars	Anomalies
Wear				
Males. (Continued.)				
very slight	slightly above average	upper	{ r. 4, ? irreg.	—
advanced	do.		{ l. 4, ? irreg.	1st upper left bicuspid congenitally absent
medium	medium		?	—
slight	slightly above average	upper	{ r. 4, 4, 3	—
"	medium		{ l. 4, 4, 3	—
?	?		?	—
—	slightly above average	u.	{ r. 4, ?, ?	left lateral upper incisor displaced backward and inward
			{ l. 4, 4, ?	
advanced	?	l.	{ r. 5, 5, ?	—
			{ l. ? 4, ?	—
slight	slightly above average		?	right upper 1st bicuspid displaced backward and inward

*Females. (Continued.)*

—	slightly above average	u.	{ r. 4, 3 + two $\frac{1}{2}$ , irreg.	—
			{ l. 4, 3 + " "	
slight	medium	l.	{ r. 5, 5, irreg.	canines partly turned on their axis
moderate	"		{ l. 5, 5, "	
?	?	u.	{ r. 4, 3 $\frac{1}{2}$ , ?	—
slight	medium		{ l. 4, 3 $\frac{1}{2}$ , irreg.	?
			?	—
		u.	{ r. 4, 4, ?	
			{ l. 4, 4, ?	

*Young. (Continued.)*

—	medium	u.	{ r. 4, — —	—
			{ l. 4, — —	
		l. ?		
—	"	u.	{ r. 4, 4, —	—
			{ l. 4, 4, —	
		l.	{ r. 5, ? —	
			{ l. ?, ' —	
—	"	u.	{ r. 4, 4, ?	—
			{ l. 4, 4, ?	
		l. ?		

1 Compared to whites of same sex.

## CONCLUDING REMARKS.

The series of skulls under consideration has shown many unusually interesting points. A few of these appear to be local peculiarities, but the majority belong to the characteristics of the Eskimo in general. Among the former are the extraordinarily large, even for Eskimo, face and also vault; while the latter include foremost the whole large and important complex of structural modifications, some already hereditary and some individual, which are the result of the great development and use of the temporal muscles and other muscles of mastication, which in turn are the results of the kind and quantity of food. After a thorough consideration of the subject of differentiation of the Eskimo cranial type, it is impossible to arrive at a different conclusion than that the main cause of this lies primarily in the food of the people. Climatic influences have doubtless played their part also; extreme cold is a powerful stimulus which in a human organism calls forth far-reaching reactions and these, continuing, must result in structural accommodations; but the exact effects of these influences on the skull are as yet difficult to define. The size of the cranial cavity (respectively the brain), and the narrowness of the nasal aperture are the two most probable effects of the climatic agencies. The narrowing of the nasal bones is doubtless favored by the narrowing of the nose, but its main cause appears to be the strengthening of the frontal process of the superior maxilla.

The rarity of pronounced dolichocephaly precludes any considerable recent blood relation with the Eskimo from Labrador or lower Greenland.

In conclusion, it may be remarked that the Southampton Island, and all other Eskimo crania present absolutely no racial affinity with either the diluvial or posterior European crania and their comparison, except for contrasts, should once for all be abandoned. The kinship of the Eskimo, is with Asia and America.

It is very regrettable that the collection here described is restricted to crania, for the chances of further gatherings from the Island are very remote. The neglect of the other skeletal parts by collectors is surely a cause of a loss of many data of scientific importance.

## ESKIMO CRANIUM FROM LYON INLET, MELVILLE PENINSULA.

This is a remarkable specimen and was also collected by Captain George Comer, during his 1907-'9 trip. It was found in a surface stone grave. It was broken, and with it was another skull, smaller and still more damaged. The latter was not collected, and the same applies to other bones of the skeletons. Buried with the bodies was a fine piece of serpentine. The region is frequented by the Aivilirmiut, but according to Captain Comer, it was the general opinion of the natives that the bones were not those of individuals of their tribe, but belonged to people who inhabited the country before them.

The skull under consideration came to the writer in several pieces, from which, fortunately, a partial reconstruction was possible. The lower jaw is complete. All the parts show thorough bleaching, due to long exposure to the elements, but there is nothing that would point to any real antiquity. The cranium is that of a man between fifty and sixty years of age and is one of the most pronounced and characteristic representatives of a male Eskimo skull. It is one of the two normally most scaphoid skulls of which the writer has thus far any knowledge, being slightly exceeded in this respect by a Smith Sound skull described in the latter part of this paper, and its lower jaw is one of the broadest on record. Its tribal identity cannot be easily determined, for we know next to nothing in regard to the Melville Peninsula tribe. Compared with the Southampton Island crania, it differs markedly from the average, though it resembles one of the series, namely the exceptional male skull (99-4661). In general, its type approaches that of the Eastern Eskimo, i. e., those from Cumberland Sound, Greenland, or Labrador.

*Description and Measurements.* The skull had a good, though not excessive, capacity. The walls of the vault are thin. It is dolichocephalic and of fair, not great, height. The face was high and broad, the orbits spacious, the nose high and moderately broad, the upper alveolar process decidedly prognathic. The lower jaw is not very high at the chin, but is massively built, has broad ascending rami and presents great breadth at the angles.

The supraorbital ridges are prominent, but not unduly massive, and extend over the median three-fifths of the supraorbital space. The glabella lies in a slight depression. Above the ridges is a moderate concavity on each side, and above this extends a rather low and sloping frontal squama. There is only a single median frontal eminence, and the surface from the

same to the lateral frontal process on each side is quite flat. From the median eminence rises a median elevation, which reaches to and becomes continuous with a pronounced sagittal elevation, the two giving the skull a very marked scaphoid appearance. As the examination of the ventral surface of the skull shows, this fronto-sagittal keel is due in a considerable degree to a median thickening of the bones, yet there is also a more than usual acute ventral arching of the parietals. As in all Eskimo skulls of the before-described series, the fronto-sagittal elevation reaches and ends a little beyond the summit of the skull, the posterior two-fifths of the sagittal suture running through a long, somewhat triangular, flat space. Notwithstanding the median thickening of the bone, the fronto-sagittal crest is smooth. It is approached extraordinarily closely, even for an Eskimo, by the superior temporal lines, the right of which reaches 22 mm. back of the bregma, to within 14 and the left to within 7 mm. of the sagittal suture. The sagittal elevation is doubtless again due to the extent and power of the temporal muscles. The temporal plane is not only excessively high, but it also extends, particularly on the right side, over the middle of the middle third lambdoid suture on to the occipital bone. On the right side where this extension is more distinct it measures, antero-posteriorly, 11 mm. On Plate XVIII, Fig. 1, the writer shows an Eskimo skull from the collections of the U. S. National Museum, in which a similar extension on to the occipital squama can be distinctly seen in the photograph and amounts, antero-posteriorly, to 22 mm.

The parietal eminences are very moderate and the outline of the norma verticalis is elliptical. The occipital extremity of the same is pointed, due to a prominent external occipital protuberance. The whole rear part of the skull protrudes in a somewhat dull pyramidal form, which characteristic is often seen in a pronounced form among the Eastern Eskimo. In this feature again, including the prominent occipital protuberance, this skull is like no. '4661 from Southampton Island, but differs from all the other specimens from that locality. (Plate XIV.)

Besides the peculiarities just named the Lyon Inlet cranium presents a protruding, though dull, occipital crest.

The temporal regions were rather full. The mastoid processes show fair masculine dimensions. The foramen magnum is large, as in the other Eskimo skulls dealt with in this report.

The face is very high and was also very broad. The height of the upper face (8.0 cm.) exceeds even the high maximum from Southampton Island; as to the breadth, a half-diameter, from the right zygomatic arch to the middle line of the base, amounts to 7.4 cm.; the left zygoma is wanting.

The nasion depression is well marked; the nasal bones are character-

istically narrow, the bridge small, the aperture high and moderately broad, the spine submedium, the borders dull, on the right a moderate subnasal fossa, the orbits are spacious, with fairly sharp borders; the suborbital fossae are uncommonly well hollowed out; the upper alveolar process is high and prognathic, the arch externally elliptical, internally more U-shaped and long; the teeth were apparently slightly larger than the average in whites, and were moderately worn off, their number and position being regular.

The lower jaw as a whole is very strong: the chin is moderately high; the alveolar process is reinforced on each side by a considerable ventral thickening, in this case quite regular, extending from the canines to the second molars; the vertical rami are very broad; while the horizontal rami and particularly the inferior portions of the vertical branches present a marked obliquity from above downwards, so that the lower border of the bone shows at all points, but especially at the angles, much wider separation than the upper. Thus, at the line of the second molars, the superior breadth, between the centers of the teeth, is 5.7 cm., while the inferior diameter at the same vertical plane, between points in the middle of the lower border, is 8.6 cm. In this extraordinary flaring, which is due to the powerful masseters, this specimen again closely resembles the before-mentioned skull '4661 from the series described in the first part of this paper. (Plate xv.)

The base is rather flat; it is very defective. The long axis of the foramen magnum passes 4.3 cm. below the nasion.

The conclusions that the above results of the examination, and the measurements of the Lyon's Inlet skull enable the writer to form, are:— The specimen is unquestionably Eskimo, and of no great antiquity. It is of a distinct type from that prevailing among the Southampton Islanders, though it resembles closely an exceptional cranium found on that island. In so far as it differs from the average type of the group just mentioned, it seems to approach the Labrador and other Eastern Eskimo. The question as to whether it is extraneous to the locality where found cannot be answered definitely before we possess more knowledge regarding the Aivilirmiut but the physical evidence rather favors the assumption. Nevertheless, marked dolichocephalic crania occur even among the Alaska Eskimo and cannot, so far, be regarded as outside of the range of individual variation, and due at least partly to an extraordinary and probably early development of the muscles of mastication.

The principal *measurements and indices* of this highly interesting Lyon Inlet cranium are as follows:—

	cm.
Diameter antero-posterior maximum .....	19.6
"    lateral maximum, approxim .....	13.7
<i>Cephalic index</i> , about .....	70.0
Basion-bregma height .....	13.6
<i>Height-length index</i> .....	69.4
<i>Height-breadth index</i> , near .....	101.0
Cranial module (mean diameter) .....	15.63
Circumference maximum above ridges .....	52.5
Nasion-opisthion arc .....	36.9
Thickness of left parietal above and along squamous suture .....	2 to 4 mm.
	cm.
Total facial height .....	12.8
Upper facial height .....	8.0
Basion-nasion diameter .....	11.4
Diameter frontal minimum .....	9.5
"    "    maximum .....	11.1
Orbits: right, height .....	3.9
"    "    breadth .....	4.3
"    " <i>index</i> .....	90.70
Nose, height .....	5.4
"    breadth .....	2.45
" <i>index</i> .....	45.0
Palate, external length (Turner) near .....	5.5
"    "    breadth "    " .....	6.2
Mean diameter of foramen magnum .....	3.8
<i>Lower jaw</i> : diameter bigonial .....	13.1
height of symphysis about .....	3.7
smallest breadth of ascending ramus .....	4.3
greatest thickness of horizontal rami (opposite bicuspid) .....	1.7
angle .....	115°

#### AN ESKIMO SKULL FROM AN ISLAND IN FROZEN STRAITS.

The body of water known as Frozen Straits separates Southampton Island on the north northeast from Melville Peninsula and some islands belonging to the same. On one of these islands Captain Comer collected a female skull (99-4103), which is now in the possession of the Museum.

The specimen, which proceeds from a woman of not more than thirty-five years of age, is mesocephalic, with a high and quite markedly scaphoid vault. The face is only moderately high and not as flat as in many of the Eskimo. The orbits are relatively somewhat wide and low, the nose is narrow. The suborbital depressions are rather pronounced, the nasal spine is limited to a moderate horizontal protrusion, the upper alveolar process shows a marked slant and the chin but slight prominence.



The supraorbital ridges are small, but the mastoids are well developed for a female. The forehead is well arched; it shows a median as well as two small lateral eminences. The medio-frontal elevation begins 3 cm. above nasion and as it proceeds backward becomes gradually quite prominent. It is continuous with a similar sagittal elevation, which however, soon begins to diminish in height, and ends entirely before reaching the obelion. The parietal eminences are fairly well marked. The temporal crests do not run especially high, reaching (the superior line) on the right to within 43, and on the left to within 40 mm. of the sagittal suture; nevertheless, this is a considerably greater vertical extent of the muscles than the average in the females of whites and the condition may well be assumed to have exerted a considerable, though in this instance perhaps not exclusive, influence in the formation of the keel-shaped vault of the specimen. The occiput is somewhat square from above, protruding but little. The outline of the *norma verticalis* approaches the elliptical.

The base is quite flat. The petrous portions are only slightly depressed, and are stout anteriorly, as is common in the previously-described series of Eskimo skulls; the middle lacerated foramina are submedium. There are no styloids, but only deep situated small bases; the glenoid fossæ are deep, especially those of the left side; the median walls of both spinous foramina and that of the right *foramen ovale* are defective; the jugular canals are about equal in size on the two sides; the condyloid foramina are all normal. The *foramen magnum* is not large, and from the middle of the ventral part of its anterior border a spine, 3 mm. long, projects into its lumen. The palate is rather deep, somewhat U-shaped, while the external outline of the upper alveolar arch is elliptical. The pterygoid plates are poorly developed.

The lower jaw offers several points of interest. The ascending rami are disproportionately broad, the condyles disproportionately high — the tip of the right coronoid process being 5.8 cm., the uppermost part of the condyle of the same side 6.7 cm. above the horizontal. The angles are very perceptibly inverted, so that while the diameter between the middle of the ascending rami measures 9.8 cm., the bigonial line is only 9.2 cm. The jaw is also asymmetrical, the upper part of the right ascending branch inclining somewhat towards the median line while that on the left inclines a little away from the same. The cause of the last-named condition is not perceptible, the base of the skull being quite symmetric and the lower dental arch normal. The usual internal reinforcement of the dental arch is but little developed.

The teeth are of moderate size and only slightly worn. The dentition has been normal, there are no abnormalities or disease of the teeth and none of these have been lost in life.

## MEASUREMENTS AND INDICES.

Capacity.....	1380cc.
	cm.
Diameter antero-posterior maximum.....	17.6
"    lateral                    ".....	13.7
<i>Cephalic index</i> .....	77.8
Basion-bregma height.....	14.05
<i>Height-length index</i> .....	79.8
<i>Height-breadth index</i> .....	102.6
Cranial module (mean diameter).....	15.12
Circumference maximum above ridges.....	50.1
Nasion-opisthion arc <sup>1</sup> .....	36.2
Transverse arc <sup>2</sup> .....	29.8
Thickness of left parietal above and along squamous suture.....	4 to 5 mm.
	cm.
Total facial height.....	11.0
Upper " ".....	6.8
Diameter bizygomatic maximum.....	13.8
<i>Total facial index</i> .....	79.7
Upper " ".....	49.3
Diameter frontal minimum.....	9.3
"    "    maximum.....	11.2
Orbits: right, height.....	3.5
left, ".....	3.45
right, breadth.....	4.2
left, ".....	4.2
<i>Orbital index</i> —right 83.3, left.....	82.1
Nose, height.....	4.85
"    breadth.....	2.1
<i>Nasal index</i> .....	43.3
Smallest breadth of nasal bones, right 2.5, left 5 mm.	
Basion-alveolar point diameter.....	10.5
"    infranasal point (middle of nasal notches) diameter.....	9.4
"    nasion diameter.....	10.5
<i>Index of facial prognathism</i> <sup>3</sup> .....	70°
<i>Index of alveolar prognathism</i> .....	52°

<sup>1</sup> Nasion-bregma 13.0, bregma-lambda 10.6, lambda-opisthion 12.6 cm.

<sup>2</sup> Smallest distance of superior temporal lines along the transverse arc: 8.4 cm., percental relation of this to the transverse arc: 28.2. Vertical temporal plane index ( $\frac{\text{height of planum temporale} \times 100}{\text{corresponding half of transverse arc}}$ ) is right 71.1, left 72.6.

<sup>3</sup> The angle between the basion-alveolar point and the basion-nasion lines. The term *basi-facial*, which the writer employed for this particular facial angle (Report on an Additional Collection of Skeletal Remains from Arkansas and Louisiana, J. Acad. Nat. Sci. Philadelphia, XIV, 1909), he found to be preoccupied. It was applied by Ranke to the percental relation between the basilar suture-alveolar border line and the basilar suture—to the most distant point on the occiput diameter (J. Ranke, Beiträge zur physischen Anthropologie der Bayern, II, München, 1892, p. 23.)

	cm.
Palate, external length (Turner).....	5.15
“ “ breadth “ .....	6.1
“ index.....	118.5
Mean diameter of foramen magnum .....	3.25
Lower jaw: diameter bigonial.....	9.3
“ bicondylar.....	12.1
height at symphysis.....	3.2
smallest breadth of ascending rami, right 4.4; left .....	4.3
maximum thickness of horizontal rami .....	1.55
angle, right 108°, left 106°.	

*Concluding Remarks.* The specimen bears a general resemblance to the Southampton Island crania, but presents also some individual or tribal differences. The vault is extraordinarily high for a female, and that both absolutely as well as in relation to the other cranial measurements. On the other hand, the upper and particularly the total facial height is rather low. A similar condition in regard to the facial height was seen, in even a higher degree, in no. 99-4655 from Southampton Island; that skull, however, presented also a low vault. In regard to the other measurements, the orbital and nasal height, the dimensions of the palate, the height and bicondylar breadth of the lower jaw and the size of the foramen magnum, are all near the lowest values obtained among the Southampton Islanders; but the various indices agree quite well with those of that series. In view of these facts, the skull must be classed as one of the same general type, but possessing numerous exceptional features, possibly due to its coming from an individual of sub-average body development.

