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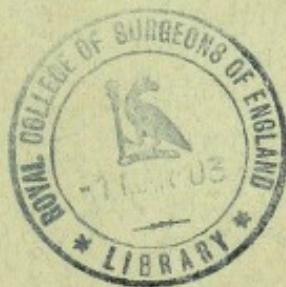
PART I.

THE HILL TRIBES OF THE NORTH-EAST FRONTIER AND
THE PEOPLE OF BURMA.

BY

PROFESSOR SIR WM. TURNER, M.B., D.C.L., F.R.S.

[WITH THREE PLATES.]



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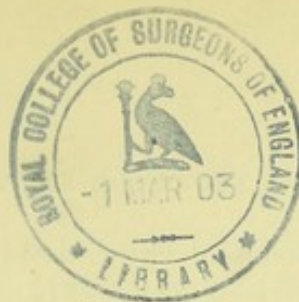
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XXVIII.—*Contributions to the Craniology of the People of the Empire of India.*

Part I. *The Hill Tribes of the North-East Frontier and the People of Burma.* By Professor Sir WM. TURNER, M.B., D.C.L., F.R.S. (With Three Plates.)

(Read July 3, 1899.)

For a number of years I have been collecting specimens and conducting an investigation into the craniological characters of the native inhabitants of our great Indian Empire, and several hundred skulls have now been under examination, and almost all have been measured. The sources to which I have been indebted for material are in part the collection of crania belonging to the Henderson Trustees, long known as the Edinburgh Phrenological Museum, and now deposited by the Trustees in the Anatomical Museum of the University; in part, a few specimens belonging to the University collected by my predecessors in office; in part, the valuable series of Indian crania belonging to the Indian Museum, Calcutta, which through the intercession of Dr JOHN ANDERSON, F.R.S., the former Director, the Trustees of that Museum, with great liberality, most courteously permitted me to have the loan of for purposes of study; and lastly, a number of crania which have been forwarded to me by friends and former pupils, engaged in the public service in India, to whom I take this opportunity of expressing my indebtedness for the valuable material which I have received from them.

Owing to the number of specimens and the wide range of country from which they have been derived, I have thought it advisable to depart from my original intention of including in one memoir my observations on the whole series of crania, and in preference, to arrange and publish them in groups, based on the geographical distribution of the people.

The skulls described in this, the first part of my memoir, are sixty-four in number, and include specimens from the hill tribes of the North-east frontier of India and from Burma. For purposes of comparison I have also given tables of measurements of skulls from China and Siam.

HILL TRIBES.

Before I commence the description of the skulls of the Hillmen, it may be well to preface the anatomical details with some reference to the localities from which the crania were obtained, as well as the names which have been given to the places and to the people who dwell in them.

In entering on the consideration of the savage and barbarous tribes who inhabit the wide range of mountainous country which lies south and east of the river Brahmaputra and Assam on the one hand, and north and west of Burma on the other, we are confronted by differences in the nomenclature employed by those who have explored

this extensive region, and have written descriptions of its inhabitants. Travellers who have approached the hills from the side of India have applied to the places and people such names as the natives of Bengal have been in the habit of using, whilst those who have entered from the Burmese frontier have employed Burmese names to designate the same tribes and localities. As regards the Hillmen themselves, as they usually neither recognise nor pay allegiance to any central authority, they do not apparently possess race or tribal names, but call themselves after the village, or group of villages, in which they live; or after the petty chief who for the time being exercises authority over them. In some villages no chief appears to be recognised, and the government is a democracy in which all the men are on an equality. The want of a common tribal name is also accentuated by the fact that in adjoining hill ranges the language in use possesses such dialectic differences that the words employed are often mutually unintelligible—a condition which is probably due to the state of constant feud in which the people live, so that they have had but little intercommunication with each other, except as enemies.

The name by which the Hillmen on the north-east frontier first became known to Europeans was that of Kookie, which is a Bengalee word for highlander, and is also written Kuki or Cúci. As Kookie it appears in a letter addressed in 1777 by the Chief of Chittagong to Warren Hastings.* In 1778 the Honourable Robert Lindsay, who was Collector at Sythet, speaks of the hill people as Kukis.† He describes them as living more in the style of the brute creation than other savages that he had seen. Their habitations were on spreading trees to defend them from beasts of prey; their food was wild honey and the fruits of the forest. The form Cúci was used by Mr JOHN RAWLINS‡ in 1790 in his description of the mountaineers of Tipra (Tipperah), to the east of Bengal, and it was also employed by Mr J. RENNEL in 1800 to designate the same people.§

Mr JOHN MACRAE, surgeon at Chittagong, writing in 1801,|| states that the Kookies or Lunctas, who live in the mountains north-east of Chittagong, are active mountaineers, but not tall. The face, he says, is like that of eastern Asiatics, broad and round; the nose is flat, the eye small. The men go naked, hence the term Luncta, though the chiefs wear a black loin cloth, and the women an apron. The chiefs bring the hair forward and tie it in a bunch to overshadow the forehead, whilst the other Kookies wear it loose over the shoulders.

Colonel LEWIN, who acted for many years as Deputy Commissioner in the Chittagong district, and who also accompanied the Lushai Expedition of 1871–72, uses the term Lhoosai or Lushai as equivalent to Kookie, and states that it is derived from “Lu,” signifying head, and “sha,” to cut, from the practice of decapitating their enemies. In

* Quoted in the *Report on the Hill Tracts of Chittagong*, by Deputy Commissioner T. H. Lewin. Calcutta, 1869.

† *The Thackerays in India*, by Sir W. W. Hunter. London, 1897.

‡ *Asiatic Researches*, 1790, vol. ii. p. 187.

§ Quoted in Deputy Commissioner Lewin's Report, p. 109.

|| *Asiatic Researches*, 1801, vol. vii. p. 183.

one passage he says that these people are named Lankhé by the Burmese.* He arranges the people occupying these hill tracts, into the Khyoungtha, children of the river, and the Tounghtha, or children of the hills. These words, he says, are both Arracanese. The Khyoungtha conform to Buddhist customs, and he considers them to be of pure Arracanese origin. The Tounghtha are, he believes, the aboriginal people, and under this name he includes the Tipperah tribes, the Kumi, Mroos, Khyengs, Bungees, Pankhos, Shendoos, and the Lushais or Kookies with their offshoots. In his introductory remarks LEWIN states (p. 33) that the general physique of the hill tribes is strongly Mongolian: broad faces, flat nose with no perceptible bridge; eyes narrow and set obliquely; high cheek bones, no beard or moustache, stature about 5 ft. 6 in. In his special description of the Lushais he says, however, that they differ entirely from the other hill tribes of Burman or Arracanese origin, in that their faces bear no marks of Tartar or Mongolian descent; their complexion is swarthy; the height of the men is about 5 ft. 8 in., that of the women 5 ft. 4 in. In his subsequent book, *The Fly on the Wheel*, written after he had penetrated some distance amongst the Lushai hill tracts, as a member of the military expedition of 1871-72, he repeats the statement that the features did not have the Mongolian type, but were more like Portuguese half-castes. The hair, he says, is black, and fastened in a knot on the nape of the neck.

Colonel WOODTHORPE, R.E., who was also a member of the Lushai expedition of 1871-72, gives an account of the people.† He states that they were of three tribes—Lushais, Paités or Sektés, and Pois. Both sexes were well made and muscular; the average stature of the men was 5 ft. 6 in., that of the women 5 ft. 4 in. The colour of the skin was every shade of brown, but the Pois were fairer than is usual with hillmen. The cheek bones were high and prominent, the face broad, the lips thick, the nose usually *retroussé*, with wide nostrils; though in the higher classes the nose was sometimes thin and aquiline and with small nostrils, and the lips were thin. The eyes were small and almond shaped; the beard and moustache were scanty. The tribes differed in their mode of wearing the hair. The Lushai men part it in the middle, smooth it on each side, bind it in a knot at the nape of the neck, and secure it by a copper or steel pin. The Sekté men do not part it, but wear it short and standing out around the forehead; sometimes the hair is twisted into a tail behind. The Poi men part the hair across the head from ear to ear; that in front of the parting is drawn forwards into a high double knot on the forehead and fastened by a comb; that behind the parting hangs in wavy curls over the back and shoulders. The dress is a long sheet of cotton cloth. The women sometimes dilate the lobe of the ear with a disc of baked clay.

In Mr E. A. GAIT'S Report on the Census of Assam ‡ it is said that the tribes variously

* See his *Report on the Hill Tribes of Chittagong*, 1869, already quoted, and his book, *A Fly on the Wheel*, London, 1884. Possibly Lankhé is a modified form of the word Luneta used by Mr John Macrae.

† "The Lushai Expedition," 1871-72, in *United Service Institution Journal*.

‡ *Census of Assam*, 1891.

known as Kuki, Lushai, Poi, etc., are closely allied. They are all of the Mongolian type, being a short, squat, muscular people, but effeminate in appearance. Mr BAKER gives in the Report the height of a Kuki measured by him as 4 ft. 11½ in. The return made in the census of Assam, 1891, of the tribes designated as Kukis and Lushais was 60,652 of both sexes.

In 1828 Lieut. T. A. TRANT gave an account* of the Khyen tribe inhabiting the Yuma Mountains between Ava and Arracan. He states that they differed in several respects from the Burmese: their faces were flatter and not so regular, and the girls tattooed the face. The men wore a black cloth, striped red and white, over the shoulders, a black cloth round the loins, and occasionally a black jacket; the women wore a black petticoat reaching to the knees.

Major G. E. FRYER describes by the name of Khyengs† tribes extensively distributed in the western mountains of Burma from 18° to 21° N. lat. The people who came under his observation belonged to the Sandoway district, Arracan. The Khyengs, he says, regard the Shendoos (Chins), Khumis and Lungkhes (Lunctas) as of the same race as themselves, and the tradition is that they came from the sources of the Kyendweng (Chendwin) river. Major FRYER gives some interesting facts on their physical characteristics. The average height of twenty-five men was 65·2 inches, and their weight was 110 lbs.; the average height of twenty-five women was 57·4 inches, and their weight 94 lbs. The colour of the skin corresponded with No. 28, and that of the eyes with No. 1 of Broca's Tables; the hair was black, though some women had reddish-brown patches on the crown of the head. The faces of the women were tattooed. The heads of a number of men and women were measured, and the mean length in the men is given as 7·5 inches, the mean parietal breadth 5·5 inches; interzygomatic breadth 5·3 inches. The corresponding dimensions in the women were 6·8, 5·0, and 5·2 inches. The length-breadth index of the head, calculated from these data, gave 73·3 for the men, and 73·5 for the women; so that both sexes were distinctly dolichocephalic. As to clothing, the men wear a loin-cloth, passed between the thighs with an end hanging down in front and behind, whilst the women wear a loose blouse reaching to the knee. As regards the practice of wearing the breech-cloth tucked between the legs like a dog's tail, LEWIN states that the Kúmi are called by the Arracanese, Khivé mi, dog-men, though he thinks that the name may also refer to the practice of eating dog for food.

LEWIN, FRYER, and other writers make reference to tribes situated to the east of the Lushai hill-tracts by the name of Shendoos or Shendús. Little that was definite was known about them until the annexation of Upper Burma brought our Government officials into contact with the wild mountain tribes living to the east of the Koladyne river. These tribes were known to the Burmese as Chins. The Chin hill-tracts lie between the Koladyne river and the Chinduri river, and the ranges extend northwards

* *Asiatic Researches*, vol. xvi. p. 261.

† *Journal Asiatic Soc., Bengal*, 1875, vol. xlv. part i. p. 39.

beyond latitude 24° . Owing to depredations committed by the Chins it was found necessary to organise an expedition against them in 1889-90.

Surgeon-Lieut.-Col. A. S. REID has published an interesting account of the expedition, along with maps of the Lushai and Chin hill-tracts.* He regards the Koladyne river as separating the Lushais on the west from the Chins to the east, and he considers that the Burmese word Chin should replace the name Shendú given to these people by those who approached their hills from the Indian frontier.

Whilst exhibiting differences in dialect and dress, Dr REID regards the Lushais and Chins as practically one race. The men, he says, are well built, with strong limbs and good figures. The average height is about 5 ft. 6 in., though individuals approach 6 ft. Like the Lushais, the northern Chins gather the hair in a knot on the nape of the neck, but the tribe of Baungshes wear it on the forehead. The Sektés, again, have it short, and outstanding like the tresses of Medusa. The mode of dressing the hair accords with Colonel WOODTHORPE's description. The Chinmen have a small loin-cloth, and a large shawl or blanket thrown loosely over the shoulders; the clothes of the chiefs are in coloured patterns. A haversack of hairy skin is worn on the right side, suspended by a strap from the left shoulder. The women wear a dark cloth jacket and skirt; the latter is sometimes woven in coloured patterns.

The tribes which inhabit the Kachin Hills on the borders of Upper Burma and Yunnan are often called Kachins or Kakhyens, though a more appropriate name is Chingpaw or Singpho. They have been described both by Dr JOHN ANDERSON† and Mr E. C. S. GEORGE‡. Their ancestral home was apparently the head waters of the Irrawaddy, and they are probably offshoots of the same race as gave origin to the Chins. The men are said to average 5 ft. 4 in. in height, and the women are three or four inches shorter. The oblique eyes widely separated, high cheek-bones, colour of skin from a brunette almost to black, point to their Mongolian affinities. The nose, however, varies from aquiline to a broad, squat projection on the face. The hair varies between black and brown; the eyes between dark and light brown.

South-east of Assam and north-west of Burma, and in proximity to the state of Manipur, are ranges of hills which lie between 25° and 28° latitude and 93° to 97° longitude. Our knowledge of the tribes inhabiting them is largely due to Captain BUTLER,§ Colonel WOODTHORPE,|| Mr G. H. DAMANT,¶ Dr BROWN,** and General Sir JAMES JOHNSTONE.†† The principal tribes inhabiting these mountains are called Nágás,

* *Chin-Lushai Land*. Calcutta, 1893.

† *Expedition to Western Yunnan*, Calcutta, 1871.

‡ *Appendix to Census of Burma*, 1892.

§ *Journal Asiatic Soc.*, Bengal, 1875, vol. xlv. part i. p. 307.

|| *Journal Anthropol. Inst.*, 1882, vol. xi. pp. 56, 196.

¶ *Journal Royal Asiatic Soc.*, 1880, vol. xii.

** *Statistical Account of the Native State of Manipur*, 1873.

†† *Experiences in Manipur and the Nágá Hills*. London, 1896.

An excellent account of the social structure, religion, myths, dances and songs, cultivation, trade and war of the Nágás has been compiled by Miss Gertrude M. Godden from the above and other authorities. It is published in the *Journal Anthropological Inst.*, vol. xxvi., Nov. 1896, and vol. xxvii., Nov. 1897.

or naked, from their scanty clothing.* This name is said by WOODTHORPE to be foreign, and not recognised by the natives themselves. The Nágás are divided into two groups, the kilted Nágás or Angamis, and the non-kilted or Kutchá Nágás. General JOHNSTONE states that Cacharees—people resembling those settled in Cachar—and Kukis are also found in the Nágá Hills. The Kukis came from the south, and are doubtless the same as the Lushais already referred to in the earlier part of this chapter. JOHNSTONE states that they are readily distinguished from the Nágás. The Kuki men are mostly copper-coloured, often with good features; the women are frequently fair, and wear the hair in a long, thick plait down the back.

WOODTHORPE describes the Lhota tribe of the non-kilted Nágás as of square build; eyes small, oblique; face flat; cheek-bones high; complexion dirty sallow; countenance sullen. The hair is cut short or shaved, except a large basin-shaped patch on the crown, where it is two or three inches long and combed down. The tribes living in the hills bordering the Sibsagor district are fair as to colour; the men shave the head except a long tuft from crown to forehead. The tribes in the Jaipur district show every shade of brown in the complexion; the hair is shaved just above the ears, the remainder being drawn back from the forehead and tied behind in a knot, through which strips of horn are passed; some have a small moustache, but few a beard. The Rengmahs wear a wooden tail, $1\frac{1}{2}$ foot long, attached to the small of the back. The non-kilted Nágás go either quite naked, or the men wear a waist-cloth drawn tightly between the legs, and the women a waist-cloth or short petticoat; some tribes also wear a long bright blue cloth. Tattooing is commonly practised.

The Angamis, or kilted Nágás, are taller than the non-kilted tribes, their average height is from 5 ft. 8 in. to 6 ft. They are also more muscular and more courageous. They have small features; in some cases aquiline, in others flat noses; high cheek-bones; colour in different shades of brown, seldom very dark, and the eastern tribes are fairer than the west; eyes set slightly obliquely. Hair is generally straight, but never frizzly. In youth it is cut short or shaven, except one long tuft from the crown; in adolescence it is about three inches long, brushed down all round, but with the long lock at the back usually worn in a knot bound round with cotton. The lobes of the ears are pierced and decorated. The men wear kilts of cotton cloth, decorated with cowries when on the warpath, and long blue and yellow cloths across the breast and shoulders. General JOHNSTONE says that they wear tails of wood, decorated with goats' hair dyed red. The women are tall for the sex, comparatively fair, with a ruddy glow in the cheeks, well-made, and active. They wear a petticoat, and a cloth around the shoulders.

Mr A. W. DAVIS, Deputy Commissioner of the Nágá Hills district, has also given an account of the Angami and some of the other tribes of Nágás in the Report on the

* These people are not to be confounded with a sect of religious mendicants also called Nágás; or with totemistic sections of several castes in Bengal named after Nág, snake. See Mr H. H. Risley's *The Tribes and Castes of Bengal*, Ethnographic Glossary, vol. ii. p. 120, Calcutta, 1891.

Census of Assam, 1891. As many as 102,857 Nágás belonging to different tribes were living in that year in the province of Assam.

The skulls from the Nágá Hills, which Surgeon-Lieut.-Col. WRIGHT has presented me with, belonged to the Tonkal tribe, about seventy miles north-east of Manipur. General JOHNSTONE speaks of visits which he paid to the Tankhool village of Chingsow, to the north-east of Manipur, which is probably of the same tribe as that named Tonkal by Colonel WRIGHT. Both of these authorities speak of Nágá villages in this district as having been raided by Kukis. Sir JAMES JOHNSTONE describes the people as having a fine physique, equal to that of the Angami; but they went mostly naked.

Lushai Hillmen. TABLE I.*

In 1890, my former assistant and pupil, now Surgeon-Captain D. MACBETH MOIR, who was engaged in a military expedition against the Lushais, forwarded to me a skull (H in Table) which was dug up in the process of constructing Fort Tregear, built in the loop made by the Koladyne river in the South Lushai hill-tracts, a few miles to the north of the Blue Mountain. The country visited by the expedition lies between 92° and 94° longitude and 22° and 24° latitude, and consists of a succession of steep hills and deep narrow ravines. Some of the hills attain a height of 9000 feet, and many of the villages are from 4000 to 5000 feet above the sea-level. In the following year Dr MOIR sent me a skull (I in Table) which had been found in the bed of the Koladyne river, immediately to the north of Fort Tregear. He believed it to be the skull of a Lushai who, when returning to a village on the Don Mountain, from a village on the Aitur Mountain, was drowned in crossing the river. The two skulls were found within fifteen miles from each other. Dr MOIR states that the Lushais place the severed heads of their enemies on posts, but do not impale the skull.

In 1891 I received from a former pupil, Surgeon-Captain H. B. MELVILLE, at that time civil surgeon stationed at Fort Aijal in the North Lushai Hills, the skull of a Lushai warrior who had sustained a sword-cut in the left temporal region during a skirmish. The edges of the cut were sharp and somewhat splintered, and the injury had doubtless been the cause of death (G in Table).

Through the kindness of my friend Professor CUNNINGHAM of Trinity College, Dublin, I have had the opportunity of examining two Lushai skulls in his museum. One was procured in 1892 by Dr MALCOLM MOORE. It was dug up in the floor of a hut in Poi Boi, a village of the North Lushai people, situated a little to the north-east of Fort Aijal. The dead are said to be buried in the huts of their relatives. The other specimen was obtained in the village of Ramree in the South Lushai Hills, by Assistant-

* In this and the succeeding Tables the letters E. U. A. M. mean Edinburgh University Anatomical Museum; H. T. the Museum of the Henderson Trust; T. C. D. the Museum of Trinity College, Dublin. The cubic capacity has been taken by the method which I described in my *Challenger Report* on Human Crania, part xxix., 1884, to which I may also refer for an explanation of the greater number of the measurements employed in the Tables. The terms *chamæprosopic* (low faced) and *leptoprosopic* (high faced) are adopted from Professor Kollmann's memoirs.

Surgeon V. L. WATTS, who was quartered at Fort Lungley, about fifteen miles to the west of Fort Tregear. In digging it up the left side of the face was injured.

The skulls had all reached adult life, but one was aged. Four were presumably men and one a woman. The North Lushai skull, from the Poi Boi village, was metopic.

Three of the crania were elongated and ovoid, though the metopic skull was broader in proportion to the length than the two others. H was somewhat ridged and roof-like in the sagitto-parietal region, whilst the others were more flattened. G and H were dolichocephalic, but the metopic skull was mesaticephalic. In G and in the metopic skull the height was less than the breadth, but in H the reverse was seen. None of the skulls was akrocephalic. In G, immediately behind the coronal suture, a shallow transverse constriction, such as is produced by wearing a head-band during infancy, was seen; this skull was cryptozygous, the two others were phænozygous. In these skulls the glabella and supra-orbital ridges were feeble, and the forehead was almost vertical; the cranial vault was fairly arched in the fronto-parietal region. In H the curve in the parieto-occipital region was gradual, and ended in a remarkably elongated inion, which formed the projecting occipital pole of the cranium. In the other two skulls the parieto-occipital slope was shorter and more abrupt, and the occipital squama projected behind the inion. In these skulls the parietal bones, from the obelion to the lambda, were flattened. The mastoid processes and temporal curved lines were moderate in two skulls, but in H the temporal lines were strongly marked behind, and approached to within 34 mm. of the sagittal suture. Owing to the occipital squama in H being remarkably small both vertically and transversely, it measured only 43 mm. from lambda to inion, and was only 55 mm. wide. As the temporal lines joined the lambdoidal suture only 34 mm. from the inion, three definite areas were marked in this region, viz., a mesial, between the two temporal ridges, and a right and left lateral, extending from the temporal ridge to the mastoid-temporal. The nuchal impressions in the occipital bone were strongly marked.

In these crania, the occipital arc was the shortest, the frontal was the longest in G and H, but in the metopic skull the parietal was much the longest. All three specimens rested behind on the cerebellar part of the occiput. The mean interzygomatic diameter was 127.6.

In all three the bridge of the nose was faintly concave, and the nasal bones projected so slightly that the face was flattened in the nasal region, and in H the nasals were short and narrow. The fronto-nasal suture was not depressed; the nasal spine of the superior maxillæ was moderate, and the incisive surface of the upper jaw was marked off from the floor of the nose by a definite ridge. In the metopic skull the nasal index was leptorhine, in the others mesorhine. In G the upper jaw was slightly prognathic, in H and in the metopic skull, orthognathic; in all, the incisive and canine fossæ were moderate in depth. The orbits, though wider than high, were megaseme in G and in the metopic skull, but mesoseme in H. The palate was much broader than long in these

TABLE I.
Chin and Lushai Skulls.

CHINS.							LUSHAIS.				
Edinburgh University Anatomical Museum.							North Lushai Hills, Poi Boi.	North Lushai Hills, Fort Aijal.	South Lushai Hills, Fort Tregear.	South Lushai Hills, Kola-dyne River.	South Lushai Hills, Ramree.
	Jiddim.			Klungroa.			Metopic.				
	A.	B.	C.	D.	E.	F.	T.C.D.	E.U.A.M.	E.U.A.M.	E.U.A.M.	T.C.D.
Collection,	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Aged.
Age,	M.	M.	M.	M.	M.	F.	M.	M.	M.	M.	F.
Sex,	1270	1310	1330	1290	1375	1200	1405	1390	1480	1330	1285
Cubic capacity,	174	181	177	173	183	173	176	181	188	169	170
Glabello-occipital length,	131	128	127	136	131	126	132	128	136	132	127
Basi-bregmatic height,	75.3	70.7	71.8	78.6	71.6	72.8	75.0	70.7	72.3	78.1	74.7
Vertical Index,	95	95	84	85	94	87	90	91	88	91	90
Minimum frontal diameter,	104	106	108	105	110	107	107	116	105	109	107
Stephanic diameter,	104	100	105	99	104	105	107	103	113	107	109
Asterionic "	131s.	129s.	137s.	134p.	130s.	134s.	136s.	135p.	131s.	136s.	145
Greatest parieto-squamous breadth,	75.3	71.3	77.4	77.5	71.0	77.5	77.3	74.6	69.7	80.5	85.3
Cephalic Index,	490	505	496	480	518	490	506	510	512	490	504
Horizontal circumference,	121	122	126	128	137	115	121	140	135	123	119
Frontal longitudinal arc,	117	132	114	120	119	105	133	129	134	125	118
Parietal " "	107	120	123	117	115	122	109	114	121	104	110
Occipital " "	345	374	363	365	371	342	363	383	390	352	347
Total " "	282	281	297	295	286	286	295	305	300	292	282
Vertical transverse arc,	36	31	35	32	31	34	32	30	35	37	34
Length of foramen magnum,	99	98	93	93	98	94	94	91	106	100	95
Basi-nasal length,	94	91	99	94	96	87	88	95	103	101	89
Basi-alveolar length,	94.9	92.9	106.5	101.1	98.	92.6	93.6	104.4	97.2	101.	93.7
Gnathic Index,	139	130	124	119	133	117	127	127	129	132	
Interzygomatic breadth,	126	121	112	109	124	106	113	118	120	118	
Intermalar " "	109	111	110	107	109	105	114	118	121	112	
Nasio-mental length,											
Nasio-mental complete facial Index,	78.4	85.3	88.7	89.9	81.9	89.7	89.7	92.9	93.7	84.8	
Nasio-alveolar length,	67	62	64	62	66	63	68	69	74	63	71ap.
Mazillary upper facial Index,	48.1	47.6	51.6	52.1	49.6	53.8	53.5	54.3	57.3	47.7	
Nasal height,	49	48	46	47	51	45	52	50	53	45	53
Nasal width,	23	25	25	25	27	24	23	26	27	25	26
Nasal Index,	46.9	52.1	54.3	53.2	52.9	53.3	44.2	52.	50.9	55.5	49.1
Orbital width,	42	41	36	36	40	35	37	37	40	36	40
Orbital height,	38	32	35	34	37	31	36	33	34	32	35
Orbital Index,	90.5	78.	97.2	94.4	92.5	88.6	97.3	89.2	85.	88.9	87.5
Palato-maxillary length,	51	48	51	52	52	45	50	54	55	55	
Palato-maxillary breadth,	64	64	60	57	62	58	63	63	70	65	
Palato-maxillary Index,	125.4	133.3	117.6	109.6	119.2	128.8	126.	116.6	127.2	118.1	
Lower jaw. { Symphysial height,	31	31	25	27	30	27	31	33	32	33	
Coronoid "	70	63	51	66	58	51	56	64	60	60	
Condylod "	69	68	60	69	61	54	59	65	62	61	
Gonio-symphysial length,	86	86	84	90	82	80	81	88	88	91	
Inter-gonial width,	105	94	88	91	100	88	97	...	98	99	
Breadth of ascending ramus,	32	36	29	38	31	30	35	35	36	36	

skulls, and the index was brachyuranic. The teeth were not decayed; they were not stained, and were partially flattened on the crowns from use. The mean nasio-mental length was 117·7, which is high for that diameter; the mean complete facial index was 92·1, and the mean upper facial index was 55·0; both indices were leptoprosopic, and the face was high in relation to the width. In their cubic capacity all three crania were mesocephalic. Each skull had small Wormian bones in the lambdoidal suture. G had a small left epipteric bone, and each orbit showed the rare variety of the superior maxilla, giving rise from its orbital plate to a broad process, which joined the frontal and separated the os planum of the ethmoid from the lachrymal.* The metopic skull had a large epipteric bone on each side and broad ecto-pterygoid plates.

The Ramree skull and I, both of which came from the South Lushai Hills, were in absolute length much shorter than those above described, and as I was about equal to and the other much exceeded them in breadth, they were distinctly brachycephalic. The outline in the norma verticalis was not elongated, but was broadly ovoid. The vertex sloped downwards to the parietal eminences, which were prominent. The vertical index was less than the cephalic. Both crania were phænozygous.

The glabella and supra-orbital ridges were scarcely marked; the forehead was nearly vertical and full; the nasal bridge was flattened, and the nasal bones in one were short and narrow, in the other longer and broader. The occipito-parietal slope was steep in I, in which this region was not symmetrical and was twisted to the left, probably from artificial pressure in infancy. The occipital arc was the shortest in each skull; in I the parietal arc, in the other the frontal arc was somewhat the longer. In the male the interzygomatic diameter was 132 mm.

The upper jaw was moderately projecting, mesognathic in I, but orthognathic in the other; the nose was platyrhine in I, mesorhine in the other; the orbital index was high up in the mesoseme group. The face in I was chamæprosopic in both its complete and its maxillary index. In capacity both crania were microcephalic, and the one with the smaller capacity was that of a woman. In I a small Wormian bone was in the lambdoidal and another in the left parieto-mastoid suture, whilst the parieto-sphenoid suture was broad. In the other specimen, both parieto-mastoid sutures contained sutural bones, and the right pterion had an epipteric bone. There were no unusual ossifications at the base of the cranium, and the sutures of the vault were comparatively simple.

Two skulls of Lushais, obtained during the expedition of 1871-72, have been catalogued by Dr BARNARD DAVIS in the *Supplement* to his *Thesaurus Craniorum*. In one the length-breadth index was 73, in the other 76; in both the height exceeded the breadth, and the mean interzygomatic diameter was 127 mm. Data are not given for determining the proportions of the height and width of the nose and the degree of projection of the upper jaw. Obviously these skulls had a dolichocephalic character. In

* Some years ago I described and figured an example of this rare variety in the skull of a Bushman (*Challenger Reports*, part xxix. p. 12, pl. 1, fig. 4, 1884), and I have recently seen it in the skull of a Papuan from New Guinea (*Proc. Roy. Soc. Edin.*, 3rd July 1899).

the tables of anthropological measurements published by Mr H. H. RISLEY,* seventeen 'Kukis,' natives of Rangamati in the Chittagong Hills, showed in their head measurements a mean cephalic index 76·2, and a mean nasal index 85. In the living person the nose is mesorhine. The customary deduction of two units from the cephalic index in the living head would place the same index in the skull at 74·2, *i.e.*, in the dolichocephalic group. The average stature of the people measured was 5 ft. 1 $\frac{3}{4}$ in. (1566 mm.).

Chin Hillmen. TABLE I.

In 1891 I received from Surgeon-Captain C. L. WILLIAMS a skull which, whilst acting in a surveying expedition, he had picked up in a graveyard within a quarter of a mile of Jiddim, the former capital of the Kankow country.† He states that it is the custom to dry a recent corpse over a fire for some days and afterwards in the sun for many months before it is buried beneath a stone. The skull cannot be that of a captive Burman, as the Kankows impale all captive heads on poles, and the skulls consequently have a large hole in the vertex. The Kankows are a wild tribe living in the mountains north of Burma, reaching almost as far north as lat. 24°, and westwards to the Lushai Hills. Dr WILLIAMS writes that, as compared with the Burmese, the forehead is higher, the nose less sunken, the malar bones less prominent, the lips less thick, and the chin more marked. They are a brave, hardy race of warriors and hunters, with good muscular development.

In 1894 Surgeon-Captain D. H. GRAVES sent me some skulls, which he had collected in the village graveyard at Jiddim, now the chief post for a regiment in the North Chin Hills. Up to three years prior to his visit it had been the largest village of a tribe which he names Nwengal. Dr GRAVES writes that he understands it is the custom when a member of the tribe dies to expose the body to the weather until it is decomposed. The skull is then placed along with others in an earthenware pot, which is buried. Dr GRAVES found two of these pots containing six skulls, four of which he was so good as to send me. In 1893 I also received a woman's skull collected by Surgeon-Captain GRAVES in the village of Klungroa, situated in the South Chin Hills, about sixteen miles to the south-west of Haka, between lat. 22° and 23°. She is said to have been killed by falling into a tiger trap.

The measurements of these skulls are given in Table I. E is the specimen collected by Dr C. L. WILLIAMS, the others are from Surgeon-Captain GRAVES. They were all adult. Five were presumably men, and one, F, a woman.

Norma Verticalis.—In this aspect two skulls, viz., B and E, were seen to be elongated and ovoid, so that in their proportions they were distinctly dolichocephalic, whilst A only slightly exceeded the dolichocephalic index. The three others were relatively

* *Tribes and Castes of Bengal*, vol. i. p. 204, Calcutta, 1891.

† See for an account of the Kankow campaign, *Chin Lushai Land*, by Surgeon-Lieutenant-Colonel Reid, I.M.S., p. 67, Calcutta, 1893. In the large map in this work the name apparently of this village, some miles to the north of Fort White, is printed Tiddim.

wider in the parietal region, and had a somewhat higher length-breadth index, which placed them in the lower term of the mesaticephalic group. In these three, C, D, and F, the parietal tubera projected, so that the outline of the skull approached the pentagonal or coffin shape. There was only a slight tendency to the formation of a sagittal ridge, and the slope outwards from it to the parietal eminences was not steep. One cranium was phænozygous; the rest were cryptozygous.

Norma Lateralis.—None of the skulls had a very prominent glabella or supra-orbital ridge, though in A they were more distinct than in the other crania; in A the frontal bone also showed a somewhat shelf-like projection immediately above the external orbital process; in this skull also the forehead was more receding than in the other specimens, in which indeed it approached to the vertical. The vault of the cranium was fairly well arched in the parieto-frontal region, and sloped backwards and downwards in the parieto-occipital region, somewhat more gently in B than in the other specimens. The occipital squama projected behind the inion; there was no appearance of parieto-occipital flattening, though D showed a want of symmetry in that region. The skulls rested behind on the cerebellar part of the occiput. The nasal bones had a concave bridge, and projected so slightly that the face was flattened in the nasal region; the fronto-nasal suture was not depressed. The nasal spine of the superior maxillæ was feeble in some specimens, and in no case strong; a moderate ridge marked the separation of the incisive part of the upper jaw from the floor of the nose. The incisive and canine fossæ were moderate in depth. C and D were more prognathic than the other skulls. As a rule the orbits were high in proportion to their width, but B had a low orbital index. In C, D, and F the nasal index was moderately platyrrhine, in A leptorrhine, in the rest mesorrhine. The teeth had to a large extent been lost, and of those that remained many were worn down and stained. The palate showed no unusual arching. The mastoid processes, temporal and occipital ridges, were moderate. The sutures were not obliterated in any of the crania, though in some, fusion of the bones had begun. Small Wormian bones were present in the lambdoidal suture in three skulls, and in D the suprainial part of the occipital squama had ossified as a distinct inter-parietal bone. All the skulls, with one exception, had an epipteric bone either on the one or on both sides; the parieto-sphenoid suture, when present, was usually narrow. The upper part of the coronal suture and the anterior end of the sagittal suture were almost devoid of denticulations. No skull had an exostosis in the auditory meatus, neither was a third condyle or paramastoid process present. No skull was metopic. The skull D showed a hole in the coronal suture 25 mm. to the right side of the sagittal suture. The hole measured 6 mm. by 4 mm., and the bone around it had a smooth bevelled margin, whilst the surface of the parietal bone behind it was abraded; the appearance led one to think that during life the skull had been injured, probably by the cut of a sword.

The six skulls from the Chin Hills form a homogeneous group, and in their dimensions and relative proportions may appropriately be classed together.

In the glabello-occipital length the crania ranged from a maximum of 183 mm. to a

minimum of 173, and the mean length of the series was 176·8 mm. In their parieto-squamous breadth the maximum was 137 mm., the minimum was 129, and the mean was 132·5 mm. The mean length-breadth index of the group was 75·0. Three skulls had the index either 77·5 or 77·4, which placed them in that division of the mesaticephalic group which approached closer to the dolichocephalic than the brachycephalic standard. No skull was brachycephalic. Both in numerical proportion and in general shape these Chin crania may be regarded either as distinctly dolichocephalic or as approximating to that group.

In basi-bregmatic height the crania ranged from a maximum 136 mm. to a minimum 126, and the mean was 129·8 mm. The mean length-height (vertical) index was 73·4, so that the skulls belong to the group with a moderate vertical index, which I have named metrioccephalic.* In D and E the height slightly exceeded the breadth; in A they were equal; in the remaining three the breadth was more than the height.

The mean stephanic diameter, 106·6 mm., exceeded the mean asterionic diameter, 102·8 mm., and the mean minimum frontal diameter was 90 mm. The bizygomatic diameter, with a mean 127 mm., ranged from 117 to 139 mm., and invariably exceeded the intermalar diameter.

The occipital longitudinal arc in four skulls was less than either the frontal or parietal, but in F it was greater than either of these, and in C it was greater than the parietal. In five crania the frontal arc exceeded the parietal, and in B the parietal was the longer of the two.

The nasio-mental length of the entire face ranged from 105 to 111 mm., with a mean of 108·5 mm. The complete facial index ranged from 78·4 to 89·9, and gave a mean of 85·6, so that the skulls fall into the chamaeprosopic or low-faced group, not a single specimen was leptoprosopic. As regards the maxillary facial index the range was from 47·6 to 53·8, and the mean was 50·4; they were therefore leptoprosopic in the proportions of the upper face.

In four of the six skulls the basi-nasal diameter exceeded the basi-alveolar. The gnathic index ranged from 92·6 to 106·5, and the mean was 97·6; the majority were orthognathous or mesognathous, though C was prognathous.

The nasal index ranged from 46·9 to 54·3, and the mean of the series was 52·1, *i.e.*, mesorhine; individually, however, A was leptorhine, C, D, and F were platyrhine, and only two were mesorhine. The orbital index ranged from 78 to 97·2, and the mean was 90·2; the orbits therefore were generally megaseme, B only being microseme. The palato-maxillary index ranged from 109·6 to 133·3, and only one specimen was below 115; the mean was 122·3, which placed the palate well into the brachyuranic group.

The cubic capacity of the cranium in the five men ranged from 1270 to 1375 c.c.; thus there was only a small range of variation amongst them, and the mean, 1315 c.c., was distinctly microcephalic. The capacity of the skull in the specimen which I have regarded as a woman was 1200 c.c.

* *Challenger Reports*, part xxix. p. 5, 1884.

Although I have described the crania from the Lushai hill-tracts as a group separate from those collected in the hills occupied by the Chins, yet as the peoples known by these names, if not one race, have close affinities with each other, it will be instructive to look at the two series together.

Of the eleven skulls under observation four had a length-breadth index below 75, five were between 75 and 77.5, and two from the South Lushai hill-tracts were above 80; the mean of the series was 76.1. If the two brachycephalic crania are excluded the mean of the rest is 74.6, so that the skulls are in the main dolichocephalic, or approximating thereto in their numerical index as well as in their general form. In three of the skulls the length-height index was slightly above the cephalic, in one they were equal, but the mean vertical index of the series was 73.78; on the whole, therefore, in these skulls the breadth exceeded the height. The mean stephanic diameter was 107.6, whilst the mean minimum frontal breadth was only 90.

If we take the figures suggested by Sir WILLIAM H. FLOWER * as limiting the three divisions of the gnathic index, two skulls were prognathous, three were mesognathous, the rest orthognathous; and as the mean of the eleven crania was 97.8, orthognathism is apparently a preponderating character.

As the lower jaw was present in ten specimens the complete facial index was obtained. In only one skull was it below 80, in seven between 80 and 90, in two above 90; the mean of the series was 87.5, which places them in the chamæprosopic or low-faced group of Kollmann. The upper facial or maxillary index is on the average 51.5.

The width of the anterior nares was moderate in relation to the height of the nose, the nasal index was leptorhine in only two specimens, in four it was platyrhine, in the others mesorhine; the mean of the eleven crania was 51.3, *i.e.*, mesorhine; the bridge of the nose was concave and feeble above and tilted forward below, but the face must have been flattened in this region. The height of the orbit was considerable in relation to the breadth, and the mean index was 89.9, *i.e.*, megaseme. The palato-maxillary breadth was great in relation to the length, and the mean index was 122, so that the skulls were in the brachyuranic group; no specimen was dolichuranic.

The mean cubic capacity of the crania of nine men was 1353 c.c., which places them on the confines of the microcephalic and mesocephalic groups.

To summarise the characters of the crania of the natives of the Lushai-Chin hills, one may say that in the main they are dolichocephalic: as a rule the breadth of the cranium exceeds the height; the upper jaw is orthognathic; the face is low, chamæprosopic; the nasal width is moderate in relation to the height, mesorhine; the height of the orbit approximates to the breadth, and the index is megaseme; the palato-maxillary breadth is wide in relation to the length, brachyuranic; and the cranial capacity is moderate.

* *Catalogue of the Museum of the Royal College of Surgeons*, p. 252. 1879.

Tonkal Nágás. TABLE II.

In 1893 a box reached me from Surgeon-Lieutenant-Colonel F. W. WRIGHT, D.S.O., containing eight skulls which he had collected in the house of a Tonkal Nágá, in the upper village of Hwining, situated about 6000 feet above the sea-level in the hills some forty miles north-east of Manipur. The occasion which led to an expedition being sent into the hills was a raid by the "Kukis" on the Nágá village of Swemi, situated some 7000 feet above sea-level, and about 70 miles north-east of Manipur. The people of Hwining, although themselves Nágás, had joined the Kukis in the raid on villages of their own tribe.

Dr WRIGHT also wrote a most interesting letter, in which he informed me that there are two villages at Hwining, an upper and a lower, built on the crest of a spur running from about south-west to north-east, and at the south-west end is the upper village. The villages are separated by about half a mile of uneven ground, and their inhabitants used to fight with each other, and take each other's heads. As it is not the custom of the Tonkal Nágás to preserve the heads of friends and relatives, but to bury their dead close to their houses, the skulls collected had evidently been those of persons murdered or killed in battle, and afterwards preserved. Dr WRIGHT found these skulls fixed as trophies to a board on the wall of the front room facing the entrance to a house. He believes them to be the skulls of Tonkal Nágás, as Hwining is surrounded by Tonkal villages, with which it was, and indeed in some instances is, still at feud; possibly they are skulls of the Nágás of the lower village of Hwining. The head of a woman is as much prized as that of a man, for as women do not go far away from their homes, the captor requires to approach close to the hostile village, and puts himself therefore into greater danger in order to secure the head.

*The Nágas of the
Jairpur district
do sometimes
decorate & preserve
the skulls of their
own dead.
(see Journ. Anth.
Inst. 1882, p. 2)*

From the very instructive account of the Nágás with which Dr WRIGHT has favoured me I make the following extract:—

"The hills north-east of Manipur range in height from 3000 to 7000 feet. They are clothed with forests, and abound in game. The human inhabitants are Nágás and Kukis. Both are savage tribes, and go about nearly naked, but the women are more clothed than the men. They make clearings in the forests and grow crops of rice, Indian corn, etc., and from the rice they make a fermented liquor called 'Zoo,' which is not unlike a rough kind of cider. The Nágás are the indigenous natives, and reside permanently in one place, and live in huts on the tops of the hills, where they can command a view of the approach of their enemies. The Kukis have immigrated from the south from the hills between Manipur and Burma. They are not settled in their habits, but make from time to time new clearings, so that they are very destructive to the forests, and raid the Nágá villages and kill the inhabitants. Both Nágás and Kukis eat the flesh of pigs and other animals. It is said that a Nágá gives a good meal of rice to a dog, then kills and roasts it, and makes a meal of dog, stomach and rice.

Neither Nágás nor Kukis drink milk, which they look upon as an excrement.* Their native weapons are bows, spears and poisoned arrows; the poison is said to be aconite. They are now using guns, and employ urine and fæces in the manufacture of gunpowder. They are demon worshippers. They seem to have slaves, and in both the Nágá and Kuki villages there are head-men or village elders, though in theory all the men are equal. Both Nágás and Kukis make very good coolies, but the Nágá is preferred, as he is both cheerful and enduring."

