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SKELETONS FROM ANCIENT GREENLAND GRAVES

BY

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WITH 4 FIGURES IN THE TEXT

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I. THE LONG EXTREMITY BONES

Introduction.

The purpose of this work is to examine part of the skeletal material secured by means of the National Museum's excavations in Greenland in the years 1929—1934, and since preserved in the University Museum of Normal Anatomy. In West and Southeast Greenland the excavations were performed by Dr. THERKEL MATHIASSEN with the assistance of Mr. ERIK HOLTVED, M.Sc. in 1929—1934, and in Northeast Greenland by Mr. HELGE LARSEN, keeper at the National Museum, and Mr. P. V. GLOB, M.A.[1]).

The material gathered in this manner is very considerable, comprising skulls and other skeletal parts.

The portions of it that are dealt with in the following have been determined as to time, for material taken from graves and settlements dating from the time after the arrival of HANS EGEDE in Greenland has been left out. By this means it has presumably been possible to get together objects of the utmost racial purity, though theoretically there is a chance of an intrusion of foreign blood from the Norse colonists and European whalers.

The present work will deal with the long extremity bones; the skulls and other parts will be treated later. The reason for preferring to divide the material and not to publish it all at the same time, which would

[1]) TH. MATHIASSEN, Contributions to the Archaeology of Disko Bay 1934. Medd. om Grønl. Vol. 93, Nr. 2.

— Ancient Eskimo Settlements in the Kangâmiut Area 1931. Medd. om Grønl. Vol. 91, No. 1.

— Prehistory of the Angmagssalik Eskimos, 1933. Medd. om Grønl. Vol. 92, No. 4.

— Eskimo Finds from the Kangerdlugssuak Region, 1934. Medd. om Grønl. Vol. 104, No. 9.

— The Eskimo Archaeology of Julianehaab Dist. 1936. Medd. om Grønl. Vol. 118, No. 1.

HELGE LARSEN, Dødemandsbugten, 1934. Medd. om Grønl. Vol. 102, No. 1.

P. V. GLOB, Eskimo Settlements in Kempe Fjord and Kong Oskar Fjord, 1935. Medd. om Grønl. Vol. 102, No. 2.

delay publication considerably, is particularly that scarcely anything is known of the extremity bones of the Greenland Eskimos, whereas several large works have already appeared on the skulls, especially that by FÜRST & HANSEN: Crania Groenlandica; and now that we have a good deal of information concerning the extremity bones of the Western Eskimos[1]), it is of much interest to have matters cleared up for the Greenland Eskimos.

The Graves.

The graves in Greenland have been discussed in an earlier work by the writer[2]), with much support from the reports of K. J. V. STEENSTRUP[3]) and TH. MATHIASSEN[4]).

Flat slabs of stone set on edge form the outline of the graves, which are mostly rectangular or quadratic, and over these edge-stones were flat cover-stones; finally, a large number of smaller stones were piled up over them all. The sizes of the graves vary very greatly, as also the number of interments in them. Sometimes there are single graves, or graves with two — often man and woman — but large common graves are frequently met with, containing up to fifteen or sixteen skeletons. In such cases it is often impossible to place the elements to any particular skeleton and thus to determine the individual height. In Northeast Greenland most of the graves are single.

The Material.

Eskimo graves cannot be said to be good storage places for bones. Many have been too easily accessible for wild animals — particularly foxes and bears — and others in the course of time have been disturbed and plundered by people collecting Greenland antiquities and human skulls. What is more, the elements in many places have been able to work their destruction on the skeletons. As a consequence, the material that can be brought home for anthropological examination — especially for exact anthropometric work — is not so large as would be desirable, but possibly large enough to provide a reliable picture of the long extremity bones of the old Eskimos and thereby a possibility of determining the stature, which is so important a racial characteristic. The writer has divided the material so that West and Southeast Greenland

[1]) ALEŠ HRDLIČKA, Anthropological Survey in Alaska. 46th Annual Report of the Bureau of American Ethnology, Washington 1930, pp. 313—329.

[2]) K. FISCHER-MØLLER, Skeletal Remains of the Central Eskimos, Copenhagen 1937, p. 9.

[3]) K. J. V. STEENSTRUP, Medd. om Grønl. Vol. 5 1883, pp. 21—26.

[4]) TH. MATHIASSEN, Contributions to the Archaeology of Disko Bay 1934, p. 69. Medd. om Grønl. Vol. 93, No. 2.

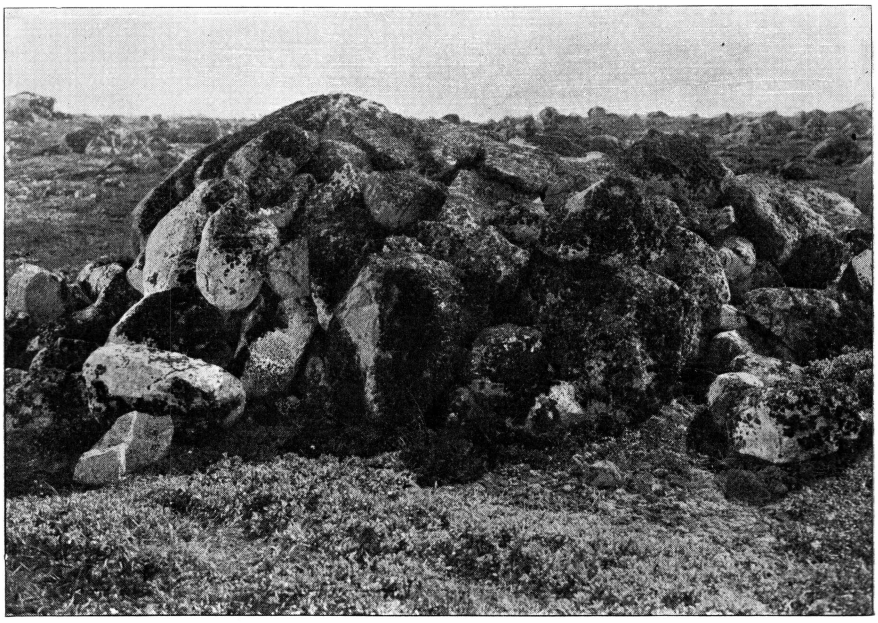

Fig. 1.

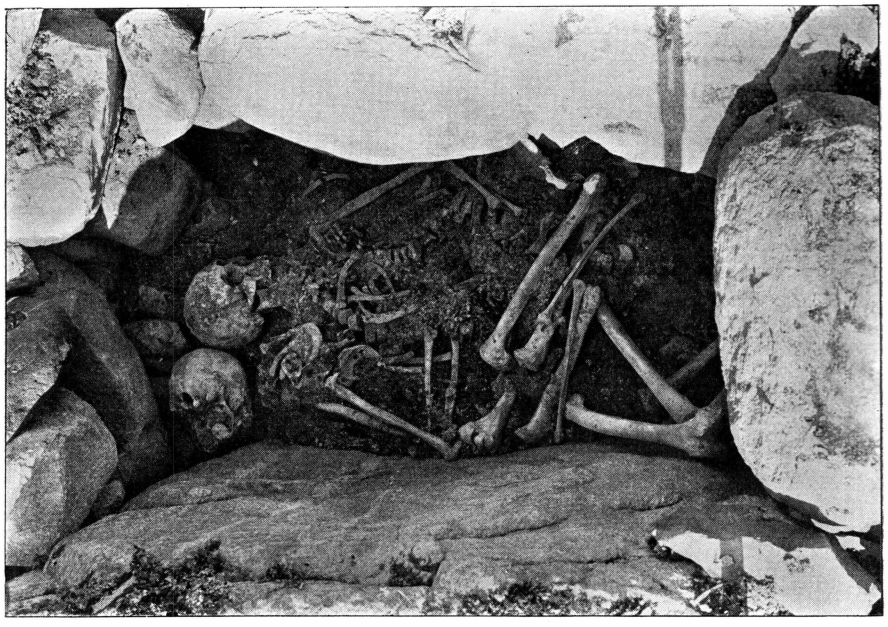

Fig. 2.

are dealt with together, for to divide them would leave rather small figures for the east coast, and samples have shown that the averages are almost the same for West and for Southeast Greenland; this is only natural, of course, as their culture is the same in all essentials, and it is doubtless certain that the Eskimos on the southeast coast up to Scoresby Sound migrated from the west coast round about Cape Farewell.

