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I.—ZOOLOGY.

ART. I.—*Contribution to the Osteology of the Aborigines of New Zealand and of the Chatham Islands.*

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Plates I. and II.

IN preparing this paper I have made use not only of the collection of bones in the anatomical museum of the University of Otago, but also of those in the Colonial Museum, Wellington, and the Canterbury Museum, Christchurch, and of such private collections in Dunedin as were, through the kindness of their owners, made available to me. To these gentlemen, and to Sir James Hector and Professor Hutton, I take this opportunity of expressing my great indebtedness.

MAORI CRANIA.

As craniometry still suffers from variety of method, I preface my description of the crania examined by a statement of the measurements I have adopted. In the main I have followed the directions given by M. Paul Broca,* but in a few instances I have taken the measurements recommended by other anthropologists.

Maximum Length.—So that my results may be comparable with those of other observers, I have taken this in three different ways, measuring the greatest length from the

* "Instructions craniologiques et craniométriques," 1875.

ophryon, from the glabella, and from the nasion. In calculating the cephalic and vertical indices, I have, however, used only the second of the three, the glabello-occipital length, as recommended by M. Broca, Sir William Turner, and others.

Maximum Transverse Diameter. — This was taken as directed by Broca.

Glabello-iniac Length, Basi-bregmatic Height, Stephanic Diameter, Biauricular Diameter, Temporal Diameter, Minimum Frontal Diameter, Asterionic Diameter, Mastoid Height, Length and Breadth of Foramen Magnum.—These were all taken in accordance with Broca's directions.

Horizontal Circumference, with its Pre-auricular and Post-auricular Subdivisions.—In this also I have followed Broca, carrying the tape round the skull at the level of the ophryon in front, and the most distant occipital point behind. When I began this series of measurements I took a second horizontal circumference, from the glabella round the most distant part of the occipital bone; but, after an experience of about sixty skulls, I gave this up, owing to the irregularities introduced by the varying amount of projection of the external angular process of the frontal bone.

Nasio-opisthic Arc, with its Subdivisions—Vertical Transverse Arc, superior and inferior.—These were measured in the ordinary way between the points given by Broca. I found it impossible, however, to measure the inferior arc of the transverse vertical circumference at all accurately with a stiff broad tape, such as is used for the other curves, owing to the very irregular character of the undersurface of the skull. Broca recommends twisting the tape somewhat, so that it may pass between the styloid process and the spine of the sphenoid; but even with this precaution my results were very variable, and much in excess of the actual length of the curve. I found it easy, however, to take a satisfactory measurement with a piece of fine cord, and this was used accordingly.

Cranial Capacity.—In estimating the cranial capacity I have followed as closely as I could the directions given by Sir William Turner in his report on the crania collected by the "Challenger" expedition.* I was, however, unable to procure the two-litre graduated glass used by him, and in estimating the quantity of shot contained in each skull I used the litre and half-litre measures used by Broca. Each skull was measured at least twice.

Basi-alveolar Length.—Here I follow Professor Sir William Flower.† Unfortunately the central incisor region was fre-

* "'Challenger' Reports," part xxix.: Report on the Human Skeleton—the Crania. 1884.

† "Catalogue of the Museum of the Royal College of Surgeons of England," part i., 1879.

quently broken, or altered by absorption consequent on loss of teeth, and in many skulls a true alveolar point did not exist. But, while even moderate absorption of the alveolar arch in front materially shortens those vertical measurements of the face which have their lower end at the alveolar point, the distance between the basion and the centre of the alveolar arch is not altered to the same extent. I have therefore sometimes given the basi-alveolar length in skulls whose ophryo-alveolar, naso-alveolar, and spino-alveolar lengths I have omitted.

Facial Angle (*Ophryo-spino-auricular Angle*).—This is the angle made by the ophryo-spinal and auriculo-spinal lines. It was measured by means of the goniometer designed for the purpose by Professor Broca, and made by Mathieu, of Paris.

Projection of the Zygomatic Arches.—This is shown by the terms "phænozygous" and "cryptozygous," introduced by the late Mr. Busk. In estimating this feature the skull was placed on a Topinard's craniophore, with the condyles and alveolar point in one horizontal plane. If the zygomatic arches were visible to the observer's right eye placed at a distance of one metre vertically above the bregma, the skull was noted as Phænozygous. If they were invisible it was noted as Cryptozygous. In the tables the letters P and C are used to signify these conditions. When P alone is used, I mean that the arches, though visible, are not seen as free from the side of the skull. P + means that the interval between the arch and the skull can be seen from above.

Other Face-measurements.—These require but little explanation. They were all, excepting those of the palate, taken in strict accordance with Broca's directions. The *palate* was measured in the way proposed by Professor Flower,* and adopted by Sir William Turner. The length given is the distance between the alveolar point and a line drawn between the most posterior parts of the maxillary tuberosities. The breadth includes the alveolar arch, and is measured at the level of the second molar tooth.

Indices.—The following are the indices selected, with the formulæ by which they are calculated:—

Cephalic index	$\frac{\text{Maximum transverse diameter} \times 100}{\text{Glabello-occipital length}}$
Vertical index	$\frac{\text{Basi-bregmatic height} \times 100}{\text{Glabello-occipital length}}$
Frontal index	$\frac{\text{Minimum frontal diameter} \times 100}{\text{Maximum transverse diameter}}$
Index of foramen magnum ..	$\frac{\text{Width of foramen magnum} \times 100}{\text{Length of foramen magnum}}$

* "The Cranial Characters of the Natives of the Fiji Islands": Journal of the Anthropological Institute, 1880.

Orbital index	$\frac{\text{Orbital height} \times 100}{\text{Orbital width}}$
Nasal index	$\frac{\text{Width of anterior nares} \times 100}{\text{Nasio-spinal length}}$
Gnathic index	$\frac{\text{Basi-alveolar length} \times 100}{\text{Basi-nasal length}}$
Palato-maxillary index ..	$\frac{\text{Palato-maxillary length} \times 100}{\text{Palato-maxillary breadth}}$

In grouping the skulls according to their indices I have used the divisions as named and defined by Flower* and Turner†:

Dolichocephalic ..	Cephalic index	below 75.
Mesaticephalic ..	"	between 75 and 80, inclusive.
Brachycephalic ..	"	above 80.
Tapeinocephalic ..	Vertical index	below 72.
Metriocephalic ..	"	between 72 and 77, inclusive.
Akrocephalic ..	"	above 77.
Microseme ..	Orbital index	below 84.
Mesoseme ..	"	between 84 and 89, inclusive.
Megaseme ..	"	above 89.
Leptorhine ..	Nasal index	below 48.
Mesorhine ..	"	between 48 and 53, inclusive.
Platyrhine ..	"	above 53.
Orthognathous ..	Gnathic index	below 98.
Mesognathous ..	"	between 98 and 103, inclusive.
Prognathous ..	"	above 103.
Dolichuranic ..	Palato-maxillary index	below 110.
Mesuranic ..	"	between 110 and 115, incl.
Brachyuranic ..	"	above 115.

The grouping of the skulls according to their cranial capacities is as follows:—

Microcephalic ..	Below 1,350c.c.
Mesocephalic ..	Between 1,350c.c. and 1,450c.c., inclusive.
Megacephalic ..	Above 1,450c.c.

I give in Tables I. and II. the measurements of eighty-three Maori skulls. Fifty are adult males, twenty-six are adult females, and seven are the skulls of children. Thirty-five of these are in the Canterbury Museum at Christchurch; twenty-nine are in the anatomical museum of the University of Otago; twelve are in the Colonial Museum at Wellington; while the remaining seven are in private collections.

The number of skulls of the Maori race already described by competent observers is sufficient to adequately establish the cranial characters of the race generally. I therefore did not undertake this series of measurements with

* "Catalogue of the Museum of the Royal College of Surgeons."

† "'Challenger' Reports": Human Crania.

the object of possibly slightly modifying our knowledge on some points, but rather with the idea of ascertaining the craniometric expression of the differences which exist between certain tribes, and whether there is within the tribes themselves much individual variation in any of the more important cranial features. We know the Maoris to be a mixed race, the result of the mingling of a Polynesian and a Melanesian strain. The crania already examined leave no room for doubt on this point. But such skulls were for the most part collected either singly or in small groups from a very wide area —the whole of New Zealand, practically. Few, therefore, come from any one tribe, and, though their evidence as to the race-type, and its variations in the people as a whole, is ample, they tell us but little as to the characters of the smaller groups or tribes. So far as I have been able to ascertain, there has been but one contribution of any importance to the tribal craniometry of the Maoris. Sir William Flower gives in the Catalogue of the Museum of the College of Surgeons the measurements of twenty skulls, nineteen of which are adult, from near Whangarei. As these were found together in one cave it is probable that they all belonged to one tribe. They show considerable variety in form, but are, on the whole, rather long and narrow. I shall frequently refer to them in what follows. A much smaller group of six skulls found in a cave on the Island of Kapiti, and now in the anatomical museum of the University of Edinburgh, is described by Sir William Turner in his "Challenger" report; and to these may be added the two from the same island brought Home by the "Astrolabe." Unfortunately two of the crania in Professor Turner's small series are not full grown; and the history of the island must make us careful of accepting as of one tribe, skulls collected at different times by different people.

With these objects in view, I have measured eighty-three skulls, forty-five of which belong to a single tribe. These last were all found in the South Island, in the Provinces of Otago and Canterbury. Though this is a very large area, it really supplies as satisfactory material for the study of variation within one tribe as can be got in New Zealand. A district of corresponding size in the North Island would yield individuals from several tribes, but in the South Island this is not so. In this Island, if we except the northern end, there is practically only one tribe, and skulls coming from widely-separated districts may therefore be made use of. To make this clear, I shall, following Mr. Stack's account,* show how the South Island was peopled. We have first a tradition of a

* "Traditional History of the South Island Natives": Trans. N.Z. Inst., vol. x., 1877.

tribe called Waitaha crossing Cook Strait from the north. Little is known of these Waitaha, but they are supposed to have come originally from the Bay of Plenty, and to have made their way south through the centre of the North Island. They are said to have spread themselves over the whole of the South Island, peopling it densely. This migration is held to have occurred in the latter half of the fifteenth century, but all such dates are of course most uncertain. The Waitaha held undisturbed possession of the land for at least a hundred years, when, about 1577, another band of invaders crossed Cook Strait, and soon conquered and destroyed or enslaved the peaceful Waitaha. These invaders, the Ngatimamoe, were an offshoot of the Ngatikahungunu, a powerful East Coast tribe, whose descendants still occupy the whole of the eastern half of the North Island to the south of Poverty Bay. After another more or less peaceful hundred years, the Ngatimamoe were, in their turn, called upon to defend themselves from the Ngaitahu, a second offshoot of this same Ngatikahungunu Tribe. The history of the Waitaha conquest was repeated, and the Ngatimamoe were absorbed by their more powerful relations. Still another invasion took place in 1827, when the Ngatitoa, a tribe from the west coast of the North Island, under Te Rauparaha, harried the settlements of the South Island Natives. But this was a mere raid, and did not result in settlement. The Ngaitahu still remain as the dominant tribe, and have given their name to the descendants of the conquered Ngatimamoe. The present Maoris in Otago and Canterbury are, then, though called Ngaitahu, the result of the fusion of that tribe with the Ngatimamoe. But these tribes, though hostile, were not distinct. They were really only sub-tribes given off at different times from the parent Ngatikahungunu stock. I describe forty-five skulls which belong to one or other of these two subdivisions. Their measurements are given in Table I. In Table II. are given the measurements of thirty-eight skulls from different parts of the North Island, a series obviously too small to be of any use alone towards answering either of the questions mentioned above. I include them in the present paper, however, from their bearing on the general type of the race, and also because they can be made use of to some extent when taken with those described by others. I hope that some day I may be in a position to make this North Island table more complete. In the meantime I divide the skulls into three groups, according to the districts where they were found. The first includes skulls from the East Coast, between Poverty Bay and the Wairarapa, the country of the Ngatikahungunu. In this group there are fifteen skulls, fourteen of which are adult.

Those in the second group were found on the shores of Cook Strait and the line of coast running northwards towards Cape Egmont. This contains ten adult skulls, one of which was found on the southern shore of the Strait, in the Nelson Province. I have, however, included it in this table because this part of the South Island was mainly peopled by Natives from the opposite coast. There are thirteen skulls in the third group, twelve adults and one child, from the Bay of Islands and the neighbourhood of Auckland.

In analysing these two tables, I give the results, as far as possible, in tabular form. In the first line of each of these smaller tables I take the skulls from Otago and Canterbury—Ngaitahu—then come the three groups of North Island skulls, while the last line gives the combined result of the entire series. Each line gives the average of the indices or measurements—(1) of the male skulls, (2) of the female skulls, (3) of those of doubtful sex, and (4) the general average of both sexes, with the extremes between which the individual skulls have varied. In each case the number of skulls on whose measurements the average is based is given. None but adult skulls are included in these tables of averages.

CRANIAL CAPACITY.

—	Male.		Female.		?		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	23	1,448	9	1,280	2	1,273	34	1,393	1,725	1,183
S.W. coast, N.I.	10	1,549	1	1,345	1	1,375	12	1,518	1,608	1,345
E. coast, N.I. ..	6	1,443	1	1,350	..	..	7	1,429	1,605	1,333
Auckland, &c. ..	6	1,494	4	1,275	1	1,235	11	1,391	1,635	1,188
Total ..	45	1,476	15	1,288	4	1,289	64	1,420	1,725	1,183

The average male index of the Ngaitahu skull is therefore mesocephalic, but almost at the upper limit of the group. The average of both sexes is of course much lower, but it is still mesocephalic. The range of variation for male skulls is 517c.c. Ten of the twenty-three male skulls, or 43 per cent., are megacephalic; eleven, or 47·8 per cent., are mesocephalic; two, or 8·7 per cent., are microcephalic. Of the North Island skulls, those which give the highest average are from the south-west coast, all the males being megacephalic. Those from the east coast have an average and a range of variation closely resembling the Ngaitahu skulls. Taking the combined results for both Islands, we find that the average of the forty-five male skulls whose internal capacity could be measured places them in the megacephalic division. Twenty-

six, or 57·8 per cent., are also megacephalic; fifteen, or 33·3 per cent., are mesocephalic; while only four, or 8·9 per cent., are microcephalic.

CEPHALIC INDEX.

—	Male.		Female.		♀		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	25	75·8	12	76·1	3	80·5	40	75·9	85	69·1
S.W. coast, N.I.	11	75·4	1	75·1	2	75·8	14	75·5	79·6	71·6
E. coast, N.I. ..	7	74·9	3	73·8	..	..	10	74·6	78·3	70·7
Auckland, &c. ..	7	71·4	4	71·7	1	71·7	12	73·3	76·9	70·4
Total ..	50	75·4	20	74·7	6	77·9	76	75·4	85	69·1

This table shows that the Ngaitahu come very low down in the mesaticephalic group, the male skulls being slightly longer than the female. The combined result for both Islands, however, shows this latter character reversed. The range of variation is 15·9, and between the two extremes the forty skulls from the South Island are arranged as follows: Three, or 7·5 per cent., are brachycephalic; twenty-two, or 54 per cent., are mesaticephalic; fifteen, or 37·5 per cent., are dolichocephalic. Even in much smaller groups the variation is considerable. For example, if we take the eight skulls collected in the small area in the neighbourhood of the Otago Heads, we find the cephalic index varying between 83 and 72·5. The average of the three North Island groups is dolichocephalic, though one of them is just within the mesaticephalic division. In none of these three groups is there a single brachycephalic skull. The most dolichocephalic group is that from Auckland and the Bay of Islands. Professor Flower's series of skulls from Whangarei, already referred to, and the three described by Sir William Turner from Auckland, likewise show a low cephalic index. The average of Professor Flower's—omitting the child's skull—is 73·5, and had he used the glabello-occipital length it would have been lower. Professor Turner's give an average of 72·7. We have therefore the measurements of thirty-four skulls from the northern end of New Zealand, not one of which is brachycephalic, and whose average index (even taking Professor Flower's at 73·5) is 73·4.

The average for the whole of New Zealand, according to my tables, shows the typical Maori skull to be at the lower limit of the mesaticephalic group: 4 per cent. are brachycephalic, 52·6 per cent. are mesaticephalic, 43·4 per cent. are dolichocephalic. Three have indices under 70. The seventy-

two crania referred to by Sir William Turner in his paper show the same small number of brachycephalic skulls, and have an average index of 74, a little lower than that given in this paper.

VERTICAL INDEX.

—	Male.		Female.		♀		Both Sexes.			
	No.	Av.	No	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	24	74·2	11	74·9	3	76·4	38	74·6	81·9	66·8
S.W. coast, N.I.	11	76·1	1	75·7	2	75·6	14	76	79·3	71·7
E. coast, N.I. ..	7	75·5	3	73·2	..	..	10	74·8	77·8	71·2
Auckland, &c. ..	7	73·2	3	72	1	72·8	11	72·8	77	70·4
Total ..	49	74·7	18	74·2	6	75·5	73	74·6	81·9	66·8

The Ngaitahu skulls are therefore metriocephalic. The range of variation is 15·1. Of the thirty-eight in the table, ten, or 26·3 per cent., are akrocephalic; nineteen, or 50 per cent., are metriocephalic; nine, or 23·7 per cent., are tapeinocephalic. The most northern of the North Island groups has again the lowest index, almost tapeinocephalic. The average for both Islands is the same as that for the Ngaitahu, and the grouping of the skulls is as follows: Fourteen, or 19·2 per cent., are akrocephalic; forty-four, or 60·3 per cent., are metriocephalic; fifteen, or 20·5 per cent., are tapeinocephalic. The general average also shows that the male skulls, following the usual rule, are slightly higher than the female. The comparatively low indices, which we have just seen to be characteristic of the Auckland skulls measured by me, are also shown by those examined by Professors Flower and Turner from the same district. The Whangarei skulls in the College of Surgeons' Museum have an average index of 73·9, while that of Professor Turner's three is 71. The general average of the entire set of thirty-three crania is therefore 73·2. Comparing the *cephalic* and *vertical indices*, we find that in the Ngaitahu the average cephalic exceeds the average vertical by 1·3, and in the Auckland group by 0·5. In the other two groups from the North Island the vertical exceeds the cephalic—in one case by 0·5, and in the other by 0·2. The general average gives a slight superiority—0·8—to the cephalic index.

In sixteen Ngaitahu skulls (nine males and seven females) the *Basi-bregmatic height* exceeds the *maximum transverse width*, while in twenty-two (fifteen males and seven females) the width is greater than the height. The greatest excess of width over height is in No. 6, Table I., where the height is 125mm. and the width is 141mm., giving a height-breadth

index of 89·3. The North Island skulls, on the other hand, have a majority whose height exceeds their width. In twenty-one is this the case, while in twelve the opposite condition is present. In two both diameters are equal. In these skulls the lowest height-breadth index is 92·8, the height in this skull being 128mm., and the breadth 138mm. Though the skulls which come from the southern half of the North Island are those in which the height exceeds the breadth of the brain-case most frequently, the numbers observed are too few and the district too large to allow of any tribal character being based on their measurements. Fortunately we are, thanks to Professors Flower and Turner, in a position to speak more definitely with regard to the skulls from the northern part of the Island. Combining their results with mine, we have, out of a set of thirty-three adult skulls, nineteen in which the height exceeds the width, thirteen in which the width exceeds the height, and two in which both diameters are equal. Contrasting these skulls in this respect with those from the South Island, we find that, while in 42·1 per cent. of the Ngaitahu the height is in excess of the width, there are 57·6 per cent. of these high skulls from this northern district. The average height of the Ngaitahu skulls is 136mm.; the average maximum width of the same skulls is 137·3mm. These diameters in the thirty-three of the Auckland group average 136·2mm. and 136·3mm.

FRONTAL INDEX.

—	Male.		Female.		♀		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	25	68	12	68·9	3	63·5	40	67·9	74·6	60·3
S.W. coast, N.I.	11	68·3	1	69·9	2	65·8	14	68·1	73·8	64
E. coast, N.I. ..	7	68·1	3	67	..	..	10	68·6	73·3	63·8
Auckland, &c. ..	7	67·7	4	39·5	1	66·7	12	68·2	75	63 6
Total ..	50	68·2	20	68·8	6	64·8	76	68·1	75	60·3

The proportion between the *maximum width* of the brain-case and its *minimum frontal width* as shown by this index varies little in the four groups. The range of variation is 14·7, and 59 per cent. of the indices are between 65 and 70. Comparing the *asterionic* and *stephanic widths*, we find that among the male Ngaitahu skulls there are eleven in which the asterionic and twelve in which the stephanic is the greater diameter. In two they are equal. Among the female skulls the asterionic is the greater in four, the stephanic in eight, and in two they are equal. The numbers in the North Island

groups are: Males — asterionic greater, eight; stephanic greater, fifteen; both equal, one. Females — asterionic greater, six; stephanic greater, five.

INDEX OF FORAMEN MAGNUM.

	Both Sexes.			
	No.	Av.	Max.	Min.
Ngaitahu	37	87·4	100	73
South-west coast, North Island ..	14	89·2	100	80·6
East coast, North Island	10	86·3	97	73
Auckland, &c.	12	87·9	97	80
Total	73	87·8	100	73

The large range of variation, 27, shows that the foramen magnum has no very fixed proportions. The length is equalled by the width in three cases.

ORBITAL INDEX.

	Male.		Female.		♀		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	24	86·7	9	85·6	1	86·8	34	86·4	97·4	73·8
S.W. coast, N.I...	11	86·7	1	86·8	2	84·8	14	86·4	95·0	78·6
E. coast, N.I. ..	7	83	1	82·5	..	..	8	83	90·0	76·7
Auckland, &c. ..	7	86·4	4	88·2	1	84·6	12	86·8	95·1	80
Total ..	49	86·1	15	86·2	4	86·2	68	86·1	97·4	73·8

The average index in the Ngaitahu group is mesoseme, and the range of variation in it is 23·6. Of the thirty-four Ngaitahu skulls measured, nine, or 23·5 per cent., are megaseme; fourteen, or 44·1 per cent., are mesoseme; eleven, or 32·4 per cent., are microseme. The proportion of female skulls is greatest in the lower groups, and this low orbital index in the female is worthy of note, as not being in accordance with the generally-received view. Two of the North Island groups have indices almost the same as the Ngaitahu. The east coast skulls, however, have a lower index, which brings them into the microseme division, but there are not enough of these skulls in the series to lower the general average for both Islands below 86·1, in the mesoseme group. Of the total sixty-eight skulls, seventeen, or 25 per cent., are megaseme; twenty-nine, or 42·6 per cent., are mesoseme; twenty-two, or 32·4 per cent., are microseme.

The average interorbital distance is 20mm.

The average orbital index of Professor Flower's Whangarei series, 91·9, is much higher than that of any of my groups. Professor Turner's three, on the other hand, have a lower index—80·3. Combining their results with my Auckland group, we have an average of 89·3 for these northern skulls.

NASAL INDEX.

	Male.		Female.		?		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	23	48·2	9	47·7	1	44·2	33	48	59·6	40·4
S.W. coast, N.I.	11	46·8	1	50	2	48·5	14	47·2	50·9	42·6
E. coast, N.I. ..	6	48·6	1	46	..	..	7	48·2	52·9	43·4
Auckland, &c. ..	7	48	4	55·1	1	48	12	50·4	56·8	41·1
Total ..	47	47·9	15	49·1	4	47·3	66	48·1	59·6	40·4

The average index of the Ngaitahu skulls of both sexes places them in the lowest possible position in the mesorhine group. The males are also mesorhine, but the females are leptorhine. The range of variation is 19·2. Sixteen of these South Island skulls, or 48·5 per cent., are leptorhine; thirteen, or 37·4 per cent., are mesorhine; while only four, or 12·1 per cent., are platyrhine. The only leptorhine group is that from the south-west coast of the North Island. The east coast skulls are mesorhine, and those from the northern districts are higher in the same division. The general average for both Islands places the Maori skull very low down in the mesorhine division. Sixty-six skulls were available for the required measurements, and, of these, twenty-nine, or 43·9 per cent., are leptorhine; thirty, or 45·5 per cent., are mesorhine; seven, or 10·6 per cent., are platyrhine.

The highest average is, as we have just said, found in the Auckland group, where 25 per cent. of the skulls measured are platyrhine; but a small group like this, containing only twelve skulls, does not allow of conclusions being drawn as to the character of the nasal opening in the tribes of the far north. By making use, however, as before, of Sir William Flower's collection from Whangarei, and of those from the same part of the Island described by Professor Turner, we get a set of thirty-four, and these give a result but little different from that given in the table. Sir William Flower's skulls have an average nasal index of 49·9; Professor Turner's of 50·4; and the general average derived from their results and mine is 50·2. We get therefore a nasal index of 50·2 from thirty-four skulls collected about Auckland, and in

the region to the north; while my series of thirty-three Ngaitahu skulls give, as we have seen, an index of 48. It must be remembered, however, that the nasal index has been found to vary much even in races which are generally regarded as fairly pure.

GNATHIC INDEX.

—	Male.		Female.		?		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	22	98·4	9	94·7	2	102·2	33	97·6	104·9	92
S.W. coast, N.I.	10	94·5	..	..	2	95·3	12	95	99	93·2
E. coast, N.I. ..	4	95·9	1	95·7	..	..	5	95·9	97·1	94·3
Auckland, &c. ..	7	96·1	4	100·5	1	94·1	12	98·2	103·9	88·8
Total ..	43	97	14	96·4	5	97·8	62	96·9	104·9	92

According to the averages all the groups are orthognathous, with the exception of the most northern, which is very slightly mesognathous. The range of variation is 12·9. Of the thirty-three of the Ngaitahu Tribe measured, eighteen, or 54·5 per cent., are orthognathous; twelve, or 36·4 per cent., are mesognathous; three, or 9·1 per cent., are prognathous. And of the sixty-two skulls which form the entire series, thirty-eight, or 61·3 per cent., are orthognathous; twenty, or 32·3 per cent., are mesognathous; while only four, or 6·5 per cent., are prognathous. The comparatively high index of the northern group seems to be the usual arrangement, for Professor Flower's set, omitting the child's skull, has an average index of 98·2, and Sir William Turner's of 100; giving with mine an average of 98·4 for thirty-four skulls from this district.

OPHRYO-SPINO-AURICULAR ANGLE.

—	Male.		Female.		?		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	22	70½°	9	73°	1	70°	32	71½°	80°	66°
S.W. coast, N.I.	10	71	..	..	2	71	12	71	74	69
E. coast, N.I. ..	6	73½	1	71	..	..	7	73	80	69
Auckland, &c. ..	7	72	4	74	1	74	12	72	76	67
Total ..	45	71	14	73½	4	71½	63	71½	80	66

As the gnathic index shows the projection of the whole face, so this angle shows the degree of projection of the parts above the alveolar arch. This table, therefore, does not

closely correspond with the previous one, which deals with the gnathic index. The range of variation is considerable—14 degrees.

PALATO-MAXILLARY INDEX.

—	Male.		Female.		♀		Both Sexes.			
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	21	119·4	9	125	2	116·5	32	120·8	137·8	106·9
S.W. coast, N.I.	10	123·4	..	..	2	124·1	12	123·5	129·6	115·4
E. coast, N.I. ..	4	117·1	1	124·5	..	..	5	118·6	129·2	115·1
Auckland, &c. ..	6	120	4	117·4	1	128·3	11	119·9	128·3	110·5
Total ..	41	120·3	14	122·8	5	121·9	60	121	137·8	106·9

The averages place all the divisions in Sir William Turner's brachyuranic group. The greatest range of variation, 30·9, occurs as usual in the Ngaitahu Tribe, and the distribution of its thirty-two skulls is as follows: Brachyuranic, twenty-four, or 75 per cent.; mesuranic, six, or 18·8 per cent.; dolichuranic, two, or 6·9 per cent. In the south-west-coast group all the skulls are brachyuranic, and the index is highest. In Professor Turner's six skulls from Kapiti, however, one is dolichuranic, and three are mesuranic. The general average for the whole of New Zealand is, of course, brachyuranic. Of the sixty skulls in the tables, forty-four, or 73·3 per cent., are brachyuranic; thirteen, or 21·7 per cent., are mesuranic; three only, or 5 per cent., are dolichuranic. The measurements given by Professor Flower of his skulls from Whangarei do not permit of this index being calculated.