"In the Nágá houses the wall of the front room facing the entrance is decorated with the heads and bones of the animals killed for food and in the chase. Heads or horns of the Sambre deer, mithan buffalo, pig, barking deer, bear, dog, porcupine, and capricorn were recognised. Outside the entrance of the house of a head-man a small grove of dead trees is sometimes seen. Each tree signifies a big feast, the trees being set up as monuments of the head-man's hospitality. They are also used incidentally for the growth of orchids. The Kukis do not set up monuments of dead trees, but they fix trophies of the skulls and horns of animals at the entrance to their houses.† A Kuki warrior therefore can point to the human skulls in his house as evidence of his cunning and bravery as a head hunter, and to the crania of the large mammals as testifying to his success in the chase and to his hospitality."

"The Nágás shave the head, but leave a crest of hair in the middle of the crown from front to back, which ends in a lock hanging down behind. The Kukis do not shave the head. Neither they nor the Nágás have hair on the face. The Tonkal Nágás wear a ring made of bone, or ivory, or porcelain, around the middle of the penis, and it appears to be a mark of bad manners to appear without the ring."

When the expedition occupied the Kuki village of Mougham some recent scalps were noticed on a tree near the chief's house in the highest part of the village. On examining them more closely they were seen to consist not only of the scalp but of part of the skull, the top of which had been cut off and the bone pierced with a spear. They were trophies of the raid on the Nágá village of Swemi. The Political Agent told Dr WRIGHT that in the Nágá villages the young men sleep together in a house of their own, but he is not sure if a similar arrangement is provided for the young women, though he thinks that it is so.‡

The skulls of the Tonkal Nágás were all from adults, though one was aged, and in two specimens the upper wisdoms were not erupted. Six were without

* Miss Mary H. Kingsley (*Travels in West Africa*, p. 451, London, 1897) states that the West Coast Africans have a horror of the idea of drinking milk, and hold it as a filthy habit.

† In some of the Pacific Islands, as in the Solomon group, human skulls and those of pigs, dogs, and dugongs are preserved in and around the Tambu house, and the practice of preserving and decorating the skulls of relatives and enemies alongside of the skulls of animals prevails extensively in New Guinea.

‡ The custom of providing a separate sleeping house in each village for all the unmarried girls and another for all the young men prevails generally amongst the races to the north-east and south of Assam (S. E. Peal in *Journal Asiatic Soc.*, Bengal, vol. lii. part ii., 1883). A similar practice also exists amongst the Khonds, a hill tribe in the Indian peninsula (R. W. Frazer, *Silent Gods and Sun-Steeped Lands*, London, 1895). It is also the custom with some of the tribes in New Guinea and other islands in Polynesia.

doubt those of men, one a woman, and one was more doubtful, though most probably a man.

Each of these skulls was enclosed in an open basket-work frame of split cane. In the greater number two parallel bands of cane were bent antero-posteriorly and mesially around the base of the skull to the occiput, vertex, forehead and face, including the lower jaw. These longitudinal bands were intersected and knotted to a band which passed around the skull in its vertical transverse circumference. A vertical transverse band of cane had been passed below the angles of the lower jaw and was secured to the zygomata. A decorative feature in each orbit consisted of a strip of cane rolled once or twice around the interior of the chamber near the facial orifice; so as, when seen at a short distance, to simulate an eye. The skulls had been dried with the scalp on, but the hair had been removed. In three specimens the base of the skull had been partially broken away, doubtless to assist in the extraction of the brain, so that the determination of the capacity of these crania was only approximative. The heads had been exposed to smoke, and were more or less blackened. The scalp and the basket-work had to be removed in order to examine the crania and take the measurements; but the basket-work was subsequently replaced.

Norma Verticalis.—From this aspect the series of skulls did not present a uniform appearance. The woman's and four men's, D, E, F, G, were elongated and more or less ovoid, with vertical sides and a tendency to a sagittal ridge, from which the skull sloped rapidly downwards and outwards to the parietal eminences; in E, F, and H the crania had an "ill-filled" character. In the other three male skulls, A, B, C, the breadth was proportionately greater in relation to the length, so that the form was not so elongated an ovoid as in the other specimens; the vertex also had not the same tendency to be ridged, and the slope outwards to the parietal eminences was not so steep. One skull was phænozygous, but in the majority the zygomata were concealed in the vertex view; the condition in G could not be ascertained, owing to the zygomata being broken, but from the wide stephanic diameter it would probably have been cryptozygous.

Norma Lateralis.—In none of the skulls were the glabella and supra-orbital ridges very prominent, and they were best marked in the skull A, which was metopic. The forehead was almost vertical; the arch of the vault was moderate, and the slope backwards into the occipital region was as a rule gentle, and in A, B, and C, that is, in the more brachycephalic crania, the occipital squama projected in all behind the inion; there was no sign of parieto-occipital flattening. As a rule the skull rested behind on the cerebellar part of the occiput, and in five of the skulls the parietal arc was somewhat longer than the frontal. In all, the occipital arc was less than the frontal, and in only one specimen did it exceed the parietal. The face was flattened in the nasal region, and the osseous bridge of the nose was slightly concave and not projecting. The nasal bones were relatively narrow, the fronto-nasal suture was not depressed. The nasal spine of the superior maxillæ was faint; a fairly-defined ridge demarcated the incisive

TABLE II.

Tonkal Nágás, Hwining. Nepal.

EDINBURGH UNIVERSITY ANATOMICAL MUSEUM.									
	Metopic.								Par- battia. Gurung. Nepal.
Collection,	A.	B.	C.	D.	E.	F.	G.	H.	
Age,	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.
Sex,	M.	M.	M.	M.	M.	M.	M.	F.	M.
Cubic capacity,	1565	1455	1520	1520ap.	1395ap.	1455	1600ap.	1250	1655
Glabello-occipital length,	188	171	177	182	180	183	186	174	168
Basi-bregmatic height,	137	136	136	...	...	137	138	132ap.	144
Vertical Index,	72.9	79.5	76.8	...	...	74.9	74.2	75.9	85.7
Minimum frontal diameter,	103	93	98	97	88	97	97	85	97
Stephanic diameter,	111	111	109	110	110	107	120	102	121
Asterionic "	110	97	109	107	115	106	120	108	109
Greatest parieto-squamous breadth,	145	140	145	132	135	134	140	130	152s.
Cephalic Index,	77.1	81.9	81.9	72.5	75.	73.2	75.3	74.7	90.5
Horizontal circumference,	535	500	516	510	505	514	528	488	507
Frontal longitudinal arc,	134	120	125	122	134	133	134	120	137
Parietal " "	120	130	128	127	133	131	138	121	128
Occipital " "	125	110	109	121	115	116	...	...	108
Total " "	379	360	362	370	382	380	...	...	373
Vertical transverse arc,	302	308	301	301	302	298	306	291	325
Length of foramen magnum,	35	37	37	...	...	32	...	...	36
Basi nasal length,	106	96	101	...	...	102	100	...	97
Basi-alveolar length,	99	93	87	...	...	100	93	...	90
Gnathic Index,	93.4	96.9	86.1	...	...	98.	93.	...	92.8
Interzygomatic breadth,	146	131	137	...	127	140	131	122	141
Intermalar " "	132	121	123	120ap.	116	124	114	115	122
Nasio-mental length,	119	118	114ap.	107	115	117	111	115	
Nasio-mental complete facial Index,	81.5	90.	83.1	...	90.5	83.5	84.7	94.2	
Nasio-alveolar length,	71	72	72	67	67	70	66	68	46
Maxillary upper facial Index,	48.6	54.9	52.5	...	52.7	50.	50.3	55.7	46.8
Nasal height,	53	53	57	58	50	54	50	50	51
Nasal width,	28	26	25	27	26	29	26	24	21
Nasal Index,	52.8	49.1	43.8	46.5	52.	53.7	52.	48.	41.2
Orbital width,	42	37	42	40	36	37	38	33	39
Orbital height,	36	35	38	37	35	34	36	30	36
Orbital Index,	85.7	94.6	90.5	92.5	97.2	91.9	94.7	90.9	92.3
Palato-maxillary length,	51	55	46ap.	52	48	56	46	52	51
Palato-maxillary breadth,	67	66	59ap.	63	65	67	66	69	68
Palato-maxillary Index,	131.3	120.	128.2	122.1	135.4	119.6	143.4	132.6	133.3
Lower jaw. { Symphysial height,	28	28	33	30	30	31	28	32	
{ Coronoid " "	62	66	67	57	60	61	57ap.	56	
{ Condylod " "	64	68	65	65	58	64	59	58	
{ Gonio-symphysial length,	84	74	89	88	92	92	82	88	
{ Inter-gonial width,	97	90	105	...	107	102	...	100	
{ Breadth of ascending ramus,	36	36	35	36	40	36	30	33	

part of the upper jaw from the floor of the nose; the canine and incisor fossæ were moderate in depth, though in the aged skull they were deeper. The jaws were not prognathic; the orbits were high in proportion to their width. The teeth were deeply stained, and as a rule free from decay, though in the older skulls they showed evidence of wear, and in the aged specimen they had almost all been shed and the sockets absorbed. The sutures in the aged skull were almost obliterated, and in some of the other crania they were also disappearing. The mastoid processes were moderate, the temporal and occipital ridges were fairly marked. The palate was arched and horseshoe shaped. The external meatus was free from exostoses. No third condyle or paramastoid process was seen, but in one specimen each external pterygoid plate sent a spur-like process backwards which did not reach the spine of the sphenoid. In one skull the infra-orbital suture was seen.

In three specimens small Wormian bones were in the lambdoidal suture. The breadth of the parieto-sphenoid suture varied from 3 to 12 mm. In the right pterion of two specimens, F and G, an epipteris bone was seen, and in the left pterion of both of these skulls a tongue-shaped process of the squamous temporal articulated with the frontal; in the skull F this process was so broad as to separate the ali-sphenoid from the parietal by an interval of 17 mm.

The eight skulls of the Tonkal Nágás varied in maximum length from 171 to 188 mm., with a mean of 180 mm. In their greatest breadth the range was from 130 in the woman to 145 mm. in the broadest-headed man, and the mean was 137.6. The mean cephalic index of the series was 76.4, *i.e.*, mesaticephalic; two of the crania were brachycephalic, four were dolichocephalic, and the remaining two were in the lower half of the mesaticephalic group.

The crania ranged in basi-bregmatic height from 132 to 138 mm., with the mean 136 mm., and the mean vertical index was 75.7, which is moderately high. In two specimens the vertical index was slightly above the cephalic, but the opposite condition was the rule.

The mean stephanic diameter, 110 mm., slightly exceeded the mean asterionic, 109 mm., and both were considerably higher than the mean minimum frontal diameter 94.7 mm. The bizygomatic diameter, with a mean of 133.4 mm., ranged from 122 to 146 mm. In each skull it invariably exceeded the intermalar diameter.

The mean complete facial index was 86.7, *i.e.*, chamæprosopic, whilst the proportions of the upper face gave an index 52, or leptoprosopic. In the five skulls in which the dimensions could be taken the basi-nasal diameter exceeded the basi-alveolar, and the mean relative index, 93.5, was orthognathous.

In the nasal index two skulls were leptorhine, five were mesorhine, and only one was platyrhine; the mean index of the series was 49.7, or mesorhine. The mean orbital index was 92.2; the orbit, except in one skull, was megaseme, and with no great difference between the breadth and height. The mean palato-maxillary index was 128.9, and every skull was brachyuranic.

The seven male skulls had a mean internal capacity 1501 c.c., whilst the single woman's skull was only 1250 c.c.

Up to this time very few examples of the skulls of the natives of the Nágá Hills have been deposited in Museums. The specimens sent home by Surgeon-Lieutenant-Colonel WRIGHT form therefore an important addition to the material collected for the investigation of their cranial characters. In the Barnard Davis collection, now in the Museum of the Royal College of Surgeons of England, are three Nágá crania;* and a fourth specimen from Ninu, in the Patkoi Mountains, has subsequently been acquired by the College. These, together with a fifth specimen, collected by Colonel WOODTHORPE in the Patkoi Mountains, have been described by Professor G. D. THANE,† who looks upon three as those of men and two those of women. They are all adult, but not aged. Two were decorated: one with wire passed through the orbits and zygomata, which supported fragments of shell as well as some small bells; the other having rings of thick wire placed through the zygomatic arches, orbits and nasal cavities.

Both in Professor THANE's series and in mine the skulls had a certain smoothness of surface, owing to the muscular ridges and processes possessing no special prominence, and the forehead was almost vertical. His specimens were, however, shorter than mine, for though the mean height and breadth were almost identical in the two series, the mean length of THANE's specimens was 4 mm. less than in mine. In both sets the mean cephalic index was mesaticephalic; but in THANE's series owing to the diminished length it was 78.1, being 1.7 higher than in mine; taking both series together the mean cephalic index in the thirteen Nágá skulls was 77. The mean vertical index in THANE's specimens was 78.4, which was appreciably higher than in mine, and the mean of both series was 76.9, so that the mean breadth very slightly exceeded the mean height in the two groups. The crania may be regarded as hypsicephalic.

In Professor THANE's series the mean gnathic index was 98.6, but in mine it was much lower, 93.5: the mean of both series was 96, i.e., orthognathous. In his specimens the mean nasal index was 53.3, in mine 49.7, but the mean of the two was 51.1, i.e., mesorhine: the anterior nares therefore are moderately wide in relation to the height. In his crania the mean orbital index was 88.5, in the higher term of the mesosome series; but in mine they were definitely megaseme, so that in the people generally we may say that the height of the orbit approaches its width. In both series of skulls the palate was wide in relation to its length, and the index was brachyuranic.

In THANE's specimens the mean interzygomatic diameter was 129.7, but in mine it was 133.4, and as five of my skulls exceeded in this dimension the mean of his collection, it follows that they had greater breadth in the facio-zygomatic region.

The three male skulls in Professor THANE's series ranged in their cubic capacity from 1300 to 1400 c.c., with a mean of 1377 c.c., whilst the mean capacity of the two women was 1237 c.c. In my series, only one skull apparently was that of a woman

* *Thesaurus Craniorum*, p. 173; and *Supplement*, p. 88.

† *Journal of the Anthropological Institute*, vol. xi. p. 215, 1882.

with a capacity of 1250 c.c., whilst the mean of the seven men was 1501 c.c., which is much above the average of savage or barbarous people, corresponding indeed to the European mean. If THANE's males are, however, computed along with my series of males, the mean capacity is reduced to 1464 c.c., a measurement which is also high for a tribe of savages.

In the preceding narrative it will have been noticed that explorers in the hill ranges occupied by the Lushais (Kukis) and Nágás have recognised differences in the physical characters of these people. Sir JAMES JOHNSTONE, for example, definitely states that they are readily distinguishable from each other. There is, however, a general consensus that their narrow oblique eyes, flat broad faces, high cheek bones, flat noses, skin of various shades of brown, inclining sometimes to copper colour, long straight black hair, and scanty beard and moustache, are Mongolian characters. Colonel LEWIN, however, in both his works asserts that the Lushais do not exhibit the Mongolian type of feature, and he compares them with Portuguese half-castes. WOODTHORPE speaks of some of the Angami Nágás as having aquiline features and a complexion so fair that the cheeks show a ruddy glow.

It would seem, therefore, whilst the Mongolian type of feature prevails, that departures from that type do occur with sufficient frequency to be noticeable. The study of the skulls proves that they also possess some diversities of character. Though the majority of specimens in the Chin-Lushai group and in the Nágás were dolichocephalic or approximated thereto, in both the Lushais and Nagas two distinctly brachycephalic crania were met with, though in the series of Chins 77.5 was the highest index of breadth. Both groups, however, were alike in the absence of a marked projection of the upper jaw: in both, the face was wide in relation to its height, and the complete index was chamaeprosopic; the nose was not prominent, and the mean nasal index in both groups was mesorhine and the orbital index was megaseme. Their facial characters were therefore closely allied, and testify to a corresponding physiognomy. As regards the breadth of the face, the mean interzygomatic diameter of ten Lushai-Chin skulls was 127.7 mm., and that of seven Nágás was 133 mm., as compared with 130.6, the mean of the same diameter in thirteen Chinese crania in the collection, and 131.5, the mean of four Siamese skulls. The Nágás, therefore, in absolute width of face surpassed the Chinese and Siamese which I have measured. In the Nágás the mean capacity of the crania was distinctly higher than in the Chin-Lushai series.

As the best marked Mongolian races are either definitely brachycephalic or in the higher terms of the mesaticephalic group, it is interesting to note that these hill tribes, with a prevailing type of Mongolian feature, possessed crania in which brachycephalism is the exception, and where the customary form of skull is dolichocephalic or approximating thereto. It would seem, therefore, that the Mongolian character of face is not necessarily associated with only one type of cranium.

Nepal. TABLE II.

More than thirty years ago the late Sir JOHN BROWN, of the Indian Medical Service, presented to the Anatomical Museum of the University, a skull without the lower jaw, which he had found in the valley of Nepal. He believed it to be that of a Gurung or Magar, and it is marked, apparently in his own handwriting, Parbuttia, which signifies hillman. Surgeon-Lieut.-Colonel REID states* that the Gurungs and Magars occupy the country to the west of the Nepal valley. They are, he says, short and powerful men of Mongolian cast of features, with broad flat faces and oblique eyes. They form the Gurkha regiments in the British army in India.

The skull is obviously that of a man not thirty years of age, for the upper wisdom teeth were not erupted. The sutures were unossified and comparatively simple. The squamous-temporals were small, but the ali-sphenoids were wide, and each had a broad articulation with the parietal at the pterion. The mastoids and the temporal and occipital ridges were feeble, and there were no unusual ossifications.

In the *norma verticalis* the breadth of the cranium approximated to the length. The parieto-occipital region was almost vertical, flattened and unsymmetrical, the flattened surface being directed to the right. Sir JOHN BROWN ascribed the shape of the skull behind to the mother, as she carried her infant, having kept this aspect of the head pressed against some part of her person. The vertex was not ridge-like, the parietal and frontal eminences were distinct, the parieto-squamous region bulged laterally. The length-breadth index was 90.5, and the skull was hyper-brachycephalic. The height was materially less than the breadth, notwithstanding that the basi-bregmatic diameter was as high as 144 mm. The skull was cryptozygous.

In the *norma lateralis* the glabella and supra-orbital ridges were seen to be feeble, the forehead was lofty and not very receding. The frontal longitudinal arc was much the longest and the occipital the shortest. The bridge of the nose was almost straight, sharp, and moderately projecting, and there was scarcely any fronto-nasal depression. The nasal spine of the superior maxillæ was distinct, and a sharp ridge separated the floor of the nose from the incisive region. The nasal index was markedly leptorhine. The interzygomatic diameter was 141 mm., so that the face was unusually wide. The orbital index was strongly megaseme. The upper jaw was not prognathic. The palate was not highly arched, and as its breadth materially exceeded the length it was highly brachyuranic. The internal capacity was 1655 c.c. and the skull was megacephalic. In its brachycephalic form and proportions, in the breadth being less than the height, the flattened nasal region, the broad face, the slight forward projection of the upper jaw, megaseme orbit, and brachyuranic palate, the cranium exhibited well defined Mongolian characters.

Sir R. OWEN has given the measurement of a skull of an adult male Gurung† in

* *Chin-Lushai Land*, p. 72. 1893.

† Owen, *Rep. Brit. Assoc.*, 1859, p. 100.

the British Museum, the length of which was 7 inches and the breadth 5 in. 8 lines : the length-breadth index may be regarded as 81·4. Other crania from Nepal had different proportions. From the measurements which he has recorded of two Magar skulls it is probable that in this race the crania are dolichocephalic. A skull from Nepal, figured by MM. DE QUATREFAGES and HAMY,* plate lxii., is elongated in form, and with a length-breadth index 75·5. Dr BARNARD DAVIS catalogues, *Thesaurus Craniorum*, p. 158, seven crania from Nepal, which he names Khas. The length-breadth index varied in them from 73 to 78, and gave a mean 75·7. The skulls were either dolichocephalic or mesaticephalic. In the anthropological tables compiled by Mr H. H. RISLEY† the mean cephalic index in 28 living Gurungs is stated to be 81·6, and the nasal index in the same persons was 78·5. The heads were brachycephalic, and the nose was mesorhine. The average stature was 5 ft. 2 $\frac{3}{4}$ in. (159·8 mm.). It would appear, therefore, that the people of Nepal are not a homogeneous race. A strong Mongolian element, however, exists in that country, as is shown both in the skulls and heads of the Gurungs which have been measured.

BURMA.

The inhabitants of Burma consist in the main of the people termed Burmese, but intermingled with them are representatives, sometimes in considerable numbers, of other tribes and races. The Burmese proper are in all probability of the same stock as the Himalaya-Tibetan people, offshoots of which race migrated, it is believed, in a south-easterly direction until they reached Burma. How far the country was populated by aborigines, prior to and at the time of the invasion, it is impossible to say. It is, however, thought that the district forming the delta of the Irrawaddy was occupied by a people named Mòns or Talaings, whose descendants remain more or less commingled with the Tibeto-Burmese stock. The Burmese proper, according to the census return for 1891, were 9,000,000, whilst the Talaings were not quite 1,000,000 in number.‡

Partly on the confines of and partly within the Burmese territory are other races, which in their respective districts modify the population. To the east are the Shan states ; to the northward are Manipur and the Nágá hills ; to the north-west the Lushai-Chin hill ranges, the people of which were described in an earlier chapter of this memoir ; and to the east of Lower Burma are the Karens, who constitute an important element in the population.

The Shans, according to the census returns for 1891, were about 180,000 in number in Upper Burma, and about 108,000 in Lower Burma. The Chins, under which term the census report includes apparently also the Kukis (Lushais) and Nágás, were 206,000.

* *Crania Ethnica*, p. 416.

† *Tribes and Castes of Bengal*, Calcutta, vol. i. pp. 232 and 220. 1891.

‡ The above figures are compiled from the Census of 1891, *Report on Burma*, prepared by Mr H. L. Eales, the Provincial Superintendent, Rangoon, 1892.

The Karens numbered about 1,000,000. In addition to these races, natives of India, Malays, Chinese and Europeans were also represented.

The Burmese proper are people of moderate stature. In the lists which accompanied the valuable series of crania of prisoners who had died in the jail at Insein, for which I am indebted to Surgeon-Major BELL, the stature of each person is given in feet and inches. They were all men. The mean stature was 5 ft. 2 $\frac{3}{4}$ in. The tallest man, Nga Aung Myat, a native of Yebouk, was 5 ft. 7 in., and the shortest, Nga Pe, a native of Sharsayboo, was 4 ft. 9 $\frac{1}{2}$ in.; whilst another, Nga Pu, born at Aungmyingain, was 4 ft. 11 in. Seven measured from 5 ft. 5 in. to 5 ft. 6 in., and the others were between 5 ft. and 5 ft. 4 in. The Burmese men are thick-set, muscular, and active. The skin in the higher classes is a light olive-brown, but a darker brown in those people who are much exposed to the sun. The hair is black and straight, abundant on the head, but scanty on the face. The face itself is broad and flattish, the nostrils are usually spread out laterally and the nose is short. The eyes are wide asunder and inclined to be oblique and almond-shaped. The lips are not thick and projecting as in the negro.

The Karens consist of three divisions,* the Pghos (Pwos), who are found along the sea-board of Tenasserim from Moulmein to Tavoy and Mergin; the Chghaws (Sgau), who occupy the hills and jungles of the lower part of the Irrawaddy river, in the district of Henzada on the right bank, and those of Prome and Shwegyin on the left bank, as far east as the Salween river. The Bghai (Bwi) division are found in the Toungoo hill-tracts which lie to the east of Prome. Mr SMEATON says that the Karens are short in stature, but broad and muscular. A Karen man from the Toungoo district who died in the jail at Insein, and whose skull was presented to me by Major BELL, was 5 ft. 1 $\frac{3}{4}$ in. high. The skin is naturally fair, like that of the Chinese, and the features of those of pure blood are, according to Mr SMEATON, Caucasian in type. The hair is black and straight; the eyes are black, though in the north brownish hair and hazel eyes are sometimes found. It is difficult to give the original home of the Karens. The prevailing opinion, however, is that they left the borders of Tibet and passed through Western China on their way to Burma.

The Shans (Htai or Tai, to employ their own name), on the eastern frontier of Burma, are divided into the Chinese Shans, the Salween Shans and the Siamese Shans. They form a number of tribes, which occupy the hill-ranges, elevated plateaus and valleys of the extensive tract of country in which they dwell.† They present differences in their physical characters in different districts. Dr ANDERSON states that the Shans dwelling in the valleys have the sallow tint of the Chinese, usually with red cheeks, dark brown eyes, black hair, face generally rather short, broad and flat, cheek bones prominent, a faint obliquity and contraction of the outer angle of the eyelids as in the Chinese. The

* *The Loyal Karens of Burma*, by D. McKenzie Smeaton. London, 1887.

† The Shan country has been visited by many travellers. The works that I have consulted are Dr John Anderson's *Expedition to Western Yunan*, 1871; *Report on Administration of Shan States for 1889-90 and 1892-93*, by J. G. Scott; *Census of Burma*, 1891; Colonel Woodthorpe in *Journ. Anthropol. Inst.*, August 1896, vol. xxvi. p. 13; *From Tonquin to India*, by Prince Henri d'Orleans, 1898.

nose is well formed, not so broad and depressed as in the Burmese, and the bridge is usually prominent, almost aquiline. In the higher ranks the features are, he says, decidedly Tartar. The Hill Shans (Poloungs) have darker skins and are shorter than the Shans of the valleys, the average height of the valley men being 5 ft. 8 in. or less. The Chinese Shans are described as resembling Laplanders in their squat figures, broad, short, round, flat faces, and prominent cheek bones. Like the Nágás, they do not drink milk.

Mr SCOTT, in his account of the Keing Tung Shans, says that in stature and complexion they do not differ materially from the Western Shans. The nose, though small, is straight and not flattened out or button-shaped, and without a bridge, as in the people west of the Salween river. Of the hill races the Kwi are short in stature, and grow the hair to its full length. The Leu tribe, again, cut the hair short except a short tail. He speaks of a tribe as the wild Wās, who treat the hair like the Leus; whose skins are as dark as negroes or negritos, and who go naked or nearly naked. They decorate their villages with the skulls of animals, as well as with human skulls, for the people are head-hunters. The wild Wa country is a little to the south of 23° lat., and a little to the east of 19° long.

As a rule the Shans are civilised. They are Buddhists, and although not so prominent a political power as they were some centuries ago, they are organised into principalities. They are agriculturists and traders, weavers, dyers and expert workers in metals. They are properly clothed, and construct houses, monasteries and temples. Notwithstanding the differences observed amongst the tribes, it is obvious that the Mongolian cast of features is the prevailing type. They have Chinese affinities in both physical characters and language, and it seems probable that they have migrated from Western China.

The Southern or Siamese Shans have both a political and philological affinity to the kingdom of Siam. The form Siam is a corruption of the French method of writing Shan or Scian, and the original monosyllabic term has been converted by them into a word of two syllables.*

I have had the opportunity of examining forty-four skulls collected in different parts of Burma, almost the whole of which are in the University Museum.

In 1889 my friend and former assistant, Surgeon-Major WM. B. BANNERMAN, who was attached to the military expedition to Upper Burma, presented me with the skulls of two Dacoits.† The one, an old man, was the leader of a band in the Ye-U district, and was shot by the military police at Mugan; his head was brought into the village of Ye-U for identification in August 1888. The other, named Pau-dun, was hanged for murder at Ye-U in June of the same year. Dr BANNERMAN states that the people in the Ye-U district have, as a rule, the bridge of the nose flattened with the point turned up, and with wide nostrils. The eyes have the Mongolian cast, the cheeks are broad, the hair is black, long and straight, the skin yellow, and with scarcely any hair on the face

* *Report on Census of Burma*, 1891, p. 201. Rangoon, 1892.

† The Dacoits were the disbanded troops of King Thebaw's army. They were not hillmen, but Burmese.

except a lanky moustache. They are muscular, active, and under the average height of Europeans. The religion is Buddhist. From personal observations on infants and young children, Dr BANNERMAN has seen no evidence of modification from artificial pressure of the skull.

Another skull from Upper Burma, obtained at Mahlaing, Meiktila district, and said to be that of a Dacoit, was presented by Dr GEOFFREY H. PRANCE.

In the summer of 1895 I received from my friend and former assistant, Surgeon-Major G. J. H. BELL, a box containing the crania of sixteen men who had died in the central jail, of which he is the superintendent, at Insein, in Lower Burma. In 1897 the same gentleman forwarded to me a series of twenty skulls from this prison. The skulls were accompanied by explanatory lists, from which it appeared that thirty-two were Burmese, one was a Karen, one a Shan, and one a Mohammedan from Ralum, Akyab. Another, a Hindoo from the Coromandel coast, is not included in the following description. The name, jail number, sex, age, height, birthplace, crime for which imprisoned, and cause of death were given in the lists. To each specimen was appended a metal plate stamped with the jail number, the period of imprisonment, etc., which, I understand, it is customary for each criminal to wear suspended with a string around the neck. All the Burmese names have the prefix Nga,* a term employed by a superior when addressing one of much inferior social status. In more than one instance the cranial and dental characters did not correspond with the age of the person having the jail number specified in the lists, so that either the criminal had mis-stated his age, or the attendant employed to clean the specimens had not been sufficiently careful to attach the proper metal plate to the skull.

Early in 1896 I received from Surgeon-Captain J. M. CRAWFORD the skull of Nga Pota, æt. 32, a Burmese prisoner who had died in 1895 of phthisis in the jail at Benares when under Dr CRAWFORD's charge.

In March 1897 Miss VIOLET G. S. ADAMS presented to the Museum two skulls which had been dug up in an old cemetery in Upper Burma. They had the appearance of buried bones which had lost much of their organic matter. One, an adult, had female characters; the other was a male somewhat advanced in life.

In the collection of the Henderson Trust, now in the University Museum, is a skull, No. 158, presented in 1827 by Mr GEORGE LYON, who procured it from Ava proper in Upper Burma. A second specimen, No. 159 in the same collection, is also said to be from Burma, but the precise locality is not stated.

Through the courtesy of Professor D. J. CUNNINGHAM I have been able to examine the skull in the museum under his charge of a Shan, Nga To, from the Insein jail.

In the following description I have arranged and compared with each other in Part I. thirty-seven skulls which were marked Burmese by the collectors.† The

* In the Abor Miri group of the Tibeto-Assam languages, Ngá is the personal pronoun (see Report on *Census of Assam*, 1891, p. 183).

† Shan Gyi and San Min from the Insein jail were both catalogued as Burmese; their measurements are given in Table VI.

Burmese crania from the prison of Insein are those of men. They are mostly in the prime of life, although three present marks of age, and one is said to be only eighteen years old. The other Burmese crania are also of the male sex; one is an old man, one is said to be twenty-one years of age, the other three are adults.

Part I. TABLES III., IV., V., VI.

The skulls in this series gave, without doubt, a fair representation of the type met with amongst the male natives of Burma.

Norma Verticalis.—When arranged side by side on a table and examined from the *norma verticalis*, this series of skulls from Burma could be arranged in two more or less clearly defined groups. The one, which I shall designate Group A, included skulls, generally of a rounded form, and usually unsymmetrical in the parieto-occipital region, which, both from this character and from the steep vertical direction of the region in some of the specimens, gave evidence of the production of parieto-occipital flattening by artificial pressure applied during infancy. The unsymmetrical flattened surface in some specimens was directed obliquely to the right, in others obliquely to the left. In this group were a large proportion of the crania from the Insein jail, and five skulls not from that prison. All of these crania were brachycephalic, and several of them, as may be seen from the Tables, were hyper-brachycephalic. With three exceptions the vertex was not ridged in the sagittal region, nor did the vault slope rapidly downwards and outwards from the mesial suture to the parietal eminences. The curve of the vault in the vertical transverse direction from one parietal eminence to the other was not steep, and the skulls had generally a well-filled character.

The other Group, B, consisted of the remainder of the skulls from the jail at Insein. These had a more elongated form than those in Group A when examined from the *norma verticalis*. They did not show a definite want of symmetry in the parieto-occipital region, which, with one or two exceptions, was not so flattened and steep as in Group A, but sloped more gradually downwards and backwards into the occipital squama. As a rule these skulls did not reach the brachycephalic index, and they were usually longer than those in Group A. Two were dolichocephalic and elongated: one of these, San Min, with a length-breadth index 74, was said to be from the Southern Shan States, though marked Burman in the list sent along with the Insein skulls; the other, San Kun, with an index 74·9, was from the district of Monyo. In ten crania the cephalic index ranged from 75·3 to 79·5. In several the parietal eminences were prominent. Except in five crania there was no definite ridge in the sagittal line, and the slope outwards from it, as well as the curvature of the vault to the parietal eminences, was much the same as in Group A. As a rule the crania were cryptozygous both in A and B, but in some specimens in Group B the zygomatic arches could be distinctly seen from the *norma verticalis*.

Norma Lateralis.—In a few of the crania in both Groups A and B the glabella and supra-orbital ridges were moderately projecting; in others these ridges were so slight

as to be scarcely noticeable; but in none was the projection very strong. In one from the Insein jail an old depressed fracture was seen in the left frontal region just above the orbit; in two others from the same prison the frontal bone had been broken, and in a fourth the frontal and parietals had been extensively fractured during life. As a rule the forehead receded no more than one is accustomed to see in well-formed male skulls. The cranial vault was usually fairly well arched, and the parieto-occipital region showed the characters already described. In thirteen specimens the skulls rested behind on the tips of the mastoids, in the remainder on the cerebellar part of the occiput. In all the crania, with three exceptions, the occipital longitudinal arc was the shortest, and in most instances it was considerably below either the frontal or parietal. In twelve crania the parietal arc exceeded the frontal, and in three they were equal. The osseous bridge of the nose was often elongated, moderately projecting at its tip, and its outline was slightly concave. In the specimens with the projecting glabella the fronto-nasal suture was somewhat depressed, but the face did not show a marked flattening in the nasal region. The nasal spine of the superior maxillæ was, as a rule, only moderate, but in some skulls it was more strongly marked. A distinct ridge of demarcation separated the incisive region from the floor of the nose. In many of the crania the incisive region of the upper jaw was almost vertical, in others it projected slightly forward; it was exceptional to see a marked amount of alveolar prognathism. In some specimens the incisive and canine fossæ were deep. The orbits showed much variation in the relations of height and width.

In many of the crania the crowns of the teeth were flattened and much stained with betel-chewing. The palate was moderately arched; the mastoid processes, temporal and occipital ridges were not strong, as a rule, but in only a few specimens was theinion projecting. In a few of the crania the sutures were in process of obliteration, two skulls were metopic, the lambdoidal suture was usually free from Wormian bones, and in only two specimens were they numerous. The parieto-sphenoid articulation in the pterion was, as a rule, broad. Three skulls had an epipteric bone on one side, in one on both sides, and in two crania the squamous temporal articulated with the frontal on one side. No skull had an exostosis in the auditory meatus, but the left tympanic plate in one was much thickened at its free outer edge. In two skulls the external pterygoid plate was broadened backwards, but did not quite reach the spine of the sphenoid, so that the osseous boundary of a pterygo-spinous foramen was not completed. No skull had a third condyle, and in none was a para-mastoid process present, although in a few specimens the jugal process was tuberculated; an infra-orbital suture was occasionally seen. Variations from the normal ossification in this series of crania were therefore not common. As a rule the sutures of the cranial vault were simple in their denticulations.

The examination of the series of thirty-seven male skulls, and the study of their absolute and relative dimensions in certain diameters, as expressed in the tables of measurement, have given the following results.

TABLE III.

Burmese, from Insein Prison.

Province and Name.	Prome.					Tharrawaddy.					Hanthawaddy.			
	Maung.	Pyaw.	Shwe Hman.	Lu Ga Le.	Shwe Htun.	Po Nwe.	Shwe Gaung.	San Min.	Kwe Yoe.	Shwe Noe.	Ngwe Thee.	Po Tsan.	Kywet Oh.	Kya Huit.
Age,	23	Aged.	Aged.	18	40	29	30	32	23	72	20	30	33	Ad.
Sex,	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.
Cubic capacity, . . .	1460	1460	1460	1460	1290	1460	1460	1820	1270	1340	1540	1440	1440	1440
Glabello-occipital length, .	177	166	171	171	169	186	170	184	159	164	178	168	185	171
Basi-bregmatic height, .	141	142	135	127	130	139	133	144	128	138	138	141	135	131
Vertical Index, . . .	79.7	85.5	78.9	74.3	76.9	74.7	78.2	78.3	80.5	84.1	77.5	83.9	73.0	76.6
Minimum frontal diameter, . . .	101	94	88	93	87	93	87	96	89	92	96	98	99	92
Stephanic diameter, . .	113	113	92	105	103	109	109	120	110	111	112	106	114	112
Asterionic,	105	97	101	106	101	105	108	114	105	103	117	104	112	103
Greatest parieto-squamous breadth, . . .	143	150s.	134p.	140	140	140	142	153	142	139	148	145	147	141s.
Cephalic Index, . . .	80.8	90.4	78.4	81.9	82.8	75.3	83.5	83.2	89.3	84.8	83.1	86.3	79.5	82.5
Horizontal circumference, .	503	487	499	485	520	495	536	475	484	515	491	529	495	495
Frontal longitudinal arc, .	134	129	130	126	121	137	129	135	121	127	128	111	130	122
Parietal,	140	123	128	115	124	133	120	137	104	118	106	119	134	127
Occipital,	111	109	100	112	100	123	111	125	98	111	128	112	121	109
Total,	385	361	358	353	345	393	360	397	323	356	362	342	385	358
Vertical transverse arc, .	317	323	298	300	290	308	294	328	302	306	312	304	312	303
Length of foramen magnum,	34	32	33	36	35	33	35	37	38	33	38	36	33	35
Basi-nasal length, . . .	96	103	96	97	97	99	95	99	98	97	104	107	100	96
Basi-alveolar length, . .	97	102	93	98	93	97	88	100	93	...	98	101	101	91
Gnathic Index,	101.0	99.	96.9	101.0	95.9	98.0	92.6	101.0	94.9	...	94.2	94.4	101.0	94.8
Interzygomatic breadth, .	137	141	128	134	134	132	130	135	127	132	138	144	138	129
Intermalar,	123	124	122	120	118	117	115	121	112	121	124	128	127	119
Nasio-mental length, . .	117	122	117	112	117	120	118	114	113	103	115	114	120ap	106
Nasio-mental complete facial Index,	85.4	86.5	91.4	83.5	87.3	90.9	90.7	84.4	88.3	78.0	83.3	72.2	86.5	82.1
Nasio-alveolar length, . .	72	72	73	67	70	71	74	69	67	...	71	73	75	62
Maxillary upper facial Index,	52.5	51.	57.	50.	52.2	53.7	56.9	51.1	52.7	...	51.4	50.6	54.3	48.
Nasal height,	55	54	54	53	54	52	53	51	53	48	56	58	50	48
Nasal width,	22	26	27	25	25	26	21	27	22	25	23	28	26	23
Nasal Index,	40.0	48.1	50.	47.2	46.3	50.0	59.6	52.9	41.5	52.1	41.1	48.3	52.0	47.9
Orbital width,	43	42	39	38	39	39	37	38	40	38	41	42	43	39
Orbital height,	33	37	32	36	34	36	36	34	38	32	35	33	35	30
Orbital Index,	76.7	88.1	82.	94.7	87.2	92.3	97.3	89.5	95.0	84.2	85.4	78.6	81.4	76.9
Palato-maxillary length, .	56	57	57	51	53	54	52	57	49	...	51	65	59	50
Palato-maxillary breadth, .	63	70	61	67	64	65	66	66	55	64	64	69	70	61
Palato-maxillary Index, .	112.2	122.8	107.	131.3	120.	120.3	126.9	115.7	112.2	...	125.5	106.1	118.6	122.
Lower jaw.	Symphysial height, . . .	34	35	30	29	31	36	32	31	29	30	31	30	30
	Coronoid,	63	64	65	62	64	65	62	68	55	60	65	68	51
	Condylod,	65	64	65	60	63	68	65	63	60	60	63	67	53
	Gonio-symphysial length,	86	89	85	88	89	93	86	90	92	87	90	95	80
	Inter-gonial width, . . .	97	97	97	94	95	105	104	93	94	98	97	109	104
Breadth of ascending ramus, . . .	35	37	36	39	36	36	29	40	35	36	37	38	40	31

TABLE IV.

Burmese, from Insein Prison.

Name, with Place or Province.	Pyu Win, Zikaywa.	Lon Htaw, Zibynon.	Pe, Sharsaybo.	Lu Gyi, Monyo.	San Kun, Monyo.	Noo, Aleywa.	Chut, Yaykayon.	Tun Yan, Mahatham.	Shwe In, Sogaing.	Shwe Byaung, Pakokko.	Tun Tha, Goumyidan.	Pu, Aungmyingain.	Tun U, Myan-aung.	Aung Myat, Yebouk.	Kyunk Lon, Sakangyi.
Age,	61	35	Ad.	52	Ad.	52	56	57	60	44	29	Ad.	33	30	Adult.
Sex,	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.
Cubic capacity,	1240	1235	1480	1240	1240	1670	1350	1350	1350	1480	1340	1330	1445	1445	1315
Glabello-occipital length,	173	168	167	170	179	179	179	185	172	179	161	168	183	170	167
Basi-bregmatic height,	132	133	131	139	130	139	141	145	132	136	136	131	140	136	130
Vertical Index,	76.3	79.2	78.4	81.8	72.6	77.7	78.8	78.4	76.7	76.0	84.5	78.	76.5	80.	77.8
Minimum frontal diameter,	93	94	91	92	91	98	95	98	92	94	95	91	88	93	90
Stephanic diameter,	105	108	112	109	102	121	108	113	113	111	110	101	102	117	111
Asterionic,	106	105	104	111	107	112	119	114	107	111	111	105	100	104	107
Greatest parieto-squamous breadth,	136s.	133s.	147s.	145s.	134s.	151s.	139s.	140	140	142	146s.	132s.	143s.	147p.	142s.
Cephalic Index,	78.6	79.2	88.	85.3	74.9	84.4	77.7	75.7	81.4	79.3	90.7	78.6	78.1	86.5	85.
Horizontal circumference,	493	478	502	498	494	527	510	518	500	516	484	485	505	503	489
Frontal longitudinal arc,	121	129	126	129	124	135	129	137	123	129	129	125	133	131	128
Parietal,	127	118	127	118	124	140	121	126	123	129	103	127	130	126	115
Occipital,	107	99	109	105	106	113	115	124	112	113	106	99	126	112	113
Total,	355	346	362	352	354	388	365	387	358	371	338	351	389	369	356
Vertical transverse arc,	290	291	311	310	280	325	301	311	300	301	306	291	305	317	304
Length of foramen magnum,	35	36	35	35	29	39	33	37	35	36	35	33	31	29	33
Basi-nasal length,	96	94	89	103	109	98	106	101	95	102	99	95	101	95	93
Basi-alveolar length,	92	95	108	93	111	96	106	93	96	102	96	98	96	92	97
Gnathic Index,	95.8	101.1	121.3	90.3	101.8	98.	100.	92.1	101.1	100.	97.	103.2	95.	96.8	104.3
Interzygomatic breadth,	125	130	133	132	136	137	138	137	132	139	142	130	130	131	128
Intermalar,	117	121	120	121	127	127	126	126	115	125	131	118	119	118	113
Nasio-mental length,	108	106	116	117	122	122	118	122ap	112	120	113	109	120	116	115
Nasio-mental complete facial Index,	86.4	81.5	87.2	88.6	89.6	89.	85.5	89.0	84.8	86.3	79.5	83.8	92.3	88.5	89.8
Nasio-alveolar length,	66	63	68	71	71	75	69	74	65	74	68	64	73	69	66
Maxillary upper facial Index,	52.8	48.4	51.1	53.7	52.2	54.7	50.	54.0	49.2	53.2	47.8	49.2	56.1	52.6	51.5
Nasal height,	52	49	48	52	54	56	53	53	50	55	51	49	55	48	48
Nasal width,	29	26	24	25	32	27	27	27	26	25	26	23	25	24	23
Nasal Index,	55.8	53.1	50.	48.2	59.1	48.2	50.9	50.9	52.0	45.5	51.	46.9	45.5	50.	47.9
Orbital width,	38	36	40	37	40	40	39	43	40	39	40	38	40	37	36
Orbital height,	34	32	25	35	34	37	34	32	32	33	35	31	30	33	30
Orbital Index,	89.5	88.9	87.5	94.6	85.	92.5	87.2	74.4	80.0	84.6	87.5	81.6	75.	89.2	83.3
Palato-maxillary length,	50	53	50	49	60	57	55	50	54	62	54	53	55	54	54
Palato-maxillary breadth,	59	60	64	66	72	71	70	68	...	68	67	64	68	64	62
Palato-maxillary Index,	118.	113.2	128.	134.6	120.	124.5	127.2	136.0	...	109.6	124.	120.7	123.6	118.5	114.8
Lower jaw. { Symphysial height,	28	28	36	29	33	32	36	38	27	35	30	40	32	33	34
Coronoid,	63	55	61	64	62	61	70	62	65	71	63	62	60	66	65
Condylod,	66	64	64	64	67	64	73	66	66	74	68	67	69	67	61
Gonio-symphysial length,	90	86	83	86	94	90	94	80	90	91	94	89	79	85	84
Inter-gonial width,	93	105	103	100	102	115	106	98	98	97	110	83	88	93	99
Breadth of ascending ramus,	38	37	32	35	40	32	44	37	36	33	40	40	34	34	33

TABLE V.