The bones from the graves in Northeast Greenland have been kept separate. It soon proved that the bones from there were distinctly larger; and, as it must be assumed after the investigations of ethnographers[1]) that some of the northeast coast dwellers came from the north, and their culture differs to some extent from that of the west and southeast coast, it seems reasonable to keep this group by itself.

Unfortunately, the group is much too small to form a safe basis for the determination of these Eskimos' anthropological peculiarities; it is to be anticipated, however, that larger finds will be forthcoming later on. It is also to be hoped that anthropological material will soon be available for the Thule Eskimos, for the lack of it is very much felt. Possibly that material will help to dispel some of the doubt prevailing as to the migrations of the Eskimos and their settlement in Greenland.

The material consists of the following measurable long bones:

183 femora
147 tibiae
132 humeri
102 radii
76 ulnae
65 fibulae, in all 705 bones.

The separation of male and female bones would seem to be reliable as a whole; there are not very many pelvises in a complete state, but in a good many cases there are sufficient fragments to determine the sex of skeletons from single graves and graves in which only two or very few people had been buried. In several cases, too, the grave goods were taken as an indicator. In large common graves there will always be some uncertainty, but here again the pelvic bones will often be a guide. The others were determined by their size and massiveness.

The Individual Bones.

In the measurement of the bones the writer has carefully followed the instructions contained in MARTIN's Lehrbuch d. Anthropologie, II.

[1]) HELGE LARSEN, l. c. p. 171. F. V. GLOB, l. c. p. 81.

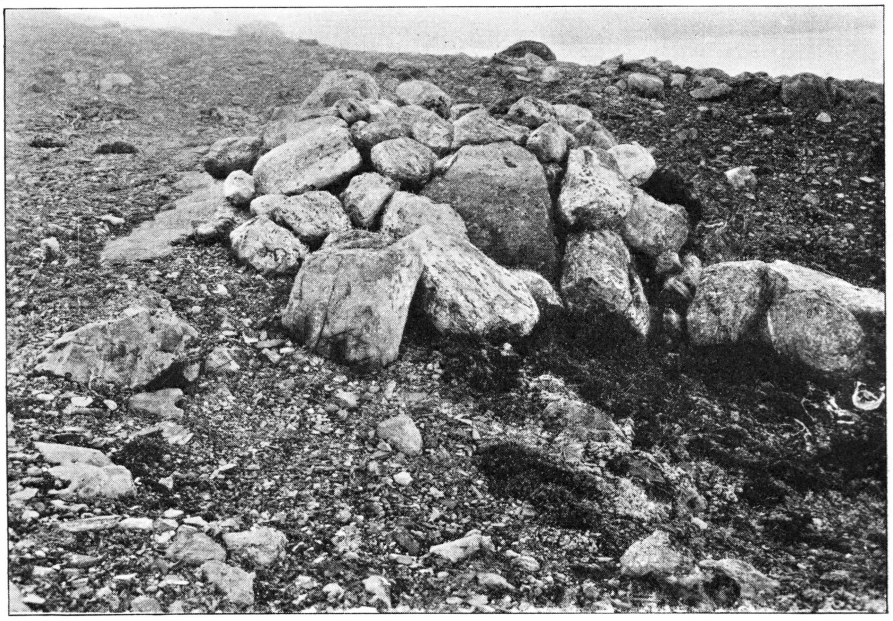

Fig. 3.

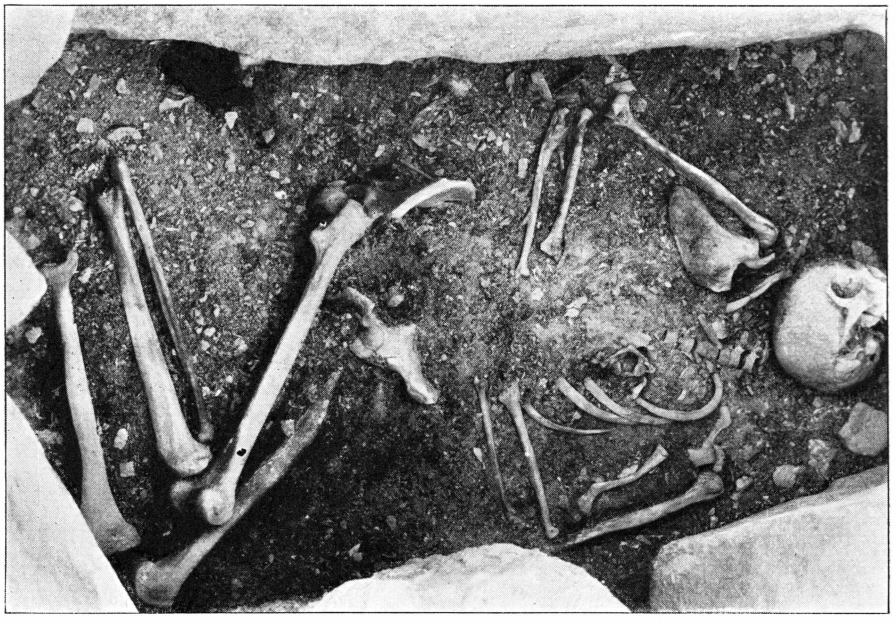

Fig. 4.

Ausg. 1928, and in the tables the number given in that work is entered opposite every measurement. In the very few instances where special measurements were used, that fact is stated.

In the comparisons of the various values, consideration has of course first been given to other Eskimo groups; next, however, a comparison is made with another arctic or subarctic people of low stature, i. e. the Lapps. This latter comparison is presumably of interest too, for, like the Eskimos, in the opinion of several anthropologists the Lapps are of Asiatic descent, however different the two races may be in many respects. Finally, in several cases a comparison is made with an entirely different race, the Scandinavian, Norwegians of the Middle Ages. On these two races we have execellent works by K. E. SCHREINER[1]) and K. WAGNER[2]), and the methods of measuring in those works are essentially the same as those in the present paper.

The length of the humerus of the Greenland Eskimo is small, the lowest value for males being 280 mm, for females 255, or 5 mm lower than the measurement given in MARTIN as the lowest. The greatest

Table 1. Humerus.

Measures & Indices	Males								
	West & Southeast Greenland							Northeast Greenland	
	No	M	σ	v	r	l	pair No	No	M
Maximum length..... M 1	56	306.7	12.47	4.07	308.8	305.0	23	11	309.4
Caput-capital length.. - 2	50	302.6	12.93	4.27	304.5	300.4	17	10	306.6
Prox. epiphysis breadth - 3	26	46.7	2.61	5.59	49.3	47.1	7	9	49.4
Max. breadth of caput - 9	28	40.8	..	..	43.4	41.3	9	8	43.5
Max. height of caput. -10	31	42.5	..	..	44.0	43.6	10	9	46.3
Circ. along margin of cartilage..... - 8	26	132.4	..	..	139.4	135.4	9	8	143.1
Max. diam. at middle. - 5	57	22.7	1.67	7.37	23.9	22.8	22	11	26.5
Min. diam. at middle. - 6	58	16.8	1.34	8.0	17.2	16.9	22	11	19.2
Circumf. at middle... - 7a	56	66.6	4.53	6.80	69.3	67.6	22	11	75.7
Min. circum. diaphysis - 7	56	61.0	..	..	63.1	61.8	21	11	69.9
Length-thickness index $\frac{M7 \times 100}{M1}$	55	19.9	1.00	6.01	20.4	20.2	21	11	22.7
Distal epiphysis br. .. M 4	30	57.3	..	..	60.4	60.5	8	9	63.2
Condylo-diaph. angle . -16	31	83°.7	..	..	83°.5	84°.1	8	6	84°.7
Torsion ..... -18	27	149°.3	8.68	5.82	141°.0	147°.5	10	10	129°.6
Diaph. trans. sec. index $\frac{M6 \times 100}{M5}$	57	74.2	5.87	7.91	72.4	75.1	21	11	72.4

[1]) K. E. SCHREINER, Zur Osteologie der Lappen. Oslo 1935.
[2]) K. WAGNER, Mittelalterknochen aus Oslo. Oslo 1927.

Humerus.