#### CRANIUM FROM AN ISLAND IN REPULSE BAY.

This is still another specimen collected for the Museum by Captain George Comer. It is a skull of an adult female, and is apparently slightly abnormal, for with teeth indicating a young person, there is more or less occlusion of the nasal, coronal, sagittal, and lambdoid sutures. In addition to this, it presents so many characteristics that are unlike those of the ordinary full-blood Eskimo, that it had better be left out of consideration. It is either a very exceptional Eskimo, or, what is more probable, it is a white-Eskimo, mixed blood. The principal peculiarities of the specimen are as follows:—

It presents a rather low vault (basion-bregma 13.2 cm.), which at the same time is but slightly scaphoid. The parietal eminences are quite pro-

nounced. The temporal crests are 7.9 cm. apart at their nearest approach, but the absolute vertical extent of each temporal plane is less than that of a majority of the female skulls described in this paper.

In contrast to the vault, the face is extraordinarily high (total 11.9, upper 7.8 cm.); it is narrow (d. bizygomatic maximum about 12.5 cm.), and protruding, with rather narrow orbits, high nasal bridge with quite well developed nasal bones, very narrow nasal aperture, marked alveolar prognathism, narrow dental arches (greatest external breadth 5.9 cm.), prominent chin and only moderately strong lower jaw. The specimen is moderately dolichocephalic (cephalic index 73.6), and gives the capacity of 1360 cc.

#### OBSERVATIONS ON BODIES AND SKELETONS OF ESKIMO FROM SMITH SOUND.

The Smith Sound natives are the northernmost contingent of the Eskimo. Discovered in 1818 by Captain John Ross,<sup>1</sup> they were visited from time to time by other explorers, in recent years particularly by Peary, and their crania, collected in a large number by Hayes, were studied and reported on by E. Bessels.<sup>2</sup> Unfortunately, the latter's data are incomplete, his manuscript having been destroyed by fire.

The group numbered in 1897, according to Peary,<sup>3</sup> two hundred thirty-four individuals. Two years previous there were two hundred fifty-three, one hundred forty males and one hundred thirteen females. The rapid diminution occurred through an epidemic, otherwise the births somewhat exceeded the deaths. The preponderance of males over females is exceptional, occurring in no other Greenland tribe of people.<sup>4</sup> Notes on the stature and body development of the Smith Sound natives will be found in Bessels and especially in Peary,<sup>5</sup> the latter also giving a number of good illustrations. The stature ranges in men from a decidedly sub-average to nearly six feet, and they are "generally well built, plump and rounded in figure, and deceptively heavy."

In 1896 Lieutenant Peary brought six of the Smith Sound natives to New York, and they were housed in the Museum. However, scarcely had

<sup>1</sup> *Voyage in Search of North-West Passage.* 2 vol., 8vo., London, 1819.

<sup>2</sup> *Einige Worte über die Inuit (Eskimo) des Smith Sundes, nebst Bemerkungen über Inuit-Schädel.* Archiv. f. Anthropologie, VIII, 1875, pp. 107-122; also, in part, in his "Die Amerikanische Nordpol-Expedition, 1 vol., 8°, Leipzig, 1879, p. 350 et seq.

<sup>3</sup> *Northward Over the Great Ice*, vol. I, N. Y., 1898, pp. 511-514.

<sup>4</sup> For additional details, habits and bibliography, see A. L. Kroeber, *The Eskimo of Smith Sound*, Bull. Amer. Mus. Natural History, pp. 265-327.

<sup>5</sup> *Ibid.*, p. 479 et seq.

they arrived when the majority of them began to cough and became infected with the bacillus of tuberculosis. Within less than nine months four of them died from acute phthisis, one had to be sent back, the same fate threatening, and one, a boy of about eight at that time, after having been adopted and brought up in New York and after having passed through the initial stages of lung, as well as light grades of gland and skin tuberculosis, was, at his demand, also sent back to his native country.

These six individuals the writer was able to examine during life and, in one instance, immediately after death; he further secured and described the brain of one of the men and made a preliminary report on the others, which were subsequently reported upon in detail by Spitzka. Finally, he was able to examine the skeletal remains of the four who died, as well as several additional skulls and skeletons collected in later years in the Smith Sound region by Mr. Peary. The results of these various observations are here recorded.

*The Living.* The party consisted of, 1., an elderly man (Nooktah or Nuktan); 2., a middle-aged man (Kishu, Kissuk or Kessuh); 3., a young man (Yaragapsuk or Ujaragapsuck); 4., an elderly woman (Atana or Atangana); 5., a girl of about twelve (Aviag), daughter of 1. and 4.; and 6., a boy of about eight years of age (Minnie or Minik), son of 2. For convenience, these individuals will be referred to simply under the numerals. Number 2 was examined post-mortem.

*Description of the Living.* When the Peary party of Smith Sound Eskimo arrived in New York, they were remarkable in the main for two features: one, the decidedly red color of their faces and the other, their pleasant facial expression. The facial red was somewhat dusky and altogether characteristic for these people. It was most pronounced over the upper parts of the cheeks, as weather-roughness is in most whites, and during their stay in New York it gradually weakened until it was nearly all gone, leaving the face a dusky yellow.

The color of the bodies of these people was that of a yellowish-brown stained wood, decidedly lighter than in the average Plains or Southwestern Indian. As their health failed, the color became gradually more sallow. The eyes were brown.

*Details.* Number 1 was an elderly man, rather short in stature, well nourished, strong, though not having excessive musculature. He had straight black hair, about 25.0 cm. long, short and very black straight mustache; a small, 3.0 cm. long, chin beard, the hair of which was not quite straight; a small tuft of hair slightly externally to and below the level of the corners of the mouth; sides of the face smooth, and heavy eyebrows. (Plate xvi, Fig. 1.)

His head was of good size, regular, and narrowing somewhat from the sides towards the top with a symmetrical and somewhat flat, high, and large face. Malars were large. The angles of the lower jaw were large and wide; the inferior boundary of the face with the chin formed a distinct angle. The forehead was of fair height and arching, the supra-orbital elevations well developed.

The eyes were slightly oblique, the external canthi, particularly the right one, being higher. A distinct mongolic fold existed on the right side.

The nasion depression was broad and quite deep. The nasal bridge was rather low, narrow and straight; the lower extremity of the nose, however, was broadened out.

Alveolar prognathism was quite fairly marked, without being excessive. The lips were of moderate dimensions, the mouth wide. The chin was dull, somewhat pointed, and of medium prominence.

The ears were long, with compressed helices and adherent lobules.

As to the structures within the mouth, the palate was rather broad, the gums were somewhat pigmented; the uvula was broader at the base than in whites. The dentition has been normal; the dental arches were regular; the teeth were somewhat worn.

The neck was moderately strong, rather submedium in length.

The body was well developed throughout, free of other than slight asymmetries, and well provided with adipose tissue. The chest was deep, the nipples were situated unusually high. The spine was slightly convex from the upper cervical up to the lumbar region then moderately depressed. The buttocks were of submedium development as compared to whites. The genitals were normally developed, of medium size, glands covered, pubis overgrown with moderate quantity of hair which showed slight tendency to loose curliness.

The limbs were well developed with moderate calves.

The hands, and particularly the fingers, were somewhat short; the medius measured along its palmar surface 7.2, and along its dorsal surface 10.9 cm.

The feet were well formed, well arched toes gradually diminishing from the great toe outward.

Sensitiveness, measured with an ordinary aesthesiometer, dorsal surface of hands 42; cheek 16; forehead 14 mm.

Number 2 was a middle-aged man, of medium stature and was examined post-mortem.

The body was not much emaciated, fairly muscular, free from all deformities.

He had straight black hair reaching to a little below the top line of the

shoulders, and only traces of mustache and chin beard. The eyebrows were moderate.

The head was of good size, regular, with a slightly receding forehead and a rather long, oval, quite full, slightly flat face.

The supraorbital elevations were well developed, eyes slightly oblique, external canthi, especially the right one higher; mongolic fold on left.

Nasion depression was medium; nose long, of moderate height, nearly straight; septum slightly inclining forward and downward, alveolar prognathism; lips and mouth medium; chin fairly prominent, angles of lower jaw somewhat large.

The palate was quite spacious; gums pigmented as in number 1; uvula broad at base; upper front teeth crowded; lower third molars never appeared.

The neck was strong, quite short. The body was symmetrical; chest large and deep; hips and buttocks rather submedium as compared to strength of upper part of the trunk; genitals as in number I.

The spine was moderately convex from lower part of cervical to lumbar region, fairly concave over the latter.

The limbs, hands, and feet were well developed, and arms rather muscular, calves moderate, toes diminishing in size from the second outward.

Number 3 was a man of about twenty-two, rather short in stature, well-nourished, plump, and with good musculature. He had straight black hair, hanging to a little below the top line of the shoulders; short black straight mustache and traces of a beard on the chin; also a few hairs on the side of the face; eyebrows about medium. (Plate XVI, Fig. 2.)

The head was of moderate size, regular, face symmetrical, large, rather flat. Large malars and angles of the lower jaw. The nose was rather straight; mouth somewhat protruding; lips thicker than in the rest of the party.

The forehead was medium high, slightly receding; supraorbital elevations moderate. Nasion depression was fairly well marked and the eyes were somewhat more oblique than in number 1 and 2. External canthi higher than internal remnants of mongolic folds. Nasal bridge was of moderate height, straight; septum horizontal. Chin slightly prominent. Ears of good size, normal lobules attached.

The palate was spacious; gums somewhat pigmented (bluish); uvula broad at base. Second dentition recently completed; teeth normal, of good size, upper incisors ventrally spade-like, as in Indians.

The neck was medium; body and limbs well developed throughout. The chest was deep, and finely built. The spine was moderately convex throughout with very little lumbar depression; buttocks submedium; genitals as in number 1. Hair on pubis slightly curly.

The hands were well formed; feet nicely built, rather small; arching medium toes, diminishing in length from first outward.

Number 4 was an elderly woman (wife of number 1), rather short, moderately well nourished with moderate musculature; head of medium dimensions, face quite flat with large malars and angles of the lower jaw. The forehead was somewhat submedium in height, well arched, supraorbital elevations small. (Plate XVII, Fig. 1.)

The eyebrows were well developed; eyes slightly oblique; external canthi higher, especially the right. Nasion depression was broad and quite deep. The nasal bridge was low and straight. Septum nearly horizontal; alveolar prognathism moderate; lips medium; mouth somewhat wide; chin of slight prominence.

Ears were rather long, compressed helices, lobules adherent.

The neck was submedium in height; chest well built, very deep; breasts moderate size; pendant flabby; umbilicus depression deep; complex cicatrix; spine moderately convex from mid-cervical to lumbar region, and but slightly depressed over the latter.

The lower third of the abdomen was much darker in color than the skin of the rest of the body (lighter yellowish brown).

There was no hair on pubis.

The limbs, hands, and feet were normally built; hands, as well as feet, small, nicely formed; toe nails all thick and over-grown, claw-like.

Number 5 was a girl of about twelve years of age (daughter of 1 and 4), well developed throughout and well nourished, with fairly pleasant features. The head was of fair size; hair black, straight, falling to a little below the top line of the shoulders; face long, slightly flat. (Plate XVII, Fig. 2.)

The forehead was somewhat globular and rather prominent; supra-orbital elevations, none; nasion depression shallow, wide; nose submedium in height, nearly straight; eyebrows heavy, eyelashes thin. The eyes were somewhat oblique, outer angles higher; quite prominent down along the sides of the face.

The ears were of good size, rather broad and angular; lobules slightly detached.

The palate was normal; gums rather heavy, slightly pigmented; uvula broad at base; teeth slightly larger than in white females. As to dentition, the milk teeth have all been shed, except four posterior premolars; second molars of the permanent dentition are all fully erupted. There are no anomalies in form or position, the upper incisors are ventrally all spade-like in shape.

The neck was medium; chest somewhat flat, and less deep than in others of the party; no sign of mammae; stronger pigmentation in axillae and on



the under surface of the arms. Waist shows slight narrowing. The abdomen was normal; umbilicus a flat scar.

The pelvis was not very large, yet somewhat feminine, the latter remark is also true about the back; the buttocks are not prominent; the genitals are externally, nothing unusual, and are covered with down. The spine presents a moderate convexity from the lower third of the neck down to the lumbar region; chest flattened.

The limbs, hands and feet are well formed.

Sensitiveness to aesthesiometer, dorsal surface of hands 14; cheeks 9; forehead 7 mm.

Number 6 was a boy about eight years of age (son of number 2), and showed throughout a good symmetric development, was well nourished and quite strong; the head was of good size; the face was long, oval, and slightly flat; black straight hair reached to below the middle of the neck.

The forehead was high and full; supraorbital elevations very small; eyebrows rather heavy; eyelashes thin; eyes slightly oblique, outer angles higher; pronounced mongolic folds; nasion depression fairly well marked, nose medium height, straight; malars somewhat large, the lower part of the face nicely rounded.

The neck was somewhat short; shoulders moderately sloping; chest deep; abdomen somewhat prominent; spine convex from lower cervical to lumbar region, the latter quite concave; buttocks medium; genitals normally developed, moderate size; glabrous limbs, calves submedium, hands and feet well developed.

The palate was normal; gums slightly pigmented; uvula broad at base; dentition: upper — all permanent incisors and both anterior molars; lower — same as upper. There was no trace as yet of permanent canines; upper incisors somewhat crowded; all ventrally pronouncedly spade-like in shape.

The ears were rather large, helices compressed, upper border somewhat angular, lobules adherent.

*Measurements on the Living.* The various head and body dimensions secured on the six individuals are given in the following table.

## MEASUREMENTS OF SIX SMITH SOUND ESKIMO BROUGHT TO NEW YORK.

	1 (elderly man)	2 (middle- aged man)	3 (young man of about 22)	4 (elderly woman) (wife of 1)	5 (girl of about 12) (daughter of 1 & 4)	6 (boy of about 8) (son of 2)
	cm.	cm.	cm.	cm.	cm.	cm.
Stature	155.0	164.0	154.0	146.7	132.8	121.3
Greatest arm stretch	153.0	?	150.0	?	126.0	116.0
Head: greatest length	18.8	19.8	19.8	18.0	18.8	18.6
"    breadth	15.3	15.1	14.8	14.5	13.7	14.65
auditory canals line- bregma height	14.2	14.2	13.7	13.0	12.85	13.4
Cephalic index	81.4	76.3	74.7	80.6	72.9	78.8
Face: height, menton-nasion	11.3	12.3	11.3	10.5	10.5	9.5
diameter bizygomatic maxi- mum	14.8	14.5	14.2	13.6	13.0	12.6
Facial index	76.3	84.8	79.6	77.2	80.8	75.4
Nose, height	5.3	5.65	4.9	4.4	4.7	3.9
breadth	3.8	3.55	3.7	3.55	3.2	3.1
Nasal index	71.7	62.8	75.5	80.7	68.1	79.5
Additional:						
Chest, diameter antero-posterior						
at nipple height	22.0	—	22.0	21.5	15.5	17.3
diameter lateral at same level	26.8	—	26.6	22.5	21.7	20.5
index " " "	82.1	—	82.7	95.6	71.4	84.4
circumference " " "	86.8	—	87.2	?	67.4	65.0
Smallest circumference of waist	79.5	—	77.5	?	63.5	65.0
Circumference at umbilical height	79.5	—	76.6	?	63.0	64.5
Circumference at pubic height						
over greatest expanse of but- tocks	86.5	—	82.3	?	68.5	60.2
Head: circumference maximum						
above supraorbital ridges	56.2	56.8	58.0	53.6	53.3	54.5
diameter frontal minimum	10.4	10.4	11.2	10.2	10.0	10.5
Face: height of forehead (nasion- crinion)	8.4	7.7	7.6	7.1	6.6	7.2
diameter bigonial	12.0	11.1	11.2	11.5	10.4	9.8
separation between internal canthi	3.4	3.55	3.85	3.6	3.65	3.7
separation between external canthi	9.3	9.4	10.0	8.9	9.0	9.0
lips, height	1.5	1.5	2.5	1.0	1.65	1.7
mouth, width	5.9	6.0	5.5	5.0	4.5	4.3
Ears: height, right	6.9	6.1	6.4	6.4	5.8	6.0

## MEASUREMENTS OF SIX SMITH SOUND ESKIMO BROUGHT TO NEW YORK.

(Continued.)

	1 (elderly man)	2 (middle- aged man)	3 (young man of about 22)	4 (elderly women) (wife of 1)	5 (girl of about 12) (daughter of 1 & 4)	6 (boy of about 8) (son of 2)
Ears: height, left	6.9	6.2	6.7	6.5	5.9	6.0
breadth, right	3.4	3.6	4.0	3.35	3.7	3.6
left	3.4	3.6	3.7	3.25	3.6	3.6
mean index	49.3	58.5	58.8	51.2	62.4	60.0
Hand, left, length <sup>1</sup>	17.5	—	16.0	15.7	14.3	13.5
breadth <sup>2</sup>	8.4	—	7.5	7.1	6.9	6.8
index	48.0	—	46.9	45.2	48.3	50.4
Foot, left, length maximum	22.8	—	22.4	20.1	—	—
breadth “	10.2	—	8.5	7.2	—	—
index “	44.7	—	37.9	35.8	—	—

It is seen that as to height, two of the men are short, while one (No. 2) as well as the adult woman (No. 4) reaches a stature which is fair for Eskimo. The girl and boy also, are not too small for their apparent age.