Burmese.

Name or Native Place.	Ava Proper.	Saung. Ava.	Upper Burma, Mahlaing, Meiktila District.	Paudun. Ye-U.	Mugan. Ye-U.	Nga Pota.
Collection,	H.T. 158	Insein.	E.U.A.M.	E.U.A.M.	E.U.A.M.	E.U.A.M.
Age,	Ad.	53	Ad.	21	Aged.	32
Sex,	M.	M.	M.	M.	M.	M.
Cubic capacity,	1248	1330	1300	1405	1160	1600
Glabello-occipital length,	158	172	173	178	163	176
Basi-bregmatic height,	131	139	132	131	127	140
Vertical Index,	82.9	80.8	76.3	73.6	77.9	79.5
Minimum frontal diameter,	92	92	96	92	93	97
Stephanic diameter,	112	109	110	109	105	114
Asterionic "	106	109	104	108	105	111
Greatest parieto-squamous breadth,	141s.	139	139s.	143s.	140s.	147s.
Cephalic Index,	89.2	80.8	80.3	80.3	85.9	83.5
Horizontal circumference,	481	486	500	515	482	515
Frontal longitudinal arc,	118	123	129	130	124	132
Parietal " "	112	115	117	125	117	129
Occipital " "	100	106	107	108	102	107
Total " "	330	344	353	363	343	368
Vertical transverse arc,	305	298	297	306	293	314
Length of foramen magnum,	37	38	33	36	33	38
Basi-nasal length,	97	102	99	100	91	102
Basi-alveolar length,	98	103	100	95	...	96
Gnathic Index,	101.	101.0	101.	95.	...	94.1
Interzygomatic breadth,	135	139	134	131	130	138
Intermalar "	123	125	125	119	121	123
Nasio-mental length, . . . . .	...	116	110	130	...	...
Nasio-mental complete facial Index, . . . . .	...	83.4	82.	99.2	...	...
Nasio-alveolar length,	71	69	63	74	...	70
Maxillary upper facial Index,	52.5	49.6	47.	56.4	...	50.7
Nasal height,	52	52	49	53	46	56
Nasal width,	26	24	26	22	25	28
Nasal Index,	50.	46.0	53.1	41.5	54.3	50.
Orbital width,	40	39	41	40	36	40
Orbital height,	31	33	31	33	34	33
Orbital Index,	77.5	84.6	75.6	82.5	94.4	82.5
Palato-maxillary length,	53	56	55	53	...	61
Palato-maxillary breadth,	68	63	66	61	...	64
Palato-maxillary Index,	128.3	112.2	120.	115.	...	125.5
Lower jaw. { Symphysial height, . . . . .	...	29	31	37	...	...
{ Coronoid " . . . . .	...	63	74	60	54	...
{ Condylod " . . . . .	...	64	64	62	61	...
{ Gonio-symphysial length, . . . . .	...	88	93	88	82	...
{ Inter-gonial width, . . . . .	...	104	100	86	94	...
{ Breadth of ascending ramus, . . . . .	...	42	38	40	35	...

In the glabello-occipital length the crania ranged from a maximum 186 mm. to a minimum 158 mm., and the mean of the series was 172.8 mm. In their parieto-squamous breadth the maximum was 153 mm., the minimum 132 mm., and the mean 141.7 mm. The mean length-breadth (cephalic) index was 82.1, which placed the series well into the brachycephalic group. In only two crania was this index below 75, and of the ten specimens which were mesaticephalic eight were above 77.5, *i.e.*, nearer to the brachycephalic than to the dolichocephalic standard. On the other hand eight specimens had a cephalic index of 85 or upwards, and two of these were above 90, so that a sensible proportion were hyper-brachycephalic. Both as regards the numerical index and the configuration of the cranium generally, there can be no doubt that the customary form of the Burmese skull is brachycephalic. The few exceptional specimens which had an elongated shape and an index either dolichocephalic or approximating thereto, are probably to be regarded as affiliated to the people with dolichocephalic skulls described in the earlier paragraphs in Part II.

In the basi-bregmatic height the crania ranged from a maximum of 145 mm. to a minimum of 127 mm., and the mean was 135.1 mm. The mean length-height (vertical) index was 78.2, which placed the series in the group of skulls termed akrocephalic or hypsicephalic, *i.e.*, with a high vertical index. But notwithstanding this relatively high index, in only three specimens did the vertical index slightly exceed the cephalic, and in two others they were equal. That the breadth of the skull is greater than the height is therefore a character which prevails in the Burmese skull.

The mean stephanic diameter, 109.2 mm., slightly exceeded the mean asterionic diameter, 106.8 mm., and the mean minimum frontal diameter was 93.1 mm. The bizygomatic diameter with a mean of 133.7 mm. ranged from 125 to 144 mm., and in each skull it invariably exceeded the intermalar.

The measurements made for the purpose of determining the length and breadth of the face gave the following results:—In thirty-five skulls the lower jaw was present, and the complete nasio-mental diameter, which ranged from 103 to 130 mm., had a mean length of 115.7 mm.; in its relation to the bizygomatic diameter the resulting index was in the mean 86.3, which places the crania in the chamaeprosopic or low-faced group of Kollmann. In only six specimens did the index exceed 90, so as to bring these crania into the leptoprosopic division. In these skulls the upper facial index gave a different result, for although it had a range from 47 to 57, the mean was 52, which places the face generally in the leptoprosopic or high upper face group, and no fewer than twenty-six of these crania came into this category. The vertical diameter of the lower jaw in the mental region does not therefore contribute proportionally to the length of the face in the same measure as the vertical diameter of the superior maxilla.

In eighteen skulls the basi-nasal diameter was greater than the basi-alveolar, in thirteen it was slightly less, in one materially less, and in two they were equal. The mean gnathic index, calculated on the relations of these two diameters, was 98.9, which

shows how nearly equal they were in their mean relative proportions, so that they fall into the mesognathic group. It was exceptional to see a marked degree of alveolar prognathism.

The mean nasal index was 48·6, thus on the average the nasal height was something more than twice the width; though in the individual specimens the index ranged from 40·0 to 59·1. They came collectively just within the mesorhine group, but five specimens had the index above 53, *i.e.*, were platyrrhine, and fourteen were leptorrhine. The mean orbital index was 85·0, though in individual orbits it ranged from 73·2 to 97·3; the skulls collectively came within the mesoseme group, though ten were megaseme and fourteen were microseme. The mean palato-maxillary index was 119·7, and the range was from 106·8 to 136·0. In twenty-four specimens the index was 115 and upwards; they were brachyuranic, and showed a wide palato-alveolar diameter in relation to the length.

As regards the cubic capacity it must be remembered that all the skulls were males. The mean of twenty-eight specimens capable of being measured was 1388 c.c., which places them in the mesocephalic group. One skull had a capacity of only 1160 c.c.; two were 1600 and 1670 c.c. respectively, and one had the remarkably high capacity 1820 c.c.; but these were exceptional, and the usual capacity ranged from 1240 to 1450 c.c.

To sum up, the Burmese proper are brachycephalic; as a rule the cranial breadth is greater than the height; the face is low, chamaeprosopic; the upper jaw is moderately projecting, mesognathic; the nasal width is moderate in relation to the height; the orbits vary in their dimensions, but the mean is mesoseme; the palato-alveolar arch is wide in relation to the length; the cranial capacity is moderate.

Part II. TABLE VI.

In this part are included the description of some skulls from Burma, which apparently belonged to tribes that form distinct elements in the population, and which may very properly be considered apart from those which belonged to the customary type of the people. With one exception, they were all apparently men.

H. T., No. 159 (Table VI.), referred to on page 728, though catalogued by the Henderson Trust as a Burmese skull, is not associated with any definite locality, and on this account and from its special character it has not been included in the preceding description. In the proportion of length and breadth it was distinctly dolichocephalic (72·2), and its outline in the *norma verticalis* was so elongated that it presented a striking contrast to the usual brachycephalic Burmese cranium. It was keeled in the anterior half of the sagittal region, from which the parietals sloped downwards to their eminences, below which the side walls of the skull were almost vertical. It differed also from the customary type of the Burmese skulls in having its basibregmatic height and vertical index considerably higher than its greatest breadth and cephalic index. The skull was phænozygous. The forehead was narrow, but was

almost vertical. The glabella and supra-orbital ridges were feeble. The nasal bridge was concave, depressed above and slightly projecting below; the anterior nares were wide, and the nasal index was distinctly platyrrhine. The nasal spine of the superior maxillæ was moderate, and an imperfect ridge separated the incisive region from the floor of the nose. The absence of the lower jaw prevented the proportions of the entire face from being taken, but the upper face was leptoprosopic. Some small Wormian bones were in the lambdoidal suture, and there was a large left epipteric bone. The prognathism of the upper jaw was well marked; the breadth of the orbit was materially greater than the height, and the index was microseme. The combination of the most important of these characters caused the skull to differ from the type described in Part I., so that it does not possess the customary features of a Burmese skull.

The two skulls obtained from an old cemetery in upper Burma also differed materially in character from the brachycephalic crania sent to me from the Insein jail. They were both distinctly dolichocephalic both in form and measurements, and in each specimen the height exceeded the breadth. In this respect they corresponded with the skull 159 above described in the collection of the Henderson Trust. They did not, however, possess the prognathic condition of the upper jaw, which was a feature in that specimen. Although the nasal bones were not projecting, the proportions of the nose were not platyrrhine. As the two dimensions of the orbit were more nearly on an equality, the orbital index was higher than in 159. The breadth of the palato-maxillary arch, in relation to the length, was not so great. In the male skull there was a small inter-parietal bone, and in the female, Wormian bones were in the lambdoidal suture. In one pterion in the female the ali-sphenoid had a very slight articulation with the parietal, in the other they were separated by a process continuous with the squamous temporal.

It is obvious that a certain admixture with the brachycephalic Burmese of a race or races with dolichocephalic proportions of the skull is to be found in Burma. It is possible that they may be the descendants of the aboriginal people, or be those of persons, or the descendants of persons, who had migrated into Burma from the hill districts at present inhabited by a dolichocephalic race.

One of the skulls from Insein, marked Erinia, was from Ralum, Akyab, in the northern part of Burma, south of Chittagong, where the people are for the most part Mahommedans. It was that of a man, said to be seventy years of age, whose height was 5 ft. 6 in. The condition of the sutures and the state of the teeth proved it to be that of a person who had passed middle life. The skull was hyper-brachycephalic, with a vertical parieto-occipital region, which pointed to artificial flattening during infancy. The height of the cranium was considerably less than the breadth. The skull was cryptozygous. The glabella and supra-orbital ridges were well marked, and the forehead sloped gently backwards and upwards. The nasal bridge was moderate in length, slightly concave, and somewhat depressed at the root; the nasal index was platyrrhine. The upper jaw was not prognathous, the incisive region was short, but separated from

TABLE VI.

Karen, Shan, etc.

Name, or Native Place or Province.	Burma, no Locality.	Here. Toungoo. Karen.	Erinia. Akyab.	Ko Nanda. Shan.	To, Shan State, Yunnan.	Shan Gyi, Tharra- waddy.	San Min, Southern Shan States.	Old Cemetery, Upper Burma.	Old Cemetery, Upper Burma.
Collection,	H.T.159	Insein.	Insein.	Insein.	T.C.D.	Insein.	Insein.	E.U.A.M.	E.U.A.M.
Age,	Ad.	23	70	40	27	55	24	Aged.	Ad.
Sex,	M.	M.	M.	M.	M.	M.	M.	M.	F.
Cubic capacity,	1345	1420	1410	...	1510	1360	1380	...	1270
Glabello-occipital length,	180	175	167	186	178	175	181	185	181
Basi-bregmatic height,	136	134	136	147	146	135	133	138	135
Vertical Index,	75.6	76.6	81.4	79.0	82.0	77.1	73.5	74.6	74.6
Minimum frontal diameter,	91	85	92	96	94	96	89	89	93
Stephanic diameter,	101	106	116	110	107	108	107	108	109
Asterionic "	103	105	115	113	109	101	106	105	102
Greatest parieto-squamous breadth,	130p.	141	150	150	140	140	134	135	129
Cephalic Index,	72.2	80.6	89.8	80.6	78.7	80.0	74.0	73.	71.3
Horizontal circumference,	504	498	501	538	505	506	502	518	502
Frontal longitudinal arc,	132	128	127	133	117	120	122	123	121
Parietal " "	120	118	118	140	135	140	124	253	120
Occipital " "	124	116	110	124	122	110	114	125	125
Total " "	376	362	355	397	374	370	360	376	366
Vertical transverse arc,	302	300	317	320	306	301	292	308	296
Length of foramen magnum,	35	32	32	35	34	31	36	33	34
Basi-nasal length,	97	97	106	102	107	103	102	103	100
Basi-alveolar length,	105	97	104	101	100	109ap	105	96	99
Gnathic Index,	108.2	100.	98.1	99.0	93.5	105.8	102.9	93.2	99.0
Interzygomatic breadth,	130	121	140	140	141	138	125	...	...
Intermalar " "	119	109	125	123	118	129	112	...	...
Nasio-mental length, . . . . .	...	109	113	129	113	120	115	...	114
Nasio-mental complete facial Index, . . . . .	...	90.	80.7	92.	80.1	87.	92.0	...	...
Nasio-alveolar length,	70	67	65	74	67	72	69	72	66
Maxillary upper facial Index,	53.8	55.3	46.4	52.8	47.5	52.	55.2	...	...
Nasal height,	52	53	52	55	54	52	53	56	50
Nasal width,	29	26	29	24	26	25	24	28	22
Nasal Index,	55.8	49.1	55.8	43.6	48.1	48.2	45.3	50.	44.
Orbital width,	38	36	38	38	41	41	38	41	39
Orbital height,	28	30	33	31	34	30	33	34	31
Orbital Index,	73.7	83.3	86.8	81.6	82.9	73.2	86.8	82.9	79.5
Palato-maxillary length,	59	50	52	58	53	58ap	58	...	55
Palato-maxillary breadth,	68	61	...	68	...	65	62	...	63
Palato-maxillary Index,	115.2	122.	...	117.2	...	112.	106.8	...	114.5
Lower jaw. { Symphysial height, . . . . .	...	24	31	38	30	37	35	30	34
Coronoid " " . . . . .	...	54	60	65	65	68	71	63	60
Condylod " " . . . . .	...	57	66	68	63	71	69	68	66
Gonio-symphysial length, . . . . .	...	80	90	85	88	99	95	83	81
Inter-gonial width, . . . . .	...	96	107	105	95	105	88	98	87
Breadth of ascending ramus, . . . . .	...	30	43	38	36	47	40	35	33

the floor of the nose by a long ridge; the nasal spine was moderate. The orbital index was mesoseme. The interzygomatic breadth, 140 mm., was a feature in the face, and both the entire facial and upper facial indices were chamæprosopic. The cranial capacity was moderate, 1410 c.c. Owing to the extensive senile obliteration of the sutures, nothing can be said as to Wormian or epipteric bones.

The skull shows no material difference from the Burmese type, so that although a Mahomedan in religion he was probably of the Burmese race.

The skull marked Karen from the jail at Insein was that of a man named Here, aged twenty-three, 5 ft. 1½ in. in height. In the relation of length to breadth it was brachycephalic, and the vertical index was distinctly below the length-breadth index. The outline in the *norma verticalis* was broadly ovoid, and the parieto-occipital slope was not so steep as to suggest artificial flattening in that region. The cranium was moderately capacious, and contained 1420 c.c. The skull was cryptozygous. The forehead was full, sloping moderately backwards, and the glabella and supra-orbital ridges projected very slightly. The nasal bridge was elongated, concave, not depressed at the root, and slightly projecting below; the nose in its proportions was mesorhine. The nasal spine of the superior maxillæ was small, and the incisive region was continued into the floor of the nose by a smooth surface. The basi-nasal and basi-alveolar diameters were equal and the upper jaw was mesognathous. In its dimensions the orbit was microseme. The entire face in the relations of length and breadth was chamæprosopic, but the upper face was leptoprosopic. The interzygomatic breadth, 121 mm., was relatively small. The ossification of the cranium was normal.

So far as a single skull can enable one to express an opinion on the cranial characters of a people, it would appear that the Karens are a brachycephalic race. This view of the proportion of the breadth to the length of the cranium is borne out by two male skulls marked Karen, the measurements of which are recorded in Sir WM. FLOWER's Catalogue of the Museum of the College of Surgeons. In one the length-breadth index was 82·9, in the other 79·2. It should be stated that in both of these the height of the cranium exceeded the breadth. The mean gnathic index was 98·5.

The collection from Insein contained the skull of a man marked Shan, named Ko Nanda, whose height is given as 5 ft. 5 in. His death was caused by a fracture of the skull. I have also had the opportunity of examining the skull of another Shan named Nga To, said to be twenty-seven years of age, a native of Yunnan, now in Professor Cunningham's Museum. These skulls differed from each other in some particulars. Nanda was brachycephalic, 80·6, without artificial parieto-occipital flattening; Nga To, again, was in the higher term of the mesaticephalic series. In Nanda the height of the cranium was less than the breadth, but in To the height materially exceeded the breadth. In both skulls the basi-nasal length exceeded the basi-alveolar, and there was no prognathism. In Nanda the glabella and supra-orbital ridges were feeble, and in To moderately projecting; the nasal bridge was concave, elongated, not depressed at the root, and projecting slightly forward below. The nasal

region was generally flattened. In neither specimen was the nose platyrrhine. In Nanda the nasal spine of the superior maxillæ was strong, the incisive fossa was deep and was separated from the floor of the nose by a ridge. In Nanda the index of the entire face was leptoprosopic; in To it was chamæprosopic, and a similar proportion was seen in the upper facial index; but both specimens had great interzygomatic diameter. In both crania the orbital index was mesoseme. As regards the cubic capacity of the crania, Nanda was so much injured that the cubage of the skull could not be taken, but the capacity of To was 1510 c.c.*

From the relations of length to breadth in the two Shan crania there can be little doubt that these people are in the main brachycephalic, as might have been expected from their Siamese and Chinese affinities.

For purposes of comparison I may refer to four adult male skulls in the Anatomical Museum of the University, which belong to the collection formed by Dr R. BROOM. They are from Bangkok; three are undoubted Siamese, whilst the one lettered A in Table VII. is said to be probably a cross between a Malay and a Siamese.† Their measurements are given in the Table.

All the crania were brachycephalic, both in their general form and numerical proportion; and in three the flattened parieto-occipital region showed evidence of artificial pressure applied during infancy. In each specimen the height was not equal to the breadth. In three specimens the frontal longitudinal arc was longer than either the parietal or occipital. The glabella and supra-orbital ridges were not prominent, and the forehead only slightly receded. The nasal bones had so small a degree of projection that the face was flattened in that region, and the nasal index was mesorhine. The nasal spine of the superior maxillæ was well marked, and the incisive region of the upper jaw was differentiated from the floor of the nose by a ridge. In one specimen the jaw was orthognathic; the others showed to the eye a degree of alveolar prognathism greater than was indicated by the gnathic index. Although in one specimen the complete facial index was 92·8, in the others the face was low, chamæprosopic, a condition which was obviously due to the breadth between the zygomata. The orbital index was variable, and in only two crania the orbits could be regarded as round or megaseme. The palato-alveolar region was either mesuranic or brachyuranic. The mean cubic capacity of the four skulls was 1332 c.c. The teeth were stained with betel-chewing. In two specimens an epipteric bone was present, in one there were two small Wormian bones. One had flat occipital condyles, which were not associated with a third condyle. The palate was highly arched, and the lower jaw was well developed.

In the Barnard Davis Collection, now in the Museum of the Royal College of

* From the name, Shan Gyi, of one of the men from the jail at Insein (Table VI.), it is possible that he may have been a Shan. It is to be observed that his skull was also brachycephalic. Another skull, that of San Min (Table VI.), described as from the Southern Shan States, was distinctly dolichocephalic, index 74, so that it differed from both the Burmese and Shan type of cranium, and probably belonged to a foreign race.

† A fifth adult specimen is in the collection, but as it has been deformed, apparently from hydrocephalus, the measurements have not been given. Its internal capacity was 1930 c.c.

TABLE VII.

Siamese.

	Assam. Cross between Siamese and Malay.	Warng.			Metopic, Hydro- cephalic.
Collection (Dr R. Broom), .	A.	B.	C.	D.	
Age,	Ad.	31	Ad.	Ad.	Ad.
Sex,	M.	M.	M.	M.	M.
Cubic capacity,	1330	1270	1330	1400	1930
Glabello-occipital length, .	168	162	166	173	Size and
Basi-bregmatic height, . .	138	131	135	138	proportions
<i>Vertical Index</i> ,	82.1	80.9	81.3	79.8	abnormal.
Minimum frontal diameter, .	88	92	98	95	
Stephanic diameter, . . .	113	114	111	115	
Asterionic " "	108	100	108	105	
Greatest parieto - squamous breadth,	139	137s.	143s.	144s.	
<i>Cephalic Index</i> ,	82.7	84.6	86.1	83.2	
Horizontal circumference, .	494	484	490	502	
Frontal longitudinal arc, .	135	127	120	132	
Parietal " "	116	123	129	117	
Occipital " "	114	98	95	107	
Total " "	365	348	344	356	
Vertical transverse arc, . .	305	305	305	311	
Length of foramen magnum, .	30	35	36	34	
Basi-nasal length,	98	94	101	101	
Basi-alveolar length, . . .	92	93	103	101	
<i>Gnathic Index</i> ,	93.9	98.9	102.	100.	
Interzygomatic breadth, . .	128	126	134	138	
Intermalar " "	118	117	124	125	
Nasio-mental length, . . .	113	117	118	118	
<i>Nasio-mental complete facial Index</i> ,	88.2	92.8	88.	85.5	
Nasio-alveolar length, . . .	67	67	66	69	
<i>Maxillary upper facial Index</i> , .	52.3	53.1	49.2	50.	
Nasal height,	53	52	50	52	
Nasal width,	26	25	26	26	
<i>Nasal Index</i> ,	49.1	48.2	52.	50.	
Orbital width,	37	40	39	41	
Orbital height,	34	33	31	37	
<i>Orbital Index</i> ,	91.9	82.5	79.5	90.2	
Palato-maxillary length, . .	53	52	55	58	
Palato-maxillary breadth, . .	62	62	66	63	
<i>Palato-maxillary Index</i> , . . .	116.9	119.2	120.	108.6	
Lower jaw. { Symphysial height, . . .	26	28	31	31	
{ Coronoid " "	63	68	68	70	
{ Condylod " "	67	68	71	68	
{ Gonio-symphysial length, .	88	89	95	90	
{ Inter-gonial width, . . .	91	104	99	108	
{ Breadth of ascending ramus,	39	40	44	39	

Surgeons of England, are several skulls from Siam, which are catalogued by the name Thai.* Six of the crania ranged in their length-breadth index from 80 to 89, and the mean was 85; they were distinctly brachycephalic. A seventh specimen was dolichocephalic, index 73, which Dr DAVIS ascribes to the sides of the coronal suture having been obliterated: an explanation which does not appear to me to be satisfactory. There can be no doubt that the normal shape of the Siamese skull is brachycephalic.

The University Museum also contains a collection of crania ascribed to natives of China. With the greater number the history supports the view that they are undoubted Chinese, but two or three specimens are uncertain. They are all adults; eleven are male, two female. Their measurements are given in Table VIII.

I do not intend to give a detailed description of this series of skulls. I may, however, state that one skull obtained at Chusan was dolichocephalic (index 74·3), seven were brachycephalic, five were mesaticephalic. Of the latter three had the cephalic index above 77·5; the remaining two, with the index 76·9, had a doubtful history, and, as well as one from Chusan, were possibly not true Chinese. Even if we include all the specimens the cephalic index works out with a mean 81·2, and if the doubtful specimens be excluded, it is a little higher, and the mean of the entire series is brachycephalic. The breadth of the cranium exceeded the height in all but three specimens.

As the lower jaw had not been preserved in the majority of the crania, the complete facial index could only be obtained in three skulls, which were low-faced, chamæprosopic. I have compared these crania, as regards their interzygomatic breadth, with the corresponding dimension in neighbouring Mongolian people, whose skulls approximate in general magnitude, and also with the Esquimaux. From the appended list it will be seen that in this diameter the Chinese face has a less transverse diameter than the Burmese, Shans, Nágás and Esquimaux, though somewhat greater than in the small number of Siamese under examination.

	Number of Skulls.	Sex.	Mean Interzyg. Diam.
Chinese,	11	M.	132·5
Siamese,	4	M.	131·5
Burmese,	38	M.	133·7
Shans,	2	M.	140·5
Chin-Lushais,	9	M.	128·8
Nágás,	6	M.	135·3
Esquimaux,	18	M.	138·0

So far as the degree of prognathism can be determined by the measurements from which the gnathic index is computed the skulls generally were orthognathous, but three were mesognathous. The only prognathic skull was the one found at Chusan with a length-breadth index of 74·3, an additional reason therefore for regarding it as not a genuine Chinaman. As a rule the nose was either mesorhine or leptorhine. Four specimens were platyrrhine, and the Chusan skull was in this category. In six crania

* *Thesaurus Craniorum*, p. 174. The mean interzygomatic diameter of these crania was 132 mm.

TABLE VIII.

Chinese.

Collection, . . .	E.U.A.M.*	E.U.A.M.†	E.U.A.M.	E.U.A.M.‡	E.U.A.M. Hong Kong.	H.T. 161	H.T. 163	H.T. 165	H.T. 169	H.T. 170 Chusan.	H.T. 494	H.T. 162	H.T. 523
Age,	Ad.	Ad.	Ad.	Ad.	Ad.	Aged.	Ad.	Ad.	Aged.	Ad.	Ad.	Ad.	Aged.
Sex,	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	M.	F.	F.
Cubic capacity, . . .	1320	...	1370	1400	1240	1335	1590	1540	1300	1330	1340	1280	1140
Glabello-occipital length, . .	175	170	182	175	166	167	179	168	170	179	168	167	173
Basi-bregmatic height, . .	129	136ap.	129	141	134	136	144	141	137	126	135	129	125
Vertical height, . . .	73.7	80.	70.9	80.6	80.7	81.4	80.4	83.9	80.6	70.4	80.4	77.2	72.3
Minimum frontal diameter, . . .	94	100	95	90	90	93	92	91	92	86	95	86	89
Stephanic diameter, . .	109	116	105	107	100	105	119	113	112	112	116	103	103
Asterionic, . . .	114	108	108	111	100	107	106	111	116	108	104	99	109
Greatest parieto-squamous breadth, . . .	143	148	140	138	133	143	142	150s.	143s.	133	139	132	133
Cephalic Index, . . .	81.7	87.1	76.9	78.9	80.1	85.6	79.3	89.3	84.1	74.3	82.7	79.	76.9
Horizontal circumference, . .	505	...	510	500	479	490	512	503	500	493	495	478	485
Frontal longitudinal arc, . .	122	128	127	130	117	118	133	128	133	115	122	117	124
Parietal, . . .	123	130	131	130	127	120	134	130	113	114	122	116	115
Occipital, . . .	121	114	109	117	104	102	115	110	124	130	113	116	102
Total, . . .	366	372	367	377	348	340	382	368	370	359	357	349	341
Vertical transverse arc, . .	297	...	289	313	295	300	315	317	310	295	298	285	291
Length of foramen magnum, . . .	30	...	32	36	32	35	37	36	30	36	35	31	31
Basi-nasal length, . . .	93	...	99	93	98	106	99	94	95	96	94	93	101
Basi-alveolar length, . .	90	...	100	84	91	98	94	93	96	103	90	86	94
Gnathic Index, . . .	96.8	...	101.	90.3	92.9	92.5	94.9	98.9	101.1	107.3	95.7	92.5	93.1
Interzygomatic breadth, . .	132	139	134	128	126	141	134	132	124	132	136	121	119
Intermalar, . . .	117	126	122	118	116	129	120	115	113	117	121	110	105
Nasio-mental length, . .	116	113	...	...	114	...	...	...	...	...	...	...	...
Nasio-mental complete facial Index, . . .	87.8	81.2	...	...	90.4	...	...	...	...	...	...	...	...
Nasio-alveolar length, . .	73	66	...	71	70	70	72	66	66	70	67	61	61
Maxillary upper facial Index, . . .	55.3	47.4	...	55.4	55.5	49.6	53.7	50.	53.2	53.	49.2.	50.4	51.2
Nasal height, . . .	51	50	47	51	52	56	56	53	49	52	54	48	46
Nasal width, . . .	24	24	26	24	25	26	24	28	26	28	26	24	25
Nasal Index, . . .	47.1	48.	55.3	47.1	48.2	46.4	42.8	52.8	53.1	53.5	48.1	50.	54.3
Orbital width, . . .	38	38	43	36	40	41	37	35	37	37	36	33	38
Orbital height, . . .	34	29	33	33	33	35	33	35	35	31	31	32	32
Orbital Index, . . .	89.5	76.3	76.7	91.7	82.5	85.4	89.2	100.	94.6	83.8	86.1	97.	84.2
Palato-maxillary length, . .	52	53	52ap.	48	47	50	56	52	53	57	52	45	50
Palato-maxillary breadth, . .	67	67	57	62	60	65	64	63	59	67	66	59	53
Palato-maxillary Index, . .	128.8	126.4	109.6	129.	127.6	130.	114.2	121.	111.3	117.5	126.9	131.1	106.
Lower jaw, { Symphysial height, . .	39	37	...	...	31	...	...	...	...	...	...	...	...
Cronoid, . .	64	65	...	...	59	...	...	...	...	...	...	...	...
Condylod, . .	55	75	...	...	56	...	...	...	...	...	...	...	...
Gonio-symphysial length, . .	89	92	...	...	86	...	...	...	...	...	...	...	...
Inter-gonial width, . .	92	95	...	...	97	...	...	...	...	...	...	...	...
Breadth of ascending ramus, . .	33	37	...	...	34	...	...	...	...	...	...	...	...

* With skeleton—presented by G. D. Hutchison, Esq.

† Presented by Dr More Reid.

‡ Presented by Professor Greenfield.

the orbit was rounded (megaseme), but in four the transverse diameter so much exceeded the vertical as to place them in the microseme group. In nine specimens the palato-alveolar arch was horseshoe-shaped, brachyuranic; in only two skulls it was elongated so as to be dolichuranic.

In the Chinese the mean cranial capacity of the males was 1376.5 c.c. They approximate closely, therefore, to the Burmese and Siamese in the volume of the cranial cavity.

Since I began, about thirty-five years ago, to collect human crania for purposes of anthropological study, I have endeavoured, as far as possible, to obtain for each skull or group of skulls, a statement of the locality where the specimen was obtained, and of the conditions under which it was got. In a large majority I have found it possible to acquire these particulars, and to speak therefore with some precision of the specimens. When I have resorted to the older collections to which I have had access, not unfrequently I have found a skull catalogued under some general designation, such as from Australia, from India, or from Ceylon, without any attempt being made to specify the exact locality. Such specimens, of course, have not the same value in determining the distribution of the two great groups of dolichocephali and brachycephali.

In all cases, however, the conservator of a museum is dependent on the accuracy of the original collector, and the care with which the specimens have been marked. The series of crania described in this memoir have, with few exceptions, been gathered by members of the medical profession, who have carefully labelled them and given me an account of the locality, and the conditions under which they were collected. We may rely therefore on the specimens as representing, so far as they go, the crania of the people inhabiting the regions in which they were obtained.

It will have been noticed that from time to time in the course of the description, I have referred to the occurrence of crania, brachycephalic in form and proportions, in districts where the skulls are usually dolichocephalic, and conversely of skulls, dolichocephalic in form and proportions, being found in districts where brachycephalic crania are the customary type. The question may, therefore, be very properly considered, in how far the contrasted forms of skulls which we designate by the terms dolichocephalic and brachycephalic, are to be regarded as two distinct race types, or merely extremes found in the same race, graded into each other by a series of intermediate forms. If the latter proposition be correct they would lose the value which has been assigned to them, since the time of ANDERS RETZIUS, as important guides in the classification of races. In employing these terms it should be understood that I recognise with BROCA and the later school of craniologists a mesaticephalic (mesocephalic) group, as interposed between the more extreme brachycephalic and dolichocephalic forms, and that, to enable a comparison to be made between my observations and those of craniologists generally, the arbitrary numerical division into dolichocephali, with the length-

breadth index below 75, mesaticephali, index from 75 to 80, and brachycephali, index 80 and upwards, has been employed in this memoir. It is obvious that those mesaticephalic skulls which have the length-breadth index below 77.5 approach nearer to the dolichocephali, whilst those with this index above 77.5 approximate to the brachycephali. Thus a skull with the index at or near 76 or 77 is in its form essentially dolichocephalic; whilst one with an index at or near 78 or 79 is essentially brachycephalic, though not falling numerically into this category.

To assist one in determining the value of these classificatory characters as expressing racial distinctions, one should strive to obtain a sufficient number of skulls of a given race, and determine, both by inspection of their form and by actual measurement, how far they fall exclusively either into the brachycephalic or the dolichocephalic group, or present an admixture of both groups, or possess the form and proportion, termed mesaticephalic, *i.e.*, intermediate to the two extremes. One ought not, however, to attach, as is sometimes done, too exclusive an importance in the determination of race characters to the differences expressed by the terms dolichocephalic and brachycephalic; as if those races were necessarily allied to each other, which on the one hand had in common dolichocephalic skulls, or, on the other, heads brachycephalic in form and proportions.* RETZIUS himself emphasised also the necessity of the study of the relative projection of the upper jaw, and employed the terms orthognathic and prognathic in his classification of races in accordance with their skull and head-forms. Since his time the relation between the length and breadth of the nose, the breadth and height of the orbit, the breadth and length of the palato-alveolar arch, the breadth and height of the face, the breadth and height of the box of the cranium, as well as its cubic capacity, have all attracted attention. The value of cranial characters as a basis for the classification of races depends therefore upon a comparison not only of the relative length and breadth of the skull or head, but of several other characters. When, with but a slight range of variation, the majority of these characters correspond in a particular tribe or people, they may then properly be considered as the cranial and head characters of the race, and be of value for purposes of classification.

It is not easy at the present time to find a race so pure that the possibility of an intermixture with another race may not at some previous period in the history of the race or the locality have taken place. In using this term 'intermixture' one should understand that it may cover one or other of two conditions. Either it may be produced by the cohabitation of parents of different races, whose offspring would therefore be a half or mixed breed. Or by the residence side by side either, in the same

* The question of the signification of brachycephaly and dolichocephaly has been discussed in a recent memoir by Dr A. B. Meyer of Dresden, "On the Distribution of the Negritos in the Philippine Islands and elsewhere," and he has arrived at the conclusion that they are not necessarily to be looked upon as constant factors in the determination of racial features. He regards the Negritos and Papuans to be of one race, notwithstanding the differences in the form of the skull and in the stature; so that in his view considerable variability may exist in the physical characters of the same race.

village or in adjacent villages, of individuals or families of, say, two different races, one of which may have reached the place either as captives in war, or as invaders, and the other may represent the aboriginal inhabitants. Skulls collected in such a district would be therefore those of distinct races, and might possess very different forms and proportions, although cohabitation and the production of a mixed breed would also doubtless give rise to a people in which the individuality of the parent types would be lost.

There are, however, certain parts of the globe where, from the climatic conditions, or the geographical position, an almost perfect isolation of the people is possible, and where one may expect to find the race as nearly as possible in its purity.

It is customary, for instance, to speak of the Esquimaux as a dolichocephalic race, and numerous skulls have been measured and recorded in evidence of this character. For my present purpose I may refer to the specimens enumerated and measured in Sir WM. FLOWER's catalogue,* where the mean cephalic index of twenty-seven crania was 72. Twenty-five of these crania ranged in the length-breadth index from 66.1, the minimum, to 76.6, the maximum, but two specimens were respectively 78.1 and 78.7, i.e., in the higher term of the mesaticephalic group. It is to be noted that both of these were from the eastern side in proximity to Baffin's Bay, where the possibility of the production of a half-breed by intercrossing with a brachycephalic Dane is not unlikely to have occurred.

In the Anatomical Museum of the University of Edinburgh are twenty-two adult Esquimaux crania collected at various places from Greenland to Behring Straits. Eighteen of these had a mean length-breadth index 71.4, and the range was from 69.3 to 75.7; they may all be regarded as essentially dolichocephalic. The remaining four specimens presented different proportions, for the length-breadth indices ranged from 76.2 to 87, so that three were mesaticephalic and one hyperbrachycephalic. A special interest is to be attached to these four crania, as they belonged to the western division of the Esquimaux, and were collected by the late Mr JOHN SIMPSON,† Surgeon to H.M.S. *Plover*, at Point Barrow, Kotzebue Sound, on the American side of Behring Straits. From Mr SIMPSON's description communication takes place yearly with the Asiatic coast by boats, which cross the Straits after mid-summer, and an active trade is carried on between the Esquimaux and the Asiatics. Opportunities are therefore given for an intermixture of the brachycephalic people of Northern Asia with the dolichocephalic Esquimaux, and in this manner a crossing of the two races and the production of half-breed children could without difficulty arise; or some of the Asiatics might, and it is probable do, stay and cohabit with the Esqui-

* Museum of the Royal College of Surgeons of England, 1879.

† See an excellent description of the locality and people by Mr John Simpson in the *Nautical Magazine*, vol. xxiii, p. 639, 1854. A fifth specimen from the same locality was dolichocephalic, with a length-breadth index 72.7. It is included in the eighteen crania referred to in the text.

maux and be adopted as members of the tribe. One may therefore legitimately draw the conclusion that, as regards the Esquimaux, the occurrence of a brachycephalic cranium or of skulls in the higher terms of the mesaticephalic group may be accounted for by the introduction from without of another race possessing brachycephalic proportions, and not by the evolution within the dolichocephalic Esquimaux of a brachycephalic type.

As regards certain of the other leading characters of the adult crania, it is to be observed that in the dolichocephalic Esquimaux, with few exceptions, the height of the cranium was greater than the breadth; the nasal region was narrow and elongated and well within the leptorhine index, with the exception of one specimen which was mesorhine. The mean gnathic index was 99.5, mesognathous; one specimen only was prognathous; the index variation between 94, the lower, and 104.6, the highest, was 10.6; and twelve out of sixteen specimens ranged only from 97.3 to 101. The skulls therefore showed in these relations a remarkable constancy of type, in harmony with the uniformity in the proportion of the length to the breadth of the cranium.

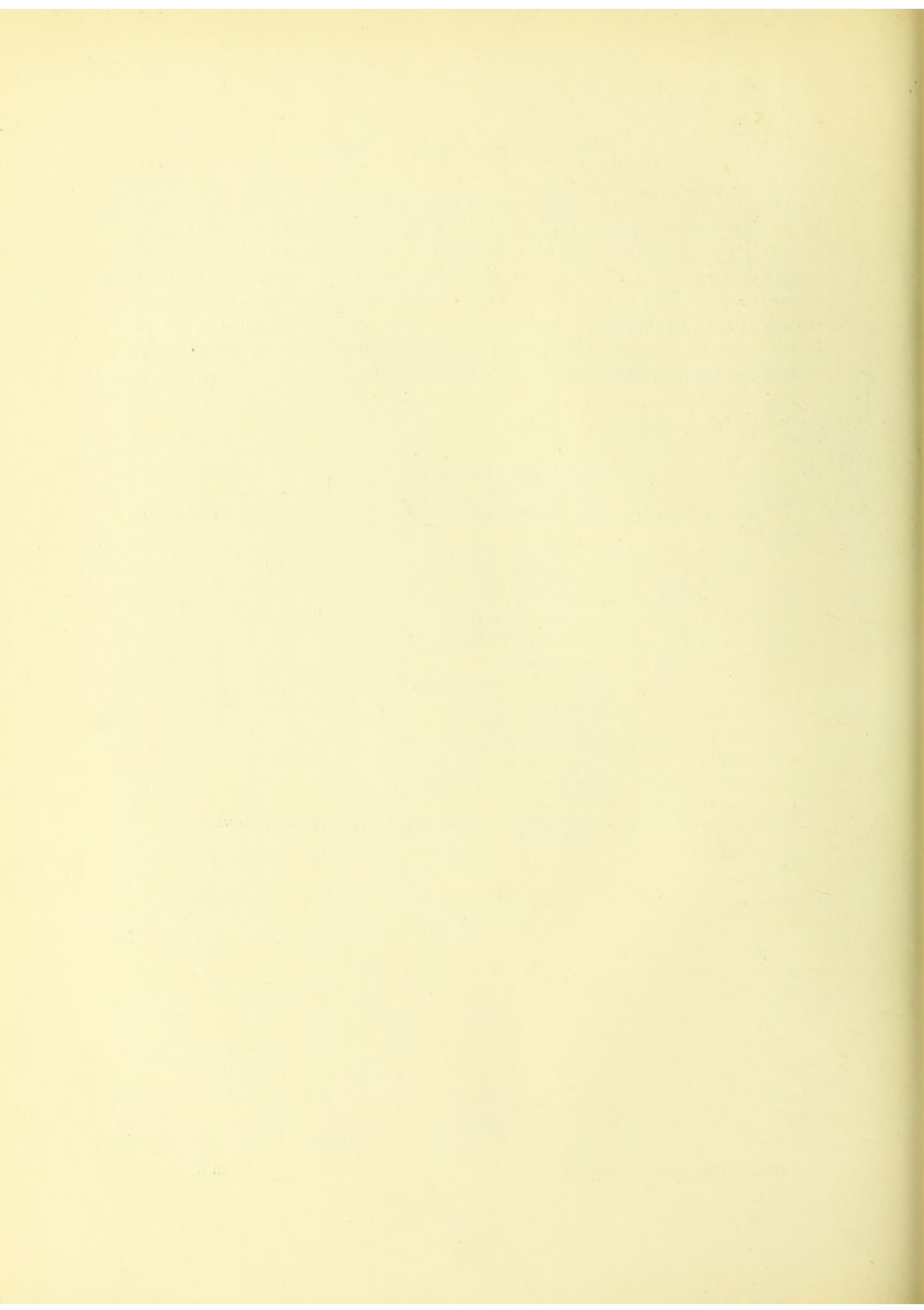
Another race, from its geographical isolation, and from the number of specimens which I have collected, may also appropriately be considered. I refer to the aborigines of Australia. Several travellers have expressed the opinion that the natives conform to one pattern as regards features, colour of skin, hair and mental characters. The University Museum contains seventy-one adult crania of these people. In almost every instance the locality where the skull was got is known, and the series is representative of all parts of the great island, except the central region. Sixty-nine skulls ranged in their length-breadth index from 61.5 (a specimen elongated from scaphocephaly) to 71.1, and their mean index was 70.2; they were all dolichocephalic both in form and proportion. Of the remaining two skulls, one, a female from West Victoria, had a cephalic index, 77.9; the other a male, from the Thomson River, Queensland, had an index 77.4; both, therefore, were mesaticephalic. Although brachycephalic Malays do, it is said, visit the west coast, and brachycephalic Polynesians may possibly have visited the east coast of Australia, yet in the large series of skulls now before me not a single brachycephalic specimen occurred. There is no evidence therefore of an evolution within the dolichocephalic Australians, or even of the intrusion from without, of a brachycephalic type. As regards the proportions of other parts of the skull, the platyrrhine nasal index, dolichuronic palate, upper jaw either markedly prognathic or mesognathic, and the microcephalic brain cavity are characters which, conjoined with the dolichocephalic cranium, constitute race features of the aboriginal Australians. The relation of the breadth to the height of the cranium is not, as I pointed out in my *Challenger Report* (Part xxix., 1884), constant in the different tribes; for whilst in South Australia, and in some other localities along the southern seaboard, a considerable proportion of the crania possess the basi-bregmatic diameter distinctly below the greatest breadth, in other parts of the island it is altogether exceptional to meet with a skull in which the height is less than the breadth.

