DESCRIPTIONS AND MEASUREMENTS OF SOME MAORI AND MORIORI CRANIA.

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As the subject of my paper will probably be new to many of you, it may be as well to make a few introductory remarks. We were all aware of the great value scientists attached to the brains, hair, etc., of various individuals and races, but, to quote Topinard, "Bones, on the other hand, have the inestimable advantage of presenting to us all that remains of ancient peoples of which there are no longer any living representative ; some extending back to one and two thousand years, others to ten and twenty thousand, when the various types had become less changed. When making a comparison of races, therefore, it should not be matter of surprise that such importance is attached to the study of the bones, and particularly of the skull—that noblest part of the human animal." When man was first studied in relation to the animals, early in the present century, it was noticed that in the former the brain case was directly above the face, and in the animals smaller and further back. From this arose the study of the facial angle, one of the earliest attempts of craniometry. Many angles were suggested, but it is only within comparatively recent times that the measurement has taken definite form.

At first the skull was placed on a plane and studied from above, without the use of instruments—craniology was merely a descriptive science—but now it has become exact and is capable of expressing characteristics with precision. First the brain-case was considered the part of the skull most worthy of attention, then later it was recognised that more certain characteristics were to be discovered in the face, and now was found in the various facial indices, projections and angles, the best aids for defining race differences. It was not claimed for craniometry that it was the one means by which the mystery of man's origin and early life and history on this planet might be solved, but it was a most important branch of the master science of anthropology. However, I have this evening to lay before you not an essay on comparative craniometry, but just a table and short description of seven skulls in the Tasmanian Museum.

Descriptions and Measurements of Some Maori and Moriori Crania.

So few Maori and Moriori skulls being available for measurement in the Tasmanian Museum, the value of this paper, outside its use as a Museum record, must lie in its being comparable with the tables of other craniologists. It is for this reason I have followed closely the system used by Professor Scott in preparing his paper on "The Osteology of the Maori and Moriori," read before the Otago Institute in 1893. I have been compelled to omit the "facial angle" for want of a suitable goniometer, but have added several projections, taken with Topinard's "craniophore," and from these I have, by trigonometrical calculations, arrived at the angles of prognathism. The important measurement of capacity was taken at least twice on each skull—once by myself, and again by Dr. Clarke, of Hobart. The system of Sir William Turner was carefully followed, excepting that, not being able to procure a two litre measure, I used a one litre graduated glass. Of the Maori skulls measured, three were male and one female; and of the Moriori, two were male and one sex uncertain. No. 5, which I have classed amongst the Moriori, is marked on its label, "Maori," but I think this is an error, for it presents all the features of the Moriori skull as described by Sir William Turner and Professor Scott, and certainly differs very much from the four preceding crania. No. 7 is marked "female" on its label, but I am inclined to think it is "male." It appears on the table as doubtful.

Description.

Cranial Vault—Maori.—Viewed from above, Nos. 1 and 2 are quite oval, No. 3 is rounded, and No. 4 obovate. This last presents the roof-like shape so frequently met with in New Zealand crania, and, owing to the prominence of the parietal eminences, is distinctly pentagonal viewed from behind. The forehead is rather high in every case, thus distinguishing them from the Moriori skulls. In No. 2 a hollow is formed just above the superciliary ridges by the projection of the glabella and the frontal eminences. In No. 1 the glabella is prominent, and in the remaining three well marked. The zygomatic arches of the first three skulls are plainly visible from above, while the fourth is cryptozygous. The obelion is depressed in Nos. 2 and 4. The greatest width is at the squamosals on No. 1, and the parietals on Nos. 2, 3, and 4. No. 1 rests upon the mastoid processes; No. 2 upon the mastoid processes and the conceptacular region; No. 3 upon the conceptacular region and one of the mastoid processes; No. 4 upon one of the condyles, one of the mastoids, and the conceptacular region.

Moriori.—The three of these skulls exhibit the retreating forehead; Nos. 6 and 7 show the median ridge and the flattening of the parietals noticed by Professor Scott. Viewed from above, the skulls are obovate; the glabella is prominent, and the obelion depressed in all three. The "maximum transverse diameter" was taken on the parietals in every case, and the three skulls are phænozygous. Nos. 5 and 7 rest upon the condyles; No. 6 upon the conceptacular region and one of the mastoids.