The *width of the face relative to that of the brain-case* is shown by comparing the bizygomatic diameter with the maximum transverse, and stephanic diameter of the cranium. In looking over the tables we find that in the great majority of the skulls the maximum transverse diameter is greater than the bizygomatic width. Among the male Ngaitahu skulls fourteen have the transverse diameter greater than the bizygomatic, while the reverse is the case in five skulls. Among the females of the same tribe six show the former condition, one the latter, while in another the two diameters are equal. In the combined North Island groups the proportion is twenty-two of the former type to seven of the latter, and in two the diameters are equal. The terms "phænozygous" and "cryptozygous" roughly indicate the relation between the bizygomatic width and the stephanic, or, rather, the maximum frontal diameter. As shown in Tables I. and II., all the male skulls from both Islands, with two exceptions, are phænozygous; and one of these cryptozygous skulls cannot be regarded

as normal in this respect, as a complete and early obliteration of the sagittal suture has checked materially the growth in width of its brain-case. In fifteen of these male phænozygous skulls, though the zygomatic arches are visible from above, the space between them and the bones of the temporal fossa is covered and invisible. In thirty the arches are seen free and open. The projection is less in the female skulls, and three of them are cryptozygous.

Basi-nasal Length, or Cranio Facial Axis.—The average length of this important dimension and its variations are shown in the following table:—

—	Male.				Female.				♀		Both Sexes.			
	No.	Av.	Max.	Min.	No.	Av.	Max.	Min.	No.	Av.	No.	Av.	Max.	Min.
Ngaitahu ..	24	103	112	95	11	102	110	94	3	95·7	38	102·4	112	93
S.W. coast, N.I. ..	11	105·1	109	99	1	101	110	93	2	105·5	14	104·9	110	93
E. coast, N.I.	7	103·6			3	97·3			..	..	10	101·7		
Auckland, &c. ..	7	104·4			4	98·8			1	102	12	102·3		
Total ..	49	103·9	112	95	19	100·5	110	93	6	100	74	102·7	112	93

In the paper on the cranial characters of the Fiji Islanders, already referred to, Sir William Flower gives a table showing the average length of this line in several races, both savage and civilised. In the male Esquimaux it is 106·1mm.; in the male Fijian, 104mm. In none of the other examples given does the length equal that given above as the average for the male of the Maori race, while the average for the female Maoris of my series exceeds that of the females of all the races included in the table.

If we compare the *basi-nasal length* with the *distance between basion and nasion, as measured over the vertex in the middle line*, we find little variety in the different groups. Expressing the lower line as a percentage of the upper curve, we get for the Ngaitahu, 25·3; for the group from the south-west coast of the North Island, 25·5; for the east coast group, 24·9; and for the skulls from Auckland and the Bay of Islands, 25·2.

Professor Cleland,* and, following him, Sir William Turner,† make for purposes of comparison a somewhat different division of this mesial vertical circumference. Instead of using the

* "An Inquiry into the Variations of the Human Skull": Philosophical Transactions, 1870.

† "'Challenger' Reports": Human Crania.

basi-nasal, they take the opistho-nasal length, and, regarding this as 1, they give its proportion to the length of the upper arch between the opisthion and nasion. The highest proportion of arch to base—2·91—was found by Cleland in Irish skulls; the lowest—2·47—in Esquimaux. My series of Maori skulls, looked at in the same way, shows that in the Ngaitahu the proportion is 2·71; in those from the south-west coast, 2·69; in the east coast skulls, 2·72; and in the Auckland group, 2·74.

Median Circumference of Brain-case.—Of the three subdivisions of the nasio-opisthic arc the frontal is the longest in twenty, or 80 per cent., of the male Ngaitahu skulls. In one the parietal equals it, and both are longer than the occipital or lambdo-opisthic portion of the arc. In two the occipital segment equals the frontal, the parietal being the shortest. In two cases the parietal arc is the longest, the frontal coming second. In no case is the occipital the longest. It, however, exceeds the parietal in twelve skulls, while the parietal exceeds it in eleven. The parietal portion of the arc is the shortest in fourteen skulls; the occipital in ten. In nine of the fourteen female skulls of the same tribe the frontal arc is the longest. The parietal equals it twice, while in one skull the frontal, parietal, and occipital divisions are all equal. Though the parietal thus equals the frontal in three female skulls, in no case does it exceed it; but in two cases the occipital portion of the arc is the longest, the frontal coming second. The parietal is the shortest in five female skulls; the occipital in eight. Combining the sexes, we have the frontal arc longest in 82 per cent. of the skulls, and the parietal and occipital in 5 per cent. The occipital arc is shortest in 46·2 per cent., and the parietal shortest in 48·7 per cent.

The fourteen skulls from the south-west coast of the North Island have the frontal arc longest in six, the parietal in five, while these two bones are equal in three more. The occipital is the shortest in every case.

The group of ten skulls from the east coast of the North Island has the frontal arc longest in five, the parietal in four, and equal to the frontal in one. As in the last group, in every skull the occipital portion of the arc is the shortest.

Of the twelve skulls from Auckland and the district to the north of it, one has the sutures so completely obliterated that the limits of the bones could not be determined. The frontal is the longest portion of the arc in eight, and equals the parietal in the other three. The occipital is the shortest in all except one, where it exceeds the parietal.

All this shows clearly that the Melanesian characteristic, a parietal bone longer than the frontal, does not obtain among Maori skulls.

EXPLANATION OF PLATES I. AND II.

PLATE I.

Fig. 1. Skull as seen from the front.
Fig. 2. Skull as seen from the side.

PLATE II.

Fig. 3. Skull as seen from above.
Fig. 4. Skull as seen from below.

B. Basion.
I. Inion, or external occipital protuberance.
O. Occipital point.
L. Lambda.
Ob. Obelion.
Bg. Bregma.
Op. Ophryon.
Gl. Glabella.
N. Nasion.
S. Spinal point, or nasal spine.
A. Alveolar point.
St. Stephanion.
Pt. Pterion, with epipteric bone.
As. Asterion.
Op. Opisthion.
G. Gonion.
St.st. Stephanic diameter.
F.F. Minimum frontal diameter.
E.E. External biorbital diameter.
J.J. Bijugal diameter.
Z.Z. Bizygomatic diameter.
Gl.O. Glabello-occipital length.
B.Bg. Basi-bregmatic height.
M.M. Maximum transverse diameter.
B.N. Basi-nasal length.
B.A. Basi-alveolar length.
N.S. Nasal height.

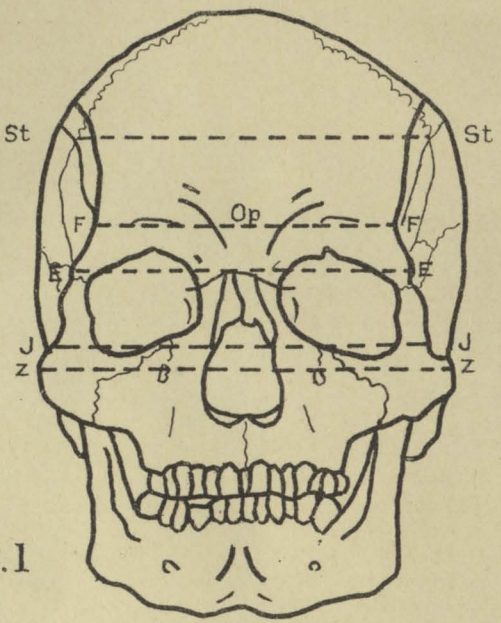

Fig. 1

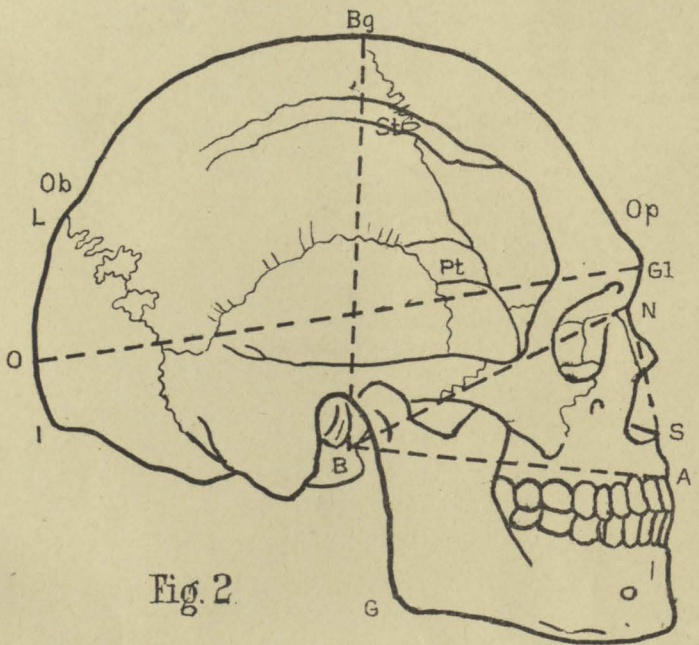

Fig. 2

Human Skull

J.H.S. del.

F.H.T. lith.

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B.A. Basi-alveolar length.
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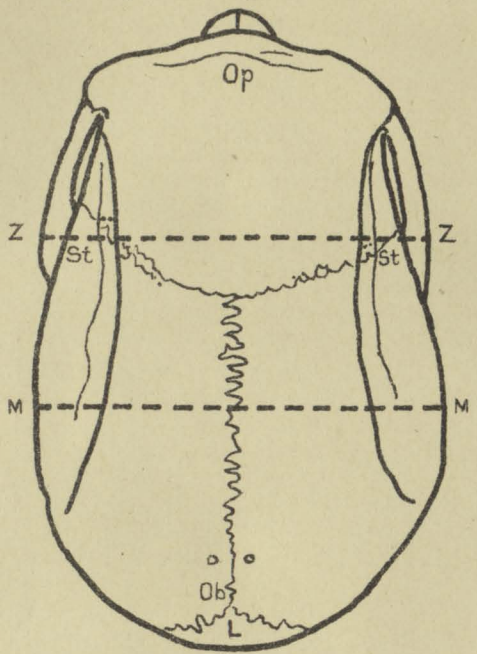

Fig.3.

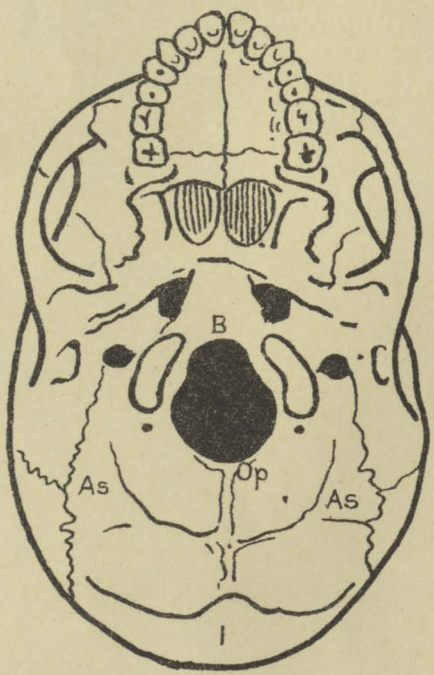

Fig.4

Human Skull

J.H.S. del. F.H.T. lith.

Characters of Cranial Vault.—In the majority of skulls the vertex is roof-like, with a more or less sharp and prominent median ridge in the parietal region, and a flattening, or sometimes hollowing, of the parietal bones between this ridge and their eminences. Some, however, have a rounded vault, and intermediate forms are met with. The outline of the longest skulls as seen from above is a very regular oval, the parietal eminences in these not being distinct. In most skulls, however, the parietal eminences are sharp and prominent, and, as they lie towards the back of the brain-case, the norma verticalis is obovate. Some skulls are pentagonal, as seen from behind. The forehead is, as a rule, moderately high and rounded, and any such pronounced flattening of the frontal region as is so characteristic of Moriori skulls is rare. A post-bregmatic depression was noted in seven skulls. The obelion was markedly depressed in two. The relative width of the parietal and frontal regions has been already described. The greatest transverse width is most often, in 36·9 per cent., on the parietal bones between the eminences and the lower border. In 29·8 per cent. it lies at the level of the parietal eminences, and in an equal number of cases at the squamous suture. I have noted it as being on the squamosals in two skulls, and in one on the suture between the mastoid portion of the temporal and the parietal. One skull alone showed the characteristic form due to early hydrocephalus.

The *glabella* is, as a rule, in the male skulls large and prominent, and the superciliary ridges long and curved. The *temporal fossæ* are large, and the *temporal ridges* usually run above or across the parietal eminences.

Sutures.—The coronal suture is generally simple, except for a short distance above the stephanion, where it is in most skulls deeply serrated. The sagittal suture, though not so simple as the coronal, is not complex. Nos. 2, 3, and 4 of Broca's scale would in most cases represent its serration. The lambdoidal is, as in Europeans, the most complicated suture. In one case it was, however, exceedingly simple, showing scarcely any serration.

The obliteration of the sutures of the vault does not seem to follow any very definite order, though on the whole these skulls lend support to the view that in savage races the closure begins anteriorly. In twenty-four skulls in which the obliteration of the coronal and lambdoidal sutures is partial it is further advanced in the coronal than in the lambdoidal in fifteen; in six the process is equally advanced in both; and in three the lambdoidal is in advance. The sagittal is in advance of the coronal in this respect in the proportion of eleven to six. In the sixteen cases which show partial obliteration of the sagittal suture the closure has begun

anteriorly in three cases only, while posterior fusion—the anterior end being free—is seen in twelve. In one the ossification has apparently begun about the centre.

In two skulls the sagittal suture has disappeared prematurely, not a trace remaining. One (No. 22, Table I.) is that of an adult; the other (No. 43, Table I.) is a child's skull, five or six years of age. They are both, in consequence, much more elongated than others of the same ages. The cephalic index of this adult skull is 69·6.

Metopism.—One skull is fully metopic. It was found in the Nelson Province, and is described with the North Island skulls. It is No. 11 of the group from the south-west coast, in Table II. In four other skulls a short fissure is to be seen in the glabella, and in a fifth a small triangular ossification is to be seen extending upwards into the glabella from immediately above the nasal bones.

Inter-parietal Bone.—No example of this irregularity was met with among the Maori crania, but in one case a small fissure 13mm. in length passed on one side into the occipital bone from its lateral angle.

Pterion.—The pterion is in almost all the cases in which it could be observed of the H-shaped type. The length of the parieto-sphenoid articulation varies from 3mm. to 20mm., the average being 9·5mm. In one specimen it seemed as if a K-shaped pterion had been present, but this could not be determined with certainty, because of extensive obliteration of the sutures. In one only is there an articulation between the squamosal and the frontal, and this, as in the Moriori to be afterwards noted, takes placé by means of an oblong bony process which projects forwards from the squamosal as if an epipteric bone had fused with it. In a separate Maori temporal bone in my possession this same condition is present.

Epipteric bones are of fairly frequent occurrence. They occur in five skulls on both sides, and in ten more on one.

Wormian bones occur in thirty-seven skulls. In addition to the region of the pterion, they are found in the lambdoidal suture, where they occur most frequently, in the occipito-mastoid and parieto-squamous sutures, and at the asterion. In one skull there occurs in each orbit a small separate ossification in the angle between the frontal, the malar, and the great wing of the sphenoid, and it is this skull which has the separate ossification at the root of the nose in the glabella already alluded to.

Incomplete union between the squamosal and petro-mastoid elements of the temporal bone was seen in two skulls, occurring on both sides in each. In these a fissure, such as has been described in European skulls, is seen running obliquely from the angle between the squamous and mastoid above, down-

wards across the mastoid process, nearer its anterior than its posterior border. In neither case is the separation between the two elements complete.

Paramastoid Process.—This was noted in eight skulls, in four of which it is present on both sides. As a rule they are small and unimportant, but those of a skull from near Dunedin merit a short description. They are both low and blunt, but are each articular; one, the left and the longer, articulates with the outer surface of the corresponding lateral mass of the atlas, while the other articulates with the upper and back part of the right lateral mass. This skull is part of a complete skeleton, and the atlas shows the facets which correspond to these paramastoid articular surfaces. In another skull there is a non-articular paramastoid on one side, while on the other there is, not a projection, but a smooth flattened area on the undersurface of the jugular process, which in all probability was for articulation with the transverse process of the atlas.

In one female skull, also from Otago, the atlas is fused to the occipital bone by its anterior arch and lateral masses.

Third Condyle.—A slightly-raised third condyle, 8mm. broad, is present in one skull close to the anterior edge of the foramen magnum. In another the anterior border of the foramen is articular, but not raised. On the contrary, it is slightly concave, as if the tip of the odontoid had pressed on the occipital. In a third skull, although there is no articular surface, there are two bony nodules lying close together on the undersurface of the basi-occipital, a very short distance in front of the border of the foramen.

Parietal Foramen.—This, though present in the great majority of skulls, is often exceedingly minute. It is absent in 20 per cent. of the crania examined. It is present on both sides in 32·5 per cent., and on one side in 45 per cent. One skull has two foramina on one side, the right; and in four the foramen is in the middle line.

Posterior Condyloid Foramen.—This also varies in size, but not to the same extent as the parietal foramen. It is absent in nearly 8 per cent. of the skulls measured. It is present on both sides in 56 per cent., on one side in 36 per cent., occurring more often on the left side than on the right side.

External Auditory Meatus.—No obvious diminution in the size of this canal was observed. No exostoses are present, but in one adult skull the tympanic plate is perforated.

The superior curved line of the occipital bone is clearly double in 33 per cent. of the crania examined.

Equilibrium of Skull.—Nearly 40 per cent. of the skulls, when placed on a table, rest on the teeth, and either the

postero-lateral edges of the foramen magnum or the occipital bone near the foramen. Thirty-four per cent. rest on the mastoid processes, a posterior mastoid equilibrium being present more frequently than an anterior. In a little over 20 per cent. the condyles project beyond the mastoids, and the skull rests on them, while in a few the lateral points of contact are one mastoid and one condyle.

Infra-orbital Suture.—Thirty-one per cent. of the skulls have this suture present on both sides. In 15 per cent. it is present on one side only. In about 10 per cent. of the instances observed it is partly obliterated.

Lachrymal Bone.—A pronounced deviation from the ordinary type was observed in only one New Zealand skull. The inner wall of the orbit is, however, frequently greatly broken. In the skull referred to there is no separate lachrymal on either side, the nasal process of the superior maxilla being prolonged backwards to meet the os planum of the ethmoid. A small space is, however, present in the lower part of this suture, and this was in all probability filled during life by an ossicle. The os planum is occasionally narrowed anteriorly, the shortest ethmo-lachrymal suture I have noted being 5mm.

In another skull, which I believe to be Maori, though it was found at the Chatham Islands, an irregularity also occurs in this region. The measurements of this skull are given with those of the others from the Chathams, in Table III., but the lachrymal irregularity may be described here. It occurs in the right orbit. In it the lachrymal bone and the os planum come in contact by a mere point. Below they are separated from each other by a triangular process of the orbital plate of the superior maxilla, above by a triangular ossicle which articulates along its third side with the frontal bone.*

Spheno-pterygoid Foramen.—Traces of this are present in nearly 50 per cent. of the skulls of my series. In one it is complete on both sides; in two more it is complete on one side, and in one of these the bridge of bone which connects the pterygoid plate and the spine of the sphenoid is 7½mm. deep. It is nearly complete in six skulls, one of these having the same condition on both sides; it is more than two-thirds formed in nine more; while in nineteen a spine is to be seen projecting backwards from the posterior edge of the external pterygoid plate. In those skulls which

* For a full description of lachrymal irregularities and their mode of production, see "Notes on the Varieties and Morphology of the Human Lachrymal"; Professor Macalister, Proceedings of the Royal Society, 1884: also, "The Orbito-maxillary-frontal Suture in Man and the Apes, with Notes on the Varieties of the Human Lachrymal Bone"; Mr. Arthur Thomson, "Journal of Anatomy and Physiology," vol. xxiv., 1890.

have the foramen complete, or nearly so, the pterygoid plate is very much broader than usual.

Nasal Bones.—The nasal bones show considerable variety in size and form, even in skulls from the same district; but in male skulls the bridge of the nose generally seems sunken below the prominent glabella. In a few it is here very narrow, and in three skulls, one nasal bone alone reaches the frontal. The lower part of the nasal bones is usually convex; and though in a number of skulls they are short, and in a few flat, yet in many the bridge of the nose is high, prominent, and curved.

Anterior Nares.—In one skull only is this opening quadrangular. Though it varies considerably in its proportions, it is almost invariably rounded, and much narrower above than below. The lower margin is rounded in 37 per cent., sharp in 31 per cent., two-lipped in 20 per cent., and bevelled or sloping gradually to the facial surface of the superior maxilla in 12 per cent. of the skulls in which it could be examined.

Alveolar Arch.—In nearly half the skulls this is of the ordinary parabolic curve. Of the remainder, the great majority are hyperbolic; while in only from 9 to 10 per cent. is the hypsiloid form of curve present. In none is the curve elliptical. In one, a female from the west coast of Otago, there is an incurving of the premolar and anterior molar region, so that the arch in this part is concave outwards.

Lower Jaw.—This bone is generally strong and massive. The angle is occasionally sharp and easily localised, but is more frequently rounded, and this rounding is in many bones carried forwards along the undersurface of the body, curving upwards anteriorly towards the chin. Indeed, in some cases the posterior margin of the ramus, the angle, and the lower border of the body form one long continuous curve, whose most dependent part is below the first molar tooth.

The coronoid height is greater than the condyloid in the great majority of the mandibles examined. In five cases it is less, and in one these two measurements are equal.

The intergonial diameter exceeds the gonio-symphysial length in every case.

Teeth.—In very few of the skulls in this series are all the teeth present. The loss has in most cases occurred after death, or in advanced age, but in several adult skulls there are undoubted signs of *ante-mortem* loss of teeth. These have probably been lost as the result of injury, as in no case have I been able to observe the slightest sign of dental caries. But though I have not seen decayed teeth in these Maori skulls, I have noted in seven the cavities of alveolar abscesses. Six of these cavities are found in the upper jaw, one in the lower; and most of them have been at the roots of either the

incisor or the premolar teeth. Professor Rolleston* has noted this condition in several of the skulls from British barrows examined by him—skulls belonging to a people whose habits in many respects, in all probability, closely resembled those of the Maoris. Most of his instances occurred in female skulls. All mine were met with in males.

The third molars are, as a rule, not ground, or only very slightly so; and the second molars are usually not much worn; but all the other teeth, except in one or two skulls, show in a marked degree the wearing-down of the teeth characteristic of races in the condition of the Maoris, frequently the whole crowns having been ground away. In several skulls I have observed a curious condition of the first molar teeth of the upper jaw. In its slighter degrees there is merely an oblique wearing of the crown, the outer side being most worn. In the most pronounced cases, however, the pressure from without has caused a gradual dislocation of the tooth inwards, so that it comes to lie transversely in the jaw, with the two outer fangs exposed, and these, with the remaining portion of the crown, are ground down so that the pulp-cavity is exposed in its entire length. The chewing-surface so produced is not flat, but rounded from within outwards. The incisor teeth are quite as much worn as the first molars and the premolars, and, instead of cutting-edges, have flattened crowns. Unfortunately they have been lost even more frequently than the molar teeth, and in comparatively few cases have I been able to determine satisfactorily the relation that the upper incisors have had to the lower; but in some skulls it is clear that the upper teeth do not, as with us, project in front of the lower, but lie directly above them, the flatly-ground surfaces of each being in contact. This arrangement has been described by Sir William Turner in Australian skulls.†

The molar teeth are generally three on each side, or, rather, have been so during life, as, of course, many have been lost after death, and many more, though once present, have been lost during life from old age or other causes. In fifteen skulls, however, I have been unable to find any trace of a third molar on either side of the superior maxilla, and in another, this tooth, though present on one side, has apparently never been developed on the other.

Children's Skulls.—The measurements of nine young skulls are given in the tables. Two of these were found at the Chathams; the others come from different parts of New Zealand.

* Scientific papers and addresses; Ed. Turner, 1884: "General Remarks upon the Series of Prehistoric Crania."

† "The Relations of the Dentary Arcades in the Crania of Australian Aborigines": "Journal of Anatomy and Physiology," vol. xxv., 1891.

The large cranial capacity of these skulls is worthy of note. Their average is 1,417c.c. The average cephalic index, 78·5, shows them to be more brachycephalic than the adults. The altitudinal index, 76·3, also shows a greater relative height; but, as in the adult skulls, the cephalic index is higher than the altitudinal. There is, however, a greater difference between these indices in the young skulls than was found in the adult crania. The mean frontal index, 65·5, is, as might be expected, lower in this group than in the adult skulls. The mean orbital index, 93·7, is markedly higher; indeed, in one skull it is 103·1. The nasal index is almost identical with the average for the adult crania. For the young skulls it is 48·2, for the adults 48·1. The more feeble development of the face results in the lower gnathic index and the higher palato-maxillary. The premature closure of the interparietal suture in the most dolichocephalic of these skulls has been already referred to.

CRANIA FROM THE CHATHAM ISLANDS—MORIORI.

Our knowledge of the now almost extinct Moriori inhabitants of the Chatham Islands is very slight. It is true that they have been known to Europeans for rather more than one hundred years, as the islands were discovered by Lieutenant Broughton, in Her Majesty's brig "Chatham," in 1790; but no use seems to have been made of this discovery till about 1828, when whalers and sealers from Sydney first began to visit them. These men, however, left no written record, and when the regular settlement began, between 1840 and 1850, the Morioris were a rapidly-dying race, much inferior in point of numbers to the Maoris, who had conquered them and taken possession of the islands in 1835, and so timid from ill-usage that intercourse with them was not easily established. They were a gentle people, who, in the words of one of the Maori invaders, "did not know how to fight, and had no weapons," and had been quickly either massacred or enslaved. An epidemic in 1839 had aided the work of destruction; so that during the twenty years that followed the Maori invasion their numbers had dwindled from an estimated 2,000 to 212. Since then, though, of course, Maori oppression has ceased, they have not been able to accommodate themselves to the new conditions of life, and the decrease has continued steadily. In 1881 there were forty-three adults and one child, and now only thirty-five are left, and some of these are not of pure Moriori blood.*

According to their own traditions, their ancestors came

* A. Shand: "The Occupation of the Chatham Islands by the Maoris in 1835"; "Journal of the Polynesian Society," vol. i., 1892.

from Hawaiki, some twenty-seven or twenty-eight generations ago. On arrival they found the islands thickly inhabited by natives who differed considerably from them, being darker, and having very black hair. After much fighting, they made peace with the islanders, and, intermarrying with them, the two races became fused. There is another tradition of the arrival of a second body of immigrants at a later date. These are said to have come from New Zealand.*

This traditional history tends to show that the Morioris, like the Maoris, are of a mixed Polynesian and Melanesian stock.

One of the earliest of the English settlers† describes them as "of middle stature, with almond-shaped eyes and hooked noses," bearing "a most remarkable resemblance to the Jewish race." I am told, however, by one of the European residents that this Jewish nose is by no means universally present—that, indeed, broad and rather flat noses are more common. They differed considerably from the Maoris in appearance, as they did not practise tattooing. In character, too, they were unlike the New Zealand natives, being gentle and timid, and totally devoid of the energy, intelligence, and ferocity of their conquerors.