From the geographical relations of the hill-tracts in North-Eastern India, occupied by a dolichocephalic people, to the surrounding countries, where the prevailing type of skull is brachycephalic, it seems more reasonable to conclude that the occurrence of exceptional specimens in a district is due to an intermixture of races possessing different head-forms, rather than to the evolution of a new type, on the one hand, in a dolichocephalic race, or, on the other, in a brachycephalic race,—the more so when it is kept in mind that tradition and history point to these countries as having during many centuries been occupied by successive waves of invading people.

EXPLANATION OF PLATES I.-III.

The figures in these plates are reproductions of photographs kindly taken for me by Mr W. E. Carnegie Dickson, B.Sc.

- FIG. 1. Profile of Skull of Lushai from the north hill tracts. G in Table I.
 „ 2. Front view of the same skull.
 „ 3. Profile of skull of Chin. B in Table I.
 „ 4. Front view of the same skull.
 „ 5. Profile of skull of Nágá. F in Table II.
 „ 6. Front view of the same skull.
 „ 7. Profile of Gurung skull from Nepal. Table II.
 „ 8. Front view of the same skull.
 „ 9. Profile of Siamese skull. C, Table VII.
 „ 10. Profile of Burmese skull, Tun Tha. Table IV.
 „ 11. Front view of the same skull.
 „ 12. Profile of Burmese skull, Paudun. Table V.
 „ 13. Front view of same skull.
 „ 14. Profile of a Burmese skull from an old cemetery, Upper Burma. Table VI.



Sir WILLIAM TURNER on "Craniology of People of India."—PLATE I.

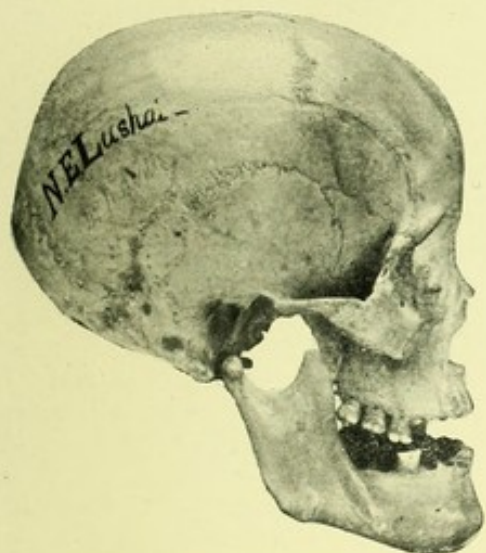


FIG. 1.—Lushai.



FIG. 2.—Lushai.



FIG. 3.—Chin.



FIG. 4.—Chin.



Sir WILLIAM TURNER ON "Craniology of People of India."—PLATE II



FIG. 5.—Nága.



FIG. 6.—Nága.



FIG. 9.—Siamese.



FIG. 7.—Gurung, Nepal.

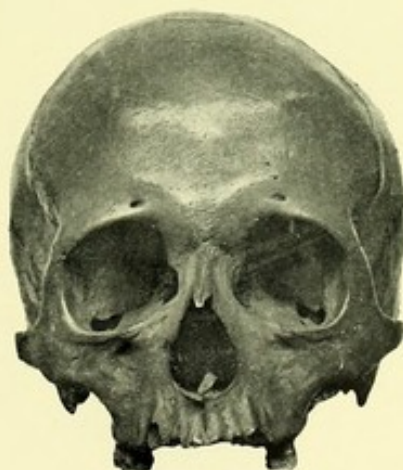


FIG. 8.—Gurung, Nepal.

Sir WILLIAM TURNER ON "Craniology of People of India."—PLATE III.

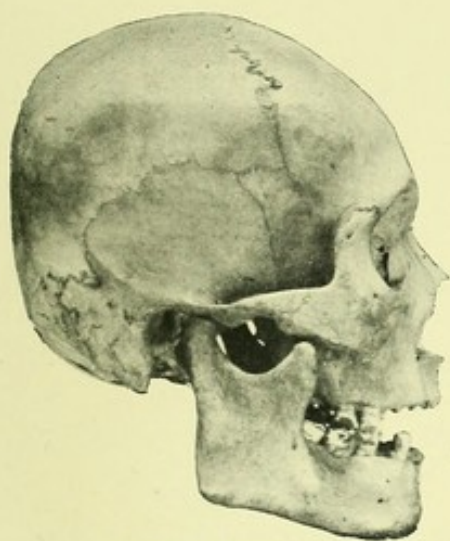


FIG. 10.—Burmese.



FIG. 11.—Burmese.

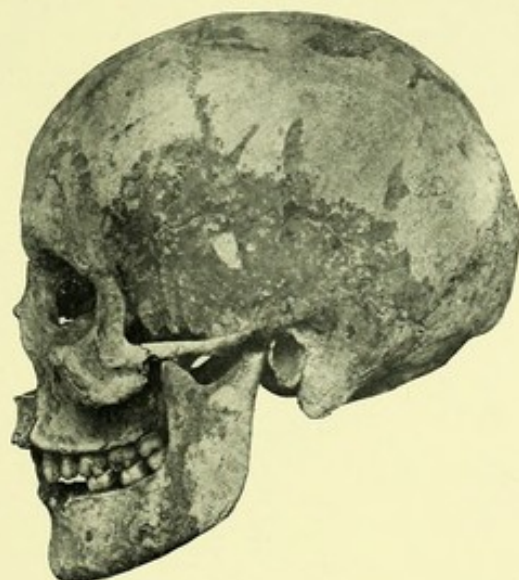


FIG. 14.—Upper Burma.

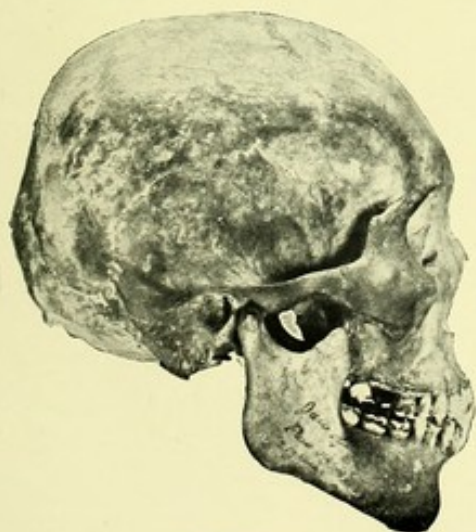


FIG. 12.—Burmese.



FIG. 13.—Burmese.



12.

(2)

TRANSACTIONS
OF THE
ROYAL SOCIETY OF EDINBURGH.

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CONTRIBUTIONS

TO THE
CRANIOLOGY OF THE PEOPLE OF THE
EMPIRE OF INDIA.

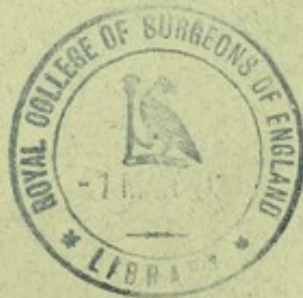
PART II.

THE ABORIGINES OF CHÚTA NÁGPÚR AND OF THE CENTRAL
PROVINCES, THE PEOPLE OF ORISSA, THE
VEDDAHS AND NEGRITOS.

BY

PROFESSOR SIR WM. TURNER, K.C.B., D.C.L., F.R.S.

[WITH FOUR PLATES.]



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MDCCCL.



VI.—*Contributions to the Craniology of the People of the Empire of India.*
Part II. *The Aborigines of Chûta Nâgpûr and of the Central Provinces, the People of Orissa, the Veddahs and Negritos.* By Professor Sir WM. TURNER, K.C.B., D.C.L., F.R.S. (With Four Plates.)

(Read July 2, 1900.)

It is my intention in this, the second part of my memoir on the Craniology of the Races of India, to give the results of my examination of skulls obtained from the districts occupied by the aboriginal tribes in Chûta Nâgpûr, the Central Provinces, the people in the province of Orissa, and to compare them with the skulls of some other aboriginal people.

The majority of the specimens described belong to the Indian Museum, Calcutta, and through the courtesy of the Trustees I was permitted to have them on loan for purposes of study. Many of these crania had been those of persons who had died in jail. The names, tribes, and castes, and not unfrequently the age, stature, and other physical characters, had been recorded in the prison books, and were embodied in the lists which were sent to me along with the skulls by the authorities of the museum. Several of these skulls were especially interesting, as having been presented to the museum by Colonel DALTON, the author of the valuable treatise on the *Ethnology of Bengal*. Other specimens in the museum had been obtained from the Medical College, Calcutta, and several were presented by Professor D. B. SMITH; in all probability they were from bodies which had been used for anatomical purposes. Mr W. H. P. DRIVER also had presented a series of crania from Ranchi.

In addition, I have received specimens from former students holding appointments in the Indian Medical Service, and I take this opportunity of acknowledging their courtesy in presenting them to me.

The descriptions in this part of my contribution to Indian Craniology are based on the examination of one hundred and one skulls, and the measurements are recorded in the series of Tables.

The works which I have chiefly consulted in drawing up the account of the geographical distribution and tribal characters of the aborigines, are Colonel DALTON's *Descriptive Ethnology of Bengal*, Calcutta, 1872; Sir W. W. HUNTER's *Statistical Account of Bengal* and *Imperial Gazetteer of India*; Sir H. M. ELLIOT's *Memoirs of the Races of the North-West Provinces of India*, edited by JOHN BEAMES, London, 1869; *The Tribes and Castes of Bengal*, *Ethnographic Glossary*, and *Anthropometric Data*, Calcutta, 1891, by H. H. RISLEY, I.C.S.; *The Tribes and Castes of the North-Western Provinces and Oudh*, by W. CROOKE, B.A., B.C.S., Calcutta, 1896; "India," by Sir RICHARD TEMPLE in *Chambers's Encyclopædia*; *Census of India*, 1891, General Report by Census Commissioner J. A. BAINES, I.C.S.; *Report on the Lower Provinces*

of Bengal and their Feudatories, by C. J. O'DONNELL, M.A., I.C.S.; *Report on the Central Provinces and Feudatories*, by B. ROBERTSON, I.C.S.; *Reports on Anthropology in Bulletin of Madras Government Museum*, Madras, 1897-1900, by EDGAR THURSTON; *The Distribution of the Negritos*, by A. B. MEYER, M.D., Dresden, 1899.

ABORIGINES.

Before I enter on the description of the craniological characters of the different aboriginal tribes, it will be useful to say something of the geographical position of the districts in which they live, and of the distribution and physical characteristics of the people of each tribe.

Chúta Nágpúr is a division of Bengal situated to the south of Mirzápur, in the North-West Provinces, and to the north and east of the Central Provinces. It contains, amongst others, the districts of Singbhúm, Manbhúm, Hazáribágh and the tributary state of Sargúja, from all of which skulls had been obtained. In the Lohárdagá district is the town of Ránci, where there is an important jail, from which had been procured the crania of some prisoners who had been executed or had died of disease—many of whom were natives of the adjoining villages. The country is broken up into hills, valleys, and raised plateaux. Hindus form the largest element of the population, but interspersed among them are semi-Hinduised natives and aboriginal tribes.

The Central Provinces are a large territory which extends as far south as the Godavery River, the Nizam's dominions, and the north part of the Madras Presidency. Skulls have been examined from Bastár, Ráipur, and other districts in the provinces. The country is diversified and contains tablelands, which in some parts are 2000 feet high, ranges of hills, valleys, and wide plains. The Hindus are the preponderating element amongst the people, but numbers of aborigines are to be found, especially on the Sátúra plateau and in the hill districts of the feudatory state of Bastár.

Orissa is an extensive province on the west side of the Bay of Bengal, and is bounded on the west by Chúta Nágpúr and the Central Provinces. Along the coast line it possesses a border of alluvial land, but the interior is an undulating country intersected by ranges of hills, the highest peaks of which are from 3000 to 4000 feet. Hindus constitute the mass of the people, but the aborigines and semi-Hinduised aboriginal tribes form an important element. Skulls have been obtained from Keunjhar, Kandh-mals, Cuttack, and other parts of Orissa.

In the several provinces under consideration the Hindus occupy and cultivate the valleys and more fertile lands. The aboriginal tribes live in the hills and on the higher plateaux, and preserve more or less completely their religion and tribal customs. Where the Hindus have come into immediate contact with the aborigines, the latter, whilst retaining to some extent their ancient forms of faith and customs, have, in other respects, adopted the Hindu religion and modes of thought.

Writers on the philology and ethnology of the people of India have distinguished, by the names Dravidian and Kolarian, two groups of languages spoken by the aboriginal tribes who occupy the hill ranges in the Central Provinces, Chúta Nágpúr, Orissa, extending also into Western Bengal and Southern India. The name Dravidian was given to the southern of the two linguistic groups by Bishop CALDWELL, and many writers have attached to it an ethnological value. This group of languages is most extensively represented in the Madras Presidency, where it forms the south Dravidian group, known as Telugu, Tamil, Kanarese, and Malayalám; but it also extends into the hill ranges in the Central Provinces and Orissa, as the north Dravidian group spoken by the Gonds, Túlús, Oráons, Kharwárs, Mál-Paháriás, and Kandhs. The Kolarian group of languages, as it has been named by Sir GEORGE CAMPBELL,* prevails amongst the tribes which lie to the north of those who speak Dravidian, and who occupy the hill tracts of Western Bengal and Central India. The Santals, Múndas, Hos, Kols, Korwás, and Bhils are the principal tribes to employ the languages of this group. It by no means, however, follows that tribes speaking a Kolarian dialect are ethnically distinct from those who speak Dravidian, as it is not uncommon to find that a tribe possessing the physical characteristics of the Dravidians is classed linguistically as Kolarian. The division, therefore, into these two linguistic groups has a philological rather than an ethnological significance. Dravidian dialects are apparently spoken by about one-fifth of the population of India; Kolarian by about one-tenth.

Gond. TABLE I.

These people are regarded on linguistic grounds as Dravidian. They inhabit an extensive tract of country formerly known as Gondwáná, which extended from the Vindhyan mountains to the Godavery, and which now constitutes a large part of the Central Provinces. They are found also in the southern part of Chúta Nágpúr and a small number in Orissa. They occupy the tableland of Sátpurá and the hill country from Mandla to Asirgarh, as well as Koreá, Sirgúja, and Udaipur. They were a brave and independent people before the rise of the Mogul Empire. Whilst some still retain their independence and original faith, others have been subjugated and have become either Hinduised or Mahomedans. Colonel DALTON considers the Márias who inhabit dense jungles in Bastár, Chanda, and other southern dependencies to be the best type of the primitive aboriginal Gond.† Along with the Rev. G. HISLOP, he describes the wild Gonds as having flat noses, distended nostrils, thick lips, dark skin, scanty beard and moustache, and straight, black hair; sometimes the hair is said to be short, crisp, and curly, but quite distinct from the woolly hair of the negro. In some instances the head is shaved, leaving only a top-knot, but more frequently the hair is matted and

* Races of India. *Journ. Ethno. Soc.*, London. N.S. Vol. I. p. 130, 1869.

† See also Chanda Settlement Report; Colonel Glasfurd's Report on Bastár; Mr Robertson's Census Report, 1891.

untidy. The Gonds are about the same height as the Márias and Bhatras, but are larger and heavier in build than the Oráons or Kols. They are scantily clothed and the women are tattooed. The dead are cremated and the ashes are then buried, but it is said that the women and children are buried without being cremated. The grave is dug so that the head lies to the south and the feet to the north. In character, the Gonds are reserved, sullen, and suspicious, and the Márias are a shy, timid people. They are totemistic and exogamous. They practise both infant and adult marriage, and widows remarry. The unmarried young men sleep in a common dormitory, and in some villages there is a similar provision for the unmarried young women. DALTON says that they are indifferent cultivators, and careless about the appearance of their houses. The Gonds, who are not Hinduised, worship their own deities and the spirits of the forests in which they live. From the *Census Report* of 1891, it would appear that 1,379,580 people were returned as speaking the Gond branch of the northern Dravidian group of languages, though the actual numerical strength of the Gonds is said to be 2,897,591.

The Edinburgh University Anatomical Museum contains four skulls of Gonds from the Godavery district, though the exact locality is not known. They had originally been in the collection of the late Dr HANDYSIDE, and were marked "wild tribes called Götch or Gōnd, from Godavery district of Central India." They were all adults, though the wisdom teeth were not erupted in D; three were presumably males and one a female.

Norma Verticalis.—The crania had a marked family likeness. They were elongated, narrow, with vertical sides, and dolichocephalic in form and proportions. In the males the parietal eminences were feeble, in the female (C) they were more projecting and gave greater relative breadth to the cranium. In both sexes they were situated considerably in front of the occipital point. The vault of the skull was somewhat roof-shaped, but not ridged in the sagittal line. The skulls were cryptozygous or nearly so. In three specimens the stephanic diameter was greater than the asterionic.

Norma Lateralis.—The skulls rested behind on the cerebellar part of the occiput. The glabella and supra-orbital ridges, although visible, were not prominent even in the men. The forehead in the males only slightly receded; in the female it bulged slightly forward. The antero-posterior curve of the cranial vault rose gently to the vertex, and from the obelion it sloped downwards and backwards into the occipital squama, which projected behind the inion. There was no sign of parieto-occipital flattening. The frontal longitudinal arc in each skull was slightly less than the parietal, but always considerably in excess of the occipital arc.

The nasal bones were of moderate size, with the bridge not prominent and concave forwards; the fronto-nasal suture was not depressed, and the nasal spine of the superior maxillæ was moderate. The junction of the side walls and floor of the anterior nares was rounded, and in three specimens the floor of the nose was separated from the incisive region of the maxilla by a low ridge. The canine and incisor fossæ were of

moderate depth. The teeth were fully erupted except in D, in which the wisdoms had not appeared, and they were in good order except in B, in which the crowns were much worn. No skull was metopic, but the other cranial sutures were distinct and denticulated. In two skulls Wormian bones were in the lambdoidal suture, and in one also in the parieto-mastoid suture. In all, the ali-sphenoid and parietal articulated at the pterion, but in C the junction was very narrow; in B a very small epipteric bone was present in the suture. The muscular ridges and processes were not strong except in A. No skull had a 3rd occipital condyle or an exostosis in the external auditory meatus, or a subdivision of the malar bone. One skull had a pair of short para-mastoid processes: two had infra-orbital sutures. The interzygomatic breadth of the face invariably exceeded the intermalar, stephanic, and asterionic breadth; in A the interzygomatic breadth was slightly in excess of the parieto-squamous, and in B they were almost equal.

The lower jaw was moderate in size and with a deep symphysis in B; the chin was prominent; the coronoid height did not greatly exceed the condyloid. The intergonial width and gonio-symphysial length closely approximated to each other.

The mean cephalic index was 71.2 and the range of variation was from 69.4 to 75. The crania were therefore dolichocephalic. The greatest length of the crania ranged from 176 to 180 mm., and the mean was 177.5; the greatest breadth ranged from 123 to 132 mm., and the mean was 126.5. The vertical index was 76, and the range of variation was from 74.6 to 77.2. The crania were metriocephalic. The actual height of the skulls ranged from 132 to 139 mm., and the mean was 135. In each skull the basi-bregmatic height was greater than the parieto-squamous breadth.

The nasio-mental length ranged from 98 to 112 mm., with a mean of 104 mm.; the interzygomatic breadth ranged from 118 to 128 mm., with a mean of 121.5. The complete facial index ranged from 79.7 to 91.8, with a mean of 84.8; the skulls, therefore, were chamæprosopic or low-faced. The maxillary or upper facial index ranged from 46.9 to 53.4, with a mean of 50.2; in the proportion of its upper region, the face was in the lowest term of the leptoprosopic group.

The mean gnathic index was 99.8, and the range of variation was from 96.9 to 104.4; the skulls, therefore, on the average, were mesognathous, though one was orthognathous and another prognathous. The mean nasal index was 53.4, and the range of variation was from 48.9 to 56.8; though the mean was just within the platy-rhine group, two of the crania were mesorhine. The mean orbital index was 83, and the range of variation was from 81.1 to 83.8. All the orbits were microseme. The mean palato-maxillary index was 114.5, and the range of variation was from 105.3 to 122; the greatest palato-maxillary length was 56 mm. and the greatest breadth was 61 mm.; the skulls were in the mean mesuranic, though one was dolichuranic and two brachyuranic.

The mean cubic capacity of the four crania was 1274.5 cub. cent., *i.e.*, microcephalic, to which category each cranium belonged.

TABLE I.
Dravidian Tribes.

	Gond.				Oráon.			Pahária, Bírbhúm.		Kharwár Bogta.	Kandh.	
					Somra, Konka Village.	Jura, Lalpur Village.	Chandea Village.	Rampoojar.	Dhobía.	Bahadur.	Judisther-Jani, Bhatpara, Orissa.	
	E. U. A. M.				I. M.	I. M.	I. M.	I. M.	I. M.	I. M.	I. M.	E. U. A. M.
Collection number,	A.	B.	C.	D.	608	610	601	559	558	551	556	
Age,	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	50	Aged.	29	Ad.	25
Sex,	M.	M.	F.	M.	M.	M.	F. (?)	M.	M.	M.	F.	M.
Cubic capacity,	1238	1250	1295	1315	1420	1430	1250	1246	1206	1305	1070	1325
Glabello-occipital length,	180	177	176	177	186	189	175	176	178	175	158	172
Basi-bregmatic height,	139	132	134	135	130	136	127	124	128	128	123	140
Vertical Index,	77.2	74.6	76.1	76.3	69.9	72.	72.6	70.5	71.9	73.1	77.4	81.4
Minimum frontal diameter,	92	92	91	89	91	90	92	88	91	85	92	92
Stephanic,	110	110	105	101	104	104	105	102	102	101	115	106
Asterionic,	102	101	100	103	103	106	104	108	108	104	90	106
Greatest parieto-squamous breadth,	125p.	123s.	132p.	126p.	132s.	129s.	132p.	135s.	128s.	128s.	133p.	135s.
Cephalic Index,	69.4	69.5	75.0	71.2	71.	68.3	75.4	76.7	71.9	73.1	84.2	78.5
Horizontal circumference,	500	493	488	488	503	518	480	497	498	490	463	483
Frontal longitudinal arc,	135	132	130	130	130	128	118	127	118	123	110	119
Parietal " "	140	243	132	131	126	147	234	118	130	124	127	120
Occipital " "	103		108	114	121	110		109	112	115	105	119
Total " "	378	375	370	375	377	385	352	354	360	362	342	358
Vertical transverse arc,	298	298	298	299	305	304	290	292	280	294	287	296
Length of foramen magnum,	29	34	32	33	30	35	33	35	33	37	28	37
Basi-nasal length,	104	91	95	97	103	101	95	96	98	91	88	99
Basi-alveolar length,	102	95	95	94	98	...	91	95	...	84	89	95
Gnathic Index,	98.1	104.4	100.	96.9	95.1	...	95.8	99.	...	92.3	101.1	96.
Interzygomatic breadth,	128	122	118	118	127	130	123	129	134	121	115	128
Intermalar " "	117	113	109	109	115	124	108	111	124	112	106	116
Nasio-mental length,	102	112	...	98	108	126	...	...	...	107	...	108
Nasio-alveolar " "	60	64	63	57	64	...	61	64	...	62	51	64
Complete Facial Index,	79.7	91.8	...	83.	85.	96	...	...	...	88.	...	84.3
Nasal height,	47	46	44	43	48	50	46	48	45	47	37	47
Nasal width,	23	24	25	24	26	27	22	25	26	23	25	25
Nasal Index,	48.9	52.2	56.8	55.8	54.2	54.	47.8	52.1	57.8	48.9	67.6	53.2
Orbital width,	36	37	37	37	37	37	36	39	41	38	35	40
Orbital height,	30	30	31	31	31	33	30	32	31	35	27	32
Orbital Index,	83.3	81.1	83.8	83.8	83.8	89.2	83.3	82.	75.6	92.1	77.1	80.
Palato-maxillary length,	55	56	50	50	52	...	48	51	...	49	50	52
Palato-maxillary breadth,	61	59	61	60	67	72	55	...	...	65	60	68
Palato-maxillary Index,	110.9	105.3	122.	120.	128.8	...	114.5	...	...	132.6	120.	130.7
Lower jaw. { Symphysial height,	29	35	...	28	27	...	...	...	...	27	...	33
Coronoid " "	69	63	...	55	57	72	...	54	...	53	...	62
Condylod " "	60	61	...	53	60	67	...	59	...	50	...	61
Gonio-symphysial length,	88	87	...	84	80	90	...	77	...	78	...	81
Inter-gonial width, out- side,	89	87	...	79	89	106	...	86	...	89	...	100
Breadth of ascending ramus,	32	32	...	31	33	34	...	30	...	27	...	35

NOTE.—In the Tables, as in Part I, I.M. signifies Indian Museum; E.U.A.M., Edinburgh University Anatomical Museum; H.T., Henderson Trust-Collection; T.C.D., Trinity College, Dublin.

Oráon. TABLE I.

The Oráons, or Uráons, are a Dravidian tribe in Chúta Nágpúr, especially in the tributary states of Sirgúja and Jashpúr, but scattered also in Singbhúm, Manbhúm, and Hazáribágh. The tradition in the tribe is that they migrated from the west coast of India. DALTON states that the skin is a dark brown approaching black; the hair is long, black, coarse, and inclined to be frizzy; the jaws are projecting; the lips are thick; the forehead is low, narrow, and not receding; the eyes are bright but not oblique; the expression is pleasing; and the upper face displays intelligence. DALTON gives the height of a young man as 5 feet 2 inches, and that of four girls between 12 and 16 years as ranging from 4 feet 7½ inches to 5 feet ½ inch. The dress of the men is a long strip of cloth adjusted about the middle of the body, but giving free play to the limbs, and a girdle of cord is about the waist. The hair is gathered into a knot at the back of the head, in the knot are combs and ornaments of brass and glass; bright brass chains dangle from the ears. The women wear a waist-cloth, and when more civilised, a cotton dress, and ornament themselves with beads and copper or brass rings. They have tattoo marks on the brow and temple, and on the arms and back. The unmarried men sleep in a bachelor house, the Dhúmkúria, and it is probable that the young women have a similar arrangement. Adult marriage is practised, and widows may remarry. The dead are cremated, and the ashes are collected in an earthen vessel, which for a time is suspended to a post in front of the house of the deceased, but is subsequently buried. They eat flesh as well as vegetables. They worship a supreme being as represented by the sun. In the General Report on the Census of India, 1891, it is stated that 368,222 speak the tribal language, but that the numerical strength of the Oráons is 523,258.

Three skulls in the Indian Museum, obtained from the neighbourhood of Ranchi, are marked Oráon or Uráon: No. 601, from the village of Chandoa, 30 miles from Ranchi; No. 606 from Konka village; and No. 610 marked Jura from Lalpur village. They were presented by Mr W. H. P. DRIVER. They are all adult; I regarded two as males, but the sex of the skull from Chandoa was more doubtful.

In their general form they were elongated and ovoid, and with vertical sides, and resembled in general form the skulls of the Múnda race, also from Ranchi, to be described in a subsequent section. One was hyper-dolichocephalic, and the parietal longitudinal arc greatly exceeded the frontal and occipital; another was dolichocephalic with the frontal arc a little the longest; the third slightly exceeded the upper numerical limit of the dolichocephalic, and in it the parietal and occipital arcs could not be properly differentiated. In two specimens the basi-bregmatic diameter was less than the parieto-squamous, but in the hyper-dolichocephalic skull it was greater. The face was orthognathous. In two specimens the nose was platyrrhine; in the third it was leptorrhine. In two skulls the orbital proportions were microseme, in the third just within

the megaseme group. The palato-maxillary index in one was mesuranic, in another brachyuranic. The face in one was chamæprosopic, in the other leptoprosopic. In the two males the mean capacity of the cranium was relatively high for an aboriginal race, viz., 1425 c.c.; in the possible female skull the capacity was 1250 c.c.

Málé Paháriá or Hillmen of Rájmahál. TABLE I.

DALTON, in the *Ethnology of Bengal*, devotes a section in his chapter on the Dravidian tribes to the aborigines who inhabit the Rájmahál Hills. This range extends from the banks of the Ganges to the Bráhmañi river and the boundary of the Bírghúm district, and is in the Santál Parganá district of Bengal. He also states that in the Rámgarh Hills of the Bírghúm district, and at the foot of the Rájmahál Hills, are villages occupied by a tribe who call themselves Mál-Paháriás,—the precise affinities of which it is somewhat difficult to determine. As two skulls of aborigines marked Paháriás from Bírghúm have come under my observation, it is convenient, from their possible Dravidian affinities, to consider them in this section. The Málers are short in stature, face oval, nose not prominent but broad below, and with the nares circular rather than elliptical; lips full, eyes not oblique. They dress as well as the peasants of the plains, and the women wear a white skirt, a gay coloured square of silk over the right shoulder and tied under the left arm. The hair is collected into a knot behind the head, with two long locks hanging over the ears. They are apparently exogamous. Marriage is either infant or adult, and widows can remarry. A special house is provided for the bachelors, and another for the unmarried girls. They worship the sun and their ancestors, and believe in the transmigration of souls. The dead are sometimes buried, though, Mr RISLEY says, more usually cremated. They are hunters, but they also practise jhúm cultivation. They eat flesh as well as vegetables, and drink a fermented liquor. The numerical strength of the tribe is said to be 18,506, though 30,838 use the tribal language.

In the collection in the Indian Museum are the skulls of two men, Nos. 558, 559, from Bírghúm, both of whom had died in the prison hospital. No. 558, marked Dhobia Paháriá, was that of a man said to be 80 years old, with an edentulous upper jaw; he had sustained a comminuted fracture of the frontal bone, the pieces of which had subsequently united. No. 559, also marked Paháriá, was named Rampoojar, and aged 50.

The skulls were not roof-shaped, but were somewhat flattened at the vertex, and the outline was ovoid in the *norma verticalis*, though the cranium in one was not specially elongated, and the side walls bulged somewhat in the squamous region. In No. 558 the length-breadth index was 71·9, dolichocephalic, and the parietal longitudinal are greatly exceeded both the frontal and occipital; the vertical index corresponded with the cephalic. In No. 559 the length-breadth index was 76·7 in the lower term of the mesaticephalic group; in this skull the frontal longitudinal are greatly exceeded

the parietal and occipital ; the vertical index was much below the cephalic. The glabella and supra-orbital ridges were more prominent in the aged than in the younger man. In both the forehead slightly receded. In the old skull the parieto-occipital region was asymmetrical as if from artificial pressure, but in the other it had a gentle slope backwards. The nasion was not depressed, and the bridge of the nose, concave from above downwards, was distinct, though less so in the old man. The nose was platyrrhine in the old skull, 57·8, and nearly so in the adult—viz., 52·1, in which also the upper jaw was mesognathous. In both the orbital index was mesoseme. The muscular ridges were stronger in the aged skull, which was markedly phænozygous, and wide both in the interzygomatic and intermalar diameters ; it rested behind on the mastoids. The adult cranium was nearly cryptozygous, and rested behind on the occipital bone. In both the cubic capacity was small, the mean of the two being 1226 c.c.

Kharwár. TABLE I.

In Chúta Nágpúr and Southern Behar is a non-Aryan tribe named Kharwár, who speak a Kolarian tongue. The Bhogtas are the most important division of the tribe. DALTON states that the Kharwárs are mixed up with the Cheros, living in the same district, with whom they claim affinity. Both have become proselytes to Hinduism. When visited in 1794 by Captain J. T. BLUNT, they were seen to be nearly naked, and armed with bows, arrows, and hatchets. BUCHANAN found that whilst some were land-owners and others labourers, there were others again who were obviously primitive in habits, and represented the aboriginal inhabitants. The low Kharwárs are said by DALTON to resemble strongly the Santals. The skin was very dark, nose low and pyramidal-shaped, lips thick and protuberant, zygomata so prominent that the temples were hollow. Another observer says that the hair was black and straight. The facial type is much more refined in the land-owning class, owing to intermarriage with high castes. The women are tattooed as in other Dravidian tribes. The Kharwárs are totemistic, and marriage within the same sect is forbidden. They have in a large measure adopted the Hindu practice of infant marriage ; in the more primitive tribes the marriage of widows is permitted. Some of the clans continue to offer sacrifices to spirits. They practise cremation, and throw the ashes into a running stream. They will not eat flesh, but cultivate the soil for grain. According to the Census Report for 1891, their numerical strength was 112,298, but only 7651 spoke the tribal language.

The Indian Museum contains a skull, No. 551, of a man named Bahadur of the Bhogta division of the Kharwár tribe. He came from Gola, Hazáribágh, Chúta Nágpúr. He was reported as 29 years old, 5 feet 0·5 inch high ; eyes brown, not very almond shaped ; beard very scanty, slight moustache, no whiskers ; lips everted ; nose pyramidal ; cheek bones prominent. He died of phthisis, and is said to have been a poor example of his race. The skull was presented by Dr J. Wood.

The cranium was an elongated ovoid, though the sides were not so vertical as in many dolichocephalic skulls of the aborigines; the parieto-squamous diameter was considerably greater than the stephanic; a low sagittal ridge was associated with a moderate slope outwards to the parietal eminences. The length-breadth index, 73·1, was dolichocephalic, and the frontal and parietal longitudinal arcs were almost of the same length; the breadth and height were equal. The forehead was retreating; the glabella and supra-orbital ridges were moderate. The slope downwards from the obelion was steeper than in the more dolichocephalic crania; the occipital squama was prominent and projected behind the inion. The nasion was not depressed; the bridge of the nose was sharp and laterally compressed; the nasal spine of the superior maxillæ was strong, and a sharp ridge separated the floor of the nose from the incisive region of the jaw. The nasal index, 48·9, was almost leptorhine, and the gnathic index, 92·3, was orthognathic. The orbital index, 92·1, showed the height of the orbit to be almost equal to its breadth; the palato-alveolar arch, 132·6, was strongly brachy-uranic. In its complete facial index, 88, the face was chamæprosopic. The upper wisdom teeth were fully erupted, the lower were appearing; the upper incisive fossæ were deep. The skull was not metopic; there were no Wormian bones. A small epipteric bone was in the left pterion. The hard palate was strongly arched; the occipital condyles were flattened; the left jugular foramen was partially blocked by a growth from the petrous-temporal; the left jugal process was tuberculated. The lower jaw was feeble. The skull was cryptozygous, and rested behind on its lower occipital surface. The cubic capacity was 1305 c.c., and the cranium was microcephalic.

Kandh. TABLE I.

The Kandhs, Kondhs, or Khonds are regarded as Dravidians. The name signifies mountaineer, and they constitute one of the most important aboriginal tribes in Orissa, where they occupy an elevated plateau, intersected by ranges of hills called Kandhmals; but they are also scattered through the tributary states of Orissa. An interesting account of the people and their customs has been given both by Major MACPHERSON and by Colonel DALTON. The latter writer states that the men are physically a fine race, more so than the Gonds, Bhuiyás, and Páns. They are as tall as the average Hindu, and not much darker in complexion. He regards them as a mixed race, a blend of the Kol, Gond, and Aryan. They worship their own deities, one of the most important being the earth-god or goddess. They are an agricultural people, and before they came under British influence they made human sacrifices to the earth-goddess, and practised female infanticide. Their clothing is scanty, and consists of a waistcloth passed between the thighs. The long hair is tied into a horn-like projection between the eyes. The cheeks and forehead are tattooed. The Kandhs practise cremation. The unmarried young men have a common dormitory, and the girls also have a house assigned to them. Marriage is between adults, and not during infancy; widows may

remarry. They are inveterate drunkards. In the Census Report for 1891, 627,388 persons are returned as Kandhs, though only 320,071 speak the tribal language.

I have had the opportunity of examining two skulls said to be those of Kandhs. One was presented to me by a former pupil, now Major WM. B. BANNERMAN, M.D. It was that of a man named Judisther Jani, an inhabitant of the village of Bhatpara, in the Khonda subdivision of the commissionership of Orissa. The man had been hanged for murder in the jail at Cuttack. Another specimen, No. 556, in the Indian Museum, was presented by Dr W. D. STEWART, and was obtained from the Kandhmals. It was that of a woman said to be 18 years old, and 5 feet 1 inch in stature.

The male skull was that of an adult. The teeth were more worn in the upper jaw than in the lower. The sutures were unossified, and if it had not been for the worn condition of the molars, one would have regarded the man as about 30 years of age.

In the *norma verticalis* the skull was broadly ovoid with no sagittal ridge, and with a moderate slope from the suture to the parietal eminences. In the proportion of length and breadth the cranium was mesaticephalic, 78·5, and nearer therefore to the brachycephalic than the dolichocephalic standard. The parietal arc was only 1 mm. longer than either the frontal or occipital. The height was greater than the breadth, and the vertical index was 81·4, akrocephalic.

In the *norma lateralis* the glabella and supra-orbital ridges were moderate, the forehead was slightly receding, the vertex was moderately arched, and the slope backwards into the occipital squama was gentle. A slight want of symmetry was noticed in the occipital squama, but not sufficient to lead one to infer that there had been intentional parieto-occipital flattening. The skull was cryptozygous, and rested behind on the occipital condyles. The nasion was not depressed; the nasal bones were slender, and the osseous bridge was depressed and slightly concave. The nasal spine of the superior maxillæ was moderate, and the floor of the nose passed into the incisive region of the upper jaw without the interposition of a dividing ridge. The upper jaw was orthognathic. The complete facial index was 84·3,—i.e., chamæprosopic; the nasal index was platyrhine, and the orbital index was microseme. The palate was remarkably deep and brachyuranic. The lower jaw was well formed and with a strong chin. A large epipteric bone was in each pterion. The cubic capacity of the cranium was microcephalic, 1325 c.c.

The female skull, No. 556, from the Kandhmals, was that of a young woman, and the wisdom teeth were not erupted. A slight transverse constriction was seen behind the coronal suture. Its breadth was great in relation to the length. The parieto-occipital region was steepish but not flattened; the cephalic index, 84·2, placed it amongst the brachycephalic. The parietal arc was much longer than either the frontal or occipital. The vertex was flattened; the frontal and parietal eminences were prominent, the forehead was vertical, all of which are sexual characters. The height was considerably below the breadth, and the vertical index was 77·4. The bridge of the

nose was wide and flattened; the anterior nares were wide and rounded at the junction of the side walls with the floor; the nasal index was strongly platyrrhine. The upper jaw was mesognathous, the orbital index was microseme, and the palate was brachyuranic. The cranial capacity was only 1070 c.c. The skull was cryptozygous.

Nágesar or Kisán. TABLE II.

The Nágesars are a Dravidian tribe found in Sirgúja, Jashpúr, Palámau, and Lohárdagá in Chúta Nágpúr. DALTON says that in appearance they resemble the Kols, but not the best type, the Santal rather than the Ho. They are not, however, marked with a *godna* or arrow, and the women are not tattooed. DALTON describes them as ill-favoured, the forehead receding, narrow and low; the nose short, broad at the base and with a truncated appearance; the front teeth and jaws project, tilt up the lip and the end of the nose, and give a prognathic character. The skin is deep brown to black; the stature is short. They are totemistic and practise adult marriage. They offer sacrifices to the sun and other deities, but many of them worship the tiger—like the Santals—and they also adore their ancestors.

The Indian Museum contains the skull (No. 405) of a man æt. 30, of the Nágesar tribe from Chúta Nágpúr. He was a Dacoit named Lukroo, who died in prison. The skull was presented by Lieut.-Col. DALTON.

The cranium in the *norma verticalis* was an elongated ovoid with vertical sides, a ridge-like sagittal region with a steep slope downwards and outwards to the parietal eminences. The cephalic index was only 67·8, and the skull was hyper-dolichocephalic. The basi-bregmatic height materially exceeded the breadth, and the vertical index was 73·3. The glabella and supra-orbital ridges were moderate; the forehead somewhat receded; the parieto-occipital region sloped gradually backwards; the occipital squama was rounded and projected behind the inion. The nasion was shallow; the bridge of the nose was almost vertical and inclined to be flattened; the nasal spine of the superior maxillæ was feeble, and the anterior nares rounded off into the incisive region of the upper jaw. The nasal index, 53·2, was platyrrhine, but the gnathic index, 96·9, was orthognathous. The complete facial index was 80·6, i.e., low-faced or chamæprosopic. The height of the orbit was materially below the breadth, and the index, 84·2, placed the orbit almost in the microseme group. The palato-maxillary index, 111·1, was almost dolichuranic. The teeth were fully erupted and showed signs of wear; the canine fossæ were deep. The skull was not metopic, and the other sutures were not ossified; a small inter-parietal bone and smaller Wormian bones were in the lambdoid region. In the left pterion were two epipterice bones, and the right alisphenoid was pointed. The os planum of the ethmoid was pointed in front. A pterygo-sphenoid foramen was present on the right side. The muscular ridges were moderate. A third condyle was not present, and the right jugal process was tuberculated. The cubic capacity of the cranium was only 1252 c.c., therefore distinctly microcephalic.

TABLE II.

Dravidian Tribes.

	Nāgesar. Lukroo.	Bhuiyá.			Korwá. Fukeera.	Tamil from Madras.	
	I.M.	I.M.	I.M.	I.M.	I.M.	E.U.A.M.	
Collection number, . . .	405	441	439	438	404	...	...
Age,	30	Adult.	Adult.	Adult.	28	Ad.	Ad.
Sex,	M.	M.	M.	F.	M.	M.	M.
Cubic capacity, . . .	1252	1438	1330	1255	...	1150	1240
Glabello-occipital length, . .	180	189	175	177	186	181	181
Basi-bregmatic height, . .	132	136	142	131	137	131	132
Vertical Index,	73·3	72·0	81·1	74·0	73·7	72·4	72·9
Minimum frontal diameter, . .	89	95	94	89	91	90	87
Stephanic " " . . .	108	116	112	110	105	99	102
Asterionic " " . . .	102	106	109	96	107	101	95
Greatest parieto-squamous breadth,	122s.	132s.	130s.	133p.	128p.	121s.	130s.
Cephalic Index,	67·8	69·8	74·3	75·1	68·8	66·9	71·8
Horizontal circumference, . .	495	520	492	490	511	490	495
Frontal longitudinal arc, . .	120	130	128	130	130	129	123
Occipital " " . . .	243	253	234	125	138	125	130
Parietal " " . . .				109	104	105	108
Total " "	363	383	362	364	372	359	361
Vertical transverse arc, . .	288	302	313	305	300	273	287
Length of foramen magnum, . .	33	36	34	31	36	34	35
Basi-nasal length, . . .	98	105	103	95	105	104	105
Basi-alveolar length, . . .	95	100	103	...	99	95	101
Gnathic Index,	96·9	95·2	100·	...	94·3	91·3	96·2
Interzygomatic breadth, . .	124	131	133	115	126	123	123
Intermalar " " . . .	113	117	122	103	117	115	114
Nasio-mental length, . . .	100	...	...	...	106	105	...
Nasio-alveolar " " . . .	62	67	65	...	62	59	61
Complete facial Index, . . .	80·6	...	...	...	84·	85·3	...
Nasal height,	47	50	50	...	46	47	47
Nasal width,	25	26	25	...	27	27	25
Nasal Index,	53·2	52·	50·	...	58·7	57·4	53·2
Orbital width,	38	38	38	40	39	39	36
Orbital height,	32	29	31	38	28	29	30
Orbital Index,	84·2	76·3	81·6	95·	71·8	74·4	83·3
Palato-maxillary length, . .	54	56	54	...	54	53	53
Palato-maxillary breadth, . .	60	65	66	...	65	60	62
Palato-maxillary Index, . .	111·1	116·	122·2	...	120·	113·2	116·
Lower jaw.	Symphysial height, . . .	30	...	...	29	28	...
	Coronoid " " . . .	60	...	...	57	62	...
	Condylod " " . . .	59	...	...	54	61	...
	Gonio-symphysial length, . .	80	...	...	90	83	...
	Inter-gonial width, outside, .	93	...	...	96	91	...
	Breadth of ascending ramus,	29	...	...	29	34	...