Circumference—Maori.—In the majority of cases (three out of four) the parietal arc is the longest. This would not be the case, however, if a larger number of skulls had been available for measurement. Sir William Turner found the frontal longer than the parietal in 10, equal to it in four, and less in four skulls. While of the large number measured by Professor Scott, 82 per cent. show the frontal arc exceeding the parietal. The occipital arc is shortest in every case.

Moriori.—In Nos. 5 and 7 the parietal arc is longest, and in No. 6 the frontal. The occipital arc is shortest in Nos. 5 and 7, but exceeds the parietal in No. 6.

Sutures.—In all the skulls, except Nos. 1 and 5, the sagittal suture is clearly marked and complicated. In No. 1 it is obliterated, and in No. 5 nearly so, starting from the bregma. Except in No. 1, where it has disappeared, the lamboidal suture is very complicated, and frequently beset with large wormian bones. A wormian bone also appears at the pterion in No. 7. In No. 6 the temporal pushes back the great wing of the splenoid, and touches the frontal on one side, thus forming a K. In every other case the pterion is distinctly of the usual H shape. None of the skulls examined were metopic, nor were any traces of an inter-parietal bone discovered. In No. 6 the infra-orbital suture is clearly marked, and traces of it appear in several others.

Parietal Foramina.—These are apparent on all the skulls, generally one on either side of the suture, and in Nos. 4 and 5 in the median line. No. 7 has three foramina, two on one side and one on the other side of the sagittal suture.

Nasal Bones.—As a rule, the nasal bones are high and curved at the end, and sunken at the root.

Anterior Nares.—In six of the skulls this is wide below and narrow above. In No. 2 the opening does not narrow so much, and the base is rounded off by the obliteration of the nasal spine. In five of the remaining skulls the nasal spine is well marked and two-lipped—in No. 4 somewhat bevelled.

Alveolar Arch.—All the skulls show the alveolar arch in the parabolic form, although in No. 2 it approaches the form of the letter U.

Lower Jaw.—Only two of the skulls, Nos. 6 and 7, had the inferior maxilla. No. 6 is light, and the angle nearly a right angle. No. 7 is much more massive and more rounded at the angle.

Teeth.—In none of the skulls are all the teeth present, three have none at all. No. 3, the skull of a young man, has remarkably good and well preserved teeth, and in this skull the upper wisdom teeth are to be seen just breaking through. In the other skulls such teeth as are present are very much worn, but show no signs of decay.

Classification.

Cranial Capacity.—The average of the three Maori skulls is 1392, thus placing them in the mesocephalic class. Professor Scott's averages for 64 skulls of both sexes was 1420. Of the Moriori skulls, two (Nos. 5 and 6) are in the microcephalic class, and one (No. 7) is mesocephalic, the average being 1310. This is very low, for the 38 skulls measured by Professor Scott averaged 1416. One Moriori skull measured by MM. de Quatrefages and Hamy gave 1785 cubic centimetres capacity. It will be noticed on my table that No. 7, which was marked female on its museum label, but which I mark "?," has a much greater capacity than the two male skulls. This is one of my reasons for doubting the accuracy of its label. Professor Scott's highest capacity of a female Moriori skull is 1358.

Cephalic Index.—The average of four Maori crania is 77·8, or mesati-cephalic. The individual indices vary greatly, No. 3 (86·1) being very brachy-cephalic, and No. 2 (71·3) dolichocephalic. The average of these four crania, owing to the exceptionally high index of No. 3, is not a fair one, since Professor Scott's average for 76 skulls is 75·4, and Sir William Turner's for 72 skulls is 74. The mean of the three Moriori crania is 76·1, or mesati-cephalic. Professor Scott's mean for 40 skulls is 76·3, and Sir William Turner's mean for eight skulls is 75·2.

Vertical Index.—The average of the Maori skulls is 74·7, or metrio-cephalic. The height is less than the breadth in three out of the four skulls, and in the remaining one it is greater. Turner's mean of 16 skulls was 73·5. Of the Moriori, in two cases the breadth exceeds the height, and in

one it is less. The mean vertical index of these three skulls is 73·5, also metrio-cephalic. Professor Scott's mean of 41 skulls was 72·7.