Measures & Indices	Females								
	West & Southeast Greenland							Northeast Greenland	
	No	M	σ	v	r	l	pair No	No	M
Maximum length..... M 1	55	280.0	11.24	4.02	285.4	279.7	15	10	284.5
Caput-capital length .. - 2	48	276.0	11.78	4.27	279.9	275.6	14	10	281.5
Prox. epiphysis breadth - 3	27	40.4	1.72	4.25	42.0	42.0	6	7	44.1
Max. breadth of caput - 9	33	34.8	..	..	35.8	36.0	10	8	38.3
Max. height of caput. -10	34	37.6	..	..	38.1	38.3	9	7	40.9
Circumference..... - 8	28	115.6	..	..	118.0	117.3	6	7	124.6
Max. diam. at middle. - 5	56	20.1	1.34	6.67	20.6	20.1	16	10	21.4
Min. diam. at middle . - 6	56	15.0	1.28	8.55	15.1	14.8	16	10	15.8
Circumf. at middle... - 7a	56	58.8	3.46	5.88	60.6	58.9	16	10	63.0
Min. circumf. diaphysis - 7	56	53.7	..	..	55.1	53.7	16	10	58.3
Length-thickness index $\frac{M7 \times 100}{M1}$	49	19.2	1.32	6.89	19.3	19.2	13	8	20.7
Distal epiphysis br. .. M 4	18	51.3	..	..	53.3	53.8	4	7	55.6
Condylo-diaph. angle . -16	21	85°.3	..	..	84°.2	84°.0	5	8	83°.9
Torsion ..... -18	26	150°.9	9.50	6.30	155°.0	156°.3	8	10	139°.6
Diaph. trans. sec. index $\frac{M6 \times 100}{M5}$	52	74.8	6.33	8.46	72.8	73.2	14	11	73.5

length is 337 for males and 310 for females. A comparison with different groups, Eskimos and others, gives the following:

Table 2. Maximum Length of Humerus.

Group	Males		Females		Author
	No.	Measure	No.	Measure	
Eskimos, W. & SE. Greenland.	56	306.7	55	280.0	Fischer-Møller
Alaska Eskimos, SW. & Central groups	143	306.9	136	284.0	Hrdlička[1])
Seward Peninsula	261	314.2	26	287.5	—
Pt. Barrow (old igloos).....	35	311.7	27	288.2	—
Central Eskimos	10	311.3	6	(265.5)	Fischer-Møller[2])
Northeast Greenland.....	11	309.4	10	284.5	—
U. S. Indians.....	523	315.0	386	289.0	Hrdlička[3])
Lapps.....	198	306.7	163	283.5	Schreiner[4])
Norwegians (mediaeval)	314	335.7	312	310.5	Wagner[5])

[1]) In 46th Ann. Rep. of B. of Am. Ethn. Wash. 1930, p. 314.

[2]) K. Fischer-Møller, l. c., pp. 51—53.

[3]) Hrdlička. The principal dimensions, absolute and relative, of the humans n the white race. Am. J. of Phys. Anthrop. Vol. XVI. Phil. pp. 431—450.

[4]) K. E. Schreiner, l. c. Vol. I, p. 208.

[5]) K. Wagner, l. c. p. 72.

With the exception of the very small group of 6 female humeri of Central Eskimos, the dimensions in the Eskimo groups are very similar, though most of the Western Eskimos and the Northeast Greenlanders have a rather longer humerus than the West and Southeast Greenlanders. However, the large group from Middle-west and Southwest Alaska — of which a large part came from St. Lawrence Island — have practically the same size as far as the men are concerned, whereas the mean value for the male Lapps is of exactly the same height. These two arctic races both have a short humerus compared especially with the Scandinavian race. Negroes, too, have a very considerable length of the upper arm.

The sexual index for the maximum length of humerus is 90.6, a rather low value; for Lapps, for instance, it is 92.4.

Eskimo humeri follow the general rule that the right is longer than the left. For 23 male pairs the difference is 3.8 mm, for 15 female pairs 5.7. Of the 23 male pairs the left is longer than the right in only one case, in three cases they are of equal length. Of the 15 female pairs there is likewise only one case of a longer left than right, but there are none of equal length.

As in the case of Lapps and Norwegians, it holds good of Eskimos that the greatest lengths (and physiological lengths) are those which have the least relative variation (variation coefficient).

The difference between greatest length and physiological length is almost the same for both sexes, 4.1 and 4 mm, which is a rather smaller difference than for Lapp humeri, due to the fact that trochlea does not extend so far down; this is also to be seen in the size of the condylo-diaphysis angle.

The length-thickness index is rather low, 19.9 for males, 19.2 for females, which is lower than for Lapp humeri; this is a result of the lower value of the minimum circumference in the Greenland Eskimos.

The index of the caput transverse section is 96.0 for males, 92.6 for females; this is a rather high average for males, but it follows the rule that the thickest humeri have a more spherical caput.

The diaphysis transversal index is 74.2 for males, 74.8 for females. For both males and females the index is higher on the left than on the right side. A higher index for females than for males also occurs among the Eskimos from the old graves at Point Barrow (HRDLICKA), where the transverse-sectional index at the middle for (35) males is 75.2, and for females 76.1. This is not a constant feature in all Eskimo groups, however. Among the Lapps there is very little difference between males and females, and there again the index for the left is higher than for the right side, whereas for mediaeval Norwegians the index is much

higher for males than for females, but again higher for the left than for the right side.

For the Greenland Eskimos the shape of the transverse section must be typified as platybrachial.

The condylo-diaphysis angle is 83°.7 for males, 85°.3 for females. In males the right is smaller than the left, but not in females, but as there are only 8 pairs of humeri, this is hardly of much significance. On the other hand the size of the condylo-diaphysis angle is considerable, especially for females. MARTIN records Senoi with an angle of 83°.7, and Paltacalo Indians with 84°. For Lapps SCHRIENER has 82°.7, for both males and females. The large size of the angle, which presumably is to be regarded as a primitive feature, is due to the more horizontal trochlea; the most conspicuous feature of Greenland Eskimo humeri is the horizontal trochlea and the slight torsion.

Torsion. For males the torsion is 149°.3, for females 150°.9, which means that they follow the general rule that the torsion is greater in females than in males; and if we examine the pairs of humeri — few in number, it is true — we find that they also conform to the rule that torsion is greater on the left side than on the right. Compared with other races, European especially, the torsion is low; that of the Lapps is also low, 154°.1 for males, 156°.4 for females, lower than most Europeans', and, as with the Eskimos, the difference in torsion between the two sexes is less than among Europeans, especially Scandinavians. Presumably this is connected — as SCHREINER points out[1]) — with the slight difference between the sexes as far as robusticity is concerned. Possibly this may be due to the fact that in these races the women often have to use their arm muscles just as vigorously as the men; in Greenland it is usually the women who row the large boats (the umiak).

The few humeri from Naujan (Central Eskimos) do not differ much from those from Greenland. The average torsion angle for 7 males is 145°.5, and for 5 females 148°.0. The 10 male and 10 female humeri from Northeast Greenland have for both sexes a torsion angle so low as 139°.6 (Paltacalo Indians 138°.5). For 85 Eskimo humeri (male and female) measured by the writer the average is 147°.1, which according to MARTIN[2]) closely approaches that for Veddas, Japanese and Birmans.

Processus supracondyloid was found only in rudimentary form on a single humerus from the Southeast coast, whereas perforatio fossae olecrani is frequent; it occurs in 19 % of the male and in 50 % of the female humeri.

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[1]) K. E. SCHRIENER, l. c. p. 211.

[2]) MARTIN, l. c. p. 1106.

Table 3. Contains the principal measurements of radius.

