

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 Luncta 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 Kutcha 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 "											
Greatest parieto-squamous breadth,	131s.	129s.	137s.	134p.	130s.	134s.	136s.	135p.	131s.	136s.	145
Cephalic Index,	75.3	71.3	77.4	77.5	71.0	77.5	77.3	74.6	69.7	80.5	85.3
Horizontal circumference,	490	505	496	480	518	490	506	510	512	490	504
Frontal longitudinal arc,	121	122	126	128	137	115	121	140	135	123	119
Parietal " "	117	132	114	120	119	105	133	129	134	125	118
Occipital " "	107	120	123	117	115	122	109	114	121	104	110
Total " "	345	374	363	365	371	342	363	383	390	352	347
Vertical transverse arc,	282	281	297	295	286	286	295	305	300	292	282
Length of foramen magnum,	36	31	35	32	31	34	32	30	35	37	34
Basi-nasal length,	99	98	93	93	98	94	94	91	106	100	95
Basi-alveolar length,	94	91	99	94	96	87	88	95	103	101	89
Gnathic Index,	94.9	92.9	106.5	101.1	98.	92.6	93.6	104.4	97.2	101.	93.7
Interzygomatic breadth,	139	130	124	119	133	117	127	127	129	132	
Intermalar " "	126	121	112	109	124	106	113	118	120	118	
Nasio-mental length,	109	111	110	107	109	105	114	118	121	112	
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.
Maxillary 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	53	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 platyrrhine in I, mesorrhine 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 metriocephalic.* 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 chamæprosopic 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.

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 gun-powder. 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. lli. 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-butia. Gurung. Nepal.
Collection,	A.	B.	C.	D.	E.	F.	G.	H.	Ad.
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 epipteric 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 mesoseme 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 chamæprosopic; 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. M'Kenzie 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 Wás, 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, Nga 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 the inion 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	1840	1540	1460	1460	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	39.6	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	33	30
	Coronoid, . . .	63	64	65	62	64	65	62	68	55	60	65	66	51
	Condylod, . . .	65	64	65	60	63	68	65	63	60	63	67	69	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	109	111	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.	Pyn Win, Zikaywa.	Lon Htaw, Zibynon.	Pe, Sharsayboo.	Lu Gyi, Monyo.	San Kun, Monyo.	Noo, Aleywa.	Chut, Yaykayon.	Tun Yan, Mahathanan.	Shwe In, Sagaing.	ShweByaung, Pakokko.	Tun Tha, Goumyindan.	Pu, Aungmyingain.	Tun U, Myan-aung.	Aung Myat, Yebonk.	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	1670	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	78.3	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	126	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	26	25	26	25	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	35	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
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 hypsiccephalic, *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 chamæprosopic 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, chamæprosopic; 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	78.5	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	78.	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	253	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. Symphyseal 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 Mahommedan 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. $1\frac{3}{4}$ 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
Vertical Index,	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.	
Cephalic Index,	82.7	84.6	86.1	88.2	
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	
Gnathic Index,	93.9	98.9	102.	100.	
Interzygomatic breadth, .	128	126	134	138	
Intermalar "	118	117	124	125	
Nasio-mental length, . . .	113	117	118	118	
Nasio-mental complete facial Index,	88.2	92.8	88.	85.5	
Nasio-alveolar length, . . .	67	67	66	69	
Maxillary upper facial Index,	52.3	53.1	49.2	50.	
Nasal height,	53	52	50	52	
Nasal width,	26	25	26	26	
Nasal Index,	49.1	48.2	52.	50.	
Orbital width,	37	40	39	41	
Orbital height,	34	33	31	37	
Orbital Index,	91.9	82.5	79.5	90.2	
Palato-maxillary length, .	53	52	55	58	
Palato-maxillary breadth, .	62	62	66	63	
Palato-maxillary Index, .	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 platyrhine, 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.	H. T.	H. T.	H. T.	H. T.	H. T.	H. T.	H. T.	H. T.
					Hong Kong.	161	163	165	169	170	494	162	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	...	...	...	...	...	...	...	...
{ Coronoid, . . .	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, dolichuranic 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.

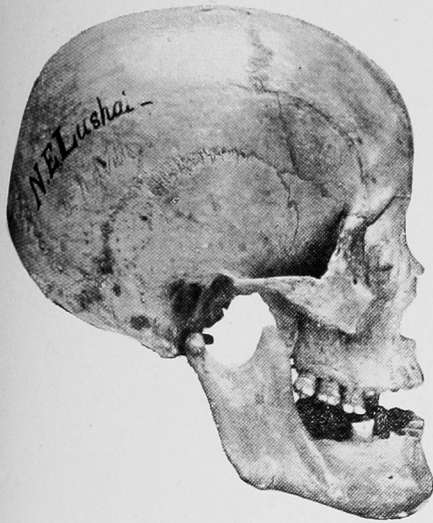


FIG. 1.—Lushai.



FIG. 2.—Lushai.

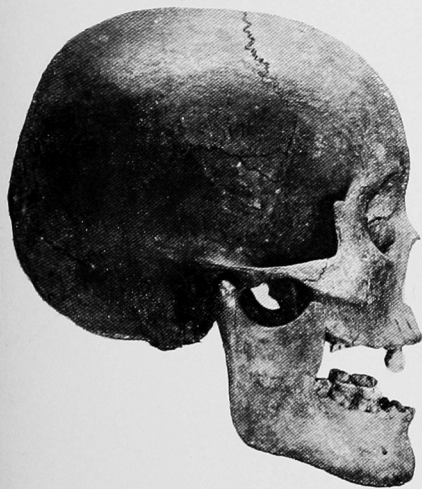


FIG. 3.—Chin.



FIG. 4.—Chin.

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



FIG. 5.—Nágá.



FIG. 6.—Nágá.



FIG. 9.—Siamese.

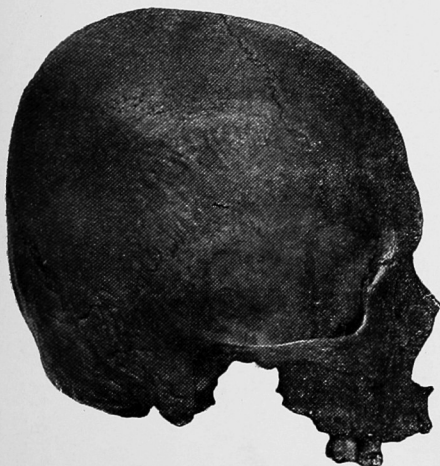


FIG. 7.—Gurung, Nepal.



FIG. 8.—Gurung, Nepal.

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

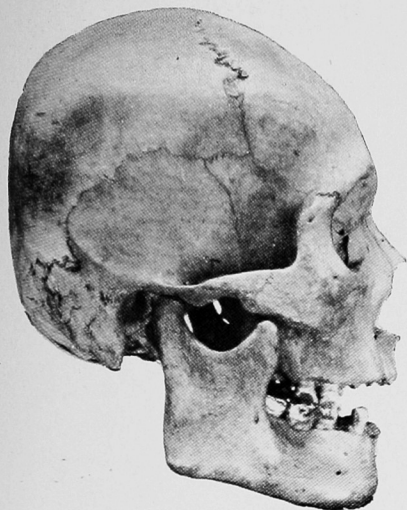


FIG. 10.—Burmese.



FIG. 11.—Burmese.



FIG. 14.—Upper Burma.



FIG. 12.—Burmese.



FIG. 13.—Burmese.