Frontal Index.—The average frontal index of the Maoris is 66·6, and of the Morioris 67·2. The asterionic diameter exceeds the stephanic in four of the skulls, and is less in the remaining three.

Foramen Magnum.—The mean of the Maori skulls is 87·3, and of the Moriori 87·9. Professor Scott's averages were 87·8 Maori, and 87·3 Moriori.

Orbital Index.—The average of the four Maoris is 92·7, or megaseme. This is very high, and is owing to the almost rounded orbits of some of the skulls examined. Professor Scott's mean is 86·1, thus placing the Maoris in the mesoseme group. The Moriori skulls averaged 91 (megaseme). Professor Scott's average was 89, and Sir William Turner's 88.

Nasal Index.—The average of this index is 46·3 for the Maoris, and 44·1 for the Moriori, thus placing both in the Leptorhine class. Professor Scott's averages were 48·1 Maori, and 46·8 Moriori. Sir William Turner's were 47·5 and 47. The index varies greatly in the Maori skulls, the minimum being 36·1, and the maximum 56·0.

Gnathic Index. — The Maori skulls averaged 99 (mesognathous), and the Moriori 97·7, or just within the orthognathous group Professor Scott's mean places both the Maori and Morioris in the ortho-gnathous class, his average for the former being 96·9, and for the latter 97·7.

Palato-maxillary Index.—These indices average 123·5 for the Maoris (brachy-uranic), and 110·5 for the Moriori (mesuranic). Turner's average for the Morioris (113) places them in the mesuranic class, and Professor Scott's means are 121 for the Maori, and 120·8 for the Moriori, or brachy-uranic in both cases.

TABLE OF MEASUREMENTS.

			MAORI.				MORIORI.		
			1	2	3	4	5	6	7
Sex			Male.	Male.	Male.	Female.	Male.	Male.	?
Age			Adult.	Adult.	Adult.	Adult.	Adult.	Adult.	Adult.
Capacity			1395	1435	1345	...	1250	1280	1400
Diameters of Brain Case.	Longitudinal	Ophryo-occipital	177	192	165	173	171	180	176
		Glabello-occipital	181	192	166	174	175	184	181
		Nasio-occipital	180	190	164	170	175	181	179
		Glabello-iniac	178	183	155	158	157	168	163
	Basi-bregmatic Height		139	135	126	132	129	136	132
	Transverse	Maximum	135 s	137 p	143 p	138 p	137 p	132 p	142 p
		Asterionic	113	110	105	102	104	104	108
		Stephanic	117	102	111	108	102	103	103
		Minimum Frontal	90	92	96	91	92	90	94
		Bi-auricular	118	120	127	115	117	121	124
		Temporal	135	136	142	133	133	131	139
Circumferences of Brain Case.	Horizontal	Total	508	529	496	497	495	507	516
		Post-auricular	261	289	253	253	283	278	295
		Pre-auricular	247	240	243	244	212	229	221
	Median	Total	519	523	477	483	483	503	494
		Frontal	125	128	120	125	116	129	120
		Parietal	139	132	122	119	126	117	126
		Occipital	116	124	107	112	109	120	111
		Lambdo-iniac	68	70	73	74	72	76	76
		Inio-opisthic	48	54	34	38	37	44	35
		Length of Foramen Magnum	33	38	36	30	34	34	37
		Basion to Nasion	106	101	92	97	98	103	100
	Transverse	Total	438	422	422	414	417	418	421
		Supra-auricular	304	293	292	293	288	285	290
		Infra-auricular	134	129	130	121	129	133	131
Length of Foramen Magnum			33	38	34	30	34	34	37
Width of Foramen Magnum			30	29	29	29	32	31	29
Basi-alveolar Length			102	105	91	94	99	94	101