Measures & Indices	Males					
	West & Southeast Greenland				Northeast Greenland	
	No	M	σ	v	No	M
Maximum length ..... M 1	42	222.5	7.21	3.29	9	226.4
Physiol. length ..... - 2	44	209.6	6.89	3.29	11	211.4
Min. circumference at middle .. - 3	44	41.0	2.69	6.56	11	46.0
Transversal diam. of diaphysis . - 4	44	15.5	1.44	9.29	11	17.5
Sagittal — — . - 5	44	10.9	0.86	7.89	11	12.1
Length-thickness index $\frac{M3 \times 100}{M2}$	43	19.6	..	..	11	21.8
Diaphysis-transvers. index $\frac{M5 \times 100}{M4}$	43	70	..	..	11	69.9
	Females					
Maximum length ..... M 1	40	201.7	6.92	3.43	6	208.7
Physiol. length ..... - 2	40	191.7	7.46	3.90	7	196.4
Min. circumference at middle .. - 3	38	35.3	2.39	6.75	7	37.6
Transversal diam. of diaphysis . - 4	38	14.1	1.18	8.37	7	15.0
Sagittal — — . - 5	38	9.4	0.76	8.09	7	10.0
Length-thickness index $\frac{M3 \times 100}{M2}$	38	18.3	..	..	7	19.1
Diaphysis-transvers. index $\frac{M5 \times 100}{M4}$	38	67.1	..	..	7	66.7

As the table shows, the standard deviation and the variation coefficient are small for the length measurements of radius, for both males and females. The Greenland Eskimos have small radii, unusually short: the shortest female radius is 180 mm, the longest male radius 253 mm. Nine pairs of male and eight pairs of female radii have the right larger than the left — males 1.6 mm, females 2.1 mm.

In proportion to stature the radius of the Southeast and West Greenlanders represents 14 %, that of the Lapps 14.4 %, and of Norwegians (mediaeval) 15.1 %.

A comparison of the measurements with those of other groups is given in Table 4.

From this it appears that the Alaska Eskimos have much longer radii than both Greenland Eskimos and Central Eskimos, and this applies especially to the Alaska Eskimos from the old graves at Point Barrow. As was the case with humeri, the Northeast Greenlanders have longer and more massive bones than the other Greenlanders.

The length-thickness index gives great massiveness compared with that of most native races — see MARTIN 2nd ed., p. 1109. The nearest

Table 4.

	Males				Females			
	No	M	length-th. Ind.	diaph.-transv. Ind.	No	M	length-th. Ind.	diaph.-transv. Ind.
Eskimos, W. & SE. Greenlanders	42	222.5	19.6	70.0	40	201.7	18.3	67.1
Northeast Greenlanders	9	226.4	21.8	69.9	6	108.7	19.1	66.7
Alaska Eskimos, Central & SW. groups	98	229.0	..	..	109	205.0	..	..
Pt. Barrow (old igloos)	31	235.3	..	..	17	209.8	..	..
Central Eskimos	8	224.6	21.5	67.0	8	199.1	20.4	67.0
Lapps	238	227.1	20.3	65.1	194	207.7	19.0	63.9
Norwegians (mediaeval)	253	253.0	19.3	67.3	171	233.1	17.9	69.1

on this point are the Japanese, with a length-thickness index of 20.2; they have also very nearly the same radius length, males 223.0 and females 203.0.

The diaphysis cross-section index is rather higher for Greenland Eskimos than for Lapps, due especially to the fact that the transversal

Table 5. Ulna.

Measures & Indices	Males					
	West & Southeast Greenland				Northeast Greenland	
	No	M	σ	v	No	M
Maximum length M 1	27	242.6	7.47	3.08	6	252.3
Physiol. length - 2	32	213.9	6.49	3.03	7	218.1
Minimum circumference - 3	31	34.5	2.12	6.12	7	39.0
Transversal diameter - 12	32	15.3	1.26	8.24	7	17.4
Sagittal — - 11	31	12.3	1.26	10.24	7	14.7
Length-thickness index $\frac{M3 \times 100}{M2}$	31	16.1	..	..	7	17.9
Diaphysis transv. section index $\frac{M11 \times 100}{M12}$	32	81.1	..	..	7	84.7
	Females					
Maximum length M 1	24	221.3	7.64	3.45	8	230.8
Physiol. length - 2	29	195.6	7.46	3.81	8	201.8
Minimum circumference - 3	29	31.2	1.63	5.22	8	31.8
Transversal diameter - 12	27	13.4	1.21	9.03	7	13.9
Sagittal — - 11	27	10.7	0.89	8.32	8	11.4
Length-thickness index $\frac{M3 \times 100}{M2}$	29	15.9	..	..	8	15.8
Diaphysis transv. section index $\frac{M11 \times 100}{M12}$	27	80.2	..	..	7	82.0

diameter is greater in the Lapps. In both Eskimos and Lapps the relative variation of sagittal and transversal diameters is great; both races have very nearly the same variation coefficient. This circumstance, that the transversal diameter (i. e. crista) is relatively small compared with that of the Lapps, is striking; if we may take it that the development of crista is in direct relation to the development of the musculature[1]), one would think that in a race just such as the Eskimos the fore-arm muscles would be particularly well developed. Perhaps it is of some significance that the hands of the Eskimos are small and gracile.

Length of hand, Lapps ..... ♂ 184 ♀ 173[2])
— Eskimos, SW. Greenland ..... ♂ 175 ♀ 165[3])

It is perhaps most likely that the less developed crista, like the gracility of the hand, is a characteristic peculiar to the race.

The principal measurements of ulna are given in Table 5.

Like that of radius, the length of ulna is small. To the writer's knowledge nothing has been published on the Eskimo ulna. Some figures are given below for other races.

Table 6.

Group	Males		Females		
	Max. L.	Physiol.L.	Max. L.	Physiol.L.	Author
W. & SE. Greenlanders	(27)242.6	(32) 213.9	(24)221.3	(29) 195.6	FISCHER-MØLLER
NE. Greenlanders	(6)252.3	(7) 218.1	(8)230.8	.. 201.8	—
Lapps.....	(197)246.1	.. 215.3	(172)224.9	.. 197.8	SCHREINER
Ainu.....	♂ + ♀	.. 212.5	.. ..	.. ..	FISCHER
Japanese	♂ + ♀	.. 220.5	.. ..	.. ..	—
Norwegians (mediaeval)	(148)275.2	.. 243.2	(133)251.2	.. 221.9	WAGNER

The shortest Eskimo ulna is 199, the next shortest 212, the longest 270 (Northeast Greenland). The physiological length of ulna is greater than for radius, being 4.3 mm greater for males, 4.5 mm for females. Of pairs of bones there are only 5 male and 9 female. Of the males, right and left are of exactly the same length; of the females, right is a fraction longer than left.

In massivity the Eskimo ulna is less than that of the Lapps, as was the case with radius. Like those of the Lapps they show very little sexual difference in the length-thickness index, whereas for radius the difference was considerable for both Lapps and Eskimos.

[1]) WAGNER, l. c. p. 58.
[2]) GJESSING, Kautokeinolapper, p. 43.
[3]) Own investigations.

The massivity of ulna in the Eskimos approaches that of Europeans, whereas most native peoples have gracile ulnae[1]).

The diaphysis transversal section index is somewhat higher for males than for females, and the same applies to the Lapps. In ulna as in radius the variation coefficient for transversal and sagittal diameters is particularly high.

Table 7. Femur.

Measures & Indices	Males								
	West & Southeast Greenland							Northeast Greenland	
	No	M	σ	v	r	l	pair No	No	M
Max. length..... M 1	74	426.7	16.40	3.84	427.1	427.6	26	9	433.3
Length in nat. position - 2	81	424.4	15.94	3.76	424.0	424.7	27	9	432.1
Trochanter length in nat. position..... - 4	56	397.0	..	..	394.8	396.6	16	6	415.7
Diaphysis length..... - 5	76	329.1	15.30	4.65	329.7	329.3	26	9	336.0
Proximal breadth .... - 13	54	92.9	..	..	93.6	93.7	14	8	98.5
Sagittal diam. dia- - 6	85	29.1	..	..	28.9	28.5	31	9	31.0
Transvers. — physis - 7	85	26.2	..	..	26.2	26.2	29	9	28.0
Circumference middle - 8	85	87.4	..	..	86.9	86.7	31	9	93.7
Prox. transv. diameter - 9	84	30.6	..	..	30.1	30.6	30	9	32.3
— sagittal — - 10	84	25.9	..	..	25.3	25.8	30	9	29.2
Min. distal sagitt. diam. - 11	75	27.1	..	..	26.9	27.4	29	9	28.7
Distal transvers. — - 12	78	43.2	..	..	43.7	42.9	29	9	44.0
Vertical diam. of collum - 15	71	31.2	..	..	30.9	30.9	22	9	32.8
Sagittal — — - 16	69	25.2	..	..	24.9	24.3	21	9	28.9
Circumf. — — - 17	69	92.6	..	..	90.7	90.6	21	9	100.8
Vertical diam. of caput - 18	45	43.9	..	..	44.8	44.3	9	9	47.8
Sagittal — — - 19	43	44.3	..	..	45.2	44.7	9	9	48.3
Circumf. — — - 20	39	141.2	..	..	142.1	141.2	8	6	153.0
Epicondyl breadth ... - 21	41	78.5	..	..	79.6	79.5	11	4	86.0
Collo-diaphysis angle . - 29	81	128°.3	..	..	126°.9	129°.3	28	9	124°.6
Condylo-diaphys. angle - —	66	80°.9	..	..	81°.2	80°.6	22	6	81°.0
Torsion ..... - 28	71	15°.1	7.00	9.86	15°.4	15°.5	24	—	—
Index platymericus $\frac{M10 \times 100}{M9}$	84	84.94	7.14	8.41	84.3	84.2	30	9	90.4
— pilastricus $\frac{M6 \times 100}{M7}$	85	111.5	..	..	110.4	109.4	31	9	110.7
— robusticitatis $\frac{M(6 \times 7) \times 100}{M2}$	80	13.1	..	..	13.0	12.9	26	9	13.7
Length-thickness index $\frac{M8 \times 100}{M2}$	80	20.7	11.0	5.32	20.5	20.4	26	9	21.7

