

REPORT ON THE ADITTANALUR SKULLS

B. K. Chatterjee, D. Sc. (Paris)

P. Gupta, M. Sc.



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Survey of India, Government of India,
Indian Museum, Calcutta-13*



सत्यमेव जयते



PREFACE

This report deals with the human remains of the early iron age burial site at Adittanalur in Tinnevely district, Madras, which was excavated during 1899-1904 by Mr A. Rea of the Archaeology Department, Government of India. These remains were entrusted to Mr E. Thurston of the Madras Government Museum for study who published a short account of them in the first volume of his 'Castes and Tribes of Southern India' in 1909. Thereafter this collection was proposed to be studied by Prof Elliot Smith but unfortunately he could not visit India on account of the out break of World War I and two skulls of this collection were sent to him for study in 1915. Subsequently, these two skulls were also studied by Drs Zuckerman, utilising the notes taken on them by Prof Elliot Smith and his report was published in 1930 as a bulletin of the Madras Government Museum. Ultimately, this collection was sent to Dr R. B. S. Sewall, Director of Zoological Survey of India in 1927 and was transferred to the Department of Anthropology, Government of India from the Zoological Survey of India in 1946. The present writers were entrusted to prepare a report on the complete series in 1956.

B. K. CHATTERJEE

P. GUPTA

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*Department of Anthropology,
Government of India,
Indian Museum,
Calcutta.*

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INTRODUCTION

Discovery.—The Iron age site of Adittanalur (Adichanallūr) was first discovered by Dr Jagor, an archaeologist of Berlin in 1876. A considerable number of archaeological finds consisting of baked earthenwares of different sizes along with a number of iron implements, *viz.*, knives, sword blades, hatchets, etc., and a number of skulls and bones were excavated by him. All these articles were taken away by him for the Berlin Museum für Völkerkunde. Further explorations were conducted in 1903-4 by M. Lapique, which resulted in additional collections¹. The Adittanalur skulls at our disposal for study, are fourteen in number, were excavated by Mr A. Rea, at intervals from 1899-1904.

The Site.—The site extending over one hundred acres of land was distributed partly in the village of Adittanalur and partly in Karungulun and Kalvi about two miles west of the town of Srivāikuntam in the district of Tinnevelly (Tirunvelly), Madras Presidency. The actual prehistoric site is situated on a gravelly ridge extending north to south on the south bank of the river Tambraparni and it was not possible to excavate the site stratigraphically which was already disturbed and several interesting finds were destroyed as a result of quarrying.

Age.—On the basis of excavated finds and in the absence of any stratigraphic evidence, Rea² asserts that the age of the site might possibly have ranged within 400-4,000 years. According to him, most probably the area had been occupied during early Pandyan times at least several centuries before the beginning of the Christian era and might have been in use after the commencement of Christian era. In the opinion of Dr C. Maclean as quoted by Lapique, "the sepulchral urns of Tinnevelly may be earlier than Dravidians or they may be Dravidians".

Find-spot.—The excavated finds were mainly concentrated at the middle of this area and the spot extended over an area of about five acres. At the find-spot, a loose quartz rock appeared very close to the excavated pits which were sunk in rows and the urns were discovered inside them.

Contents of the Urns.—The burial sites excavated by Rea, yielded many interesting finds, *viz.*, different kinds of iron implements, earthen vessels, ornaments of bronze and gold, stone beads, stone objects and along with them traces of cloth, husks of rice and millets from inside the urns. It is interesting to observe that all the implements were of iron and none was of bronze or stone. According to Rea, "Numerous human bones have been found and one of the latter in particular from an urn which was devoid of earth, retained its shape in perfect condition. This skull was taken from the bottom of the urn, which contained only bones of large size and the decomposed debris of smaller ones. Against one of the inner sides of the urn, leant the bones of the legs and arms of the skeleton while below, in addition to the skull, were vertebrae, ribs and other smaller bones exactly as one would expect them after the body, as evidently was the case in this instance, had been placed in the urn in a crouching or a sitting position. In only a few instances did an urn contain the complete bones of a skeleton, and in such cases it was of large size, being nearly three feet in diameter."

Urns.—The Urns in which the bones were kept were large and elongated, globular in form and one legged which were made of thick red earthenware having less than a yard in diameter, with a flat conical cover on each. According to Rea, except

¹ Henderson, J. R.—Preface, Catalogue of Prehistoric Antiquities from Adichanallur and Perumbair by A. Rea, Pt. 3, 1915.

² Rea, A.—Annual Report Prehistoric Antiquities in Tinnevelly, Arch. Sur. of India, p. 115, 1902-3.

in a very few cases, all the bones of a complete skeleton have not been found from inside the urns. In exceptional cases where skeletons have been found, the sizes of the urns were of about 3 ft. in diameter. Such urns contained only a skull or a part of it and a portion of long bones along with pottery or metal objects.¹

It may be remarked that the collection which is at our disposal for study consists of fourteen skulls, one of which was unfortunately totally smashed in England during transit² and some fragments of long bones. Some are badly damaged; and as a result all the craniometric measurements on all the skulls could not be taken for the purposes of the present study. Osteometric measurements of any use could not be taken as not even a single complete long bone was available for study.

The Position of Skeletons inside the Urns.—According to Rea, the position of the complete skeletal remains was in a squatting or sitting position. He remarked that as a result of decay the limb bones had fallen over and rested against one side of the urn, while the skull and the remaining bones dropped down at the bottom. Such was the position in almost all the cases where complete skeletons were found, and he further remarked that the urns were devoid of earth. But in some cases Rea observed ashes deposited inside the urns and was of the opinion that these did not appear to be the results of cremation. Combustion of wood used for some burial ceremony was probably the cause of the presence of these ashes. In most cases only a selection of bones appeared to have been interred, and as there are no evidences of cremation, it may be probable that only portions of the body were placed in each urn.

Condition of the Skulls.—Most of the skulls are in a very fragile condition but certain broken skulls have been reconstructed in the Osteology Laboratory of Department of Anthropology. It should be remarked that one skull was too fragmentary which baffled all attempts at reconstruction. Some skulls bear excavation marks. Before handling the skulls for the present study special chemical treatment and restorations were undertaken as the skulls were in an extremely fragile and fragmentary condition. In several cases, certain craniometric landmarks have been obliterated and defaced, hence certain important measurements could not be taken.

It may also be mentioned that Zuckerman had reconstructed one skull with the help of Dr John Beattie³ but unfortunately that particular reconstructed skull was found to have broken into innumerable fragments.

For the present study the craniometric linear measurements and angles which were possible to be taken under such circumstances, were only taken into consideration. Angles were taken indirectly on the diagraphic tracings of the skulls as it was not possible to place the skulls on the craniophore for orientation due to fragility of the skulls.

In taking craniometric measurements, mainly Martin's technique was followed and in calculating cranial capacity Lee-Pearson's formula was adopted. On certain cases Wilder's Laboratory Manual of Anthropometry was also consulted and cranioscopic observations were done after Sergi.

Auricular height was measured by Davidson Black's auriculometer placing the skull on Mollison's craniophore and three mandibular measurements taken by mandibulometer, viz., length, height and angle.

The application of any statistical test and use of statistical constants was not attempt to the small size of the Adittanalur data. The linear measurements are given in millimeter.

¹ Rea—*Op. cit.* pp. 115-119.

² Zuckerman—*Bulletin*, Madras Museum, New Series, Gen. Sec. Vol. II, Pt. I, p. , 1930.

³ Zuckerman—*op. cit.* p. 2.