Bhuiyá. TABLE II.

In addition to the name Bhuiyá, these people are known by other appellations. Colonel DALTON uses as an alternative Bhúniyá, Mr BUCHANAN HAMILTON calls them Bhungiyá, Mr RISLEY adopts the form Bhuiyá, but gives a number of synonyms; Mr W. CROOKE also names them Bhuiyá. Mr RISLEY considers the name to mean "children of the soil," and that it is not employed as a definite tribal designation, but as implying a status or connection with the land. Bhuiyá is said to be a Sanskrit word, used over India from Assam to Rajputáná and from Madras to Behar, associated with some claim to land, a fact which Mr RISLEY regards as strongly supporting his contention. Mr O'DONNELL, in his Census Report, p. 42, states that Bhuiyá, from Bhui, land, is in Hindu terminology synonymous with autochthon. Colonel DALTON considers that in some parts of Chúta Nágpúr the name has a tribal significance, and he links them with the Dravidians. He says that the lowest type have swarthy, almost black skins, and coarse negro-like features. In the Keunjhar hills they are apparently the dominant aboriginal people, and are described by DALTON as having the skin varying from deep chocolate to tawny; very large mouths; thick, projecting lips; low, narrow foreheads; eyes dark, well-shaped; hair abundant on head but not on face; stature short, averaging 5 feet 2 inches. The higher types found in Gangpur and Bonai are dark brown in colour; hair black, straight, abundant on head, scanty on face; stature moderate; cheek and jaw bones projecting; face broad and square; nose rather retroussé, not very broad at the root; mouth and teeth well formed; eyes straight, not large or deeply set.

In the tributary States the girls seldom marry before puberty, but in other parts the marriage age is twelve, and in the land-holding class during infancy. In some places the unmarried men have a common domicile, and the girls also have a house set apart for them. Widows may marry again. The wealthier classes are properly clothed, but amongst the more primitive people the raiment is very scanty. The women are tattooed. The dead are cremated and the ashes are thrown into an adjoining stream. They eat pork and fowls, but not the flesh of the cow or buffalo. Many of the Bhuiyás are Hinduised, others worship their ancestors. Mr CROOKE states that the rules of succession do not differ from those of cognate Dravidian tribes.

The Indian Museum contains three adult crania marked Bhuiyá from Keunjhar in the Orissa Hills, presented by Dr W. D. STEWART in 1868. Two of these, Nos. 439, 441, were males; one, No. 438, was that of a woman.

When examined in the *norma verticalis* the general form was an elongated ovoid, but the greater projection of the parietal eminences in the woman's skull raised its breadth to 133 mm., which in relation to the length gave it a cephalic index 75·1. In the two male skulls the index was 69·8 and 74·3 respectively; both were dolichocephalic. In the woman's skull and in one of the men the vertex was comparatively flat; in the

other man it was more roof-shaped, and the antero-posterior curve was higher at the vertex. The backward slope to the occipital point was more prolonged in the other crania. In the men the basi-bregmatic height exceeded the greatest breadth. In the woman it was somewhat less, and the greater parietal projection gave a pentagonal outline to the cranium, in which the frontal longitudinal arc was the longest. In the two men the large Wormian bones in the lambdoidal suture interfered with the measurements of the parietal and occipital longitudinal arcs. In two skulls a faint transverse depression behind the coronal suture indicated that a band had been worn during infancy. The forehead in the woman and in one man was almost vertical, but receded somewhat in the other male. The skulls were cryptozygous or nearly so, and rested behind on the occiput. The glabella and supra-orbital ridges only slightly projected. The nasion was not much depressed; the nose had a definite bridge, concave forwards; the nasal spine of the superior maxillæ was moderate. The nasal index in the two men was mesorhine, 52 and 50 respectively; in the woman's skull the face was broken. In the men the orbital index was microseme, in the woman megaseme; the palato-maxillary index was brachyuranic; the gnathic index in one male was orthognathous, in the other mesognathous. The teeth were erupted, though in one male the wisdoms were not fully in place. The cranial sutures were unossified; epipteric bones were seen in two crania. In one male, stunted paramastoid processes were present. In the female skull each occipital condyle was almost equally divided by a constriction into an anterior and a posterior area. The cubic capacity of the female skull was 1255 c.c., and the mean of the two males was 1384 c.c.

Korwá. TABLE II.

The Korwás are a Dravidian tribe living in Chúta Nágpúr, in the districts of Sargúja, Jashpúr, and Palámau, and claiming to be the aboriginal inhabitants. By some linguists the word Korwá is regarded as another form of Kol. They lead a nomadic life in the highlands, and armed with bows and arrows, are hunters and flesh eaters rather than agriculturists; though to some extent they are cultivators, and clear the ground by burning the jungle. DALTON states that they are the most savage looking of the Kolarian group of tribes. They are strongly built and active; the skin is dark brown, the face is broad, the forehead narrow, the hair is long and tangled, though in a figure of a man reproduced by Mr CROOKE, the head is shaven; they grow a beard and moustache. The more savage of the Korwás have black skins, flat faces, projecting chins, and tawny hair. In stature, the men of the Sargúja Korwás averaged 5 feet 3 inches, the women 4 feet 9 inches; but the men living on the Khúria plateau were somewhat taller; one measured 5 feet 8 inches. Both sexes are scantily clothed. They worship the tribal god Râja Chandol, and offer sacrifices to it, but the Sargúja tribe sacrifice to the spirits of their ancestors. They are totemistic, and apparently marriage is prohibited within the sept using the same totem. Mr CROOKE

says the marriage age for boys is twelve and ten for girls; widows may remarry. Some families cremate, others bury the dead. Mr O'DONNELL, in his Report on the Census of the Lower Provinces of Bengal, gives 79,954 persons as speaking the Korwá dialect of the Kolarian group of languages.

The Indian Museum contains a skull (No. 404) of a man of the Korwá tribe, 28 years old, named Fukeera, from Sargúja, Chúta Nágpúr. He died in prison, and the skull was presented by Lieut.-Colonel DALTON.

The cranium in the *norma verticalis* was an elongated ovoid, very narrow, somewhat roof-like in the sagittal region, and with the sides of the skull almost vertical. The length-breadth index was only 68·8, and the skull was hyper-dolichocephalic. The parietal longitudinal arc was more than the frontal and much longer than the occipital. The basi-bregmatic height materially exceeded the greatest breadth, and the vertical index was 73·7. The parieto-occipital region sloped gently downwards, and the occipital squama was rounded and projected behind the inion. The glabella was moderate and the forehead was somewhat retreating. The nasion was shallow; the bridge of the nose was slightly projecting and vertically concave. The nasal spine of the superior maxillæ was distinct, and a sharp border separated the floor of the nose from the incisive region of the upper jaw. The nasal index was 58·7, distinctly platyrrhine; the gnathic index, 94·3, was that of an orthognathous jaw. The orbital index, 71·8, was mesoseme, and the palato-maxillary index, 120, was brachyuranic. The complete facial index, 84, placed it in the low-faced group, chamæprosopic. The teeth were fully erupted, but not much worn; the canine fossæ were depressed. Small Wormian bones were in the lambdoidal suture. The skull was phænozygous, and rested behind on the occipital bone.

Múnda, Ho, or Larkha Kol. TABLE III.

The Múndas are a large non-Aryan tribe, occupying the plateau in Chúta Nágpúr which attains an elevation of 3000 feet. On linguistic grounds they are classed as Kolarian. Mr RISLEY states that the name Múnda is of Sanskrit origin, and is applied to the headman of the tribe or village; it is also used generally as a tribal name. As regards their language, physical characteristics, and customs, the Múndas, Hos, Bhúmij, Korwá, Kharriás and Santals are closely allied, and from speaking the languages of the Kolarian group, they are frequently classed together as Kols or Coles. There is a difference of opinion as to the derivation and meaning of the term Kol. It has been regarded as signifying pig, and used by the Indo-Aryans as a term of contempt applied to the aborigines; but it is now, on the authority of DALTON, considered to be derived from the Mundári word Ho, or Horo, which means a man. According to tradition, the Kols were the earliest settlers in the valley of the Ganges.

DALTON in his account of the Múndas regards the Hos or Larkha (fighting) Kols as so closely allied to them, that they are often included together in the same descriptive sentence. He states that the Múndas are located in Singbhúm, Chúta Nágpúr, and in the

territory known as Kolhán. The Hos admit that they are of the same family as the Múndas, and that they came from Chúta Nágpúr. DALTON considers that from their isolation and independence, they furnish the best illustration of the characteristics of the Mundâris. They are physically a much finer people than the Bhúmij, Santals, or Kharriás. The men are 5 feet 5 or 6 inches in height, the women 5 feet 2 inches; they have an erect carriage. The skin has a brownish coppery tint; the eyes are dark brown; the hair is black, straight or wavy. Many have high noses, oval faces, and young girls are sometimes seen with delicate features, finely chiselled straight noses, so that there may be an admixture of Aryan blood. DALTON has also met some with strongly marked Mongolian features and a dark skin like the Santals.

The clothing is reduced to a minimum, and often consists only of a loin-cloth brought between the thighs and fastened in front to a girdle. The women wear the hair collected into a knot touching the back of the right ear and decorated with flowers. Marriage is between adults and is exogamous, and widow marriage is permitted. The national emblem is a *godna* or arrow. The dead are cremated and the ashes are buried, the spot being marked by a large grave-stone, and often a megalithic monument is set up outside the village. They are active and courageous, truthful and sensitive to wrong. They cultivate the ground, but eat also fowls and the flesh of pigs. They worship the sun and several other deities. In the general Report on the Census of 1891, it is stated that the Múnda, Ho, Kol, Kur, and Korwá people number 1,109,157 by tribe, and that of these 840,282 speak the tribal language.

In the series of skulls lent to me by the Indian Museum, six specimens are marked Kol or Cole. One of these, No. 31, from Singbhúm, designated Larkha Kol, was presented by Colonel DALTON; another, No. 557, from the Kandhmals, marked Pan Cole, said to be 42 years old, height 5 feet 8 inches, and of dark complexion, was presented by Dr W. B. STEWART. Nos. 440, 442, and 444, also presented by Dr STEWART, were from Keunjhar, Orissa. No. 24, named Phugooa, given by Colonel DALTON, was from Moorgoo, Chúta Nágpúr; the age was said to be 65, the stature 5 feet 5 inches; hair of head straight, grey, that of face scanty; eyes regular; food rice, flesh, and vegetables.

In the same museum were nine skulls, marked Múnda from Chúta Nágpúr. Of these, No. 25 is said to have been in height 5 feet 4 inches; hair black, coarse, straight; eyes large, black, straight; food rice, flesh, vegetables; whilst No. 26 was 34 years old; height 5 feet 5 inches; hair black, coarse; eyes large, black, straight; food as above; they were presented by Colonel DALTON. The others were collected in or near Ranchi by Mr W. H. P. DRIVER. Dr HEDLEY WOOD has presented to me the skull of a woman aged 24, also obtained at Ranchi.

Sixteen crania marked Múnda or Kol have therefore come under observation; thirteen of which are apparently those of men and three those of women. They are all adults, with the exception of No. 25, said to be that of a youth of 18, in which, though the wisdom teeth were not erupted, the basi-cranial synchondrosis was ossified.

TABLE III.

Munda, Kol.

	Dholeja Munda. Jurobaree.	Dhirho Munda. Kakateh.	Hochar. Lodha Village.	Biphaiya. Madkom Village.	Mangra Munda. Ranchi. Old Town.	Debia Munda. Lalpur Village.	Lellie Munda. Konka Village.	Gonda Munda. Lalpur Village.	Somari Munda. Ranchi.	Kol. Phugosa. Moorgoo.	Larkha Kol. Singhahm. Mora.	Kol. Keunjhar.			Pan Cole.	Jattia Munda. Bhowro Village.
	I.M.	I.M.	I.M.	I.M.*	I.M.	I.M.	I.M.	I.M.	Metopic. E.U.A.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.*
Collection number, . . .	25	26	603	605	606	612	607	611	...	24	31	440	442	444	557	604
Age, . . .	18	32	45	Ad.	Ad.	Ad.	Ad.	Ad.	...	Ad.	Adult.	Aged.	Adult.	Adult.	42	Ad.
Sex, . . .	M.	M.	M.	M.	M.	M.	F.	F.	F.	M.	M.	M.	M.	M.	M.	M.
Cubic capacity, . . .	1248	1210	1375	1430	1315	1310	1000	1110	1180	1306	1215	1470	1176	1220	1388	1200
Glabello-occipital length, . .	176	179	180	191	183	180	165	168	170	182	175	182	176	178	191	164
Basi-bregmatic height, . .	132	128	131	141	133	129	130	126	128	130	130	138	130	130	126	132
Vertical Index, . . .	75	71.5	72.8	73.8	72.7	71.7	78.8	75	75.3	71.4	74.3	75.8	73.9	73	66	80.5
Minimum frontal dia- meter, . . .	89	89	96	97	89	90	88	92	91	94	90	101	94	95	97	93
Stephanic, . . .	102	105	102	109	99	100	89	97	109	111	110	121	107	110	118	107
Asterionic, . . .	105	100	104	109	99	105	89	93	102	104	106	106	101	104	110	99
Greatest parieto-squam- ous breadth, . . .	123s.	127s.	134s.	130s.	131p.	129p.	112s.	122s.	125	132s.	132s.	137s.	127s.	127s.	141s.	132s.
Cephalic Index, . . .	69.9	70.9	74.4	68.1	71.6	71.7	68	72.6	73.5	72.5	75.4	75.3	72.2	71.3	73.8	80.5
Horizontal circumference, . .	488	491	493	521	498	491	448	460	480	506	492	515	495	497	534	470
Frontal longitudinal arc, . .	125	112	124	135	124	120	112	116	120	130	122	130	122	124	130	118
Parietal " " " "	131	125	124	133	136	120	130	127	129	129	121	132	130	136	113	117
Occipital " " " "	111	118	112	130	125	110	103	99	101	112	116	120	108	104	128	108
Total " " " "	367	355	360	398	381	366	335	345	348	371	359	382	360	364	371	343
Vertical transverse arc, . .	278	285	301	312	287	291	277	280	237	298	290	312	287	295	298	300
Length of foramen mag- num, . . .	35	35	33	31	36	32	31	32	32	35	31	34	31	33	34	33
Basi-nasal length, . . .	91	101	101	102	94	96	98	93	95	98	95	101	101	101	101	97
Basi-alveolar length, . . .	88	95	93	102	93	96	95	88	94	93	86	100	99	...	99	95
Gnathic Index, . . .	96.7	94.1	92.1	100	98.9	100	96.9	94.6	98.9	94.9	90.5	99	98	...	98	97.9
Interzygomatic breadth, . .	123	122	128	130	131	128	115	120	125	125	131	133	...	...	133	126
Internalar " " " "	112	109	118	122	120	118	109	110	114	104	119	120	...	...	120	115
Nasio-mental length, . . .	102	107	115	117	106	103	98	...	...	...	107	...	...	...	...	100
Nasio-alveolar " " " "	59	62	62	70	60	...	54	56	64	60	63	68	63	...	63	58
Complete Facial Index, . .	82.9	87.7	89.8	90	80.9	80.4	85.2	...	...	...	81.6	...	...	...	...	...
Nasal height, . . .	45	47	47	52	48	45	41	42	47	46	50	54	48	...	47	43
Nasal width, . . .	23	26	23	27	25	25	24	22	25	23	26	25	22	...	27	24
Nasal Index, . . .	51.1	55.3	48.9	51.9	52.1	55.5	58.5	52.4	53.2	50	52	46.3	45.8	...	57.4	55.8
Orbital width, . . .	35	39	39	40	37	36	37	37	36	37	40	40	39	...	40	38
Orbital height, . . .	34	31	30	30	29	31	30	34	33	32	32	33	34	...	30	30
Orbital Index, . . .	97.1	79.5	76.9	75	78.4	86.1	81.1	91.9	91.7	86.5	80	82.5	87.2	...	75	78.9
Palato-maxillary length, . .	49	53	49	58	56	...	51	45	50	54	47	60	55	...	53	51
Palato-maxillary breadth, . .	62	66	63	68	64	...	62	...	60	64	66	69	65	...	63	59
Palato-maxillary Index, . .	126	124	128.5	117.2	114.2	...	121.5	...	120	118	140	115	118	...	118	115.6
Lower jaw.																
Symphysial height, . . .	30	29	31	32	31	...	27	...	...	...	30	...	...	...	...	26
Coronoid " " " "	60	62	65	66	...	63	53	...	...	...	66	...	...	...	...	52
Condylod " " " "	60	60	63	64	...	59	54	...	...	...	61	...	...	...	...	58
Gonio-symphysial length, . . .	85	86	86	91	86	88	80	...	...	...	85	...	...	...	...	80
Inter-gonial width outside, . . .	85	91	95	99	92	93	93	...	...	...	91	...	...	...	...	86
Breadth of ascending ramus, . . .	30	30	37	35	35	31	33	...	...	...	32	...	...	...	...	35

* With Skeletons.

Of the sixteen crania, No. 604, stated in the museum list to be Jattia Múnda, of Bhowro village, near Ranchi, differed so greatly in the form and proportions of the cranium from the others, that it will be described in a separate paragraph (p. 79). The following description applies therefore to fifteen skulls, and of these No. 444 consisted only of the calvaria. The lower jaw was absent in several specimens.

The crania presented in the *norma verticalis* an elongated ovoid form, with steep sides and moderate parietal eminences. The sagittal region showed no special ridge or flattening, nor was the slope outwards to the parietal eminence, though distinct, so marked as one sees in some aborigines. In the males, the glabello-occipital length ranged from 165 to 191 mm., and the greatest breadth from 123 to 141 mm. In three crania the cephalic index was below 70, hyper-dolichocephalic; in ten it ranged from 70 to 75, dolichocephalic; in two it was between 75 and 76, essentially dolichocephalic, though numerically in the mesaticephalic group. The mean cephalic index of the fifteen crania was 72. In these skulls the occipital was the smallest of the three longitudinal arcs, except in one specimen where it exceeded the frontal; usually the parietal had the longest arc, but in five specimens the frontal was the longer. In the males, the basi-bregmatic height ranged from 126 to 141 mm.; in the females from 126 to 130 mm. The mean vertical index in the fifteen crania was 73·4, *i.e.*, metriocephalic. The basi-bregmatic height exceeded the greatest breadth in ten skulls; in four it was less, and in two the diameters were equal.

The forehead in the men did not much recede, and the skull sloped gently backwards in the parieto-occipital region; as a rule, the occipital squama was rounded, and projected behind the inion. The glabella and supra-orbital ridges were moderate; as a rule the nasion was not depressed. The nasal bones were not large, and the bridge was either feeble or only moderately projected. The nasal spine of the superior maxillæ was moderate. In some specimens a ridge demarcated the floor of the nose from the incisive region; but as a rule, they rounded off into each other. The mean nasal index in fourteen skulls was 52·1, high in the mesorhine series; but in the individual specimens, whilst five were markedly platyrhine, seven were mesorhine, and two were leptorhine; eight skulls were microseme, and the mean orbital index of the series was 83·5, *i.e.*, microseme; but the range of variation was considerable, so that three were in the megaseme group and three were mesoseme. The mean gnathic index of the series was 96·6, *i.e.*, orthognathous; no specimen was prognathous, and only six were mesognathous. In the male skulls the greatest interzygomatic breadth was 133 mm., but the mean of ten specimens was only 128·4, which is materially below the measurements of the face breadth given in Part I. of this memoir, in the Chinese, Burmese, Nágás, and Esquimaux. Owing to the lower jaw being absent in several specimens, the nasio-mental diameter could only be taken in eight skulls, all of which were chamæprosopic, and the mean of the series was 84·8. The mean palato-maxillary index was brachy-uranic, 121·7, and only one skull was below the lowest term of that group.

One skull, that of a woman, was metopic. The sutures were as a rule distinct,

though in some they were more or less obliterated. The skull marked Pan Cole had a transverse depression behind the coronal suture as if from wearing a band during infancy. Wormian bones were present in the lambdoidal suture in several specimens. Three crania had a single epipteric bone, and in No. 25 the squamous temporal articulated with the frontal; no skull had a third condyle, but in No. 557 each occipital condyle was divided into an anterior and a posterior facet. The jugal processes were sometimes tuberculated. The crania rested behind either on the mastoids or occipital region. Several specimens showed the infra-orbital suture, and in one of these the superior maxilla and sphenoid articulated at the anterior end of the sphenomaxillary fissure. The cranial capacity ranged in twelve men from 1176 to 1470 c.c.; the mean of the series was 1305 c.c., and seven specimens exceeded the mean. In the three women the range was from 1000 to 1180, and the mean was 1097 c.c.

No. 605, Biphaiya Munda from Madkom village, near Ranchi, was accompanied by a skeleton, the bones of which I have examined.

Pelvis.—The chief measurements of the pelvis are given below. The alæ were expanded and the iliac fossa were not translucent; the subpubic angle was relatively wide; the pectineal lines were not knife-like; there was a shallow præauricular sulcus. The breadth-height index of the entire pelvis was 81·2. The transverse diameter of the brim was much more than the conjugate, and the brim index was 86·7, *i.e.*, platypellic.* The sacrum consisted of five vertebræ, and the sacral index was 110·5, *i.e.*, platyhieric.

Measurements of Pelvis.

Collection, Indian Museum, . . .	No. 605	No. 604				
Sex,	M.	M.				
1. Breadth of pelvis,	245mm	246mm				
2. Height of pelvis,	199	178				
3. Breadth-height Index,	81·2	72·3				
4. Between ant. sup. iliac spines,	215	222				
5. Between post. sup. iliac spines,	82	73				
6. Between ischial tubera,	136	116				
7. Vertical diameter of obturator foramen,	45	48				
8. Transverse diameter of obturator foramen,	33	29				
9. Obturator Index,	73·3	60·4				
10. Subpubic angle,	83°	62°				
11. Transverse diameter of brim,	113	114				
12. Conjugate diameter of brim,	98	87				
13. Pelvic Index,	86·7	76·2				
14. Length of sacrum,	95	4 vert.				
15. Breadth of sacrum,	105	102				
16. Sacral Index,	110·5	...				

True Vertebræ.—The cervical vertebræ were normal. Of the twelve dorsal vertebræ 1st to 8th were normal. The 9th had a small costal articular facet at the upper border, but none at the lower border of the side of the body. The 10th, 11th, and 12th had

* For the meaning of this and several other descriptive terms used to denote proportion between certain diameters of the skeleton, see my Report on Human Skeletons, in Challenger Reports, Part XLVII., 1886.

each a large single costal facet at the side of the body. The transverse process of the 10th dorsal had no costal facet, and those of the 11th and 12th had the usual three tubercles. The lumbar vertebræ were of the customary shape. The vertical diameter of their bodies in front and behind was as follows:—

	A.V.D.	P.V.D.	Indices.
1st lumbar,	24 mm.	25 mm.	104
2nd „	23 „	26 „	113
3rd „	23 „	26 „	113
4th „	20 „	22 „	110
5th „	21 „	21 „	100
Total 111 mm.		Total 120 mm.	Mean 108·1

In this skeleton the upper four vertebræ had the posterior vertical diameter longer than the anterior. It is customary to find the antero-vertical diameter of the 5th vertebra longer than the postero-vertical, but in this specimen they were equal. The mean general index of the series of five vertebræ was as high as 108·1, which places the lumbar spine in the koilorrhachic group.

Upper Limb.—Clavicles slender, right 138 mm., left 136 mm. long; subclavian groove shallow. Scapulæ: right, 143 mm. long, 105 broad, index 73·4; left, 150 mm. long, 106 broad, index 70·6. Supra-scapular notch shallow and wide, but with a distinct border. Humerus with shallow musculo-spiral groove and moderate muscular impressions, no supra-condylar process or inter-condylar foramen. Bones of forearm not specially noticeable. Radio-humeral index, 83·3 or dolichokerkic.

	Right.	Left.
Humerus, head to trochlea,	307 mm.	312 mm.
Radius to tip of styloid,	256 „	255 „
„ base „	252 „	250 „
Ulna to tip of styloid,	281 „	281 „
„ articular surface,	276 „	278 „

Lower Limb.—Femur with linea aspera and external condylar ridge fairly well marked, also the trochanters and gluteal ridge; no platymery; articular area on internal condyle prolonged forwards and lying in the same transverse plane as the origin of the inner head of the gastrocnemius; popliteal surface plano-concave. Tibia with the head retroverted; condylar surfaces with shallow concavities; antero-posterior diameter of shaft of right tibia in plane of nutrient foramen, 36 mm.; transverse diameter in same plane 25 mm.; index of platyknesia 69·4; the corresponding diameters of the left bone were 37 and 24 mm. No articular facet on the front of lower end of left tibia continuous with the astragalar area was seen, but a slight indication of one was present in the right bone. The fibulæ had strong oblique ridges and a deep concavity for the origin of the tibialis posticus.

No. 604, referred to on p. 77, and marked Jattia Múnda from Bhowro village, is so different in configuration from the other Múnda crania that there can, I think, be little doubt that it has been erroneously named by the collector. The skull is brachycephalic, 80·5, in its proportions and form. It was rounded in outline when seen from the

norma verticalis, and comparatively flattened on the vertex. The frontal and parietal eminences were distinct, and the skull sloped steeply downwards in the parieto-occipital region, where it was unsymmetrical and flattened on the left side. The frontal longitudinal arc was the longest; the basi-bregmatic diameter was the same as the parieto-squamous. The upper jaw was orthognathous, the nasal index was platyrrhine, the orbital index was microseme, and the palato-maxillary index was barely brachyuranic. Although I have given the measurements of the lower jaw sent with the skull, I doubt if it really belonged to it. The cranial capacity was 1200 c.c.

The skull was accompanied by other bones of the skeleton.

Pelvis.—The measurements of the pelvis are given on page 78. The iliac fossæ were translucent, and the alæ were expanded; the subpubic angle was acute; the obturator foramen had a long vertical diameter. The pelvis was broad in relation to the height, and the index was 72·3. The transverse diameter of the pelvic brim greatly exceeded the conjugate, and the brim index, 76·2, was platypellic. The pectineal lines were knife-like; the præauricular sulcus was faintly marked. Only four sacral vertebræ were present; the body of the 4th was oval like a normal 5th, and its laminae formed two sacral cornua and did not meet behind in a spine. The base of the sacrum had on the right of its body an articular surface for the right transverse process of the 5th lumbar vertebra.

True Vertebræ.—The cervical vertebræ were normal. The dorsi-lumbar vertebræ were eighteen in number. The 10th had a single facet on the side of the body for a part of the head of the 10th rib; the 11th and 12th had single facets for their corresponding ribs, they had both rudimentary transverse processes, and the inferior articular processes of the 12th dorsal were convex, and looked forwards and outwards. There were six vertebræ between the 12th dorsal and 1st sacral. The first of these approximated in shape to the 12th dorsal; its transverse processes were rudimentary, and showed the superior, inferior and external tubercles. On the side of the pedicle, immediately in front of the external tubercle, was a smooth facet 2 mm. in diameter, apparently for the head of a rudimentary rib; its articular processes had the characters of a lumbar vertebra. The remaining five vertebræ had the customary lumbar characters, and the right transverse process of the lowest was divided by a deep furrow into a non-articular part, and an articular part which was jointed to the base of the sacrum. The vertical diameters of the bodies of these vertebræ, in front and behind, was as follows:—

	Ant. V. Diam.	Post. V. Diam.	Index.
Dorsi-lumbar,	23 mm.	26 mm.	113
1st lumbar,	24 "	26 "	108·3
2nd "	24 "	25 "	104·1
3rd "	23 "	24 "	104·3
4th "	22 "	22 "	100
5th "	24 "	21 "	87·5
	Total 117 mm.	Total 118 mm.	Mean 100·8

In this skeleton the 4th lumbar body showed an equality in the vertical diameters; in those higher up the posterior diameter exceeded the anterior, whilst in the lowest, the anterior was distinctly greater than the posterior diameter. The mean general index of the series of five vertebræ was 100·8, and the lumbar spine was in the orthorachic group.

Upper Limb.—The bones of the upper limb were slender, and the muscular markings were feeble. The Humerus had neither supra-condyloid process nor inter-condylar foramen; the musculo-spiral groove was shallow, and the shaft had only a slight twist. The right radio-humeral index was 75·3, mesatikerkic.

	Right.	Left.
Humerus, head to trochlea,	292 mm.	288 mm.
Radius, head to tip of styloid,	220 "	222 "
" " base "	217 "	216 "
Ulna, olecranon to tip of styloid,	238 "	240 "
" " lower articular surface,	234 "	236 "

The Clavicles were: right bone, 129 mm., left, 134 mm. long; their subclavian grooves were scarcely marked. The right Scapula was 129 mm. long and 91 broad, index 70·5; the left was 129 mm. and 94 broad, index 72·9; the supra-scapular notch was shallow and not differentiated from the superior border by a sharp margin.

Lower Limb.—The bones of the lower limb were also slender. In the Femur the trochanters and gluteal ridges were fairly marked, but there was no platymery. The linea aspera and external condylar ridge were distinct, the popliteal triangle was flattened or faintly concave; the inner condylar articular surface was prolonged backwards and in the same transverse plane as the place of origin of the inner head of the gastrocnemius. The head of the Tibia was slightly retroverted; the lower articular end was not prolonged on the front of the bone. The antero-posterior diameter of the shaft in the plane of the nutrient foramen was for the right bone, 28 mm.; for the left, 27 mm.; the transverse diameter was in each bone 21 mm.; the index of platyknemia was 75 in the right tibia.

In No. 605 the tibio-femoral index 86·4 was dolichoknemic; in No. 604 the index was 82·96, practically also dolichoknemic, *i.e.*, with a relatively long tibia.

	No. 604.		No. 605.	
	Right.	Left.	Right.	Left.
Femur, maximum length,	410 mm.	410 mm.	445 mm.	445 mm.
" oblique length,	405 "	408 "	441 "	441 "
Tibia, condylar surface to tip of malleolus,	343 "	336 "	395 "	393 "
" " " astragular surface,	336 "	332 "	381 "	381 "
Fibula, maximum length,	341 "	339 "	377 "	378 "

*Bhúmi*j. TABLE IV.

The *Bhúmi*j is a non-Aryan tribe living in the Manbhúm and Singbhúm districts of Chúta Nágpúr as well as in Western Bengal. They are regarded as the original inhabitants, and are located by DALTON in the country between the Kasai and Subarnarekhá rivers. They have been classed on linguistic grounds as Kolarian; most authorities regard them as closely allied to, and probably identical with, the Múndas, with whom they associate and intermarry. DALTON says that their appearance is inferior to that of the best of the Múndas and to the Hos of Singbhúm. They are short, but strongly built. The skin ranges in colour from a light brown to a dark chocolate. They build commodious houses and practise adult marriage. The divisions of the tribe are totemistic, and the marriage of adults is exogamous, as amongst the Múndas; widows may remarry. The dead are cremated, and the body is laid upon the pyre with the head to the south; the ashes are buried under gravestones, which are sometimes of large size. They are agriculturists, but they eat fowls and drink fermented liquors. They worship the sun as well as minor deities. Their numbers do not appear to have been separately recorded in the General Report on the Census of 1891, but in the special census of the lower provinces of Bengal and their Feudatories, Mr C. J. O'DONNELL gives a total of 306,473.

I have examined two skulls of the *Bhúmi*j tribe, both adult males, collected at Mánbhúm. One in the Indian Museum, No. 18, is named Aunundo Bhoomiz; in the list supplied to me he is said to have been 40 years of age, 5 feet 3 inches in height, hair and eyes black, whiskers small. The other, a male named Karnai, aged 30, was presented to me by Dr J. J. HEDLEY WOOD.

In both specimens the cranium was long, relatively narrow, and roof-shaped in the sagitto-parietal region. The parietal eminences were well in front of the occipital point which projected behind the inion; the side walls of the cranium were almost vertical. In one skull the length-breadth index was 72·7, in the other 70·9; both were dolichocephalic. In one the frontal and parietal longitudinal arcs were equal and in excess of the occipital; in the other the frontal arc was the longest. In one the basi-bregmatic diameter was less than the greatest breadth; in the other it was slightly longer. The glabella and supra-orbital ridges were moderately projecting; the forehead slightly receded; the antero-posterior curve of the vault rose gradually to the vertex, and then sloped gently downwards to the occipital squama. In neither skull was any sign of parieto-occipital flattening. The nasion was somewhat depressed; the nasal bones were short, concave forwards, and only feebly projecting. The nasal spine of the superior maxillæ was moderate, and the floor of the nose was separated by a slight ridge from the incisive surface of the jaw.

The nasal index in both specimens was in the higher mesorhine group; the gnathic index in both was orthognathous; one skull was mesoseme, the other megaseme; the

TABLE IV.

Bhūmij and Turi Races.

	Bhūmij. Mánbhūm.		Mánbhūm. Race unknown. Scapho- cephalic.	Turi.				
	Aunundo Bhoomiz.	Karnai.		Bitna. Surungee.	Sookeam. Teerrah.			
	I.M.	E. U. A. M.	I.M.	I.M.	I.M.			
Collection number, . . .	18	...	407	22	23			
Age,	40	30	Ad.	28	35			
Sex,	M.	M.	M.	M.	M.			
Cubic capacity,	1414	1235	1410	1280	1435			
Glabello-occipital length, .	183	182	194	183	188			
Basi-bregmatic height, . .	131	130	137	132	132			
Vertical Index,	71.6	71.4	70.6	72.1	70.2			
Minimum frontal diameter, .	94	89	93	93	95			
Stephanic,	115	113	107	110	111			
Asterionic,	105	100	114	99	109			
Greatest parieto-squamous breadth,	133s.	129	125s.	133p.	135s.			
Cephalic Index,	72.7	70.9	64.4	72.7	71.8			
Horizontal circumference, .	517	502	520	514	518			
Frontal longitudinal arc, .	135	130	137	128	127			
Parietal " "	135	125	143	131	118			
Occipital " "	114	103	124	106	129			
Total " "	384	363	404	365	374			
Vertical transverse arc, . .	302	233	298	308	304			
Length of foramen magnum, .	36	34	32	...	38			
Basi-nasal length,	95	101	102	101	99			
Basi-alveolar length, . . .	92	93	94	102	101			
Gnathic Index,	96.8	92.1	92.2	101	102			
Interzygomatic breadth, . .	129	126	125	124	134			
Intermalar " "	110	119	117	115	121			
Nasio-mental length, . . .	120	113	109	...	110			
Nasio-alveolar " "	66	64	65	61	66			
Complete Facial Index, . .	93	89.7	...	...	82			
Nasal height,	50	46	48	44	46			
Nasal width,	26	24	24	27	24			
Nasal Index,	52	52.2	50	61.4	52.2			
Orbital width,	38	35	37	41	39			
Orbital height,	33	32	29	31	30			
Orbital Index,	86.8	91.4	78.4	75.6	76.9			
Palato-maxillary length, . .	53	52	52	56	58			
Palato-maxillary breadth, .	61	69	61	65	65			
Palato-maxillary Index, . .	115	132.7	117.3	116	112			
Lower jaw. { Symphysial height, . . .	35	32	29	...	32			
{ Coronoid " "	65	55	64	...	64			
{ Condylod " "	58	59	65	...	65			
{ Gonio-symphysial length, .	91	82	89	...	96			
{ Inter-gonial width outside,	96	95	96	...	98			
{ Breadth of ascending ramus,	30	33	37	...	38			

palato-maxillary index in one was brachyuranic, in the other mesuranic. In one the complete facial index was chamaeprosopic, in the other high-faced leptoprosopic. The teeth were somewhat worn from use; the canine and incisor fossæ were deep. The cranial sutures were distinct. In one there were no irregular ossifications; in the other the right pterion had a large epipteric bone. The muscular ridges and processes were well marked. In one the cubic capacity, 1414, was mesocephalic; in the other, 1235 c.c., microcephalic. The lower jaw was well proportioned and possessed a square chin.

Another skull from Manbhúm, an adult male, No. 407 in the Indian Museum, is marked "race unknown." It is a characteristic specimen of a scaphocephalic cranium. Although not known to be a Bhúmij, yet as it came from Manbhúm, it is convenient to describe its characters here. The skull was greatly elongated and narrow, strongly keeled in the sagittal region, and with the suture obliterated; the lambdoidal suture was almost completely obliterated, but the coronal and the lateral longitudinal sutures were to all appearance unossified. The glabella and supra-orbital ridges were prominent, and the nasion was depressed. The nasal bones were short and prominent. The canine and incisive fossæ were deep. The nasal spine of the superior maxillæ was moderate. The dimensions of the skull are given in Table IV. The modifications in shape produced by the premature closure of the sagittal and lambdoidal sutures have, however, deprived this skull of any ethnic significance. It will be seen from the Table that owing to the elongation of the cranium and the diminished parieto-squamous breadth, the length-breadth index is only 64·4. The cubic capacity, 1410 c.c., is apparently not affected by the cranial deformity.

Turi. TABLE IV.

The Turis are a non-Aryan tribe or caste, living in Chúta Nágpúr. In his account of these people Mr RISLEY states that they are without doubt a Hinduised offshoot of the Múndas. He adduces in support of this opinion the following:—They use amongst themselves a dialect of Mundari; their totems correspond closely with those in force amongst the Múndas; their original religion is closely akin to the form of animism current among the Múndas.

The Turis are cultivators and makers of baskets. They are, like the Múndas and Oráons, lax in articles of food. Each sub-caste is strictly endogamous. Girls usually marry as adults and widows can marry again. The caste is small, and in 1881 numbered apparently about 30,000 persons.

Two crania, marked Turi, are in the Indian Museum. No. 22 is that of Bitna, from Surungee. He was 28 years old; 5 feet 4 inches high; hair black, straight; eyes black, small; no beard or whiskers. No. 23, Sookeam, was from Teerrah. He was 35 years old; 5 feet 3 inches high; hair black, straight; eyes black; no beard or whiskers. Both men had been hanged in Ranchi jail as murderers.

The skulls resembled each other in the *norma verticalis*; they were elongated ovoids, with distinct parietal eminences, and with a moderate slope outwards from the sagittal suture. They were both dolichocephalic, the mean length-breadth index being 72·2; in Bitna the parietal arc was a little longer than the frontal, but in Sookeam the occipital arc had the unusual diameter, 129 mm., and was longer than either the frontal or parietal. In each skull the basi-bregmatic height was slightly less than the breadth. The forehead was moderately receding, and the glabella and supra-orbital ridges were not prominent; the crania sloped gently backwards and downwards from the obelion; the occipital squama was rounded and prominent. The upper jaw slightly projected, and the gnathic index, mesognathous, was 101 and 102. The nasion was shallow; the bridge of the nose was concave vertically; the nasal spine of the superior maxillæ was moderate, and the anterior nares were rounded at the junction of the side-wall and floor. The nasal index in Bitna was markedly platyrrhine; in Sookeam it was mesorrhine, and in his skull the face was chamæprosopic. In both skulls the orbital index was microseme; in one the palato-maxillary index was mesuranic, in the other in the lower term of the brachuranic group. In No. 22 the arch of the palate was much deeper than in No. 23. Both crania were barely cryptozygous, and they rested behind on the cerebellar part of the occiput. In Bitna the wisdoms were erupted, in the other skull in process of eruption; the incisor fossæ were deeper than the canine. The frontal suture was closed, but the other sutures were not ossified. In No. 23, small Wormian bones were in the lambdoidal suture, but there were no other special abnormalities. The muscular ridges were fairly developed. In Bitna the cranial capacity was only 1280 c.c., *i.e.*, microcephalic, whilst in Sookeam the capacity, 1435 c.c., placed it high in the mesocephalic group.

Juang. TABLE V.

The Juangs are a non-Aryan tribe living in the hill districts of Dhekanál and Keunjhar, two of the tributary states of Orissa. DALTON groups them with the Kolarians on account of some affinities of language, but he also says that, whilst they have adopted many Uriyá words, they employ vocables which cannot be connected with any Aryan, Kolarian, or Dravidian language. They are a primitive people, and claim to be the autochthones in Keunjhar. They are remarkably shy and timid. The stature of the men is somewhat less than 5 feet, that of the women about 4 feet 8 inches; the forehead is upright, but narrow and low; nasal bones depressed, alæ of nose spreading; mouth large, lips thick, upper jaw rarely prognathous, chin receding; hair coarse and frizzly; prevailing colour of skin a reddish brown; the jaw is flat, and the cheek bones are strongly projecting. The women tattoo the forehead and temples. Those seen by DALTON were not clothed, but wore a girdle composed of several strings of beads from which depended scanty curtains of leaves. The men wear a small cotton loin cloth. They had no knowledge of metals or pottery. They cremate the dead, and place the body on the bier with the head to the south; the ashes are thrown into a running

stream. Their huts are low, and measure about 6 feet by 8; but the boys of the village occupy a common dormitory. Marriage takes place between adults, and widows may remarry. They are exogamous. They are semi-nomadic in their habits, cultivate the ground sparingly, and eat all kinds of flesh. Little is known of their religious creed, and they make sacrifices to the sun and earth. 11,171 persons were said in 1891 to speak the tribal language.

The Indian Museum contains two skulls from Keunjhar in the Orissa hills, stated in the MS. Catalogue to be those of Juangs. They were presented by Dr STEWART in 1868. The larger skull, No. 443, is that of a man. The smaller, No. 446, is that of a woman. The male skull in the *norma verticalis* was an elongated ovoid, sloping steeply from the sagittal suture to the parietal eminences, below which the side walls of the skull were almost vertical. The cephalic index was 73·2, and the skull was dolichocephalic in form and proportions. In both, the parietal longitudinal arc exceeded the frontal. The height in the male was greater than the breadth, and the vertical index was 79·3. The glabella and supra-orbital ridges were moderate, the forehead was not specially receding, the slope from the obelion was not precipitous, and the occipital squama above the inion was not prominent, but there was no evidence of parieto-occipital flattening. The fronto-nasal suture was shallow; the nasal bones were short, narrow, concave forwards, and only slightly projecting. The canine and incisor fossæ were not specially marked; the skull was barely cryptozygous, it rested behind on the mastoids. The occipital bone sloped steeply upwards from the foramen magnum to the inion. The muscular ridges and processes were moderate; the sutures were simple and often with two small Wormian bones in the lambdoidal suture. The parieto-sphenoid articulations were broad. The sockets of the teeth were broken, and there were no marked osseous irregularities.