[1]) E. Fischer, Zeitschrift f. Anthrop. u. Morphologie, Vol. IX 1906, p. 200.

Table 8. Femur.

Measures & Indices	Females								
	West & Southeast Greenland							Northeast Greenland	
	No	M	σ	v	r	l	pair No	No	M
Maximal length ..... M 1	82	392.4	16.40	4.18	394.3	393.4	31	7	413.3
Length in nat. position - 2	84	389.2	16.70	4.29	391.0	390.0	32	9	399.3
Trochanter length in nat. position..... - 4	44	366.0	..	..	365.2	363.4	12	6	389.3
Diaphysis length..... - 5	75	306.3	14.0	4.57	306.7	305.0	26	9	313.5
Proximal breadth .... - 13	47	85.1	..	..	84.9	85.9	13	7	90.0
Sagittal diam. } dia- - 6	84	26.9	..	..	27.3	27.1	32	9	27.8
Transvers. — } physis - 7	84	24.4	..	..	24.6	24.8	32	9	24.7
Circumference } middle - 8	84	81.5	..	..	82.2	82.0	32	9	82.6
Prox. transvers. diam. - 9	81	28.8	..	..	28.5	29.1	29	8	29.3
— sagittal — - 10	83	24.2	..	..	24.1	24.3	31	8	24.9
Min. distal sagitt. diam. - 11	73	24.3	..	..	23.9	24.2	24	8	25.5
Distal transvers. — - 12	75	39.7	..	..	39.9	39.5	27	8	43.3
Vertical diam. of collum - 15	67	28.1	..	..	28.1	28.0	22	9	28.1
Sagittal — — - 16	66	22.7	..	..	22.7	22.4	22	8	24.0
Circumf. — — - 17	66	83.6	..	..	83.7	83.1	22	8	85.9
Vertical diam. of caput - 18	40	39.3	..	..	39.2	39.2	11	9	40.7
Sagittal — — - 19	37	39.8	..	..	39.5	39.2	11	7	42.1
Circumf. — — - 20	32	125.8	..	..	126.4	125.9	9	6	132.8
Epicondyl breadth ... - 21	38	70.6	..	..	71.5	71.0	10	6	75.5
Collo-diaphysis angle . - 29	77	128°.7	..	..	128°.2	129°.3	29	8	124°.9
Condylo-diaph. — .. —	65	80°.3	..	..	80°.8	79°.8	21	6	80°.8
Torsion..... - 28	67	14°.5	7.86	5.44	14°.2	14°.3	23	—	—
Index platymericus $\frac{M10 \times 100}{M9}$	83	84.9	7.01	8.26	86.1	83.8	32	8	85.3
— pilastricus $\frac{M6 \times 100}{M7}$	84	110 7	..	..	111.2	109.4	32	9	112.7
— robusticitatis $\frac{M(6 \times 7) \times 100}{M2}$	84	13.2	..	..	13.2	13.3	32	9	13.2
Length-thickness index $\frac{M8 \times 100}{M2}$	84	20.94	12.23	5.84	20.98	20.96	32	9	20.72

The length in natural position for males is 424.4, for females 389.0, which gives a sex index of 91.9. The lowest value is 354, the highest 480.

A comparison of the length in natural position in various groups is given in the following table.

Table 9.

Group	Males				Females				Author
	No	M	σ	v	No	M	σ	v	
Eskimos, W. & SE. Greenl.	81	424.4	15.94	3.76	84	389.2	16.7	4.29	FISCHER-MØLLER
— NE. coast	9	432.6	..	..	9	399.3	..	..	—
Cent. Eskimos (Naujan).	12	432.6	..	..	6	393.9	..	..	—
Alaska Esk., W. & SW..	195	425.0	..	..	132	393.6	..	..	HRDLIČKA
Seward Peninsula.....	44	432.0	..	..	26	401.2	..	..	—
Pt. Barrow (igloos)	33	438.6	..	..	25	403.1	..	..	—
Lapps.....	305	410.4	22.57	5.50	259	381.1	18.10	4.77	SCHREINER
Norwegians (mediaeval).	521	462.8	21.0	4.54	493	417.4	19.0	4.57	WAGNER

For the large group of Alaskan Eskimos in the central and southwest regions the length of femur proves to be very near to that of the west and southeast Greenlanders, just as was the case with humeri, and also to some degree with tibia. In a racial characteristic so important as stature the two groups are very closely related.

On the other hand, the Eskimos from the old graves at Point Barrow have much longer femora than both Greenlanders and the central and southwesterly Alaskan Eskimos.

The northeast-coast Eskimos and the Central Eskimos seem to approach each other very closely, if we may judge from the small figures for these groups. The Eskimo femur is small as compared for instance with the Nordic race, and indeed with small southern Europeans, especially as regards males, for example the Portuguese[1]): males 444.9, females 399.3; but whereas the Lapps have a greater length for the upper extremities, the Lapp femora are much shorter than those of the Eskimos.

It may be said of the length in natural position, and of the maximum length and the trochanter length, that the left is greater than the right in males, whereas the diaphysis length is slightly greater for right than for left; for females all the measurements are slightly longer on the left than on the right side.

Length-thickness index is almost the same for males as for females, and also left and right, as well as being rather high compared with other races, the Mongoloids being nearest[2]). Index robusticitatis is almost the same for both sexes and for both sides, being very high, almost as high as in the Japanese, whom MARTIN records as having the most massive femora, whereas negroes have the most gracile, 11.8. Europeans stand midway between as regards the massivity of the bones.

[1]) Quoted from SCHREINER, l. c. p. 292.

[2]) MARTIN, l. c. p. 1133.

For his mediaeval femora from Oslo WAGNER records 19.6 for males, 19.0 for females.

Pilastric index for our Eskimos is high: males 111.5, females 110.7; for both males and females (measured on pairs of bones) it is greater for the right than for the left side. For the Alaskan Eskimos (central and southwesterly groups) it is 114.1 for males, 109.3 for females. For the Central Eskimos (Naujan) 111.6 and 108.1. This latter index is high, higher than for Europeans and nearest East Asiatic peoples and Indians. Prehistoric Japanese have 110.4, whereas present-day Japanese have a low pilastric index (103—100).

The high value of Index platymericus conforms very well with the high pilastric index. The writer does not feel competent to discuss the origin of platymeria, but most investigators seem to assume[1]) that platymeria is associated with a low pilastric index and eurymeria with a high one, though several and other factors assert themselves in the formation of platymeria. Greenland Eskimos are pronouncedly eurymeric, and the same is the case with the Central Eskimos (Naujan): males 83.0, females 85.8. The Alaskan Eskimos, on the other hand, seem to have a much lower platymeric index. It may be that different measuring techniques are partly to blame for this.

The collo-diaphysis angle is also assumed to have some relation to platymeria, a low collo-diaphysis angle being connected with pronounced platymeria, and vice versa[2]). For males the collo-diaphysis angle is 128°.3, for females 128°.9. Thus it is slightly larger for females than for males, which is stated to be the case in most groups — but with several exceptions. That of the Greenland Eskimos is almost identical with that of the Japanese.