The measurements of about thirty Moriori skulls have, I believe, been already published. Four crania, one of them a child's, were collected by the "Challenger" expedition. These, with five others in the anatomical museum of the University of Edinburgh, have been described by Sir William Turner‡ in his report on the human crania in that collection. Eight crania are in the museum of the Royal College of Surgeons in London, and have been measured by Sir William Flower.§ Three are described by Dr. Zuckerkandl,‖ from the collection made by the "Novara" expedition, and one of these is figured. Five are in the Paris Museum, and are described by MM. de Quatrefages and Hamy;¶ one of these is also figured. Dr. Barnard Davis** gives the measurements of three more, one of which, however, is a child's. Some measurements of one skull are given by Dr. F. J. Knox,†† in describing a

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* Gilbert Mair: "Notes on the Chatham Islands and their Inhabitants"; Trans. N.Z. Inst., vol. iii., 1870. W. T. L. Travers: "Notes on the Traditions and Manners and Customs of the Morioris"; Trans. N.Z. Inst., vol. ix., 1876.

† F. Hunt: "Twenty-five Years' Experience in New Zealand and the Chatham Islands." 1866.

‡ "'Challenger' Reports": Human Crania.

§ Catalogue of the museum of the Royal College of Surgeons.

‖ Reise der "Novara," Anthropologischer Theil.

¶ "Crania Ethnica."

** "Thesaurus Craniorum."

†† Trans. N.Z. Inst., vol. v., 1872.

Moriori skeleton in the Colonial Museum, Wellington; and a few crania are, I believe, in the Godeffroy Museum at Hamburg.

I describe in this paper fifty skulls from the Chatham Islands. Thirty-four of these are adult or aged males; seven are adult females. In three other adult skulls the sexual characters are very ill-defined, and I class them as of doubtful sex. Six are the skulls of youths or children.

Twenty-eight of these skulls are in the anatomical museum of the University of Otago; seventeen are in the Canterbury Museum; five are in the Colonial Museum at Wellington.

Though all fifty were, I believe, found at the Chathams, I do not regard them all as Moriori skulls. From what has been said above it is clear that Chatham Island skulls are not necessarily those of the Moriori aborigines. They may be so; but they may also be Maori, or even European; and in my collection it is easy to recognise different types of skull, and, though none of them are European, I have come to the conclusion that four skulls are Maori rather than Moriori. These differ from the others in several respects, but especially in the form of the cranial vault, and resemble more closely some of the skulls found in New Zealand, near the western opening of Cook Strait—that part of the North Island where the Ngatiawa and other invaders of 1835 lived before their exodus to the Chathams.

The other forty-six skulls are, in my opinion, Moriori, but not all of one type. Amongst the adult skulls two types may be recognised, and the skulls may be divided into groups according to their resemblance to one or other—groups, however, which shade into each other through intermediate forms. The typical members of the first group are usually large and rather heavy skulls, with prominent parietal eminences and roof-like vertices. They are all more or less pentagonal as seen from behind, some very markedly so, and the low flattened retreating frontal region is a most striking feature. The excess of width over height is generally well marked; indeed, in the most typical members of the group the brain-case is distinctly flattened. The orbits are, as a rule, high, and the appearance of height is increased by the form of the superciliary ridges; while the nasal opening is narrow, with long prominent nasal bones, which are convex below. The air-sinuses in the frontal bone are mainly confined to the region above the root of the nose, so that, while there is, as a rule, a massive prominent glabella, the superciliary ridges are short, and do not pass far out over the orbits. The majority of the skulls from the Chatham Islands that I have examined are of this type. The skull numbered 27, in Table III., shows a different type, and several others resemble it more or less

closely. These form the second group. The main differences between these skulls and those I have just described are the higher and more rounded forehead, the less pentagonal norma occipitalis, the less projecting jugal arches, and the smaller orbital openings. By the "smaller orbital openings" I do not mean that the orbital index is lower in these skulls. This is certainly not the case in all. I mean rather that the orbital opening relatively to the rest of the face is smaller in the skulls which compose this group than in those of the first. The more overhanging superciliary ridges do, however, take away somewhat from the appearance of vertical height. Some of the skulls in this group are also large, one having a capacity of 1,650c.c. These crania are of a more Maori type than those in the former group; but I class them all as Moriori, because I have a clear series of gradations between them and the most typical members of the other group, and also because I have been told by one of the English settlers that in undoubted Moriori burial-places skulls of both types are found. That there should be found among Moriori skulls some which might be regarded as Maori is almost to be expected, as there can be little doubt that both Maori and Moriori are the result of a mingling of the same races—in different proportions perhaps, but still the same. There is, besides, as already noted, a tradition of the early introduction of a pure Maori strain direct from New Zealand; and, remembering the nearness of the Chatham Islands to New Zealand, it is difficult to believe that this occurred only once in the long period that elapsed between the settlement and the arrival of Europeans.

The measurements and indices of these Chatham Island skulls, taken in the way already explained, are given in Table III. I give in the table the entire series, but the four skulls which I regard as Maori are placed in a division by themselves at the end. They are numbered 47, 48, 49, 50.

The short tables included in the text contain, as before, averages calculated from the figures in the larger table. They deal with adult skulls alone.

CRANIAL CAPACITY.

Male.		Female.		♀		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
29	1,455	6	1,276	3	1,321	38	1,416	1,650	1,185

The average of the male skulls shows them to be megacephalic; the female average is microcephalic; and both

sexes combined give an average which is in the upper half of the mesocephalic group. The small number of female skulls makes the combined average rather unsatisfactory. Had the sexes been in more equal proportions the average would have been lower, and would have more correctly expressed the general fact.

The range of variation is 465c.c. if we include both sexes, 365c.c. if we take the male skulls alone.

Of the male skulls, fifteen, or 51·7 per cent., are megacephalic; eleven, or 37·9 per cent., are mesocephalic; while only three, or 10·3 per cent., are microcephalic. One of the females and one of the skulls of undetermined sex are at the lower limit of the mesocephalic group; the others are microcephalic.

Professor Flower has taken this measurement in seven Moriori skulls, and these have an average capacity of 1,396c.c. The average of Sir William Turner's series of eight is still lower, 1,387c.c; but in both groups the percentage of female and doubtful skulls is higher than in mine. It is also to be noted, as explaining my higher results, that the collections measured by these two observers contain none of the skulls of exceptionally large size described by MM. de Quatrefages and Hamy.* The mean cranial capacity of the three males in the Paris Museum is given by them as 1,600c.c., of the two females as 1,565c.c., while one of the male skulls has a capacity of 1,785c.c. Sir William Turner's largest has a capacity of only 1,492c.c., Professor Flower's of 1,560c.c., whereas I show in my table three skulls whose capacity ranges from 1,580c.c. to 1,650c.c. The three "Novara" skulls have a mean capacity of 1,428c.c.; Dr. Barnard Davis's two adults of 1,475cc.

Combining these measurements with mine—in all, sixty-three skulls—we get the following results: Average capacity of forty-seven male skulls, 1,460c.c.; average capacity of sixteen skulls of female or of doubtful sex, 1,326c.c. The male Moriori skull is therefore low down in the megacephalic group. The female is microcephalic.

CEPHALIC INDEX.

Male.		Female.		?		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
30	76·3	7	77·1	3	75·0	40	76·3	81·3	70·2

* "Crania Ethnica," p. 461.

The male skulls, the female skulls, and the skulls of undetermined sex have all, therefore, average indices in the mesaticephalic group, the females having slightly higher indices than the males. The general average is also low down in the same division.

The range of variation is 11·1.

One skull only is brachycephalic. Thirty-one, or 77·5 per cent., are mesaticephalic; eight, or 20 per cent., are dolichocephalic; but no skull has a cephalic index under 70.

Professor Flower's series of eight has a higher average index—78; but, as already pointed out, his method of calculating the index leads to a higher result than that which I have adopted. My results are more directly comparable with Sir William Turner's. The eight skulls measured by him have an average index of 75·2. The three of the "Novara" collection average 75·9. The Paris skulls average 76·3; and the adults measured by Dr. Barnard Davis, 74·9.

Combining these results—exclusive of Professor Flower's—with mine, we get from fifty-eight skulls an average cephalic index of 76·1.

The average glabello-occipital length in my male skulls is 187mm.; in the female, 175·6mm. In the males the maximum transverse diameter of the brain-case averages 142mm.; in the females, 134·2mm.; while the average of both sexes is 140·1mm.

VERTICAL INDEX.

Male.		Female.		?		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
31	72·6	7	72·9	3	73·1	41	72·7	79·5	66·2

In all the groups the average index is metriocephalic, close to the lower limit of the group. The index of the female skulls is very slightly higher than in the case of the males, but the small number of female skulls measured makes it impossible to say whether the Morioris are really exceptions to the general rule in this respect.

The range of variation is 13·3.

Only two skulls in my set are akrocephalic, and these are both males. Twenty-one, or 51·2 per cent., are metriocephalic; eighteen, or 43·9 per cent., are tapeinocephalic. Five of the females belong to the metriocephalic group; the others are tapeinocephalic.

As the mean length-breadth, or cephalic index, is 76·3, we see that the average Moriori skull is distinctly lower than

it is broad. Indeed, if we look at the measurements of the individual skulls, we find that in only two (Nos. 22 and 29) does the height exceed the maximum width, and then only by two millimetres in one case and by one in the other, while in two skulls more these diameters are equal. In one skull (No. 11) this excess of breadth over height amounts to 18mm., giving a height-breadth index of 88.

In this respect the Moriori skulls differ distinctly from the Maori. As will be seen by referring to the earlier part of this paper, the average vertical index in Maori skulls is 74·6—slightly lower than the cephalic index, which is 75·4. In them there is an excess of the cephalic index over the vertical of 0·8. In the case of the Morioris, however, the excess is 3·6. It is true that there are several Maori skulls given in the tables whose vertical indices are lower than the Moriori mean, but there is no Maori skull with an index as low as the lowest Moriori, nor no Moriori as high as the highest Maori. Also, in over 90 per cent. of the Moriori skulls the width is greater than the height, while in only from 40 to 50 per cent. is this the case with the Maori skulls that I have examined.

The highest cephalic index and the highest vertical index belong to the same skull, and there is a general correspondence between these indices throughout the series.

Professor Flower's series have again a higher index than mine—73·9—because of the measurements selected; and Professor Turner's have an average of 73. I have not calculated this index for the "Novara" skulls, as the height given is not the basi-bregmatic; but the mean index of those in the Paris Museum is 72·8.

The average basi-bregmatic height of the male skulls that I have examined is 135·5mm.; of the females, 128·1mm.; while the combined average is 133·7mm., showing an excess of breadth over height of 6·4mm.

FRONTAL INDEX.

Male.		Female.		?		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
31	66·1	7	67·8	3	68·7	41	66·6	73·4	57

The range of variation is here 16·4.

In my series of Maoris this index averages 68·1. The anterior narrowing of the cranium is therefore more pronounced in the Moriori than in the Maori.

In the forty skulls in which it was possible to compare

them, the *asterionic diameter* exceeds the *stephanic* nineteen times; the reverse condition occurs eighteen times; and in three skulls the two diameters are equal.

Though in the majority of cases the stephanic diameter is the maximum frontal, yet in fifteen of the skulls examined the greatest frontal width lies a little below the stephanion.

INDEX OF FORAMEN MAGNUM.

Both Sexes.			
Number.	Average.	Maximum.	Minimum.
42	87·3	97·2	73·7

The range of variation is here 23·5.

ORBITAL INDEX.

Male.		Female.		?		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
32	88·6	7	91·6	3	87·3	42	89	102·7	78·6

The male average is high up in the mesoseme division; the female is low in the megaseme; and the combined average is almost in the latter group.

The range of variation is 24·1.

Of the forty-two skulls measured, twenty, or 47·6 per cent., are megaseme; eighteen, or 42·9 per cent., are mesoseme; and four, or 9·5 per cent. are microseme. A much larger proportion (32·4 per cent.) of the Maori skulls examined were noted as microseme, while the percentage of megaseme Maori skulls was only 25.

The average female index is seen to be higher than the male. This is not the case with the Maoris measured by me.

The average index of the skulls in the Paris Museum is 96, while that of Professor Flower's series is 93·7, both considerably higher than what I give above. Professor Turner's have 88 as their average.

Combining their results with mine, we get, from a series of sixty-three skulls, an average orbital index of 90·1, a little higher than what I get from my own measurements, which brings the Moriori into the megaseme group.

The average interorbital distance in my skulls is between 20mm. and 21mm.

NASAL INDEX.

Male.		Female.		♀		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
32	46·1	7	48.2	3	50·1	42	46·8	52·9	39·6

The group of male skulls is leptorhine, as also is the general average. The female skulls and the skulls of doubtful sex are low down in the mesorhine group.

The range of variation is 13·3.

Twenty-seven skulls, or 64·3 per cent., are leptorhine; fifteen, or 35·7 per cent., are mesorhine; none are platyrhine. The anterior nasal opening is therefore narrower in these Moriori skulls than in the Maoris that I have examined.

Professor Flower's eight skulls have an average index of 46·1; Professor Turner's eight give an average of 47·4; while that of the five in the Paris Museum is 47·5. The average when these four series are combined with mine—sixty-three skulls—is 46·8, the same as that given by my collection alone.

GNATHIC INDEX.

Male.		Female.		♀		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
31	97·8	7	97·1	3	97·4	41	97·7	103	92

The above table of averages shows that all the divisions are orthognathous, though close to the upper limit of the group.

The range of variation is 11.

Nineteen skulls, or 46·3 per cent., are orthognathous. Twenty-two, or 53·7 per cent., are mesognathous. Seven have indices over 100, but none are actually in the prognathous group.

Seven of Sir William Flower's series allowed of the calculation of this index, and these yield an average of 99·2, somewhat higher than that of my set; while Professor Turner's have a mean index of 96, a trifle lower. The average of the whole fifty-six skulls is 97·6.

OPHRYO-SPINO-AURICULAR ANGLE.

Male.		Female.		♀		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
32	67°	7	69½°	3	69½°	42	67½°	72°	62°

The range of variation is 10.

The projection of the nasal portion of the face, as shown by this angle, is greater in the Moriori than in the Maori skulls.

PALATO-MAXILLARY INDEX.

Male.		Female.		♀		Both Sexes.			
No.	Av.	No.	Av.	No.	Av.	No.	Av.	Max.	Min.
30	120·8	7	120·5	2	123·5	39	120·8	132·8	110·2

The average of each group is brachyuranic.

The range of variation is 22·6.

All the skulls with the exception of four are brachyuranic. The four exceptions are mesuranic. Expressing this in percentage form, 89·7 per cent. belong to the former, 10·3 per cent. to the latter group.

A palato-maxillary index is not given in the catalogue of the College of Surgeons' Museum, nor the measurements by which it is calculated. I cannot therefore compare my skulls with those in that museum in this respect. Those measured by Professor Turner seem to have had narrower palates than those included in my table, as their average index is only 113. His range of variation, between 120 and 107, differs also considerably from mine. Combining his results with mine, we get a general average of 119·5 for 47 skulls.

The *width of the face compared with that of the anterior part of the brain-case* is great. In every adult skull, whether male or female, the zygomatic arches are visible from above. In eight, the arches, though visible, do not show their opening, but in the other thirty-four they project freely beyond the part of the brain-case above them. The *maximum transverse diameter* of the brain-case is, however, exceeded by the *bizygomatic* in only six skulls, while it is the longer of the two in thirty-one. In two these diameters are equal. This proportion is much the same as that noted in connection with the Maori skulls.

Basi-nasal Length or Cranio-facial Axis.—In thirty-two

males this averages 103·8mm. This is almost identical with what I find in the male Maori skull. The seven females have a mean diameter of 98·6. The extent of variation is from 116mm. to 98mm. in the males, while in one of the females the axis is 95mm.

In this dimension the Moriori skull is, like the Maori, exceeded in Professor Flower's table already referred to only by the Esquimaux, and to a very slight extent indeed by the Fijian.

Comparing the *basi-nasal length* with the rest of the *mesial vertical circumference*, as we did with the Maori skulls, we find that, taking the mean of all the measurements, the direct length from basion to nasion is 24·7 per cent. of the curve over the vertex between the same two points. This is the mean of both sexes combined. Or, making the similar comparison suggested by Professor Cleland, we get the proportion between the opistho-nasal diameter and the opistho-nasal arc to be as 1 to 2·69.

Treating the upper and lower divisions of the *transverse vertical circumference* of the brain-case in the same way we find that the mean infra-auricular distance is to the supra-auricular arc as 46·5 to 100.

Nasio-opisthic Median Arc.—The frontal portion of this curve exceeds the parietal and occipital in twenty of the thirty-two male skulls examined, while in two more, though longer than the occipital, it is equalled by the parietal. In five cases the parietal is the longest; in five also the occipital exceeds the other two. The parietal is the shortest in thirteen male skulls, the occipital in sixteen. The female skulls have the frontal arc longest thrice, the parietal also thrice, and the occipital once. The only case amongst either Morioris or Maoris in which the frontal is the shortest subdivision of the arc is the Moriori of doubtful sex, numbered 40 in Table III.

Shape of the Cranial Vault.—As already mentioned, the frontal region in a large proportion of the skulls examined is in a very marked degree flat and retreating. This has been noted by other observers. The roof-like form of the vertex in the parietal region is also a very noticeable feature of the brain-case. The median ridge varies in height, but it is present in almost all skulls, and the parietal bone between it and the eminences is almost invariably either flat or even hollowed. Those few skulls which have more rounded vaults are, for the most part, female, or scarcely full grown. This type of vertex, especially when combined with the usually prominent parietal eminences, gives to most of these skulls, when viewed from behind, a markedly pentagonal form. The narrowness of the frontal region as compared with the parietal

has been already noted, and, in consequence, the skull as seen from above is decidedly obovate. The level of the *maximum transverse diameter* varies. In six skulls it is at the parietal eminences, in nine on the parietal bones lower down, in twenty-two on the squamous suture, and in four on the squamosal portion of the temporal bone. The *temporal fossæ* are large, and include the parietal eminences, and a *post-bregmatic hollowing* is not uncommon. The form and size of the glabella and superciliary ridges has been already described.

Sutures.—The coronal and sagittal sutures are, as a rule, simple. The lambdoid is complicated, sometimes exceedingly so. In many skulls the coronal suture is quite unserrated, except for a short distance above the stephanion. The part below the stephanion is always simple, and is frequently ossified; indeed, this suture shows partial or complete fusion much more frequently than does the lambdoidal. In those skulls which show commencing obliteration of the sagittal suture I have noted that the process had begun anteriorly in eight skulls; posteriorly, or in the region of the obelion, in six.

No skull in my series is metopic, but three show a short fissure in the glabella.

An *interparietal bone* is present in one skull—an adult male. In it a distinct serrated suture passes across the occipital bone from lateral angle to lateral angle. In three others, though the division of the occipital is not complete, yet there are fissures extending in towards the protuberance from the lateral angles. An interparietal bone was also present in one of the skulls examined by Professor Turner.

Pterion.—In the great majority of cases this is H-shaped, the length of the articulation between the parietal and the great wing of the sphenoid varying from 1mm. to 19mm., and averaging between 8mm. and 9mm. A K-shaped pterion was noted once. In another case the squamosal bone articulates with the frontal, but this is by means of a process projecting forward from the former bone, an epipteric which has fused with it. Free epipteric bones were noted twenty-six times in nineteen skulls. Sometimes these completely separate the four bones of the region, but in other cases the sphenoid and parietal articulate with each other either in front of or behind the epipteric bone.

Wormian Bones.—These are very often present, in addition to the epipterics just described. I have noted their occurrence in the lambdoid suture in twenty-eight skulls, in one completely separating the occipital from the parietal bones except for a very slight contact close to the asterion; at the asterion in ten; in the occipito-mastoid suture in eight; in the parieto-squamous in two. Small epactal bones were observed twice.

In the parieto-mastoid suture I have seen a wormian once; in the parieto-frontal, above the stephanion, twice; while in the suture, between the great wing of the sphenoid and the malar in the outer wall of the orbit, I have met with wormian bones in two skulls.

Paramastoid Process.—Two skulls show this projection on both sides. Two have a single process. One of these last, though broken, is 10mm. long.

Auditory Meatus.—In six skulls the lumen of the meatus is diminished, or almost obliterated, by a hyperostosed condition of its bony walls. In another, distinct exostoses are present. Two skulls show perforation of the tympanic plate. In one of these the meatus is much dilated, as if by a polypus or some other morbid growth. An exostosed condition of the meatus has been noticed by others as being not uncommon among the South Sea Islanders.

Parietal Foramen.—This is absent in eight skulls, but in several others it is very small. In twenty-three skulls it is present on one side, while in three there is a foramen in the line of the sagittal suture.

Posterior Condyloid Foramen.—The complete absence of this foramen was noted eight times. It is present on the right side alone in fourteen skulls, on the left alone in four.

Superior Curved Line of Occipital Bone.—This is, as usual, best marked in the male skulls, forming in one of them a very projecting ridge. In a large number of skulls it is distinctly double.

Equilibrium of Skull.—Posterior mastoid in eleven cases; anterior mastoid in one; double mastoid in four; posterior condyloid in two; anterior condyloid in four; posterior condylo-mastoid in two. Eighteen skulls rested on the teeth in front, and either on the conceptacula cerebelli or the posterior margin of the foramen magnum behind. In one the posterior point of support was as far back as the inion, while in another it was a paramastoid process.

Spheno-pterygoid Foramen.—In no case is this foramen present in its fully-completed form, but it is nearly perfect on one side in six skulls, and in another on both. In a somewhat less complete condition it is present on both sides in an eighth skull; whilst in ten more a bony spicule projects backwards from the posterior margin of each external pterygoid plate towards the spine of the sphenoid. In all these cases the pterygoid plate is generally broader than usual.

Nasal Bones.—In some specimens the nasal bones are short, and the root of the nose is sunken; but more often they are long, narrow, prominent and convex below, and the root of the nose is not depressed, or only slightly so: in some it is even remarkably high. The Jewish nose, which is said to

have been frequently seen among the Morioris, should be remembered in this connection. It must not be supposed, however, that this form of nose is peculiar to the Morioris among Pacific Islanders. Such noses are not uncommon among the Maoris of some districts of New Zealand, and Professor Moseley * states that they occur to the extent of 5 or 6 per cent. among the Admiralty Islanders.

Lower Margin Anterior Nares.—In twenty skulls this is rounded; in thirteen sharp, as in Europeans; in six the margin is doubled; while in four it is bevelled off.

Infra-orbital Suture.—In a large number of skulls this suture is present, either complete or partially obliterated. It was noted as present on both sides in twenty-one skulls.

Third Condyle.—Though no true example of this condition was observed, in one skull a smooth articular surface was present on the anterior margin of the foramen magnum. This was probably caused by the rubbing of the tip of the odontoid process.

Lachrymal Bone.—Unfortunately, owing to the broken state of the inner wall of the orbit in many of the skulls, I was unable to determine the nature of the articulations in this region in more than a few cases. In some of these, the only peculiarity is a marked shortening of the ethmo-lachrymal suture. In one this is reduced to 5mm., in another to 4mm., and in another to 1½mm. But six skulls show peculiarities which, I think, merit special notice. In the first, the lachrymal bone of the right orbit is a narrow, delicate, curved plate, separated from the frontal by a narrow neck of bone connecting the os planum with a backwardly prolonged nasal process of the superior maxillary. In front of and behind the lower part of this rudimentary lachrymal are spaces which were probably at one time filled by additional ossicles. Behind this the orbital process of the superior maxilla sends a triangular process upwards to within 2mm. of the frontal bone. In the left orbit of the same skull the lachrymal is still further reduced, and a similar process of the superior maxilla passes up between the nasal process and the os planum, and articulates with the frontal bone. In another skull (left orbit) there is no separate lachrymal bone, but its place is taken by the extension backwards of the nasal process of the superior maxilla, behind which a broad triangular process of the frontal passes down, completely separating it from the os planum, and articulating with the orbital surface of the superior maxilla. My collection, therefore, shows two examples of the rare orbito-maxillary-frontal suture. This articulation has been described and figured by Sir William

* "On the Admiralty Islanders"; Journ. Anthrop. Inst. (1877).

Turner* and Mr. Arthur Thomson†, and it is worth noting that, though this condition was found only thrice in the 1,037 skulls in the Oxford collection examined by this last observer, yet one of these three skulls was from the Chatham Islands, while another was a Maori. The third was an Andamanese; and Professor Turner's specimens were bushmen. In another skull in my collection, in the left orbit, a triangular process from the frontal bone and one from the orbital plate of the superior maxilla approach each other between the os planum and lachrymal to within a millimetre. This small interval is filled by an ossicle distinct from both lachrymal and ethmoid. In the right orbit of the same skull the ethmo-lachrymal suture is only 1½mm. in length. In two other skulls—right orbit in one, left orbit in the other—the lachrymal bone is absent, its place being taken by a backward prolongation of the nasal process of the superior maxilla, which articulates with the os planum. A somewhat similar condition occurs in the right orbit of another skull, but two small ossicles are present in this maxillo-ethmoid suture, which almost completely separate the bones from each other. In this same orbit the frontal bone articulates with the orbital process of the palate behind the os planum. In the left orbit of this skull there is another modification of the same condition. The broadened nasal process of the superior maxilla articulates with the ethmoid behind; but the articulation is shortened below by the presence of an ossicle, which articulates with the orbital plate of the superior maxilla.

In the right orbit of another skull the osplanum is divided into three parts.

Alveolar Arch.—The curve is either parabolic or hyperbolic in almost all the specimens examined; but in three the molar portions are parallel to each other, and the arch would be classed by Broca as hypsiloid. In one skull there is a slight incurvation of the premolar region.

Lower Jaw.—The mandible is present in fourteen skulls, and shows considerable variation as to the degree of rounding of the angle and the character of the lower margin of the body, some bones being of the ordinary European type in these respects, others being convex from behind forwards, as we have seen is frequently the case with this bone among the Maoris. The coronoid exceeds the condyloid height in every case except one, and in it the two diameters are equal. The bigonial width also exceeds the gonio-symphysial length in every case. In one, however, these measurements differ by only 1mm.

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* "'Challenger' Report": Human Crania, pl. i.

† *Loc. cit.*

Teeth.—With the exception of the third molars, the teeth are always much worn, though the second molar is not as a rule so much so as the first. The first molars in the upper jaw occasionally show the same dislocation and peculiar wearing already described in connection with the teeth of Maori skulls.

In seven adult skulls the absence of one or both third molars was observed; and in a lower jaw, also adult, there was no second premolar on the right side, the second milk molar being still in place.

Though in no case was any trace of dental caries recognised, yet in six skulls—three males and three females—the cavities caused by alveolar abscesses are present.

Children's Skulls.—Two of the young skulls (Nos. 49 and 50) in Table III. are, in my opinion, Maori. The other four I regard as Moriori, and their more important features I shall now briefly note. Their cranial capacity, though of course lower than that of the adult skulls, is still comparatively high, as it averages 1,358c.c. The average cephalic index is 79·9, considerably higher than that of the adult, and showing them to be on the verge of brachycephaly. The average vertical index, 74·8, is also higher, but in all four skulls the width exceeds the height of the brain-case. The frontal index, 64·3, is lower than in the adult skulls, and shows the greater preponderance in width of the posterior over the anterior part of the brain-case in the child. The orbital index, 95·3, and the nasal index, 51, are also much in excess of those of the adult. The distinctly lower gnathic index, 89·5, and the wider facial angle, 77·8°, are due to the infantile condition of the face. The feeble development of the face is also shown by the slight projection of the zygomatic arches, and by the proportion between the transverse width of the brain-case and the bizygomatic width. In all four skulls the former exceeds the latter. The shortness and width of the palate in the child is well shown by the high palato-maxillary index, 143·2.

Vertebral Column (Maori).

I give in Table IV. the measurements and the indices of thirteen more or less complete Maori columns. The measurements given are the anterior and posterior vertical diameters, and the transverse and antero-posterior horizontal diameters of the vertebral bodies. The horizontal diameters are taken at the lower surface.