The following measurements were taken on the crania :

(a) *Linear measurements*

Maximum cranial length.	Nasion-prosthion line.
Maximum cranial breadth.	Nasion-basion line.
Cranial height :	Prosthion-basion line.
(i) Auricular height.	
(ii) Basilo-bregmatic height.	Maxillo-alveolar length.
Least frontal breadth.	Maxillo-alveolar breadth.
Greatest frontal breadth.	Palatal length.
Bimastoid breadth.	Palatal breadth.
Bizygomatic breadth.	Occipital foramen :
Bimaxillary breadth.	(i) Length.
Nasal length.	(ii) Breadth.
Nasal breadth.	Biauricular breadth.
Interorbital breadth.	Outer biorbital breadth.
Orbital breadth.	Inner biorbital breadth.
Orbital height.	Greatest occipital breadth.
Sagittal cranial arc.	Parietal chord.
Transverse cranial arc.	Occipital chord.
Horizontal circumference (max.).	Bigonial breadth.
Biorbital nasal arc.	Height of the ramus.
Frontal arc.	Maximum breadth of ramus.
Parietal arc.	Minimum breadth of ramus.
Occipital arc.	Symphyseal height.
Nasion-lambda line.	Mandibular length.
Basion-lambda line.	Bicondylar breadth.
Nasion-inion line.	Height of the body of the mandible.
Frontal chord.	

(b) *Angular measurements*

Nasal profile angle.	Nasion-bregma-lambda angle.
Facial profile angle.	Bregma-lambda-basion angle.
Metopic profile angle.	Lambda-basion-nasion angle.
Profile angle of nasal roof.	Nasion-prosthion-basion angle.
Alveolar profile angle.	Prosthion-basion-nasion angle.
Inclination of occipital foramen.	Basion-nasion-prosthion angle.
Calvarial base angle.	Frontal curvature angle.
Frontal angle of Schwalbe.	Parietal curvature angle.
Bregma angle of Schwalbe.	Occipital curvature angle.
Lambda angle of Schwalbe.	Mandibular angle.
Basion-nasion-bregma angle.	

(c) *Volume*

Cranial capacity.

The following indices were calculated on the measurements taken :

Length-breadth index.	Longi. cranio-facial index.
Length-height index.	Trans. cranio-facial index.
Length-auricular height index.	Mandibular index.
Breadth-height index.	Ramus index.
Sagittal cranial curvature index.	Fronto-parietal index.
Transverse cranial curvature index.	Fronto-occipital index.
Transverse fronto-parietal index.	Parieto-occipital index.
Index of the occipital foramen.	Fronto-sagittal arc index.
Upper facial index.	Parieto-sagittal arc index.
Orbital index.	Occipito-sagittal arc index.
Nasal index.	Frontal curvature index.
Maxillo-alveolar index.	Parietal curvature index.
Palatal index.	Occipital curvature index.

DESCRIPTION OF INDIVIDUAL SKULL

From the descriptions of the skulls it will be seen that they are generally in broken condition. Of the fourteen skulls for the present study few are complete and in very few could all the measurements be taken. However, some important data regarding dimensions and shape have been obtained from these skulls. Only one mandible is available along with the skull. The skeletons are too small in number and too incomplete or badly broken, which can be of any racial value. Eight of the fourteen skulls under present study are of adult males, five of adult females and the sex of the remaining one could not be determined which is merely a portion of the calvarium. Detailed craniological description with the measurements of the Skull No. 14 has been furnished by Zuckerman¹, who studied the original skull. Further observation and remaining measurements could not be attempted, as the skull at our disposal at present is fragmentary in nature. The measurements recorded by Zuckerman have, however, been incorporated in our data.

Skull No. 1

This is an incomplete skull. The occipital portion and a part of the parietal are present, in which the muscular ridges are marked, and the occipital protuberance is prominent with a bulging occiput. Root of the left zygomatic arch, and the left auditory meatus with the ear ossicles within it are present. Left mastoid is moderately developed and the right one is partially broken. Left glenoid cavity is deep and both the occipital condyles are noticed. Shape of the foramen magnum is slightly distorted due to the pressure of earth. Carotid canal of the left petrous portion is also present. Impressions for the lodging of cerebellum are well-marked and at the inner aspect of the left side the impressions of the blood-vessels and nerves are well-marked.

Due to the absence of the major portions of the skull it is not possible to determine the sex of the individual, but it is a skull of an adult individual.

¹ Zuckerman—Bulletin, Madras Museum, New Series, Gen. Sec. Vol. II, Pt. 1, pp. 2-7+21-23, 1930.

Skull No. 2

The shape of the skull is ovoides as viewed vertically and the whole of the external surface of the skull is pitted. The sharp upper margins of both the orbits are partially damaged and the left orbital roof is totally absent, whereas the right one is partially present and the facial portion is missing. The forehead is low and vertical. Root of the zygomatic arches is slightly present. The occiput is protruding. Muscular attachments are not well-marked on the skull. The left squama temporalis is broken. The right parietal tuberosity is present. Coronal suture is simple, and it appears to be open when viewed from inside; the sagittal suture is open and not much complex. The mastoid processes are not well-developed. The foramen magnum is elliptical and the basi-occipital suture is fused. Air-sinuses of the frontal bone are well-marked and clearly visible as the outer table of the bone is damaged. The individual was a middle aged adult female. The skull is hyperdolichocranial, chamaecranial acrocranial and eurymetop.

Skull No. 3

The shape of the skull is brisoides as viewed from norma verticalis. The forehead is low and the glabella is prominent. The orbits are high, orbital margins are not very sharp and the wall of the orbital sockets are complete. The right lacrimal bone is absent. The nasal bone is broad, short and depressed at the root. Right zygomatic arch is broken. Infra-orbital foramina are clearly marked. The canine fossae are deep. Alveolar prognathism is present and sulcus prenasalis is marked. Both the auditory meatuses are present with the auditory ossicles in them. The occiput is protuberant. The sutures are open and the lambdoidal suture is complex, transverse palatine suture is straight and the median palatine suture is present. Left parietal is partly broken and an ill-defined sagittal torus is present. Muscular ridges are well-marked on the occiput. The mastoids are well-developed. Broken roots of the styloid process are present. Both the glenoid fossae are deep and large. Foramen magnum is oval and the basi-occiput appears to be fused. Left lateral pterygoid lamina is present. On both the sides, the external carotid foramina are present. Large air-sinuses are clearly visible on the frontal bone. Dental arch is upiloid and the transverse straightness of the anterior portion of the dental arch is distinct which indicates primitiveness. The skull is hyperdolichocranial, orthocranial, chamaeconch, eurymetop and chamaerrhine.

It is interesting to note that several teeth appear to be not fully erupted. The individual was an adult male. The skull is hyperdolichocranial, orthocranial, chamaeconch, eurymetop and chamaerrhine.

Skull No. 4

The cranioscopic type is ovoides. A part of the frontal, the parietal except a small portion and the temporal region of the left side are missing. The skull has been reconstructed in the laboratory. The bones are comparatively fragile. Traces of supra-orbital ridges on both the sides are present medially. The glabella is well-marked and the forehead is low and vertical. The left orbit is missing and the infra-orbital foramen is present. Pyriform aperture is incomplete and the left nasal bone is broken. External auditory meatuses are present in both the sides. Well-marked muscular ridges are present in the occipital region. The basal portion is absent except the petrous portion of the temporal bone. The mastoids are well developed. Air sinuses are clearly visible on the frontal bone. Pitting of the bones is observed on the outer table. The individual was an adult male advanced in age. The skull is hyperdolichocranial, orthocranial and mesoconch.

Skull No. 5

Cranioscopic type of the skull is ovoides. The forehead is low and vertical. Supra-orbital ridges are prominent medially. Upper margins of the orbits

are sharp, but the rest of the portion of the orbits is lacking. Facial portion is totally absent except a small portion of the nasal bones. External auditory meatuses with the ear ossicles and the root of the left zygomatic process are present. Occiput is bulging. The sutures are synostosed, excepting the right lambdoidal suture and the sagittal suture at the lambda region. Frontal and parietal bosses are prominent. A faint parieto-sagittal ridge is developed towards the vertex. The glenoid cavities are deep. The left mastoid is massive, but the right one is broken. In between the right mastoid and the foramen magnum a kidney-shaped mark is noticed, which is most probably due to some pathological condition. Both the occipital condyles are absent, except a small portion of the right. The occipital foramen is oval in shape with its apex directed posteriorly. Basi-occiput is completely fused. The surface of the skull is pitted. The individual appears to be an adult male. The skull is dolichocranial, orthocranial, acrocranial and metriometop.