The maximum finger reach (*grande envergure*) which in whites and most known races is greater than the stature, shows perceptibly smaller than the latter measurement in all four subjects where it was determined (respectively as 98.7, 97.4, 94.9 and 95.6 to 100). A similar condition was found by A. Bordier<sup>3</sup> in two of his four lower Greenland Eskimo measured in Paris, while in two, the measurement was greater than the stature.

The head presents, in all, good size, particularly when considered in relation to the stature, and ranges in shape from moderate dolichocephaly to slight brachycephaly. It is rather curious that it is the two females of the party who show the narrower crania, but this can hardly be regarded as other than accidental. The height of the head is pronounced in all the male subjects.

The relatively high cephalic indices of most of these Eskimo approach them, apparently, more to the Central than to the lower Greenland and the Labrador Eskimo; but this point will be dealt with more fully in another connection.

<sup>1</sup> Proximal wrist-line, or, if this is curved or irregular, a line connecting the posterior boundaries of the thenar and hypothenar eminences, to limit of longest finger, hand held in full extension.

<sup>2</sup> Transversely across the middle of the palm (just above the thumb), the hand held as in previous measurement.

<sup>3</sup> "Les Esquimaux du Jardin d'Acclimatation," *Mém. Soc. Anthropol.*, 2me. sér., I, Paris, 1873-1878, pp. 448-461.

The facial measurements show the faces to be high and broad at the same time. The breadth of the face is smaller than that of the head in every instance.

The nose is fairly high except in numbers 4 and 6 and moderately broad at its lower end.

The forehead is generally of good extent and well arched. The breadth of the angles of the lower jaw is large. The lips, except in one of the men, are of moderate thickness in all; the mouth is slightly larger than the average in whites.

The average separation between the median angles of the eyes amounts to 36 mm., which is somewhat in excess of what is observed in whites.<sup>1</sup> The average length of the palpebral fissure, which averages 29 mm. in these four skulls, is, on the other hand, somewhat smaller than that observed in some whites and most other races.

The ears show good size, though in No. 1 they are rather narrow.

The lengths of the hands are to the stature as 10.8 to 100, and the proportion of the length of the feet to the stature in three of the adults is as 14.3 to 100. Both of these proportions are slightly smaller than those in whites and most other races, but are very near those obtained by the writer on some of the American Indians.<sup>2</sup>

The chest, while not absolutely larger than that in the majority of whites is remarkable for its great depth, in which, however, the girl, who is rather typical in many respects, is an exception.

*Observations on the Crania.* The detailed notes will be found tabulated in the following pages. The principal items brought out by the examination of the skulls are these:—

The four skulls are free from deformation and pathological conditions. In general, the two male skulls resemble each other closely, and there is also a considerable likeness between those of the two females; but the two pairs of specimens are separated by rather pronounced partly sexual and partly individual differences.

The vault in the male skulls presents the usual Eskimo scaphoid appearance; in the females, particularly in No. 4, this feature is less marked.

The outline of the *norma verticalis* approaches the elliptical in three of the skulls, as was observed generally in the Southampton Island crania; in the skull of the girl it is pentagonal — or rather, taking in account the square occiput, hexagonal.

The forehead is well arched in three of the crania and slightly sloping

<sup>1</sup> Compare Topinard, P., *Éléments d'Anthropologie générale*, p. 1003; et seq.

<sup>2</sup> Thus fifty male Navajo gave an average hand-stature index of 10.4 and an average foot-stature index of 14.7.

in one. In two cases, it shows a median eminence only, while in the other two there are, besides the more pronounced median, also small bilateral elevations. The medio-frontal ridge is present in all, but varies in development.

The parietal eminences range from rather indistinct in No. 1 to well pronounced in the skull of No. 5.

The temporal regions are bulging in three of the skulls. This, as can be seen on examining the skull ventrally, is directly due to large development of the temporal lobes of the brain.

The occipital regions present, when looked at from above, a more or less square appearance as was noticed in the crania of the Southampton Island series; protrusion is marked only in No. 5. The muscular ridges and depressions are in no case excessive.

In regard to the mastoids, there is observed again a tendency towards a larger than usual size of these processes in the females.

The supraorbital ridges are well developed in the two males, absent in the two females.

In regard to the cranial sutures, the serration tends toward a greater simplicity than in whites. Obliteration, as will be seen from the details, is rather irregular, involving, however, the earliest coronal suture. Wormian bones exist only in one of the four specimens. The pterions in every case show the H-form (spheno-parietal articulation), and the suture is generally quite broad.

As to facial features, the nasion depression is well marked in the males, and slight in the females. The nasal bones which are very narrow in No. 1, are moderately narrow in the three other crania. The nasal bridge is unusually well developed for an Eskimo in No. 2 and unusually flat in No. 4. The inferior borders of the nasal aperture are fairly sharp in one, and more or less dull in three of the specimens. The anterior nasal spine is in all of small to submedium dimensions. Alveolar prognathism is generally moderate.

The borders of the orbits are more or less sharp as in the series of Eskimo skulls described in the first part of this paper. The malar bones differ in size but are all characterized by a greater or lesser protrusion of their antero-inferior portion with the adjacent part of the superior maxilla, due to the masseters. The zygomae are more developed in all than they are in average whites. Suborbital (canine) fossae submedium to very shallow in three of the skulls are pronounced in No. 2. The protrusion of the chin which is good in the two males is submedium in the two females, particularly the girl. The outline of the chin is square in the two males, and rounded in the females. The angles of the jaw are slightly to moderately

everted in all. The lower jaw as a whole is in all strongly developed. The buccal reinforcements of the lower alveolar arch are present in the three adults, absent in the girl.

The palate is spacious and rather broad in all except No. 5, the girl. In three of the subjects, it approaches the U-shape in outline; in No. 4 it is nearly elliptical. The external outline of the upper alveolar process is generally more or less elliptical, somewhat less rounded than in the majority of the Southampton Island crania. The posterior nares are, except in No. 2, spacious.

The lateral pterygoid plates show poor development in all, a similar condition has been observed in the Southampton Island crania.

As to the basal structures, the middle lacerated foramina range from moderate to fair size, and the depression of the petrous portions in both of the males equals that in whites. The basilar process is rather flat in the two females. The styloids are generally small to rudimentary. The jugular foramina are twice larger on the right and once on the left side, while in one they are about equal. The posterior condyloid foramina are normal in two cases, one or both absent in the other two cases. Dehiscence in the floor of the auditory meatus is present in one instance only. A tendency to paramastoid (paroccipital) elevations exists in all; a decided coronal process was, however, present in one case only.

The teeth in both of the males show a tendency towards elimination of the third molars; in male No. 2 and the girl they are slightly above the medium in size. The wear, rather distinct in the adult female, is slight only in the two males. It is interesting that small wear-facets are already extant on the second molars of the young girl, but possibly in this case they are the result of slight irregular occlusion. There are no anomalies besides the diminutive condition of the third molars (see details), and there is no trace of any disease of the teeth.

The upper incisors, particularly the median, are characterized by short roots, a feature frequently observed also in the Indian. In No. 5 the total length of the right median incisor is 17.5 mm., that of the root (measured anteriorly and posteriorly) 8 mm.; the canines have each a short rudimentary ventral cusp and the front upper bicuspid is deeply notched.

The cusp-formulæ of the molars present but little unusual.

Ventrally the skulls of the two males and that of the girl show many and pronounced impressions of the brain convolutions; but in the adult female these impressions are few and shallow.

The females, particularly No. 5, show marked separation by constriction of the walls between the frontal and middle parts of the skull.

Ventrally the cribriform space is unusually long in all, measuring in 1.,

2.5; in 2., 2.75; in 4., 2.4; and in 5., 2.7 cm. The clinoids are in every case free; the middle processes are small in three of the skulls and nearly absent in number 2.

In number 5 there is a pronounced notch 9. mm. high by 6. mm. in its greatest breadth in the base of the dorsum sellae and involving the adjacent border of the basilar process.

All of the specimens show translucent areas under the middle of the frontal lobes, laterad to the lower and posterior part of the same, along the upper portion of the temporal fossae and under the lobes of the cerebellum. There is further in each of the male skulls a fair sized translucent spot in the lowest part of each temporal fossa in front of the foramen ovale; and in number 2 also one over each glenoid fossa.

Besides the above, the four skulls show the following points of interest:—The two male crania each have a small foramen in the posterior border of the foramen-magnum a few millimeters to the right of the median line.

In number 5 there is a nearly complete well-marked canal in the middle of the left lateral border of the basilar process.

#### OBSERVATIONS ON FOUR CRANIA OF THE SMITH SOUND ESKIMO BROUGHT TO NEW YORK.

##### *The Vault.*

Subject & Catalogue numbers	Norma frontalis	Norma verticalis	Frontal region		Medio-frontal & sagittal elevation
			arching	eminences	
1. 99/3607	rounded, top quite markedly scaphoid	broadly elliptical	medium	central and also faint bilateral	from 3.5 cm. above nasion to middle of sagittal; most pronounced over upper part of frontal; broadening towards bregma
2. 99/3610	moderately scaphoid	somewhat angular, approaching elliptical	somewhat sloping	central only	moderate, from above glabella to obellon
4. 99/3608	slightly scaphoid	approaching elliptical, square posteriorly	good	central, with slight bilateral	median frontal eminence to summit, rather indistinct
5. 99/3609	slightly scaphoid	pentagonal, nearing hexagonal (square occiput)	medium	central only	from above glabella to summit, well marked though not high

*The Vault. (Continued.)*

	Parietal eminences	Temporal region	Occipital region	Mastoids
1.	very subdued	full	moderately prominent, moderately rough, inferiorly somewhat asymmetrical	medium masculine
2.	fairly well marked	quite full	somewhat square from above, moderately prominent, only moderately rough	medium
4.	submedium	somewhat full	decidedly square from above, moderately protruding, moderately rough	well developed feminine
5.	quite pronounced	but slightly convex	protruding; somewhat square from above; rather smooth	short but very stout

	Supraorbital ridges	Sutures: serration	Obliteration (external)	Sutural bones	Pterions
1.	quite pronounced, occupy median $\frac{2}{3}$ of supraorbital space	somewhat submedium	left speno-frontal and pteric, most of middle third of coronal, whole sagittal, median $\frac{3}{5}$ of lambdoid; also most of nasal	one small in right asterion	H-form, broad
2.	well developed, occupy median $\frac{3}{5}$ of supraorbital space	sagittal medium, lambdoid submedium	at bregma; larger part of nasal	one large in right asterion	H-form, medium
4.	none	somewhat submedium	nearly all coronal and sagittal, inferior halves of temporo-occipital, traces in lambdoid (apex); traces in nasal	none	H-form, medium
5.	none	quite simple	—	one moderate in right speno-frontal suture	H-form, above medium



## OBSERVATIONS ON FOUR CRANIA OF THE SMITH SOUND ESKIMO.

*Face and Base.*

	Nasion depression	Nasal Bones smallest breadth remarks	right	left	Nasal bridge	Inferior nasal borders
1	pronounced, wide	very narrow in upper $\frac{1}{3}$ , short	mm. 1-5	mm. 2	low and small in upper $\frac{1}{2}$	slightly dull
2	pronounced, wide	well developed, long	4	5	quite well devel- oped	fairly sharp
4	slight, wide	quite well devel- oped	4	4	nearly flat	very dull
5	slight, wide	submedium	3	3	low	somewhat dull

	Anterior nasal spine	Alveolar pro- trusion	Orbital borders	Malars <sup>1</sup>	Zygomae
1	small	moderate	only malar por- tion dull	large, antero-inferior angles somewhat pro- truding	broad
2	submedium	moderate	fairly sharp	medium, antero-inferior parts protruding posterior fissure each side	rather above medium
4	submedium	moderate	sharp	moderate, antero-inferior angles somewhat protruding.	well developed
5	submedium no height	medium	sharp	quite strong, antero-inferior angles somewhat protruding	decidedly above medium

	Suborbital ("canine") fossae	Protrusion of chin	Form of chin	Angles of lower jaw	General character of lower jaw
1	quite shallow	fair	square	slightly everted	strong
2	very well marked	good	square	somewhat everted	quite strong
4	submedium	submedium	rounded	somewhat everted, strong	strong
5	very shallow	slight	somewhat dull- pointed	slightly everted	very stout (for one of this age & sex)

<sup>1</sup> In 2, 4 and 5 the antero-inferior extremity of the bone and the adjacent part of the maxilla are prolonged downward in the form of a short, *masseteric* process. This is particularly marked in No. 5.

*Face and Base. (Continued).*

	Ventral reinforcement of lower alveolar arch	Palate	Posterior nares	Pterygo-spinous foramina <sup>1</sup>	Middle lacerated foramina
1	marked, lateral incisors to last molars	spacious, wide U-shaped	quite spacious	—	moderate size
2	moderate, anterior bicuspid to last molars	rather large, somewhat U-shaped	high but somewhat narrow	—	fair size
4	marked, canines to last molars	large, approaching elliptical	wide	—	moderate
5	not differentiated	rather narrow (broad alveolar process), approaching U-shaped	quite large	—	moderate <sup>2</sup>

*Base<sup>3</sup> and Ventral Surface. Teeth.*

	Depression of petrous portions	Basilar process	Styloids	Jugular foramina	Posterior condyloid foramina
1	fair	nothing special	right rudimentary, left small	left larger	both absent
2	as in whites	more inclined downwards than in the others of this series	right only a little base, left rudimentary	right larger	normal
4	slight	flat	rudimentary	right larger	left absent
5	slight	somewhat flat	small	equal	normal

	Defects in floor of auditory meatus	Paramastoid (paroccipital) elevations	Ventrally: Impressions of brain gyri	Teeth: Dentition	Teeth: Size
1	—	moderate, broad irregular	numerous, pronounced in anterior and middle fossae	31—left lower posterior molar never erupted	medium, last upper molars diminutive
2	—	conical, 7 mm. high, non-articular, on left	do.	30—lower posterior molars never erupted	slightly above medium; last left upper molar diminutive

<sup>1</sup> Proximal portions of lateral pterygoid plates poorly developed in all. Hamular processes in No. 5 large and broad.

<sup>2</sup> Partly occluded by 5 mm. long excrescences from the sphenoid.

<sup>3</sup> Spinous processes in all double, consisting of one sphenoidal or alar process and a mate arising next to the same from the petrous portion; all fairly well developed (accessory process particularly marked in Nos. 2 and 5).

*Base and Ventral Surface. Teeth. (Continued.)*

	Defects in floor of auditory meatus	Paramastoid (paroccipital) elevations	Ventrally: Impressions of brain gyri	Teeth: Dentition	Teeth: Size
4	small on left	large, low	not many and shallow	32	medium
5	—	irregular, low	numerous and quite pronounced in anterior and middle fossae	1st dentition teeth: all posterior premolars: 2nd dentition: all incisors, canines, anterior bicuspids, anterior and middle molars	above medium

	Wear	Irregularities of position	Anomalies	Pathological	Cusp-formulae of molars	Upper incisors spade-shaped
1	slight	slight crowding of upper incisors	—	—	upper { right 4, 3, irreg. left 4, 3½, ? lower { right 5, ? irreg. left 5, 4½, —	all
2	very slight	upper canines outside the line of neighboring teeth	—	—	upper { right 4, 3, 2½ left 4, 3, irreg. lower { right 5, 5, — left 5, 5, —	all
4	advancing	—	—	—	upper { right ? left ? lower { right ? left ?	?
5	traces on middle molars	—	—	—	upper { right 4, 3, — left 4, 3, — lower { right 4½, 7, — left 4½, 4½, —	all

*Measurements of the Skulls.* The vault shows very good dimensions, particularly in the two males. It is at the same time quite thin, and the result is large internal capacities.

The form of the vault is in the three adults mesocephalic, in the girl moderately dolichocephalic. Bessels<sup>1</sup> who measured one hundred Smith Sound Eskimo skulls from the Hayes collection obtained an average cephalic index of only 71.4, in view of which the small series of subjects reported here appears somewhat exceptional.

<sup>1</sup> Einige Worte über die Inuit (Eskimo) des Smith-Sundes, nebst Bemerkungen über Inuit-Schädel. Archiv. für Anthropologie, VIII, 1875, p. 120.

The height of the skulls, while by no means small, is not as much as observed in some of the Southampton Island crania.

The face, while still high, is somewhat lower than in the Southampton Islanders, as a result of which both the facial indices are also a little lower. The girl, however, forms a marked exception to this, yet this is due more to narrowness of the bizygomatic diameter than to the absolute height of the face.

The nose is high and, excepting in the old woman, decidedly narrow. The narrowness is much more marked on the skull than it was on the living, falling in all the subjects well in the class of leptorhynian, while in the living of one of the subjects (the female adult) it was near platyrhynian; in one (No. 1.), mesorhynian; and in one (No. 5.), nearly mesorhynian.

The orbits are fairly spacious and, as in the Southampton Islanders, show much variation in the index, ranging in the four subjects from nearly microseme in No. 1. to hypermegaseme in No. 2.

