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On the OSTEOLOGICAL CHARACTERS of the KUBUS of SUMATRA.

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THE osteological remains of the Kubus of Sumatra, placed in my hands for examination by Mr. H. O. Forbes, consisted of the skeleton of a female and a single skull, also that of a female, which are now in the possession of the British Museum. Both specimens are those of adults of middle age.

Stature.—The height of seven males measured by Mr. Forbes averaged 1,596 mm., or almost exactly the same as that of adult English women¹ (1,592 mm.), while the average height of five females was 1,493 mm.; the difference between the stature of the male and female Kubus is therefore 103 mm. The height of the skeleton placed in my hands, estimated from the length of the femur, is 1,450 mm., which, allowing for the soft parts existing in the living body, would indicate the stature of this individual to be about the average of the females measured by Mr. Forbes.

Characters of the Skull.

Cranium.—The appearance presented by the drawings of the people taken from life by Mr. Forbes shows that the head is of moderate length, somewhat narrow transversely in the frontal region, and flat in the glabellar and superciliary regions; the malars are prominent, the nose becomes gradually elevated towards the tip, its contour following a wide arc; the chin is narrow but not pointed; the lips are thick and prominent, and the hair is straight with a tendency to curl.

Turning to the skulls we are at once struck by the strong resemblance they bear to one another in general appearance, the chief difference observable between them, on a superficial examination, being that that belonging to the skeleton is somewhat larger generally than the other.

The maximum length of the one is 174 mm., and of the other 173 mm., while their maximum breadth is 135 mm. and 136 mm. respectively. These measurements give a cephalic index to the one of 77·6, and to the other of 78·6, which places them in the mesatecephalic group of Flower and of the Frankfurter Verständung.

The altitudinal index (the ratio of the basio-bregmatic height

¹ Report of the Anthropol. Committee of the Brit. Assoc. (Rep. Brit. Assoc., p. 260, 1883.)

to the maximum length) differs somewhat in the two skulls, that belonging to the skeleton being considerably higher than the other; but in neither instance does the height exceed the breadth.

The general form of the cranium, as seen in the *norma verticalis*, is narrow in front, the sides straight and gradually diverging to the parietal eminences which are situated near the posterior border of the parietal bones. The differences in the broadening out of the cranium from the anterior frontal to the parietal regions in the two skulls is well seen by comparing the relation of the minimum and maximum frontal breadths of each with their respective maximum breadth, this latter being taken as 100. In the skull belonging to the skeleton, which we will designate as No. 1, the indices are 67·4, 79·2, and 100; in the other skull, which we will call No. 2, they are 64, 77·2, and 100. The glabellar region is flat and smooth, corresponding to outline No. 0 of Broca in skull No. 1, and to No. 1 in skull No. 2; superciliary ridges are entirely absent. The forehead rises somewhat vertically to the level of the frontal eminences (which are not prominent), and then slopes backwards and upwards till it attains its maximum, which is situated in the parietal region. Viewed from the *norma frontalis*, the arch of the top of the cranium is markedly flat, giving the stephanic region a somewhat angular appearance. In the parieto-occipital region the contour of the cranium falls with a moderate curve towards the foramen magnum. The general surface of the cranium is smooth, and the muscular ridges are little pronounced. The mastoid processes are feebly developed.

The sutures are very simple in No. 2, but somewhat more complicated in No. 1, though still simple; those in the former being represented by Broca's outlines of complication of sutures No. 2 for the fronto-parietal, and No. 3 for the parieto-occipital suture, the latter by Nos. 2-3 for the fronto-parietal, and No. 4 for the parieto-occipital. Wormian bones are not present in either skull. In No. 2 the sutures are more open than in No. 1, in which the coronal and sagittal sutures are approaching obliteration.

With regard to the projection of the zygomatic arches, in relation to the contour of the bi-stephanic region, No. 2 is slightly phænozygous, but in No. 1 the arches are not visible, bi-zygo-stephanic index being 87·7 in No. 1, and 91·3 in No. 2. In my paper on the Cranial Characters of the Natives of Timor-Laut,¹ I showed that skulls in which this index is 90 and upwards are phænozygous; these Kubu skulls are therefore on the border-

¹ "Journ. Anthropol. Inst.," vol. xiii, p. 391 (1884).

line between the two conditions. The inion is fully developed in both skulls, being represented by Broca's outline No. 1.

The average horizontal circumference of the two skulls is 490 mm., 10 mm. less than the average circumference of the heads of the five living females measured by Mr. Forbes.