Skull No. 6

Cranioscopic type of the skull is sphenoides. Facial portion is absent but the upper margin and the roof of the left orbit are present. Vault of the skull is comparatively high. The parieto-occipital region is somewhat flattened. At the nuchal region the occiput is bulging and just below the nuchal line the squama occipitalis sharply retreats. Both the auditory meatuses are present. Root of the left zygomatic arch is present. Supra-mastoidal crest is prominent. Anterior portion of the frontal bone is broken. It appears that the sutures are partially closed. Parietal bosses are well marked. Occiput is flattened at the parieto-occipital region and the muscular ridges are marked. Both the mastoids are moderately developed and right one is partially broken. Glenoid cavities are deep. Foramen magnum is elliptical in shape. Rest of the basal portion of the skull is damaged.

The skull is comparatively heavy probably due to the presence of earth inside it. The individual was an adult male. The skull is acrocranial.

Skull No. 7

Cranioscopic type of the skull is ovoides. Supra-orbital ridges are marked towards the medial region. A comparatively large air sinus is visible on the left supra-orbital region which is remarkable. Orbits are nearly circular, and the orbital margins are complete but the roofs and the floors are damaged. The nasal bones are partially broken. The forehead is vertical and moderately high, having a well filled vault. Alveolar prognathism is slightly marked. The skull is phaeozygous. The sutures are open but a portion of the lambdoidal suture is partially closed. The mastoids are moderately developed. Foramen magnum is oval in shape with its base directed posteriorly. Occiput is slightly bulged and the occipital condyles are absent and the muscular impressions are marked. The glenoid cavities are deep. Basi-occiput is fused and the outer table of the skull is pitted. As regards dentition it was observed that two left upper molars, two right premolars and two right molars are present and occlusal surfaces are smooth. Roots of the two right incisors are visible within the socket. The palate is upsiloid in shape. The skull is of an adult male individual. The skull is hyperdolichocranial, orthocranial, eurymetop, acrocranial and the face is euren and the nose is chamaerrhine.

Skull No. 8

Cranioscopic type of the skull is sphenoides. Facial portions, except a nasal portion and a basal portion, are missing. Supra-orbital ridges are marked medially. The forehead is low and retreating and the vault is medium. Nasal root is depressed. Coronal suture is partially closed, but the other sutures are more or less open. Due to the pressure of earth, well-marked cracks have appeared antero-

posteriorly on the temporal bones. Occipital bone is slightly bulging. Muscular ridges on the occiput are not well marked. Mastoid processes are not well developed. The skull belonged to an adult female. The skull is chamaecranial.

Skull No. 9

The facial and the anterior basal portion of the skull are wanting. The shape of the skull is ovoides as viewed from above. Supra-orbital ridges are slightly marked medially. Orbits are broken except the upper margins which are sharp. The forehead is low and vertical with a smooth medium vault. Root of the left zygomatic arch is present. A portion of the skull near about the vertex is lacking. Right temporal is wanting. Sutures are open. Parietal bosses are not prominent. Muscular ridges are ill-marked. Right half of the basal part excepting the basi-occiput is wanting. Left mastoid is present and moderately marked. The left glenoid cavity is deep. Left occipital condyle is present. The foramen magnum is oval in shape. Fusion of the basi-occiput is partially observed. The size of the skull is comparatively small. Although the characters do not clearly indicate the sex, yet majority of the male characters predominate. The skull is dolichocranial.

Skull No. 10

The shape of the skull is sphenoides as viewed from above. Superciliary arches are slightly present medially. The vault is well filled. Orbital margins are sharp. Left orbit is complete but a portion of the right one is missing, orbital notches are present in both the upper margins. Left zygomatic bone is partially present but the arches are totally broken. Nasal bones are partially lacking, but the naso-frontal suture persists. Pyriform aperture is broken at the right. The upper alveolar margin is absorbed which indicates that the person died at an advanced age. Occipital bone is partially broken. Left temporal bone is damaged, and a portion of mastoid is left. Alveolar prognathism is well marked. Sutures are synostosed. Dental arch is paraboloid. As regards dentition, the left incisors, right incisor, and the left canine are present. The cusps of the teeth are eroded. The individual was a male of advanced age. The skull is dolichocranial and eurymetop.

Skull No. 11

Cranioscopic type is brisoides. The vault is well filled, well arched and comparatively high. The forehead is low but vertical and rises gradually into a full curve. Superciliary arches are marked moderately. Upper margins and the roofs of the orbits are present. Facial portion is totally absent. Bulging of the occiput is slightly marked. Root of the zygomatic processes are present. The sutures are open and of simple type except the coronal suture which is slightly complicated towards the lambda-region. Parietal tuberosities are marked. Muscular ridges are not well marked, except the nuchal region. Mastoids are moderately developed. Basi-occiput is not united. Shape of the foramen magnum is circular. Though few characters are towards the female side, other characters are towards the male of an adult. The skull is dolichocranial, orthocranial acrocranial, and metriometop.

Skull No. 12

Cranioscopic type of the skull is brisoides. The margins of the orbit are sharp. Left orbital margin is partially broken and the right one is totally crushed. The facial portion, including the nasal bones, is totally absent. The lateral contour of the skull is elongated. Sutures are of simple type. Parietal tuberosities are traceable. Forehead is low and retreating, the vault is well filled with a regular curve. The occipital region is remarkably protruding. Muscular ridges are not well marked on the nuchal region. The basal portion is totally absent. The skull is of an adult female. The skull is hyperdolichocranial and eurymetop.

Skull No. 13 (Zuckerman No. 2)

Zuckerman has already given a short description of the skull, which is based on Prof. E. Smith's notes and photographs of *norma lateralis* and *verticalis*. He has stated, 'the facial bones including the nasals and malars are missing'. The fragments of the skull, at our disposal, were reconstructed and fortunately we found the presence of the facial portion including the nasal and the malar bones. Zuckerman refers Elliot Smith in connection with the presence of the curious combination of open sutures and an edentulous lower jaw. As regards the age and sex of the skull Zuckerman remarked that although the lower jaw was edentulous yet the age of the individual was in early twenties; and probably the skull is of a female individual.

Alveolar prognathism is present. Jugum alveolar space is comparatively large.

The skull is mineralized to some extent and it differs from other skulls in this respect.

Elliot Smith remarked that the cranial sutures show no trace whatever of closure. Yet the molar series in the lower jaw has disappeared and the alveolar process has been absorbed. Ascending ramus is broad and short and the sigmoid notch is shallow.

From our examination we support Elliot Smith's contention that the skull belongs to an adult female.

Elliot Smith has attributed this skull to the Armenoid branch of Mediterranean race. The skull is comparatively small in size and ovoides in cranioscopic type. The forehead is vertical and the supra-orbital ridges are not prominent and the parietal tuberosities are eminent. The skull is cryptozygous. The occipital portion is comparatively flattened. The skull is mesocranial, hypsicanial, chamaeconch and euryetop.

Skull No. 14 (Zuckerman No. 1)

On observing photographs and a cast of the reconstructed skull Zuckerman writes, 'The skull, probably that of an adult female, hyperdolichocephalic and phaenozygous. The contour of the *norma verticalis* is an elongated ovoid, with the greatest width across the parietal bosses, which, however, are not prominent. The skull is of moderate height. The skull and supra-orbital ridges are well marked, and the forehead is receding. The mastoid processes and muscular ridges are well developed. It is impossible to determine the condition of the cranial sutures, either in the photographs taken previous to fragmentation or in the cast.