The palate is shorter and also less broad than the average in the skulls from Southampton Island, but its index is very brachyuranic.

The facial prognathism as expressed by the facial angle is moderate, and the same is true of the alveolar protrusion.

The lower jaw agrees with those of the first series of crania described in this paper in its moderate height of the chin, its broad ascending ramus, and its large bicondylar diameter.

The distance of the temporal crests from the median line and from each other agrees in the two males fairly well with that observed in the Southampton Islanders, but is larger than in the majority of the subjects of the same sex from that island in the two females.

The foramen-magnum, finally, again shows large dimensions.

# CRANIAL MEASUREMENTS OF FOUR OF THE SMITH SOUND ESKIMO BROUGHT TO NEW YORK.

## A.

	1 99/3607 elderly man	2 99/3610 middle-aged man	4 99/3608 elderly woman (wife of 1)	5 99/3609 girl (daughter of 1 & 4)
<i>Vault:</i>				
Diameter antero-posterior maximum	18.3 cm.	19.1 cm.	17.6 cm.	18.0 cm.
“ lateral maximum	14.4 “	14.4 “	13.8 “	13.0 “
<i>Cephalic index</i>	78.7.	75.4.	78.4.	72.2.
Basion-bregma height	14.0 cm.	13.6 cm.	13.4 cm.	12.8 cm.
<i>Height-length index</i>	76.5.	71.2.	76.1.	71.1.
<i>Height-breadth</i> “	97.2.	94.4.	97.1.	98.5.
Capacity <sup>1</sup>	1570 c.c.	1600 c.c.	?	?
Cranial module (mean diameter)	15.6 cm.	15.7 cm.	14.9 cm.	14.6 cm.
Circumference (above ridges)	52.1 “	53.6 “	51.0 “	49.9 “
Nasion-opisthion arc	37.1 “	38.3 “	36.7 “	36.0 “
nasion-bregma	13.1 cm. (35.3%)	13.0 cm. (33.9%)	12.3 cm. (33.5%)	12.6 cm. (35.0%)
bregma-lambda	11.2 cm. (30.2%)	12.5 cm. (32.6%)	12.8 cm. (34.9%)	11.8 cm. (32.8%)
lambda-opisthion	12.8 cm. (34.5%)	12.8 cm. (33.4%)	11.6 cm. (31.6%)	11.6 cm. (32.2%)
Thickness of left parietal <sup>2</sup>	3 to 6 mm.	3 to 5 mm.	4 to 5 mm.	3 to 4 mm. near
Transverse arc (x)	31.5 cm.	30.2 cm.	30.2 cm.	28.2 cm.
Smallest surface distance of superior temporal line from sagittal suture	4.8 “	3.9 “	4.9 “	4.7 “
	4.2 “	3.9 “	4.8 “	4.7 “
Smallest surface distance between the superior temporal lines along the transverse arc line (z)	9.2 “	7.9 “	9.9 “	9.4 “
Percentual relation of z to x	29.2.	26.2.	32.8.	33.3.
Diameter frontal minimum	9.6 cm.	9.4 cm.	9.6 cm.	9.4 cm.
“ “ maximum	12.3 “	11.8 “	11.2 “	10.8 “
Mean diameter of foramen magnum	3.7 cm.	3.45 cm.	3.55 “	3.55 “
<i>Ventrally:</i>				
Diameter antero-posterior maximum	17.4 “	18.1 “	?	17.2 “
“ lateral “	13.9 “	13.8 “	12.9 “	12.4 “

<sup>1</sup> Measured after the part of the vault that was cut off to permit of brain extraction was fastened in approximately the same position it occupied originally.

<sup>2</sup> One centimeter above and along the squamous suture.

## B.

	1	2	4	5
<i>Face:</i>				
Chin-nasion height	11.9 cm.	12.1 cm.	11.2 cm.	11.0 cm.
Alveolar point-nasion height	7.3 "	7.4 "	6.7 "	6.7 "
Diameter bizygomatic maximum	14.1 "	14.0 "	13.0 "	12.1 "
Facial index, total	85.0.	86.4.	86.1.	90.9.
" " upper	51.8.	52.9.	51.5.	55.4.
Nose: height	5.4 cm.	5.6 cm.	5.1 cm.	5.05 cm.
breadth	2.15 "	2.1 "	2.35 "	2.25 "
index	39.8.	37.5.	46.1.	44.6.
Orbits: height, { right	3.5 cm.	4.0 cm.	3.35 cm.	3.4 cm.
{ left	3.5 "	3.8 "	3.4 "	3.35 "
breadth { right	4.15 "	3.9 "	3.9 "	3.6 "
{ left	4.1 "	3.9 "	3.8 "	3.55 "
index { right	84.3.	102.6.	85.9.	94.4.
{ left	85.4.	97.4.	87.2.	94.5.
Palate, external length (Turner)	5.3 cm.	5.1 cm.	5.1 cm.	4.8 cm.
" " breadth "	6.5 "	6.5 "	6.0 "	6.0 "
" index	122.6.	127.4.	117.6.	125.0.
Basion-nasion diameter (a)	10.1 cm.	10.0 cm.	9.5 cm.	9.9 cm.
" -middle of nasal notches (a)	8.8 "	8.0 "	8.2 "	8.7 "
" -alveolar point (a) (b)	9.8 "	8.9 "	9.1 "	9.5 "
" -most protruding chin point (a)	11.1 "	10.8 "	9.8 "	10.0 "
Facial angle (between line <i>b</i> and alveolar point-nasion line)	70°	74°	72°	73°
Alveolar angle (between line <i>b</i> and alveolar point — middle of nasal notches line)	53°	55°	53°	56°
<i>Lower Jaw:</i>				
Height at symphysis	3.3 cm.	3.3 cm.	3.5 cm.	3.1 cm.
Maximum thickness of horizontal branches	1.75 "	1.8 "	1.75 "	1.9 "
Smallest breadth of { right	3.9 "	3.85 "	3.85 "	3.8 "
ascending rami { left	3.9 "	3.85 "	3.9 "	3.9 "
Diameter bigonial	11.5 "	11.0 "	11.1 "	10.0 "
" bicondylar	11.9 "	11.8 "	12.4 "	10.8 "
Angle { right	123°.	121°.	123°.	132°.
{ left	122°.	127°.	126°.	132°.
Prolongation forward of long axis of foramen magnum reaches, below nasion	4.1 cm.	5.0 cm.	2.8 cm.	4.2 cm.

In addition to the preceding data, it was possible, because the skulls have been cut for the extraction of the brain, to make certain measurements of the cranial cavities. The table on page 242 gives the results of these determinations which present a number of results of importance.

As seen from the figures the absolute and also the relative length of the anterior fossae are, except in the exceptional No. 5, perceptibly shorter than in whites of similar head form. On the other hand, the length of the middle fossae is slightly longer in all of the adult subjects and on both sides than the average obtained previously by the writer on whites. These differences occurring in all the adults can scarcely be regarded as accidental.

The lengths, absolute and relative, of the posterior cerebral and the cerebellar fossae approach those of whites quite closely.

The racial differences in the anterior middle fossae are especially visible in the comparison of the length of the individual cavities to the sum of the lengths of the three cerebral fossae of the same side.

#### MEASUREMENTS OF OTHER SKELETAL PARTS THAN SKULLS, IN THE SKELETONS OF FOUR SMITH SOUND ESKIMO BROUGHT TO NEW YORK.

The various long and other bones of the little group of Eskimo under consideration are full of interesting points and these can scarcely be regarded as exhausted by this report. The smallness of the series, however, and the dearth of records on similar material prevent in many a line the reaching of definite conclusions, however desirable these may be, and necessitates a restriction of the report to a little more than the bare observations. The wants in this line are felt especially keenly and it is hoped that in the future collectors will pay more attention to gathering all the skeletal parts that remain of a body, and not merely the cranium.

##### THE LONG BONES.

*Humeri.* The arm bones of these Eskimo are characterized by their shortness and their strength. The average length of the right humeri in 378 American males and 133 American females, determined by the writer, was for the males 32.6 and for the females 29.96 cm.; and it was respectively 31.7 and 29.0 cm. in 174 male and 127 female Indian skeletons. In the present series, the maximum length of a male humerus is only 29.2 cm. and the length of the longer bone in the female 26.7 cm. In all the four subjects the right humerus is longer than the left.

LENGTH OF THE CRANIAL FOSSAE IN FOUR OF THE SKULLS OF SMITH SOUND ESKIMO BROUGHT TO  
NEW YORK.<sup>1</sup>

	1.	2.	4.	5.	In a series of mesocephalic male whites <sup>2</sup>
	mm.	mm.	mm.	mm.	mm.
Length of anterior fossae { right left	49.5 49.0	48.5 47.5	47.0 47.5	57.5 56.5	52.2 50.9
Length of middle fossae { right left	58.0 58.0	58.0 56.5	54.5 54.5	51.0 51.5	55.3 55.1
Length of postero-superior fossae { right left	78.0 77.0	77.5 83.0	? ?	? ?	79.6 81.8
Length of postero-inferior (cerebellar) fossae { right left	61.5 58.5	63.0 66.5	? ?	60.0 60.5	62.6 62.7
anterior fossae { right left	1. 27.0 2. 28.6 1. 26.8 2. 28.3	1. 25.4 2. 27.0 1. 24.9 2. 26.4	1. 26.7 — 1. 27.0 —	1. 31.9 2. 33.4 1. 31.4 2. 32.8	1. { 27.5 2. { 29.5 1. { 29.4 2. { 32.2
middle fossae { right left	1. 31.7 2. 33.6 1. 31.7 2. 33.5	1. 30.4 2. 32.2 1. 29.6 2. 31.4	1. 31.0 — 1. 31.0 —	1. 28.5 2. 29.7 1. 28.6 2. 29.9	1. { 29.4 2. { 32.2 1. { 43.0 2. { 46.0
postero-superior fossae { right left	1. 42.6 2. 45.1 1. 42.1 2. 44.6	1. 40.6 2. 43.1 1. 43.5 2. 46.1	— —	— —	1. { 43.0 2. { 46.0 1. { 34.0 2. { 36.4
postero-inferior fossae { right left	1. 33.6 2. 35.5 1. 32.0 2. 33.8	1. 33.0 2. 35.0 1. 34.8 2. 36.9	— —	1. 33.5 2. 34.9 1. 33.6 2. 35.2	— —
anterior fossae { right left	26.7 26.6	26.4 26.4	— —	— —	27.9 27.1
middle fossae { right left	31.3 31.5	31.5 30.2	— —	— —	29.5 29.3
postero-superior fossae { right left	42.0 41.8	42.1 44.4	— —	— —	42.6 43.6

<sup>1</sup> For technique and detailed comparative data see A. Hrdlička, Measurements of the Cranial Fossae, Proc. U. S. National Museum XXXII, pp. 177-232, Washington, 1907.

<sup>2</sup> Eleven subjects.

: Mean of the greatest lengths on the two sides.



In contrast to the length, the strength of the bones under consideration exceeds that of both whites and Indians. Thus, in the same series as mentioned above, in whites the diameter antero-posterior of the right humerus averaged in the males 2.32, in the females 2.07 cm.; the diameter lateral 1.89 in the males and 1.73 cm. in the females. In these Eskimo the larger diameter ranges, on the right, from 2.2 cm. in the female to 2.7 cm. in one of the males, and the smaller one from 1.55 cm. in the female to 1.9 in both males. In the Indians these dimensions were respectively 2.27 and 1.64 cm., for the males and 2.02 and 1.40 cm. for the females.

The right bone besides being longer as shown above, is also in all subjects stouter antero-posteriorly than that of the left arm.

The index of the shaft of the humerus  $\left( \frac{\text{diameter lateral at middle} \times 100}{\text{diameter antero-posterior at middle}} \right)$  which in white males gave 81.6 cm., in white females 78.8 cm., and which is in the Indian males 72.3 cm., and in the Indian females 69.3 cm., ranges in these Eskimo between 70.4 and 79.2 cm., so that their humeri may be considered as intermediate between the rather flat ones of the Indian and the relatively thicker ones among the whites.

In shape, the shaft at middle approaches mostly the prismatic; yet it is noteworthy that in both of the males the bones preserve in part their fetal shape, namely, plano-convex.

There is no trace on any of these humeri of the supra-condyloid process and none of them show perforation of the septum between the coronoid and olecranon fossae.

As to special features, the bones of the old man as well as those of his wife show marginal exostoses and some wearing off of the articular surfaces at the lower end. These conditions are very likely of rheumatic origin (rheumatic arthritis). It is well known that rheumatism is one of the few diseases that are frequently observed in the tribe (Peary).

## HUMERUS, MEASUREMENTS AND DETAILED NOTES.

	1.		2.		4.		5.	
	right	left	right	left	right	left	right (minus epiphyses)	left
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length maximum	29.2	28.7	29.0	28.95	26.7	26.4	21.35	21.15
Diameter antero-posterior at middle (a)	2.7	2.55	2.4	2.3	2.2	2.05	1.95	1.85
Diameter lateral at middle (b)	1.9	1.9	1.9	1.7	1.55	1.55	1.4	1.4
Index at middle $\left(\frac{b \times 100}{a}\right)$	70.4.	74.5.	79.2.	73.9.	70.5.	75.6.	71.8.	75.7.
Shape of shaft, type	1-6	1-6	6 <sup>1</sup>	1	near 1	near 1	1-4	4
	inter-	inter-	plano-	nearly	nearly	nearly	inter-	quadri-
	medi-	medi-	con-	pris-	pris-	pris-	medi-	lateral
	ate	ate	vex	matic	matic	matic	ate	
Supracondyloid process or foramen	—	—	—	—	—	—	—	—
Perforation of fossa	—	—	—	—	—	—	—	—
Special	mod- <sup>2</sup>	slight	—	—	marginal	ex-	—	—
	erate	mar-			ostoses	and		
	mar-	ginal			erosion of	ar-		
	ginal	exos-			ticular surface,			
	exos-	toses,			lower end,			
	toses	lower			both humeri			
	& par-	end;						
	tial							
	denu-							
	dation							
	of the							
	articu-							
	lar							
	surface,							
	lower							
	end							

<sup>1</sup> See A. Hrdlička, Typical Forms of Shaft of Long Bones, Proc. Assoc. Amer. Anatomist, 14th Session, 1900, pp. 55-60.

<sup>2</sup> Marginal exostoses = bony excrescences along the borders of the articular surfaces.

*Radii.* The length of this bone is also less than the average in both whites and Indians. It is quite strongly built, but its features show nothing extraordinary. The radius is in all the subjects except the girl slightly longer on the right side. In Nos. 1 and 4 these bones and also the ulnae show marginal exostoses, allied to those that were observed on the humeri.

The radio-humeral index, which in whites gave the writer the average of 73.8 in the males and 72.8 in the females, and in the Indians 77.8 in the former and 76.6 in the latter sex, reaches in No. 2 the excessive proportions of 79.8 on the left and 80.3 on the right side; but in the remaining three subjects it ranges only from 70.5 to 75.0, being thus rather near that in whites. In a male Eskimo skeleton measured by Sir William Turner the same index was only 69.6, while in a female measured by the same observer it reached the figure of 76.0 cm. In a male Eskimo skeleton measured by Topinard the same index was 69.8. Apparently, the relation between the length of the forearm and arm in this group of Eskimo has an extensive range of variation.<sup>1</sup>

#### RADIUS, MEASUREMENTS AND NOTES.

	1. right      left		2. right      left		4. right      left		5. right      left (minus epiphyses)	
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length maximum	21.45	21.15	23.3	23.1	19.9	19.8	15.05	15.15
Shape	near 1	1-2	(near 1	1	near 4	4	near 2	near 2
	(pris-	(inter-	pris-	(pris-	(near	(quad-	(near lateral	
	matic)	matic)	matic)	matic)	quadri-	rilat-	prism)	
		ate)			lateral)	eral)		
Radio-humeral index ( $\frac{\text{maximum length of radius} \times 100}{\text{maximum length of humerus}}$ )	73.5.	73.7.	80.3.	79.8.	74.5.	75.0.	70.5.	71.6.
Special	mar-	slight	—	—	upper	upper	—	—
	ginal	ero-			mar-	mar-		
	exos-	sion			ginal	ginal		
	toses	of up-			exos-	exos-		
	and	per			toses	toses		
	ero-	artic-			and	and		
	sion	ular			ero-	ero-		
	of ar-	sur-			sion of	sion of		
	ticu-	face			articu-	articu-		
	lar	'			lar sur-	lar sur-		
	sur-				face	face		
	face							
	upper							
	end							

<sup>1</sup> Challenger Reports, XVI, Pt. 47, 1886, p. 95.

*The Ulnae.* The ulna is also marked, in the main, by a rather strong development. It is in all the adults slightly longer on the right side; in the girl very slightly longer on the left side.

#### ULNA, MEASUREMENTS AND NOTES.

	1. right   left		2. right   left		4. right   left		5. right   left (minus epiphyses)	
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length maximum	23.6	23.1	25.3	25.2	21.7	21.6	17.4	17.45
Shape	near 1	1	1-3	3	indefi- nite	indefi- nite	1	1
	(near (pris- pris- matic) matic)		(inter- (exter- medi- nal ate) surface con- cave				(pris- (pris- matic) matic)	
Special	slight mar- ginal exos- toses upper end	—	—	—	upper mar- ginal exos- toses	slight upper mar- ginal exos- toses	—	—

*Femora.* In four hundred white male subjects of all provenience the writer found an average bicondylar femoral length of 44.8 cm., while in one hundred forty-five females of the same race it was 41.65 cm. In ninety-nine male Indian skeletons the length amounted to 43.9 and in sixty-one female skeletons, to 40.1 cm. In the three adult Eskimo under consideration, the length ranges from 38.5 in the females to 42.1 in one of the males. This indicates that the bone, like the humerus, is also quite short in the Eskimo.