The torsion angle is very variable, with marked standard deviations, the lowest value being 0°, the highest 33° for both males and females. It is a trifle larger for males than for females in the present material. In most groups the opposite is the case, e. g. for Lapps, where for males it is almost the same, 15°.4, as for Eskimos, whereas for females it is 17°.9, female Eskimos having 14°.5; but if the cause of the greater torsion in females is that the massivity of female bones is less than that of male bones, the position among the Eskimos is easily understood, as both length-thickness index and robusticity index are somewhat higher in females than in males; this does not seem to be so among the Lapps.

The robusticity index of caput femoris is 20.8 for males, 20.3 for females.

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[1]) WAGNER, l. c. p. 101.
[2]) WAGNER, l. c. p. 105.

The caput transversal section index is over 100 for both sexes, males 100.9, females 101.3. According to MARTIN, the mean of most groups lies between 99 and 100, but sometimes reaches 101. These measurements vary a great deal; for instance, WAGNER states that for Norwegians (in the Middle Ages) in 30 per cent. he found the sagittal diameter to be as great — rarely greater — than the vertical. It is, however, safe to describe these proportions for Eskimo femora as being definitely primitive.

The condylo-diaphysis angle, measured as the angle between the vertical line and the diaphysis axis, amounts to 9°.1 for males and 9°.7 for females, conforming to the general rule that the angle is greater for females than for males on account of the greater breadth of the female pelvis; most values for the various groups lie very close to one another, and the angle is scarcely of much racial significance.

Whereas linea aspera is strongly developed and the pilastric index is high, the muscle attachments in regio infra-trochanterica are not particularly strong. Fossa and crista hypotrochanterica are only faintly pronounced on the whole, and in only 9 per cent. is there a trochanter tertius proper.

Table 10. Tibia.

Measures & Indices	Males					
	West & Southeast Greenland				Northeast Greenland	
	No	M	σ	v	No	M
Maximum length ..... M 1a	61	337.4	..	..	9	371.4
Total length ..... - 1	68	331.7	13.65	4.10	9	363.6
Length according to MOLLISON - 1b	63	327.4	..	..	9	361.7
Physiological length..... - 2	69	316.7	..	..	9	347.3
Sagittal diam. at foram. nutrit. - 8a	68	32.0	2.40	7.50	9	34.7
Transvers. — — - 9a	67	22.5	1.93	8.58	9	24.9
Sagittal diameter of middle... - 8	70	27.4	1.88	6.86	9	31.7
Transvers. — — ... - 9	70	19.9	1.71	8.59	9	22.4
Circumference — ... - 10	70	75.9	..	..	9	87.1
Min. circumference of diaphys.. - 10b	69	70.2	3.43	4.89	9	78.6
Length-thickness index $\frac{M\,10b \times 100}{M\,1}$	65	21.2	..	..	9	21.7
Max. proxim. epiphys. breadth. M 3	37	72.3	..	..	3	82.3
— distal — — . - 6	41	46.6	..	..	6	50.7
Torsion angle ..... - 14	63	17°.5	..	..	7	13°.1
Index cnemicus $\frac{M\,9a \times 100}{M\,8a}$	65	70.8	..	..	9	71.9
Diaphysis transvers. index $\frac{M\,9 \times 100}{M\,8}$	70	72.8	..	..	9	70.9

Table 11. Tibia.

Measures & Indices	Females					
	West & Southeast Greenland				Northeast Greenland	
	No	M	σ	v	No	M
Maximum length ..... M 1a	55	313.3	..	..	8	341.8
Total length ..... - 1	59	306.6	11.98	3.55	8	335.3
Length according to MOLLISON - 1b	51	302.8	..	..	8	332.6
Physiological length..... - 2	60	294.1	..	..	9	320.0
Sagittal diam. at foram. nutrit.. - 8a	59	28.9	2.34	8.10	9	30.4
Transvers. — — . - 9a	60	20.3	1.65	8.13	9	21.8
Sagittal diameter of middle... - 8	61	25.2	1.46	5.79	9	27.6
Transvers. — — ... - 9	61	18.1	1.41	7.79	9	19.4
Circumference — ... - 10	60	70.1	..	..	9	75.6
Min. circumference of diaphys. - 10b	61	65.0	3.77	5.80	9	69.2
Length-thickness index $\frac{M\,10b \times 100}{M\,1}$	59	21.2	..	..	8	20.4
Max. proxim. epiphys. breadth. M 3	26	66.5	..	..	6	71.7
— distal — — . - 6	28	42.1	..	..	6	46.7
Torsion angle ..... - 14	49	14°.4	..	..	8	15°.1
Index cnemicus $\frac{M\,9a \times 100}{M\,8a}$	58	70.2	..	..	9	71.6
Diaphysis transvers. index $\frac{M\,9 \times 100}{M\,8}$	59	71.9	..	..	9	70.7

Of 23 pairs of male and 17 pairs of female tibiae, the right tibia is slightly longer than the left, 1 mm in males and 0.4 mm in females.

The lowest value for the maximum length is 282 mm, the greatest 409 (Northeast Coast); the lowest value recorded (in MARTIN) is 280 mm.

The sex index of maximum length is 92.9. Table 12 is obtained from comparisons with other groups.

Table 12.

	Males			Females			Author
	No	Total length	Physiol. length	No	Total length	Physiol. length	
W. & SE. Greenlanders.....	68	331.7	316.7	59	306.6	294.1	FISCHER-MØLLER
Northeast Coast —.....	9	363.6	347.3	9	332.6	320.0	—
Alaskan Eskimos, S. & SW..	141	338.6	..	147	313.2	..	HRDLICKA
Seward Peninsula.....	35	345.2	..	18	319.0	..	—
Pt. Barrow (igloos).....	29	356.0	..	24	319.4	..	—
Central Eskimos (Naujan) ...	6	350.0	335.5	5	326.2	..	FISCHER-MØLLER
Lapps	306	324.2	306.7	257	299.9	283.9	SCHREINER
Norwegians (mediaeval)	569	369.3	338.1	544	331.1	304.2	WAGNER

Greenland Eskimos on the west and southeast coast have short tibiae compared with those of other Eskimo groups. As is the case with the other long extremity bones, the nearest to the Greenland Eskimos is the central and southwesterly group of the Alaskan Eskimos, whose male tibiae are 6.9 mm longer, and female tibiae 6.6 mm. The Eskimos in the old graves at Point Barrow had tibiae that were very much longer, while the greatest length has been measured on the small group from the northeast coast, where the figures, as for those of the other bones, must be taken with all possible reserve on account of the small number.

The difference between the maximum length and the whole length (length without eminentia intercondyloidea) is 5.7 for males, which is exactly the same value as for Lapp tibiae; for females it is 6.7 mm, whereas for Lapp females it is 5 mm. For Norwegians (Middle Ages) the difference is 5.3 and 5.1. Accordingly, the Eskimos seem to have a relatively large eminentia intercondyloidea, and larger in females than in males.

The length-thickness index is 21.2 for both sexes; here the values closely approach those of the Lapps.

The epiphyses are very strongly developed, the proximal epiphysis for males being 72.3 and for females 66.5. Among the Lapps the value for males is 1 mm higher, and for females 1 mm lower, and we find the same proportions for the distal epiphyses:

Eskimos	♂ 46.6	♀ 42.1
Lapps	♂ 46.6	♀ 41.7

Diaphysis transverse section index — Index cnemicus — at foramen mitrit is for

males 70.8, for females 70.2
at the hiatus, males 72.8, females 71.9.

From side to side the applanation is less than in many primitive races, almost like that of most present-day Europeans. The
is greater in females than in males, contrary to what is mostly the case. The cause of this may be that Eskimo women have to use their lower extremities a great deal; as a rule their work takes them more among the rocks than the men, whose hunting in kayaks does not strain the leg muscles particularly.

As far as tibia is concerned the small group from the northeast coast has both longer and more powerful bones. The other Eskimo groups — the Alaskan Eskimos — have a lower index cnemicus 67.5—67.9 in males, and as a rule one or two female individuals higher; the exception, however, is provided by the old graves at Point Barrow, where the female tibiae are more platycnemic than those of the males.