'The fronto-nasal suture is depressed and the nasal bones are small. The face is broad across the malars and leptoprosopic. The orbits are mesoseme and the nasal aperture is platyrrhine. The face is somewhat prognathous. The teeth are small, and the left, second and third molars are missing. The dental arcade is almost parabolic, the width between the third molars being almost equal to the greatest palatal length. The skull is microcephalic.

'There is also a marked degree of parieto-occipital flattening.....'

The skull is hyperdolichocranial, chamaecranial, orthocranial, acrocranial and euryetop.

TABLE I
Table shows the Mean Values of the Linear Measurements (mm) of *Adiantodon Skulls*

Measurements	Male		No.	Female		No.
	Mean	Range		Mean	Range	
Max. cranial length	185.86	195—171	7	180.70	191—170	5
Max. cranial breadth	130.57	136—125	8	128.25	135—124	4
Cranial height						
(a) Auricular height	117.33	119—115	3	114.25	116—112	2
(b) Basilo-bregmatic height	133.50	141—130	4	126.66	130—122	2
Least frontal breadth	93.90	102.5—95	5	92.75	95—90	4
Greatest frontal breadth	111.90	115—110	5	112.33	114—109	3
Bimastoid breadth	105.90	111—102	5	100.00	—	1
Bizygomatic breadth	126.00	—	1	128.00	—	1
Bimaxillary breadth	90.50	93—88	2	89.00	—	1
Nasal height	51.50	52—51	2	47.50	50—45	2
Nasal breadth	25.50	27—24	2	27.00	—	1
Interorbital breadth	20.33	22—19	3	27.50	—	1
Orbital breadth	41.00	43—38	4	40.50	41—40	2
Orbital height	33.75	35—32	4	32.50	35—30	2
Nasion-prosthion line	61.00	65—58	3	62.00	70—62	2
Nasion-basion line	102.50	110—98	5	93.00	100—83	3
Prosthion-basion line	93.50	101—86	2	101.50	107—96	2
Maxillo-alveolar breadth	59.75	61.5—58	2	65.00	—	1
Maxillo-alveolar length	51.00	—	1	53.00	—	1
Palatal length	45.50	46—45	2	—	—	—
Palatal breadth	38.00	—	1	—	—	—
Occipital foramen length	38.25	41—35	6	38.50	40—37	2

TABLE I—contd.

Table shows the Mean Values of the Linear Measurements (mm) of Adittanalar Skulls

Measurements	Male		No.	Female		No.
	Mean	Range		Mean	Range	
Occipital foramina breadth	32.33	38—28	6	30.25	31.5—28	3
Biauricular breadth	118.00	123—112	5	111.17	117.5—108	3
Outer bi-orbital breadth	104.00	107—102	3	100.00	—	—
Inner bi-orbital breadth	96.62	103—93.5	4	93.50	—	1
Greatest occipital breadth	111.20	123—105	6	102.50	109—99	4
Sagittal cranial arc	372.42	392—344	7	360.00	362—358	2
Trans. cranial arc	305.00	310—302	4	301.00	310—295	3
Horizontal circumference	517.80	528—508	5	498.50	506—491	2
Bi-orbital nasal arc	105.60	116—98	5	105.00	110—100	2
Frontal arc	131.80	141—128	5	121.00	—	1
Parietal arc	133.33	143—123	6	124.00	129—119	2
Occipital arc	112.87	124—101	8	118.33	121—115	3
Nasion-lambda line	179.83	189—168	7	166.50	167—166	2
Basion-lambda line	117.83	123—105	6	115.66	116—115	3
Nasion-inion line	170.14	184—160	7	162.00	164—160	2
Frontal chord	114.60	122—110	5	107.00	—	1
Parietal chord	119.08	126—112	6	110.66	116—103	3
Occipital chord	92.62	102—86	8	96.00	100—91	4

TABLE II
Indices of the Individual Adamanian Skull

Indices of Cranium	Skull No. 1	Skull No. 2	Skull No. 3	Skull No. 4	Skull No. 5	Skull No. 6	Skull No. 7	Skull No. 8	Skull No. 9	Skull No. 10	Skull No. 11	Skull No. 12	Skull No. 13	Skull No. 14
Length-breadth index	—	65-44	66-58	69-31	71-50	—	67-74	—	73-09	72-37	68-71	69-72	79-41	67-8
Length-height index	—	68-06	—	—	70-43	—	69-89	69-91	—	—	72-30	—	—	69-94
Length-auricular height index	—	—	60-88	62-9-6	—	—	62-09	—	—	—	—	—	68-47	61-20
Breadth-height index	—	104-00	—	—	98-49	104-41	103-17	—	—	—	105-22	—	—	103-22
Sagittal cranial curvature index	—	—	45-00	43-73	45-23	—	43-93	44-19	46-91	48-71	46-93	—	45-81	—
Trans. cranial curvature index	—	37-9	—	—	37-08	—	38-07	—	—	—	39-21	—	37-90	—
Trans. fronto-parietal index	—	73-6	79-76	—	67-66	—	73-80	—	—	71-75	67-16	73-64	69-62	72-58
Index of the occipital foramen	81-08	78-37	80-00	—	92-10	67-46	80-48	78-75	82-85	—	79-48	—	76-71	—
Upper face index	—	—	—	—	—	—	47-69	—	—	—	—	—	—	54-60
Orbital index	—	—	79-06	80-00	—	—	92-10	—	—	79-06	—	—	73-17	87-30
Nasal index	—	—	51-92	—	—	—	47-05	—	—	—	—	—	—	54-00
Maxillo-olivolar index	—	—	120-58	—	—	—	—	—	—	—	—	—	—	122-64
Palatal index	—	—	83-51	—	—	—	—	—	—	—	—	—	—	123-00
Longi. craniofacial index	—	—	52-33	—	—	—	—	—	—	—	—	—	56-47	58-46
Trans. craniofacial index	—	—	—	—	—	—	98-41	—	—	—	—	—	—	103-22
Mandibular index	—	—	—	—	—	—	—	—	—	—	—	—	65-36	—
Ram. index	—	—	—	—	—	—	—	—	—	—	—	—	66-03	—
Fronto-parietal index	—	—	—	107-51	103-90	—	100-00	98-34	—	98-40	95-74	—	—	—
Fronto-occipital index	—	—	—	85-71	92-18	—	81-06	100-00	—	82-40	82-26	—	—	—
Parieto-occipital index	92-24	—	—	79-72	88-72	89-55	81-06	101-68	—	83-73	85-92	—	—	—
Parieto-occipital index	—	—	—	34-01	33-86	—	29-57	33-42	—	35-51	35-96	—	—	—
Parieto-sagittal arc index	—	—	—	36-57	35-18	—	35-57	32-87	—	35-04	34-43	—	—	—
Parieto-sagittal arc index	—	—	—	29-15	31-21	—	28-84	33-32	29-36	29-34	29-59	—	32-12	—
Occipito-sagittal arc index	—	—	32-63	86-46	86-71	—	87-14	88-42	—	88-00	86-52	—	—	—
Frontal curvature index	—	—	—	88-45	88-72	88-80	—	—	—	91-05	90-37	—	—	—
Parietal curvature index	—	89-92	—	—	—	—	—	86-55	—	83-49	84-48	—	85-21	—
Occipital curvature index	80-17	79-83	82-25	84-21	80-93	80-00	—	82-64	86-13	—	—	—	1299-02	—
Cranial capacity (in c.c.)	—	1266-18	1422-97	1434-74	1386-62	—	1347-37	—	—	—	1504-63	—	—	1268-20