The female skull was much smaller; it was more flattened on the vertex than the male. Proportionally it was not so elongated, and its cephalic index was 77·4. The height was a little less than the breadth, and the vertical index was 76·2. The forehead was more vertical, and the glabella and supra-orbital ridges were feeble; the occipital squama above the inion was more projecting, and below the inion it was not so steep as in the male skull. There was no evidence of parieto-occipital flattening. The nasal bones were larger than in the man, but the bridge of the nose had a similar curvature. The canine fossæ were more hollowed out, and the teeth were much worn down. The cranial sutures were in process of obliteration; small Wormian bones were present in the lambdoidal suture; the parieto-sphenoid articulation was moderately broad. The mastoids were very feeble. The skull was cryptozygous, and rested behind on the occipital condyles.

Both crania were orthognathous and platyrrhine. The proportions of the orbit in the woman were microseme, and in the man megaseme. The cranial capacity of the woman was very low, 1030 c.c.; but in the man it reached 1420 c.c.

TABLE V.

Juangs, and various Tribes or Castes.

	Juang.		Koydwar. Nagooloo.	Bunjana.	Bhima.		Ahir- Goálá. Teetoo. Puttea.	Teli.		Kámár. Bhudny. Hazári- bágh.	Lohár. Ranchi.
	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	E.U.A.M.	E.U.A.M.	I.M.
Collection number, . . .	443	445	284	285	602	599	27	598	...	...	600
Age,	Ad.	Ad.	50	40	Ad.	Ad.	25	Ad.	23	Ad.	Ad.
Sex,	M.	F.	M.	M.	M.	F.	M.	M.	F.	F.	F.
Cubic capacity, . . .	1420	1030	1267	1292	1270	1170	1328	1370	1005	1230	1240
Glabello-occipital length, .	179	164	181	166	180	178	183	184	168	173	170
Basi-bregmatic height, . .	142	125	126	131	132	125	135	138	110	128	131
Vertical Index,	79.3	76.2	69.6	78.9	73.3	70.2	73.8	75.	65.8	74.	77.1
Minimum frontal diameter, .	95	87	87	93	89	92	89	95	89	90	90
Stephanic,	109	110	112	112	102	103	102	109	104	102	107
Asterionic,	103	94	104	106	100	98	100	108	94	100	103
Greatest parieto-squamous breadth,	131p.	127s.	129s.	142s.	130s.	123p.	125p.	134s.	121	128	130s.
Cephalic Index,	73.2	77.4	71.3	85.5	72.2	69.1	68.2	72.8	72.	74.	76.5
Horizontal circumference, .	500	465	498	495	494	491	502	508	474	481	473
Frontal longitudinal arc, . .	120	120	128	121	122	130	126	125	114	125	126
Parietal " "	135	125	120	120	126	130	137	253	120	118	120
Occipital " "	115	96	110	103	113	96	107	...	105	105	106
Total " "	370	341	358	344	361	356	370	378	339	348	352
Vertical transverse arc, . .	310	283	290	305	296	285	292	292	269	281	288
Length of foramen magnum, .	33	30	35	37	35	36	41	36	27	34	34
Basi-nasal length,	106	93	100	98	102	91	96	102	91	100	96
Basi-alveolar length, . . .	103.1	86	96	93	99	90	87	97	95	95	89
Gnathic Index,	97.2	92.5	96.	94.9	97.1	98.9	90.6	95.1	104.4	95.	92.7
Interzygomatic breadth, . .	126	121	119	131	131	122	124	134	119	123	123
Intermalar,	116	107	109	120	118	112	111	120	114	112	112
Nasio-mental length, . . .	...	...	100	105	104	...	106	...	...	...	106
Nasio-mental complete facial Index, . . . . .	...	...	84.	80.	...	...	...	...	...	...	60
Nasio-alveolar length, . . .	...	60	60	63	64	65	63	67	58	59	...
Maxillary upper facial Index, .	...	...	50.4	48.	79.4	...	85.	...	...	...	86.1
Nasal height,	47	44	48	49	50	46	47	47	42	45	46
Nasal width,	25	24	27	26	21	23	25	25	24	24	22
Nasal Index,	53.2	54.5	56.3	53.1	42.	50.	53.2	53.2	57.1	53.3	47.8
Orbital width,	39	38	38	38	36	39	39	39	36	36	37
Orbital height,	35	31	29	35	32	36	34	31	31	30	32
Orbital Index,	89.7	81.6	76.3	92.1	88.9	92.3	87.2	79.5	86.1	83.3	86.5
Palato-maxillary length, . .	...	47	52	50	53	54	52	53	54	52	49
Palato-maxillary breadth, . .	...	55	59	61	60	61	63	65	65	64	58
Palato-maxillary Index, . .	...	117.	113.4	122.	113.2	112.9	121.1	122.6	120.	123.	118.3
Lower jaw. { Symphysial height, . .	...	...	28	27	22	...	30	...	...	...	28
Coronoid " " . . . . .	...	...	57	60	65	...	61	...	...	...	51
Condylod " " . . . . .	...	...	58	63	60	...	56	...	...	...	48
Gonio-symphysial length, . .	...	...	83	82	80	...	89	...	...	...	81
Inter-gonial width, . . . .	...	...	95	88	94	...	101	...	...	...	92
Breadth of ascending ramus, .	...	...	27	28	33	...	30	...	...	...	34

Bhima. TABLE V.

Two skulls, Nos. 599, 602, presented to the Indian Museum by Mr W. H. P. DRIVER, are marked Bhima race. The former is apparently that of a woman, and the latter that of a man who died in Ranchi. I have had a difficulty in determining the tribe, caste, or race known as Bhima. I find, however, that Mr ROBERTSON, in his *Report*, p. 183, speaks of Bhimas as vagrants who form a small sub-division of the Gonds; but it is possible that it may be a mis-spelling of Bhaina, a tribe living along the southern border of Chûta Nágpûr.

The general form of the skulls in the *norma verticalis* was an elongated oval with the sides of the cranium steep, the parietal eminences not very bulging. The sagittal region was not ridged, and the slope downwards to the parietal eminences was not very steep. The slope from the obelion to the occipital point was gradual; the occipital squama moderately projected. In both, the length-breadth index was dolichocephalic; in the male the parietal longitudinal arc exceeded the frontal; in the female they were equal. In each skull the basi-bregmatic diameter was greater than the parieto-squamous, and the vertical index was higher than the cephalic. The forehead did not much recede, and the glabella and supra-orbital ridges showed no special projection. The nasal bones had not much prominence, and the bridge was concave in the vertical direction; the nasal spine of the superior maxillæ was relatively small. In the male the anterior nares were narrow, and the index was leptorhine; in the woman it was mesorhine. In the man the upper jaw was orthognathous, in the woman mesognathous. In the man the orbital index was mesoseme, in the woman megaseme. In both the palato-maxillary index was mesuranic. The cubic capacity was microcephalic, 1270 and 1170 c.c. respectively.

Koydwar. TABLE V.

The Indian Museum contains the skull, No. 284, of a man named Nagooloo, 50 years old, from Bijji, Bastar State, Central Provinces. He is said to have been of short stature; skin black; hair black and soft; eyes dirty brown; a moustache; food rice, flesh, fish, vegetables. He is stated in the list sent to me to be of the Koydwar race. It is possible that this term may be a mis-spelling for Kotwâri, a term applied to the caste which performs the service of village watchman.

The skull was elongated and ovoid in the *norma verticalis*; the sides were moderately steep, the sagittal region was not ridged, the parietal eminences were much in advance of the occipital point, and the occipital squama was rounded and prominent. The length-breadth index was 71·3, and the skull was dolichocephalic. The frontal longitudinal arc was the longest. The basi-bregmatic height was a little below the greatest breadth, and the vertical index, 69·6, was tapeinocephalic. The anterior nares were wide, and the nasal index, 56·3, was distinctly platyrhine. The upper jaw was

orthognathic, the gnathic index being only 96. The orbits were low, and the index was 76·3. The palato-alveolar arch was mesuronic. The complete facial index, 84, was chamæproscopic. The teeth were much worn. The sutures of the cranial vault were nearly obliterated. The skull was cryptozygous. The cranial capacity was 1267 c.c.

Bunjana. TABLE V.

A skull in the Indian Museum, No. 285, from the Central Provinces from Koromankiai near Bastar, marked Bunjana, is probably that of a Banjára or Bunjára. It is that of a man æt. 40, 5 feet 3 inches high; he had skin dark brown; hair grey; eyes dirty brown; a moustache; food, rice, mutton, vegetables. The Bunjára are a nomadic class, engaged in the occupation of carrying goods by pack-bullocks.

This skull did not possess an elongated oval form. When seen from the *norma verticalis* it was more rounded, and its greatest length was only 166 mm. The parieto-occipital region was flattened, and as it was not symmetrical, it is probable that artificial pressure had been applied during infancy. The length-breadth index was 85·5 and the skull was hyper-brachycephalic. The frontal longitudinal arc was 1 mm. longer than the parietal. The basi-bregmatic height was much less than the greatest breadth, and the vertical index was 78·9. The anterior nares were wide, and the index was platyrrhine. The upper jaw was orthognathous. The height and width of the orbits were almost equal, and the index was megaseme. The palato-maxillary index was brachyuranic, and the palate had a wide horse-shoe shape. The face was chamæproscopic, and the complete facial index was only 80. The teeth were much worn and stained with betel. The cranial sutures were distinct; small Wormian bones were present in the lambdoidal suture; the pterion was normal. The skull was cryptozygous. The cranial capacity was 1292 c.c.

Kámár and Lohár. TABLE V.

These names are applied to castes who manufacture articles in metal. The Kámárs work in metals generally; the Lohárs are the blacksmiths or workers in iron. The Kámárs are found in Bengal and Behar;* the Lohárs in Western Bengal, Behar, and Chúta Nágpúr. Mr RISLEY considers that these caste names express only a similarity in occupations, and do not indicate uniformity in race. He also states that the lohár or blacksmith is a recognised official in a Kol village community. Each caste is probably composed of persons belonging to different tribes, some of which are probably indigenous to the locality, whilst others have migrated into the district in which they live, so that they may include Aryans, Aborigines, and crosses between Aryan and non-

* Mr ROBERTSON, in his *Report on the Census in the Central Provinces*, p. 190, states that in Raipur a tribe of people named Kámár live in remote jungles on fruits and small game, and although in some provinces, as Bengal, the term is an occupational one, it includes both aborigines and non-aboriginal people.

Aryan people. He supports this view by citing the prevalence of different social customs as well as religious differences. Some are orthodox Hindus, others worship gods not included in the Hindu mythology. As regards marriage, both infant and adult marriage prevail; widow marriage is allowed by some, but forbidden by others. Some groups permit marriage within the group, whilst others are exogamous. Cremation is practised by the Kámárs.

I have examined the skull of a Kámár named Bhudny, from Hazáribágh, said to be a woman, presented to me by Dr J. J. HEDLEY WOOD; also that of a Lohár, who died at Ranchi, No. 600 in the India Museum.

The Kámár skull, ovoid in its general form, was long in relation to the breadth; its sides were vertical, but it was not so roof-shaped as in some of the dolichocephali; the length-breadth index was 74, and the frontal longitudinal arc was the longest. The basi-bregmatic corresponded with the greatest parieto-squamous diameter. The projection of the glabella and supra-orbital ridges gave one the impression of a male rather than a female cranium, but the forehead receded very slightly, and the vertex was inclined to be flattened; the parieto-occipital region sloped gently into a rounded occipital squama. The nasion was a little depressed; the bridge of the nose was concave, but projected at the tip; the nasal spine of the superior maxillæ was moderate, and a low ridge separated the floor of the nose from the incisive region. The anterior nares were large and platyrrhine, the upper jaw was orthognathous; the orbits were mesoseme, and the palate was brachyuranic. There was no lower jaw. The teeth were only slightly worn, though some were carious; the canine and incisive fossæ were deep. The sutures were unossified; from their condition and that of the teeth the age was probably about 30. There were no Wormian bones, but a large epipterion was in each pterion; with this exception no osseous irregularities were observed. The cranial capacity was 1230 c.c.

The Lohár skull was probably that of a female. Its breadth bore to the length a proportion which placed the cranium in the lower term, 76·5, of the mesaticephalic group, and the greatest breadth was about the squamous suture; the frontal longitudinal arc was the longest. The height was somewhat greater than the breadth, and the vertical index was 77·1. The left parieto-occipital region was a little flattened. The nasal bones had but little projection, and the bridge was concave vertically; the nasal spine of the superior maxillæ was small. The nose was relatively narrow and with a leptorrhine index; the upper jaw was orthognathous, the orbit was mesoseme, and the palate was brachyuranic. The face was chamæprosopic. The cranial capacity, 1240 c.c., was microcephalic.

Ahír-Goálá. TABLE V.

The Goálás or Gopas are the pastoral caste of India, extensively diffused in the North-West Provinces, the valley of the Ganges, Behar, Orissa, and Chúta Nágpúr. The name Ahír is applied to the whole caste in North-Western India; but in the south

and east it is apparently restricted to one of its divisions, the entire caste being named Goálá. The Ahír or Goálá, whose duty it is to look after the cattle, is, according to Mr RISLEY, one of the recognised officials of a Kol village community. Colonel DALTON groups the Ahírs as Aryans, but in the mountainous districts of Orissa and Chúta Nágpúr, they seem to have had incorporated with them a proportion of the aboriginal inhabitants, who have become Hinduised. In consequence of this intermixture, the physical characters of the caste vary in different localities. DALTON states that the Mathurábásis have high, sharp and delicate features, and light brown skins quite of the Aryan type; whilst the Magadhas have coarse features, the skin is dark in colour, the hands and feet are large, and the difference between them and the Kol-speaking people of Singbhúm is not distinguishable. The intermixture also affects the customs of the caste. Marriage usually takes place in infancy, though in Chúta Nágpúr adult marriage is permitted, and in the hill districts the marriage of widows is sanctioned. RISLEY states that in Chúta Nágpúr a man may not marry a woman of his own totem. Cremation is practised on the dead bodies of married persons, but not on those of children. In religion they are Hindus, and observe the usual festivals. The Ahírs and Goálás together numbered, in 1891, about eleven and a half millions of people.

In the Indian Museum is a skull, No. 27, marked Ahír, Goálá caste, which was presented in 1863 by Lieut.-Col. DALTON; the man, Teetoo, from Puttea, was hanged in Ranchi jail. He is said to have been 25 years old, 5 feet 2 inches high; hair black, long, coarse; eyes black, set straight in the face; food, rice, vegetables, and flesh.

The cranium, seen in the *norma verticalis*, was a very elongated ovoid, the sides vertical, with a slight sagittal ridge, and a slope outwards to the parietal eminences. The length-breadth index was 68·3, and the skull was hyper-dolichocephalic; the parietal longitudinal arc was much longer than either the frontal or occipital; the basi-bregmatic height exceeded considerably the breadth, and the vertical index was 73·8. The glabella and supra-orbital ridges were moderate; the forehead was somewhat retreating; the parieto-occipital region sloped gently backwards, and was flattened from side to side; the occipital squama was not prominent, and projected very little behind the inion. The nasion was slightly depressed; the bridge of the nose was not prominent, and was concave from above downwards. The nasal spine of the superior maxillæ was distinct, and a sharp ridge separated the floor of the nose from the incisive region. The nasal index was 53·2, *i.e.*, platyrrhine; the gnathic index, 90·6, markedly orthognathous; the orbital index, 87·2, was mesoseme; the palato-maxillary index, 121·1, was brachyuranic; the complete facial index was 85, so that the face was chamæprosopic. The teeth were all erupted and a little worn; the incisive fossæ in the upper jaw were deep, and the canine fossæ were well marked. The cranial sutures were simple, and showed signs of commencing ossification. No Wormian bones were present, but a large epipteric bone was seen in each pterion. The jugal processes were tuberculated. The lower jaw was well developed. The skull was phænozygous and rested behind on the mastoid-temporals. The cubic capacity of the cranium, 1328 c.c., placed it in the microcephalic group.

Teli. TABLE V.

The Teli or Tili is a banking, trading, and oil-pressing caste in Bengal, Behar, and Orissa. Some are Hindus, others Mahommedans in religion. In Bengal, amongst the richer classes, they permit infant marriage and forbid the marriages of widows. In Orissa, again, they adhere more to aboriginal customs; they hold, says Mr RISLEY, totems in reverence. Infant marriage is not essential, and widow marriage is allowed. They cremate the dead. They number from 4,000,000 to 5,000,000 of people.

Two crania of this caste have come under my observation; one, No. 598 in the Indian Museum, a male from the village Pittoria, near Ranchi, Chúta Nágpúr; the other a female, presented to me by Dr HEDLEY WOOD, from Raipur in the Central Provinces. The general form in the *norma verticalis* was the elongated ovoid so frequently referred to in the preceding descriptions of the dolichocephalic crania of the aborigines; this form being associated with vertical sides and a rounded occipital squama. The length-breadth index in the man was 72·8, and the basi-bregmatic diameter exceeded the parieto-squamous; in the woman the index was 72; the basi-bregmatic height was much below the parieto-squamous diameter, and the parietal longitudinal arc was longer than the frontal. The forehead was not receding; the glabella and supra-orbital ridges were not prominent. The nasal bones were not projecting, and the bridge was flattened; the nasal spine of the superior maxillæ was moderate; a ridge marked off the floor of the nose from the incisive region of the upper jaw; the anterior nares were wide, and the index in each specimen was platy-rhine. In the Teli man, the upper jaw was orthognathous, in the woman prognathous. In the man the orbital index was microseme, in the woman mesoseme. In both, the palato-maxillary index was just within the brachyuranic group. In the woman's skull there were no osseous irregularities. The cranial capacity in the man was 1370 c.c.; in the woman it was only 1005 c.c.

URIYÁ.

In addition to the crania described in the preceding part of this memoir, which are definitely associated with particular races, tribes, or castes, the Indian Museum contains a number of skulls from Orissa, marked in the catalogue Ooriá or Uriyá. Uriyá is a linguistic term, which expresses a particular derivative of Sanskrit. It is the mother tongue of a very large percentage, said to be 95·1 per cent., of the Hindu population of Orissa, of those who inhabit the plains as distinguished from the aborigines who live in the mountains, and the name of the language is given to the people who speak it. As the aborigines of this province speak either Dravidian or Kolarian, the Uriyá tongue of the Hindu population in Orissa contains a mixture of archaic forms and words derived from those languages. Uriyá-speaking people form a considerable proportion of the class of domestic servants in the north-east of India, which probably accounts for

the number of crania in the Indian Museum marked Uriyá, most of which had been obtained from the medical school of Calcutta.

I have examined thirty skulls from the Indian Museum, marked Uriyá in the list sent to me, and in addition I have received from my friend Major BANNERMAN, M.D., two specimens which he had collected at Baghmari village in Orissa.

The crania were by no means a homogeneous series, but varied materially in form and proportions, so that it would be impossible to draw up a description which would be generally applicable. If we take the proportion of length and breadth to guide us in our examination, we shall find that the crania can readily be arranged in three groups. The larger number, seventeen in all, have the length-breadth index below 75, and in form and proportions are dolichocephalic; in ten skulls the corresponding index is between 75 and 80, mesaticephalic; whilst in five crania this index was upwards of 80, brachycephalic.

Dolichocephalic Series.—Of the seventeen crania belonging to this group, fifteen were apparently males and two females. They were all adults, with perhaps two exceptions about 20 and 21 years of age. When examined in the *norma verticalis*, they were seen to be elongated and ovoid in outline, with side walls approaching the vertical and with no great difference between the frontal and parietal transverse diameters. The parietal eminences were fairly marked. As a rule, the sagittal line was not raised above the general plane of the vertex, and the slope from it to the parietal eminence was moderate. In the majority the parieto-occipital region sloped gently backwards and downwards, but in four specimens it was inclined more abruptly, and in three of these it showed a want of symmetry, as if modified by artificial pressure. In No. 232 this character was most distinct, and in it was also seen a transverse post-coronal depression, as if from wearing a tight band during infancy. In No. 42, the elongated form was exaggerated and the skull was hyper-dolichocephalic; the sagittal suture was unossified, but the right parieto-mastoid and adjoining parieto-squamous were closed. The mean cephalic index of the series was 72.2. The male skulls in the greatest length ranged from 171 to 194 mm., but the majority were between 180 and 187 mm. In the greatest breadth they ranged from 124 to 139 mm., but the majority were between 127 and 134 mm. In no specimen was the occipital arc the longest; in several, the frontal and parietal longitudinal arcs were equal or almost equal; in a few, the frontal materially exceeded the parietal, in others the proportion was reversed. The mean vertical index of the series was 75.4, and in only three crania was the basibregmatic height less than the greatest breadth. (Table VI.)

The glabella and supra-orbital ridges had, as a rule, but little prominence, though well marked in the man from Baghmari village. In the men the forehead was slightly receding, but in the women it was almost vertical. The nasion was only slightly depressed; as a rule, the bridge of the nose projected forwards, but in a few it was not prominent. The nasal spine of the superior maxillæ was distinct as a rule, and the floor of the nose was separated from the incisive region of the maxilla by a sharp ridge.

The nasal index in sixteen skulls ranged from 45·8 to 56, and the mean was 51·6, *i.e.*, mesorhine, to which group eight specimens belonged; of the remainder, two were leptorhine, and six were platyrhine. The projection of the upper jaw was orthognathous, the mean gnathic index of fifteen crania being 96·2; no specimen was prognathous, and only four were mesognathous. The orbits were measured in sixteen crania, and the mean index was 85·6, mesoseme, to which group eight specimens belonged; five specimens were microseme and only three were megaseme. The palato-maxillary index showed a great range of variation, and indicated marked differences in the relative length and breadth of the palate and alveolar arch; five specimens were dolichuranic, six were mesuranic, six were brachyuranic; in several specimens the palate had a high arch. The nasio-mental diameter was taken in only seven skulls, in five of which the proportion between that diameter and the interzygomatic breadth was chamæprosopic, in the remaining two, leptoprosopic.

The cranial sutures were simple and, as a rule, not ossified. In ten skulls the lambdoidal suture contained Wormian bones, and in one of these they were numerous. In seven crania an epipteric bone or bones was present either on one or both sides, but in none did the squamous-temporal and frontal directly articulate. No skull was metopic. In No. 414 the basi-cranial synchondrosis was not ossified, and the upper wisdom teeth were not erupted; in the right orbit a slender process of the orbital plate of the superior maxilla ascended between the os planum and the lachrymal to articulate with the frontal. I have previously recorded examples of this variation in human crania in Bush, Papuan, and Lushai skulls.* Several specimens retained the infra-orbital suture. The muscular ridges and processes were not strongly marked. The skulls were cryptozygous. No specimen showed a paramastoid process, third condyl or auditory exostosis. In three crania the wisdom teeth had not appeared. The mean cranial capacity of fifteen male skulls was 1370 c.c., mesocephalic; and the range was from 1138 c.c. to 1660 c.c. The mean capacity of two female skulls was 1370 c.c.

Mesaticephalic Series.—Of the ten crania which belonged to this series, seven were apparently males and three females. They were all adult except No. 20, in which, though the wisdom teeth were erupted, the basi-cranial synchondrosis was not ossified.

Of these specimens, seven had a cephalic index between 75 and 77·5, whilst three ranged from 77·6 to 79·6. Those with the lower indices showed no great difference in the general form of the cranium from the dolichocephalic group, whilst those in the higher series approximated to the brachycephalic, to be next described. (Table VII.)

Two skulls were so steep and vertical in the parieto-occipital region as to give the impression that they had been artificially flattened. In four skulls the basi-bregmatic height was less than the greatest breadth; in three it was greater; in three they were equal. In all, the occipital longitudinal arc was less than either the parietal or frontal; in four the frontal exceeded the parietal; in four the opposite condition existed.

The glabella and supra-orbital ridges were moderate, but in No. 130 they were

* *Trans. Roy. Soc., Edinburgh*, 1899, vol. xxxix, p. 712.

TABLE VI.

Uriyá.—Dolichocephali.

	Gopaul. Cuttack. Orissa.	Hurmah. Orissa.	Bhurruth. Orissa.	Hindu. Uriyá.	Blaobun. Hindu. Uriyá.	Blaurruth. Uriyá.	Panoo. Uriyá.	Bipoo. Orissa.	Dudeah. Orissa.	Uriyá. Orissa.	Uriyá. Orissa.	Uriyá.	Naran. Hindu. Uriyá.	Bozunto. Balasore. Orissa.	Baghmari. Orissa.	Uriyá. Orissa.	Baghmari. Orissa.
	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	E.U.A.M.	I.M.	E.U.A.M.
Collection number, . . .	2	149	54	20	23	32	33	179	232	409	412	419	24	42	...	414	...
Age,	28	23	45	27	23	38	24	30	18	Ad.	Ad.	Ad.	65	20	Ad.	Ab. 21	Ad.
Sex,	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	F.	F.
Cubic capacity, . . .	1345	1455	1308	1448	1350	1305	1232	1300	1348	1660	1485	1138	1334	1406	1440	1396	1130
Glabello-occipital length, . .	181	180	174	187	177	180	176	175	177	194	180	171	182	186	184	182	168
Basi-bregmatic height, . .	143	146	130	140	130	126	137	138	134	138	146	129	135	136	135	138	122
Vertical Index, . . .	79.0	81.1	74.7	74.9	73.4	70.0	77.8	78.9	75.7	71.1	81.1	75.4	74.2	73.1	73.4	75.8	72.6
Minimum frontal diameter,	92	95	90	95	91	89	99	96	92	97	91	95	101	91	99	92	92
Stephanic,	106	114	112	109	109	113	114	109	108	113	112	107	113	106	105	109	102
Asterionic,	100	100	100	109	109	99	97	103	104	108	108	98	100	98	106	96	95
Greatest parieto-squamous breadth,	127p.	133s.	127s.	134s.	129p.	133p.	127s.	130p.	128p.	139s.	132p.	127s.	129s.	124p.	134s.	128p.	125p.
Cephalic Index,	70.2	73.9	73.0	71.7	72.9	73.9	72.2	74.3	72.3	71.6	73.3	74.3	70.9	66.7	72.8	70.3	74.4
Horizontal circumference, . .	495	501	486	516	488	499	491	488	488	538	507	485	505	502	510	500	464
Frontal longitudinal arc, . .	130	130	130	137	129	134	137	124	130	130	147	128	128	138	137	135	128
Parietal " " " " " " " "	130	248	130	139	128	125	124	130	138	130	124	126	131	142	134	134	116
Occipital " " " " " " " "	110	99	116	113	114	107	105	99	127	110	99	109	112	109	103	101	101
Total " " " " " " " "	370	378	359	392	370	373	368	359	367	387	381	353	368	392	380	372	345
Vertical transverse arc, . .	310	314	298	309	302	303	308	300	302	320	322	288	302	302	306	309	279
Length of foramen magnum,	35	35	32	33	34	32	33	34	31	36	34	29	33	35	36	35	31
Basi-nasal length,	106	104	102	101	94	95	102	102	101	111	107	98	102	99	101	102	93
Basi-alveolar length,	95	96	100	98	94	94	98	97	96	111	100	95	...	96	98	97	93
Gnathic Index,	89.6	92.3	...	97	100	98.9	96.1	95.1	95	100	93.5	96.9	...	97	97	95.1	100
Interzygomatic breadth, . .	126	133	124	127	114	123	126	128	130	133	125	123	125	123	131	118	122
Intermalar " " " " " " " "	114	116	112	116	103	111	116	120	118	121	112	113	115	111	120	107	113
Nasio-mental length,	124	119	...	...	...	...	...	114	105	...	...	...	...	108	122	...	104
Nasio-alveolar,	73	66	62	66	62	64	65	66	60	72	67	62	...	64	69	59	56
Complete Facial Index, . .	98.4	89.4	...	...	...	...	...	89	80	...	...	...	...	87.8	93.1	...	83.6
Nasal height,	51	46	46	46	47	49	48	48	47	51	51	46	53	45	50	46	43
Nasal width,	24	25	26	25	23	24	25	22	23	28	26	24	27	23	28	25	24
Nasal Index,	47.1	54.3	...	54.3	48.9	49	52.1	45.8	48.9	54.8	51	52.2	50.9	51.1	56	54.3	55.8
Orbital width,	37	36	35	38	36	38	37	37	37	40	39	39	39	38	40	37	35
Orbital height,	36	33	29	32	31	31	29	32	32	33	32	32	35	33	34	32	30
Orbital Index,	97.3	91.7	...	84.2	86.1	81.6	76.3	86.5	86.5	82.5	82	82	89.7	8	85	86.5	85.7
Palato-maxillary length, . .	53	54	55	57	54	53	55	56	52	63	54	55	51	3	52	52	50
Palato-maxillary breadth, . .	65	65	62	59	58	57	63	63	58	71	57	68	60	56	70	63	60
Palato-maxillary Index, . .	120.7	120.3	112.7	103.5	107.4	107.5	114.5	112.5	111.5	112.7	105.5	123.6	117.6	105.6	134.6	121	120
Lower jaw. { Symphyseal height, . . .	33	35	...	33	28	28	27	30	29	36	31	29	27	30	37	25	30
Coronoid " " " " " " " "	69	60	...	70	56	67	54	59	57	62	58	61	66	67	60	64	69
Condylod " " " " " " " "	63	60	...	67	57	60	54	63	52	65	64	57	59	...	59	59	69
Gonio-symphysial length,	92	85	...	89	79	90	87	92	84	87	92	82	82	87	86	84	87
Inter-gonial width,	105	100	...	...	...	...	...	98	92	...	...	...	...	96	98	...	93
Breadth of ascending ramus, . .	33	32	...	38	29	40	33	35	29	34	29	34	29	34	35	33	33

strongly marked. The forehead only slightly receded. The nasal bones were prominent and with usually a good bridge, but in No. 65 the bridge was flattened. The nasal spine of the superior maxillæ was moderate; in some specimens the nasal floor was separated from the incisive region by a ridge; in others, as in No. 65, they rounded off into each other. In seven specimens the nasal index was mesorhine; in one, leptorhine; in two, platyrrhine. In six crania the upper jaw was orthognathous; in two, mesognathous, and in one, No. 65, prognathous. In six the orbital index was mesoseme; in three, microseme; in one, megaseme. As regards the relative length and breadth of the palato-alveolar arch, five specimens were mesurancic, one was dolichurancic, two were brachyurancic. The four crania in which the length of the entire face could be taken, were practically leptoprosopic or high faced.

The cranial sutures, as a rule, were simple; in four skulls, Wormian bones were present in the lambdoidal suture, and in one of these, No. 65, the right half of the upper occipital was an independent bone; in No. 415, two sutural bones were in the sagittal behind the obelion. In one skull on both sides, and in another on the left side, the squamous temporal articulated with the frontal; in three crania, epipteric bones were present, in two of these on both sides, in one on one side. Three skulls showed the infra-orbital suture. One skull, No. 98, was edentulous; in one, the teeth were stained with betel. No skull was metopic, or possessed a third condyl, paramastoid process or auditory exostosis. They were cryptozygous, and mostly rested behind on the occipital bone. The muscular ridges and processes were not strong. The mean cranial capacity in the men was 1336 c.c., and ranged from 1212 to 1530 c.c.; in the three women, the mean capacity was 1176 c.c.

Brachycephalic Series.—Five of the crania marked Uriyá were brachycephalic in form and proportions. Three were apparently males and two females. (Table VIII.)

In the *norma verticalis* the crania were rounded, and the male skulls, with one exception, had a less glabello-occipital length than the shortest male skull in the dolichocephalic group; whilst the female skulls were shorter than the female dolichocephalic Uriyás. The sagittal region was not ridged, and the crania generally were more flattened at the vertex than in the dolichocephali. The parietal eminences were prominent, especially in No. 38, and in the *norma occipitalis* the skulls had a pentagonal form. In four crania there was evidence of parieto-occipital flattening, more particularly in the hyper-brachycephalic skull, No. 417, in which the parieto-occipital region was almost vertical; the pressure had produced in two skulls an unsymmetrical projection to the right, and in two others to the left. In No. 38 the occipital region was rounded, and projected behind the inion. The cephalic index ranged from 80 to 88.2, and the mean was 83.7. In all, the occipital longitudinal arc was the shortest; in three, the frontal arc was longer than the parietal; in two, the parietal was the longer. In all, the basi-bregmatic diameter was less than the parieto-squamous, and the mean vertical index was 79.2.

The glabella and supra-orbital ridges were feeble; the forehead was almost vertical;

TABLE VII.

Uriyá.—Mesaticephali.

	Mata. Hindu. Orissa.	Bho- blancee. Hindu. Orissa.	Gally. Orissa.	Bassu. Orissa.	Orissa.	Orissa.	Ori-sa.	Orissa.	Orissa.	Orissa.
	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.	I.M.
Collection number,	65	76	98	130	199	413	415	410	416	418
Age,	20	30	70	50	38	Ad.	Ad.	Ad.	Ad.	Ad.
Sex,	M.	M.	M.	M.	M.	M.	M.	F.	F.	F. (?)
Cubic capacity,	1260	1212	1205	1530	1408	1336	1405	1270	1110	1150
Glabello-occipital length,	174	169	167	185	175	173	179	170	168	168
Basi-bregmatic height,	132	128	130	150	132	134	128	136	128	132
Vertical Index,	75.9	75.7	77.8	81.1	75.4	77.5	71.5	80.	76.2	78.6
Minimum frontal diameter,	94	95	88	100	98	94	90	91	91	88
Stephanic,	114	115	104	120	115	108	111	109	108	103
Asterionic,	103	95	102	115	98	104	105	101	90	102
Greatest parieto-squamous breadth,	137p.	128p.	133p.	141s.	135p.	134s.	135p.	132p.	128p.	128p.
Cephalic Index,	78.7	75.7	79.6	76.2	77.1	77.5	75.5	77.6	76.2	76.2
Horizontal circumference,	494	480	475	518	493	495	500	480	472	470
Frontal longitudinal arc,	120	122	130	138	131	124	130	124	124	119
Parietal " " " " " " " " " " " "	243	236	115	125	134	118	134	131	118	120
Occipital " " " " " " " " " " " "	111	111	114	100	112	112	107	99	109	109
Total " " " " " " " " " " " "	363	358	356	377	365	354	376	362	341	348
Vertical transverse arc,	312	285	309	319	315	298	308	303	293	295
Length of foramen magnum,	29	31	31	33	37	33	34	35	31	30
Basi-nasal length,	97	96	93	106	97	99	93	98	100	99
Basi-alveolar length,	100	97	...	95	96	95	88	94	91	95
Gnathic Index,	103.1	101.	...	89.6	99.	96.	94.6	95.9	91.	96.
Interzygomatic breadth,	124	117	118	133	126	124	123	117	116	118
Intermalar " " " " " " " " " " " "	116	110	106	120	117	116	116	107	104	110
Nasio-mental length,	109	116	...	120	120	...	...	...	...	...
Nasio-alveolar " " " " " " " " " " " "	61	68	...	69	66	68	60	63	61	63
Complete Facial Index,	89.5	99.	...	90.	95.	...	...	...	...	...
Nasal height,	46	50	43	52	50	49	46	46	46	47
Nasal width,	23	24	20	25	25	26	23	23	23	27
Nasal Index,	50.	48.	46.5	48.2	50.	53.1	50.	50.	50.	57.4
Orbital width,	38	37	36	39	39	37	37	36	38	38
Orbital height,	31	30	32	35	35	33	34	30	34	32
Orbital Index,	81.6	81.1	88.9	89.7	89.7	89.2	91.9	83.3	89.5	84.2
Palato-maxillary length,	59	53	...	52	56	54	51	53	49	52
Palato-maxillary breadth,	63	61	...	64	64	63	60	59	57	63
Palato-maxillary Index,	106.7	115.	...	123.	114.3	116.6	117.6	111.3	116.3	121.
Lower jaw. { Symphysial height,	28	31	...	28	36	29	33	28	25	29
Coronoid " " " " " " " " " " " "	56	63	57	61	63	62	60	59	58	61
Condylod " " " " " " " " " " " "	58	66	58	66	63	59	56	48	52	54
Gonio-symphysial length,	90	83	72	97	87	80	87	85	76	81
Inter-gonial width, outside,	92	91	...	105	90	...	...	...	...	...
Breadth of ascending ramus,	42	33	27	35	30	35	35	30	31	33

TABLE VIII.

Uriyá.—Brachycephali.

	Hindu. Orissa.	Siplo. Hindu. Orissa.	Orissa.	Orissa.	Puttonez. Hindu. Cuttack, Orissa.
	I.M.	I.M.	I.M.	I.M.	I.M.
Collection number,	4	129	411	417	38
Age,	20	32	Ad.	...	40
Sex,	M.	M.	M.	F.	F.
Cubic capacity, . . . . .	...	1148	1200	1118	1240
Glabella-occipital length,	173	161	163	152	167
Basi-bregmatic height,	139	128	126	126	127
<i>Vertical Index</i> ,	80.3	79.5	77.3	82.9	76.
Minimum frontal diameter,	82	90	88	88	83
Stephanic,	116	112	109	106	104
Asterionic,	106	97	99	93	97
Greatest parieto-squamous breadth,	140p.	138p.	135p.	134p.	135p.
<i>Cephalic Index</i> ,	80.9	85.7	82.8	88.2	80.8
Horizontal circumference,	488	478	473	452	466
Frontal longitudinal arc,	130	124	131	117	118
Parietal " "	128	117	120	119	125
Occipital " "	105	100	99	92	112
Total " "	363	341	350	328	355
Vertical transverse arc,	314	302	307	300	290
Length of foramen magnum,	37	29	32	34	33
Basi-nasal length,	101	96	94	88	87
Basi-alveolar length,	95	96	96	86	87
<i>Gnathic Index</i> ,	94.1	100.	102.1	97.7	100.
Interzygomatic breadth,	123	122	120	110	115
Intermalar " "	109	112	109	100	102
Nasio-mental length,	109	96	...	...	96
Nasio-alveolar " "	62	60	64	56	58
<i>Complete Facial Index</i> ,	88.6	78.6	...	...	83.4
Nasal height,	48	48	45	43	43
Nasal width,	24	24	24	19	22
<i>Nasal Index</i> ,	50.	50.	53.3	44.2	51.2
Orbital width,	36	37	33	34	36
Orbital height,	31	30	29	31	30
<i>Orbital Index</i> ,	86.1	81.1	87.9	91.2	83.3
Palato-maxillary length,	50	56	58	49	48
Palato-maxillary breadth,	61	61	60	56	58
<i>Palato-maxillary Index</i> ,	122.	109.	104.4	114.3	120.8
Lower jaw. { Symphysial height,	28	25	33	30	24
{ Coronoid " "	53	60	58	53	60
{ Condylod " "	51	59	56	54	53
{ Gonio-symphysial length,	86	90	81	73	78
{ Inter-gonial width, outside,	95	90	...	...	79
{ Breadth of ascending ramus,	35	35	34	28	28

the nasion was not depressed; the bridge of the nose was not very prominent; the nasal spine of the superior maxillæ was moderate; the floor of the nose in some specimens was separated from the incisive region by a sharp ridge. The mean nasal index was 49·7, mesorhine, to which group three specimens belonged: one was leptorhine, one platyrhine. The mean gnathic index was 98·7, mesognathous, to which group three specimens belonged, but two were orthognathous. The mean orbital index was 85·9, mesoseme, to which group two skulls belonged; one was megaseme; two were microseme. The relative length and breadth of the palato-alveolar arch showed great variation: two skulls were dolichuranc; one mesuranc; two brachyuranc. In all the face was chamæprosopic.

No skull was metopic. The cranial sutures were simple. In two specimens the lambdoidal suture contained Wormian bones; in one there was a right epipteric bone; in two the infra-orbital suture was present. The crania were cryptozygous. The mean cranial capacity of two males was 1174 c.c., and of two females 1179 c.c.; each skull was microcephalic.

COMPARISON OF ABORIGINAL CRANIA.

Before proceeding to consider the relations, as regards race, which the Dravidian and Kolarian-speaking tribes bear to each other, it will be advisable to examine the evidence of the possible presence in India of a people more ancient even than the present wild tribes of the hill districts. From time to time objects have been found, which, from the material of their construction and the simplicity of the workmanship, would point to the existence in India of people who manufactured and employed tools and implements of stone.

In 1842 Dr W. H. PRIMROSE found at Lingsoo-goor,* near a tumulus on which the mess-house of the Hyderabad contingent was built, knives and arrow heads made of cornelian, jasper, agate, and chalcedony.

In 1863 Mr R. BRUCE FOOTE discovered in the Madras Presidency, *in situ*, in beds of a red ferruginous clay mingled with sand and gravel, and at an elevation of 300 feet above the sea, chipped implements formed of quartzite.† Stone implements have also been obtained by other collectors in Orissa, Mirzapore, Jubbulpore, and the South Mahratta country. Although formed of quartzite and not of flint, Sir JOHN EVANS‡ considers that, as far as general form is concerned, they are identical with the implements from European river-drifts, and he regards them as belonging to palæolithic times. Mr F. SWYNNERTON § states that quartzite implements of palæolithic type have been found on the surface of the ground at Raipur.

Sir JOHN EVANS has recorded a worked arrow head from India in the possession of Professor BUCKMAN which belonged to the late Stone age. A number of arrow heads, with

* MEADOWS TAYLOR in *Journ. Ethno. Soc.*, London, N.S., vol. i. p. 175, 1869.

† *Geological Magazine*, vol. xi. p. 503.

‡ *Ancient Stone Implements*, 2nd ed., p. 651, London, 1897.

§ *Journ. Anthro. Inst.*, 1899, vol. ii. p. 141.

stone beads, a celt, a perforated stone and other objects, formed of chert, chalcedony, rock crystal, and quartz have been found by Mr W. H. P. DRIVER at Ranchi in Chúta Nágpúr. They have been described and figured by Professor J. WOOD-MASON.* The place where they were found had obviously been a neolithic settlement. Mr SWYNNERTON has described roughly chipped fragments of jasper and chert in the gravel of the Sourrka river, from the alluvium of the plain in which the city of Gwalior is built.

We can scarcely expect to trace a direct continuity between the present aborigines and those prehistoric men who manufactured the primitive palæolithic implements. It is, however, worthy of consideration if some of the existing hill tribes may not be the descendants of the people of neolithic times.

Of the hill tribes referred to in the earlier pages of this memoir the Juangs are without doubt the most primitive. Colonel DALTON speaks decidedly on this point, and regards them as representatives of the Stone age. Until strangers came amongst them, they had no knowledge of metals, they had no word in their language to designate iron or other metals, and they employed implements made of stone. They could neither spin nor weave, nor had they the simplest knowledge of pottery. They wore no clothes but leaves, and were remarkably shy and timid. Although their language is in part Kolarian, like that of the Hos and Santals, they have many words which cannot be connected with the languages now spoken by other people in India, and the people themselves claim to be the autochthones in Keunjhar.

Like other primitive people they are of low stature; they have thick lips and, according to DALTON, coarse frizzly hair, though the two girls drawn from photographs in his great work do not support this statement, as the hair is long and wavy. The colour of the skin is not black, but reddish brown.

In an account which Dr SHORTT has given† of the Juangs, Juags, or leaf wearers of Orissa, met with by him in the tributary Mahals of Cuttach, he states that the head is well formed and globular, the forehead expanded, the cheek bones high, nasal ridge depressed and wide, lips fleshy, chin pointed, face triangular or wedge-shaped; eyes large and expressive, a character which scarcely conforms to the Mongolian type of countenance which he ascribes to the Juangs. The hair is copious and long on the head, moustache and beard scanty. He attaches importance to the large proportion of persons in whom the lower jaw is 'underhung.' The average stature of the men is 5 feet 1½ inches, of the women 5 feet.‡

If the two skulls in the Indian Museum which I have measured are genuine specimens of the Juang race, it will be seen that whilst the male is dolichocephalic, the index

* *Journal Asiatic Soc. Bengal*, vol. lvii. part xi., 1888.

† *Journ. of Anthropol. Soc.*, p. cxxxvi. in *Anthropological Review*, vol. iii., 1865.