The torsion is very low, 17°.5 for males and 14°.4 for females. The nearest to this low value are the Japanese with 14°. The Japanese also have a very low torsion of femur, like the Eskimos. This may probably be due to the placing of the foot; the broad-tracked "bear-like" gait in kamiks with soft soles must without doubt contribute greatly to the low torsion, a gait which, with the toes turned rather inwards, is more pronounced among the women, and certainly was still more so among the Eskimos from whom these skeletal parts have come.

Table 13. Fibula.

Measures & Indices	Males					
	West & Southeast Greenland				Northeast Greenland	
	No	M	σ	v	No	M
Maximum length ..... M 1	29	327.7	14.9	4.55	6	357.7
Minimum circumference ..... - 4a	20	35.1	2.63	7.49	6	37.5
Length-thickness index.....	29	10.8	7.62	7.04	6	10.6
	Females					
Maximum length ..... M 1	23	301.6	10.65	3.53	7	338.6
Minimum circumference ..... - 4a	23	31.6	2.70	8.54	6	33.5
Length-thickness index.....	23	10.5	9.08	8.66	6	9.9

The mean maximum length is for

West and Southeast Greenlanders	♂ 327.7	♀ 301.6
Lapps.....	♂ 323.4	♀ 298.0

The ratio of the maximum length of fibula to the whole length of tibia is 98.8 for males, 98.4 for females. For Lapps the same index is 99.8 for males, 99.4 for females. Thus the Eskimos have a relatively short fibula. The sex index for maximum length is 92.0, for Lapps 92.15.

The length-thickness index is a trifle lower in Eskimos than in Lapps:

Eskimos.....	♂ 10.8	♀ 10.5
Lapps.....	♂ 11.0	♀ 10.7.

A rather high value for both races.

Skeletal Proportions.

For West and Southeast Greenlanders we arrive at the following:

1) Radio-humeral index:

$$\frac{\text{Maximum length of radius} \times 100}{\text{Maximum length of humerus}} \quad \text{♂ } 72.5 \quad \text{♀ } 72.0$$

2) Tibio-femoral index:

$$\frac{\text{Whole length of tibia} \times 100}{\text{Length of femur in nat. position}}$$ ..... ♂ 78.2, ♀ 78.8

3) Intermembral index:

$$\frac{\text{Humerus} + \text{radius} \times 100}{\text{Femur} + \text{tibia}}$$ ..... ♂ 70.0, ♀ 69.2

4) Humero-femoral index: ..... ♂ 72.3

$$\frac{\text{Humerus} — \text{max. length} \times 100}{\text{Length of femur in nat. position}}$$ ..... ♀ 71.9

5) Radio-tibial index: ..... ♂ 67.1

$$\frac{\text{Radius} — \text{max. length} \times 100}{\text{Whole length of tibia}}$$ ..... ♀ 65.8

The proportional values of other Eskimo groups and of Lapps and Norwegians are compared in Table 14.

Table 14.

	Radio-humeral index		Tibio-humeral index		Inter-membral index		Humero-femoral index		Radio-tibial index	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
W. & SE. Greenland Esk.	72.5	72.0	78.2	78.8	70.0	69.2	72.3	71.9	67.1	65.8
Alaskan Esk., Central & SW. group	74.5	72.2	79.7	79.6	..	..	72.2	72.2	..	..
Seward Peninsula	75.2	74.0	79.9	79.5	..	..	72.7	71.7	..	..
Pt. Barrow (igloos)	75.5	73.8	81.2	79.2	..	..	71.1	70.5	..	..
Lapps	73.9	73.3	78.9	78.6	73.1	72.2	75.5	74.3	70.6	69.3
Norwegians (mediaeval)	75.4	75.1	80.0	79.8	70.8	72.5	72.7	74.4	68.5	70.0

The proportions provide a picture of the figures given in the foregoing. For the Greenlanders the radio-humeral index shows the short forearm bones, a feature not shared so markedly by the other Eskimo groups, though the Central and Southwesterly Group of Alaskan Eskimos has figures which on the whole closely approach those of the Greenlanders, both for radio-humeral index and for tibio-femoral and humero-radial indices. The radio-humeral and tibio-femoral indices of the Lapps, too, are near to those of the Greenlanders, whereas humero-femoral and radio-tibial indices differ a good deal in these two groups, mainly because both femur and tibia are somewhat longer in the Eskimos than in the Lapps.

Pelvis Measurements.

It has already been stated that the fragments of pelvic bones were particularly numerous and were a great help in determining the sex of limb bones and crania. Of entire pelvises, however, there are only 15 male and 9 female. However, it is assumed that the mean figures given will be of some interest, and in Table 15 they will be compared with those of Lapps, Europeans and Japanese from measurements given by SCHREINER (Osteologie der Lappen, p. 215).

Table 15.

	Eskimos		Lapps		Europeans		Japanese	
	♂	♀	♂	♀	♂	♀	♂	♀
1. Pelvis leight ..... M 1	204.7	195.8	207.2	189.3	220.0	197.0	200.0	182.0
2. Max. pelvis breadth . - 2	253.4	252.9	254.2	255.4	279.0	266.0	269.0	252.0
Height-breadth index $\frac{M1 \times 100}{M2}$	80.7	78.5	81.8	74.5	78.9	74.1	74.3	72.2
3. Br. of ant. sup. spina - 5	224.1	214.5	216.6	216.1	231.0	222.0	230.0	215.0
4. Sagittal diameter of pelvic inlet..... - 23	96.9	108.0	94.4	101.7	104.0	106.0	103.0	107.0
5. Transversal diameter of pelvic inlet ..... - 24	117.4	124.9	117.1	125.5	130.0	135.0	120.0	121.0
Pelvic inlet index $\frac{M4 \times 100}{M5}$	82.8	86.5	81.7	81.2	80.0	78.5	86.9	88.2
6. Height of true pelvis - 28	104.4	99.0	94.0	85.4	..	..	104.0	97.0
Height index $\frac{M6 \times 100}{M1}$	50.2	50.6	45.4	44.8	..	..	52.0	53.3
7. Angulus subpubicus	59°.9	84°.2	60°.4	78°.0	60°.0	74°.0	58°.0	76°.0

The Eskimo and Lapp pelvises are very similar as regards most measurements, including height and breadth and the structure of the true pelvis; only in the height of the true pelvis is there a considerable difference, but here the Eskimos and Japanese have values that are very near to each other.

It is characteristic of both Eskimo and Lapp pelvis that the maximum pelvic breadth is so to say the same for both sexes, whereas among Europeans and Japanese the difference is very pronounced.

Stature.

PEARSON's method has been employed in computing the stature, using the mean values for femur, tibia, humerus and radius. Only in Northeast Greenland can we calculate the individual height, as there

we have single graves. Any attempt at isolating the various skeletons in common graves would presumably give more uncertain results.

According to PEARSON's method the height is:

for males ..... 159.1 cm
for females ..... 148.2 -

Not much difference is found when employing MANOUVRIER's tables:

♂ 160.4 — 2 = 158.4 cm
♀ 148.7 — 2 = 146.7 -

and the concordance would be better if we made the deduction — the 2 cm for the curve of the spine — less. It is perhaps too schematical to deduct the same for both large and small statures.

According to HRDLICKA's method[1]) the height is:

for males ..... 159.0 cm
for females ..... 151.2 -

The stature of Northeast Greenlanders cannot be determined with reasonable certainty from the few bones, and therefore the figures are given here with all reserve.

According to PEARSON's method we get:

for males ..... 162.6 cm
for females ..... 151.6 -

But if we cannot attach any absolute value to the figures, it is probably reasonable to say that this now extinct group of Eskimos in Northeast Greenland had a somewhat higher stature than the other Greenlanders on the west and southeast coast.

A stature of 159.1 cm for males and 148.2 cm for females in prehistoric Greenland (i. e. prior to HANS EGEDE's time) is low, but the writer does not consider the estimate to be much too low. If we take the Lapps, measured by the same method they have a stature of 9 mm lower for males and 7 mm for females, but their male tibiae are 7 mm shorter and femora 10 mm; on the other hand their radii are 4.6 mm longer than those of the Eskimos. Regarding present-day Lapps, GJESSING[2]) for 148 male Kautokeino Lapps has a stature of 159.1, and A. SCHREINER[3]) a stature (recruit material) of 162.4, i. e. a good deal higher measurements for live material than those for skeletal material.