ANALYSIS OF DATA

It should be mentioned that it was not possible to take all the important craniometric measurements on the Adittanalur skulls as the landmarks are missing due to broken condition of different parts of the skulls. However, it would appear from Table I that maximum cranial length varied from 195 to 171 mm in male and from 191 to 170 mm in female skulls. Doubtful skulls were not taken into consideration when variation in sex character was considered. Maximum cranial breadth varied from 136 to 125 mm and 135 to 124 mm in male and female skulls respectively. Difference between the auricular height and the basilo-bregmatic height in male is 16.2 and in female is 12.4 mm. It is interesting to note that in male skulls the difference between the least frontal breadth and the greatest frontal breadth is 18 whereas in females it is found 19.6 mm. Difference between the maximum cranial breadth and the greatest occipital breadth in male is 17.5, 22.0, 20.0, 13.0, 21.0, 24.0 and 23.0 mm in skulls Nos. 3, 4, 5, 6, 7, 10 and 11 respectively. In female skulls the mean difference between the maximum cranial breadth and the greatest occipital breadth is 23.0 mm. The difference between the frontal arc and the frontal chord in male is 18, 17, 17, 15 and 19 in the skulls No. 4, 5, 7, 10 and 11 respectively. Remarkable difference was not observed between the frontal arc and parietal arc in male skulls. The differences are 16.5, 15, 15, 11 and 13 in skulls Nos. 4, 5, 6, 7, 10 and 11 respectively. The difference between occipital arc and the occipital chord in male is 22, 18, 32, 24, 17, 14, 17 and 18 in skulls Nos. 3, 4, 5, 6, 7, 9, 10 and 11 respectively. In female skulls the difference is 24, 21 and 17 in skulls Nos. 2, 8 and 13 respectively.

It would appear from Table II that the length-breadth index varies from 66.58 to 73.09 in male and 65.44 to 79.41 in female. Length-height index varied from 69.89 to 72.30 in male and 68.06 to 69.94 in female. Length-auricular height ranges from 60.88 to 62.09 in male and 61.20 to 68.47 in female. It should be remarked that the breadth-height index varies from 98.49 to 105.22 in male and 103.22 to 104.0 in female. Sagittal cranial curvature index ranges from 43.73 to 48.71 in male and 44.19 to 45.81 in female. Transverse cranial curvature index varies in the case of male from 37.08 to 39.21 and in female from 37.90 to 37.91. The range of variation of transverse fronto-parietal index is from 67.16 to 79.76 in male and 69.62 to 73.64 in female. Index of the occipital foramen magnum varies from 67.46 to 92.10 in male and 76.71 to 78.75 in female. Orbital index ranges from 79.06 to 92.10 in male and 73.17 to 87.5 in female. Nasal index varies from 47.05 to 51.92 in male, in female the index is 54.0. Maxillo-alveolar index is 120.58 in male and 122.64 in female. Palatal index differs considerably in male and in female, the index being 83.51 and 123.00 respectively. Longitudinal cranio-facial index is 52.33 in male but it varied from 56.47 to 58.46 in female. Transverse cranio-facial index in male is 98.41 but in female is 103.22. Fronto-parietal index varies from 95.74 to 107.51 in male and in female the index is 98.34. Fronto-occipital index ranges from 81.06 to 92.18 in male but the index is 100.00 in female. Parieto-occipital index varies from 79.72 to 89.55 in male, whereas in female it ranges from 92.24 to 101.68. It appears that the fronto-sagittal arc index varies from 33.86 to 35.96 in male and the index is 33.42 in female. Parieto-sagittal arc index ranges from 34.43 to 36.57 in male and the index is 32.87 in female. Occipito-sagittal arc index varies from 28.84 to 32.63 in male and from 32.12 to 33.42 in female. Frontal curvature index ranges from 86.46 to 88.00 in male and the index is 88.42 in female. Parietal curvature index varies from 88.45 to 91.05 in male and 86.55 to 89.92 in female. Occipital curvature index ranges from 80.00 to 86.13 in male and from 79.83 to 85.21 in female. Cranial capacity varies from 1347.37 cc to 1504.63 cc in male and from 1296.18 cc to 1299.02 cc in female.

It would appear from Table III that the length-breadth index in male skulls varies from 66.58 to 73.09 and the mean is 69.9 but in female it ranges from 65.44 to 79.41, the mean being 70.59. Length-height index in male ranges from 69.89 to 72.30 having mean value 70.87 and in female it is 68.06 to 69.94 and the mean is 69.30. Length-auricular height index in male varies from 60.88 to 62.09 the mean being 61.97, whereas

TABLE III

Means and ranges of the Indices of Adittanalur Skulls

Indices	Male skulls			Female skulls		
	Mean	Range	Total No.	Mean	Range	Total No.
Length-breadth index	69.90	73.09-66.58	7	70.59	79.41-65.44	4
Length-height index	70.87	72.30-69.89	3	69.30	69.94-68.96	3
Length-auricular ht. index	61.97	62.09-60.88	3	64.83	68.47-61.20	2
Breadth-height index	120.82	105.22-98.49	4	103.61	104.00-103.22	2
Sagittal cranial curvature index	45.77	48.71-43.73	7	45.00	45.81-44.19	2
Trans. cranial curvature index	38.12	39.21-37.08	3	37.90	37.91-37.90	2
Trans. fronto-parietal index	72.02	79.76-67.16	5	72.36	73.64-69.62	4
Occipital foramina index	80.39	92.10-67.46	6	77.94	78.75-76.71	3
Upper facial index	47.60	47.60	1	54.60	54.6	1
Orbital index	82.55	92.10-79.06	4	80.33	87.50-73.17	2
Nasal index	49.48	51.92-47.05	2	54.00	54.00	1
Maxillo-alveolar index	120.58	120.58	1	122.64	122.64	1
Palatal index	83.51	83.51	1	123.00	123.00	1
Trans. cranio-facial index	98.41	98.41	1	103.22	103.22	1
Longi. cranio-facial index	52.33	52.33	1	57.46	58.46-56.47	2
Fronto-parietal index	101.11	107.51-95.74	5	98.34	98.34	1
Fronto-occipital index	84.72	92.18-81.06	5	100.00	100.00	1
Parieto-occipital index	84.76	89.55-79.72	6	96.96	101.68-92.24	2
Fronto-sagittal arc index	35.00	35.96-33.86	5	33.42	33.42	1
Parieto-sagittal arc index	35.35	36.57-34.43	5	32.87	32.87	1
Occipito-sagittal arc index	30.01	32.63-28.84	7	32.77	33.42-32.12	2
Frontal curvature index	86.96	88.00-86.46	5	88.42	88.42	1
Parietal curvature index	89.48	91.05-88.45	5	88.23	89.92-86.55	2
Occipital curvature index	83.07	86.13-80.00	7	82.56	85.21-79.83	3
Cranial capacity (c. c.)	1419.26	1504.63-1347.34	5	1297.60	1299.02-1296.18	2