The length of the left femur is in all subjects slightly greater than that of the right. Similar excess of length of the left bone is also often, but not generally, observed in whites and other races.

The humero-femoral index which in white males gave the writer the average of 72.7 in the males and 72.1 in the females, and in the Indians 72.35 in the males and 72.7 in the females, falls in three of the subjects in the present series below 70, showing that the humerus in these Eskimo is often, not only absolutely short, but also shorter than in other races in relation to the femur. In thickness, the Eskimo femur, while strong, does not show the excess over that of the whites that was met with in the case of the humerus.

The subtrochanteric flattening is, except in No. 2 and on the left side in No. 5, more marked than the average in whites, approaching the platymery of the Indians.

The shape of the shaft in five instances is prismatic, or nearly so. In the girl the bones are plano-convex. Third trochanter is represented in all by either a ridge or tuberosity, but is in no case excessive. Linea aspera is mostly above the medium in whites. The neck is of moderate length.

The forward curvature of the shaft is slight in all of the bones of the adults, and moderate in those of the girl.

### FEMUR, MEASUREMENTS AND DETAILED NOTES.

	1.		2.		4.		5.	
	right	left	right	left	right	left	right (minus epiphyses)	left
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length bicondylar	39.1	39.15	42.0	42.15	38.5	38.6	30.85	31.1
Length maximum	39.65	39.8	42.2	42.3	38.9	38.95	31.0	31.2
Humero-femoral index	74.7.	73.3.	69.05.	68.7.	69.35.	68.4.	69.2.	68.0.
Diameter antero-posterior maximum at middle (a)	3.15	3.1	2.85	3.0	2.85	2.75	2.45	2.45
Diameter lateral maximum at middle (b)	2.5	2.55	2.45	2.55	2.55	2.55	1.95	1.95
Index at middle $\left(\frac{b \times 100}{a}\right)$	79.4.	82.3.	86.0.	85.0.	89.5.	92.7.	79.6.	79.6.
Diameter antero-posterior minimum at greatest expanse of upper flattening (c)	2.4	2.5	2.45	2.7	2.2	2.3	2.05	2.15
Diameter lateral at greatest expanse of upper flattening (d)	3.15	3.15	3.05	3.15	3.1	3.25	2.7	2.6
Index of platymery $\left(\frac{c \times 100}{d}\right)$	76.2.	79.4.	80.3.	85.7.	71.0.	70.8.	72.2.	82.7.
Shape of shaft	1-6	near 1	near 1	1	near 1	1	6	6
Third trochanter	moderate ridge	moderate ridge	moderate tuberosity	—	moderate ridge	small tuberosity	—	moderate oblong tuberosity
Linea aspera	quite high	quite high	medium	above medium	medium	medium	well marked	well marked
Forward curvature of shaft	small	small	small	small	small	small	moderate	moderate
Special	—	—	—	—	—	—	—	—

*Tibiae.* The length of the tibia which in whites averages on the right in the males 36.45 and in the females 34.5 cm. is again very perceptibly smaller in these Eskimo.<sup>1</sup>

The tibio-femoral index, which in whites averages in both sexes slightly over 80, fails in five of the bones of the present series — coming from three subjects — to reach 80, indicating that the leg bone is not only absolutely short in these Eskimo, but also short in relation to the femur.

In three of the subjects the right tibia is slightly longer than the left, while in the girl the left bone exceeds very slightly in length the right. In whites the writer found the right bone longer in 42.8%, the left longer in 25%, and equal in 28.6% of the cases.

The strength of the tibia at the middle of its shaft is in the adult female slightly less than in whites in whom the average antero-posterior diameter at this height was found to be on the right 3.13 cm. in the males and 2.72 cm. in the females, while the right lateral diameter in the males averaged 2.24, and in the females 2.05 cm. The only one among the Eskimo who comes near these averages is the adult woman.

The index of the tibia at the middle, which in the whites gives the average of 71.1 in the males and 71.9 in the females, is somewhat higher in three of these skeletons. In this particular, the Eskimo differ considerably from the Indians, in whom the tibia is generally more flattened than it is in the whites.

The shape of the shaft of the tibia is in these cases mostly the ordinary prismatic, or nearly so, but in four of the bones there is also a more or less marked subdivision into two by a vertical intermuscular ridge of the posterior surface.

The backward inclination of the head is slight in the bones of the adults, moderate in that of the girl.

Neither the tibiae nor the femora show anything pathological, and the same is true of the fibulae.

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<sup>1</sup> A. Hrdlička, "Study of the Normal Tibia," *American Anthropologist*, October, 1898, p. 307, et seq.; same title, *Proceedings of the Association of the American Anatomists, Eleventh Annual Session, New York, December, 1898 (Washington, 1899)*, p. 1, et seq.; and "A Further Contribution of the Study of the Tibia, relative to its Shape," *Proceedings of the Association of the American Anatomists, Twelfth and Thirteenth Annual Sessions, Washington, 1900*, p. 12-13.

## TIBIA MEASUREMENTS AND DETAILED NOTES.

	1. right   left		2. right   left		4. right   left		5. right   left (minus epiphyses)	
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length maximum (minus spine)	30.3	30.2	34.5	34.4	31.0	30.8	24.05	24.1
Tibio-femoral index $\left(\frac{\text{length of tibia} \times 100}{\text{bi-condylar length of femur}}\right)$	77.5.	77.1.	82.1.	80.3.	80.5.	79.8.	78.0.	77.5.
Diameter antero-posterior maximum at middle (a)	2.7	2.75	2.95	2.95	2.7	2.65	2.2	2.15
Diameter lateral at middle (b)	2.1	2.15	2.05	2.1	1.95	2.0	1.8	1.8
Index at middle $\left(\frac{b \times 100}{a}\right)$	77.8.	78.2.	69.5.	71.2.	72.2.	75.5.	81.8.	83.7.
Diameter antero-posterior maximum at nutritive foramen (c)	3.15	3.15	3.15	3.25	2.95	2.95	2.45	2.35
Diameter lateral at nutritive foramen (d)	2.25	2.35	2.25	2.3	2.1	2.15	1.95	1.9
Index at nutritive foramen $\left(\frac{d \times 100}{c}\right)$	71.4.	74.6.	71.4.	70.8.	71.2.	72.9.	79.6.	80.9.
Shape of shaft	1-2	near 2	1-4	1-4	near 4	4-5	near 1	near 1
Backward inclination of head	slight	slight	slight	slight	slight	slight	mod- erate	mod- erate
Special	—	—	—	—	—	—	—	—

*Fibulae.* The fibulae are in all the adults longer on the right side, while in the girl they are of equal length. They are well developed.

## FIBULA MEASUREMENTS AND NOTES.

	1. right   left		2. right   left		4. right   left		5. right   left (minus epiphyses)	
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length maximum	30.4	30.2	33.65	33.35	29.9	29.7	23.8	23.8
Shape	3a	3a	Irreg- ular	near 4	near 3a	near 3a	2	2
	(external surface con- cave)							
Special	—	—	—	a hook- like exos- tosis be- low the head, poste- riorly	—	—	—	—

## OTHER BONES OF THE SKELETON.

*Clavicles.* The clavicles, like the long bones, are also rather short in these Eskimo. The average length of this bone in English whites approaches (Turner) in males 15.0, in females 14.0. cm., proportions which are reached by none of the subjects under consideration.

## CLAVICLE MEASUREMENTS AND NOTES.

	1.		2.		4.		5.	
	right	left	right	left	right	left	right	left
Length	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Special	13.7	13.9	13.7	13.9	12.35	12.75	10.7	10.6
	erosion on acromial surface, both		—	—	—	—	—	—

*Scapulae.* The scapulae are remarkable, in the first place, by their length which exceeds that in the average whites; by their narrowness, which is especially pronounced in No. 4; by their consequent low scapular and infra-scapular indices; and especially by a peculiarly modified superior border.

The total scapular and particularly the infra-scapular index reaches very low proportions, the latter not being equalled by any of the races available for comparison.<sup>1</sup>

As to the superior border of the bone, this is shaped in such a way that it presents a pronounced, angular, deep notch. (See Plate xxii.) This feature is present on both sides in one of the males and in both of the females, while in No. 1 the superior border is moderately concave. The writer found it also in other scapulae from Smith Sound, and it also exists among the Eskimo of more Western regions, though apparently not with such great frequency. In Indian scapulae the writer has seen the feature in only one or two instances while in skeletons from the Northwest Coast, and in whites it is also of great rarity. The cause of the formation is not apparent, though in all probability the levator scapulae muscle is concerned in, if not entirely responsible for, its production.

<sup>1</sup> See Turner, l. c., p. 86; and Topinard "Eléments d'Anthropologie Générale.



## SCAPULA, MEASUREMENTS AND DETAILED NOTES.

	1. right   left		2. right   left		4. right   left		5. right   left (minus epiphyses)	
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Height, inferior to superior angle (a)	?	?	16.5	16.65	14.2	14.5	11.1	?
Height, inferior angle to spine-line on median border, (b)	13.0	?	13.8	13.6	12.4	12.5	9.7	9.8
Breadth, middle of anterior border of glenoid fossa to spine-line on median border (c)	9.9	9.65	9.85	9.85	8.6	about 8.6	7.3	7.25
Scapular Index $\left(\frac{c \times 100}{a}\right)$	?	?	59.7	59.2	60.6	59.3	65.8	?
Infra-scapular index $\left(\frac{c \times 100}{b}\right)$	76.4	?	71.4	72.4	69.4	68.8	75.3	74.0
Shape of superior border	mod- erate- ly con- cave	mod- erate- ly con- cave	U- shaped	nearly U	U	U	U	U
Special	teres major process quite pronounced		median border irregular; teres major process pronounced		whole scapula shows a pronounced wedge-like shape		—	—

*Sternum.* In all of the cases this bone shows a detached manubrium, and is also without the xiphoid portion. Its length differs a little from that in whites.<sup>1</sup> In No. 5 the body presents a fetal condition, in that its component parts are not united.

## STERNUM, MEASUREMENTS AND NOTES.

	1.	2.	4.	5.
	cm.	cm.	cm.	cm.
Total height (including manubrium but minus xiphoid cartilage.	15.8	16.1	13.3	10.0
Manubrium	detached	detached	detached	detached

<sup>1</sup> Compare Thos. Dwight, "Sternum as an Index of Sex, Height, and Age," *Journ. of Anatomy and Physiology*, XXIV, London, pp. 527-535.

STERNUM, MEASUREMENTS AND NOTES. (*Continued.*)

	1.	2	3.	4.
Rib { right	7	7	6	6
notches: { left	7	7	6	6
Maximum breadth of body	4.3	3.95	3.6	2.4
Thickness of body between fourth and fifth ribs	0.8	0.8	0.7	0.55
Special	—	lower part of the body somewhat asymmetrical	cartilages of the 7th ribs are attached together below the sternum and in front of the xiphoid and are also attached to the latter	the body consists of 4 separate segments, cartilages of the 7th ribs as in 4

*Ribs.* These bones are strong and very regular in all the subjects, and show no anomaly in structure or numbers.

## RIBS, DETAILED NOTES.

	1.	2.	4.	5.
Total number: { right	12	12	12	12
{ left	12	12	12	12
Special	strong; very regular	strong; very regular	regular	very regular

*Vertebrae.* On the whole, there is but little unusual in the vertebrae, which are all well developed as to strength. In No. 2 there are present six instead of five lumbar vertebrae, which is the only numerical irregularity which occurs in the four subjects. In No. 1 the neural arches of the fourth and fifth lumbar are separated. Minor details of structure and anomalies will be seen in the following table. In Nos. 1 and 4 are found some marginal exostoses, in all probability of the same origin as those in the same subjects in the bones of the arms.

### VERTEBRAE, DETAILED OBSERVATIONS.

	1.		2.		4.		5.	
	right	left	right	left	right	left	right	left
<i>Cervical</i>								
Number	7		7		7		7	
		3-6						
Transverse process bifid	3-6	3-6	3-6	3-6	3-6	3-6	3-6	3-6
Vascular foramen (in lateral process) double, in	7th	5, 6 (in both the septum is incomplete)	5, 6	4	—	— obliterated in 2nd and 5th	5-6	5-6
Spinous process bifid	2-5		2nd only		2-5		2-4	
Special	—		—		the articular surfaces of some of the bodies show roughening		lateral foramina in the axis posteriorly incomplete	
<i>Dorsal:</i>								
Number	12		12		12		12	
Articular facets on								
9th	2	2	2	2	1	1	2	2
10th	1	1	1	1	1	1	1	1
11th	1	1	1	1	1	1	1	1
12th	1	1	1	1	1	1	1	1
Special	tendency to marginal exostoses; roughness of articular surfaces.		—		slight marginal exostoses and roughness of articular surfaces		—	

VERTEBRE, DETAILED OBSERVATIONS. (*Continued.*)

	right 1. left	right 2. left	right 4. left	right 5. left
<i>Lumbar:</i>				
Number	5	6	5	5
Special	the posterior portion (part of laminae and spinous process) of neural arch of the 4th and 5th is separate and articulates with the proximal parts of the arch; considerable marginal exostoses and much roughness of the articular surfaces of the bodies of the 4th and 5th	the extra vertebra is intercalated between the 12th dorsal and 1st ordinary lumbar; it is in every way well developed and shows no articular facet	marginal exostoses and roughness of articular surfaces on 2nd, 3rd and 4th	—

## BONES OF THE PELVIS.

*Sacrum.* From the details which are given below, it appears that the height of the bones is comparable with that of the whites, except in the girl where it is excessive. The breadth of the bone, however, is rather subaverage in the males and is very low in the girl, but shows good dimensions in the adult female. The sacral index, which in whites averages from about 112. to 119. cm. (Verneau, Görtz, Garson), is about like that of the whites in No. 2, is smaller in Nos. 1 and 5 (especially in the latter), but is considerably larger in No. 4, the adult woman. All four of the sacra show five segments each. The anterior curvature is pronounced in the bones of the adults, slight in the child. A number of individual peculiarities observed are enumerated in the table.

## SACRUM, MEASUREMENTS AND DETAILED NOTES.

	1.	2.	4.	5. (minus epiphyses and interarticular discs)
	cm.	cm.	cm.	cm.
Height (maximum, between middle of body of superior to middle of body of inferior segment, the bar of the sliding compass touching both (a)	10.8	9.05	9.1	10.1
Breadth maximum (b)	11.2	10.45	12.5	8.7
Sacral Index $\left(\frac{b \times 100}{a}\right)$	103.7.	115.5.	137.4.	(86.1).
No. of segments	5	5	5	5
Anterior curvature	pronounced	pronounced	pronounced	slight
The curvature begins at body of	3rd segment	2nd segment	4th segment	2nd segment
Posterior wall of spinal canal deficient from	the level of third foramina	below the spinous process of the 2nd segment, opposite 3rd foramen.	above the 4th foramina	slightly above 5th segment.
Special	—	body of 5th segment not synostosed with the body of the 4th	articular facets quite narrow; on left, posteriorly, at level of 2nd foramen, a special round, articular facet (articulation with the posterior spine of the ilium)	upper segment shows a lumbar form on the left, sacral form on the right side; only the 4th and 5th segments are partly attached

*Ossa Innominata.* The pelvic bones are marked by their strength and regularity. The left bone is in all the subjects slightly higher than the right; in three it is also slightly narrower, but in one its breadth exceeds somewhat that of the right side.

#### PELVIC BONES, DETAILED MEASUREMENTS AND OBSERVATIONS.

	right	left	right	left	right	left	right	left (minus epiphyses)
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Height maximum (a)	20.9	21.0	20.6	20.9	19.8	20.0	16.2	16.3
Breadth maximum (between superior spines of ilium) (b)		about						
	15.4	15.2	15.5	15.25	14.65	14.9	12.0	11.95
Index $\left(\frac{b \times 100}{a}\right)$		about						
	73.7.	72.4.	75.2.	73.0.	74.0.	74.5.	74.1.	73.3.
Special	bones strong		bones	strong	some erosion in acetabulum	—	ilium fully, ischium and pubis superiorly detached, both sides; bones strong	

*Pelvis.* The pelvis as a whole is of moderate dimensions, all its measurements being slightly inferior to the general average in whites. Its total index in the males is somewhat higher than the average in whites (Verneau, Garson), showing relatively a greater height; but is about the same as in whites in the two females. The inlet of the pelvis, however, is pronouncedly oval (transversely) in all of the adults, the index of the brim showing a lower value than that in whites and most other races whose pelvises are known.