We see the same thing for the Greenland Eskimos. If in particular

[1]) 46th Report of the Bureau of Ethnology, p. 317.
[1]) R. R. GJESSING, Die Kautokeinolappen, Oslo 1934, p. 78.
[2]) A. SCHREINER, Die Nordnorweger, p. 171.

Table 16.

Group	Stature from Skeletal Parts		
	Males	Females	Author
W. & SE. Greenland	159.1	148.2	FISCHER-MØLLER
Central Eskimos (Naujan)	162.0	149.5	—
Seward Peninsula	164.3	156.9	
Lapps	158.2	147.5	SCHREINER
	Stature of Living Eskimos		
W. Greenland	162.0	152.0	S. HANSEN
SW. Greenland	162.7	150.9	FISCHER-MØLLER
Labrador	157.7—159.6	..	DUCKWORTH, BOAS, etc.
Coronation Gulf	164.8	..	JENNESS
St. Lawrence Island	163.3	151.35	R. D. MOORE
Seward Peninsula	165.4	..	WEYE

we take SØREN HANSEN's measurements[1]), which comprise about two thousand individuals, the height is 2.9 cm higher for males and 3.8 cm for females compared with our heights calculated from the extremity bones. It must be remembered, however, that in the two to five hundred years which lie between the skeletons and those alive today the stature in all probability has increased as a result of the improved social conditions, just as stature has increased in Denmark and many other countries. In addition, there is the crossing with the Nordic race. S. HANSEN states that for Greenlanders whose fathers or grandfathers were Danish, the average stature was 166 cm.

From the figures given for the long extremity bones in the 46th Annual Report of the Bureau of American Ethnology, p. 314, the writer has calculated the heights for Eskimos from Seward Peninsula (using HRDLICKA's method) and found for males 164.3 and for females 156.3, i. e. a considerably higher stature than for the Greenland Eskimos. There can scarcely be any doubt that the Western and Central Eskimo groups are taller than those in the east — in Greenland and Labrador.

SUMMARY AND CONCLUSIONS

For the purpose of judging the stature and proportions of the Greenland Eskimos a material comprising long extremity bones is described in this work. The material has this advantage, that we know with certainty from what graves it came, and we have left out what came from habitations where settlement was more recent than about

[1]) Medd. om Grønl. VII, 1893.

the year 1700. This gives us a material of the utmost possible racial purity. Naturally, it would be interesting to be in a position to deal with the earliest — mediaeval — graves separately, but the material is not large enough for that.

The determination of the skeletal bones should form a valuable supplement to the cranium researches, and in a subsequent paper the skulls from the same graves as the above-described extremity bones shall be dealt with. As far as can be seen from a preliminary examination of the material, these cranium studies will scarcely effect much change in the results hitherto arrived at for the Greenland Eskimos. The measurements of the length, breadth and height of the skull, and the dimensions of the face, will in all essentials be the same as those already known, and we may characterize the Greenland Eskimos (prior to the Danish colonization) as one of the groups most distinctly having long, high and narrow skulls, to which we can now add: and low stature. Our examination reveals various peculiarities. Besides the small length of the forearm bones, of tibia and to some extent of femur, there are other primitive traits: the slight torsion of humerus, femur and tibia, the horizontal direction of the distal articulation of humerus, the great transversal diameter of the caput of femur — all of them primitive features which, together with the many primitive traits of the skull, justify the term of primitive race.

One might be inclined to assume that the form here described, with the distinctly dolichocephalic, high skulls with long faces, and the low stature, expressed the peculiarities of the Eskimo race most typically, one of the main reasons being that in the period with which we are concerned in Greenland there was no contact with other races — apart from the Norse colonists — and particularly not with Indian tribes, so that the type-stamp of the race has not been disturbed by bastardization and has been able to develop the features peculiar to the race.

However homogeneous the Eskimo race may be from the Bering Sea to East Greenland, there are several differences in its physical structure between East and West: westwards an increasing skull breadth, greater breadth of the zygomatic arch, greater nasal breadth, and taller growth. To a theoretic consideration it is tempting to assume that these peculiarities may be due to Indian influence, and at any rate it is no theory that there was once a very wide contact zone in Canada around the Great Lakes and in Alaska. Races, even one so outstanding as the Eskimos, are not unchangeable; SHAPIRO[1]) points out the great resemblance, almost identity, existing between Central and Western Eskimo

[1]) H. L. SHAPIRO, The Alaskan Eskimo, a study of the relationship between the Eskimos and the Chipewyan Indians of Central Canada.

groups and Chipewyan Indians, and it is difficult to see how one could rule out an influence of such groups.

Just as the East Baltic race in Finland, Balticum and White Russia has Mongoloid traits which the true Nordic race lacks, the Western Eskimos may have received Indian traits more pronounced than those of the Greenland Eskimos through contact with the Indian tribes of Canada and Alaska.

It is possible that the migration of these Central Eskimo tribes from the interior out to the coast separated the Greenland Eskimos from the Western tribes and affected the physical structure of the latter. SHAPIRO believes that hunting the caribou and the musk ox took these tribes to the coast and northeastwards. It is possible that the considerably greater stature found among the Northeast Greenlanders means that it was a Central Eskimo tribe that migrated along that route. Archaeological research seems to support that assumption[1]), though nothing certain can be said.

If these Central Eskimos came from the interior and spread out to the coast, as several ethnographers assume, they may have displaced earlier Eskimo groups and driven a wedge in between westerly and easterly tribes. That theory would be strengthened if it were possible to find remains of earlier Eskimo tribes on the coastland of Canada or Alaska whose migrations presumably went from the west towards Greenland, and whose physical anthropology resembles that of the Greenlanders. And a find such as this has been made in the old graves at Point Barrow (old igloos). In many respects, especially the breadth index of the head, the facial measurements, they are more like the Greenland Eskimos than Central and Alaska Eskimos[2]), even if they differ from the former by their greater stature. According to the archaeological investigations it is quite certain that they were the carriers of a culture older than that of the Central Eskimos. The physical structure of the latter — even from the ancient graves at Naujan — on the other hand has features that are so to say identical with those occurring in the skeletons from the more recent graves at Point Barrow[3]).

However, it must always be taken into consideration that along the enormous stretch which it inhabits, the Eskimo race, so homogeneous as it is in the main features, may very well form types of its own, "Gautyper", especially where the neighbourhood is a very isolated one. For example, it is beyond doubt that the Southeast Greenland Eskimos of the region round about Angmagssalik are somewhat different from

[1]) HELGE LARSEN, Dødemandsbugten. Medd. om Grønl. Vol. 102, No. 1, 1934, p. 164.

[2]) HRDLICKA, A., 46th Ann. Rep. of the Bureau of Am. Eth., p. 318 seqq.

[3]) K. FISCHER-MØLLER, Skeletal Remains of the Central Eskimos, p. 65.

those of Northwest Greenland, for example a shorter head length, smaller capacity, greater calot height. Consequently, from the physical characteristics of isolated groups one cannot draw definite conclusions as to migrations and kinship with other groups; in many cases the culture will provide better guidance.

STEENSBY's statement[1]) that the Smith Sound Eskimos more resemble the Central Eskimos, for example the Netsiliks, and have less Mongoloid features than the West Greenlanders, agrees well with the hypothesis presented above that in Greenland the original Mongoloid racial character of the Eskimos has been most pronounced in its development because, in contrast to the Central and Alaskan Eskimos, they had no contact zone with Indian tribes. The writer cannot say anything about the Polar Eskimos, with whose appearance he is not familiar; but he has no doubt whatever that the Southwest Greenlanders, where they have escaped racial intermixture of importance, are distinctly a Mongoloid race.

All this of course is merely hypothesis, and if we are to have firmer ground to walk upon we must have more finds, and these must be accurately classified as to time and place.

Finds, preferably large, like those from the old graves at Point Barrow, from the regions around the Bering Sea or along the north coast of Canada would do much towards clearing up the question of the physical differences of the Eskimo groups and the possible causes of those differences.

Finally, we are still lacking the results of the scientific excavations with finds of skeletons in the Thule region. These excavations have now been concluded, and presumably the results will soon appear. An augmentation of the skeletal material from Northeast Greenland would also be extremely desirable.

Postscript.

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[1]) Medd. om Grønl. Vol. 34, part 7, 1910, p. 384.

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