in female it ranges from 61.20 to 68.47 and the average index is 64.83 which shows the presence of certain difference between the male and the female. The mean value of the breadth-height index in male is 120.82, it ranges from 98.49 to 105.22 and in female the average value is 103.61 and it varies from 103.22 to 104.00. It is interesting to note that insignificant difference is present in sagittal cranial curvature index between the male and female but it ranges in male from 43.73 to 48.71 and in female from 44.19 to 45.81. Very little difference is noticed in transverse cranial curvature index between male and female, in male the mean is 38.12, in female it being 37.90. It ranges in male from 37.08 to 39.21 and in female from 37.90 to 37.91. Transverse fronto-parietal index in male varies from 67.16 to 79.76 and in female from 69.62 to 73.64; but it is remarkable that very little difference is found between the two mean values, the difference between the two sexes is 0.34. Occipital foraminal index in male varies from 67.46 to 92.10 and in female from 76.71 to 78.75, the mean value of the male being 80.39 and of female 77.94; the difference between the two mean value is 2.45. Appreciable difference is present in mean value of upper facial index between the male and female, the difference being 7.0, the index is higher in female than in male. It ranges in male from 47.6 to 67.46 and in female from 54.60 to 76.71. Orbital index in male ranges from 79.06 to 92.10 but in female from 73.17 to 87.50 and the mean values are 82.55 and 80.33 in male and in female respectively. Appreciable difference is present in nasal index between the male and the female skulls, the difference between the two mean values is 4.52. It is observed that the females possess higher index than the male and the mean values in male and in female are 49.48 and 54.00 respectively. The nasal index ranges in male from 47.05 to 51.92, it could be measured in only one female skull due to absence of land marks in other skulls, so the range of the female skulls could not be estimated. The mean values of the maxillo-alveolar index are 120.58 and 122.64 and that of transverse cranio-facial index are 98.41 and 103.22 in male and female respectively. Longitudinal cranio-facial index ranges from 56.47 to 58.46 in female, and in male only one skull could be measured in order to find out the index, others being in damaged condition. Fronto-parietal index in male ranges from 95.74 to 107.51 and the mean values are 101.11 and 98.37 in male and female respectively. Parieto-occipital index in male varied from 79.72 to 89.55 and in female from 92.21 to 101.68. The mean values are 84.76 and 96.96 in male and in female respectively. Fronto-sagittal arc index in male ranges from 33.86 to 35.96 and the mean values are 35.00 and 33.42 in male and in female respectively. Parieto-sagittal arc in male ranges from 34.43 to 36.57 and the averages are 35.35 and 32.87 in male and in female respectively. Occipital-sagittal arc index in male ranges from 28.84 to 32.63 and in female from 32.12 to 33.42 and the mean values are 30.01 and 32.77 in male and in female respectively and the difference between the two mean values is 2.76. Frontal curvature index in male ranges from 86.46 to 88.00 and the mean values are 86.96 and 88.42 in male and in female respectively. Parietal curvature index in male varies from 88.45 to 91.05 and in female from 86.55 to 89.92. The mean values are 89.48 and 88.23 in male and in female respectively and the difference between the two mean values is only 1.25. Occipital curvature index in male ranges from 80.00 to 86.13 and in female 79.83 to 85.21 and the mean values are 83.07 and 82.56 in male and female respectively. The difference between the two mean values is only 0.51.

Direct measurement of the cranial capacity was not attempted as the condition of the skulls were very fragile and certain portions were badly broken. The cranial capacity was estimated indirectly from length, breadth and height of the skulls with the help of a formula introduced by Lee and Pearson.¹ The cranial capacity in male varies from 1347.34 cc to 1504.63 cc whereas in female it ranges from 1296.18 cc to 1299.02 cc. The difference between the male and the female cranial capacity is 121.66 cc, i.e., the cranial capacity of the males is higher than that of the females.

¹ Lee, Alice & Pearson, Karl. 1901.—A first study of correlation of the human skull, Phil. Trans., Roy. Society, London. Series A, vol. cxvii. p. 247, London.

TABLE V

Mean Values of the Angular Measurements of Adittanalur Skulls

Measurements	♂ Mean	Range	Total No.	♀ Mean	Range	Total No.
Nasal profile angle	91.25°	92.5°-90°	2	..	..	..
Facial profile angle	88.25°	89.5°-87°	2	..	..	..
Metopic profile angle	78.75°	80°-77.5°	2	..	..	..
Profile angle of nasal roof	73.25°	80°-66.5°	2	..	..	..
Alveolar profile angle	110.5°	116.5°-104.5°	2	110°	110°	1
Inclination of occipital foramen	8°	9.5°-6.5°	2	7.5°	7.5°	1
Calvarial base angle	15.25°	16.5°-14°	2	..	..	..
Frontal angle of Schwalbe	111°	120°-103.5°	3	..	..	..
Bregma angle of Schwalbe	60°	62.5°-57°	5	59.5°	59.5°	1
Lambda angle of Schwalbe	91.2°	94°-87°	6	84.5°	84.5°	1
Basion-nasion-bregma angle	75.5°	77°-74°	3	79°	79°	1
Nasion-bregma-lambda angle	102.3°	105°-98.5°	5	103.5°	..	1
Bregma-lambda-basion angle	68.6°	71°-67°	3	67°	67.5°-66.5°	2
Lambda-basion-nasion angle	112.7°	115.5°-111°	4	111°	111°	1
Nasion-prosthion-basion angle	78°	82°-74°	2	..	..	..
Prosthion-basion-nasion angle	37.75°	38°-37.5°	2	..	..	..
Basion-nasion-prosthion angle	64.25°	68°-60.5°	2	..	..	..
Frontal curvature angle	128.4°	133.5°-123°	5	132.5°	132.5°	1
Parietal curvature angle	132.9°	135.5°-130°	5	127.5°	133.5°-121.5°	2
Occipital curvature angle	123.3°	128°-116°	6	118.3°	120°-116°	3
Occipital flexion angle	124.3°	129°-121°	6	120.5°	121.5°-119°	3
Mandibular angle	..	..	..	114°	..	1

Angular measurements on diagraphic tracings of the Adittanalur skulls

It should be remarked that as none of the skulls was in a condition suitable for taking direct angular measurements, an attempt has been made to take angular measurements on diagraphic tracings as far as possible. Certain difficulties were encountered at the time of orientation of the skulls due to highly fragile and broken condition of the skulls, as has already been mentioned. However, the skulls were placed on a devised cup craniophore and oriented on Frankfurt plane and then diagraphic contour diagrams were drawn (*vide* Table IV).

It was not possible to take all the important angles on the diagraph tracings as the landmarks were not traceable or absent. It will appear from Table V that in male the nasal profile angle varies from 90° to 92.5°, facial profile angle from 87° to 89.5° and alveolar profile angle from 116.5° to 104.5°. It should be mentioned that the alveolar prognathism is present in all the three cases wherever it has been possible to take the measurements. Face of two male skulls appears to be orthognathous as seen from facial profile angle.

Mean difference of 0.5° between male and female is observed in alveolar profile angle. Inclination of occipital foramen angle and bregma angle of Schwalbe. In the case of lambda angle of Schwalbe the difference is 6.7°; the difference in frontal curvature angle is 4.1°, in parietal curvature angle 5.4° and in occipital curvature angle 5°. The occipital flexion angle shows the mean difference to be 3.8° between male and female.

TABLE VI
Frequencies of Different Indices

	Hyperdolichocranial		Dolichocranial		Mesocranial	
Length-breadth index	Male 4	Female 3	Male 3	Female ..	Male ..	Female 1
Length-height index	Orthocranial		Chamaecranial			
	Male 2	Female ..	Male ..	Female 3		
Length-auricular height index	Orthocranial		Hypsicranial			
	Male 2	Female 1	Male ..	Female 1		
Breadth-height index	Acrocranial					
	Male 3	Female 2				
Trans. fronto-parietal index	Metriometopic		Eurymetopic			
	Male 2	Female ..	Male 3	Female 4		
Upper facial index	Euryene		Mesen			
	Male 1	Female ..	Male ..	Female 1		
Occipital foramina index	Narrow		Average		Broad	
	Male 3	Female 3	Male 1	Female ..	Male 1	Female ..
Orbital index	Hypsiconch		Mesosconch		Chamaeconch	
	Male ..	Female 1	Male 3	Female ..	Male ..	Female 1
Nasal index	Chamaerhine		Mesorrhine			
	Male 1	Female 1	Male 1	Female ..		
Maxillo-alveolar index	Brachyuranic					
	Male 1	Female 1				
Palatal index	Brachystaphylin		Mesostaphyline			
	Male ..	Female 1	Male 1	Female ..		
Cranial capacity	Euencephal		Aristencephal			
	Male 4	Female 3	Male 1	Female ..		