#### PELVIS, MEASUREMENTS.

	1.	2.	4.	5.
	cm.	cm.	cm.	cm.
Breadth maximum (externally)	25.5	25.2	27.1	21.7
General pelvic index $\left(\frac{\text{mean height of ossa innom.} \times 100}{\text{breadth}}\right)$	82.2	82.3	73.4	74.9

PELVIS, MEASUREMENTS. (*Continued.*)

	1.	2.	4.	5.
Diam.-antero-posterior of superior strait or brim (promontory of sacrum to nearest point on the lips of the symphysis (a)	8.6	8.8	10.1	8.0
Do., according to Turner's method <sup>1</sup> (b)	8.8	9.1	10.2	8.2
Diam.-lateral maximum of superior strait (c)	11.4	11.6	13.1	9.4
Pelvic index at superior strait				
$\left(\frac{a \times 100}{c}\right)$	75.4	75.9	77.1	85.1
$\left(\frac{b \times 100}{c}\right)$	(77.2)	(78.4)	(77.9)	(87.2)

BONES OF THE HANDS AND FEET.

All of these bones show a good development and no gross anomalies, although there are present some interesting individual modifications. The measurements of the patella and os calcis must remain as simple records until we possess more extensive Eskimo and also other comparative material.

*Patellae.*

	1.		2.		4.		5.	
	right	left	right	left	right	left	right	left
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Height maximum(vertical)	4.0	3.95	3.8	4.0	3.8	3.6	?	?
Breadth maximum	4.55	4.45	4.2	4.25	3.9	3.8	?	?
Thickness maximum	1.9	2.0	1.85	1.9	1.7	1.65	?	?
Special	—	—	—	—	—	—	—	—

<sup>1</sup> Turner, Wm., *Challenger Reports*, v. XVI, Report on the Bones of Human skeleton, p. 7: "from the mid-point on the promontory of the sacrum" to a point on "the posterior surface of the body of the os pubis immediately adjacent to the upper part of the region of the symphysis." This point is not definite enough and the diameter thus obtained is from 2 to 5 mm. longer than that of the pelvis inlet.

## BONES OF THE FOOT.

*Os Calcis.*

	1. right   left		2. right   left		4. right   left		5. right   left	
	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
Length maximum	7.6	7.65	7.7	7.6	6.8	6.9	damaged	
Height at middle (between the elevations)	4.1	4.1	3.9	3.9	3.7	3.5	—	—
Breadth at middle (minimum)	2.4	2.55	2.7	2.8	2.3	2.35	—	—
Facets for astragalus	3	3	3	3	2	2	—	—
Special	Peroneal spine and external inferior tuberosity well developed in all							

*Astragali.*

	1.	2.	4.	5.
Characteristics:	nothing special	2   anterior facets for the calcaneus; both bones	nothing special	damaged

*Scaphoid.*

	1.	2.	4.	5.
Characteristics:	both bones thick and short	facet for the cuboid (isolated)	both bones thick; on both a facet for the cuboid (not isolated)	—

*Cuneiform Bones, Metatarsals, Phalanges.*

	1.	2.	4.	5.
Characteristics:	nothing special	nothing special	a facet on each cuboid for the scaphoid	—



## ADDITIONAL SKELETAL MATERIAL FROM SMITH SOUND.

Besides the skeletal remains described above there are also in the Museum four other crania and three whole skeletons of the Smith Sound natives, collected on other expeditions by Mr. Peary.

Five of the skulls, including one skeleton, are those of adult males, one, with a skeleton, that of an adult female; and one with a skeleton, that of a small child.

The specimens agree well in all their important features with those that were described in the preceding pages. Two of the male crania, Nos. '105 and '108, are very remarkable, the former on account of its extremely broad face, the latter because of its extremely keel-shaped form and the highest temporal crests of any in a human being of which the writer could find a record. This latter specimen corroborates fully the important fact of a causative relation between highly developed temporal muscle and the scaphoid shape of the vault, which was dwelt upon in the earlier parts of this paper.

The crania are again characterized by a more or less elliptical outline of the norma verticalis, with generally a more or less square occiput (as viewed from above), due to lateral elevations at the insertions of the trapezii. The forehead is generally quite broad and well arched, and presents a median with two slightly developed lateral eminences. The parietal bossae are pronounced in none of the adults and in some are very moderate. No. '108 presents a very good illustration of the suppressing effect on the parietal eminences of extraordinarily developed temporal muscles. (Plate xx.)

The temporal, with a part of the adjacent sphenoidal region, is again generally more or less bulging, due to a large development of the corresponding parts of the brain. This feature is evidently one of the general characteristics of both the Smith Sound and Central Eskimo crania.

The supraorbital ridges are in no case developed excessively and occupy in no case more than the median two-thirds of the supraorbital space, corresponding very closely to the extent of the eyebrows in the living individuals of this race. The mastoid processes are in no instance of extraordinary dimensions.

The sutures of the wall generally show a simpler serration than in the whites, as in the two other groups of Eskimo skulls here described. The pterions are as a rule of the H-form (spheno-parietal articulation), and in some instances are very broad. In '105, where they each measure 29 mm., they are the broadest yet encountered by the writer. In the majority of the adult crania in this series coming from elderly individuals, obliteration

tion of the sutures is mostly advanced; the locality of its beginning and its progress are apparently irregular. Sutural bones, as in the other Eskimo crania here described, are very scarce.

The nasal bones are again narrow in a large majority of the cases, the nasal bridge in the males is small, in the female and the child flat. The inferior borders of the nasal aperture are mostly more or less dull, but there are no instances of well developed prenasal fossae or simian gutters. The anterior nasal spine is generally low, occasionally without any height at all, and of no more than a moderate protrusion.

Alveolar prognathism is in no case pronounced. The borders of the orbits are generally fairly sharp. The malar bones are usually strongly developed and protrude more or less at their antero-inferior angle, due to the influence on that part of the masseter muscle. The zygomae are mostly broad and strong. The suborbital ("canine") fossae are shallow in all except the female, which, with the slight protrusion of the upper part of the malar bones and the small nasal bridge, are the principal causes of the flatness of the Eskimo face.

The lower jaw is again for the most part powerfully built. The prominence of the chin ranges from slightly receding in the child to medium in the adult males. The ventral reinforcement of the lower alveolar arch, described more in detail with the two other series of crania in this paper, is present in more or less pronounced form in every instance.

The palate is generally regular and spacious, in no case very high. The posterior nares are of good size, contrasting thereby with the relatively narrow anterior nasal aperture. The lateral pterygoid plate is also but moderately developed in these skulls; this seems to be another general characteristic of the Eskimo from Central and Smith Sound regions. Due to the comparatively small development of these plates a tendency to pterygo-spinous foramina is observed infrequently and when present is not pronounced.

The size of the middle lacerated foramina and the depression of the petrous portions present characteristics approaching those of the whites. The styloid processes range from medium to rudimentary. The jugular foramen is three times larger on the right, twice on the left side. The posterior condyloid canals are normal in four cases, absent in one on the left, and absent in one on both sides. Dehiscences in the floor of the auditory meatus are present in none of the adults. A greater or less tendency to paramastoid (paroccipital) processes exists in every specimen, but in none of the cases is there a distinct, conical, or articulating elevation.

As to the teeth, the dentition shows a serious disturbance in the lower jaw of No. '108. In '105, notwithstanding the ample size of the alveolar

ridges, all the posterior molars are congenitally absent, indicating probably an ancient tendency towards the elimination of these teeth. The size of the teeth is generally medium or but slightly above. Wearing off is noticeable to a marked degree in the older individuals. Irregularities of position of the teeth occur in two instances. The upper incisors are seen, in all cases where they have not been too far worn down, to have the peculiar spade-shaped ventral appearance common to the Eskimo and the Indians. There is again in no one of these skulls the slightest trace of dental caries.

#### DETAILED OBSERVATIONS ON SEVEN ADDITIONAL SMITH SOUND ESKIMO SKULLS.

##### *The Vault.*

Number	Norma frontalis	Norma verticalis	Frontal region arching                      eminences		Medio-frontal and sagittal elevation.
99/105	dull scaphoid, slightly asymmetrical (due to more powerful left temporal muscle)	near elliptical	good (is very broad)	moderate median and bilateral	from glabella to summit, most marked over upper $\frac{1}{3}$ of frontal and anterior $\frac{2}{3}$ of sagittal, very dull, pronounced, slightly flatter on left side
'108.	extremely scaphoid	elliptical (square posteriorly)	slightly sloping	slight medi- and bilateral	slight ophrion to middle of frontal, then very pronounced to summit, absent posteriorly
'109	quite marked scaphoid	approaching elliptical	fair	—— <sup>1</sup>	quite marked, from above glabella to summit
'110	moderately scaphoid	do.	good	—— <sup>1</sup>	moderate, middle of frontal to summit
'111	quite markedly scaphoid	do.	good	—— <sup>1</sup>	quite marked, ophrion to summit
'106	nearly oval	do.	good	—— <sup>1</sup>	rather indistinct
'107	quite markedly scaphoid (pathological?)	——	good	—— <sup>1</sup>	marked, from above ophrion to inion

<sup>1</sup> Skull not at hand when this feature was examined; a number of the specimens were examined in New York, while others were sent to the writer to Washington.

*The Vault. (Continued.)*

	Parietal eminences	Temporal region	Occipital region	Supraorbital ridges	Mastoids
'105	moderate	bulging anteriorly (on both sides of temporo-sphenoidal articulation)	square from above, moderately protruding, medium rough	medium, extend over median $\frac{1}{2}$ of supraorbital space	good-sized masculine
'108	indistinct	bulging	square from above, medium protrusion and roughness	medium (median $\frac{3}{5}$ )	medium
'109	— <sup>1</sup>	quite marked bulging	rather prominent	quite pronounced	large
'110	— <sup>1</sup>	somewhat bulging	slight protrusion	moderate masculine	moderate masculine
'111	— <sup>1</sup>	slightly bulging	slight protrusion	medium	medium
'106	— <sup>1</sup>	slightly bulging	moderate protrusion	very small	small
'107	— <sup>1</sup>	— <sup>1</sup>	— <sup>1</sup>	— <sup>1</sup>	moderate

	Sutures. Serration	Pterions	Obliteration (external)	Sutural bones
'105	quite simple	H-form, very broad (each 29 mm.)	—	1 small in left lambdoid, 1 small in right sphenoparietal
'108	sagittal fair, lambdoid sub-medium	H-form, moderate breadth	traces in lower $\frac{1}{3}$ of left coronal and at obelion	4 very small in lambdoid
'109	all quite simple	H-form, rather broad	most of coronal, advanced in sagittal and in median $\frac{1}{2}$ of lambdoid, whole temporo-occipital and nasal	One, 46 mm. broad by 30 mm. high, at lambda
'110	all rather simple	H-form, broad, especially right	slight in coronal and lambdoid, advanced in sagittal, some in temporo-occipital, nearly whole nasal	1 small in left asterion
'111	all submedium	H-form, moderate breadth	median $\frac{1}{3}$ of coronal, whole sagittal, advanced in median $\frac{1}{2}$ of lambdoid	none

<sup>1</sup> Skull not at hand when this feature was examined; a number of the specimens were examined in New York, while others were sent to the writer to Washington.

*The Vault. (Continued.)*

	<i>Sutures:</i> Serration	Pterions	Obliteration (external)	Sutural bones
'106	all submedium	H-form. medium	all occluded except squamous and temporo-sphenoidal; but little in nasal	none
'107	?	H-form	all except right temporo-sphenoidal fully synostosed (including temporo-parietals); facial sutures all patent	?

*Face and Base.*

	Nasion depression	Nasal bones smallest breadth right      left		Nasal bridge	Inferior nasal borders	Anterior nasal spine	Alveolar protrusion
'105	well marked	mm. 4	mm. 7	medium	normal	very low, moderate protrusion	moderate
'108	well marked	3	2	low (not flat)	slightly dull	no height, moderate protrusion	quite marked
'109	well marked	4	4	submedium	dull	submedium	very moderate
'110	submedium	3	3	low and small	very dull	submedium	moderate
'111	submedium	3.5	3	quite flat	somewhat dull	submedium	moderate
'106	none	4.5	5.0	flat	very dull	submedium	quite marked
'107	—	—	—	—	—	small	slight

	Orbital borders	Malars	Zygomae	Suborbital ("canine") fossae	Protrusion of chin	Form of chin
'105	only slightly dull	large, antero-inferior angles slightly protruding	broad and stout	shallow	submedium	somewhat square
'108	fairly sharp	medium, antero-inferior angles slightly protruding	medium	submedium	moderate	rounded

*Face and Base. (Continued.)*

	Orbital borders	Malars	Zygomae	Suborbital ("canine") fossae	Protrusion of chin	Form of chin
'109	" "	well developed, do.	strong	very shallow	medium	—
'110	" "	medium, do.	well devel- oped	very shallow	?	—
'111	" "	medium, do.	well devel- oped	shallow	medium	—
'106	" "	medium, antero- inferior angles quite promi- nent	well devel- oped	fairly well marked	submedium	—
'107	sharp	moderate	medium	—	slightly re- ceding	somewhat rounded

	Angles of lower jaw	General character of of lower jaw	Ventral reinforcement of lower alveolar arch	Palate	Posterior nares	Pterygo-spinous foramina
'105	slightly everted, grooved inter- nally	very strong	well developed posterior bi- cuspid to 3rd molars	broadly el- liptical, very spa- cious	good- sized	—
'108	somewhat everted	relatively weak (apparently not fully nor- mal)	quite marked, anterior bicus- pids to posteri- or ends of arch	spacious, ap- proaching elliptical	fair size	—
'109	—	strong: right condylar epi- physis wanting, glenoid fossa broad, rough	marked	spacious	" "	slight tendency to, both sides
'110	—	?	?	medium	" "	slight tendency to, on left
'111	—	well developed	moderate	quite spa- cious	" "	—
'106	—	strong	quite marked	medium	" "	some tendency to, both sides
'107	—	—	—	—	—	—

*Face and Base. (Continued.)*

	Middle lacerated foramina	Depression of petrous process	Basilar process	Styloids	Jugular foramina	Posterior condyloid foramina
'105	as in average whites	as in average whites	nothing special	medium	left larger	normal
'108	submedium	do.	do.	rudimentary	left larger	both absent
'109	?	?	?	moderate	?	left absent
'110	moderate	moderate	—	rudimentary	right larger	normal
'111	moderate	slight	—	small	right larger	normal
'106	submedium	slight	—	rudimentary	right larger	normal
'107	small	—	—	none	—	—

	Defects in floor of auditory meatus	Paramastoid (paroccipital) elevations	Additional	Dentition	Size
'105	—	moderate irregular	supramastoid crests pronounced	28 — last molars never appeared	medium
'108	—	do.	glenoid fossae deep	15 above; only 10 below <sup>1</sup>	"
'109	—	do.	"pharyngeal" fossa near middle of the basilar process	32	"
'110	—	—	moderate palatine torus	?	"
'111	—	—	median wall of each foramen ovale deficient	?	"
'106	—	—	a pair of precondylar tubercles on basilar process	32	"
'107	—	—	shallow broad post-corenal depression	1st permanent molars in eruption	"

<sup>1</sup> Upper: the right 3rd molar never erupted; lower: median incisors, canines (right lost in life), all bicuspids, 1st molars. If 2nd molars had existed, they were lost very early and left but little trace on the alveolar process; more likely they never appeared, the whole bone having apparently suffered from trophic disturbance.

*Teeth.*

	Wear	Irregularities of position	Anomalies	Upper incisors spade-shaped	Disease
'105	moderate	—	—	all	—
'108	some	right posterior upper bicuspid situated inwardly to the anterior bicuspid and 1st molar	left 3rd upper molar diminutive	all	—
'109	advanced	diastema between upper median incisors	—	?	—
'110	advanced	alveoli of lower canines external to those of neighboring teeth	—	?	—
'111	advanced	?	—	?	—
'106	slight	—	—	?	—
'107	—	—	—	all (in sockets)	—

*Measurements.* The principal measurements agree, as did the observations, with those of the crania here reported from Smith Sound. The cranial index is again predominantly meso-cephalic. The height of the skull is considerable. The capacity, except in '110, is large. As in the Southampton Island skulls and the other series of crania from Smith Sound, the thickness of the walls of the vault is very moderate. The temporal crests are high in every instance; in '108 the percental relation of their smallest surface distance along the transverse arc line to this arc reaches the unprecedentedly low index figure of 6.6. (Plates xx, xxi.)

The foramen magnum is again generally large.

The face, particularly its upper portion, is high, reaching as much as 8.3 cm. in No. '109; and in three of the males it is also very broad, particularly in '105, where the bizygomatic diameter gives the enormous value of 15.8 cm. (Plate xxiii, Fig. 1; Plate xix.)

The nose is very leptorhynic, due on one side to its considerable height, accompanying the extraordinary height of the face, and on the other hand to its small to moderate breadth.

The orbits are spacious and, as in the other two series of skulls here reported, the orbital index differs considerably.

The palate is with one exception brachyuranic.

The facial and alveolar angles are very moderate, except in '106.