The indices of the individual vertebræ, the vertebral indices, are calculated from the formula—

$$\frac{\text{Posterior vertical diameter} \times 100}{\text{Anterior vertical diameter}};$$

and the general indices of the different regions—cervico-, dorso-, and lumbo-vertebral, according to the formula—

$$\frac{\text{Sum of posterior vertical diameters} \times 100}{\text{Sum of anterior vertical diameters}}.$$

I give the general index for each region, but I have not thought it necessary to give the indices of the individual vertebræ, except in the case of those in the lumbar region.

Cervical Vertebræ.

The average *cervico-vertebral index* of the columns given in the table is 105·8, showing that the sum of the anterior diameters of the bodies is less than that of the posterior diameters, and that consequently the cervical curve is due to the intervertebral discs being deeper in front than behind. In one column the sum of the anterior and posterior measurements in this region is nearly equal, the index being 101·3, while the greatest difference between the two is seen in the column whose cervico-vertebral index is 107·9. In no case, therefore, does the anterior depth exceed the posterior.

In no case does the body of the sixth cervical vertebra exceed that of the seventh in transverse diameter, but its antero-posterior diameter was noted as greater in four cases, as equal in two, and as less in one than the corresponding measurement of the seventh.

The condition of the *cervical spines* in certain of the lower races has been described by Owen, Hamy, Turner, and Cunningham. These observers have noted that in these races the spines, instead of being bifid at their extremities, as is usually the case among Europeans, are either simple or but slightly bifurcated. The typical European arrangement is that the spines of the second, third, fourth, and fifth vertebræ are bifid; the sixth spine is frequently simple; and the seventh is invariably long and not bifid. In the coloured races it has been shown that, while the axis as a rule still retains its bifid spine, the third, fourth, and fifth vertebræ have spines which are not only shorter than in Europeans, but are more frequently not bifid. The following table shows that the Maori spinal column agrees in this respect with those of the uncivilised races already examined.

—	Bifid.	Feebly Bifid.	Not Bifid.
Second cervical vertebra ...	5	2	2
Third " ...	1	3	5
Fourth " ...	3	1	5
Fifth " ...	2	2	4
Sixth " ...	0	2	7
Seventh " ...	0	0	9

I have examined twenty *atlas* vertebræ. In none is the vertebral groove behind the lateral mass completely bridged by bone on both sides; but in three a complete foramen is present on one side, while in six others an imperfect arch was noted in this position. In one of the bones in which this foramen occurs the rarer condition of a bony bridge passing from the lateral mass to the upper surface of the transverse process is also present.

Fusion of the atlas with the occipital bone was seen once. This occurs in a female skull, and the anchylosis is between the lateral masses and anterior arch of the atlas and the corresponding parts of the occipital.

The *axis* in one instance seems to have articulated with the margin of the foramen magnum. In this bone a distinct flat eburnated surface occurs on the anterior surface of the tip of the odontoid process.

Dorsal Vertebræ.

The average dorso-vertebral index of the nine columns measured is 106·2, showing the posterior depth of the bodies to be greater than the anterior. This difference is most marked and most constant in the lower half of the dorsal region. The indices vary from 104·3 to 111·6.

The transverse measurements of the bodies show that the smallest vertebra, as in the European column, is either the fourth or the fifth. I should mention that in taking this measurement I have omitted the projection of the costal articular surfaces. The antero-posterior diameters show a steady increase from the first to the last vertebra. In several columns in the lower part of the region the maximum diameter is oblique, passing anteriorly somewhat to the right.

The costo-central articulations do not differ much from the ordinary European type. In one column from Hawke's Bay the last rib to articulate with two vertebræ is the eighth. The eighth vertebra has therefore one demi-facet above on each side of its body, and none below. The ninth has a single facet, as have also the tenth and eleventh. The usual costal facet on the twelfth vertebra is not present, but instead there is a small articular surface on the outer side of its transverse process. This vertebra therefore closely resembled a lumbar when its costal process was in position. In another column a similar condition of the twelfth vertebra was noticed, the rib-surface being very small, and much further back than usual. In one column the tenth rib articulates with the ninth dorsal vertebra, as is not uncommonly seen in Europeans. In three cases there is no articulation on either side between the transverse process of the tenth dorsal vertebra

and the tubercle of the tenth rib; and in three more the absence of this articulation on one side was observed.

The spines of the twelfth and eleventh dorsal vertebræ were noted as being exceptionally small in one female column. In two cases I observed a spinous process in the upper dorsal region, divided longitudinally into two approximately equal parts, due no doubt to a want of union between the two centres from which the neural arch is developed.

Lumbar Vertebræ.

The average lumbo-vertebral index of the twelve sets of lumbar vertebræ given in the table is 105·9, showing that the sum of the posterior vertical diameters of the bodies exceeds the sum of the anterior measurements. The highest index, that of a male, is 116·4, and the lowest, also a male, is 95·3. In this latter case and in two others, females, the index is under 100, and shows that in these the anterior depth is greater than the posterior, though the average of the series shows the reverse condition. The Maori vertebral column, described by Professor Turner in his "'Challenger' Report," has a lumbar region whose index is 100, the sum of anterior and posterior vertical diameters being the same, 101mm.

Professor Cunningham, in his memoir on the lumbar curve,* shows that the European differs markedly from the uncivilised races in the relation between the anterior and posterior depths of the vertebræ in the lumbar region; and Sir William Turner has made the same observation. The sum of the anterior depths is in the European greater than the sum of the posterior depths, and the vertebræ are, in consequence, shaped in a manner favourable to convexity of the lumbar portion of the column. In savage races, on the other hand, the opposite condition holds, and the vertebræ are shaped in a manner unfavourable to the curve. The average index of seventy-six Europeans measured by Cunningham is 95·8; that of the Andaman Islanders, according to the same observer, is 104·8; of Negroes, 105·4; and of Australian blacks, 107·8; while in the gorilla, chimpanzee, and orang it is still higher. The Maori then, judging from my measurements, has an index practically the same as that of the Negro, and widely different from the European.

The divergence from the European type is more fully brought out if we compare the indices of the individual vertebræ in the two races, as in the following table, in which the European column is taken from Dr. Cunningham's paper.

* "The Lumbar Curve in Man and the Apes," "Cunningham Memoirs," No. II. Royal Irish Academy. 1886.

—	Seventy-six Europeans.	Twelve Maoris.
Index of first lumbar vertebra ..	106·1	128·6
" second " ..	101·4	116·0
" third " ..	97·2	107·5
" fourth " ..	93·5	97·1
" fifth " ..	81·6	87·0

Not only does the table show that the index of each vertebra is higher in the Maori, but also that, while in the European only one vertebra—the first—has the posterior surface of its body distinctly deeper than the anterior, in the Maori, on the contrary, there are three—the first, the second, and the third—deeper posteriorly than anteriorly.

In Sir William Turner's Maori the first and second vertebræ are also deeper behind than in front, the third and fourth are of equal depth on both surfaces, and the fifth is deeper in front than behind.

The following table shows to what extent the individual vertebræ agree with the average.

—	Anterior Depth of Body greater than Posterior Depth.	Anterior Depth of Body equal to Posterior Depth.	Anterior Depth of Body less than Posterior Depth.
First lumbar vertebra ..	0	0	12 (100%)
Second " ..	0	0	12 (100%)
Third " ..	0	3 (25%)	9 (75%)
Fourth " ..	5 (41·7%)	5 (41·7%)	2 (16·7%)
Fifth " ..	12 (100%)	0	0

Looking now to the sexual differences as shown by the measurements, we find the average general index of the seven males to be 106·2, while that of the five females is 104·4. The relatively greater posterior depth is therefore shown by the lumbar vertebral bodies in both sexes, but the females have it in a less decided degree than the males, though, as before noted, the lowest index in the whole series belongs to a male column.

The table below gives the average indices of the individual vertebræ grouped according to sex, and shows that though both sexes clearly have their lumbar vertebræ built on the savage type, yet that those of the Maori woman, like her European sister's, are shaped in a manner more favourable to the lumbar curve than those of the male.

—	Seven Males.	Five Females.
First lumbar vertebra	130·2	126·4
Second "	117·9	113·7
Third "	108·1	106·7
Fourth "	97·2	97·1
Fifth "	87·8	85·8

In two cases the body of the first lumbar vertebra shows a much more than usual excess of the posterior depth over the anterior. In one of these, while the depth behind is 28mm., in front it is 18mm., and in the other the depth diminishes from 25mm. to 15mm. In both there is also considerable transverse hollowing of the upper surface.

Imperfections in the development of the neural arch were more frequently seen among the lumbar vertebræ than in the dorsal region of the spinal column. The separation of its posterior part (the laminæ with the spine and the inferior articular processes) from the pedicles was observed nine times. Six of the fifth lumbar vertebræ show this peculiarity; the fourth shows it in two instances; and even in the third I noted it once. In this latter case not only does the third vertebra show this defect in ossification, but the fourth also, as if to compensate for the undue rigidity of the loins caused by the fusion of the fifth vertebra with the sacrum which is present.

The fifth lumbar vertebra was seen to articulate by an enlarged transverse process with the lateral mass of the sacrum in three instances, and fusion between these bones occurs in the one case noted above.

The presence of a lumbar rib was noted once. This articulated with the right side of a first lumbar vertebra. The transverse process on this side is like that of the twelfth dorsal vertebra, while on the pedicle is the articular surface for the rib. The other side is normal.

STERNUM (MAORI).

I have seen only one sternum in which the manubrium is fused with the body of the bone. In all the others these two segments are distinct.

PELVIS (MAORI).

In Table V. I give the measurements of twenty-four Maori pelves, ten males and fourteen females.

The following are the measurements adopted, given in the order in which they occur in the table :—

Breadth of entire pelvis: The maximum distance between the outer lips of the iliac crests.

Breadth between anterior superior iliac spines: The distance between the most prominent parts of these eminences.

Breadth between posterior superior iliac spines: The distance between the inner borders of the spines.

Height of entire pelvis: From the highest part of the iliac crest to the most distant part of the tuberosity of the ischium.

Breadth between the outer surfaces of the tuberosities of the ischia: The maximum width.

Breadth between the ischial spines: Between their tips.

Breadth of Sacrum: The maximum width across the base.

Length of Sacrum: The distance in a straight line from the middle of the anterior border of the upper surface of the first sacral vertebra to the corresponding point on the lower border of the fifth. Even in sacra with six vertebral elements the same points are chosen.

Length of sacral arc: The length of the sacrum taken in a curve along the front of the bodies. By comparing this length with that taken in a direct line, the arc with its cord, a good idea is got of the degree of curvature of the bone.

Pubo-ischiatic depth: The distance between the upper surface of the pubis immediately in front of the ilio-pectineal eminence and the lowest part of the tuberosity of the ischium. This gives the depth of the pelvic cavity laterally.

Depth of pubic symphysis.

Transverse diameter of pelvic brim: The maximum width between the ilio-pectineal lines.

Sagittal or conjugate diameter of pelvic brim: From the middle of the upper margin of the anterior surface of the first sacral vertebra to the nearest point on the posterior surface of the pubic symphysis. When a median ridge is present on the pelvic face of the symphysis the measurement is taken somewhat to one side of the middle line.

Transverse diameter of pelvic outlet: Taken as recommended by Dr. Garson, between the most widely separated points on the lines which pass forwards from the ischial spines towards the lower ends of the obturator foramina.

Sagittal diameter of pelvic outlet: From the centre of the lower margin of the fifth sacral vertebra to the lowest part of the pubic symphysis.

Subpubic angle.

Height of acetabulum: From the upper margin below the anterior inferior iliac spine to the opposite border of the cavity.

Breadth of acetabulum: Taken across the cavity at right angles to the previous measurement.

Height of obturator foramen.

Breadth of obturator foramen.

Interobturator width: The distance between the inner margins of the obturator foramina.

Breadth of innominate bone: The distance between the angle of the os pubis and the most distant part of the iliac crest, generally a little above the posterior superior iliac spine.

Breadth of ilium: The distance between the anterior superior and posterior superior spines of the ilium.

As far as possible, the measurements about the innominate bone were taken on the right side.

The indices used, and the formulæ by which they are calculated, are as follow:—

Breadth-height index ... $\frac{\text{Pelvic height} \times 100}{\text{Pelvic breadth}}$

Index of the pelvic brim .. $\frac{\text{Sagittal diameter of brim} \times 100}{\text{Transverse diameter of brim}}$

Index of the pelvic cavity .. $\frac{\text{Pubo-ischiatic depth} \times 100}{\text{Transverse diameter of brim}}$

Sacral index .. .. .. $\frac{\text{Sacral width} \times 100}{\text{Sacral length}}$

Obturator index .. .. .. $\frac{\text{Obturator width} \times 100}{\text{Obturator height}}$

The following table gives the *breadth* and *height* of the whole of the pelvis, and the *height-breadth* index, or proportion between the two, distinguishing the sexes, and giving the maximum and minimum as well as the average in each case.

	Male.				Female.			
	No.	Av.	Max.	Min.	No.	Av.	Max.	Min.
Pelvic breadth	10	261·4	285	243	14	258·6	290	243
Pelvic height	10	213	232	200	14	200	208	191
Height-breadth index ..	10	80·8	85·2	75·4	14	77·6	85	68·3

The greater height of the male pelvis, not only absolute, but relative to width, is clearly shown in the table.

The measurements of two Maori pelves, both males, are given by Sir William Turner.* The maximum width of one is 255mm., and its height is 221mm.—a pelvis, therefore, somewhat narrower and higher than the average of my male specimens. Its index is 87, higher than that of any in my series. In the other pelvis, which was scarcely full grown, the breadth is 238mm., the height 188mm., and the index 79mm.

* "'Challenger' Report": Human Skeletons, part xlvii.

These twelve male pelves are, on the whole, both narrower and shallower than the average pelvis of the European male, but the height is proportionally to the breadth slightly greater in the Maori, as is seen by comparing the height-breadth index in the two races. The average male index, as given by M. Verneau, in Europeans is 79.

The female Maori pelvis, so far as shown by the fourteen now described, is also narrower than that of the European female, but is its equal as to height. It has therefore a higher index, that of the European female being 74 according to M. Verneau, 75 according to Dr. Garson.

In both sexes, then, but to a slightly greater extent in the female than in the male, the Maori pelvis is higher relatively to its width than is the case with the majority of Europeans.

The following table, arranged like the last, gives the average measurements and index of the *brim of the pelvis*:—

—	Male.				Female.			
	No.	Av.	Max.	Min.	No.	Av.	Max.	Min.
Transverse diameter ..	10	118·3	127	109	14	127·5	136	117
Sagittal diameter ..	10	101·2	112	90	14	111·8	131	94
Index of brim ..	10	86·1	92·2	79·6	14	87·7	102·3	70

The figures show that while the two diameters of the brim are, as is always the case, longer in the female than in the male, yet that the proportion between them is much the same in the two sexes, the female showing a slightly greater proportional length in the sagittal diameter.

It is curious that both the highest and the lowest index should be found among the female pelves. The maximum index, 102·3, does not, however, belong to a pelvis with an unusually short transverse diameter. On the contrary, this is 128mm., a little above the female average. It is the great length of the antero-posterior measurement which is the cause of this exceptionally high index. This is the only pelvis of either sex in which the antero-posterior diameter of the brim exceeds the transverse.

Professor Turner's two male pelves have higher brim indices than of any of my males. In one the index is 97, and in the other it is 95. Even allowing for the fact that Professor Turner measures to the back of the upper end of the symphysis, the indices show that in these two pelves the conjugate diameter is longer proportionally to the transverse than in any of the male pelves that I have measured. Including these two pelves with mine, we get an average

brim index for males of 87·9, a little higher than that given in the table, and almost the same as that yielded by the measurements of the female pelves.

If we now compare the Maori and European pelves with regard to these measurements of the brim, we find that the antero-posterior is longer relatively to the transverse in the Maori of both sexes than in the European. M. Verneau gives the brim index in European males as 80, in females as 78; Professor Turner gives 77 for males and 79 for females as the result of his measurements; Dr. Garson gives 80 for females; Sir William Flower, 81 for males, 78 for females; and, though some anatomists give higher results, those of others—as, for example, Martin, who gives 69 as the brim index of Irish women—are lower.

We may safely say, then, that the Maori pelvis, with its index of nearly 88, is narrow compared with the European type, but it falls into the same group if we follow Sir William Turner's classification. He divides pelves into three groups—platypellic, those with a brim index below 90; mesatipellic, those whose index is from 90 to 95; and dolichopellic, those whose index is above 95. Europeans, Chinese, and some savage races, such as American Indians and Fuegians, belong to the first group; Negroes are found in the second; while Australians and Andaman Islanders are members of the third. According to my measurements, the Maoris, both male and female, are also platypellic. All the pelves in my series, however, do not belong to this group. Fifteen—seven males and eight females—do so; but six—three males and three females, are mesatipellic; and the remaining three females are dolichopellic. Professor Turner's two males are also dolichopellic.

The *depth of the pelvic cavity*, as shown by the pubo-ischiatic diameter, and its relation to the transverse diameter of the brim, are shown in the following table.

	Male.				Female.			
	No.	Av.	Max.	Min.	No.	Av.	Max.	Min.
Pubo-ischiatic depth ..	10	98·1	103	85	14	91·4	96	84
Transverse diameter of brim	10	118·3	127	109	14	127·5	136	117
Index of pelvic cavity ..	10	83	89·9	76·6	14	72·3	82	64·7

The difference between the average depth in the male and in the female is seen to be 6·7mm. In a previous table it was shown that the average height of the entire male pelvis exceeds that of the female by 13mm. The lower height of the

pelvis in the female is therefore shown to be due in almost equal proportions to a shortening of the iliac bones and to a shallowing of the pelvic cavity.

The characteristic shallowness of the female pelvis is, however, brought out in a more striking way by taking not the absolute depth, but the index of the pelvic cavity—that is to say, the proportion between the pubo-ischiatic depth and the width as taken at the brim. As shown in the table, the male index exceeds the female by 10·7.

Professor Turner's two specimens have a depth of 92mm. and 106mm., and scarcely alter the average. Their indices are 84·4 and 86·9. These raise the male average to 83·4.

The *width of the pelvic outlet* in the males averages 94·1mm.; in the females, 114·1mm.

There is very little difference between the sexes as to the *depth of the pubic symphysis*. In the males it averages 36·3mm.; in the females, 35·7mm.

The *obturator foramen* is, as usual, wider in the female than the male. The mean male index is 62·7; the female, 71·7.

The *subpubic angle* also shows the customary greater width in the female pelvis, the average angle in the males being 63·3°; in the females, 82·1°.

The *acetabulum* is in almost every case smaller in the female than in the male. In fourteen cases its two diameters are equal; in ten the height slightly exceeds the width.

Sacrum (Maori).

Twenty-five sacra were sufficiently perfect to allow me to measure both the length and the breadth. Their measurements are summarised in the short table below. The individual measurements of twenty-four are given with the pelves in Table V. Nine of these are given again with the twenty-fifth, in the table of vertebral columns (Table IV.).

In eight bones a sixth vertebral element is present. This is the first coccygeal in seven instances, and the fifth lumbar in one. In measuring the length, this additional vertebra is, as already explained, always omitted.

	Male.				Female.				M. and F.	
	No.	Av.	Max.	Min.	No.	Av.	Max.	Min.	No.	Av.
Sacral breadth ..	9	115	123	108	16	119·9	128	101	25	118·1
Sacral length ..	9	105·9	113	97	16	102·6	121	85	25	103·8
Sacral arc ..	9	114·7	122	108	16	111·1	125	97	25	112·4
Sacral index ..	9	108·8	126·8	101·9	16	117·2	135·2	99·2	25	114·2

Comparing these figures with the transverse diameter of the pelvic brim, we find that in the male pelvis the sacral width is 97 per cent. of the brim width, while in the female it is 94 per cent., showing that the curvature of the back part of the iliopectineal lines is more pronounced in the female than in the male.

It will also be seen that the average degree of curvature of the sacrum, as got by comparing the length with the arc of the bone, is practically the same in both sexes.

Though the female index is distinctly higher than the male, it is worth noting that the highest and lowest indices both belong to female sacra.

The length of the sacrum in Professor Turner's two male Maoris is 101mm. and 120mm., while the breadth is 97mm. and 115mm. The sacral index is in each case, therefore, 96. If we include these with my set of males we get an average for that sex of 106·5, nearly eleven less than the average female index.

According to M. Verneau's measurements, the average length of the European sacrum is 105mm. in males, and 101mm. in females, while the width in the male is 118mm. and in the female 116; though Dr. Garson gives this latter average as 118·3. The Maori sacrum, then, so far as my measurements go, is in both sexes of almost the same length as the European; but it is somewhat narrower in the male and broader in the female than the European average for each sex.

Looking to the proportion between these two measurements, the index, we see that the Maori sacrum is in both sexes broader than it is long, and, in consequence, belongs to the platyhieric group (platyhieric, index over 100; dolichohieric, index under 100)*, in common with Europeans. The male sacra are, however, almost in what Professor Paterson† calls the subplatyhieric division—those with an index between 100 and 106, a group containing, amongst others, Andaman Islanders and Negroes. The female sacra have, on the other hand, indices equal to the average of the European female. Only one sacrum is dolichohieric, and that is a female with an index of 99·2.

As five of my pelves belong to skeletons of which I have also the skulls, I give in the following table some of the more important indices of the two cavities in each body.

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* Professor Sir William Turner: "'Challenger' Report": Human Skeletons.

† "The Human Sacrum": Royal Society Proceedings, 1892.

Cephalic.	Vertical of Cranium.	Pelvic Brim.	Breadth-height of Pelvis.	Sacral.	Sex.
76·6	70·7	81·9	82·3	112·3	M.
76·1	71·3	82·9	84·5	103·7	M.
80·0	79·4	86·5	81·1	108·9	M.
75·4	66·8	90·2	81·2	..	M.
74·0	74·6	90·0	74·9	115·9	F.

The above comparison does not seem to bring out anything definite as to whether certain types of pelvis accompany certain forms of skull, and the number of instances is too small to be of any value by themselves. They may possibly assist others with more material at their disposal.

Bones of the Limbs (Maori).

The principal measurements of the limb-bones of thirteen skeletons, nine of which are male and four female, are given in Table VI. Few of these skeletons are sufficiently perfect to allow of all the bones being measured, but I include in the table all those which have allowed of any of the usual comparisons between bones of the same body being made. In the text I give also the results of the measurements of numerous other bones, none of which could be with certainty identified as belonging to the same skeleton.

Scapula.

The measurements were taken in the manner originally proposed by Broca, and adopted by Flower, Garson, Turner, and others. The *length* is the distance in a straight line between the upper and the lower angles. The *breadth* is the distance between the centre of the posterior margin of the glenoid cavity and the point where a line drawn along the attached margin of the spine would cut the posterior border of the bone. The *infra-spinous length* is the distance between the last point and the inferior angle. The two indices are also calculated in the usual way:—

$$\text{Scapular index} = \frac{\text{Breadth} \times 100}{\text{Length}}.$$

$$\text{Infra-spinous index} = \frac{\text{Breadth} \times 100}{\text{Infra-spinous length}}.$$

Twenty-five scapulæ were sufficiently perfect to let me make the above measurements; of these, thirteen were right bones, and twelve belonged to the left side. I have not attempted to distinguish male and female bones, excepting in the case of those included in the table, which belong to skeletons sufficiently perfect to allow of the sex being determined. Though the number of undoubted female bones is too few to

permit of any conclusions being drawn from their measurements, it may, however, be of interest to note that their average scapular index is higher than that of the males, in this respect resembling European bones.

The scapulæ examined vary in their length from 174mm. to 142mm., and in breadth from 119mm. to 90mm. The mean length is 156·9mm., and the mean width 102mm. The average scapular index is 64·9; the extremes are 70·6 and 60. There is practically no difference between the bones of the two sides in this proportion. The average infra-spinous index is 89·4. The extremes are 100 and 72·4, showing that in the Maori, as in other races, there is great individual variation in the position of the spine. In Sir William Turner's "'Challenger' Report"* he gives the indices of a Maori scapula from Otago. In this bone the scapular index is 63·9, and the infra-spinous 88·5. M. Livon† has measured thirty-two Polynesian scapulæ, but how many of these are Maori I cannot say. He gives the scapular index as 66·6.

The broadest scapulæ seem to belong to the Andaman Islanders, whose index is 70·2; the narrowest to the Tasmanians, with an index of 60·3; while the average index of 65·3 shows the European bone to be slightly broader than the Maori.

The scapulæ were also examined with reference to the condition of the supra-scapular notch. In seven bones no notch is present, and the upper border forms one continuous concavity from the upper angle to the base of the coracoid process, while in several others the notch is very shallow. In no case did I notice ossification of the supra-scapular ligament.

Clavicle.

The length was taken in a straight line between the extremities of the bone. I have measured twenty-nine clavicles —fourteen belonging to the right side, and fifteen to the left. The average length of the entire series is 143·3mm.—that of the right bones 141·5mm., of the left bones 144·9mm. This excess in length of left bones over right was also observed in the clavicles of the eight skeletons in which I was able to compare the bones on the two sides. In seven of these the left was the longer bone, and in the eighth the right exceeded the left by only 1mm. The maximum length observed is 171mm.; the minimum 130mm.

The condition of the subclavian groove was looked at in each case. It is almost invariably shallow and indistinct.

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* "Human Skeletons," part xlvii.

† Quoted by Turner, *loc cit.*

Clavículo-humeral Index.

The relation between the lengths of clavicle and humerus was noted fifteen times, and the index was calculated according to the formula—

$$\frac{\text{Length of clavicle} \times 100}{\text{Length of humerus}}.$$

The average of these fifteen indices is 45·8—the maximum is 50·5, the minimum is 41·9. The left indices are higher than those of the right side.

Humerus.

The *length* given is the distance between the highest part of the head and the lowest point on the trochlear surface.

I have measured forty-three bones, and these have an average length of 310·3mm. The longest humerus measured 342mm., the shortest 285mm. Twenty of these belong to the right side, and have an average length of 310·9mm. The average length of the twenty-three left bones is 309·9mm. This shows a trifling preponderance in length of the right bones over the left. In the ten cases in which I was able to compare the bones of the two sides I found the right the longest bone eight times, and equal to the left twice. In the fifty bones examined I found a supra-trochlear foramen present in only three—that is to say, in 6 per cent. This is very little higher than the proportion in which this perforation occurs in Europeans, and differs greatly from what I expected to find. M. Topinard* gives the percentage of perforated bones among Polynesians as 34·3, and among Melanesians as 14·1. There is certainly a very marked difference in this respect between the bones examined by him and those of my series.

In no bone did I see any trace of a supra-condyloid spine.

Radius.

The *length* is the distance between the upper surface of the head and the tip of the styloid process.

The number of bones measured was thirty-five. These have an average length of 245mm. The longest bone measured 276mm., the shortest 216mm. The difference between the right and left radii is slight, the seventeen right bones having an average length of 246·6, the eighteen left bones averaging 244·7mm.

Ulna.

Two *lengths* are given—one, the maximum, from the highest part of the olecranon to the tip of the styloid process; the other to the base of the styloid.

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* "Eléments d'Anthropologie Générale," p. 1016.

Thirty-five bones were measured. The average maximum length of these is 261·6mm., but they vary between 284mm. and 237mm. The eighteen right bones have an average length of 262·4mm.; the left are slightly shorter, averaging 260·8mm.

The antero-posterior curve of the upper third of the shaft is more pronounced than in European bones.

Radio-humeral Index.

The proportion between the maximum lengths of the humerus and radius is expressed by this index, and is calculated according to the formula—

$$\frac{\text{Radial length} \times 100}{\text{Humeral length}}.$$

This I have been able to calculate in twenty cases, taking both right and left arms. In one it is as high as 82·3, in another as low as 72·8, and the average of the set is 77·8. Professor Turner has given this index in two New Zealand skeletons, and these have a mean of 76·5. The mean index of five Polynesians, as given by M. Topinard, is 76. He does not state, however, whether any of these are Maoris.