Facial portion.—The nasal bones have a very characteristic shape; they are moderately prominent in respect to the plane of the face, and form a gentle curve from above downwards, being intermediate in curve between Broca's outlines Nos. 1 and 2.

The nasal aperture differs in the two skulls: in No. 1 it is longer and slightly narrower than in No. 2, the index of the former being 50, while that of the latter is 56·8, which places No. 1 in the middle of the mesorhine group (48–53), and No. 2 well within the platyrrhine (above 53). The inferior border is nearly straight transversely, and is fairly well defined. The nasal spine of No. 1 is represented by Broca's outline No. 2, and in skull No. 2 by the outline No. 1.

The orbits are somewhat more rounded in No. 1 than in No. 2, the orbital index of the former being 89·2 and of the latter 80·1. The margins of the orbits are thin and sharply defined.

The malar bones are narrow vertically, flattened anteriorly, and curve abruptly backwards, which gives that marked prominence at the malar point so well seen in the drawings by Mr. Forbes. The nasi-malar angle of No. 1 skull is 143° , and of the other 140° .

The alveolar index of the two skulls is very similar, being 96·9 in No. 1, and 98·8 in No. 2. They are therefore on the border-land, figuratively speaking, between orthognathous and mesognathous.

The palato-maxillary index of No. 1 is 126, and of No. 2, 120·4, measuring the length and breadth of this region according to Professor Flower's plan. The palate is comparatively flat. The teeth are in good condition, small in size, and little worn. In No. 1 the two upper incisors have been lost during life.

The relation of the breadth of the middle portion of the face, from the alveolar point to the nasion, to the bi-zygomatic breadth (the latter being taken as 100), is as 52·5 and 53·9 to 100 in the two skulls respectively. This is the mid-facial index of Kolmann, and shows a very close similarity in the two skulls.

The different measurements of the mandible show great similarity. The chief point to be noted in this bone is the large size of the symphyseal angle, which is 84° in the one and 88° in the other skull, indicating a much more vertical chin than obtains generally in Europeans.

The pelvis not being articulated, I was unable to ascertain all the measurements which should be taken, but I measured the

transverse and antero-posterior diameter of the brim, which are undoubtedly the most important dimensions. The transverse diameter of the brim measured 177 mm., and the antero-posterior diameter 122, which gives a pelvic index (taking the transverse diameter as 100) of 104·3. The index of forty-nine European female pelves, measured by Verneau and myself, was 79·0; while that of thirteen Andamanese, measured by myself, was 96·2. The antero-posterior length in comparison to the transverse breadth of the brim in this Kubu woman's pelvis is extreme; indeed I have never seen or measured a pelvis of so exaggerated a type, approaching in form nearly to that of the anthropomorphous apes. The great antero-posterior length of this specimen is due chiefly to the straightness of the sacrum. It is extremely desirable that additional specimens should be procured, so as to ascertain whether such a form of pelvis is normal in this race.

The scapular index, or the ratio of the breadth of the scapula to the length, the latter being taken as 100, is 72·95 in the Kubu, in the Europeans (Flower and myself) 65·2, in Negroes (Broca) 68·16, and in Andamanese (Flower) 69·8.

The limb bones are slender; the index obtained by comparison of the upper and lower limbs with each other—the inter-membral index, or the length of the humerus and radius added together compared with that of the femur and tibia (the latter being taken as 100), is 70. This index in Europeans measured by Professors Broca and Flower was found to be 69·2 and 69·73 respectively; in Negroes Broca ascertained it to be 68·27; and in nineteen Andamanese Flower found it to be 68·3. This high index shows an approximation in the proportions of the limbs of the Kubus to those of the anthropoid apes, and indicates that the length of the upper limb is considerably greater in proportion than that of the lower as compared to what obtains in Europeans. In the Negro and the Andamanese, on the other hand, the upper limb is proportionately to the lower shorter than in Europeans.

The femoro-humeral index, or the ratio of the humerus to the femur, the latter being taken as 100, is 75·2. In twenty Europeans measured by Broca and Flower it is 72·45, in sixteen Negroes (Broca) 69·79, and in nineteen Andamanese (Flower) 69·8. In this index also the variation in the Kubus from the Europeans is in an opposite direction to that of the negroes and Andamanese.

The femoro-tibial index, or the ratio of the tibia to the femur, the latter being taken as 100, is 80·7 in the Kubu, 82·1 in the European (Flower), 84·7 in the Negro (Humphrey), and 84·5 in the Andamanese (Flower).