The lower jaw shows a fair height, but this is scarcely commensurate with the height of the face as a whole. Due to the ventral reinforcement



## MEASUREMENTS OF SEVEN ADDITIONAL ESKIMO CRANIA FROM SMITH SOUND.

## A.

American Museum of Natural History numbers		99/105	99/108	99/109	99/110	99/111	99/106	99/107
Sex		male	male	male	male	male	female	?
Period of life		adult	adult	adult	adult	adult	adult	child
Vault: Length		19.1 cm.	19.3 cm.	19.4 cm.	18.5 cm.	19.0 cm.	18.4 cm.	17.1 cm.
Breadth		14.8 "	14.1 "	14.5 "	14.1 "	14.3 "	13.8 "	12.9 "
Basion-bregma height		14.6 "	14.2 "	14.2 "	13.8 "	14.0 "	13.9 "	11.8 "
Cephalic index		77.5.	73.1.	74.7.	76.2.	75.9.	75.0.	76.4.
Height-length index		76.4.	73.6.	73.2.	74.6.	73.7.	75.5.	69.0.
Height-breadth index		98.6.	100.7.	97.9.	97.9.	97.9.	100.7.	91.5.
Capacity		1645 c.c.	1545 c.c.	?	1445 c.c.	1590 c.c.	1510 c.c.	?
Cranial module (mean diameter)		16.17 cm.	15.90 cm.	16.03 cm.	15.47 cm.	15.77 cm.	15.37 cm.	13.93 cm.
Circumference (above supraorbital ridges)		54.1 "	53.0 "	53.7 "	51.5 "	53.6 "	51.4 "	—
Nasion-opisthion arc		37.9 "	38.0 "	37.3 "	36.0 "	37.3 "	37.9 "	—
nasion-bregma		13.6 cm.	13.2 cm.	13.1 cm.	12.4 cm.	12.9 cm.	13.3 cm.	—
bregma-lambda		(35.9%)	(34.7%)	(35.1%)	(34.4%)	(34.6%)	(35.1%)	—
lambda-opisthion		12.0 cm.	12.8 cm.	(11.3 cm.)	12.2 cm.	12.2 cm.	12.5 cm.	—
		(31.7%)	(33.7%)	—	(33.9%)	(32.7%)	(33.0%)	—
		12.3 cm.	12.0 cm.	(12.9 cm.)	11.4 cm.	12.2 cm.	12.1 cm.	—
		(32.4%)	(31.6%)	?	(31.7%)	(32.7%)	(31.9%)	—
Thickness of left parietal (1.0 cm. above and along the squamous suture)		3 to 6 mm.	3 to 5 mm.	?	4 to 5 mm.	4 to 5 mm.	3 to 4 mm.	—
Transverse arc (z)		31.6 cm.	30.2 cm.	—	—	—	—	—
Smallest surface separation of the superior temporal lines		6.0 "	0.7 "	—	—	—	—	—
Do., along the transverse arc line (z)		6.2 "	2.0 "	—	—	—	—	—
Smallest surface distance of superior tem- { right		3.3 "	0.4 "	—	—	—	—	—
porel line from sagittal suture { left		2.9 "	0.3 "	—	—	—	—	—
Percental relation of z to x		19.6.	6.6.	—	—	—	—	—
Mean diameter of foramen magnum		3.5 cm.	3.5 cm.	3.5 cm.	3.3 cm.	3.6 cm.	3.2 cm.	—
Diameter frontal minimum		11.4 "	9.0 "	9.8 "	9.9 "	10.1 "	10.2 "	—
" " maximum		12.5 "	11.3 "	—	—	—	—	—

## MEASUREMENTS OF SEVEN ADDITIONAL ESKIMO CRANIA FROM SMITH SOUND. (Continued.)

## B.

American Museum of Natural History numbers	99/105	99/106	99/109	99/110	99/111	99/106	99/107
<i>Face:</i>							
Chin-nasion height	12.3 cm.	11.9 cm.	12.9 cm.	?	11.7 cm.	11.2 cm.	—
Alveolar point-nasion height	7.8 "	7.8 "	8.3 "	7.7	7.2 "	6.9 "	—
Diameter bizygomatic maximum	15.8 "	14.2 "	15.2 "	14.5	15.0 "	13.4 "	—
<i>Facial index, total</i>	77.8.	83.8.	84.9.	?	78.0.	83.6.	—
" " <i>upper</i>	49.4.	54.9.	54.6.	53.1.	48.0.	51.5.	—
Nose: height	5.95 cm.	5.6 cm.	6.1 cm.	5.7 cm.	5.8 cm.	5.5 cm.	—
breadth	2.45 "	2.35 "	2.3 "	2.2 "	2.4 "	2.3 "	—
<i>index</i>	41.2.	42.0.	37.7.	38.6.	41.4.	41.5.	—
Orbits: height, { right	3.7 cm.	3.8 cm.	3.5 cm.	3.6 cm.	3.25 cm.	3.65 cm.	—
{ left	3.75 "	3.7 "	3.5 "	3.55 "	3.35 "	3.65 "	—
breadth, { right	4.4 "	4.05 "	4.25 "	4.15 "	4.2 "	4.05 "	—
{ left	4.15 "	4.05 "	4.2 "	4.05 "	4.15 "	4.1 "	—
<i>index,</i> { right	84.1.	83.4.	83.4.	86.7.	77.4.	80.1.	—
{ left	90.4.	91.4.	89.3.	87.7.	80.7.	89.0.	—
Palate, external length (Turner)	5.4 cm.	5.8 cm.	5.9 cm.	5.6 cm.	5.4 cm.	5.3 cm.	—
" " <i>breadth</i>	7.0 "	7.0 "	7.1 "	6.2 "	6.9 "	6.4 "	—
<i>index</i>	129.6.	120.7.	120.9.	110.7.	127.8.	120.7.	—
Basion-nasion diameter	11.3 cm.	10.4 cm.	11.6 cm.	10.6 cm.	10.9 cm.	9.8 cm.	—
" -middle of nasal notches diameter	10.2 "	9.5 "	10.4 "	9.5 "	9.3 "	8.5 "	—
" -alveolar point diameter	10.9 "	10.6 "	11.2 "	10.4 "	10.0 "	9.6 "	—
" -most protruding chin point diameter	11.9 "	11.4 "	11.8 "	?	11.5 "	10.2 "	—
Facial angle <sup>1</sup>	72°	67°	71°	70°	76°	70°	—
Alveolar angle	63°	54°	64°	59°	56°	45°	—
<i>Lower Jaw:</i>							
Height at symphysis	3.7 cm.	3.6 cm.	3.6 cm.	?	3.6 cm.	3.35 cm.	2.6 cm.
Maximum thickness of horizontal branches <sup>1</sup>	1.9 "	1.7 "	—	?	—	—	—
Smallest breadth of ascending ram <sup>1</sup> { right	4.9 "	3.9 "	4.3 "	?	3.7 "	4.1 "	3.0 "
{ left	5.1 "	3.85 "	4.5 "	?	3.75 "	4.1 "	2.9 "
Diameter bigonial	12.4 "	10.9 "	?	?	11.6 "	10.4 "	—
" bicondylar	14.1 "	12.4 "	—	—	—	—	—
Angle, { right	117°	112°	—	—	—	—	122°
{ left	114°	114°	—	—	—	—	122°

<sup>1</sup> Determined as in the other series of skulls described in this paper.

of the lower alveolar process, the maximum thickness of the bone is generally quite large. The ascending branches, as in other Eskimo mandibulæ, are broad, reaching 5.1 cm. at their greatest constriction in '105. The bigonial and bicondylar diameters are generally large.

*Skeletal Parts other than Skulls.* These consist of the complete skeletons of the powerfully developed adult male '105, an adult female and a child. The latter will be considered separately.

The long bones of the male are equal and some of them slightly superior in length to the bones of the average white, so that the individual must have been of a relatively tall stature among his people. At the same time, the strength of the bones is such that he must have been very muscular and powerful.

The humerus shows stoutness, particularly in its antero-posterior diameter, which is reached or exceeded in only about 2% of male arm bones among the whites. In the male, the bone also shows a high index at the middle. There is again no trace of the supracondyloid process; but the septum between the fossæ presents a large preforation on both sides in the female.

Besides their great strength the bones of the forearm show nothing particular in the male subject. The radio-humeral index differs only immaterially from that obtained on the bones of the preceding series of skeletons.

The femora, powerfully built in the male subject, are also relatively stout in the same, the index at middle exceeding that of any of the other thigh bones. The subtrochanteric flattening is very moderate in both of the skeletons, but especially so in the male. The humero-femoral index is very near that obtained on the skeletons of the Eskimo who were brought to New York. In form, the bones show a few peculiarities which will be found in the detailed notes, under the measurements relating to these specimens.

The tibiæ are relatively somewhat stouter in both of these subjects, but particularly so in the male, than in the other Smith Sound skeletons. The tibio-femoral index is also slightly higher than in the specimens just referred to. The shape of the shaft ranges from the laterally prismatic to the plano-convex, which are two related forms. The inclination of the head is no greater than usual in whites.

The scapulæ are again characterized by the deep, more or less angular or U-shaped depression in the superior border. As in the earlier skeletons described, they also showed rather low indices, indicating a relative narrowness.

The bones of the pelvis which, also, are powerfully developed in the

male, show indices which are, on the whole, very near those of the three Eskimo skeletons described in the preceding pages.

MEASUREMENTS AND DETAILED NOTES ON THE LONG AND OTHER BONES  
OF TWO ADDITIONAL SMITH SOUND ESKIMO SKELETONS.

*Humeri.*

	Adult male '105		Adult female '106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Length maximum	32.45	32.15	26.45	26.2
Diameter antero-posterior at middle	2.75	2.75	2.25	2.1
Diameter lateral at middle	2.25	2.2	1.5	1.55
Index at middle	81.8.	80.0.	66.7.	73.8.
Shape of shaft	near plano-convex	near plano-convex	near prismatic	near prismatic
Special	bones very straight strong		—	—
Supracondyloid process or foramen	—	—	—	—
Perforation of fossa	—	—	quite large	quite large

*Radii.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Length maximum	24.8	24.5	19.1	19.4
Shape	1			
Radio-humeral index ( $\frac{\text{maximum length of radius} \times 100}{\text{maximum length of humerus}}$ )	76.4.	76.2.	72.2	74.0.
Special	bones strong		—	—

*Ulnae.*

	'105		'106	
	right	left	right	left
Length maximum	cm. 26.75	cm. 26.2	cm. 21.15	cm. 21.2
Shape	ordinary prismatic	ordinary prismatic	ordinary prismatic	ordinary prismatic, typical
Special	bones strong	bones strong	—	—

*Femora.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Length, bicondylar	46.5	46.7	36.2	36.5
Length, maximum	46.6	46.8	36.5	36.8
Humero-femoral index	69.6.	68.7.	72.4.	71.2.
Diameter antero-posterior maximum at middle (a)	3.75	3.7	2.9	2.85
Diameter lateral maximum at middle (b)	3.4	3.35	2.45	2.35
Index at middle ( $\frac{b \times 100}{a}$ )	90.7.	95.9.	84.5.	82.5.
Diameter antero-posterior minimum at upper flat- tening (c)	3.4	3.4	2.3	2.25
Diameter lateral maximum at upper flattening (d)	3.8	3.85	2.85	2.9
Index of flattening ( $\frac{c \times 100}{d}$ )	89.5.	88.3.	80.7.	77.6.
Third trochanter	slightly elevated, long rough- ness in place of third tro- chanter, both sides		moderate ob- long tuber- osity.	moderate ob- long tuber- osity.
Linea aspera	strong	strong	pronounced	pronounced
Shape of shaft	intermediate	intermediate	near pris- matic	prismatic
Forward curvature of shaft (not path.)	moderate	moderate	quite marked	quite marked
Special	very strong	medium	—	—
Angle of neck	right 125°	left 125°	?	?

*Tibiae.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Length maximum (minus spine)	37.6	37.6	29.4	29.95
Tibio-femoral index ( $\frac{\text{length of tibia} \times 100}{\text{bi-condylar length of femur}}$ )	80.8.	80.5.	81.2.	82.1.
Diameter antero-posterior maximum at middle (a)	3.25	3.2	2.4	2.35
Diameter lateral at middle (b)	2.7	2.65	1.9	1.9
Index at middle ( $\frac{b \times 100}{a}$ )	83.1.	82.8.	79.2.	80.8.
Diameter antero-posterior maximum at nutritive foramen (c)	3.85	4.15	2.8	2.9
Diameter lateral at nutritive foramen (d)	3.05	3.2	2.15	2.15
Index at nutritive foramen ( $\frac{d \times 100}{c}$ )	79.2.	77.1.	76.8.	74.1.
Shape of shaft	1-2	2 <sup>1</sup>	2-6	near 6 <sup>1</sup>
Inclination of head	as average in whites	as average in whites	moderate	moderate
Special	—	—	—	—

*Fibulae.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Length maximum	37.75	37.3	29.1	29.25
Shape	1 <sup>2</sup>	1	2 <sup>2</sup>	2
Special	—	—	—	—

<sup>1</sup> 1 = ordinary prismatic; 2 = lateral prismatic; 6 = plano-convex.

<sup>2</sup> 1 = ordinary prismatic; 2 = lateral prismatic.

*Clavicles.*

	'105		'106	
	right	left	right	left
Length maximum	cm. 16.7	cm. 16.5	cm. 11.65	cm. 11.65
Special	conoid tubercles very pronounced.		—	—

*Scapulae.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Height, inferior to superior angle (a)	17.65	17.6	13.7	14.1
Height, inferior angle to spine-line on median border (b)	14.45	14.1	11.6	11.5
Breadth, middle of anterior border of glenoid fossa to spine-line on median border (c)	10.9	10.8	8.15	7.95
Scapular index $\left(\frac{c \times 100}{a}\right)$	61.8.	61.4.	59.5.	56.4.
Infrascapular index $\left(\frac{c \times 100}{b}\right)$	75.4.	76.6.	70.3.	69.1.
Suprascapular notch	medium	trace	—	—
Shape of superior border	near U, deep	U-V, deep	U, deep	between U and V, deep
Special	teres major process large	teres major process large	teres major process quite marked	—

*Sterna.*

	'105	'106
	cm.	cm.
Total height (including manubrium but minus xiphoid cartilage)	16.8	13.55
Breadth maximum of body	4.7	3.9
No. of articular facets for ribs { right	6	5
{ left	6	5
Thickness of body between 2nd and 3rd articulations	1.1	0.6
Special	xiphoid ossified, attached; manubrium attachment still cartilaginous	—

*Ribs.*

	'105	'106
	cm.	cm.
Total number	24	24
Special	all very strong; 1st stronger and longer on left	—
Diameter of 1st { right	—	7.3 mm.
{ left	—	7.4 "

*Vertebrae.*

	'105	'106
<i>Cervical:</i>	7.	7.
Remarks:	Spinous process bifid in 5th Two foramina in lateral process in 6th on right, in 5th on left	Spinous process bifid in 3rd Two foramina in lateral process, on both sides in 6th  Lateral processes bifid: 3rd to 6th inclusive
<i>Thoracic:</i>	12.	12.
	In 11th spinous process absent and neural arch shows defect 1.5 mm. broad in narrowest place	—
<i>Lumbar:</i>	5.	5.
	Lumbar curve very small	Posterior (laminar) portion of neural arch in 4th and 5th separate, articulating with pedicles



*Sacrum.*

	'105	'106
	cm.	cm.
Height at middle (a)	11.4	10.0
Breadth maximum (b)	12.9	11.7
Sacral Index $\left(\frac{b \times 100}{a}\right)$	113.1.	117.0
No. of segments	5	5
Anterior curvature	moderate	very slight
The curvature begins at	1st segment	4th segment
Canal open at	3rd "	5th "
Special	Lateral masses of 1st project further back than the articular processes.	

*Ossa Innominata.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Height maximum (a)	23.0	23.3	18.0	18.1
Breadth maximum (b)	17.55	17.5	13.4	13.3
Index $\left(\frac{b \times 100}{a}\right)$	76.3.	75.1.	74.4.	73.5.
Special	strong; middle of ilia translucent		obturator foramina triangular	

*Pelvis as a Whole.*

	'105	'106
	cm.	cm.
Breadth maximum (externally)	29.7	24.8
Pelvic Index	77.9.	72.8.
Diameter antero-posterior of superior strait	10.1.	—
Diameter-lateral maximum of superior strait	13.0	12.5
Index of superior strait or brim	77.7.	—
Special	Subpubic angle narrow. Ileo-pectineal tubercles very pronounced	Ilia quite flaring

*Patellae.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Height maximum (vertical)	4.65	4.8		
Breadth maximum	5.2	5.25	(absent)	(absent)
Thickness maximum	2.3	2.35		
Special	External notch pronounced			

*Os calcis.*

	'105		'106	
	right	left	right	left
	cm.	cm.	cm.	cm.
Length maximum	8.7	8.55		
Height at middle	4.75	4.6	(absent)	(absent)
Breadth at middle (minimum)	3.35	3.4		
Special	—	—		

*The Skeleton of a Child.* The skull (99-107) of this individual is, as shown before, exceptional, showing synostoses of the majority of the cranial sutures, but other skeletal parts appear to be normal.

The long bones are all without epiphyses. They are fairly strong. The shape of the shafts of the humeri (on transverse section) is ordinary prismatic, that of the ulnae and radii laterally prismatic, that of the femora oval, of the tibiae typically ordinary prismatic, and of the fibulae typically laterally prismatic.

The sternum consists of five segments, all fully separated. There are twenty-four normally developed ribs. One of the longer ones on the left side has been fractured and shows a callus, with an imperfect union. The vertebrae are normal in number. The laminar part of the neural arch of the fifth lumbar exists as a separate piece, articulating with the pedicular parts of the bone; this anomaly is apparently one of frequent occurrence among the Smith Sound natives.

The scapulae show very high superior angle and the before referred to characteristic deep angular notching of the superior border. They measure, without the epiphyses, total height: right, 9.55; left, 10.0 cm.; infraspinal height: right 8.3; left, 8.2 cm.; and breadth: right, 6.4; left 6.55 cm.