Frequencies of Different Indices of the Skulls

It appears from Table VI that out of eleven skulls four males and three females are hyperdolichocranial and three males are dolichocranial and only one female possesses mesocranial skull. It is observed that of five skulls three female skulls are chamaecranial and two male skulls are orthocranial. As regards length-auricular height index, it is found that of four skulls one female and two male skulls are orthocranial and only one female skull is hypsicranial. All the five skulls are acrocranial. Of nine skulls two male skulls are metriometopic and four female and three male skulls are eurymetopic. It is interesting to note that the findings of the occipital foramina index is found narrow in four male and three female out of nine skulls while one male and one female possess average and broad index respectively. Of five skulls three male skulls possess mesosconch orbital index and one female possesses hypsiconch and another chamaeconch index. Only in the case of three individuals (two males and one female) it has been possible to calculate the nasal index and the result was two chamaerhines in opposite sexes and one mesorrhine in male. In the case of two skulls it has been possible to calculate the maxillo-alveolar index and the result is brachyuranic in one male and in one female skull. It is interesting to remark that one female possesses brachystaphyline palatal index, one male having mesostaphyline index. In upper facial index one male is euryene and one female is mesen. In cranial capacity, it appears that all the crania were small brained, excepting one.

Comparative Study

TABLE VII

Comparative Table shows the Mean Values of Linear Measurements of Different Pre-historic Skulls from India and Abroad in Comparison with Adittanalur Skulls (mm)

Measurements	Chanhudaro Skull (1)	Mohenjodaro Skull Nos. 6, 9	Mohenjodaro Skull Nos. 7, 10, 19, 26	Mohenjodaro Skull Nos. 2, 11, M	Harappa Skull No. 235(a)	Maski Skull (1)	Nal Skull (1)
	♀	♂	♀	♂	♂	♂	♂
Maximum cranial length	178.0	178.5(1)	180.17	197.0	198.0	186.0	188.5
Maximum cranial breadth	126.5	128.0(1)	118.33	130	135	137	132.0
Auricular height	108	..	..	122	..	..	120.0
Basilio-bregmatic height	123	132.0(1)	136	139	134	..	146.0
Least frontal breadth	97.0	..	..	95	99	94	93.0
Greatest frontal breadth	..	..	..	..	123	119 (?)	..
Bimastoid breadth	..	..	..	..	99	..	..
Bizygomatic breadth	124	..	..	..	..	..	12.0
Orbital breadth	..	36.0(2)	38.25	37	42 (R) 43 (L)	45 (R) 43 (L)	40.0
Orbital height	32.5	32.25	32.94	31.25	32 (R) 32 (L)	42 (L)	33.0
Length of the occipital foramen	37.0	..	..	38	40	..	..
Breadth of the occipital foramen	30.0	..	..	25	33	..	..
Sagittal cranial arc	353.0	..	..	..	382	..	..
Trans. cranial arc	279.0	..	..	..	305	312	..
Horizontal cranial circumference	492.0	..	..	..	545	530	52.8
Nasal height	48.5	46.0	46.13	46.5	50	46	49.0
Nasal breadth	25.0	26.0(1)	22.13	22	26	21	23.0
Nasion prosthion line	..	..	..	..	70	59	72.0
Nasion lambda line	..	..	..	..	187	180	..
Nasion union line	..	..	..	..	179	182	..
Nasion basion line	..	..	..	..	110	..	99.5
Basion prosthion line	..	..	..	..	105	..	90.0
Maxillo-alveolar breadth	..	..	..	83	63	..	..
Maxillo-alveolar length	..	..	..	66	56	..	..
Palatal length	44.5	..	..	53.62	..	..	53.0
Palatal breadth	39.0	..	..	46.5	40	..	42.0
Bi-alveolar bread	..	..	..	..	116	119	..
Outer bi-orbital breadth	..	..	..	..	110	102	..
Inner bi-orbital breadth	..	..	..	..	103	92	..
Greatest occipital bread	98.0	..	..	..	111	105 (?)	..
Frontal arc	126.0	..	..	..	120	127	..
Parietal arc	116.0	..	..	..	137	116	..
Occipital arc	111.0	..	..	..	123	..	..
Basion lambda line	..	..	..	..	127	..	..
Frontal chord	..	..	..	..	107	113	..
Parietal chord	..	..	..	..	119	107	..
Occipital chord	..	..	..	..	105	..	..

Figures in bracket indicate number of skulls measured.

TABLE VII—*contd.*

Measurements	Badarian Skull	Badarian Skull	Naguada Skull	Naguada Skull	Alisar Skull (1) Chalcolithic	At-Ubad Skull (8)	Ur Skull (3)
	♂	♀	♂	♀	♀	♂	♂
Maximum cranial length	182.3 (36)	176.7 (22)	184.7 (101)	177.5 (185)	179.0	192.8	191.67
Maximum cranial breadth	130.8 (36)	130.3 (21)	132.7 (88)	131.5 (185)	130	140.1	135
Auricular height	111.0 (34)	108.6 (21)	115.6 (98)	113.1 (174)	..	119.6	116.1
Basilo-bregmatic height	132.9 (34)	129.1 (22)	133.8 (70)	129.5 (169)	94	136.5	144.5
Least frontal breadth	91.1 (36)	89.4 (22)	92.6 (101)	88.2 (181)	..	97	97.6
Greatest frontal breadth	..	..	..	..	..	117.3	119
Bizygomatic breadth	122.5 (32)	117.7 (13)	125.9 (37)	117.0 (63)	..	..	..
Orbital breadth	38.4 (R) (33)	37.6 (R) (20)	39.1 (R) (57)	..	38	40 (7)	40
Orbital height	32.0 (R) (34) 32.1 (L) (33)	31.3 (R) (21) 31.4 (L) (18)	32.2 (R) (57)	31.9 (R) (116) 32.2 (L) (117)	35	33.6 (7)	36
Length of the occipital foramen	35.5 (35)	35.2 (22)	35.6 (70)	..	..	..	..
Breadth of the occipital foramen	28.7 (33)	27.5 (22)	29.5 (70)	..	..	..	..
Trans. cranial arc	302.0 (34)	298.8 (20)	302.9 (87)	296.5 (151)	..	..	..
Horizontal cranial circumference	501.3 (36)	489.0 (22)	510.4 (90)	493.7 (146)	..	..	..
Nasal height	48.4 (34)	46.0 (21) (R) 45.6 (20) (L)	50.2 (54)	46.7 (L) (123)	46	54.0 (7)	54.6
Nasal breadth	24.9 (34)	23.6 (20)	25.0 (64)	24.3 (119)	22	25.7 (7)	26.6
Nasion prosthion line	..	..	..	..	66	..	..
Nasion basion line	99.3 (35)	96.1 (22)	101.4 (69)	94.9 (141)	..	..	..
Maxillo-alveolar breadth	..	..	..	..	58	..	..
Palatal breadth	37.8 (30)	36.5 (17)	40.7 (48)	38.9 (103)	..	..	..
Inner bi-orbital breadth	94.2 (34)	90.5 (21)	96.1 (56)	..	..	96.5 (7)	99.6
Greatest occipital breadth	..	..	..	..	..	111	115.5
Frontal arc	127 (35)	123.2 (22)	..	..	..	..	..
Parietal arc	129.1 (35)	128.5 (22)	..	..	..	..	..
Occipital arc	115.7 (34)	111.7 (22)	116.9 (83)	..	..	..	..
Occipital chord	96.8 (34)	93.8 (22)	96.5 (84)	..	..	..	..