Amongst Europeans this index averages between 73 and 74. The forearm of the Maori, therefore, is, relatively to the upper arm, longer than it is among the civilised races of Europe. In this respect, however, the Maori is exceeded by the Negro, with an average index of 79, and by a few other savage races.

Sir William Turner proposes to divide races into three groups, according to the height of this index: Brachykerkic, those with an index below 75—*i.e.*, with a relatively short forearm (Europeans, Esquimaux, &c.); dolichokerkic, those with an index above 79—*i.e.*, with a relatively long forearm (Andamanese, Negritos, &c.); and mesatikerkic, those with an index intermediate (Australians, Negroes, &c.). He places Polynesians generally in the middle group, and my measurements show that the Maoris are also mesatikerkic.

If we now look at the influence of sex on this index, as shown in my table, we find that the series of fourteen males have an average index of 78·7, while the average of the six females is only 74·3. It is possible that the female skeletons examined by me have exceptionally short forearms; but, as shown by Topinard,* this index in the female is in all races measured by him lower than in the male; and my results, so far as they go, point to this rule holding also amongst the Maoris.

Os Innominatum.

The measurements of this bone are given with the description of the pelvis.

* *Loc. cit.*, p. 1043.

Femur.

The table gives the length of the bone as measured in two different ways. One shows the *maximum length* of the bone from the summit of the head to the lowest part of the internal condyle; the other is taken in the oblique position that the bone has in the body, and gives the distances between the highest part of the head and the plane of the condyles. The maximum distance between the top of the great trochanter and the internal condyle is also given, as well as the trochanteric length in the oblique position.

Fifty bones were measured, and the average maximum length of these is 437·5mm. The twenty-six bones of the right side give an average of 438·5mm.; the twenty-four of the left, 436·3mm. This slightly-greater length of the right bones is, however, not shown in those skeletons in which I was able to compare the bones of opposite sides. In six of these the left bones are the longer; in one the right and left are equal; while in four only does the right exceed the left. The longest femur measures 494mm.; the shortest is only 399mm. in length.

I measured also the antero-posterior and the transverse diameters of the shaft of the bone at its centre, as recommended by Topinard, so as to ascertain the degree of projection of the linea aspera. Taking the transverse width as 100, an index was calculated, which is called by Broca "The Index of the Section of the Femur." I call it in the table the index of the middle of the shaft, as I give another for the section of the upper fourth. The transverse diameter taken is parallel to the plane of the posterior surfaces of the condyles, and is in almost all cases slightly less than a diameter taken in somewhat oblique direction at the same level. My results are as follows: The average index of fifty femurs is 115·8, varying from 138·1 to 96·4. Three, or 6 per cent., of the bones have indices over 130; thirteen, or 26 per cent., have indices between 120 and 130; twenty, or 40 per cent., have indices between 110 and 120; thirteen, or 26 per cent., have indices between 100 and 110; and in one only is the index under 100. In a table given in Topinard's Anthropology * this index, in thirteen New Caledonians, is shown as averaging 127·6; while in two prehistoric femora it is still higher; but in none of the other races given does it reach the Maori average as given above. The "fémur à pilastre" may therefore, I think, be regarded as developed to a more than usual extent among the Maoris.

I also give in the table an index which I call the index of the upper fourth, which gives the proportion between the

* P. 1019.

antero-posterior and transverse diameters of the shaft in its upper part. The transverse diameter is taken as 100. The peculiar flattening and widening of the shaft at this level was first described by Sir William Turner in a Maori femur, but it was subsequently recognised as being a common feature of the femora of savage races. In giving numerical expression to this proportion I make the measurements at the level where the spiral line crosses below the inner border of the root of the lesser trochanter. This point is, as a rule, at the widest part of the bone, and is fairly regular and easily determined. The average index of the fifty bones measured is 64·3, and the variation is between 81·3 and 54·8. This flattening I find is an adult characteristic, and is not seen in young bones. For the sake of comparison, I measured the shaft at the same level, and calculated the indices in twenty European femora. The average of these indices is 86·6, showing that the shaft has here a much rounder section than in the Maori.

Though I did not measure the angle that the neck of the femur makes with the transverse vertical plane, I noticed that the neck in Maori bones, as a rule, projects more forwards than in the European femora with which I was able to compare them.

Tibia.

I give two longitudinal measurements of this bone. One, the "maximum," includes the malleolus, but not the spines. The other excludes both malleolus and spines. These measurements were taken in forty bones, and the average of the maximum length is 354·8mm. The longest tibia has a length of 394mm.; the shortest measures 319mm. The average length of the right bones exceeds that of the left by 5·3mm.

The measurements from which the *index of platycnemia* was deduced were taken as directed by Broca, at the level of the medullary foramen; and the index was calculated according to the formula—

$$\frac{\text{Transverse diameter} \times 100}{\text{Antero-posterior diameter}}.$$

Forty-five bones allowed of these measurements being taken, and the average index of the series was found to be 64·2. The most platycnemic bone has an index of 53·1, while that in which the lateral compression is least marked has an index of 76·5. In most bones the rounding of the posterior surface which is characteristic of platycnemia is well seen. Mr. Arthur Thomson* gives the indices of two Maori tibiæ mea-

* "On the Influence of Posture in the Form of the Articular Surfaces of the Tibia and Astragalus": Journal of Anatomy and Physiology, 1890.

sured by him as 64·7 and 73·5. A well-marked degree of platycnemia is therefore characteristeric of the Maori tibia, contrasting strongly with what the European bone shows in this respect, to which an index of 73·7 is given by Thomson as the result of the measurement of twenty-one specimens. But even among races of a corresponding civilisation the shaft of the Maori tibia is more than usually flattened, as may be seen by referring to the tables of this index as it occurs among other savage races, given in M. Topinard's book and in Mr. Thomson's papers on the subject.

I have also, following Mr. Thomson, examined all the bones that have come under my observation as to the antero-posterior curvature of the external condyloid surface. I have noted it as convex in twenty-eight cases, as plano-convex from before backwards in ten, as flat in one, and as concave in five.

Mr. Thomson has also been the first to note the presence of a facet on the anterior margin of the lower end of the tibia. This, though occasionally met with in Europeans, is of much more common occurrence among savages, and is caused by the pressure of the upper surface of the neck of the astragalus. This condition I carefully looked for, and in every bone examined except two a greater or less degree of flattening or hollowing was found to be present. The antero-posterior curve of the shaft is also more pronounced than among Europeans; but, while in some bones the curve is fairly regularly distributed along the length of the bone, in others it is mainly confined to the upper fourth.

That the squatting posture is the cause of these last peculiarities admits, I think, of no doubt. They are met with in the living races that adopt that attitude, and are all readily explained by the contacts, pressures, and muscular strains consequent on that position, which was also universal among the Maoris at the time when the individuals lived whose skeletons I have examined. Till recently, however, platycnemia has not been put down to the same cause. It is generally said to be due to the muscular development—tibialis posticus—caused by an active life in a rough, hilly country. Professor Havelock Charles,* however, shows that the tibia of the natives of the Panjab have not only the altered outer condyle, the curved shaft, and the anterior astragaloid facet, but has an average index of platycnemia of 69·9. A mountainous country can have nothing to do with the flattening in this case, while squatting is the universal custom. And I think it not impro-

* "The Influence of Function as exemplified in the Morphology of the Lower Extremity of the Panjabi": Journal of Anatomy and Physiology, 1893.

bable that the altered form of the shaft of the femur in the Maori, and the peculiar curve of the fibula, are also due to this cause, not perhaps to altered or increased muscular development, as with platycnemia, but to pressures depending on the position of the body and lower limbs.

Fibula.

The length given is the maximum, the distance between the tip of the spine and the apex of the malleolus.

Thirty-two bones were measured, and these average 345·5mm. in length. The longest fibula measures 375mm., the shortest 316mm.

The peroneal surface is always deeply channelled, and the curve of the shaft is not as usually seen in European bones. Instead of being bent with the concavity of the curve forwards, I have generally found the bone to be either straight or to have a curve which is convex forwards.

Humero-femoral Index.

This gives the proportion between the lengths of the humerus and femur, and is calculated according to the formula—

$$\frac{\text{Humeral length} \times 100}{\text{Femoral length}}.$$

The maximum length of both bones is taken.

The material at my disposal enabled me to calculate the index in twenty-one cases, both right and left limbs of the same body being used when the skeleton was sufficiently perfect to allow of the necessary measurements being made on both sides. The average of these twenty-one indices is 72·5—the highest is 77·5, and the lowest 68·4. Professor Turner's two Maoris give indices of 72·5 and 71·5 respectively, and scarcely alter the average.

This proportion between these two bones is the same as it is in Europeans, but is higher than what has been found in Negroes, Australians, and Andaman Islanders.

Tibio-femoral Index.

This indicates the proportion between the length of the tibia and the femur of the same limb, and is calculated according to the formula—

$$\frac{\text{Tibial length} \times 100}{\text{Femoral length}}.$$

The maximum length of the femur has been used, but in the case of the tibia, though I include the malleolus, I exclude the spines.

Twenty lower limbs allowed of this index being calculated. The mean is 82·6, and the indices vary from 85·7 to 79·2. This average is left practically unchanged by the inclusion of the indices 86 and 77·7 of the two Maoris measured by Sir William Turner; and the index 82·2, the mean of five Polynesians measured by M. Topinard, is but very slightly lower.

Owing to the small number of female skeletons examined by me, I can say nothing definite on the question of the influence of sex on this proportion. The males have an average of 83·2 and the females of 81·4, but these figures are of little value.

Comparing the Maoris with other races, and using Professor Turner's convenient classification,* we find that though they belong, along with Europeans, Mongolians, and others, to the brachyknemic group, yet they are on the verge of the dolichoknemic division, which includes Australians, Negroes, Andaman Islanders, &c. Using the word "leg" in its limited anatomical sense, the Maori lower limb is therefore on the border-line between short- and long-leggedness.

Intermembral Index.

This is calculated according to the formula—

$$\frac{\text{Humeral length} + \text{radial length} \times 100}{\text{Femoral length} + \text{tibial length}},$$

and gives the proportion between the lengths of the upper and lower limbs. The maximum length of the femur, humerus, and radius are used, but the spines are not included in the tibial measurement.

Eighteen indices were calculated, and these give an average of 70·2. The proportionally longest upper limb is shown by the index 73; the shortest, by 66·7. Professor Turner's two Maoris give an average index slightly lower than mine—69·3; but the general average is only lowered $\frac{1}{10}$ by their inclusion in the series.

The proportion between the lengths of the two extremities in different races has been studied by several anatomists, and a comparison of their measurements with mine shows that, while the Maori upper limb is very slightly longer in proportion to the lower than in the European, it is more distinctly so than in the Negro or the Andaman Islander. M. Broca, as the result of the measurements of fourteen skeletons, gives the index for the European as 69·73. Sir George Humphry† has calculated this index in twenty-five Negroes,

* Brachyknemic, index under 83; Dolichoknemic, index 83 or upwards.

† "The Human Skeleton."

and gives 68·4 as their mean; while 68·27 is the average of Broca's measurements of fifteen of the same race. The twenty-eight Andamanese measured by Flower and Turner have an average index of 67·3.

The *astragalus* shows no obvious peculiarity beyond the presence of a facet on the upper surface of the neck for articulation with the corresponding surface on the tibia already mentioned. This facet varies in distinctness, but it is almost always present.

The *os calcis* in several respects differs from the ordinary European type. The posterior part of the bone is narrower, and the tuberosity is usually more prolonged on to the under-surface, the upper smooth and the lower rough parts of the tuberosity being placed at a distinct angle to each other, both sloping forwards from their line of junction. The articular facet on the anterior part of the upper surface, which is so frequently present in Europeans, occurs in all the Maori bones examined, and is in almost all cases continuous with the surface on the upper face of the sustentaculum tali. I have also noticed in six bones a narrow facet at the upper and outer angle of the anterior surface of the bone for articulation with the scaphoid. I have no doubt that all these modifications are due to the same cause—the habitual adoption of the squatting posture.

VERTEBRAL COLUMN (MORIORI).

The measurements of four incomplete columns are given in Table IV.

Cervical Vertebræ.

In only two columns are the cervical vertebræ in a sufficiently perfect condition to allow of the measurements for the cervico-vertebral index being made. In these the average index is 107·9, showing the greatest depth of the vertebral bodies to be behind.

The condition of the cervical spines is shown in the following table:—

—	Bifid.	Feebly Bifid.	Not Bifid.
Second cervical vertebra	3	1	0
Third "	1	1	1
Fourth "	0	2	2
Fifth "	2	2	0
Sixth "	0	2	1
Seventh "	0	0	4

In one of the four atlas vertebræ examined the groove for the right vertebral artery was completely bridged by bone;

and in one axis the tip of the odontoid process had evidently rubbed against the anterior edge of the foramen magnum.

Dorsal Vertebræ.

The mean dorso-vertebral index of the three columns which allowed of the necessary measurements being taken is 106·4.

In one column the twelfth dorsal vertebra has no costal facet on either side of its body, and those on the eleventh are very small. One of the tenth vertebræ has no costo-transverse articulations, while in another there is none on the left side.

Lumbar Vertebræ.

The average lumbo-vertebral index of the four sets of lumbar vertebræ is 104·7. The highest index, that of a male, is 113·7; the lowest, also a male, is 100. The mean of the three males is 106. The female has an index of 100·7. In two of the males, therefore, the sum of the posterior depths of the bodies is greater than the sum of the anterior depths; in one they are equal; while in the female there is a very slight excess of the posterior depth over the anterior.

The means of the indices of the individual vertebræ is as follows:—

Index of first lumbar vertebra		...	117·8
"	second "	...	114·4
"	third "	...	108·0
"	fourth "	...	98·0
"	fifth "	...	87·6

Three vertebræ, therefore—the first, the second, and the third—are deeper behind than in front, taking the average of the four sets of vertebræ. The following table shows the form of the individual vertebræ in this respect:—

—	Anterior Depth of Body greater than Posterior Depth.	Anterior Depth of Body equal to Posterior Depth.	Anterior Depth of Body less than Posterior Depth.
First lumbar vetebra ..	0	0	4
Second " ..	0	0	4
Third " ..	0	0	4
Fourth " ..	3	0	1
Fifth " ..	4	0	0

Pelvis (Moriori).

The measurements of three pelves are given in Table V. Two of these are male, one is female.

The mean of the *height-breadth* indices of the two males is 78·7. The same index in the female is 79·9.

The *brim* index in the males averages 78·9. In the female it is 81·5.

The index of the *pelvic cavity* averages in the males 81·2. In the female it is 70.

The average male *sacral* index is 110·9. The female pelvis has a sacrum of an unusually narrow form, with an index of 105·8.

All three pelves are platypellic. One of the male sacra is platyhieric. The other, with the female, is at the upper limit of the subplatyhieric group.

BONES OF THE LIMBS (MORIORI).

I give in Table VI. the measurements and indices, so far as was possible, of the limb-bones of five Moriori skeletons: Three of these are males. Four of the skeletons are fairly complete so far as these bones are concerned, but in the fifth, a female, the right arm and leg have, unfortunately, been lost.

I have not thought it necessary to give here the averages of the various linear measurements, but I give for what they are worth the mean of the indices calculated from them, with, for purposes of comparison, the corresponding indices as I have found them in the Maoris. The figures in brackets show the number of indices from which the average is taken.

	Moriori.	Maori.
Scapular index	(6) 61·6	64·9
Infra-spinous index	(6) 82·1	89·4
Clavicule-humeral index	(5) 46·0	45·8
Radio-humeral index	(8) 77·6	77·8
Index of upper fourth of femur	(9) 64·0	64·3
Index of middle of femur	(9) 112·6	115·8
Tibio-femoral index	(9) 80·5	82·6
Index of platycnemia	(9) 63·2	64·2
Humero-femoral index	(8) 71·9	72·5
Intermembral index	(8) 70·7	70·2

These averages show a very close correspondence between the Morioris and the Maoris as to the proportionate lengths of the long bones, but the scapulæ measured are narrower in my Morioris than the average of the Maori bones. The antero-posterior diameter of the femur at the middle of the shaft has much the same relation to the transverse in both races, and the upper part of the shaft shows the same flatten-

ing that we have seen to be characteristic of the Maori femur, and almost to the same extent. Platycnemia is slightly more pronounced than in the Maoris, and the tibia shows all the other characteristics due to the squatting posture which have been already described.

The description of the Maori skull contained in the preceding pages agrees in all essentials with that already given by other observers. It is, according to my measurements, mesaticephalic, though on the verge of dolichocephaly; metriocephalic; mesoseme; mesorhine, though almost leptorhine; orthognathous; brachyuranic; phænozygous: and the males are megacephalic.

Though the Maori cranium has, so far as its race characters go, been exhaustively studied—nearly two hundred skulls having now been more or less fully described—few have had the opportunity of examining the other bones of the skeleton. I have been fortunate in this respect, and have been able to show that the vertebral column is typically savage in the form of its component parts; that the pelvis is platypellic, with a platyhieric, almost subplatyhieric, sacrum; that the upper limb is mesatikerkic; while the lower limb, though brachycnemic, is on the verge of the dolichocnemic group; that platycnemia is well marked; and that the limb-bones generally show the modifications of form characteristic of most of the coloured races.

If any further proof were needed of the mixed origin of the Maori race it is given in this paper. An examination of the cranial indices and of the extent of their variation shows this clearly. These demonstrate two distinct types and intermediate forms. At the one extreme we have skulls approaching the Melanesian form, as met with in the Fiji group, long and narrow, high in proportion to their breadth, prognathous, and with wide nasal openings. At the other are skulls of the Polynesian type, such as are common in Tonga and Samoa, shorter and broader, with orthognathous faces. And it must be noted that these extreme forms do not belong to different tribes or districts, but may both be found in one. Among the skulls of the Ngaitahu Tribe alone we have as great a variation in almost all the indices as is met with in the entire collection of crania gathered together from all parts of both these Islands.

Though a thorough mingling of the two parent stocks has thus taken place, it is yet clear that their distinguishing characters are not seen in the same proportion in each district. Undoubtedly intertribal differences exist. The material at my disposal has allowed of nothing more than a comparison

between the crania of the Ngaitahu Tribe of the South Island and those from the northern part of the Auckland Province, mainly from the Bay of Islands and Whangarei. The Ngapuhi are now the most important tribe in this region, but I cannot say whether the skulls included in this group belong to this or, indeed, to any one tribe. The district, however, is clearly defined, and the skulls available closely approximate in number to the Ngaitahu examined by me. By availing myself of the twenty-two crania already described by Professors Flower and Turner, I get, with those whose measurements are now given, a set of thirty-four skulls to compare with the forty of the southern tribe. The other two groups from the North Island given in the paper are too small to be of any value in estimating tribal characteristics, and I institute in this paper no comparison between them and the two larger collections. In the Auckland skulls the average cephalic index is 73·3, the vertical 72·8, the frontal 68·2, the orbital 89·3, the nasal 50·2, the gnathic 98·4, the palato-maxillary 119·9; while the same indices in the Ngaitahu are 75·9, 74·6, 67·9, 86·4, 48·0, 97·6, and 120·8; showing that the skulls of the former group are, proportionally to their length, longer than those of the latter, that they have wider nasal openings, and slightly more projecting jaws. And it has also been shown that the proportion of height to breadth is slightly greater in them than in the Ngaitahu. The Melanesian characters are therefore more accentuated in the North than amongst the Natives of the South Island. The prevalence of the Papuan form among skulls from the Bay of Islands has also been observed by MM. de Quatrefages and Hamy, and is noted by them in the "Crania Ethnica"* when describing the Maori cranium.

The measurements now given of the Moriori skull, taken with those already published, show it to be mesaticephalic, though close to the lower limit of the group; metriocephalic, though almost tapeinocephalic; low down in the megaseme group; leptorhine; orthognathous; brachyuranic; phænozygous: and the males to be megacephalic.

It differs from the Maori skull mainly in its lesser height, both absolute and relative to length and breadth; the greater excess of the parietal over the frontal width; the higher orbits; and the narrower nasal opening. The depressed and retreating forehead is also a very marked feature of many Moriori skulls. It is slightly broader relatively to its length, and somewhat more prognathous. The cranial capacity is also slightly less. But, as already pointed out, there is often a very close resemblance between Maori and Moriori skulls.

* P. 460.

The variation of the indices, though somewhat more restricted than with the Maoris, is still considerable, and points, like the traditions of the people, to an origin from the two great Pacific stocks. The different types of Moriori skull have been already sufficiently described.

Though the number of skulls available for measurement is sufficiently large, I regret to say that I have been unable to secure more than five Moriori skeletons, none of which are quite complete. As nothing definite as to the osteological characters of the race can be deduced from such a small collection, I have done little more than give the measurements and indices, with their averages. These show in most instances a very close correspondence with what we find among the Maoris.

TABLE I.—MEASUREMENTS AND INDICES OF SKULLS FROM THE PROVINCES OF OTAGO AND CANTERBURY.

No.	Sex.	Age.	Capacity in c.c.	Diameters of Brain-case: Longitudinal: Ophryo-occipital.	Glabello-occipital.	Nasio-occipital.	Glabello-iniac.	Basi-bregmatic Height.	Transverse: Maximum	Asterionic.	Stephanic	Minimum Frontal.	Biauricular.	Temporal	Circumferences of Brain-case: Horizontal: Total	Post-auricular.	Pre-auricular	Median: Total	Frontal	Parietal	Occipital.	Lambdo-iniac.	Inio-opisthic	Length Foramen Magnum	Basion to Nasion	Transverse: Total.	Supra-auricular.	Infra-auricular.
1	M.	Ad	1,453	185	187	183	187	145	138	106	107	98	126	134	514	280	234	524	139	131	117	50	67	33	104	458	310	148
2	M.	Ad	1,490	184	188	183	187	134	143	115	109	95	130	135	520	280	240	516	131	123	126	66	60	35	101	445	300	145
3	M.	Ad.	1,385	182	184	180	184	130	141	107	111	100	127	138	513	274	239	495	130	110	118	61	57	35	102	445	300	145
4	M.	Ad.	1,360	174	175	172	174	139	140	105	117	96	117	128	495	270	225	501	130	120	118	70	48	33	100	445	305	140
5	M	Ag	1,475	169	171	169	169	140	142	99	111	91	132	140	500	256	244	500	135	110	119	75	44	36	100	452	310	142
6	M.	Ad	1,288	179	187	180	187	125	141	113	108	95	120	135	510	265	245	504	120	115	120	63	57	39	110	447	307	140
7	M	Ad	1,360	177	179	176	179	135	134	105	102	90	121	132	504	258	246	505	133	119	118	48	70	34	101	441	303	138
8	M.	Ad	1,410	176	178	178	176	136	142	106	106	91	125	136	510	270	240	503	135	125	110	50	60	35	98	459	310	149
9	M.	Ad	1,450	182	182	180	171	138	132	104	106	95	114	121	502	285	217	507	120	132	118	78	40	35	102	425	285	140
10	M.	Ad.	1,208	185	186	181	178	134	130	107	106	94	118	124	504	278	226	505	123	127	118	70	48	35	102	420	283	137
11	M	Ad.	1,480	178	179	177	177	130	140	108	116	95	117	133	513	281	232	503	138	117	120	65	55	33	95	448	318	130
12	M	Ag.	1,498	190	194	189	194	139	142	121	111	100	133		540	275	265	523	134	113	128	68	60	39	109	454	300	154
13	M.	Ad	1,400	181	184	181	180	134	139	104	111	94	128	135	518	272	246	514	135	121	122	68	54	34	102	440	300	140
14	M	Ad	1,398	178	181	179	178	137	140	106	103	95	118	133	510	272	238	500	130	110	127	70	57	33	100	438	303	135
15	M.	Ad.	..	185	190	186	185	140	147	118	111	99	130	142	533	278	255	528	135	110	135	88	47	37	111	461	312	149
16	M.	Ad.	1,393	185	188	185	186	139	138	103	111	92	118	138	520	267	253	518	135	120	117	63	54	34	112	459	322	137
17	M.	Ad.	1,550	178	180	177	180	142	144	117	111	101	133	140	517	263	254	512	130	116	119	69	50	37	110	445	301	144
18	M	Ad.	1,425	185	185	184	185	141	140	110	109	91	124	133	515	273	242	520	135	125	123	60	63	37	100	448	310	138
19	M.	Ad	1,725	194	198	192	196	144	148	106	116	101	127	140	543	290	253	544	148	126	128	74	54	38	104	474	332	142
20	M	Ad	1,365	182	184	180	180	142	134	104	106	88	120	132	508	270	238	514	130	130	119	60	59	32	103	438	304	134
21	M.	Ad.	1,408	174	176	173	165	142	141	106	112	98	124	132	507	270	237	503	129	127	114	67	47	33	100	453	314	139
22	M.	Ad.	1,500	194	194	189	190	132	135	113	112	95	126	131	532	283	249	523	137	129	120	64	56	36	101	437	298	137
23	M.	Ad.	1,600	188	192	188	184	145	142	113	113	99	131	138	533	284	249	538	142	128	130	75	55	34	104	473	320	153
24	M	Ad.	..	186	190	185	188	.	140	115	112	97	127	134	520	271	249	.	128	122	..	65	..	..	..	442	300	142
25	M	Ad	1,675	203	206	203	197	141	150	114	125	103	135	143	570	310	260	562	143	132	140	90	50	37	110	463	320	143
26	F.	Ad	1,220	172	173	170	172	138	130	104	106	90	117	..	485	265	220	486	117	115	113	58	55	37	104	427	290	137
27	F.	Ad	1,290	173	173	170	163	132	131	101	106	93	118	.	488	264	224	483	125	119	106	66	40	35	98	428	290	138
28	F.	Ad	1,350	171	172	168	168	132	137	112	110	93	119	132	490	260	230	489	127	121	122	72	50	28	101	440	308	132
29	F	Ad	1,398	179	178	174	178	140	141	104	111	89	126	136	510	265	245	511	130	130	118	55	63	30	103	456	315	141
30	F.	Ad	1,183	168	172	170	167	134	130	97	105	88	116	124	478	263	215	485	131	118	108	61	47	29	99	430	295	135
31	F.	Ad	1,280	176	177	175	177	132	131	106	104	94	117	128	496	252	244	489	123	112	117	65	52	36	101	430	293	137
32	F	Ad	1,280	180	181	180	181	130	134	103	106	86	118	129	500	267	233	500	120	115	129	65	64	33	103	425	290	135
33	F.	Ad.	.	176	178	176	176	130	137	103	105	92	114	126	495	273	222	493	120	120	120	55	65	33	100	418	290	128
34	F.	Ad	..	178	179		162	.	138	109	111	92	124	132	503	287	216	..	121	120	122	85	37		..		290	..
35	F.	Ad	1,308	190	194	190	194	136	134	107	105	98	118	128	528	275	253	517	131	125	120	54	66	31	110	435	300	135
36	F.	Ad	1,212	174	176	173	176	132	130	98	104	97	117	126	490	258	232	482	120	120	104	50	54	37	101	414	281	133
37	F.	Ag	..	184	185	182	183	129	130	..	94	90	..	.	510	255	255	508	..		.	.	..	36	102	.	..	.
38	?	Ad	1,318	174	177	175	174	128	140	100	100	87	119	130	493	269	224	489	130	117	114	63	51	34	94	420	290	130
39	?	Ad.	1,228	163	166	168	161	132	142	102	..	88	125	..	486	264	222	479	131	107	116	77	39	32	93	443	311	132
40	?	Ad	..	177	178	175	172	138	137	104	100	91	121	130	500	268	232	501	130	120	118	70	48	33	100	437	297	140
41	?	11	1,585	179	179	176	158	138	144	102	117	92	121	132	510	271	239	502	131	127	112	82	30	36	96	439	311	128
42	?	7	1,405	.	173	171	172	130	137	98	106	88	109	127	490	268	222	489	126	121	116	58	58	37	89	428	303	125
43	?	6	..	..	169	166	158	119	124	98	101	85	..	.	466	258	208	467	123	123	106	64	42	31	84	..	.	
44	?	5	.		166	162	160	123	127	101	101	86	105	117	486	248	220	471	122	123	109	60	49	30	87	390	273	117
45	?	4	.		152	147	142		130	91	98	79	95	104	450	255	195	..	117	117	100	53	47	..	..	377	280	97