## RÉSUMÉ.

In order to present the principal facts brought out by the measurements in a more concrete form, the writer has abstracted the various indices and most important measurements into the following table.

These data demonstrate an unexpectedly close affinity in all the principal features between the Southampton Island and the Smith Sound crania. There are certain differences, but these are of minor character and are all well within the limits of individual variation.

This material leads to the conclusion that there exists a close parental relation between the Eskimo of the two regions. This conclusion, however, is difficult to reconcile with the figures presented on what were given as Smith Sound crania by Bessels. That particular series offers an average cephalic index which is decidedly dolichocephalic and decidedly below, not only the average obtained on the Smith Sound skulls from the American Museum, but also below that of any individual of this series. Under these circumstances, it will be necessary to re-examine the Hayes collection of Eskimo crania with a special care especially as to the exact provenience of the different specimens.

A thorough discussion of the results here given must be reserved until larger series of Eskimo crania and skeletons shall have been studied. The type which is here shown is clearly characterized by a large number of special features. Among these, the most important are: large cranial capacity; elevated height-length and height-breadth indices of the vault; high facial and particularly upper facial indices; low nasal and very variable orbital indices; high index of the palate, and moderate facial as well as alveolar prognathism.

In the skeletons the long bones show but little tendency towards flatness. The radio-humeral index is mostly higher, humero-femoral index lower, than the average in whites, indicating relatively short humeri. The tibio-femoral index is, on the whole, near that of the whites. The scapula indices are lower. The index of the pelvic brim indicates, on the average, a decidedly more elliptical inlet than exists in the pelvis of individuals of the white race.

## RÉSUMÉ OF THE VARIOUS AVERAGE CRANIAL AND SKELETAL

<i>Skulls:</i>		Cephalic index	Height- length index	Height- breadth index	Facial index, total
Southampton Island Crania	9 males	74.2	74.1	99.8	87.2
	5 females	74.9	74.5	99.4	87.3
Smith Sound Crania and Skeletons, 1st series	2 males	77.0	73.8	95.8	85.7
	1 female	78.4	76.1	97.1	86.1
Smith Sound Crania and Skeletons, 2nd series	5 males	75.4	74.3	98.6	81.1
	1 female	75.0	73.7	100.7	83.6
Smith Sound Living	3 males	77.5	—	—	80.2
	1 female	80.6	—	—	77.2

<i>Other Skeletal Parts:</i>		Humerus, index at middle	Radio- humeral index	Humero- femoral index	Femur index at middle	Index of platymery
Smith Sound Skeletons, 1st series	2 males	72.7	76.8	71.4	83.2	80.2
	1 female	73.0	74.7	68.9	91.1	70.9
Smith Sound Skeletons, 2nd series	1 male	80.9	76.3	69.2	93.3	88.9
	1 female	70.3	73.1	71.8	83.5	79.1

## INDICES IN THE ADULT ESKIMO HERE REPORTED.

Facial index, upper.	Nasal index	Orbital index (mean)	Facial prognathism (degrees)	Alveolar prognathism (degrees)	Palate index	Cranial capacity
53.0	42.3	90.1	69	53	118.8	1563 cc.
52.3	43.8	91.6	70	55	120.0	1457 "
52.3	38.6	92.4	72	54	125.0	1585 cc.
51.5	46.1	86.5	72	53	117.6	?
52.0	40.2	85.7	71.2	59	121.8	1556 cc.
51.5	41.8	89.5	70.0	45	120.7	1510 "
—	70.0	—	—	—	—	—
—	80.7	—	—	—	—	—

Tibio-femoral index	Index of tibia at middle	Index of tibia at nutritive foramen	Scapular index	Infra-scapular index	Sacral index	Pelvic index	Pelvic brim index
79.2	74.2	72.1	59.5	73.4	109.6	82.2	75.6
80.2	73.8	72.1	60.0	69.1	137.4	73.4	77.1
80.7	82.9	78.1	61.6	76.0	113.1	77.9	77.7
81.6	80.0	75.5	58.0	69.7	117.0	72.8	?

LONG BONES *versus* STATURE.

A few words, in conclusion, as to the relation of the long bones in the Eskimo to the height of the body in life. This could be determined in three of the Smith Sound natives who were brought to New York. The figures are given below. If the proportions be compared with those in whites, as given in the well known tables of Manouvrier, it will be found that there are for most of the bones considerable differences. There are reasons to believe that some marked differences exist also in these proportions between the Indian and the white, and the negro and the white, which points to a necessary caution in estimating the stature of the Eskimo, Indian or negro with the help of those very serviceable tables, which were, however, never intended for these races.

SMITH SOUND ESKIMO: RELATION OF THE LONG BONES TO THE STATURE  
(IN LIFE).

Sub- ject	Stat- ure  cm.:	Humerus		Radius		Ulna	
		Mean length (of the two)	Percental relation to stature	Mean length	Percental relation to stature	Mean length	Percental relation to stature
		cm.		cm.		cm.	
1	155.0	28.95	18.7	21.3	13.7	23.35	15.1
2	164.0	29.0	17.7	23.2	14.1	25.25	15.4
4	146.7	26.55	18.1	19.85	13.5	21.65	14.8

Sub- ject	Stat- ure  cm.:	Femur		Tibia		Fibula	
		Mean length	Percental relation to stature	Mean length	Percental relation to stature	Mean length	Percental relation to stature
		cm.		cm.		cm.	
1	155.0	39.1	25.2	30.25	19.5	30.3	19.5
2	164.0	42.1	25.7	34.45	21.0	33.5	20.4
4	146.7	38.55	26.3	30.9	21.1	29.8	20.3



MALE ESKIMO SKULL (99-4659) FROM SOUTHAMPTON ISLAND, SHOWING MEDIUM DEVELOPMENT.

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FIG. 1. MALE ESKIMO SKULL (99-4659) FROM SOUTHAMPTON ISLAND, SHOWING MEDIUM DEVELOPMENT.

FIG. 2. SIDE VIEW OF ESKIMO MALE SKULL (99-4661) FROM SOUTHAMPTON ISLAND, SHOWING THE OCCIPITAL PROTRUSION, AND OBLIQUITY OF THE ANGLE OF THE LOWER JAW, DUE PRINCIPALLY TO EVERSION OF THE SAME.

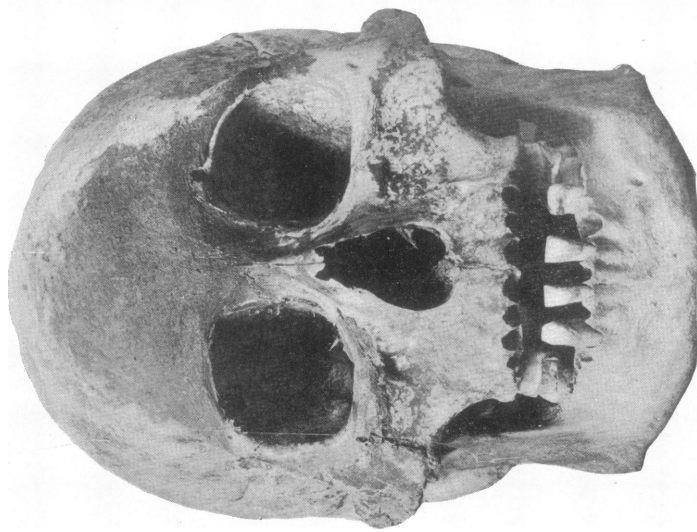




ESKIMO MALE SKULL FROM SOUTHAMPTON ISLAND (99-4661) SHOWING PARTICULARLY A LOWER JAW WITH GREATLY EVERTED ANGLES, ALSO AN EXCEPTIONALLY LONG AND POSTERIORLY PROTRUDING VAULT.

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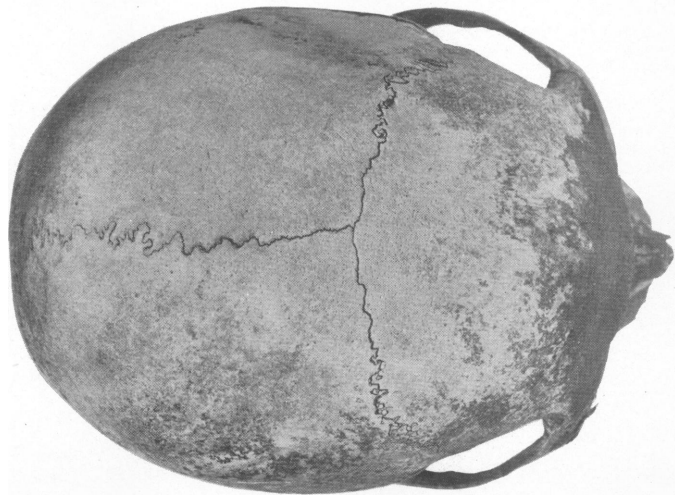
"Z"



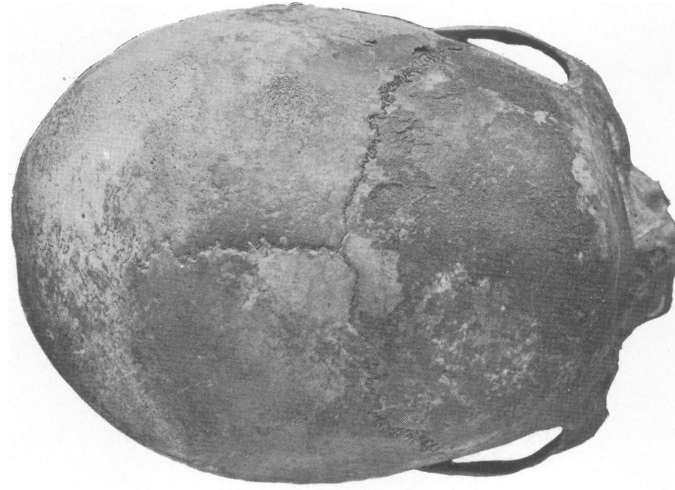
"Y"

SOUTHAMPTON ISLAND SKULLS "Z" (MALE) AND "Y" (FEMALE), SHOWING RELATED DEVELOPMENT, AND ALSO SOME ASYMMETRY OF THE LOWER PART OF THE FACE.





"Z"



"Y"

SOUTHAMPTON ISLAND SKULLS "Z" (MALE) AND "Y" (FEMALE), SHOWING RELATED DEVELOPMENT.







ESKIMO SKULL (TEMPORARY No. "X") FROM LYON INLET, MELVILLE PENINSULA, SHOWING EXCESSIVELY SCAPHOID VAULT.

(Page 216)

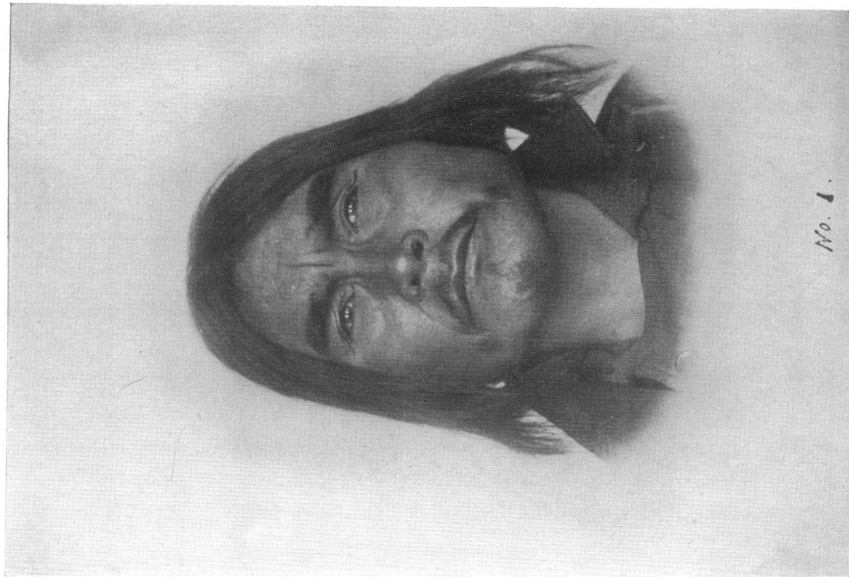




LOWER JAW BELONGING TO ESKIMO SKULL "X" FROM LYON INLET, MELVILLE PENINSULA, SHOWING MASSIVE HORIZONTAL RAMI, FLARING ANGLES AND BROAD VERTICAL RAMUS.

(Page 217)



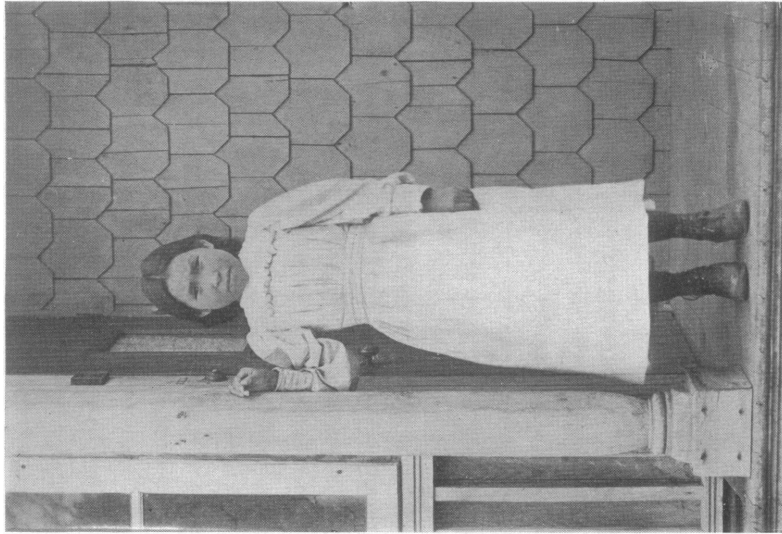


PORTRAITS OF TWO OF THE SMITH SOUND ESKIMO MEN BROUGHT TO NEW YORK. THE NUMBERS, CORRESPOND TO  
 THOSE IN TEXT. (FOR PHOTOS OF NOS. 2 AND 6, SEE A. HRDLÍČKA, AN ESKIMO BRAIN, 8° N. Y. 1901; ALSO IN  
 AMER. ANTHROPOLOGIST, U. S. III, 1901.)





No. 4.



No. 5.

PORTRAITS OF SMITH SOUND ESKIMO WOMAN AND GIRL. (THE NUMBERS CORRESPOND TO THOSE IN THE TEXT.)  
(Page 226)







FIG. 1. MALE ESKIMO SKULL FROM ST. LAWRENCE ISLAND (24-3988, U. S. N. M.), SHOWING EXTENSION OF THE *planum temporale* ON TO THE OCCIPITAL SQUAMA.

FIG. 2. SKULL (99-105, A. M. N. H.). A SMITH SOUND MALE ESKIMO, SHOWING EXTRAORDINARY BREADTH OF THE VERTICAL RAMUS OF THE LOWER JAW (SEE ALSO PLATE XIX).





SMITH SOUND MALE ESKIMO SKULL (99-105) CHARACTERIZED BY A GREAT FACIAL BREADTH.  
(Page 266)





SMITH SOUND MALE SKULL (99-108) SHOWING VERY SCAPHOID VAULT AND EXTREMELY HIGH TEMPORAL CRESTS.





SMITH SOUND MALE SKULL (99-108) SHOWING EXTREMELY HIGH TEMPORAL CRESTS.

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SCAPULAE OF SMITH SOUND ESKIMO, SHOWING THE CHARACTERISTIC, DEEPLY NOTCHED, SUPERIOR BORDER. (THE BONES BELONG, FROM LEFT TO RIGHT, TO SKELETON 99-3609, '106, '3608, '3610, AND '105.)  
(Page 250)



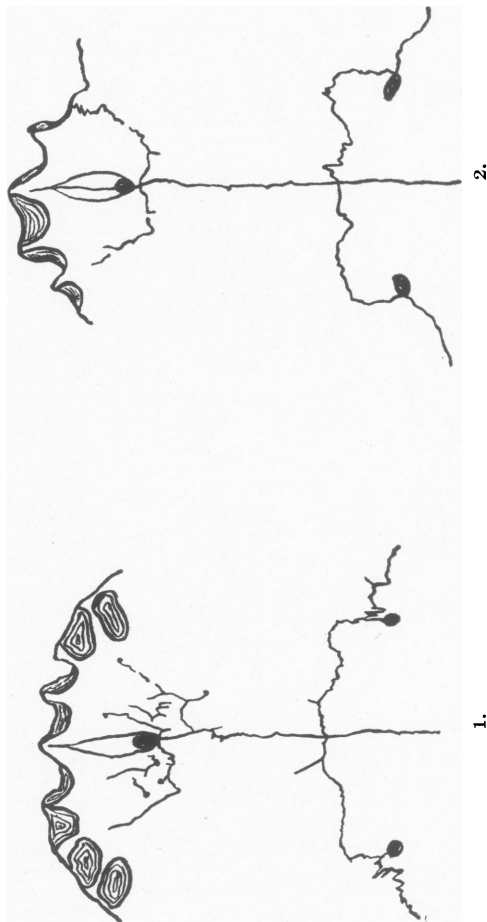


FIG. 1. REMNANTS OF FOETAL SUTURES VISIBLE ON THE PALATE OF SOUTHAMPTON IS. SKULL (99-4653).

FIG. 2. REMNANTS OF INTERMAXILLARY SUTURES ON PALATE OF SOUTHAMPTON IS. SKULL (99-4652).







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