The humero-radial index, or the length of the radius compared to the humerus, the latter being taken as 100, is 74.1, in Europeans (Broca and Flower) 73.9, in Negroes (Broca) 79.4, and in Andamanese (Flower) 81.0.

Relations of the Kubus to other Races.

I have already said that on comparing the two skulls side by side, one is struck with the close resemblance they bear to one another. There is quite as close a resemblance between these two skulls as exists between Andamanese skulls. Such a condition occurring in a sufficiently large series would indicate purity of race, or at least isolation from other races for a long period of years. Unfortunately the number of Kubu skulls before us is not sufficiently large to justify very definite statements regarding them, though I think sufficient to answer one question which presents itself to us for solution, namely, as to what race the Kubus are allied,—whether they possess Negrito or Malayan affinities. The character of the hair, the form of the nose, the various characters of the skull, and the proportion of the limb bones show that they cannot have any near affinity to the Negrito race found in various parts of the Indo-Malayan Archipelago, but that they are decidedly Malays, and therefore Mongoloid. The high nasi-malar angle, the high and broad face, the flat forehead owing to absence of all glabellar and superciliary ridges, the slight sub-glabellar nasal depressions, and the nomadic life they lead, are all highly characteristic of the Mongolian race.

The frizzle in the hair seen in the drawings by Mr. Forbes is probably to be accounted for by their having at some remote period intermingled slightly with the Negrito people, possibly during their migration southward. There is, however, evidence that they have for a long period been isolated from the other surrounding inhabitants of the island, and that by absence of infusion of fresh blood they have come to resemble one another so closely that they now possess certain definite characteristics of a more or less stable nature. It is, however, very desirable that these observations should be extended by a study of a larger quantity of material from which to gather information than has been at my disposal. In the meantime we have to thank Mr. Forbes for the trouble he has been at to secure what must be considered a very valuable addition to our specimens illustrating the osteology of the Indo-Malayan Archipelago.

CRANIAL MEASUREMENTS.

Race, Kubu Age.	Sex.	1. Capacity.	2. Length, maximum.	3. Breadth, maxi- mum.	4. Minimum frontal breadth.	5. Maximum frontal breadth.	6. Height.	Longitudinal arcs.				11. Auriculo-breg- matic arc.	12. Total transverse circumference.	13. Total horizontal circumference.	14. Pre-auricular arc.	15. Length of foramen magnum.	16. Basio-nasal length.	17. Total med un- circumference, 11 + 15 + 16.
								7. Frontal.	8. Parietal.	9. Occipital.	10. Fronto- occipital.							
No. 1, Adult	♂	174	173	135	91	107	132	128	107	124	359	285	415	495	227	33	98	480
No. 2, "	♀	173	173	136	87	105	125	115	105	128	348	275	398	485	209	35	91	474

FACIAL MEASUREMENTS.

No. 1	No. 2	Basio-alveolar length.	Alveolo-nasial length.		Nasal aperture.		Inter-orbital width.	Orbit.		Malar height.	Bi-jugal breadth.	Bi-zygomatic breadth.	Palato-maxillary.		Naso-malar angle.	Bi-gonial breadth.	Condyl-o-gonial length.	Gonio-symphesial length.	Symphesial height.	Molar height.	Antero-posterior breadth of ramus.	Symphesial angle.
			Length.	Breadth.	Length.	Breadth.		Length.	Breadth.													
95	90	64	48	24	19	37	33	20	107	122	50	63	143°	91	54	81	32	26	34	84°		
90	88	61	44	25	21	37	30	20	105	115	49	59	140°	89	51	78	79	25	34	88°		

MANDIBLE.

APPENDICULAR SKELETON.

No. 1	No. 2	Length-breadth.	Length-height.	Alveolar.	Mid-facial.	Nasal.	Orbital.	Palato-Maxillary.	Broca's descriptive Nos. indicating size of					Brim of pelvis.			Femur.	Tibia.	Scapula.		Humerus.	Radius.
									Glabella.	Nasal bones.	Nasal spine.	Inion.	Wear of teeth.	Antero-posterior diameter.	Transverse diameter.	—			Length.	Breadth.		
77-6	75-9	96-9	52-5	50-0	89-2	126-0	120-4	1	3	2	1	0	0	122	117	—	399	322	122	88	290	215
78-6	72-2	98-8	53-9	56-8	80-1	120-4	120-4	1	3	1	1	1	0	122	117	—	399	322	122	88	290	215