No.	Foramen Magnum: Length	Width	Basi-alveolar Length.	Diameters of Face: Transverse: Biorbital, External.	Biorbital, Internal	Bijugal.	Bizygomatic.	Vertical: Ophryo-alveolar.	Nasio-alveolar	Spino-alveolar.	Diameters: Of Nasal Region: Nasio-spinal Height.	Width Anterior Nares.	Length Nasal Bones.	Width Nasal Bones.	Of Orbit: Width.	Height.	Interorbital Distance.	Of Palate: Length.	Width.	Auriculo-orbital Distance, Right.	Auriculo-orbital Distance, Left.	Mastoid Height.	Zygomatic Projection.	Facial Angle.
1	33	30	102	110	98	127	144	102	71	17	54	25	24	15	42	35	20	53	60	71	71	36	P+	67°
2	35	29	101	108	97	125	141	96	73	14	59	34	26	14	42	35	19	53	64	71	70	37	P+	67°
3	35	35	107	108	98	124	143	99	71	19	52	25	28	15	39	38	19	58	62	75	75	39	P+	69°
4	33	30	97	103	94	119	133	93	69	17	52	21	24	14	39	33	20	51	62	68	68	39	P+	68°
5	36	32	96	98	91	119	141	99	74	14	60	25	26	14	41	37	18	50	61	70	68	39	P+	67°
6	39	32	110	110	98	127	143	108	77	21	56	29	25	15	40	34	20	55	62	79	77	40	P+	68°
7	34	27	..	101	94	115	135	..	..	.	60	25	..	..	41	38	18	..	62	73	71	41	P+	..
8	35	27	92	101	94	117	138	92	68	20	48	26	..	..	41	36	20	46	61	67	68	41	P+	75°
9	35	30	95	103	93	..	..	..	.	..	49	24	21	16	39	34	21	45	62	67	68	40	..	76°
10	35	29	105	105	97	111	129	91	66	19	47	28	18	18	43	35	20	60	68	69	69	35	P	76°
11	33	29	98	106	96	120	133	92	63	12	51	22	..	..	40	34	19	51	60	65	67	38	P	69°
12	39	33	114	113	100	132	.	108	75	15	60	26	..	..	42	39	20	57	70	79	81	46	P+	66°
13	34	28	97	103	96	118	135	86	66	16	50	25	..	..	39	33	22	52	61	73	72	38	P	72°
14	33	..	101	105	97	118	132	95	71	22	49	24	25	16	40	35	20	52	61	70	70	36	P+	70°
15	37	35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	42	..	..
16	34	32	103	106	94	121	..	102	76	23	53	27	24	19	41	35	21	53	64	80	79	38	P+	73°
17	37	35	102	110	98	125	143	100	76	16	60	25	30	18	42	36	20	52	61	70	72	42	P+	69°
18	37	27	98	100	90	112	135	98	73	17	56	26	26	..	37	34	19	50	59	74	75	38	P+	70°
19	38	32	106	108	99	121	143	.	..	.	57	27	25	15	41	36	20	53	62	75	74	37	P+	69°
20	32	32	103	105	98	118	..	94	66	16	50	25	20	17	42	34	18	51	62	71	72	35	P+	72°
21	33	29	103	107	96	121	134	91	65	13	52	27	..	..	39	36	21	54	59	70	..	38	P	70°
22	36	33	95	100	93	112	127	91	69	18	51	23	..	..	37	35	32	..	..	72	71	34	C	78°
23	34	30	103	108	101	125	145	95	71	16	55	25	32	16	41	33	21	53	63	75	74	40	P+	68°
24	..	..	..	109	100	.	..	102	77	17	60	..	24	..	42	36	..	..	..	.	80	39	P+	..
25	37	31	104	113	106	125	145	102	72	21	51	27	25	22	42	31	27	54	70	74	73	38	P	72°
26	37	29	96	98	90	110	128	94	69	17	52	24	28	18	40	34	19	45	59	72	70	34	P+	73°
27	35	29	92	99	91	113	126	84	60	12	48	21	..	..	40	38	16	47	63	70	70	30	P	72°
28	28	28	97	100	91	110	128	90	65	18	47	23	..	..	41	34	18	51	66	62	64	31	C	80°
29	30	29		..		..	..	..	..		..	..	..	..	..	..	..	..	..	.	..	33	..	..
30	29	26	95	94	87	103	121	91	63	16	47	21	23	13	37	35	18	47	54	67	67	29	P	73°
31	36	29	94	104	96	109	132	91	66	16	50	24	25	17	42	34	18	48	59	72	74	30	P+	72°
32	33	30	98	99	91	112	123	89	61	16	45	23	..	..	38	31	20	49	62	73	71	29	C	73°
33	33	30	97	98	88	106	..	..	..	..	54	24	..	..	40	35	17	44	56	69	71	36	P	74°
34	..	..	..	97	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	37	..	..
35	31	28	104	108	97	118	.	96	68	16	52	28	23	15	39	32	22	49	61	81	81	37	P+	72°
36	37	29	95	102	91	113	130	82	60	13	47	23	..	..	37	30	20	48	55	70	68	37	P	70°
37	36	33	.	..	.	..	..	..	.		..	..	..	.	..	..	.	..	..	..	..	..	..	..
38	34	29	96	97	89	105	124	96	68	16	52	23	24	14	38	33	19	53	59	67	66	32	P+	70°
39	32	29	95	94	86	.		94	69	..	..	..	..	..	..	..	..	46	56	..		36	P+	..
40	33	29	..	101	..	..	..	..		..	.	..	..	..	..	..	..	..	..	..	..	..	P	..
41	36	32	93	95	84	104	120	85	65	15	50	25	28	17	41	33	17	45	62	70	71	32	C	74°
42	37	29	81	90	82	96	109	..	51	10	41	23	18	15	35	33	11	40	56	68	68	29	C	81°
43	31	26	79	85	76	89	.	78	55	12	43	20	18	10	32	33	15	35	50	..	..	..	C	81°
44	30	30	79	88	79	94	106	69	54	15	39	18	18	14	33	32	16	37	51	59	59	29	C	83°
45	..	24	..	79	72	84	90	.	45	13	32	19	15	15	30	28	14	34	48	53	52	20	C	..

No.	Indices: Cephalic.	Vertical.	Frontal.	Of Foramen Magnum.	Orbital.	Nasal.	Gnathic.	Palato-maxillary.	Lower Jaw: Height: Symphysial.	Molar.	Coronoid.	Condyloid.	Width: Bigonial.	Bicondyloid.	Bimental.	Of Ramus.	Gonio-symphysial Length.	Condylo-coronoid Length.	Bigoniac Curve
1	73 8	77 5	71·	90 9	83 3	46 3	98·1	113·2	35	34	77	66	106	134	53	40	97	37	224
2	76·1	71 3	66 4	82 9	81·4	59 3	100·	120·8	32	35	72	64	112	122	49	42	99	35	215
3	76·6	70 7	70·9	100·	97·4	48 2	104·9	106·9	34	28	59	56	109	130	56	39	90	35	195
4	80·	79 4	68 6	90 9	84 6	40 4	97·	121·5	37	27	63	58	114	120	54	39	98	30	214
5	83·	81·9	64·1	88·9	90 2	41·7	96·	122·	31	28	63	66	97	120	45	29	73	37	174
6	75 4	66·8	60·3	82·	85·	51 8	100·	112·7	41	36	70	65	107	126	52	42	92	36	210
7	74 9	75·5	67·2	79 4	92·7	41·7	..	..	..	..	..	..	..	..	..	..	..	..	..
8	79 8	76 4	64·1	77·1	87 8	54·2	93 9	132 6	33	24	65	56	100	..	52	31	67	32	190
9	72·5	75·8	72·	85·7	87·2	49·	93·1	137·8	..	..	..	..	..	..	..	..	..	..	..
10	69 9	72·	72·3	82 9	81 4	59·6	102 9	113 3	35	29	54	63	96	114	48	34	92	34	205
11	78 2	72·6	67·9	87 9	85·	43·1	103·2	117·6	..	..	..	..	..	..	..	..	..	..	..
12	72 2	71 6	70 4	84 6	92 9	43 3	104·6	122·8	37	38	81	73	111	140	58	41	95	39	220
13	75 5	72 8	67 6	82 4	84 6	50·	95·1	117·3	..	..	..	..	..	..	..	..	..	..	..
14	77 3	75 7	67·9	..	87 5	49·	101·	117·3	..	..	..	..	..	..	..	..	..	..	..
15	77·4	73 7	67·3	94 6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16	73·4	73 9	66 6	94 1	85·4	50 9	92·	120·8	..	..	..	..	..	..	..	..	..	..	..
17	80·	78 9	70 1	94·6	85·7	41·7	92·7	117·3	..	..	..	..	..	..	..	..	..	..	..
18	75 7	76·2	65·	73·	91·9	46·4	98·	118·	..	..	..	..	..	..	..	..	..	..	..
19	74·7	72·7	68 2	84·2	87·8	47·4	101 9	117·	45	32	76	67	115	134	53	39	94	37	213
20	77 2	72 8	64 2	100·	81·	50·	100·	121 6	31	30	70	65	94	123	51	35	85	38	190
21	80 1	80 7	69 5	87 9	92·3	51 9	103·	109 3	32	33	71	60	111	124	52	40	95	23	210
22	69 6	68	70·4	91·7	94 6	45 1	94 1	..	32	26	62	55	93	120	47	31	81	31	185
23	74·	75 5	69 7	88·2	80 5	45 5	99·	118·9	..	..	..	..	..	..	..	..	..	..	..
24	73 7	..	69 3	..	85·7	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	72 8	68 4	68 7	83·8	73 8	52 9	94·5	129·6	40	34	81	73	111	136	49	37	91	33	210
26	75·1	79 8	69 2	78 4	85·	46	92 3	131·1	29	30	63	54	96	109	55	34	83	34	190
27	75 7	76 3	71·	82·9	95·	43·8	93·9	134·	28	25	52	50	94	121	49	35	87	37	194
28	79 7	76 7	67·9	100·	82·9	48 9	96·	129·4	..	..	..	..	..	..	..	..	..	..	..
29	79 2	78·7	63 6	96·7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	75 6	77·9	67·7	89 7	94·6	44 7	96·	114 9	..	..	..	..	..	..	..	..	..	..	..
31	74·	74·6	71·8	80 6	81·	48·	93·1	122 9	28	29	63	64	95	119	47	38	81	35	180
32	74·	71 8	64 2	90 9	81 6	51·1	95·1	126·5	..	..	..	..	..	..	..	..	..	..	..
33	77	73	67 2	90 9	87·5	44·4	97·	127 3	..	..	..	..	..	..	..	..	..	..	..
34	77 7	..	66·7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	69·1	70 1	73 1	90·3	82·	53·5	94·5	124·5	..	..	..	..	..	..	..	..	..	..	..
36	73 9	75·	74 6	78·4	81·1	48 9	94·1	114 6	..	..	..	..	..	..	..	..	..	..	..
37	70 3	69 7	69 2	91·7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
38	79 1	72 3	62·1	85·3	86 8	44 2	102 1	111 3	..	..	..	..	..	..	..	..	..	..	..
39	85 5	79 5	62·	90 6	..	..	102·2	121·7	36	34	65	58	102	..	52	..	85	..	..
40	77·	77·5	66 4	87 9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
41	80 4	77·1	63 8	88 9	80·5	50	96 9	137 8	..	..	..	..	..	..	..	..	..	..	..
42	79 2	75·1	64 2	78 4	94 3	56 1	91·	140·	..	..	..	..	..	..	..	..	..	..	..
43	73 4	70·4	68 5	83 9	103 1	46 5	94·	142 9	..	..	..	..	..	..	..	..	..	..	..
44	76 5	74 1	67·7	100·	97·	46·2	90·8	137·8	25	20	49	45	81	99	42	33	65	27	150
45	85 5	..	60 8	..	93·3	59·4	..	141·2	21	17	36	35	65	..	37	26	53	22	134

TABLE II.—MEASUREMENTS AND INDICES OF SKULLS FROM THE NORTH ISLAND.

A.—From the South-west Coast.

No.	Sex	Age	Capacity in c.cs.	Diameters of Brain-case, Longitudinal: Ophryo-occipital	Glabello-occipital	Nasio-occipital	Glabello-iniac	Basi-bregmatic Height	Transverse: Maximum	Asterionic	Stephanic	Minimum Frontal	Biauricular	Temporal	Circumferences of Brain-case, Horizontal: Total	Post-auricular	Pre-auricular	Median: Total	Frontal	Parietal	Occipital	Lambdo-iniac	Inio-opisthic	Length Foramen Magnum	Basion to Nasion	Transverse: Total	Supra-auricular	Infra-auricular
1	M.	Ad	1,608	186	190	185	190	146	143	110	110	93	127	133	530	294	236	539	138	137	120	65	55	36	108	467	317	150
2	M.	Ad.	1,535	178	181	178	170	137	144	110	115	93	120	134	514	284	230	511	130	134	112	71	41	36	99	447	315	132
3	M.	Ad.	..	182	182	177	182	142	141	110	111	95	126	132	515	264	251	515	140	120	118	65	53	36	101	458	316	142
4	M.	Ad.	1,600	193	194	187	190	144	139	114	111	95	129	134	537	292	245	536	132	146	115	62	53	35	108	448	315	143
5	M.	Ad.	1,460	184	186	182	184	144	135	104	109	97	124	130	516	263	253	532	141	130	119	69	50	37	105	451	304	147
6	M.	Ad	1,550	185	187	184	183	140	138	106	111	95	120	130	520	274	246	523	135	128	117	57	60	37	106	445	310	135
7	M.	Ad.	1,455	181	184	180	178	132	140	111	108	91	120	132	513	275	238	504	125	132	110	61	49	35	102	437	302	135
8	M.	Ad.	1,608	183	188	185	182	144	141	119	117	104	124	132	528	298	230	523	130	132	118	68	50	35	108	470	325	145
9	M.	Ad	1,580	184	185	181	184	140	139	113	112	97	123	130	522	290	232	528	130	130	127	70	57	38	103	455	310	145
10	M.	Ad	1,545	180	184	182	184	146	142	103	112	94	123	133	519	270	249	522	135	130	113	50	63	35	109	464	319	145
11	M.	Ad.	1,550	181	182	180	178	140	138	112	114	98	120	133	520	273	247	513	130	130	110	60	50	37	107	442	310	132
12	F	Ad	1,345	177	177	174	177	134	133	99	108	93	119	130	500	272	228	493	123	122	115	60	55	32	101	422	290	132
13	?	Ad.	1,375	179	179	177	176	135	136	111	109	87	121	129	508	278	230	508	130	130	115	68	47	32	101	445	310	135
14	?	Ad	..	174	176	174	173	133	133	113	105	90	123	130	495	270	225	489	115	120	111	60	51	33	110	429	290	139
15	..	10	1,295	163	164	163	152	128	133	95	104	90	106	118	471	262	209	472	118	129	106	63	43	31	88	404	285	119

No.	Foramen Magnum: Length	Width	Basi-alveolar Length	Diameters of Face, Transverse: Biorbital, External	Biorbital, Internal	Bijugal	Bizygomatic	Vertical: Ophryo-alveolar	Nasio-alveolar	Spino-alveolar	Diameters, Of Nasal Region: Nasio-spinal Height	Width Anterior Nares	Length Nasal Bones	Width Nasal Bones	Of Orbit: Width	Height	Interorbital Distance	Of Palate: Length	Width	Auriculo-orbital Distance, Right	Auriculo-orbital Distance, Left	Mastoid Height	Zygomatic Projection	Facial Angle
1	36	32	101	111	101	125	143	98	70	16	54	25	27	20	42	35	21	54	64	70	71	43	P+	69°
2	36	32	93	101	92	110	129	99	74	20	54	23	28	14	40	37	18	50	62	67	67	44	P	70°
3	36	29	100	104	96	121	137	..	..	..	52	25	..	..	41	34	21	51	64	72	74	..	P	74°
4	35	35	106	107	100	122	143	101	75	21	54	27	24	..	40	35	23	54	68	73	73	46	P+	74°
5	37	31	94	107	99	117	137	100	75	17	58	28	27	19	42	33	20	54	70	71	70	41	P+	70°
6	37	32	102	108	99	115	132	103	77	21	56	26	29	19	42	37	24	58	67	69	70	35	P	71°
7	35	31	..	109	100	118	132	..	..	..	51	25	28	15	42	34	20	..	..	70	73	42	P+	70°
8	35	30	105	108	97	122	140	..	..	..	53	24	23	19	41	36	20	52	63	73	73	37	P	69°
9	38	32	96	105	94	117	134	96	72	17	55	27	25	17	38	33	19	52	60	68	69	43	P	71°
10	35	32	104	109	98	119	141	105	74	19	55	25	..	..	40	36	22	54	70	75	74	41	P+	69°
11	37	35	100	105	96	116	134	94	72	17	55	24	26	25	40	38	22	48	62	72	73	38	P	..
12	32	28	..	101	93	116	128	..	..	..	50	25	.	..	38	33	19	..	60	67	69	36	P+	..
13	32	30	98	100	91	113	129	91	68	16	52	24	..	..	37	33	18	51	62	70	70	43	P	73°
14	33	31	103	103	96	120	138	90	64	11	53	27	28	16	41	33	18	49	62	69	68	36	P+	69°
15	31	27	84	92	83	97	109	81	58	13	45	19	21	13	36	34	17	42	54	60	62	.	C	75°

No.	Indices: Cephalic	Vertical	Frontal	Of Foramen Magnum	Orbital	Nasal	Gnathic	Palato-maxillary	Lower Jaw, Height: Symphysial	Molar	Coronoid	Condyloid	Width: Bigonial	Bicondyloid	Bimental	Of Ramus	Gonio-symphysial Length	Condylo-coronoid Length	Bigoniac Curve
1	75·3	76·8	65·	88·9	83·3	46·3	93·5	118·5	..	..	..	..	..	..	..	..	..	..	..
2	79·6	75·7	64·6	88·9	92·5	42·6	93·9	124·	..	..	..	..	..	..	..	..	..	..	..
3	77·5	78	67·4	80·6	82·9	48·2	99·	125·5	..	..	..	..	..	..	..	..	..	..	..
4	71·6	74·2	68·3	100·	87·5	50·	98·1	125·9	35	33	82	67	108	138	57	35	98	35	220
5	72·6	77·4	71·9	83·8	78·6	48·3	89·5	129·6	33	29	71	61	112	128	54	34	92	33	207
6	73·8	74·9	68·8	86·5	88·1	46·4	96·2	115·5	35	27	68	64	96	124	48	35	93	34	210
7	76·1	71·7	65	88·6	81·	49·	..	..	..	..	..	..	..	..	..	..	..	..	..
8	75·	76·6	73·8	85·7	87·8	45·3	97·2	121·2	32	33	73	71	106	..	46	38	92	32	200
9	75·1	75·7	69·8	84·2	86·8	49·1	93·2	115·4	34	28	70	59	94	..	45	29	84	31	190
10	77·2	79·3	66·2	91·4	90·	45·5	95·4	129·6	34	28	65	65	108	135	50	35	93	37	203
11	75·8	76·9	71·	94·6	95·	43·6	93·5	129·2	30	..	70	60	100	122	48	36	92	22	207
12	75·1	75·7	69·9	87·5	86·8	50	..	..	..	..	..	..	..	..	..	..	..	..	..
13	76·	75·5	64·	93·8	89·2	46·	97·	121·6	27	30	71	61	102	120	49	31	77	32	175
14	75·6	75·6	67·7	93·9	80·5	50·9	93·6	126·5	30	29	65	72	103	126	46	35	80	34	184
15	81·1	78·	67·7	87·1	94·4	42·2	95·4	128·6	..	..	..	..	..	..	..	..	..	..	..

B.—From the East Coast.

No.	Sex	Age	Capacity in c.cs.	Diameters of Brain-case, Longitudinal: Ophryo-occipital	Glabello-occipital	Nasio-occipital	Glabello-iniac	Basi-bregmatic Height	Transverse: Maximum	Asterionic	Stephanic	Minimum Frontal	Biauricular	Temporal	Circumferences of Brain-case, Horizontal: Total	Post-auricular	Pre-auricular	Median: Total	Frontal	Parietal	Occipital	Lambdo-iniac	Inio-opisthic	Length Foramen Magnum	Basion to Nasion	Transverse: Total	Supra-auricular	Infra-auricular
1	M	Ad	..	195	196	192	192	151	144	110	114	98	122	..	543	300	243	552	135	145	129	70	59	34	109	470	320	150
2	M.	Ad	1,333	178	182	179	180	136	132	108	103	93	120	128	505	280	125	504	120	126	117	64	53	38	103	434	297	137
3	M.	Ad.	1,410	178	180	178	176	135	137	101	108	91	120	130	506	270	236	499	130	123	112	57	55	34	100	437	302	135
4	M	Ag	1,378	178	180	176	177	135	138	100	104	93	125	136	510	260	250	506	131	127	112	60	52	36	100	438	302	136
5	M.	Ad	1,365	184	186	182	184	135	135	105	109	99	121	127	512	260	252	507	130	128	106	54	52	37	106	432	292	140
6	M.	Ag	1,605	182	184	182	182	140	144	105	115	98	126	138	516	274	242	512	130	122	117	60	57	35	108	448	308	140
7	M	Ad	1,565	183	185	179	180	144	138	111	113	98	123	134	520	283	237	523	136	137	113	65	48	38	99	453	313	140
8	F.	Ad	1,350	174	175	172	168	131	136	103	107	94	120	128	495	265	230	495	120	130	119	68	51	33	93	425	290	135
9	F.	Ad	..	179	184	180	183	131	130	102	..	83	123	128	494	267	127	502	130	125	115	55	60	33	99	427	290	137
10	F.	Ag.	..	177	177	176	176	130	129	105	104	94	..	..	505	..	..	505	130	130	110	60	50	35	100	436	295	141

No.	Foramen Magnum: Length	Width	Basi-alveolar Length	Diameters of Face, Transverse: Biorbital, External	Biorbital, Internal	Bijugal	Bizygomatic	Vertical: Ophryo-alveolar	Nasio-alveolar	Spino-alveolar	Diameters, Of Nasal Region: Nasio-spinal Height	Width Anterior Nares	Length Nasal Bones	Width Nasal Bones	Of Orbit: Width	Height	Interorbital Distance	Of Palate: Length	Width	Auriculo-orbital Distance, Right	Auriculo-orbital Distance, Left	Mastoid Height	Zygomatic Projection	Facial Angle
1	34	31	105	108	98	120	140	98	73	18	55	26	26	18	43	33	21	58	62	70	71	42	P	72°
2	38	31	100	104	96	115	133	99	70	19	51	27	25	20	40	33	21	53	61	69	67	39	P+	71°
3	34	27	96	99	90	110	124	91	68	15	53	23	26	14	39	33	20	48	62	71	71	38	C	75°
4	36	30	.	100	93	116	134	..	..	..	52	26	25	17	41	36	18	..	58	73	72	34	P+	80°
5	37	27	100	109	98	116	130	91	76	14	52	26	23	19	42	33	21	52	61	72	74	40	P	73°
6	35	34	..	107	98	117	138	..	..	..	54	26	18	..	40	36	19	..	..	76	76	35	P+	69°
7	38	34	..	108	97	..	..	..	..	..	..	..	..	..	42	34	20	..	..	67	..	..	P	..
8	33	32	89	105	95	111	129	91	66	16	50	23	24	13	40	33	18	49	61	67	70	33	P	71°
9	33	28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	35	30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

No.	Indices: Cephalic	Vertical	Frontal	Of Foramen Magnum	Orbital	Nasal	Gnathic	Palato-maxillary	Lower Jaw, Height: Symphysial	Molar	Coronoid	Condyloid	Width: Bigonial	Bicondyloid	Bimental	Of Ramus	Gonio-symphysial Length	Condylo-coronoid Length	Bigoniac Curve
1	73·5	77·	68·1	91·2	76·7	47·3	96·3	106·9	..	..	..	..	..	..	..	..	..	..	..
2	72·5	74·7	70·5	81·6	82·5	52·9	97·1	115·1	34	27	62	63	104	123	46	33	87	36	190
3	76·1	75·	66·4	79·4	84·6	43·4	96·	129·2	..	..	..	..	..	..	..	..	..	..	..
4	76·7	75·	67·3	83·3	87·8	50·	..	..	..	..	..	..	..	..	..	..	..	..	..
5	72·6	72·6	73·3	73	78·6	50	94·3	117·3	..	..	..	..	..	..	..	..	..	..	..
6	78·3	76·1	68·1	97·1	90	48·1	..	..	29	16	59	56	100	128	46	35	85	37	193
7	74·6	77·8	71·	89·5	81·	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	77·7	74·9	69·1	97·	82·5	46·	95·7	124·5	30	28	60	54	89	117	46	34	79	27	185
9	70·7	71·2	63·8	84·8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	72·9	73·4	68·2	85·7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

C.—From the Neighbourhood of Auckland and the Bay of Islands.

No.	Sex	Age	Capacity in c.cs.	Diameters of Brain-case, Longitudinal: Ophryo-occipital	Glabello-occipital	Nasio-occipital	Glabello-iniac	Basi-bregmatic Height	Transverse: Maximum	Asterionic	Stephanic	Minimum Frontal	Biauricular	Temporal	Circumferences of Brain-case, Horizontal: Total	Post-auricular	Pre-auricular	Median: Total	Frontal	Parietal	Occipital	Lambdo-iniac	Inio-opisthic	Length Foramen Magnum	Basion to Nasion	Transverse: Total	Supra-auricular	Infra-auricular
1	M.	Ag	1,635	187	190	184	183	146	138	110	112	95	122	133	525	280	245	537	140	130	120	73	47	39	108	457	316	141
2	M.	Ag	1,588	192	196	193	185	138	140	110	107	94	127	139	534	295	245	530	137	..	..	..	50	35	109	450	305	145
3	M	Ad.	..	179	181	180	172	135	143	117	107	91	123	134	512	277	235	510	135	128	112	69	43	33	102	456	315	141
4	M.	Ad.	1,345	174	174	177	174	134	132	105	105	99	117	129	500	258	242	496	132	108	115	70	45	34	107	423	290	133
5	M.	Ag	1,488	183	186	180	180	135	143	108	113	93	122	132	524	287	237	511	138	125	114	67	47	34	100	445	310	135
6	M.	Ad.	1,450	189	190	186	184	128	138	109	106	90	125	134	528	278	250	520	132	132	123	66	57	32	101	436	292	144
7	M.	Ag.	1,460	190	190	184	190	140	137	107	111	95	130	138	532	267	265	526	135	130	121	65	56	36	104	449	303	146
8	F.	Ad.	1,230	173	174	171	171	125	126	94	103	87	110	123	480	258	122	487	129	116	115	60	55	33	94	404	287	117
9	F.	Ad.	1,400	181	183	182	172	131	129	103	107	90	110	122	508	280	228	512	130	130	123	80	43	30	99	422	300	122
10	F.	Ad	1,280	177	178	175	175	..	131	105	99	86	121	125	495	261	234	484	120	120	108	60	48	35	101	416	280	136
11	F.	Ag.	1,188	178	179	176	179	130	126	117	102	92	116	123	494	251	243	491	128	120	109	60	49	33	101	411	281	130
12	?	Ad	1,235	184	184	180	180	134	132	105	100	88	119	130	510	266	244	507	130	118	124	74	50	33	102	424	292	132
13	..	5	..	..	167	163	163	..	130	98	..	83	..	..	..	..	..	..	115	116	116	74	42	..	..	.	..	.