		MAORI.				MORIORI.		
		1	2	3	4	5	6	7
Sex		Male.	Male.	Male.	Female.	Male.	Male.	?
Age		Adult.	Adult.	Adult.	Adult.	Adult.	Adult.	Adult.
Face Measurements. — Transverse	Biorbital, External	106	103	103	98	101	104	102
	Biorbital, Internal	96	95	96	91	93	96	94
	Bijugal	117	110	114	107	111	113	112
	Bizygomatic	133	125	130	121	131	129	130
Face Measurements. — Vertical	Ophryo-alveolar	101	87	92	91	86	102	102
	Nasio-alveolar	78	67	70	66	60	73	73
	Spino-alveolar	17	17	16	17	13	16	17
Face Measurements. — Nasal Region	Nasio-spinal Height	61	50	54	49	47	57	56
	Width Anterior Nares	22	28	25	23	23	23	24
	Length Nasal Bones	26	...	24	23	...	...	22
	Width Nasal Bones	16	...	14	12	...	...	17
Face Measurements. — Orbits	Width	40	37	37	37	41	41	39
	Height	37	33	35	35	33	40	37
	Orbital Interval	20	23	23	20	18	18	19
Face Measurements. — Palate	Length	54	56	51	48	51	55	56
	Width	65	...	66	58	58	59	...
Auriculo-orbital Distance, Right		74	71	72	73	74	73	72
Auriculo-orbital Distance, Left		75	71	73	73	74	71	70
Mastoid Height		44	37	41	38	37	37	42
Zygomatic Projection		P	P	P	C	P	P	P
Indices	Cephalic	74·6	71·3	86·1	79·3	78·3	71·7	78·4
	Vertical	76·8	70·3	75·9	75·9	73·7	73·9	72·9
	Frontal	66·6	67·1	67·0	65·9	67·2	68·2	66·2
	Stephanic	76·8	90·2	86·5	84·3	90·2	87·3	91·2
	Foramen Magnum	90·9	76·3	85·3	96·7	94·1	91·2	78·4
	Orbital	92·5	89·2	94·8	94·6	80·5	97·6	94·9
	Nasal	36·1	56·0	46·3	46·9	48·9	40·4	42·9
	Gnathic	96·2	103·9	98·9	96·9	101·0	91·2	101·0
	Palato-maxillary	120·4	...	129·4	120·8	113·7	107·3	...
	Facial	75·8	69·6	70·8	75·2	65·7	79·1	78·5

		MAORI.				MORIORI.		
		1	2	3	4	5	6	7
Sex ...		Male.	Male.	Male.	Female.	Male.	Male.	?
Age ...		Adult.	Adult.	Adult.	Adult.	Adult.	Adult.	Adult.
Measurements of Lower Jaw. Height ...	Symphisial ...	...	...	...	...	. .	26	26
	Molar ...	...	...	...	...	...	28	24
	Coronoid ...	...	...	...	...	...	57	58
	Condyloid ...	...	...	...	...	...	66	54
Width ...	Bigonial ...	...	...	...	...	...	104	97
	Bicondyloid ...	...	...	...	...	...	121	119
	Bimental ...	...	...	...	...	...	53	48
	Ramus ...	...	...	...	...	...	37	31
Gonio-symphisial, Length ...		...	...	...	...	...	84	81

Projections on Alveolo-condylean plane.

		1	2	3	4	5	6	7
Vertical ...	Vertex to alveolar point ...	149	144	134	143	144	145	143
Horizontal (Total, 1000)	Face ...	129	96	127	82	89	109	144
	Anterior Cranium ...	398	361	425	418	366	414	378
	Posterior Cranium ...	473	543	448	500	545	477	478
Vertical ...	Ophryon to alveolar point ...	99	84	87	90	85	101	99
	Nasal spine to alveolar point ...	21	15	17	17	14	14	15
Horizontal ...	Ophryon to alveolar point ...	26	20	23	15	17	21	29
	Nasal spine to alveolar point ...	5	6	5	5	4	3	3

Angles converter from above measurements.

	1	2	3	4	5	6	7
Ophryo-alveolo-condylar angle ...	75° 17′	76° 36′	75° 15′	80° 33′	78° 41′	78° 16′	73° 37′
Spino-alveolo-condylar " ...	76° 36′	68° 12′	73° 36′	73° 37′	74° 3′	77° 59′	78° 41′