‡ M. J. WALHOUSE has described, *Journ. Anth. Inst.*, 1875, vol. iv. p. 369, a leaf wearing tribe, named Korāgar, in South Canara, on the western coast of India. The leaves are worn by the women, a survival, apparently, of a habit prior to the use of raiment, but outside the clothes. The people are black skinned, thick lipped, nose broad and flat, hair rough and bushy. The men, he says, seldom exceed in stature 5 feet 6 inches, but this is probably too high an estimate of their stature.

of the female is about the middle of the mesaticephalic group; both were orthognathous and platyrrhine. The breadth in the malar and zygomatic regions was not so great as to give the impression that the face was markedly broad; but from the absence of the lower jaw the proportion between the length and breadth of the entire face could not be obtained. The general dimensions of the woman's skull were small, and its cranial capacity, 1030, was in the lowest category of human skulls. In the man, however, the capacity was higher than is customary in the skulls of savage races. If we are to regard these people, and some of the primitive tribes in Southern India described by Mr EDGAR THURSTON, as præ-Dravidian, there is no evidence that they are Negritos.

It is customary, in speaking of the existing natives of India, to consider that they belong to four ethnic types—Mongolian, Kolarian, Dravidian and Aryan or Indo-Aryan. The possibility of the presence of a Negrito element should also be made the subject of enquiry.

The Mongolians or Tibeto-Burmans are found on the northern and eastern confines of India, and on the east of the Bay of Bengal. I have described representative people of this type in Part I. of this Memoir.*

The Kolarians and Dravidians, on account of linguistic differences, have been by many writers regarded as two distinct ethnic types. It has been assumed that the Kolarian invaders had preceded the Dravidian, and had migrated into India through the north-east passes. The Dravidians, again, are stated to have found their way into the Punjab by the north-west passes, and to have spread into Central and Southern India, though others have conjectured that they came from the south and east.† They are regarded as older inhabitants than the Aryans, who are thought to have entered India, something more than 4000 years ago, from the Hindu Kush, the Pamir plateau, and the high valley of Cashmere. The aborigines of the hill districts in Southern India, the Central Provinces and the Lower Provinces of Bengal, have been described as in part Kolarians and in part Dravidians.

Mr B. H. HODGSON, in his essay on the Kocch, Bódo and Dhimal tribes,‡ uses the term Tamulian as equivalent to aboriginal, and, whilst the people of the sub-Himalayan district belong to the Tibetan stock, and those further east to the Chinese, he regards those to the south as Tamulian, and as represented by the Kols, Bhils, Gonds, Oráons and Múndas. He is of opinion that amongst the Tamulians the physical type is essentially the same in all the tribes.

During the last ten years, and principally through the influence of the writings of Mr H. H. RISLEY,§ the distinction between Kolarian and Dravidian-speaking tribes has come to be regarded as only linguistic, and not as representing differences in physical type. "The Málé of the Rahjmal hills," he says, "and the Oráons of Chota Nagpore, both of whom speak languages classed as Dravidian, are identical in point of physique

* *Trans. Roy. Soc. Edin.*, vol. xxxix., 1899.

† Sir W. W. HUNTER's *Indian Empire* and THURSTON's *Madras Bulletin*, 1899, p. 195.

‡ Calcutta, 1847.

§ *The Tribes and Castes of Bengal*, 1891.

with the Múndas and Santals, who are classed on linguistic grounds as Kolarian." He does away with the term 'Kolarian' as having an ethnic significance, and he includes both sets of people under the common term 'Dravidian.' Mr RISLEY's conclusions were arrived at after a series of anthropological examinations and measurements, conducted under his supervision, on about 6000 living persons in Bengal, the North-Western Provinces and the Punjab. He defines the Dravidian type as follows:—Head usually inclined to be dolichocephalic; nose thick and broad, so that the formula of its platy-rhine index is higher than in any known race except the Negro; facial angle comparatively low; lips thick; face wide and fleshy; features coarse and irregular; average stature ranges from 156·2 to 162·1 cm. (5 feet 1 inch to 5 feet 3 inches); figure squat; limbs sturdy. The colour of the skin varies from very dark brown to a shade closely approaching black. The term Dravidian, as employed by RISLEY, has a similar meaning, as regards the tribes which it embraces, to the term Tamulian suggested by Mr HODGSON.

Mr RISLEY defines also the Aryan type in India, and as by contrast it brings out more clearly the Dravidian characters, I append it:—Head relatively long (dolichocephalic); nose straight, finely cut (leptorhine); face long, symmetrically narrow; forehead well developed, features regular; facial angle high; stature fairly high, ranging from 171·6 in the Sikhs (5 feet 7 inches) to 165·6 (5 feet 5 inches) in the Brahmins of Bengal; build of figure well proportioned, slender rather than massive. The colour of the skin is a very light transparent brown, though with various gradations.

I have had no opportunities of measuring the heads of living natives of India, but I propose to summarise the chief characters of the crania measured in Tables I.–IV. Unfortunately, some of the tribes are only sparsely represented, as regards the number of skulls, but the entire collection gives one a fair amount of material for comparison. The Gond, Oraon, Paharia, Karwar, Nágesar, Korwá and Bhuiyá tribes, who are Dravidians in the earlier and restricted use of that term, contribute collectively fifteen crania.* The Múnda, Bhúmij and Turi tribes belong to the old Kolarian group, and contribute collectively nineteen specimens.†

If we take the fifteen skulls in the first or proper Dravidian group, we find that the highest length-breadth index was 76·7. In six crania the index was below 70, hyperdolichocephalic; in five crania it was between 70 and 75, dolichocephalic; in four crania it was between 75 and 76·7, *i.e.*, in the division of the mesaticephalic which approximates to the dolichocephalic group.‡ The customary type was therefore dolichocephalic.

* I have not included in this number the two Bhima skulls, which possibly may be a sub-division of the Gonds, with which, in their form and proportions, they indeed closely correspond. As there may be a doubt as to their racial position, I thought it advisable to exclude them.

† I have not included in this number I.M. No. 407 (Table IV.), which is deformed from scaphocephalus, nor I.M. No. 604, Jattia Múnda.

‡ I have discussed the relations of mesaticephalic skulls to dolichocephalic and brachycephalic crania in Part I. of this Memoir in *Trans. Roy. Soc. Edinburgh*, vol. xxxix. part iii. p. 744.

In the description which I have written of these crania, it is noted that in the *norma verticalis* they were elongated and ovoid; the sides vertical, or nearly so; the vertex roof-shaped, though not ridged in the sagittal region; the forehead only slightly receding; the parieto-occipital region not flattened, and the occipital squama rounded and projecting behind the inion. The muscular ridges and processes were not strong, so that the outer table was comparatively smooth, and the skulls were not characterised by their weight.

In nine crania the basi-bregmatic height exceeded the greatest breadth; in four the height was less than the breadth; in two they were equal. In these skulls, as is so frequently found in the dolichocephali, the height was usually greater than the breadth.

In the *norma facialis* the glabella and supra-orbital ridges were not prominent, and the nasion was not depressed. In seven specimens the anterior nares were wide in relation to their height, and the nasal index was platyrrhine; in six specimens the proportion of width was not quite so great and the index was in the mesorrhine group, but usually in its upper term; one specimen had a leptorrhine index which expressed a relatively narrow nose; the customary type was therefore platyrrhine. In seven specimens the upper jaw was orthognathous; in four, in the lower term of the mesognathous series; one specimen only was prognathic; the customary type of jaw, therefore, was orthognathic. In eleven skulls the orbit was microseme; in one, mesoseme; in three, megaseme; the orbit was usually low, therefore, in relation to its breadth. In the relative proportion of the length and breadth of the palato-alveolar arch only one specimen was dolichuronic; three were mesuronic, seven were brachyuronic; the type form therefore was that of a wide horseshoe. In the determination of the length and breadth of the entire face, the lower jaw was present in nine skulls, in seven of which the complete facial index was below 90, which places them in the chamæprosopic, or low-faced group, *i.e.*, a face which is broad in relation to its length.

In Table II. I have given the cranial measurements of two Tamil-speaking male natives of Madras, who may be regarded as representing the south Dravidian branch. They were both dolichocephalic, and the height exceeded the breadth. The glabella and supra-orbital ridges, and the depression at the nasion, were somewhat more pronounced than in the skulls of the northern Dravidian tribes. In both, the upper jaw was orthognathous, the nose was platyrrhine, the orbit was microseme, and the palato-alveolar arch in one was mesuronic, in the other brachyuronic. In the skull with a lower jaw the face was chamæprosopic. The characters were distinctly Dravidian.

In the series of seventeen crania under analysis, including the Tamils but excluding those marked Kandh, the cubic capacity of thirteen male skulls ranged from 1438 to 1150 c.c., of which three were above 1400, three were between 1300 and 1400, six were between 1200 and 1300, and one was 1150 c.c.; the mean of the series was 1294 c.c. Of the four women, three were between 1200 and 1300, and one was only 1070; the mean of the series was 1217 c.c.

In making this analysis of the crania I have purposely excluded the two marked Kandh. In one of these the length-breadth index was 84·2, brachycephalic; in the other, 78·5. If the Kandhs are to be regarded as an unmixed Dravidian people, the high index in each instance leads one to think that the specimens may have been misnamed, and are not genuine examples of the race. If the tribe consists, however, as Dalton supposes, of a mixture of races, these crania, more especially the brachycephalic specimen, may indicate the presence of a brachycephalic strain, which intermingled with the Dravidian would tend to modify the original dolichocephalic type. It should be stated that the nasal index in each skull was platyrrhine, and in the brachycephalic specimen strongly so; the orbital index was microseme; the palato-maxillary index was brachyuranic; in neither was the upper jaw prognathic, and in the only one with a lower jaw the face was chamæprosopic. In the facial characters the skulls marked Kandh corresponded with the Dravidian type.

We may now proceed to the analysis of the skulls belonging to Kolarian-speaking tribes. One specimen, No. 604, Indian museum, marked Jattia Múnda of Bhowro village, near Ranchi, had a cephalic index, 80·5, but as in the configuration of the cranium it differed so much from the other Múndas I have excluded it from the general description. The following observations apply therefore to nineteen skulls.

In three crania the length-breadth index was below 70, *i.e.*, hyper-dolichocephalic; in fourteen specimens it was between 70 and 75, dolichocephalic; in two specimens, between 75 and 76, which, although not numerically, yet in form and essential characters were dolichocephalic. In general form, the crania were elongated and ovoid, with steep side walls, moderate parietal eminences, no special ridging in the sagittal region, and, with the slope outwards to the parietal eminences, not very steep. The forehead was not markedly receding, indeed often approaching the vertical; the parieto-occipital slope was gradual; the occipital squama was, as a rule, rounded, and projected behind the inion. The muscular ridges and processes were fairly marked, and the skulls had no unusual weight.

The basi-bregmatic height exceeded the greatest breadth in twelve crania; it was less than the breadth in six, and in one they were equal.

In the *norma facialis* the glabella and supra-orbital ridges moderately projected, and the nasion was only slightly depressed. In six specimens the anterior nares were wide, and the nasal index was platyrrhine; in ten specimens the nose was mesorrhine, and in all of these, with one exception, with the index above 50; two specimens had a narrow leptorrhine index.* In nine specimens the upper jaw was orthognathous; eight specimens were mesognathous; no face was prognathous. Ten specimens had a low microseme orbit; four were mesoseme; four had a high megaseme orbit. In no skull was the palato-alveolar arch so elongated as to be dolichuranic; three were mesuranic; the rest were brachyuranic. The lower jaw was present in eleven of the nineteen skulls,

* It is not unlikely that in the living person the nose may have, on account of the lateral extension of the alæ, a more strongly marked platyrrhine character than would be obtainable from the width of the anterior nares in the skull itself.

in nine of which the proportion of the breadth to the length of the face was low or chamaeprosopic; in the remaining two the complete facial index was 90 and 93 respectively, and the face was within the leptoprosopic division.

In the Kolarian group the cranial capacity of the men ranged from 1470 to 1176 c.c.; of these four were above 1400, five were between 1300 and 1400, six were between 1200 and 1300, and one was below 1200 c.c.; the mean of the series was 1314 c.c. The three women's skulls had a mean capacity of 1097 c.c., and the lowest measured only 1000 c.c.

If we compare the characters of the skull in the Dravidian with the Kolarian group, we shall find that they correspond in essential particulars. In both, the type of cranium in form and proportion was dolichocephalic; the anterior nares were platyrrhine, or in the higher term of the mesorrhine group; the presence of a leptorrhine index was altogether exceptional; the upper jaw was usually orthognathous; only one of the thirty-six skulls was prognathous; as a rule the orbit was low or microseme, the palato-alveolar arch was brachyuranic. In both groups also the face was chamaeprosopic, *i.e.*, the interzygomatic width was great in proportion to the length of the face. If we take the cranial capacities of the two groups together, the men have a mean 1304 c.c., the women 1157 c.c.

Judging, therefore, from the characters of the skull, one would draw the conclusion that there is no difference of moment in the form and proportion of this part of the skeleton between the Dravidian and Kolarian types, and support is given to the view of their essential structural unity as advocated by Mr RISLEY. For descriptive purposes both groups of skulls may be classed therefore as Dravidian.

Many ethnologists of great eminence have regarded the aborigines of Australia as closely associated with the Dravidians of India. Some also consider the Dravidians to be a branch of the great Caucasian stock, and affiliated therefore to Europeans. If these two hypotheses are to be regarded as sound, a relationship between the aboriginal Australian and the European would be established through the Dravidian people of India.

The affinities between the Dravidians and Australians have been based upon the employment of certain words by both people, apparently derived from common roots; by the use of the boomerang, similar to the well-known Australian weapon, by some Dravidian tribes; by the Indian peninsula having possibly had in a previous geologic epoch a land connection with the Austro-Malayan Archipelago, and by certain correspondences in the physical type of the two people.

Both Dravidians and Australians have dark skins approximating to black; dark eyes; black hair, either straight, wavy, or curly, but not woolly or frizzly; thick lips; low nose with wide nostrils; usually short stature, though the Australians are somewhat taller than the Dravidians.

When the skulls are compared with each other, whilst they correspond in some particulars, they differ in others.* In both races the general form and proportions are

* I may refer to my *Challenger Report on Human Crania*, part xxix., 1884, for an analysis of the characters of the skulls of the Australian aborigines.

dolichocephalic, but in the Australians the crania are absolutely longer than in the Dravidians, owing in part to the prominence of the glabella. In the Australians it is not unusual for the adult male to have the glabello-occipital diameter approaching, or even a little more than, 200 mm., whilst in the male Dravidians measured in Tables I.-IV. only two specimens reached 191 mm. The Australian skull is heavier, and the outer table is coarser and rougher than in the Dravidian; the forehead also is much more receding; the sagittal region is frequently ridged, and the slope outwards to the parietal eminence is steeper. The Australians in the *norma facialis* have the glabella and supra-orbital ridges much more projecting; the nasion more depressed; the jaws heavier; the upper jaw usually prognathous, sometimes remarkably so; the teeth larger and coarser, so as to deserve the name macrodont. The coarser character of the skull, especially in the temporal region, the heavier jaws and the large strong teeth, point to the use of a coarser food by the Australians, for which a more powerful masticatory apparatus is required. On the other hand, both Australian and Dravidian crania have the nasal index platyrrhine or mesorrhine; the occurrence of a long, narrow, or leptorrhine nose being so exceptional, that its presence indicates that the skull has probably been incorrectly named, or is not of a pure race. In both races also the males have usually a microseme orbit; but whilst the Australians have customarily a long dolichuranic palato-alveolar arch, in the Dravidians it is broader in relation to the length, and frequently brachyuranic.

As regards the cranial capacity of the Australians, whilst the range in the thirty-nine male skulls which I have measured was from 1514 c.c. to 1044, the mean was only 1280 c.c., which is somewhat less than the general Dravidian mean 1314 c.c. In the female Australians, twenty-four women ranged from 1240 to 930, and had a mean 1115.6 c.c., which is also less than the Dravidian mean 1157 obtained from seven female crania. It should be stated that of the series of sixty-three Australian skulls, eight men were less than 1200 c.c., and only four above 1400 c.c.; whilst of the women only three were above 1200 c.c., and ten were below 1100 c.c.

By a careful comparison of Australian and Dravidian crania, there ought not to be much difficulty in distinguishing one from the other. The comparative study of the characters of the two series of crania has not led me to the conclusion that they can be adduced in support of the theory of the unity of the two people.

The skulls which belonged to the Koydwar, Kámár, Ahír-Goálá and Teli castes or tribes were dolichocephalic, platyrrhine, and, with one exception, orthognathic, characters which they shared with the Dravidian crania. It is not unlikely that in these castes there is a strong Dravidian element. The Bhima skulls, though dolichocephalic and either orthognathous or mesognathous, were not platyrrhine. The Bunjana skull, on the other hand, was hyper-brachycephalic, though the jaw was orthognathous, and the nose was platyrrhine. The Lohár skull was mesaticephalic and orthognathic, but the nasal index was leptorrhine, and in so far pointed to a predominance of Aryan blood. The

specimens were too few to enable one to draw a general conclusion on the cranial characters of these tribes or castes.

As already stated, the skulls of the Uriyá group presented considerable variations in the cephalic index, and in the configuration of the skull. In the dolichocephalic series about one-third were platyrrhine in the nasal index, the others were mesorrhine or leptorrhine; in the majority the upper jaw was orthognathous, and no skull was prognathous. In the mesaticephalic series the majority were mesorrhine, only two were platyrrhine, and one was leptorrhine; the upper jaw was usually orthognathous, and only one was prognathous. The brachycephalic series was represented by only five specimens, three of which were mesorrhine, one platyrrhine, and one leptorrhine; as regards the upper jaw, no specimen was prognathous.

As many of these crania were derived by the Indian Museum from the Medical School in Calcutta, it may have happened that no proper history of the dead had been obtained, and that, in consequence, the skulls had not been accurately identified.* If we grant that they had all belonged to the Uriyá-speaking people, the inference seems obvious that the community of language would by no means express unity of race.

It would seem, therefore, that in the Uriyás some crania partook of Dravidian, others of Aryan characters, and from the presence of a proportion of brachycephalic skulls, there might also have been a trace of Mongolian or other brachycephalic intermixture. As regards the Uriyá group, it is probable that a considerable Dravidian element is contributed through the presence of tribes of Hinduised aborigines, intermingled with the people who possess a strain of Aryan blood.

I will now proceed to the consideration of the Veddahs, the aboriginal hill tribe in Ceylon, of the Mincopies, the aborigines in the Andaman Islands, and of the hill tribes in the Malay peninsula.

Veddahs. TABLE IX.

In the study of the aboriginal dolichocephalic tribes in and near the Indian peninsula, we should not overlook the aborigines known as Veddahs or Weddas, who live in the hill districts of the adjoining island of Ceylon. Various travellers in Ceylon, of whom may be especially mentioned ROBERT KNOX,† JOHN DAVY,‡ C. PRIDHAM,§ Sir EMERSON TENNENT,|| B. F. HARTSHORNE,¶ JOHN BAILEY,** and C. S. V. STEVENS,†† have given accounts of these people and the districts in which they live. GEORGE

* The crania marked Uriyá, Orissa, in the Tables, are those which had been obtained from the Medical College. It will be seen that specimens so marked occur in each of the three groups tabulated in VI., VII., VIII.

† *Historical Relation of the Island of Ceylon.* London, 1817.

‡ *Account of the Interior of Ceylon and of its Inhabitants.* London, 1821.

§ *Ceylon and its Dependencies.* London, 1849.

|| *Ceylon.* London, 1859.

¶ *Fortnightly Review*, London, 1876, vol. xix.

** *Trans. Ethnol. Soc.*, London, 1863.

†† *Overland Times of Ceylon*, Nov. 6th, 1886.

BUSK described four specimens of their crania in 1862,* which, along with three others, had their chief measurements recorded by Sir WM. FLOWER in his catalogue of crania in the Hunterian Museum. MM. DE QUATREFAGES and HAMY figured a skull in the *Crania Ethnica*, Pl. LVIII. BARNARD DAVIS has also recorded, in the *Thesaurus Craniorum*,† the measures of ten Veddah skulls. GEORGE ROLLESTON exhibited to the British Association in 1872‡ photographs of jungle Veddahs, and also three skulls of this people in the Oxford Museum. VIRCHOW has described§ three Veddah skulls, and has discussed the ethnological relations of the people. ARTHUR THOMSON has given an account|| of the osteology of the Veddahs, and has described, along with the other bones of the skeleton, the characters of nine skulls in the Oxford Museum. He has also included in his tables of measurement three skulls measured by VIRCHOW, fifteen in the Museum of the Royal College of Surgeons of England, and eleven in the collection of BARNARD DAVIS. Much the most complete description of the habits, distribution, and physical characters of the Veddahs, and, indeed, of the natives generally of Ceylon, is contained in the monumental work on that island by PAUL and FRITZ SARASIN,¶ who record, in addition to an account of the skeleton generally, the measurements of eighteen male and four female skulls from the interior of the island, and four male and four female skulls from the coast districts; also some young and imperfect crania.

As regards the external physical characters of the Veddahs, the SARASINS have contributed the fullest and most carefully analytical description, which I have summarised as follows:—The colour of the face in men varies from a deep brown to one with shades of lighter brown; they have never seen a pure black skin, and those that seem to be black, when closely examined are distinctly brown. The skin of the breast is more frequently an opaque brown, though it may have a medium or reddish-brown shade. In women there is not the same range in the brown tint, and on the whole the skin is a clearer brown. The eyes have a brownish-black or opaque brown colour. The hair of the head is black, coarse, wavy, tangled, and hanging down to the shoulders or the back; that of the beard and moustache is black and sparse. On the body the hair is also sparse, though on the legs it may be abundant. The face is tolerably broad and not high, the mean index of sixteen men being 80·7, *i.e.*, low-faced, chamaeprosopic: the chin is pointed. The eyebrows are not strong, the eyes are generally large, and there is no fold of skin connecting the eyelids at the inner canthus (*epikanthus*), as in the Mongols. The nose has a deep pit in men at the root, the bridge is not strong, and the *alæ* have considerable breadth; in women the nose is flatter than in men. The lips are large and the jaws are orthognathic.

* *Proc. Linn. Soc.*, 1862, vol. vi.

† *Thesaurus Craniorum*, 1867.

‡ *Scientific Papers and Addresses*, vol. i., Oxford, 1884, edited by W. Turner.

§ "Ueber die Weddas von Ceylon," *Abh. der K. Akad. der Wiss. zu Berlin*, 1881.

|| *Journ. Anth. Inst.*, Nov. 1889.

¶ *Ergebnisse naturwissenschaftlicher Forschungen auf Ceylon*, 3d Band, *die Weddas von Ceylon*. Wiesbaden, 1892-93.

The stature is low; in the Veddahs of the central district, where the race is probably the purest, the mean height of twenty-four men was 1533 mm. (5 feet $\frac{1}{2}$ inch), of eleven women 1433 mm. (4 feet 7 inches); that of twenty-four men from the coast district was 1588 mm. (5 feet 2 inches), of ten women 1494 mm. (4 feet 9 inches), whilst fourteen men from the district of Wewatte were 1607 mm. (5 feet $2\frac{3}{4}$ inches) in height. In the sea-coast and Wewatte districts there has probably been some intermixture with Singhalese, Tamils, or even Indo-Arabians, which would affect both the stature and other physical characters of the Veddahs.

As regards the Dravidian Tamils of Ceylon, the SARASINS have also described their external physical characters. They are a bigger people than the Veddahs; the mean stature of the men was 1653 mm. (5 feet 4 inches) and of the women 1545 mm. (5 feet $\frac{3}{4}$ inch). The pigmentation of the skin was deeper in the lower than the higher castes. In about one-half the men examined the skin of the face was a medium, rarely a red-tinted, brown; in the other half a brighter brown shading into yellow: in the women a more opaque brown prevailed. The eyes were an opaque brown. The hair was black and scarcely differed from the hair of the Veddahs, though it was perhaps coarser and had a greater tendency to curl. The supra-orbital region was often well developed in the men. The face was oval and proportionately higher and narrower than in the Veddahs. The eyes were large and without an epikanthus. The nose had a stronger bridge than in the Veddahs, and the alæ were not so wide. The lips were thick. The teeth were strongly developed, and the jaws were more projecting than in the Veddahs.

I have examined and measured nine Veddah crania which have not previously been described. Three of these belonged to the Henderson Trust Collection, now in the Edinburgh University Museum; they were presented in 1827 by the Rev. G. LYON and were probably the earliest examples of the race to reach this country. One was presented to me about twenty years ago by the late Dr KRIEKENBECK of Colombo; the man had died in jail; the skull is metopic, a rare condition in dolichocephalic savages. One from Batticaloa, in the east of Ceylon, was presented by H. THWAITES, Esq. In one skull, No. 555 in the Indian Museum, the face was broken. Of the three others, two have been for some years in the Museum of Trinity College, Dublin, and another, also in Dublin, came from Batticaloa. I have to thank Professor CUNNINGHAM for permission to examine them. The skulls were all adults; to all appearance seven were men and two probably women.

When examined in the *norma verticalis* the crania were seen to be elongated antero-posteriorly; the side walls were almost vertical; the vertex in some specimens was roof-shaped, but not keeled in the sagittal region, and in others the vertex was more flattened; the parietal eminences were distinct. The skull sloped gently backwards as a rule into the occipital region, and the occipital point usually projected definitely behind the inion; there was no evidence of parieto-occipital flattening. In three of the skulls the length-breadth index ranged from 66.5 to

TABLE IX.

Veddah.

	HENDERSON TRUST.			E. U. A. M.		I. M.	TRINITY COLLEGE, DUBLIN.		
				Batticaloa.	Metopic.	555	...	...	Batticaloa.
Collection number,	143	145	144	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.
Age,	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.	Ad.
Sex,	M.	M.	F.	M.	M.	M.	M.	M.	F.
Cubic capacity, . . . . .	...	1226	1090	1090	1100	1170	1262	1362	1088
Glabello-occipital length,	177ap.	170	174	167	180	180	175	185	174
Basi-bregmatic height,	130	129	131	127	126	130	137	139	127
Vertical Index,	73.4	75.9	75.3	76.	70.	72.	78.	75.	73.
Minimum frontal diameter,	93	87	88	93	93	91	93	94	89
Stephanic,	108	104	100	98	99	96	109	113	100
Asterionic,	103	98	99	97	100	103	98	101	101
Greatest parieto-squamous breadth,	125ap.	128s.	121p.	127s.	121s.	128s.	125s.	123s.	127s.
Cephalic Index,	70.6	75.3	69.5	76.	67.	71.	71.4	66.5	73.
Horizontal circumference,	492ap.	478	475	477	500	497	490	510	485
Frontal longitudinal arc, . . . . .	...	123	120	120	120	130	130	132	120
Parietal " "	130	233	128	111	130	128	122	145	110
Occipital " "	104	105	110	110	113	114	112	110	113
Total " " . . . . .	...	356	353	341	363	372	364	387	343
Vertical transverse arc,	292	288	281	289	278	292	295	302	288
Length of foramen magnum,	37	34	33	32	29	35	34	33	32
Basi-nasal length,	94	91	97	97	98	96	97	101	100
Basi-alveolar length,	96	89	88	98	100	...	92ap.	90ap.	93
Gnathic Index,	102.1	97.8	90.7	101.	102.	...	94.8	89.	93.
Interzygomatic breadth,	131	120	111	129	121	...	126	117	123
Intermalar " "	117	109	103	116	116	...	112	108	113
Nasio-mental length, . . . . .	...	...	...	107	117	...	...	...	...
Nasio-alveolar " "	59	56	55	66	64	...	52	60	58
Complete Facial Index, . . . . .	...	...	...	82.9	96.7	...	...	...	...
Nasal height,	43	44	42	45	46	...	42	45	44
Nasal width,	25	23	26ap.	22	22	...	25	23	25
Nasal Index,	58.1	52.3	61.9	48.9	47.8	...	59.5	51.	56.8
Orbital width,	41	36	37	38	36	36	39	38	35
Orbital height,	29	30	32	31	30	30	31	34	33
Orbital Index,	70.7	83.3	86.5	81.6	83.	83.	79.5	89.5	94.3
Palato-maxillary length,	50	50	47	54	54	...	52	45ap.	50
Palato-maxillary breadth,	66	58	53	64	63	...	56	57	63
Palato-maxillary Index,	132.	116.	112.7	118.5	116.6	...	107.9	126.6	126.
Lower jaw. { Symphysial height, . . . . .	...	...	...	28	33	...	...	...	...
Coronoid " " . . . . .	...	...	...	65	61	...	...	...	58
Condylod " " . . . . .	...	...	...	59	61	...	...	...	48
Gonio-symphysial length, . . . . .	...	...	...	90	95	...	...	...	88
Inter-gonial width, . . . . .	...	...	...	82	82	...	...	...	80
Breadth of ascending ramus, . . . . .	...	...	...	33	34	...	...	...	39

69.5, hyperdolichocephalic; in four the index was from 70.6 to 73, dolichocephalic; in the remaining two it was 75.3 and 76. The mean of the series was 71.1. In seven skulls the basi-bregmatic diameter exceeded the greatest breadth; in two they were equal: the mean vertical index of the series was 74.3. In one skull the occipital longitudinal arc was a little longer than the parietal, but not so long as the frontal arc; in four skulls the frontal arc exceeded the parietal; in three the opposite condition was seen. With one exception the crania were cryptozygous.

When looked at in the *norma lateralis*, the glabella and supra-orbital ridges projected only slightly, the forehead was sometimes nearly vertical, at others receded a little. The nasion was depressed in one specimen, but not in the others. The nasal bones were usually small, not prominent and concave forwards. The nasal spine of the superior maxillæ was distinct, and the floor of the nose was separated from the incisive region by a ridge. The mean nasal index was 54.4 platyrrhine, and of the individual skulls four were markedly platyrrhine, three were mesorrhine, and one on the boundary between leptorrhine and mesorrhine. The orbits varied in the relation of width and height; six were low, microseme; two were high, megaseme; one was mesoseme; the mean index, 83.5, was microseme. In no specimen was the upper jaw prognathous, five were orthognathous, and three were mesognathous; the mean gnathic index, 96.3, was orthognathous.

The nasio-mental diameter could be measured in only two skulls, in one of which the complete facial index was chamæprosopic, in the other high-faced or leptoprosopic. The mean palato-maxillary index was 119.5, *i.e.*, brachyuranic, and with two exceptions, one dolichuranic, the other mesuranic, the other skulls belonged to the brachyuranic group.

The teeth had been fully erupted in all the skulls except a wisdom tooth in No. 143; the crowns were mostly betel stained, and the grinding surfaces of the molars were worn flat. The sutures were, as a rule, distinct, and one was metopic; though in one the sagittal was partially obliterated. In two crania the lambdoidal suture contained small Wormian bones. One had a right epipteric bone, but in none was the squamous temporal in articulation with the frontal.

The cranial capacity in both sexes was low, the mean of six men was only 1201 c.c., and the range was from 1090 to 1362 c.c.; the mean of two women was only 1089 c.c. The lower jaw was present in only three specimens, in each of which the chin was well marked; the body of the bone was deep, for the lodgment of the fangs of the teeth and the angle was well marked.

I may now briefly state the chief cranial characters of the specimens described by previous observers. ARTHUR THOMSON has embodied in a table the measurements made by BUSK, VIRCHOW, FLOWER, BARNARD DAVIS, and himself. Of the thirty-seven skulls included in that table fourteen had a length-breadth index below 70, fourteen were between 70 and 75, five were from 75 to 77.5, one was 78, and three were from 80.6 to 82.9. All the skulls, with four exceptions, were definitely dolichocephalic or in the lower terms of the mesaticephalic group. Of the four exceptional specimens,

one with the index 82.9 from Bintenne of Badulla (R.C.S. Eng. No. 676) is said to be unsymmetrically distorted from occipital pressure, which had doubtless affected the relation of length to breadth; another, from Batticaloa, measured by Virchow, with an index 80.6, is said to be evidently abnormal, probably from an artificial or accidental deformity in the occipital region.

This series of skulls confirms what I have previously had occasion to point out in the study of crania, that in the dolichocephalic crania of savage races the basi-bregmatic height usually exceeds the greatest breadth. Thus, of thirty-six skulls in THOMSON'S table, in which both breadth and height are recorded, the height exceeded the breadth in thirty-one, and it was equal to the breadth in one specimen. In only four crania was the height less than the breadth, and in three of these the length-breadth index was above 80, and the skull was brachycephalic.

The seventeen skulls in THOMSON'S table in which the proportions of the upper jaws were measured were all orthognathous. Of the twenty-two skulls in which the proportions of the nose were measured, ten were platyrhine, seven were mesorhine, and only five were leptorhine. The orbital index was variable; in six specimens it was microseme, in eight mesoseme, in eight megaseme. The palato-alveolar index in eight skulls measured exceeded 120 in only one specimen.

As regards the cranial capacity it is difficult to make a precise statement, as the methods used by different observers in its determination were not uniform, and the results cannot be strictly compared with each other. It may suffice to state that the capacity in one woman's skull is said to be as low as 960 c.c.; in eleven other women the range of capacity was 1025 to 1442 c.c., and the mean was 1230 c.c., *i.e.*, microcephalic. In twenty men the range was from 1140 to 1611 and the mean was 1336 c.c., also microcephalic. In both sexes the mean was materially higher than in the skulls which I measured, and several skulls exceeded considerably that with the highest capacity, 1362 c.c. in my series, an excess which may perhaps partly be due to the methods employed yielding a larger result than is obtained by the plan which I am in the habit of following, which I believe to be more exact.*

If we now examine the series of thirty skulls measured by the Messrs SARASIN, we find that the mean length-breadth index of the Veddahs from the interior was 70.5 for seventeen men, and 69.1 for four women; whilst the corresponding index of four men from the coast was 76.5, and of four women 73. No skull was brachycephalic, but in five the index was from 75.9 to 79.8. In each group, except in that of the men from the coast, the height exceeded the breadth. The mean complete facial index in each group was near the upper limit of the chamæprosopic division. The mean gnathic index in each group was orthognathous, and no specimen was prognathous, and only a small minority was mesognathous. The mean nasal index was in the higher mesorhine series; only four specimens were leptorhine, but thirteen were platyrhine. Fifteen specimens were

* I have described my method in *Challenger Reports*, part xxix. p. 9, 1884. By the method of BROCA, followed by so many craniologists, the capacity is overstated.

megaseme, and the mean orbital index of the series came just within the megaseme division, but four specimens were microseme. In the relative proportions of the length and breadth of the palato-alveolar arch the mean index fell just within the brachy-uranic division. As regards the cranial capacity, the mean of twenty-two men was 1277 c.c., and of ten women 1139 c.c.

Seventy-six skulls ascribed to Veddahs have now been studied and described by experienced craniologists. With very few exceptions they were elongated, with the sides approaching the vertical, the sagittal line not keeled, or only slightly so; relatively narrow, and the length-breadth index was dolichocephalic, frequently hyperdolichocephalic. It is known that some of the skulls in which the index exceeded 75 or 76 were from natives who had lived on the coast, where the possibility of an admixture of blood with other races is probable. The basi-bregmatic height in almost every case exceeded the greatest breadth.

The face was broad in relation to the height. The nose was platyrhine or mesorhine, seldom leptorhine. The upper jaw was orthognathous. The orbit was variable in the proportions of height and breadth, but tended to a relatively high vertical diameter. The palato-alveolar arch was moderately elongated. The cranial capacity was low.

If these characters be compared with those previously given, as found in the Dravidian group, they will be found to correspond in many respects. In both the crania were dolichocephalic in form and proportions; in both the height as a rule exceeded the breadth. The glabella and supra-orbital ridges did not strongly project, the forehead was not specially retreating, and in many specimens approached the vertical; the occipital squama was usually convex, and projected behind theinion. The face was low in relation to the breadth; the nasion was seldom much depressed; the anterior nares were platyrhine or mesorhine, rarely leptorhine; the upper jaw was orthognathous, occasionally mesognathous, not prognathous; the orbits varied in the proportion of width and height; the palato-alveolar arch also varied, though the index seldom much exceeded 120, and the breadth was not greatly in excess of the length. The cranial capacity was microcephalic in both Veddahs and Dravidians, though the former were, on the whole, of smaller capacity than the latter. It is difficult, therefore, to lay down a series of characters in which the Veddah and Dravidian skulls differed from each other.

Andaman Islanders. TABLE X.

I have stated on p. 101 that the possibility of the presence of a Negrito element in the people of India has to be enquired into. Considerable attention has been given to this subject by several ethnologists, and opinions both affirmative of and adverse to the affinity between the black races of India and the Negritos have been expressed. Mr O'DONNELL in his *Census Report* has indeed used the term Negritic as if it were synonymous with Dravidian, and has indicated (p. 264) a route along which he thinks a

Negrito race could have reached southern India and passed to south-eastern Asia and Australia.

That a Negrito race is scattered in the Philippine Islands is well established, and that similar people exist in other islands of the great eastern Archipelago, and in a few localities on the adjacent continent, has been asserted by eminent authorities. There can be no doubt that the Mincopies, or natives of the Andaman Islands in the Bay of Bengal, have the Negrito characters of low stature, very dark skin approaching black, with woolly or frizzly black hair growing in short, close curls. The proximity of these islands to the Indian peninsula has seemed to indicate that a Negrito population had preceded in India the present dark-skinned Dravidian race, and that traces of their existence can be still found in the aboriginal people. Although some writers have referred to black, frizzly or woolly-haired tribes in certain of the mountainous districts in India, the evidence on this head is by no means conclusive, and it may be a question if the terms woolly or frizzly may not have been loosely used to characterise the wavy hair which has been seen in individuals of some of the aboriginal tribes. The statements which have been made in regard to this question have been carefully analysed by A. B. MEYER, in his *Memoir on the Distribution of the Negritos*,* and he has come to the conclusion that the present state of our knowledge does not permit a judgment to be given that the aboriginal people of India were Negritos. As bearing on this matter, I may state that DALTON, in his *Ethnology of Bengal*, figures a Santal with curly hair, quite distinct, however, from the short, close locks of the natives of the Andaman Islands. In his portraits of the Juangs and Korwás, two tribes short in stature and primitive in habits, the hair is long, more or less matted, but not curly. Messrs FORBES WATSON and Sir J. W. KAYE have reproduced † photographs of a Santal, Kurumbas, Yenadies, a jungle tribe of Chingleput, a Toda and a Kandh with curly tangled hair. EDGAR THURSTON, in his description of the short, broad-nosed tribes of Southern India, figures Kadirs from the Ānaimalai Hills, in whom the hair was curly, relatively long, and projecting from the head, not unlike the "mop" of the Papuans. He also gives portraits of Paniyans from Malabar and Kurumbas from the Nilgiri Hills, in whom the hair had a similar character. These tribes or races are primitive in their habits, and the stature does not apparently exceed 5 feet 2 inches. Wavy and curly black hair are, he says, in the south Dravidians common types; but he had seen no head of hair to which the term woolly could be correctly applied.‡ The wavy or curly character seems to be no more marked than the curly locks not unfrequently seen in the white races.

I need not dwell upon the physical characters and the customs of the people of the Andaman Islands, as they have been described in considerable detail by J. MOUAT,§ E. H. MAN,|| DE QUATREFAGES,¶ and E. S. BRANDER.**

* Dresden, 1899.

† *The People of India*, 10 vols., 1868, c. s. London. India Museum.

‡ *Madras Bulletin*, vol. ii. No. 3, p. 187, 1899.

§ *Adventures in Andaman Islands*. London, 1861.

|| *Journ. Anthropol. Inst.*, xiv., 1885.

¶ *Les Pygmées*, Paris, 1887; and in conjunction with M. Hamy, *Crania Ethnica*, p. 184.

** *Proc. Roy. Soc. Edin.*, 1880, p. 415.

The University Anatomical Museum contains the skulls of six Andaman Islanders, presented, along with other bones of the skeleton, by Drs J. DOUGAL, J. S. FORRESTER, D. D. CUNNINGHAM, and Colonel CADELL, V.C. In the Museum of the Royal College of Surgeons of Edinburgh is another skeleton.* Of the seven skulls, two had not quite reached maturity; the others were adult, of these three apparently were women and two men.

When looked at in the *norma verticalis* the skulls were seen to be flattened at the vertex, and the vault had a low curve; they were relatively wider in the parietal regions, the eminences in which were distinctly marked even in the men's skulls. The stephanic diameter was much below the parietal, and its relatively short breadth contributed to give a characteristic contour to the cranium. Although there was no appearance of parieto-occipital flattening, the slope behind the obelion was somewhat abrupt, and the parietal eminences were much closer to the occipital than to the frontal pole of the cranium. With one exception the skulls were cryptozygous. The crania ranged in length from 173 to 158 mm., in greatest breadth from 141 to 128 mm. The mean length-breadth index was 81.5, brachycephalic, and the range was from 78.6 to 88.7. In each skull the basi-bregmatic height was, as is customary in brachycephalic crania, distinctly less than the greatest breadth, and the mean vertical index was 75.7. With one exception the occipital longitudinal arc was the shortest, but there was no constancy in the relative proportions of the frontal and parietal arcs.

In the *norma lateralis* the glabella and supra-orbital ridges were feeble in the males and scarcely marked in the female skulls; the forehead was vertical in the women and very slightly receding in the men; the frontal eminences were distinct. The nasion was not depressed, the nasal bones were not prominent except in one specimen, and were flattened across the bridge. In two skulls the nasal index was mesorhine, the rest were platyrhine, and the mean index was 55. One orbit was high in relation to the width, three were much lower, and the others were intermediate, the mean index of the series, 85.5, was mesorhine. The upper jaw in its degree of projection was in two cases orthognathous, in one prognathous, in the rest mesognathous, the mean of the series was 99.8, mesognathous. The face in each specimen was chamæproscopic, and the mean complete facial index was 80.5.

The nasal spine of the superior maxillæ was moderate, and the floor of the nose was usually separated from the incisive region by a ridge. The teeth had mostly erupted, but in some of the specimens the wisdoms were not complete, and in one of these the right upper canine and right lower central incisor were concealed in the jaws. In the older skulls the crowns were worn from use. In the younger skulls the sutures were well denticulated, but in the older they were beginning to be obliterated. One was metopic, and in it the frontal transverse diameters much exceeded those in the other skulls. In one specimen a large Wormian bone constituted the upper part of the

* The bones of five of the skeletons, exclusive of the skulls, were described by me in the *Challenger Reports*, Zoology, vol. xvi. part xlvii., 1886.

TABLE X.

Andaman Islanders—Sakai.