No.	Foramen Magnum: Length	Width	Basi-alveolar Length	Diameters of Face, Transverse: Biorbital, External	Biorbital, Internal	Bijugal	Bizygomatic	Vertical: Ophryo-alveolar	Nasio-alveolar	Spino-alveolar	Diameters, Of Nasal Region: Nasio-spinal Height	Width Anterior Nares	Length Nasal Bones	Width Nasal Bones	Of Orbit: Width	Height	Interorbital Distance	Of Palate: Length	Width	Auriculo-orbital Distance, Right	Auriculo-orbital Distance, Left	Mastoid Height	Zygomatic Projection	Facial Angle
1	39	33	98	112	100	118	137	95	69	13	56	28	25	15	39	34	23	51	57	72	72	37	P	75°
2	35	33	101	109	100	122	141	102	70	15	55	26			46	38	20	51	64	73	72	43	P+	72°
3	33	31	106	101	93	117	139	91	68	13	55	27	24	16	40	36	20	55	61	73	70	34	P+	67°
4	34	28	95	107	98	119	138	101	73	17	56	23	24	12	41	39	20	48	61	69	67	44	P+	71°
5	34	28	101	101	92	117	137	95	68	18	50	26	25	15	38	32	22	..	..	68	68	39	P+	70°
6	32	30	103	100	91	119	134	..		..	55	28	..	..	40	32	19	53	65	73	72	..	P+	70°
7	36	31	97	108	98	122	.	..		..	55	25	..	.	42	36	19	50	61	74	74	43	P	76°
8	33	32	93	95	84	108	120	79	54	11	43	24	.	.	36	31	16	49	58	64	66	32	P	76°
9	30	28	98	98	89	108	.	82	59	15	44	25			35	33	21	45	56	68	70	31	C	76°
10	35	28	102	100	90	113	131	85	66	16	50	28	21	14	38	33	20	49	57	72	73	34	P+	74°
11	33	28	103	106	97	121	132	96	68	16	52	27	23	17	41	35	21	57	63	71	71	..	P+	70°
12	33	27	96	96	89	112	127	..	..		50	24	21	16	39	33	17	46	59	72	73	38	P+	74°
13	..	..	.	83	78	92	.	72	51	11	40	20	16	12	33	31	16	35	52	.	..	..	C	81°

No.	Indices: Cephalic	Vertical	Frontal	Of Foramen Magnum	Orbital	Nasal	Gnathic	Palato-maxillary	Lower Jaw, Height: Symphysial	Molar	Coronoid	Condyloid	Width: Bigonial	Bicondyloid	Bimental	Of Ramus	Gonio-symphysial Length	Condylo-coronoid Length	Bigoniac Curve
1	72·6	76·8	68·8	84·6	87·2	50·	90·7	111·8	..	..	..	..	..	..	..	..	..	..	..
2	71·4	70·4	67·1	94·3	82·6	47·3	92·7	125·5	..	..	..	..	..	..	..	..	..	..	..
3	79·	74·6	63·6	93·9	90	49·1	103·9	110·9	..	..	..	..	..	..	..	..	..	..	..
4	75·9	77·	75·	82·4	95·1	41·1	88·8	127·1	..	..	..	..	..	..	..	..	..	..	..
5	76·9	72·6	65·	82·4	84·2	52·	101·	..	..	..	..	..	..	..	..	..	..	..	..
6	72·6	67·4	65·2	93·8	80·	50·9	102·	122·6	..	..	..	..	..	..	..	..	..	..	..
7	72·1	73·7	69·3	86·1	85·7	45·5	93·3	122·	37	27	71	58	103	132	53	35	89	39	200
8	72·4	71·8	69·	97·	86·1	55·8	98·9	118·4	..	..	..	..	..	..	..	..	..	..	..
9	70·5	71·6	69·8	93·3	94·3	56·8	99·	124·4	..	..	..	..	..	..	..	..	..	..	..
10	73·6	..	65·6	80·	86·8	56·	101·	116·3	..	..	..	..	..	..	..	..	..	..	..
11	70·4	72·6	73·6	84·8	85·4	51·9	103·	110·5	..	..	..	..	..	..	..	..	..	..	..
12	71·7	72·8	66·7	81·8	84·6	48·	94·1	128·3	..	..	..	..	..	..	..	..	..	..	..
13	77·8	..	63·8	..	93·9	50·	..	148·6	22	20	44	48	72	90	41	30	62	23	140

				Diameters of Brain-case											Circumferences of Brain-case														Foramen Magnum	
				Longitudinal					Transverse						Horizontal			Median								Transverse				
	Sex.	Age.	Capacity in c.cs.	Ophryo-occipital	Glabello-occipital	Nasio occipital.	Glabello-iniac.	Basi-bregmatic Height.	Maximum	Asterionic	Stephanic	Minimum Frontal.	Biauricular.	Temporal	Total.	Post-auricular.	Pre-auricular.	Total.	Frontal.	Parietal.	Occipital	Lambdo iniac	Inio opisthic	Length Foramen Magnum	Basion to Nasion	Total	Supra-auricular	Infra-auricular	Length.	Width
1	M.	Ad.	1,390	171	178	176	170	134	139	107	104	85	122	134	500	277	223	493	120	125	115	65	50	35	98	437	295	138	35	32
2	M.	Ad.	1,435	186	192	186	192	128	140	108	97	85	130	138	520	280	240	512	130	118	127	67	55	38	104	440	295	145	38	31
3	M.	Ad.	1,470	190	198	192	196	142	142	109	113	102	126	136	540	287	253	538	142	128	120	70	50	36	110	457	316	141	36	31
4	M.	Ad.	1,523	183	186	183	180	139	145	110	106	100	130	142	528	280	248	519	132	123	123	65	58	37	104	458	310	148	37	32
5	M.	Ad.	1,485	177	185	182	182	140	144	113	111	95	128	138	520	283	237	512	130	120	120	70	50	35	104	451	308	143	35	31
6	M.	Ad.	1,475	181	186	183	182	134	140	107	102	90	124	134	518	285	233	513	128	122	121	70	51	36	106	435	300	135	36	29
7	M.	Ad.	1,285	175	185	181	177	130	140	112	100	90	132	138	505	274	231	498	135	105	115	70	45	36	107	445	298	147	36	27
8	M	Ad.	1,380	177	182	180	173	140	144	108	110	91	125	138	518	292	226	516	128	112	139	100	39	32	105	457	318	139	32	30
9	M.	Ad.	..	202	208	206	194	144	146	115	116	103	134	140	560	317	243	564	138	142	128	90	38	40	116	465	320	145	40	34
10	M.	Ad.	1,370	180	186	184	177	134	139	107	112	100	121	132	520	285	240	511	130	130	120	70	50	30	101	446	304	142	30	28
11	M	Ad.	1,590	191	198	195	196	132	150	107	109	98	138	143	550	300	250	532	139	131	125	60	65	34	103	459	310	149	34	31
12	M.	Ad.	1,290	174	181	179	176	128	138	99	104	94	125	136	500	273	227	493	125	115	119	62	57	34	100	435	295	140	34	27
13	M.	Ad.	1,463	177	184	181	176	137	144	108	109	92	127	137	520	290	230	514	132	122	121	80	41	37	101	454	305	149	37	29
14	M.	Ad.	1,415	173	176	175	172	140	143	105	109	88	130	137	507	283	224	508	122	121	127	76	51	38	100	454	312	142	38	28
15	M	Ad	1,490	184	186	182	175	133	145	108	119	95	120	138	526	280	246	521	130	124	132	86	46	36	99	497	316	181	36	34
16	M	Ad.	1,418	176	185	183	176	132	142	118	95	81	125	137	520	290	230	500	120	100	138	85	53	38	104	500	300	136	38	33
17	M	Ad	1,510	188	194	190	184	138	148	115	115	104	135	140	535	300	235	523	124	120	137	84	53	36	106	447	300	147	36	33
18	M	Ad.	1,580	184	190	188	180	142	142	113	106	98	131	140	525	282	243	526	135	115	127	80	47	38	111	465	318	147	38	35
19	M.	Ad.	1,620	192	198	198	192	139	143	120	106	92	128	138	545	312	233	534	130	130	125	70	55	37	112	452	305	147	37	34
20	M.	Ad.	1,440	184	.	182	..	139	141	114	110	99	129	136	530	278	252	516	130	120	124	70	54	36	104	456	310	146	36	35
21	M.	Ag.	..	181	187	186	183	134	148	111	..	93	123	..	535	290	245	518	128	122	124	80	44	40	104	449	310	139	40	37
22	M.	Ad.	1,512	179	181	176	181	142	141	104	106	94	126	132	510	267	243	514	136	132	105	52	53	39	102	455	312	143	39	33
23	M	Ad.	1,650	186	190	190	181	138	145	117	114	96	132	142	538	292	246	528	140	130	121	70	51	34	103	463	320	143	34	32
24	M.	Ad	1,550	189	192	188	183	130	146	117	122	98	128	140	540	288	252	521	138	122	125	75	50	32	104	460	318	142	32	31
25	M.	Ad.	1,500	177	180	176	173	136	144	99	121	94	127	137	520	274	246	509	130	120	125	80	45	33	101	462	320	142	33	32
26	M.	Ag	..	192	198	196	196	140	..	111	..	100	126	..	..	..	.	544	144	128	125	68	57	35	112	485	328	157	35	32
27	M.	Ad.	1,490	180	184	178	179	137	138	113	105	90	122	132	513	277	236	521	134	130	122	76	46	33	102	447	310	137	33	31
28	M.	Ad.	1,375	180	183	183	169	127	141	113	114	90	122	131	512	286	226	502	126	127	117	67	50	34	98	437	295	138	34	28
29	M.	Ad.	1,380	176	178	176	171	137	135	107	108	94	125	131	503	271	232	498	122	128	113	60	53	35	100	443	300	143	35	27
30	M.	Ad.	1,338	173	177	175	170	133	138	104	107	87	126	132	500	279	221	490	119	121	115	65	50	35	100	434	290	144	35	27
31	M	Ad.	1,370	176	178	176	178	128	138	108	108	95	123	130	503	265	238	489	122	118	116	50	66	34	99	427	292	135	34	29
32	M.	Ad	1,400	181	186	185	176	132	136	106	105	98	118	130	515	283	232	504	129	121	120	70	50	34	100	434	298	136	34	27
33	F.	Ad.	1,358	171	175	174	168	132	139	110	105	96	126	132	500	280	220	486	124	114	115	67	48	33	100	428	288	140	33	29
34	F	Ad	1,300	172	176	174	162	128	136	109	103	88	118	128	490	282	208	480	119	122	110	61	49	34	95	410	280	130	34	32
35	F.	Ad.	1,255	166	170	170	168	128	133	98	105	88	118	129	485	255	230	480	124	116	109	66	43	30	101	439	306	133	30	29
36	F.	Ag.	..	175	177	177	167	123	137	100	104	97	118	131	500	270	230	482	120	112	118	73	45	33	99	323	293	130	33	27
37	F.	Ad.	1,235	172	176	176	165	130	134	100	96	86	120	132	491	270	221	482	120	108	122	77	45	35	97	423	290	133	35	28
38	F.	Ad.	1,185	167	170	169	165	123	130	99	96	86	113	125	480	265	215	468	113	121	104	56	48	33	97	402	272	130	33	27
39	F.	Ad.	1,325	175	177	176	172	126	132	104	102	96	116	124	492	273	219	483	117	119	112	72	40	34	101	406	281	125	34	29
40	?	Ad	1,318	177	179	178	170	131	138	109	106	88	121	131	504	284	220	495	117	123	118	80	38	33	104	433	300	133	33	31
41	?	Ad.	1,350	174	177	176	173	133	135	106	110	93	117	132	500	270	230	494	125	120	112	57	55	39	98	427	300	127	39	37
42	?	Ad.	1,295	177	179	177	177	127	128	104	104	94	118	123	496	270	226	491	125	115	120	70	50	36	95	412	280	132	36	28
43	?	8	1,340	..	172	170	154	129	135	105	104	85	117	128	490	283	207	474	118	117	120	70	50	35	89	422	295	127	35	30
44	?	7	1,188	..	164	162	153	122	131	96	100	87	110	125	464	263	201	465	120	100	119	75	44	34	92	414	290	124	34	31
45	?	7	1,545	..	179	176	175	130	144	110	113	93	117	133	512	285	227	497	125	127	116	63	53	35	94	436	310	126	35	32
46	?	6	..	.	172	170	..	129	139	104	111	88	117	..	..	.	.				..		..		85	..	.	..	40	36
47	M	Ad.	1,348	178	180	178	173	133	138	104	114	100	116	130	510	270	240	507	125	114	128	86	42	34	106	441	310	131	34	32
48	M.	Ad	1,420	181	184	181	174	133	138	116	103	89	116	126	502	282	220	505	120	130	125	72	53	34	96	421	291	130	34	29
49	?	14	1,448	176	178	177	171	137	138	105	112	93	117	130	498	280	218	511	125	125	114	60	54	37	100	429	302	127	37	27
50	?	14	..	169	171	170	152	124	128	99	..	..	106	118	475	274	201	474	120	120	108	70	38	35	91	397	280	117	35	34

		Diameters of Face.							Diameters													Indices								Lower Jaw.										
		Transverse				Vertical			Of Nasal Region				Of Orbit			Of Palate.														Height.				Width.						
	Basi-alveolar Length.	Biorbital, External.	Biorbital, Internal	Bijugal.	Bizygomatic	Ophryo-alveolar.	Nasio-alveolar.	Spino-alveolar	Nasio-spinal Height	Width Anterior Nares	Length Nasal Bones	Width Nasal Bones.	Width.	Height	Interorbital Distance.	Length.	Width.	Auriculo-orbital Distance, Right	Auriculo-orbital Distance, Left	Mastoid Height	Zygomatic Projection.	Facial Angle	Cephalic.	Vertical.	Frontal.	Of Foramen Magnum.	Orbital.	Nasal.	Gnathic.	Palato-maxillary	Symphysial.	Molar.	Coronoid.	Condyloid.	Bigonial.	Bicondyloid.	Bimental.	Of Ramus	Gonio-symphysial Length.	Condylo-coronoid Length	Bigoniac Curve.
1	92	103	91	116	138	102	74	18	56	25	..	..	37	38	21	48	60	73	68	42	P+	66°	78·1	75·3	61·2	91·4	102·7	44·6	93·9	125	..	..	..	..	..	..	..	..	..	..	..
2	102	106	98	128	138	112	80	21	59	28	..	..	42	38	20	54	68	72	74	43	P+	63°	72·9	66·7	60·7	81·6	90·5	47·5	98·1	125·9	..	..	..	..	..	..	..	..	..	..	..
3	108	118	109	128	143	..	.	..	58	28	..	..	47	38	22	55	64	75	76	42	P+	65°	71·7	71·7	71·8	86·1	80·8	48·3	98·2	116·4	..	..	..	..	..	..	..	..	..	..	..
4	..	110	100	124	142	..	..	..	58	30	..	..	42	33	23	..	65	72	73	40	P+	71°	78·	74·7	69·	86·5	78·6	51·7	..	..	..	..	..	..	..	..	..	..	..	..	..
5	100	111	100	124	143	112	77	21	56	27	31	16	41	37	23	53	64	71	69	47	P+	62°	77·8	75·7	66·	88·6	90·2	48·2	96·2	120·8	35	30	81	70	111	116	53	39	90	37	210
6	104	108	100	118	133	102	74	17	57	27	33	17	41	37	24	58	69	69	68	38	P	65°	75·3	72·	64·3	80·6	90·2	47·4	98·1	119	44	41	78	74	107	134	51	36	96	..	215
7	106	110	103	126	140	108	79	19	60	27	25	19	42	40	22	57	68	71	72	45	P+	63°	75·7	70·3	64·3	75·	95·2	45·	99·1	119·3	..	..	..	..	..	..	..	..	..	..	..
8	104	106	98	119	134	103	75	21	54	25	29	19	40	35	23	60	70	67	67	46	P+	68°	79·1	76·9	63·2	93·8	87·5	46·3	99	116·7	39	34	80	71	99	114	52	35	90	29	202
9	107	117	108	129	147	107	79	18	61	27	28	16	46	40	23	55	69	73	74	44	P+	70°	70·2	69·2	70·5	85·	87·	44·3	92·2	125·5	33	30	76	64	113	128	51	40	95	29	200
10	104	106	93	118	135	107	79	24	55	25	..	..	37	35	23	56	67	69	69	43	P	64°	74·7	72·	71·9	93·3	94·6	45·5	103·	119·6	..	..	..	..	..	..	..	..	..	..	..
11	101	105	96	124	144	110	80	21	59	29	..	..	43	37	18	54	67	74	73	39	P+	67°	75·8	66·7	65·3	91·2	86·	49·2	98·1	124·1	..	..	..	..	..	..	..	..	..	..	..
12	96	108	101	119	133	..	..	..	58	27	31	16	43	37	20	52	62	72	69	40	P+	63°	76·2	70·7	68·1	79·4	86·	46·5	96·	119·2	..	..	..	..	..	..	..	..	..	..	..
13	103	102	93	118	142	95	68	18	50	25	24	16	41	35	19	53	65	71	71	42	P+	68°	78·3	74·5	63·9	78·4	85·4	50·	102·	122·6	..	..	..	..	..	..	..	..	..	..	..
14	94	100	90	101	..	96	71	16	55	26	26	16	38	36	19	52	64	70	68	39	P+	68°	81·3	79·5	61·5	73·7	94·7	47·3	94·	123·1	..	..	..	..	..	..	..	..	..	..	..
15	96	106	99	120	..	94	67	17	50	25	23	14	42	36	22	53	60	70	69	38	P+	72°	78·	71·5	65·5	94·4	85·7	50·	97·	113·2	..	..	..	..	..	..	..	..	..	..	..
16	96	108	101	121	134	98	72	13	59	27	..	..	45	36	20	51	59	70	71	33	P+	66°	76·8	71·4	57·	86·8	80·	45·8	92·3	115·7	..	..	..	..	..	..	..	..	..	..	..
17	100	122	109	129	147	102	74	17	57	25	26	15	46	40	24	53	67	67	68	44	P+	66°	76·3	71·1	70·3	91·7	87·	43·8	94·3	126·4	35	36	82	69	110	126	54	34	91	29	210
18	106	106	96	121	144	108	79	18	61	26	27	16	42	36	20	59	70	77	76	40	P+	68°	74·7	74·7	69	92·1	85·7	42·6	95·5	118·6	35	38	79	66	108	133	54	38	95	37	224
19	107	115	103	125	144	115	85	21	64	28	32	18	43	40	20	55	73	75	76	42	P+	68°	72·2	70·2	64·3	91·9	93·	43·8	95·5	132·8	32	32	70	62	95	115	51	36	88	37	206
20	105	..	97	124	145	105	79	20	59	25	26	18	41	37	20	56	66	74	72	36	P+	71°	..	..	70·1	97·2	90·2	42·4	101·	117·9	36	34	79	71	108	126	56	41	95	31	220
21	103	107	97	124	142	97	74	14	60	26	27	..	42	37	19	52	62	73	74	39	P+	67°	79·1	71·7	62·8	92·5	88·1	43·3	99	119·2	..	..	..	..	..	..	..	..	..	..	..
22	97	106	97	122	141	108	78	22	56	25	24	14	41	36	19	53	67	71	71	35	P	72°	77·9	78·5	66·6	84·6	87·8	44·6	95·1	126·4	39	30	72	68	114	133	51	37	96	36	210
23	105	107	99	124	144	98	76	14	62	28	26	19	44	37	16	55	71	72	71	43	P+	64°	76·3	72·6	66·2	94·1	84·	45·2	101·9	129·1	..	..	..	..	..	..	..	..	..	..	..
24	103	106	98	119	..	109	83	23	60	27	28	17	42	37	23	58	67	71	69	43	P	70°	76	67·7	67·1	96·9	88·1	45·0	99	115·5	37	30	75	63	109	118	51	34	90	36	205
25	103	109	99	121	139	102	79	23	56	23	30	16	41	35	23	56	67	69	70	40	P	67°	80·	75·6	65·3	97·	85·4	41·1	102·	119·6	42	30	71	71	113	121	51	37	89	34	200
26	107	108	102	..	..	119	86	17	69	31	..	.	45	43	25	57	70	..	72	46	P+	65°	..	70·7	..	91·4	96·	44·9	95·5	122·8	..	..	..	..	..	..	..	..	..	..	..
27	100	104	92	118	134	96	69	16	53	25	22	16	39	35	21	50	61	67	68	34	P+	70°	75·	74·5	65·2	93·9	89·7	47·2	98·	122·	..	..	..	..	..	..	..	..	..	..	..
28	96	103	95	115	130	..	..	..	59	25	26	15	38	36	19	49	54	68	68	35	P+	65°	77	69·4	63·8	82·4	94·7	42·4	98	110·2	..	..	..	..	..	..	..	..	..	..	..
29	100	104	94	115	134	99	74	22	52	25	25	16	39	35	20	54	64	69	68	36	P+	69°	75·8	77·	69·6	77·1	89·7	48·2	100·	118·5	30	32	71	60	94	126	50	40	93	34	210
30	97	104	97	117	134	106	73	14	59	31	27	17	40	37	18	53	64	69	69	41	P+	68°	78·	75·1	63·	77·1	92·5	52·7	97·	120·8	..	..	..	..	..	..	..	..	..	..	..
31	100	102	91	116	131	91	67	17	50	26	23	16	38	31	19	52	61	70	70	32	P+	70°	77·5	71·9	69·6	85·3	81·6	52·	101·	117·3	..	..	..	..	..	..	..	..	..	..	..
32	102	107	97	118	134	99	73	15	58	23	..	..	41	36	19	..	..	70	71	38	P+	65°	73·1	71·	72·1	79·4	87·8	39·6	102·	..	..	..	..	..	..	..	..	..	..	..	..
33	92	103	92	115	132	..	..	..	52	25	25	17	40	37	19	48	53	66	66	37	P+	69°	79·4	75·4	69·1	87·9	92·5	48·2	92·	110·4	..	..	..	..	..	..	..	..	..	..	..
34	93	99	90	108	123	85	62	14	48	24	21	16	37	34	17	48	59	62	64	38	P	70°	77·3	72·7	64·7	94·1	91·9	50·	97·9	122·9	..	..	..	..	..	..	..	..	..	..	..
35	100	105	95	118	132	100	79	23	56	26	26	16	40	35	20	51	62	68	69	39	P+	68°	78·2	75·3	66·2	96·7	87·5	46·4	99·	121·6	31	25	72	64	103	118	49	38	89	28	200
36	95	102	92	111	125	91	67	14	53	23	.	..	39	37	19	47	57	68	68	32	P+	70°	77·4	69·5	70·8	81·8	94·9	42·6	96·	114·9	32	28	63	54	99	..	50	35	87	..	190
37	96	100	91	112	129	..	..	..	51	27	..	..	37	35	20	48	60	68	70	39	P+	70°	76·1	73·9	64·9	80	94·6	52·9	99·	125·	..	..	..	..	..	..	..	..	..	..	..
38	91	103	97	113	128	96	66	13	53	25	25	15	40	38	19	48	63	64	64	35	P+	69°	76·5	72·4	66·2	81·8	95	47·2	93·8	131·3	..	..	..	..	..	..	..	..	..	..	..
39	103	100	91	111	123	87	63	17	46	23	20	16	40	34	17	51	60	65	67	32	P	72°	74·6	71·2	72·7	85·3	85·	50·	102·	117·6	..	..	..	..	..	..	..	..	..	..	..
40	100	103	94	113	127	93	70	19	51	24	24	16	40	35	19	53	63	65	66	38	P+	72°	77·1	73·2	63·7	93·9	87·5	47·1	96·2	118·9	..	..	..	..	..	..	..	..	..	..	..
41	97	104	94	115	129	87	64	13	51	26	26	14	39	35	19	48	?	69	68	32	P	69°	76·3	75·1	68·9	94·9	89·7	51·	99·	..	..	..	..	..	..	..	..	..	..	..	..
42	98	102	93	113	123	90	67	16	48	25	..	..	39	33	18	48	62	65	65	38	P	68°	71·5	70·9	73·4	78·	84·6	52·1	96·9	129·1	..	..	..	..	..	..	..	..	..	..	..
43	79	94	85	101	113	..	..	..	45	21	..	..	35	34	18	37	55	62	61	..	C	78°	78·5	75·	63·	85·7	97·1	46·7	88·8	152·4	..	..	..	..	..	..	..	..	..	..	..
44	84	93	86	..	..	76	54	12	42	23	20	16	36	34	18	38	56	..	61	..	C	76°	79·9	74·4	66·4	91·2	94·4	54·8	80·4	147·4	..	..	..	..	..	..	..	..	..	..	..
45	90	95	87	104	115	78	58	15	43	23	20	15	38	34	18	45	61	60	61	27	C	79°	80·4	72·6	64·6	91·4	89·5	53·5	94·7	135·6	26	21	52	46	84	..	45	30	70	24	164
46	80	91	83	98	109	..	55	10	45	22	..	.	33	33	18	40	55	60	59	.	..	..	80·8	75·	63·3	90·	100·	48·9	94·1	137·5	..	..	..	..	..	..	..	..	..	..	..
47	102	109	100	118	130	102	77	22	55	24	28	17	42	37	23	55	61	69	71	35	P	72°	76·7	73·9	72·5	94·1	88·1	43·6	96·2	110·9	37	28	68	59	100	123	48	33	80	32	188
48	99	102	96	110	124	97	68	18	50	22	27	17	40	37	19	53	63	63	66	36	P+	68°	75·	72·3	64·5	85·3	92·5	44	103·1	118·9	32	28	61	52	95	113	52	34	87	26	208
49	89	100	91	108	120	100	71	18	53	22	27	14	39	35	19	47	62	65	65	35	C	72°	77·5	77·	67·4	73	89·7	41·5	89·	131·9	32	25	54	51	94	104	47	32	80	30	175
50	88	..	..	..	109	85	64	16	48	20	..	..	35	34	16	47	56	61	61	27	C	72°	74·9	72·5	..	97·1	97·1	41·7	96·7	119·1	27	23	56	54	85	105	47	31	75	28	170

TABLE IV.—MEASUREMENTS AND INDICES OF VERTEBRAL COLUMNS.

A.—Maori.

—	I. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	20	17	..
" 3	16	15	24	19	..
" 4	14	15	25	18	..
" 5	14	15	24	19	..
" 6	14	15	28	19	..
" 7	16	15	28	17	..
Dorsal 1	17	19	32	17	..
" 2	..	..	..	..	..
" 3	19	19	32	19	..
" 4	20	19	31	22	..
" 5	20	20	31	25	..
" 6	20	21	33	27	..
" 7	20	22	34	27	..
" 8	21	22	36	28	..
" 9	21	22	40	30	..
" 10	21	23	43	31	..
" 11	21	24	48	32	..
" 12	24	27	48	33	..
Lumbar 1	24	30	49	35	125·
" 2	25	30	51	36	120·
" 3	26	30	53	37	115·4
" 4	26	29	57	38	111 5
" 5	26	25	56	40	96·2
Sacrum, Lgth.	..	..	106	..	..
" Arc	..	..	111	..	..
" Bdth.	..	..	110	..	..

—	II. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	19	16	..
" 3	14	14	25	17	..
" 4	12	13	28	17	..
" 5	11	12	29	16	..
" 6	10	12	27	17	..
" 7	13	15	29	..	..
Dorsal 1	..	..	..	..	..
" 2	18	18	31	18	..
" 3	18	18	30	20	..
" 4	18	18	28	20	..
" 5	18	18	29	22	..
" 6	19	19	30	24	..
" 7	19	20	31	26	..
" 8	20	21	32	28	..
" 9	21	22	35	29	..
" 10	22	23	39	29	..
" 11	22	25	42	30	..
" 12	25	28	43	30	..
Lumbar 1	26	31	47	33	119 2
" 2	25	29	52	33	111·5
" 3	27	28	56	35	103 7
" 4	25	25	56	37	100
" 5	28	23	57	37	92·
Sacrum, Lgth.	..	..	106	..	..
" Arc	..	..	113	..	..
" Bdth.	..	..	119	..	..

—	III. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	23	19	..
" 3	12	13	25	18	..
" 4	12	13	25	18	..
" 5	12	13	27	17	..
" 6	13	13	29	18	..
" 7	14	15	34	19	..
Dorsal 1	15	17	36	19	..
" 2	17	17	36	21	..
" 3	18	19	34	23	..
" 4	17	19	34	25	..
" 5	17	20	34	26	..
" 6	18	20	35	27	..
" 7	19	20	39	30	..
" 8	20	20	41	31	..
" 9	20	21	44	33	..
" 10	20	22	48	35	..
" 11	21	24	49	36	..
" 12	22	27	52	37	..
Lumbar 1	23	27	54	39	117 4
" 2	25	26	56	40	104·
" 3	25	25	58	41	100
" 4	26	22	58	39	84·6
" 5	28	22	55	35	78 6
Sacrum, Lgth.	..	..	97	..	..
" Arc	..	..	111	..	..
" Bdth.	..	..	123	..	..

—	IV. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	20	17	..
" 3	13	15	24	18	..
" 4	13	13	..	..	..
" 5	12	13	..	..	..
" 6	12	13	29	17	..
" 7	15	15	32	17	..
Dorsal 1	17	18	35	18	..
" 2	18	18	34	19	..
" 3	19	19	33	20	..
" 4	19	20	31	23	..
" 5	20	21	31	25	..
" 6	21	23	32	25	..
" 7	21	23	33	27	..
" 8	22	23	34	28	..
" 9	24	22	36	29	..
" 10	24	24	40	30	..
" 11	24	27	42	30	..
" 12	26	30	44	31	..
Lumbar 1	26	30	48	34	115 5
" 2	25	30	50	36	120
" 3	27	27	52	38	103 8
" 4	24	24	52	39	92 3
" 5	25	24	..	..	92 3
Sacrum, Lgth.	..	..	101	..	..
" Arc	..	..	108	..	..
" Bdth.	..	..	110	..	..

—	V. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	..	..	..	..	..
" 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
" 8	..	..	..	..	..
" 9	..	..	..	..	..
" 10	..	..	..	..	..
" 11	..	..	..	..	..
" 12	..	..	..	..	..
Lumbar 1	25	25	45	30	166 7
" 2	24	28	46	33	116·7
" 3	26	28	49	34	112
" 4	25	25	49	..	100
" 5	25	23	50	36	92
Sacrum, Lgth.	..	..	114	..	..
" Arc	..	..	118	..	..
" Bdth.	..	..	124	..	..

—	VI (Male) Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	..	..	..	..	..
" 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
" 8	..	..	..	..	..
" 9	..	..	..	..	..
" 10	..	..	..	..	..
" 11	..	..	..	..	..
" 12	..	..	..	..	..
Lumbar 1	26	51	34	144	4
" 2	27	53	36	122	7
" 3	27	55	37	112	5
" 4	23	57	39	92	..
" 5	20	58	38	83	3
Sacrum, Lgth.	..	..	103	..	..
" Arc	..	..	114	..	..
" Bdth.	..	..	125	..	..

—	VII (Male) Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	..	..	..	..	..
" 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
" 8	..	..	..	..	..
" 9	..	..	..	..	..
" 10	..	..	..	..	..
" 11	..	..	..	..	..
" 12	21	28	48	38	..
Lumbar 1	17	28	48	37	164 7
" 2	21	28	51	38	133 3
" 3	23	27	54	39	117 4
" 4	24	25	59	41	100
" 5	25	21	58	37	84·
Sacrum, Lgth.	..	..	113	..	..
" Arc	..	..	120	..	..
" Bdth.	..	..	120	..	..

—	VIII (Female) Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index
Cervical 2	..	..	18	15	..
" 3	7	6	20	16	..
" 4	8	7	21	16	..
" 5	8	8	23	16	.
" 6	6	8	26	17	..
" 7	8	9	29	17	..
Dorsal 1	15	17	31	19	.
" 2	15	16	29	17	..
" 3	16	17	28	19	.
" 4	18	18	27	21	.
" 5	18	18	28	24	
" 6	19	19	25	22	..
" 7	19	19	27	23	..
" 8	20	20	29	25	..
" 9	21	21	33	28	.
" 10	21	23	36	29	.
" 11	22	24	39	30	..
" 12	23	26	43	31	..
Lumbar 1	24	28	44	37	116·7
" 2	24	28	46	37	107 7
" 3	26	26	49	38	100
" 4	25	25	52	38	89 3
" 5	22	22	52	38	78 6
Sacrum, Lgth.	..	..	..	..	..
" Arc	..	..	..	..	..
" Bdth.	..	..	..	..	..

—	IX (Female). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse	Horizontal. Sagittal.	Vertical Index
Cervical 2	..	.	18	16	.
" 3	12	12	20	17	..
" 4	12	12	21	16	..
" 5	11	12	21	15	..
" 6	10	12	24	16	.
" 7	12	12	26	15	..
Dorsal 1	14	15	29	16	..
" 2	15	16	29	17	..
" 3	16	17	28	19	.
" 4	18	18	27	21	.
" 5	19	19	25	22	..
" 6	19	19	27	23	..
" 7	20	20	29	25	..
" 8	21	21	30	25	..
" 9	21	21	33	28	.
" 10	21	23	36	29	.
" 11	22	24	39	30	..
" 12	23	26	43	31	..
Lumbar 1	23	27	46	31	117·4
" 2	23	27	50	33	117 4
" 3	23	26	50	34	113
" 4	24	24	52	36	100
" 5	25	21	50	35	84
Sacrum, Lgth.	..	.	103	.	..
" Arc	..	..	114	..	..
" Bdth.	..	..	125	..	..

—	X. (Female). Diameters: Vertical Anterior	Vertical Posterior.	Horizontal Transverse	Horizontal Sagittal.	Vertical Index.
Cervical 2	..	..	19	16	..
" 3	12	13	21	16	.
" 4	12	13	23	16	.
" 5	12	13	23	16	.
" 6	13	13	25	16	.
" 7	14	15	27	15	..
Dorsal 1	15	16	31	15	..
" 2	17	18	29	17	..
" 3	18	18	27	18	.
" 4	17	18	26	20	.
" 5	18	19	28	21	.
" 6	19	20	28	22	.
" 7	18	20	29	22	.
" 8	20	21	31	24	.
" 9	20	21	32	25	.
" 10	19	21	35	26	..
" 11	20	23	38	28	.
" 12	24	25	42	31	.
Lumbar 1	22	28	44	32	127 2
" 2	24	28	46	33	116·7
" 3	25	28	49	34	112
" 4	27	27	52	35	100
" 5	28	23	54	35	82 1
Sacrum, Lgth.	..	..	107	.	..
" Arc	..	..	118	..	..
" Bdth.	..	..	124	..	..

—	XI. (Female). Diameters: Vertical Anterior	Vertical Posterior.	Horizontal Transverse.	Horizontal Sagittal.	Vertical Index.
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	..	..	..	..	..
" 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
" 8	..	..	..	..	..
" 9	..	..	..	..	..
" 10	19	21	37	30	..
" 11	20	23	39	31	..
" 12	24	25	42	31	.
Lumbar 1	25	26	44	31	104
" 2	24	26	47	33	108 3
" 3	25	27	50	34	108
" 4	25	25	49	..	100
" 5	25	23	50	36	92
Sacrum, Lgth.	..	..	107	.	..
" Arc	..	..	113	.	..
" Bdth.	..	..	124	..	..

—	XII. (Female). Diameters: Vertical. Anterior.	Vertical. Posterior	Horizontal. Transverse	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	16	18	33	18	..
" 2	17	18	31	19	.
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	18	19	29	21	..
" 6	19	20	29	22	..
" 7	19	20	32	24	..
" 8	19	20	33	25	..
" 9	20	21	34	26	..
" 10	19	21	38	27	..
" 11	20	23	40	28	..
" 12	23	26	43	28	..
Lumbar 1	15	25	45	30	166 7
" 2	24	28	47	32	116·7
" 3	24	27	50	34	108
" 4	..	..	..	..	..
" 5	..	..	..	..	..
Sacrum, Lgth.	..	..	114	..	..
" Arc	..	..	116	..	..
" Bdth.	..	..	123	..	..

—	XIII. (Female). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	20	16	..
" 3	12	12	23	18	..
" 4	11	12	24	16	..
" 5	10	12	23	19	..
" 6	11	12	24	18	..
" 7	13	13	31	16	..
Dorsal 1	15	16	33	16	..
" 2	17	17	32	17	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	17	18	29	21	..
" 6	18	18	28	22	..
" 7	19	20	30	23	..
" 8	20	21	32	26	..
" 9	21	21	36	27	..
" 10	21	21	40	28	..
" 11	22	24	43	29	..
" 12	24	26	45	30	..
Lumbar 1	26	32	53	38	123 1
" 2	28	32	57	40	114·3
" 3	29	30	59	41	103 4
" 4	30	28	60	42	93·3
" 5	29	26	58	40	89·7
Sacrum, Lgth.	..	..	104	..	..
" Arc	..	..	118	..	..
" Bdth.	..	..	112	..	..

B.—Moriori.

—	I (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	..	..	..	..	..
" 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
" 8	..	..	..	..	..
" 9	..	..	..	..	..
" 10	..	..	..	..	..
" 11	..	..	..	..	..
" 12	..	..	..	..	..
Lumbar 1	26	32	53	38	123 1
" 2	28	32	57	40	114·3
" 3	29	30	59	41	103 4
" 4	30	28	60	42	93·3
" 5	29	26	58	40	89·7
Sacrum, Lgth.	..	..	104	..	..
" Arc	..	..	118	..	..
" Bdth.	..	..	112	..	..

—	II. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
Dorsal 1	..	..	..	..	..
" 2	..	..	..	..	..
" 3	..	..	..	..	..
" 4	..	..	..	..	..
" 5	..	..	..	..	..
" 6	..	..	..	..	..
" 7	..	..	..	..	..
" 8	..	..	..	..	..
" 9	..	..	..	..	..
" 10	..	..	..	..	..
" 11	..	..	..	..	..
" 12	..	..	..	..	..
Lumbar 1	24	27	47	32	112 5
" 2	24	27	50	..	112 5
" 3	24	25	..	34	104 2
" 4	25	23	55	35	92
" 5	25	24	58	40	96·
Sacrum, Lgth.	..	..	108	..	..
" Arc	..	..	110	..	..
" Bdth.	..	..	114	..	..

—	III. (Male). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	19	18	..
" 3	15	15	21	18	..
" 4	14	14	23	18	..
" 5	14	15	25	19	..
" 6	13	14	23	17	..
" 7	16	15	29	20	..
Dorsal 1	17	17	31	21	..
" 2	19	18	33	22	..
" 3	19	19	32	24	..
" 4	20	19	32	25	..
" 5	20	21	33	27	..
" 6	20	22	34	28	..
" 7	21	23	35	29	..
" 8	22	23	37	30	..
" 9	22	23	37	32	..
" 10	23	24	41	33	..
" 11	23	25	46	35	..
" 12	24	27	49	35	..
Lumbar 1	29	30	51	39	120 8
" 2	30	30	54	42	120·
" 3	29	30	57	42	120 8
" 4	27	26	58	41	112·5
" 5	29	25	58	40	96·
Sacrum, Lgth.	..	..	108	..	..
" Arc	..	..	110	..	..
" Bdth.	..	..	114	..	..

—	IV. (Female). Diameters: Vertical. Anterior.	Vertical. Posterior.	Horizontal. Transverse.	Horizontal. Sagittal.	Vertical Index.
Cervical 2	..	..	20	18	..
" 3	13	15	22	18	..
" 4	13	14	22	17	..
" 5	13	14	23	17	..
" 6	13	13	23	18	..
" 7	14	15	31	18	..
Dorsal 1	15	16	33	19	..
" 2	17	17	32	19	..
" 3	18	18	30	21	..
" 4	19	18	30	22	..
" 5	19	20	29	23	..
" 6	19	21	30	24	..
" 7	20	21	31	26	..
" 8	21	21	31	28	..
" 9	22	23	33	29	..
" 10	23	23	37	30	..
" 11	24	25	43	32	..
" 12	24	26	46	31	..
Lumbar 1	27	31	49	40	114 8
" 2	28	31	51	39	110·7
" 3	29	30	55	39	103 4
" 4	30	28	56	39	93 3
" 5	30	28	56	39	88 9
Sacrum, Lgth.	31	26	54	39	88 9
" Arc	..	..	120	..	..
" Bdth.	..	..	129	..	..
" Bdth.	..	..	127	..	..

Cervico-vertebral index	101·3	·10·	106 3	106 2
Dorso-vertebral index ..	106 3	104·5	111 6	105 1
Lumbo-vertebral index	113 4	105·4	95 3	104 7
Sacral index	103 7	112 3	126 9	..

Cervico-vertebral index	..	102 7	105 3	107 9
Dorso-vertebral index ..	..	105 7	104 4	108
Lumbo-vertebral index	105 2	97 7	105 9	106 3
Sacral index	108 9	..	121 4	115·9

Cervico-vertebral index	..	108 8	.	..
Dorso-vertebral index ..	..	..	..	..
Lumbo-vertebral index	116 4	..	99 2	..
Sacral index	106 2	..	115·9	113

Cervico-vertebral index	107·	..	..	..
Dorso-vertebral index ..	104 3	107·8	..	100
Lumbo-vertebral index	..	104 2	100·	104 9
Sacral index	118·8	107·7	116·1	105 6

Cervico-vertebral index	100	115 8		
Dorso-vertebral index ..	104 9	106·6		
Lumbo-vertebral index	113·9	100 7		
Sacral index	105 6	105·8		

TABLE VI.—MEASUREMENTS AND INDICES OF LIMB-BONES.

A. (Maori). B. (Moriori).

		Clavicle.		Scapula.						Humerus.		Radius.		Ulna.				Femur.							
		Length.		Length. Total.		Length. Infra-spinous		Breadth.		Length		Length.		Length. Max.		Length. To Base of Styloid		Lengths. Maximum Total.		Lengths. Maximum Troch		Lengths. Oblique. Total.		Lengths. Oblique. Troch.	
		R.	L.	R.	L.	R.	L.	R	L.	R.	L.	R	L	R	L	R	L	R.	L	R	L	R	L	R	L
A. (Maori).																									
1	M.	161	162	..	173	124	124	111	112	321	321	256	255	284	284	279	279	437	442	420	424	435	439	411	413
2	M	130	134	147	150	114	116	96	99	310	305	246	243	273	269	267	262	413	415	398	398	407	412	384	390
3	M	142	152	168	171	128	132	105	106	338	334	263	262	284	284	281	280	454	460	437	442	451	452	425	423
4	M	146	154	164	164	134	130	97	100	324	318	256	257	282	280	277	275	439	443	423	426	435	437	412	414
5	M	146	145	..	..	..	..	..	..	314	314	239	238	262	258	258	256	450	448	430	431	445	443	417	418
6	M	..	..	155	157	115	118	93	97	316	314	260	257	..	276	..	272	453	450	432	429	449	447	422	420
7	M	..	..	..	..	..	..	..	..	303	299	244	241	267	261	262	256	418	418	405	410	415	415	394	395
8	M	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	420	417	401	399	416	415	391	391
9	M	..	..	..	..	..	..	..	..	314	..	..	245	..	270	..	264	430	..	413	..	426	..	402	..
10	F.	137	138	144	142	109	109	90	91	299	292	224	216	249	241	244	237	413	412	395	393	408	405	383	379
11	F.	134	136	..	155	..	120	..	101	309	301	225	219	248	241	243	236	403	407	390	394	394	397	368	373
12	F.	..	138	149	143	109	101	105	101	296	292	225	219	245	237	242	234	423	427	410	412	418	423	397	400
13	F.	132	137	..	..	..	..	..	..	..	..	..	220	247	243	243	239	..	410	..	391	..	405	..	377
B. (Moriori).																									
1	M.	142	156	..	177	..	130	..	107	317	..	245	247	267	269	264	265	444	450	425	431	437	445	410	418
2	M	154	..	163	..	121	..	101	..	326	324	239	239	258	260	254	256	435	441	405	412	427	438	387	402
3	M.	158	..	..	177	..	136	..	111	333	324	262	260	282	282	276	276	451	453	435	436	446	448	422	421
4	F.	136	134	156	156	115	115	93	93	300	296	236	233	257	254	252	249	424	422	410	410	416	417	392	395
5	F.	..	..	..	136	..	107	..	89	..	288	.	230	..	250	..	246	..	417	..	398	..	412	..	387

		Femur. Diameters of Shaft.								Tibia.								Fibula.	
		Upper Third. Ant Post		Upper Third. Trans.		Middle. Ant Post		Middle. Trans		Lengths. Max.		Lengths. To Base of Malleolus		Diameter of Shaft. Ant Post		Diameter of Shaft. Trans.		Length	
		R	L	R	L	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
A. (Maori).																			
1	M.	24	23	38	37	30	31	26	26	363	363	348	347	41	40	24	23	362	362
2	M	21	21	32	32	27	27	23	23	349	348	335	333	34	34	26	24	335	335
3	M	23	23	34	35	31	31	24	24	389	392	373	378	37	38	20	22	375	373
4	M	21	21	35	35	31	30	25	24	371	374	357	361	35	36	22	23	355	357
5	M	22	23	35	35	29	28	24	25	358	355	343	340	35	35	25	23	348	347
6	M	22	22	32	30	29	30	21	22	380	375	365	362	34	33	22	21	367	367
7	M	22	22	34	34	30	28	23	23	..	..	..	..	..	..	..	..	..	330
8	M	20	20	31	32	27	26	24	24	..	342	327	330	32	34	20	20	..	..
9	M	22	..	34	..	26	..	25	..	..	364	..	350	..	33	..	23	..	..
10	F.	17	18	30	30	23	23	22	22	342	338	328	325	32	32	18	17	334	330
11	F.	20	20	34	36	25	26	24	24	336	336	321	324	33	34	20	20	323	328
12	F.	21	21	34	34	30	30	24	24	341	339	328	325	33	33	24	24	327	323
13	F.	20	20	32	31	27	27	23	23	..	325	..	311	..	31	..	20	..	316
B. (Moriori).																			
1	M.	22	23	35	33	29	30	28	27	356	361	340	345	33	34	22	21	350	351
2	M	22	23	33	34	31	31	25	26	350	342	335	326	34	34	25	24	335	336
3	M.	23	24	35	37	32	32	26	26	371	373	357	360	39	39	22	23	359	362
4	F.	22	23	36	34	27	27	27	27	344	346	329	332	38	38	21	21	334	334
5	F.	..	20	..	31	..	24	..	22	..	328	..	313	..	30	..	21	..	331

		Indices.																			
		Femoral. Upper Fourth of Shaft.		Femoral. Middle of Shaft.		Of Platycnemia		Scapular. Scapular.		Scapular. Infra-spinous.		Claviculo-Humeral.		Radio-Humeral.		Tibio-Femoral.		Humero-Femoral.		Inter-membral.	
		R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R	L.	R.	L.	R.	L.	R.	L.
A. (Maori).																					
1	M.	63·2	62·2	115·4	119 2	58·5	57·5	..	64·7	89·5	90·3	50·2	50 5	79·8	79·4	83·1	82·1	73·5	72·6	72·1	71·5
2	M	65 6	65·6	117·4	117·4	76 5	70 6	65·3	66·	84·2	85·3	41·9	43·9	79·4	79·7	84·5	83·9	77·5	75·9	73·	71·8
3	M	67·6	65·4	129·2	129·2	54·	57·8	62·5	62·	82·	80·3	42·	45·5	77·8	78·4	85 7	85·2	74·4	72·6	71·3	70·
4	M	60·	60·	124·	125·	62 9	63·9	59·1	60·9	72·4	76·9	45·1	48·4	79·	80·8	84·5	84·4	73 8	74·	71·6	70·4
5	M	62 9	65·4	120·8	112·	71·4	65 4	..	..	..	..	46·5	46·2	76·1	75·8	79 6	79·2	69·8	70·1	68·4	68·7
6	M	68·8	73·3	138·1	136·4	64·7	63 6	60·	61·7	80·9	82·2	..	..	82·3	81·8	83·9	83·3	69 8	69·8	69·1	69·2
7	M	64 7	64·7	130 4	121·7	..	..	..	..	..	..	..	..	80·5	80 6	..	..	72·5	71·5	..	..
8	M	64·5	62·5	112·5	108·3	62·5	58·8	..	..	..	..	..	..	..	..	..	82·	..	..	..	..
9	M	64·7	..	104·	..	..	69·7	..	..	..	..	..	..	..	..	..	..	73·	..	..	..
10	F.	56·7	60·	104·5	104·5	56 3	53 1	62·5	64·1	82·6	83·5	45·8	47·3	74·9	74·	82·8	82·	72·4	70·9	69·4	67·7
11	F.	58·8	55 6	104·2	108 3	60 6	58 8	..	65·2	..	84·2	43·4	45·1	72·8	72·8	83·4	82 6	76·7	74·	72·3	71·3
12	F.	61·8	61 8	125·	125·	72 7	72 7	70·5	70·6	96·3	100·	..	47·2	76·	75·	80·6	79·4	70·	68·4	68·2	66·7
13	F.	68 8	64·5	117·4	117·4	59·4	64·5	..	..	..	..	..	..	..	..	..	79·3	..	..	..	..
B. (Moriori).																					
1	M.	62·9	69·7	103·6	111·1	66·7	61·8	..	60·5	..	82·4	44·8	..	77·3	..	80·1	80 2	71·4	..	70·3	..
2	M	66·7	67·6	124·	119·2	73·5	70·6	62·	..	83·5	..	47·2	..	73·3	73·8	80·5	77·7	74·9	73·5	72·	71·9
3	M.	65·4	64·9	123·1	123·1	56·4	59·	..	62·7	..	81·6	47·4	..	78·7	80·2	82·3	82·3	73·8	71·5	72·4	70·7
4	F.	61·1	67·6	100·	100·	55·3	55·3	59 6	59·6	80 9	80 9	45·3	45·3	78·7	78·7	81·1	82·	70·8	70·1	69·8	68·9
5	F.	..	64·5	..	109·1	..	70·	..	65·4	..	83·2	..	..	..	79·9	..	78·6	..	69·1	..	69·5

TABLE V.—MEASUREMENTS AND INDICES OF PELVES.

A. Maori.

	Sex.	Breadth of Pelvis	Between Ant sup Iliac Spines	Between Post-sup Iliac Spines	Height of Pelvis	Between Ischial Tubers, Ext Surf	Between Ischial Spines	Breadth of Sacrum	Length of Sacrum.	Length of Sacral Arc.	Pubo-ischiatic Depth	Depth of Symphysis.	Transverse Diameter of Brim.	Sagittal Diameter of Brim.	Transverse Diameter of Outlet.	Sagittal Diameter of Outlet	Subpubic Angle.	Height of Acetabulum.	Breadth of Acetabulum.	Height of Obturator Foramen.	Breadth of Obturator Foramen.	Interobturator Width.	Breadth of Innominate Bone.	Breadth of Ilium.	Indices.				
																									Breadth-height Index.	Index of Brim.	Index of Cavity	Sacral Index.	Obturator Index.
1	M	266	228	77	219	125	..	119	106	113	102	36	127	104	78	118	45°	59	56	57	35	43	170	152	82 3	81·9	80·3	112 3	61 4
2	M	245	207	73	207	164	..	110	106	111	101	37	123	102	110	106	80°	56	53	54	33	54	180	163	84·5	82·9	82 1	103 7	61·1
3	M	254	212	75	206	132	75	110	101	108	85	35	111	96	83	98	70°	53	50	45	27	49	161	147	81·1	86 5	76 6	108 9	60·
4	M	255	219	71	200	130	..	109	107	114	87	30	113	90	82	95	60°	51	49	50	31	39	157	148	78·4	79 6	77·	101·9	62
5	M.	265	212	..	211	155	..	108	..	..	102	37	114	92	102	..	65°	53	51	54	36	46	153	168	79 6	80·7	89·5	..	66·7
6	M	285	240	91	215	144	..	123	97	111	103	41	120	106	93	108	60°	57	57	53	32	53	187	147	75·4	88 3	85 8	126·8	60 4
7	M	266	230	72	216	147	..	108	..	..	100	37	123	111	101	..	65°	51	51	53	35	47	169	163	81 2	90 2	81 3	..	66·
8	M.	265	225	66	232	145	86	120	113	120	100	34	122	112	102	117	65°	54	54	57	37	47	169	171	80·	91·8	82·	106·2	64·9
9	M	243	198	60	207	140	..	109	107	118	98	34	109	95	90	109	60°	53	53	54	33	48	173	156	85·2	87·2	89 9	101·9	57 4
10	M	270	211	.	217	154	89	117	106	115	103	42	121	104	100	109	63°	53	54	52	35	31	188	167	80·4	92 2	85·1	110 4	67·3
11	M.	..	.	..	.	..	..	118	110	122	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	107·3	..
12	F	258	220	75	206	144	85	117	93	106	96	36	117	107	100	125	70°	48	48	55	46	50	177	156	79·8	91·5	82·	125 8	83 6
13	F	275	235		203	170	103	118	93	107	94	40	134	94	121	110	85°	47	47	54	35	59	176	155	73·8	70 1	70 1	126 9	64·8
14	F	258	227	92	201	154	..	115	101	109	92	38	125	108	112	114	85°	48	48	49	35	57	183	156	77 9	86·4	73·6	113·9	71·4
15	F	259	228	90	203	150	..	119	103	112	96	36	130	120	107	138	70°	48	48	50	35	53	187	162	78·4	92·3	73 8	115·5	70·
16	F.	245	205	110	208	163	107	123	91	107	92	36	122	122	120	136	90°	52	50	48	37	57	191	159	85·	100·	75·4	135·2	77·1
17	F	255	200	87	191	155	100	124	107	113	84	35	130	117	116	128	80°	48	48	53	39	53	161	148	74·9	90·	71 9	115 9	73 6
18	F	290	220	76	198	160	..	125	103	114	88	33	136	113	116	116	85°	50	50	50	35	61	176	155	68 3	83·1	64·7	121·4	70·
19	F	252	203	77	205	156	..	125	94	106	92	36	130	107	112	121	80°	49	47	49	37	54	172	153	81·3	82 3	70 8	115 9	75 5
20	F	261			196	172	..	123	114	116	94	37	128	131	128	137	90°	49	49	50	34	59	..	..	75 1	102 3	73·4	107·9	68·
21	F.	255	226	77	203	164	..	118	109	113	90	35	126	110	123	119	85°	47	47	48	33	61	160	153	79·6	87·3	71·4	108 3	68 8
22	F.	273	226	100	200	157	110	128	112	118	94	36	128	100	111	128	70°	51	51	51	33	54	183	160	73·3	78·1	73 4	114·3	64·7
23	F.	243	210	90	197	148	..	120	121	125	86	32	122	117	105	118	90°	48	49	45	34	58	178	148	81 1	95 9	70 5	99·2	75 6
24	F.	251	214	..	193	162	..	121	109	116	91	38	127	111	114	122	85°	47	48	43	33	62	..	148	76 9	87·4	71 7	111·	76 7
25	F.	246	208	92	199	169	..	125	111	111	91	32	130	108	113	128	85°	49	49	49	31	60	172	149	80·9	83·1	70·	123·8	63·3
26	F	..	.	..	.	.	..	117	96	107	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	121·9	..

B. Moriori.

1	M	251	187	72	202	133	..	108	93	103	96	38	115	97	88	111	50°	52	50	60	34	37	175	151	80 5	84·3	83 4	116·1	56·7
2	M.	268	223	56	206	138	83	114	108	110	98	33	124	91	91	113	50°	52	52	57	38	39	154	158	76 9	73·4	79·	105·6	66·7
3	F.	269	238	80	215	169	..	127	120	129	91	..	130	106	120	113	100°	49	49	51	39	60	..	153	79 9	81·5	70·	105·8	76·5