	ANDAMAN ISLANDERS.							SAKAI.	
	Edin. Univ. Anat. Museum.						E.R.C.S.	Ed. U. A. M.	
	No. 6	No. 1	No. 5	No. 2	No. 3	No. 4	...	Kampar.	Pahang.
Collection number, . . .	No. 6	No. 1	No. 5	No. 2	No. 3	No. 4	...	...	...
Age,	Ad.	21?	Ad.	Ad.	Ad.	23?	Ad.	Ad.	Ad.
Sex,	M.	M.	M.	F.	F.	F.	F.	M.	M.
Cubic capacity, . . .	1080	1255	1270	1080	1190	1153	1090	1155	1385
Glabello-occipital length, .	158	159	173	166	161	159	164	169	175
Basi-bregmatic height, .	125	123	127	122	119	125	121	130ap.	134
Vertical Index, . . .	79.1	77.4	73.4	73.5	73.9	78.6	73.8	76.5	76.6
Minimum frontal diameter, .	89	90	102	90	88	90	87	91	94
Stephanic,	100	111	122	107	104	109	99	95	106
Asterionic,	97	102	96	99	95	97	91	99	106
Greatest parieto-squamous breadth,	128p.	141p.	136p.	131p.	130s.	131p.	132p.	126s.	139s.
Cephalic Index,	81.	88.7	78.6	78.9	80.7	82.4	80.5	74.6	79.4
Horizontal circumference, .	462	468	493	475	468	465	467	473	505
Frontal-longitudinal arc, .	115	113	123	111	121	117	112	112	120
Parietal " "	115	102	135	113	113	120	125	127	128
Occipital " "	102	...	103	111	103	100	101	108	111
Total " "	332	345	361	335	337	337	338	347	359
Vertical transverse arc, .	288	300	304	291	288	295	270	276	295
Length of foramen magnum, .	29	31	32	33	29	34	30	36	37
Basi-nasal length, . . .	90	83	94	93	90	89	92	93	98
Basi-alveolar length, . .	91	82	91	90	91	89	96	89	93ap
Gnathic Index,	101.1	98.8	96.8	96.8	101.1	100.	104.3	95.7	94.9 ap
Interzygomatic breadth, .	121	112	128	123	118	115	119	116	...
Intermalar breadth, . .	113	103	118	112	106	103	111	108	...
Nasio-mental length, . .	99	92	103	96	88	92	...	...	...
Nasio-alveolar " " . .	58	53	62	59	54	55	56	40	...
Complete Facial Index, .	82.	82.1	80.4	78.	74.5	80.	...	...	...
Nasal height,	43	40	45	43	41	41	44	41	51
Nasal width,	22	20	24	25	21	23	25	24	26
Nasal Index,	51.2	50.	53.3	58.1	51.2	56.1	56.8	58.5	51.
Orbital width,	37	35	37	36	37	37	36	36	...
Orbital height,	32	32	32	30	30	31	31	28	...
Orbital Index,	86.5	91.4	86.5	83.3	81.1	83.8	86.1	78.	...
Palato-maxillary length, .	50	47	50	52	49	50	53	47	...
Palato-maxillary breadth, .	62	56	64	60	53	56	59	59	...
Palato-maxillary Index, .	124.	119.1	128.	115.4	108.1	112.	111.3	125.	...
Lower jaw.	Symphysial height, . .	26	22	23	23	23	24	...	...
	Coronoid " "	59	49	49	53	53	51	...	...
	Condylod " "	54	53	51	52	47	51	...	...
	Gonio-symphysial length,	85	77	91	85	85	80	...	...
	Inter-gonial width, . .	85	80	94	82	76	78	...	...
	Breadth of ascending ramus,	31	27	35	34	37	36	...	...
			Metopic						

occipital squama. One skull had an epipteric bone on each side; another had on the left side a broad articulation of the squamous temporal with the frontal, and on the right both an epipteric bone and a direct temporo-frontal articulation. In one the os planum of the ethmoid was so narrowed in front that the orbital plate of the maxilla almost articulated with the frontal; this specimen approached therefore the condition of direct fronto-maxillary articulation, such as I have previously referred to on page 94. In three skulls indications of an infra-orbital suture were present. The lower jaw had a feeble chin and shallow symphysis, the vertical diameter of the body of the bone was moderate, the coronoid process was short, and the sigmoid notch shallow. The cubic capacity of the crania was small; the males ranged from 1080 to 1270, with a mean 1202 c.c.: the females from 1080 to 1153, with a mean of 1106 c.c.

Although OWEN and BUSK had described a few crania, the late Sir WM. FLOWER made the most extensive research into the characters of the Andaman skull that has yet been conducted. He described* a series forty-eight in number, six of which were metopic, and as one of my specimens had the same character, it is obvious that a persistent frontal suture is not uncommon in the crania of this race. The mean length-breadth index of his specimens was 82·8. The height was less than the breadth, and the length-height index was 77·7. The mean gnathic index was 100 in the men, 102 in the women. The mean nasal index was 51·1, and the orbital index, though variable, had a mean 90·9. Both in FLOWER's series and in mine the length-breadth index was brachycephalic; the height was distinctly below the breadth; the upper jaw was mesognathous; the nasal index was mesorhine or platyrhine; the orbits were mesoseme or megaseme; the cranial capacity was microcephalic. The number of specimens examined is so large as to justify one in saying that the leading characters of the cranium in these people have now been ascertained.

The series of Dravidian crania described in this Memoir differ in essential particulars from those of the Andaman Islanders, and the eye at once recognises the differential features, both in form and proportion. The measurements made by Mr THURSTON of the heads of the hill tribes in the Madras Presidency have shown the great majority to have a length-breadth index below 75, though a few ranged from 75 to 77·5; the south Dravidians, like those further north, have, therefore, heads of dolichocephalic proportions. Did we accept the view that a brachycephalic Negrito people preceded the Dravidians in the occupation of India, we could not, I consider, regard the latter, either in cranial configuration or external physical characters, as the direct descendants of the former. It might be argued that had there been a previous Negrito people, some amount of intermixture in times past of the two races might have taken place, which might have led to the production of a wavy or curly character of the hair such as has been seen in the tribes referred to on p. 114, and to the occasional presence of a skull tending to

* *Journ. Anthropol. Inst.*, Nov. 1879, vol. ix., and Nov. 1884.

brachycephalic proportions in some of the existing aboriginal Dravidian tribes, but the direct evidence of either a past or a present Negrito population in India has yet to be obtained.*

Sakai. TABLE X.

The name Sakai is given to aboriginal people dwelling in the hill regions in the Malay peninsula. Since the early part of the century certain tribes called Semangs have been described in Kedah to the north of Pinang and in Tringânû on the east coast. ANDERSON speaks of a native of Kedah as 4 ft. 6 in. in height, the hair woolly and tufted, the skin jet black, the lips thick, the nose flat, the belly protuberant as in the Andaman Islanders. J. R. LOGAN states that a tribe of Semangs in the hills opposite Pinang have a stature from 4 ft. 8 in. to 4 ft. 10 in., the nose with depressed root and spreading alæ, the skin dark brown though sometimes lighter, but black where most exposed.† The Russian traveller, v. MIKLUCHO-MACLAY, became acquainted with people named Orang Sakai in his journey through Johore in 1874-75. He stated that the hair consisted of very fine curls, arranged in a compact mass projecting for a short distance from the head, and formed a good guide to the purity of the race.‡ He regarded the people as Melanesians, though they approached the Negritos of the Philippines. The height of the men varied from 1450 to 1650 mm. (4 ft. 7 in. to 5 ft. 4 in.), and the heads were mesocephalic to brachycephalic. M. DE QUATREFAGES figured § from photographs natives, said to be Sakais from Perak, in one of whom the hair was smooth and in two others was frizzled. Mr ABRAHAM HALE has seen the Sakai people in the Kintah district of Perak, and has given an account|| of many of their customs. He states that an ancient race the Semangs are also found in Perak, on the right bank of the Perak river, whilst the Sakais inhabit the left bank.

HALE did not describe the physical characters of the Sakai, but stated that their primitive dress consisted of bark cloth twisted round the waist and drawn between the thighs. The nasal septum was pierced to wear a porcupine quill or a bone, and the ears were often pierced. The women had the hair standing out from the head in a great mop; they wore bracelets, and ornamented the face and breast with red figures. The Kelantan Sakais from the north-east were finer-looking men than those in the Kintah district.

At the instigation of Professor VIRCHOW, Mr VAUGHAN STEVENS travelled in the eastern

* After this Memoir was in type I received, through the courtesy of Major BANNERMAN, M.D., the *Madras Christian College Magazine* for September and October 1900, in which is an article by Mr C. HAYAVADAWA RAU, B.A., on the origin of the Servile Classes and Hill Tribes of South India. In this article Mr RAU discusses, from the physical, social, linguistic and intellectual points of view, the Negrito theory of the origin of the Dravidians, and regards the theory as untenable. He draws the inference that all the indigenous tribes found by the Aryan immigrants in Southern India belonged substantially to one and the same Dravidian race.

† These accounts are abstracted in G. W. EARL's work on the Native Races of the Indian Archipelago, London, 1853.

‡ *Verh. der Berliner Ges. für Anth.*, etc., 1876 and 1891, p. 837; *Journ. of Straits Branch of Royal Asiatic Soc.*, 1878.

§ *Les Pygmées*, Paris, 1887, pp. 54, 55.

|| *Journal of Anth. Institute*, vol. xv. p. 285, 1886.

part of the Malay peninsula. He sent to Berlin specimens of the hair of a tribe which he called Blandass or Belendas, a name which he seems to use as synonymous with Sakai.* VIRCHOW states that the hair varied in length from 59 to 26 cm.; it was ebony in colour, the more slender examples being paler, and in a child pale reddish brown. In no specimen was it curly or spirally twisted, though at the tip it bent into a crescentic form. At a later date STEVENS forwarded specimens of the hair and a skull from the Panghan tribe (Panggan), on the east side of the peninsula. The men cut the hair close to the scalp, but left a tuft at the top of the occiput. The tuft was said to be of 'peppercorn' shape, and only 5 to 10 mm. above the scalp. The hair was black, slender and spirally twisted as in the Negrito, and could at once be distinguished from the hair of the Belendas tribe. The Semang tribe of Perak on the western side have apparently a similar tuft of hair, possessing the same character. VIRCHOW figures the skull, which was short, broad and high, hypsibrachycephalic; the length-breadth index being 81.5, the length-height 76.9. The glabella and supra-orbital ridges were prominent. The face was broad and low, chamæprosopic; the orbital index 80, was microseme; the nose was short, with a low bridge, mesorhine; the upper jaw was strongly prognathic; the cranial capacity was 1370 c.c.

In 1897 Dr R. MARTIN undertook a journey through the Malay peninsula with the object of seeing the wild tribes in the interior.† He distinguished the appearance of the Semangs, who live especially in the north and in part in the Siamese provinces, from the Sakais, who are found especially in Perak, Selangor, and the west of Pehang. The Semangs, he says, had black skins, black frizzled hair, and were doubtless closely allied to the Negritos of the Philippines. In the Sakai the skin of the breast and body was reddish brown in tint, whilst on the face it was a medium brown with yellowish brown shades; the hair was black, but with a brownish shimmer in certain lights, and throughout was wavy, which distinguished it from the frizzled hair of the Semang, and from the stiff hair of all Mongols, including the Malays. The stature of the Sakai men averaged about 1500 mm. (4 ft. 9 in.), that of the women 1420 mm. (4 ft. 6 in.). The head, from numerous measurements, had a mean length-breadth index 79; the face was broad, but pointed at the chin, mesoprosopic in its proportions, the nose had slight projection, but with broad alæ, which were deeper than the septum; the tegumentary part of the lips, especially the upper, was thick. They painted the face and breast with red, white and black spots, put hollow cylinders of bamboo into the ears and filled them with grasses, which formed a green frame around the face of the women. The men bored the nasal septum and passed through it a piece of wood or porcupine quill.

I am indebted to Mr NELSON ANNANDALE, who travelled in 1899 in the northern part of the peninsula, for photographs of a Sakai youth aged about 15, who lived in the Aring district, a hilly country in Kelantan, in the centre of the peninsula. He had

* *Verh. der Berliner Ges. für Anth.*, etc., November 1891, July and October 1892.

† *Mitteil. der Naturwiss. Ges. in Winterthur*, Heft ii., 1900.

been captured by the Malays as a child, and had been circumcised and brought up as a Mahomedan. His skin was dark, approaching black; the forehead was almost vertical, the nose was short, with a low flattened bridge and wide alæ, the upper lip was thick and prominent, the facial configuration was negroid, but the hair, instead of being woolly or frizzled, was straight, and apparently three or four inches long.

In March 1891 I received from my former pupil, the late Dr W. DUNCAN SCOTT, an imperfect skeleton, which he believed to be that of a Sakai, with a letter giving an interesting account of the people. Dr SCOTT had accompanied his chief, Mr ABRAHAM HALE, in his visit to a tribe of Sakais inhabiting the hill-tops above the Kintah river at a place called Tanjang Keukong. Dr SCOTT is the officer referred to by Mr HALE in the appendix to his account of these people.* Dr SCOTT writes as follows:—The Sakais occupy the hill country in the Malay peninsula as far south as the north end of Johore. The skull and bones were found in a valley watered by the Kampar river, a tributary of the Kintah river, about 25 miles from Batu Gajah. The hills are inhabited by scattered groups of Sakais. The bones were found on a rude platform, about 6 feet from the ground, in a lean-to hut under the shelter of a hill. The hut was made of boughs of trees, and the bones were further protected by a sort of cage of branches.†

The Sakais, he says, were an active, well-proportioned people, with stout muscular limbs, and of a sturdier make than the Malays. Their stature was probably on the average about 5 feet 2 inches, though some may be 5 feet 3 or 4 inches. The skin was lighter in colour than in the Malay, and but little deeper in tint than in the Chinese, though rather brown than yellow, and those who lived in the hills were lighter than those who occupied the low ground. The features, on the whole, were broad, but not markedly so, and the lips were not especially thick. The hair was black, and in those seen by Dr SCOTT was inclined to be long, wavy, reaching to the shoulders; but in some tribes he says that it was stiff, slightly curled, and stood out like a mop around the head, whilst in the people who lived more to the south it was in short corkscrew-like curls. The eyes, as far as he recollects, were dark brown. The gait was peculiar, with a step and swing from the hip.

The younger women wore the Malay sarong round the waist and over the breasts; the older women were generally content with a sarong or piece of bark cloth or fringe of fibrous roots around the waist, and with necklaces of shells, seeds, or monkeys' teeth. The men wore a loin-cloth made of bark, and on festive occasions they wound a strip of bark round the head. Many of the men ornamented the face with a white patch on the cheek, and the girls had the face covered with red and brown streaks. They carried on the back a light basket of rattan to hold fruit or small animals taken in the jungle. They obtained iron choppers, or parangs, from the Malays, but could not smelt the

* *Journ. Anthropol. Inst.*, vol. xv. p. 299, 1886.

† Mr NELSON ANNANDALE has kindly given me photographs which he took of a Sakai rock shelter in Patalung which resembles the hut described by Dr SCOTT.

ore. Their weapons were spears of bamboo and the sumpitan with poisoned darts. Dr SCOTT also wrote an account of their religion, houses, dances, etc., but as this closely corresponded with the description already in print by Mr HALE, it is unnecessary to reproduce it.

The skull presented to me by Dr SCOTT is, I think, that of a man, apparently about middle life; the lower jaw is unfortunately absent.

In the *norma verticalis* the outline was broadly ovoid, with almost vertical side walls, not ridged, but flattened in the sagittal region; the parietal eminences were not prominent, and the skull was without the marked disproportion between the breadth of the frontal and parietal regions seen in the Andaman crania. The length-breadth index was 74·6, and the skull was dolichocephalic. The vertical index was 76·5, and the height was more than the breadth. The parietal longitudinal arc was much the longest. A shallow, vertical-transverse constriction, as if from the pressure of a band during infancy, was immediately behind the coronal suture. The parieto-occipital slope passed gradually downwards, and the occipital squama was rounded.

The glabella and supra-orbital ridges were distinct but not excessive, the forehead only slightly receded, and the frontal eminences were not prominent. The nasion was a little depressed; the nasal bones were small, concave forwards, and projected feebly at the tip. The nasal spine of the superior maxillæ was short. The anterior nares were wide, and the nasal index, 58·5, was strongly platyrrhine. The floor of the nose and the incisive region of the jaw were separated by a shallow ridge. The upper jaw was orthognathous. The orbital index, 78, was microseme. Although the absence of the lower jaw prevented the complete facial index being taken, the short nasio-alveolar diameter, as compared with the interzygomatic breadth index, 34·5, gave a low chamæprosopic character to the face. The palato-maxillary region was broad in relation to the length, and the index was 125.

The teeth were not much worn, though several had been lost during life, and the sockets were absorbed; their crowns were smaller than in the Andaman Islanders. The sutural denticulations were short and relatively simple. A small Wormian bone was in the left parieto-mastoid suture, and in the left pterion was a large epipterice bone. The left jugal process was tuberculated. The mastoids were feeble, and the skull rested behind on the posterior border of the foramen magnum. The cranium was phænozygous. The cranial capacity was microcephalic.

From the examination of the bones of the skeleton, especially those of the limbs, it was evident that the person had been of low stature. The atlas was the only true vertebra which reached me.

Pelvis.—It was small in general dimensions: the alæ were not expanded or very translucent: the pectineal lines were not knife-like: the præ-auricular sulcus was distinct. The sacrum had a feeble anterior concavity: its index, 102, was platyhieric, but the length was almost equal to the breadth. The conjugate diameter of the pelvic brim was distinctly greater than the transverse, and the brim index, 108·5, was highly

dolicho-pellic. The highest indices which I had previously recorded* were in a male Australian 116, a male Bushman 109, and a male Malay 105. The highest brim index in the male Andaman pelvis which I have measured was 102. The want of expansion in the iliac fossæ was shown by the small breadth between the crests of these bones. The width of the pubic arch, with its angle 80° , gave a feminine aspect to the pelvis which led me at first to doubt, notwithstanding the cranial characters, if the skeleton were that of a male. Of the numerous pelvis which I have measured in the female sex, no specimen up to this time has shown the conjugate diameter to exceed the transverse, whilst in the males of savage races this is not unfrequent. In the Sakai pelvis the conjugate was so much in excess that I regard it as confirmatory evidence of the skeleton being of the male sex. I may also state that in a male pelvis in each of the following races I have measured the subpubic angle as follows:—Andaman, 78° ; Chinese, 76° ; Malay, 76° ; Bush, 72° .

Measurements of Pelvis.

	mm.
1. Breadth of pelvis,	211
2. Height of pelvis,	164
3. <i>Breadth-Height Index</i> ,	77.7
4. Between ant. sup. iliac spines,	193
5. Between post. sup. iliac spines,	80
6. Between ischial tubera,	126
7. Vertical diameter of obturator foramen,	38
8. Transverse diameter of obturator foramen,	31
9. <i>Obturator Index</i> ,	81.6
10. Subpubic angle,	80°
11. Transverse diameter of brim,	106
12. Conjugate diameter of brim,	115
13. <i>Pelvic or Brim Index</i> ,	108.5
14. Intertuberal diameter,	107
15. Depth of pelvic cavity,	72
16. Length of sacrum,	94
17. Breadth of sacrum,	96
18. <i>Sacral Index</i> ,	102

Upper Limb.—The Clavicles were slender bones, feebly curved, and with faintly-marked grooves for the subclavius muscles. The right bone was 120 mm., the left 123 mm. long. The Scapulæ were small in their dimensions, with well-marked muscular impressions indicative of strong muscles; the axillary border was concave in its long diameter, the supra-scapular notch was shallow. The right bone was 122 mm. long and 83 broad, its scapular index was 68; the left bone was 123 mm. long and 80 broad, its index was 65. The mean index of the two scapulæ was 66.5, which is less than the mean of 69.8 obtained by FLOWER and GARSON from twenty-one scapulæ of Andaman Islanders, and of 70.6 by myself from six scapulæ of that race. The Humeri had strong muscular impressions and distinct musculo-spiral grooves; no intercondylar

* *Challenger Report on Human Skeletons*, part xlvii., 1886.

foramen or supra-condylar process was present. The bones of the forearm, though short, were well-proportioned and with distinct muscular impressions, but the styloid processes were feeble.

The dimensions were as follows :—

	Right.	Left.
Humerus, head to trochlea,	253 mm.	246 mm.
Radius to tip of styloid,	203 „	201 „
„ base „	200 „	199 „
Ulna to tip of styloid, . . . . .	...	222 „
„ articular surface, . . . . .	...	222 „

The radio-humeral index was 80·2, or dolichokerkic,* a proportion which these bones have in common with the Andaman Islanders and with the Negritos measured by MEYER and TÜNGEL and by HAMY, which expresses that the forearm was in its relation to the upper arm proportionately longer than is found in Europeans.

Lower Limb.—The right femur, tibia, fibula and tarsal bones had been sent to me. The Femur, though small, was well-proportioned, and with strong muscular impressions. The head showed the slight prolongation of the articular surface on to the upper part of the anterior surface of the neck, which I have elsewhere named the extensor area.† The upper end of the anterior intertrochanteric line was unusually strong, and indicated that the ilio-femoral ligament which takes so important a part in the maintenance of the erect attitude had been well developed. The gluteal ridge and the linea aspera were strongly marked. The flattening of the upper third of the shaft which I described in some aboriginal femora,‡ and which MANOUVRIER has subsequently termed platymery, was not present, and there was no external infra-trochanteric ridge distinct from the gluteal ridge. The transverse diameter of the upper third of the shaft was 23 mm., the antero-posterior 18 mm., and the index of platymery was 78. The transverse diameter of the shaft opposite the nutrient foramen was 20 mm., the antero-posterior diameter was 23 mm., and the pilastric index was 115, which expresses the relatively strong projection of the linea aspera. The articular surface of the internal condyl was not specially prolonged upwards and backwards.

The Tibia was well-proportioned. The head was somewhat retroverted ; the internal condylar surface was concave, the external was plano-concave. The shaft was not platyknic; its breadth in the middle was 18 mm., its antero-posterior diameter 22 mm., and the index was 81·8. At its lower end the tibia had a well-marked astragalar articular facet, prolonged to the front of the bone. Associated with this was a corresponding prolongation of the upper articular surface on the astragalus, which was almost continuous with the anterior convex surface for the scaphoid. So well defined was this additional tibio-astragalar articulation that, as ARTHUR THOMSON and HAVELOCK CHARLES have shown, the ankle joint must have been frequently acutely flexed as takes

* For the use of this term see my *Challenger Report on Human Skeletons*, part xlvii., 1886.

† Address to section of Anthropology in *British Association Reports*, Toronto, 1897.

‡ *Challenger Report*, op. cit., page 97.

place in the attitude of squatting.* The Fibula was well marked in its surfaces, borders, and muscular impressions.

The long bones had the following dimensions :—

	Right.
Femur, maximum length,	368 mm.
„ oblique length,	365 „
Tibia condylar surface to tip of malleolus,	299 „
„ „ „ astragalar surface,	295 „
Fibula, maximum length,	299 „

It will be observed that the tibia and fibula are of the same length. The tibio-femoral index, calculated from the oblique length of the femur and the condylo-astragalar length of the tibia, was 80·9, and the leg, therefore, scarcely reached dolichoknemic proportions; a result similar to that which I obtained from the measurement of four skeletons of Andaman Islanders, in which the mean index was 81·2. An index of the relative length of the upper and lower limbs, called intermembral index, has been obtained by the following formula $\frac{\text{humerus} + \text{radius} \times 100}{\text{femur} + \text{tibia}}$, in which the maximum

length of the bones was taken. In the Sakai skeleton this index was 68·3, which is somewhat less than the mean 68·9 obtained some years ago by FLOWER and myself from the measurement of a number of skeletons of Andaman Islanders. In both these people this index is relatively low, and points to the bones of the shaft of the upper limb, being short in comparison with those of the lower limb. The relative lengths of the humerus and femur have been calculated by the formula $\frac{\text{humerus} \times 100}{\text{femur}}$, and the index is 68·7, a number which is less than the mean 70 obtained by FLOWER and myself in the Andaman Islanders.

With the view of obtaining an estimate of the stature of the person whose skeleton I had examined, I compared the length of the femur and tibia with that of the corresponding bones of a male Andaman islander in the University Museum,† whose articulated skeleton was 4 feet 6½ inches (1385 mm.) in height. The oblique length of the femur in this skeleton was 385 mm. (15¼ ins.), and the condylo-astragalar length of the tibia was 322 mm. (12⅙ ins.)—together, 707 mm. (27⅞ ins.): whilst in the Sakai skeleton the corresponding diameters in the two bones were together only 660 mm. (26 ins.), which points to a stature about two inches less than that of the Andaman islander.

A short time after the receipt of the skeleton of the Sakai, Dr DUNCAN SCOTT presented me with a skull found in the jungle in Ulu Pahang, on the eastern sea-board of the Malay peninsula, immediately to the north of Johore. The collector from whom Dr SCOTT received it could not say whether it was a Sakai or a Malay, but

* *Journal of Anat. and Phys.*, 1889-1894.

† I am indebted to Colonel CADELL, V.C., for the gift of this skeleton, which I have had articulated.

thought from the locality that it was the former. Although there is a doubt as to the race, I have thought well to give a brief description of it.

The skull had been injured, and there was no lower jaw; it was obviously that of a man; the loss of teeth and the absorption of the sockets gave the impression of an aged person, but the cranial sutures were unossified and scarcely denticulated. In the right coronal were two sutural bones, in the left pterion a small epipteric, and in the lambdoidal suture several small Wormian bones. In the *norma verticalis* the cranium was broadly ovoid, raised along the sagittal line, and sloping rapidly down to the parietal eminences, below which the sides were somewhat convex. Its length-breadth index was 79·4, a little below the brachycephalic numerical limit, and the vertical index was only 76·6,—so that in the proportions of length and breadth to height, it had the brachycephalic rather than the dolichocephalic character. The parietal was the longest of the longitudinal arcs. The actual length of this skull was 6 mm. more than the one just described, but its breadth was 13 mm. greater, which accounted for the higher length-breadth index. The parieto-occipital slope was gradual, and not more or less abrupt than one sees in the more characteristic brachycephalic crania; the occipital squama did not project much behind the inion.

The glabella and supra-orbital ridges were feeble; the frontal eminences were scarcely marked; the forehead receded a little; the nasion was not depressed; the nasal bones slightly projected, and the bridge was shallow; the anterior nares were wide, but the height of the nose, 51 mm., brought the index into the mesorhine group; the nasal spine of the superior maxillæ was feeble. The absorption of the incisive alveoli made it impossible to determine the original projection of the jaw, and the gnathic index, 94·9, is only approximative. The broken zygomata prevented the width of the face from being taken. The cranial capacity was mesocephalic.

Although much remains to be done to complete our knowledge of the inhabitants of the Malay peninsula, it is obvious that in addition to the Malays, who dwell on the sea-coast, and the Siamese invaders in the northern provinces, whose appearance in the peninsula is probably of relatively recent date, the hill-districts are peopled by tribes who, in their external characters and cranial configuration, differ from each other. From the preceding narrative it will be seen, that whilst some tribes named Semangs and Panghans have the black skin and frizzly hair characteristic of the Negritos, in other tribes the skin is not so dark, and the hair, though black, is not frizzly or woolly, but is relatively straight and several inches long. Travellers do not always differentiate by descriptive names the straighter-haired from the frizzly-haired people, and by some the name Sakai is employed to designate both varieties of aborigines who dwell in the hilly and jungly districts. If the frizzly-haired, black-skinned Negrito people are the aboriginal inhabitants, those with straighter hair doubtless also represent an ancient race. The question, however, naturally arises, whether there may not have been in the course of centuries an intermixture and cohabitation of the Negrito race with the straight-haired Malays from the sea-board,

as well as with the straight-haired Siamese who have entered the peninsula from the north, so as to lead to a modification in the physical characteristics of the people and the production in certain districts of a mixed race.

As regards the cranial configuration, the skull of the frizzly-haired Panghan, described by Professor VIRCHOW, was brachycephalic; and the figure which he has reproduced obviously represents a type of skull resembling that of the Andaman Islanders. The skull form, therefore, confirms the view of the presence of a Negrito people in the Malay peninsula.

Of the two skulls which I have described, the one from the Kintah district, from its locality and the nature of the interment, must be regarded as of an aboriginal race and not a Malay. The skull was dolichocephalic, a proportion which belongs neither to the Negrito nor to the Malay. From Dr SCOTT's description of the people, to whom he gives the general name of "Sakai," it would seem that the hill-tribes in this district had long and not frizzly hair, a skin not black but lighter in colour than the Malay, which, conjoined with the dolichocephalic skull, gave race characters differing materially from the Negritos. These people, however, have, like the Negritos, a low stature. The skull from Pahang, on the other hand, differed so materially in its proportions and general appearance from the Kintah specimen, that it cannot, I think, have belonged to the same tribe or race,—the proportion of the length-breadth index, though numerically mesaticephalic, 79·4, was essentially brachycephalic, though the parieto-occipital slope was not abruptly steep. In the form of the vertex and the proportions of the nose it differed from the Kintah skull, but its injured condition did not admit of a complete comparison being made. I hesitate, therefore, to give an opinion on the race to which it had belonged.

From the consideration of the whole question there seems to be little doubt that in the hill regions of the Malay peninsula two aboriginal races are met with, distinguished from each other by the colour of the skin, the characters of the hair, and the form of the cranium, though both possess in common a low stature.

EXPLANATION OF PLATES IV.-VII.

The Plates and Figures are numbered in sequence with those in Part I. of this Memoir.

For the Photographs from which the figures are reproduced I am indebted to Mr W. E. Carnegie Dickson, B.Sc.

- FIG. 15. Gond, Godavery District, Central India, profile. Table I.
 „ 16. The Same, full face. Table I.
 „ 17. The Same, vertex. Table I.
 „ 18. Kandh, Khoorda, Orissa, profile. Table I.
 „ 19. The Same, full face. Table I.
 „ 20. Bhúmij Tribe, Mánbhúm, ♂ æt. 30, profile. Table IV.
 „ 21. The Same, full face. Table IV.
 „ 22. The Same, vertex. Table IV.
 „ 23. Tamil-speaking native of Madras, profile. Table II.
 „ 24. The Same, full face. Table II.
 „ 25. Uriyá, Baghmari Village, Orissa, profile. Table VI.
 „ 26. The Same, full face. Table VI.
 „ 27. Veddah, metopic skull, male, ♂ profile. Table IX.
 „ 28. Veddah, Batticaloa, E. Coast of Ceylon, ♂ full face. Table IX.
 „ 29. Múnda, Ranchi ♀, æt. 24, profile. Table III.
 „ 30. Andaman Islander, ♂ profile. Table X.
 „ 31. The Same, full face. Table X.
 „ 32. The Same, vertex. Table X.
 „ 33. Sakai, Malay peninsula, profile. Table X.
 „ 34. The Same, full face. Table X.
 „ 35. Section through skull of Juang, ♂, page 128. I.M., No. 443, Table V.
 „ 36. Section through skull of Múnda, ♂, page 128. I.M., No. 26, Table III.

The Antero-posterior almost mesial sections show the contour of the crania and the radial measurements.

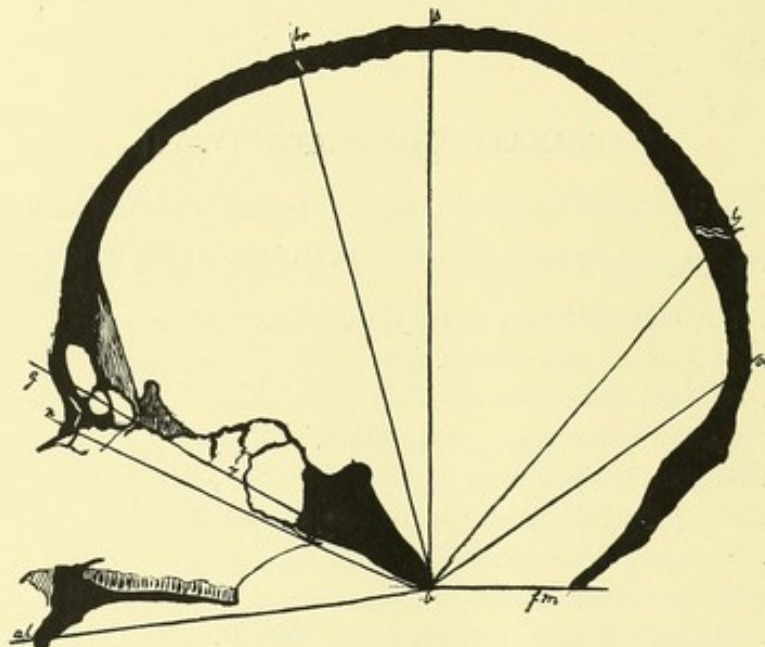


FIG. 35.—Juang.

f.m. plane of foramen magnum.

b. the basion: the lines drawn from which to the points on the circumference are radial from that point, and measure in millimètres as follows:—

	Juang.	Múnda.		Juang.	Múnda.
<i>b.al.</i> basi-alveolar radius, . . .	103	95	<i>b.p.</i> a radial line perpendicular to the plane of the foramen magnum, . . .	145	133
<i>b.n.</i> basi-nasal „ . . .	106	101	<i>b.l.</i> basi-lambda radius, . . .	120	116
<i>b.g.</i> basi-glabellar „ . . .	111	111	<i>b.oc.</i> basion to occipital point, . . .	101	94
<i>b.br.</i> basi-bregmatic „ . . .	142	128			

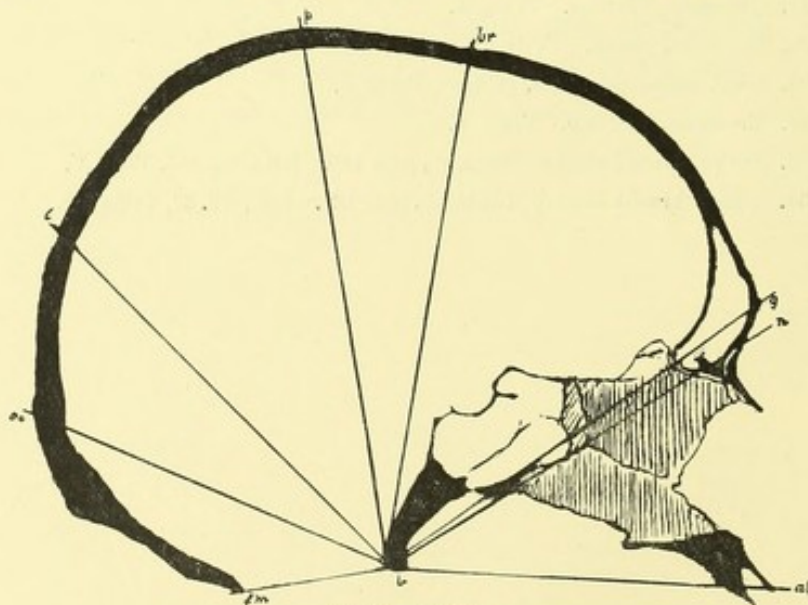


FIG. 36.—Múnda.

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96	96	96	96
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100	100	100	100

SIR WILLIAM TURNER ON "Craniology of People of India."—PLATE IV.

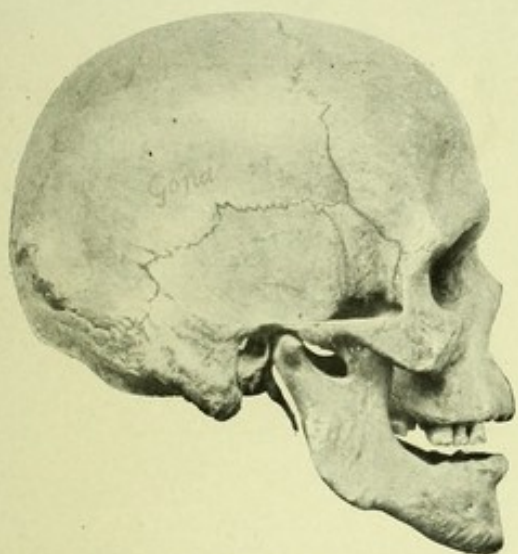


FIG. 15.—Gond.



FIG. 16.—Gond

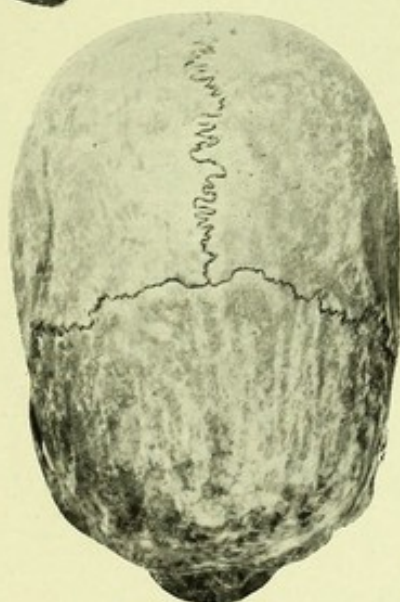


FIG. 17.—Gond.

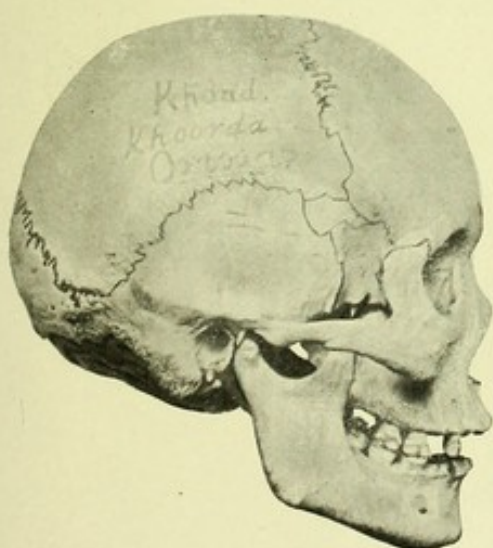


FIG. 18.—Kondh.



FIG. 19.—Kondh.



SIR WILLIAM TURNER ON "Craniology of People of India."—PLATE V.



FIG. 20.—Bhūmij.



FIG. 21.—Bhūmij.

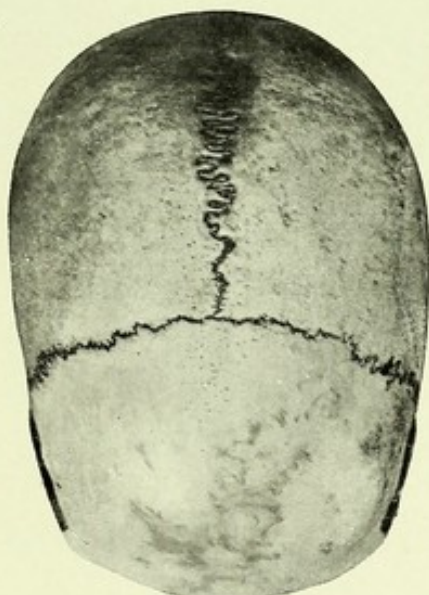


FIG. 22.—Bhūmij.

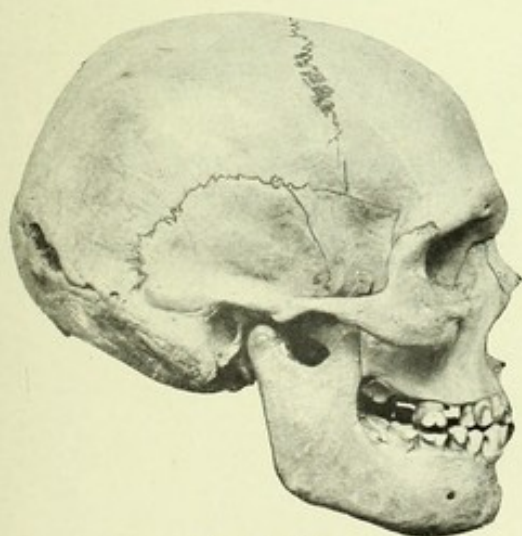


FIG. 23.—Tamil.



FIG. 24.—Tamil.



SIR WILLIAM TURNER ON "Craniology of People of India."—PLATE VI.

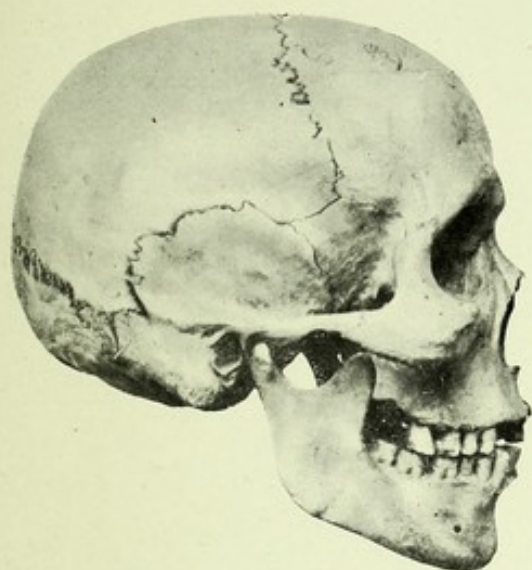


FIG. 25.—Uriyá.

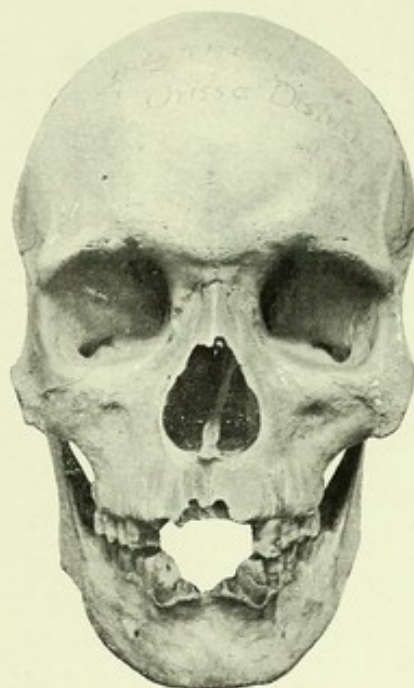


FIG. 26.—Uriyá

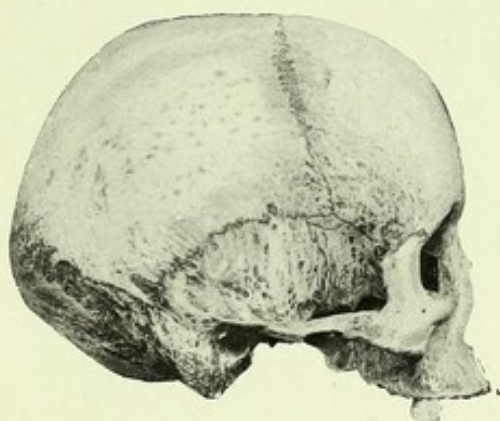


FIG. 29.—Múnda.



FIG. 27.—Veddah.

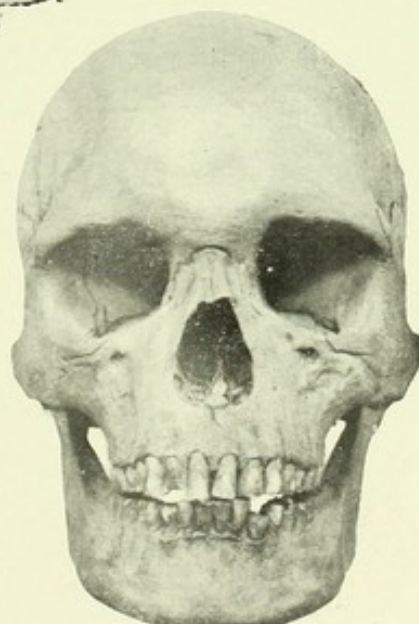


FIG. 28.—Veddah.



SIR WILLIAM TURNER ON "Craniology of People of India."—PLATE VII.



FIG. 30.—Andaman.

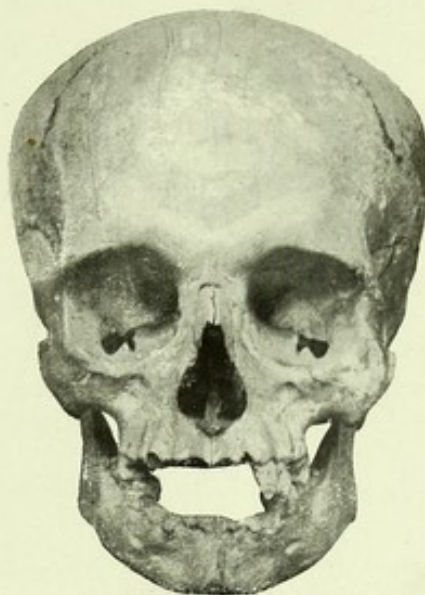


FIG. 31.—Andaman.



FIG. 32.—Andaman.



FIG. 33.—Sakai.

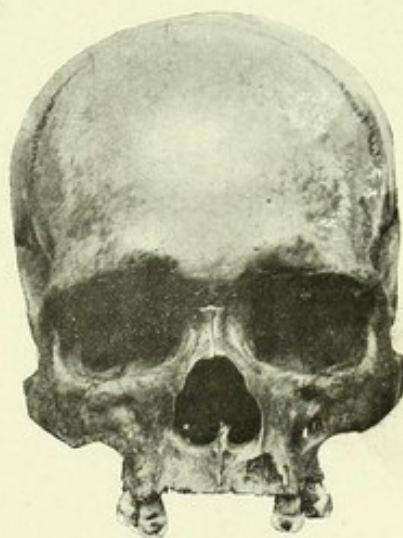


FIG. 34.—Sakai.