TABLE VII—*concl'd.*

Measurements	Ur Skull (4) ♀	Anau Skull (1) ♀	Hissar III Skull (6) ♂	Jebel Moya Skull ♂	Jebel Moya Skull ♀	Adittanalur Skull ♂	Adittanalur Skull ♀
Maximum cranial length	184.75	185	192	183.77 (41)	175.22 (41)	185.86	180.70
Maximum cranial breadth	131.5	141	135.8	136.57 (49)	131.36 (43)	130.57	128.25
Auricular height	120.04 (14)	112.43 (5)	117.33	114.25
Basilo-bregmatic height	135.3	140.12 (21)	133.06 (9)	133.50	126.66
Least frontal breadth	89.26 (46)	90.84 (40)	93.90	92.75
Greatest frontal breadth	111.90	112.33
Bimastoid breadth	105.90	100.00
Bizygomatic breadth	135.16	137.33 (15)	124.64 (7)	126.00	128.00
Orbital breadth	..	36	43.0	41.71 (17)	41.10 (7)	41.00	40.50
Orbital height	..	30	31.0	34.08 (32)	33.19 (19)	33.75	32.50
Length of the occipital foramen	37.74 (19)	36.11 (10)	38.25	38.50
Breadth of the occipital foramen	28.49 (19)	28.31 (8)	32.33	30.25
Sagittal cranial arc	378.87 (30)	364.62 (21)	372.42	360.00
Trans. cranial arc	305.00	301.00
Horizontal cranial circumference	518.35 (26)	495.13 (23)	517.80	498.50
Nasal height	52.5	52.23 (15)	48.06 (13)	51.50	47.50
Nasal breadth	27.0	26.56 (34)	24.81 (21)	25.50	27.00
Nasion prosthion line	73.5	..	..	61.00	62.00
Nasion lambda line	179.83	166.50
Nasioninion line	170.14	162.00
Nasion basion line	102.00 (20)	97.72 (9)	102.50	93.00
Basion prosthion line	93.50	101.50
Maxillo-alveolar breadth	59.75	65.00
Maxillo-alveolar length	51.00	53.00
Palatal length	45.50	..
Palatal breadth	38.00	..
Bi-auricular breadth	118.00	111.17
Outer bi-orbital breadth	104.00	100.00
Inner bi-orbital breadth	96.62	93.50
Greatest occipital breadth	111.20	102.50
Frontal arc	131.59 (29)	125.91 (34)	131.80	121.00
Parietal arc	130.68 (41)	122.80 (42)	133.33	124.00
Occipital arc	114.68 (41)	112.16 (29)	112.87	118.33
Basion lambda line	117.83	115.66
Frontal chord	115.48 (25)	110.30 (32)	114.60	107.00
Parietal chord	115.23 (37)	108.72 (40)	119.08	110.66
Occipital chord	104.29 (35)	95.52 (27)	92.62	96.00

In order to find the ethnic affinity of Adittanalur skulls comparisons have been instituted with various prehistoric and aboriginal skulls of Australoid and Mediterranean types of India and outside, as the South Indian population is mainly composed of those two elements.

It is interesting to note from Table VII that the maximum cranial length of the Adittanalur skulls approaches that of Naquada, Maski, Anau, Jebel Moya skulls but differs from Chanhudaro, Mohenjodaro, Harappa, Alubaid, Ur, Badarian, Nal and Hissar. The maximum cranial breadth of the Adittanalur skulls differs very little from that of Ur, Maski, Harappa, Hissar and Jebel Moya skulls. Auricular height of the Adittanalur skulls approaches very closely to that of Ur, Alubaid, Alisar, Maski, Mohenjodaro and Chanhudaro. Nasal height of the Adittanalur skulls approaches

that of Naquada, Harappa, Chanhudaro and Nal, whereas the nasal breadth is very close to that of Naquada, Badarian, Harappa, Chanhudaro and Nal. Nasion-basion line of the Adittanalur skull approaches to that of Naquada. Maxillo-alveolar breadth of Adittanalur skulls is very close to that of Alisar skull. Maxillo-alveolar length and palatal breadth of the Adittanalur skulls are very close to that of Mohenjodaro, Naquada, Badarian and Chanhudaro. Bi-auricular breadth approaches to that of Maski and Harappa. Outer bi-orbital breadth is nearer to Maski skulls and inner bi-orbital breadth approaches to that of Naquada and Badarian skulls. Greatest occipital breadth of Adittanalur skulls approaches to that of Ur, Alubaid and Harappa. Frontal arc of Adittanalur is very close to that of Jebel Moya, Badarian and Maski. Parietal arc is very near to that of Badarian and Harappa. It is interesting to note that the occipital arc of Adittanalur skulls approaches to that of Jebel Moya, Naquada and Badarian skulls. Frontal and parietal chords of Adittanalur skulls are very near to those of Jebel Moya and Maski; in other cases the data are wanting. It should be remarked that the occipital chord of Adittanalur skulls is very close to that of Jebel Moya, Naquada and Badarian skulls; the data in other cases are not available.

TABLE VIII

Comparative Table shows the mean values of the Indices of different prehistoric skulls of India and Abroad as compared with Adittanalur skulls

Indices	Chanhudaro Skull (1) ♀	Mohenjodaro Skull Nos. 6, 9 ♂	Mohenjodaro Skull Nos. 7, 10, 19, 26 ♀	Mohenjodaro Skull Nos. 2, 11, M ♂	Nal Skull (1) ♂	Al'Ubaid Skull (8) ♂	Kish "A" Skull Nos. A, A71 ♂
Length breadth index	71.07	71.71(1)	63.45	66.02	70.02	72.60	70.23
Length height index	69.10	73.95(1)	75.66	70.68	77.45	71.20	73.93
Upper face index	49.03	..	..	53.93	60.00	54.87	..
Orbital index	75.58	89.57	87.92	84.46	82.50	84.00	81.40
Nasal index	51.55	48.94(1)	48.04	51.06	46.94	47.60	..

Indices	Kish "A" Skull No. A75 ♀	Kish "A" Skull (1) ♂	"Medietarranean Typo" (Dixon) ♂	Ur Skull (3) ♂	Ur Skull (4) ♀	Anau Skull Nos. 1 & 2 ♀	Alisar Skull Chalcolith ♀
Length breadth index	70.45	70.00	71.10	69.80	71.25	76.20	72.60
Length height index	80.68	71.80	68.00	..	..	..	..
Upper face index	56.36	50.00	55.20	..	..	..	53.20
Orbital index	91.89	82.00	..	..	..	83.33	92.10
Nasal index	61.61	54.60	43.30	48.77	..	..	47.80

Indices	Hissar II Skull (7) ♂	Hissar II Skull (7) ♀	Hissar III Skull (51) ♂	Hissar III (32) ♀	Hissar III (6) ♂	*Proto-Australoid* (Dixon)	Adittanalur Skull ♂	Adittanalur Skull ♀
Length breadth index	69.26	74.10	71.65	72.97	70.80	69.50	69.98	70.59
Length height index	70.75	72.86	71.79	71.87	70.53	67.50	70.87	69.30
Upper face index	55.61	56.38	54.94	55.31	53.67	51.70	47.60	54.00
Orbital index	76.93	79.33	79.34	80.12	72.07	..	82.55	80.33
Nasal index	49.56	49.14	49.41	50.37	51.74	56.20	49.48	54.00

The length-breadth index of Adittanalur male and female skulls does not differ much and is close to that of Dixon's Proto-Australoid and Mediterranean type, Nal, Chanhudaro, Kish "A", Hissar III, Hissar II and Ur, and approaches to that of Mohenjodaro Nos. 6 and 9 and Alubaid. It is interesting to observe that the length-height index of skulls Adittanalur skulls approaches very closely to that of Chanhudaro, Mohenjodaro (Nos. 2, 11, M), Hissar III and Hissar II, and nearer to Proto-Australoid and Mediterranean types of Dixon, Kish "A", and Alubaid. Total facial index of Adittanalur skulls could not be calculated due to the absence of facial portions. It is interesting to note that the upper facial index of the Adittanalur female skull approaches to that of Mohenjodaro, Hissar III, Hissar II, Alishar and Alubaid, and the male Skull approaches to that of Chanhudaro. It should be remarked that the orbital index of Adittanalur skull approached very closely to that of Kish "A", and Hissar II. It is remarkable that the nasal index of the male Adittanalur skull approaches to that of Chanhudaro, Mohenjodaro, Nos. 2, 11, 6, 9 and M, Hissar III, Hissar II, Ur and of the female is nearer to Kish "A".

TABLE IX

Comparative Table shows the Cranial Capacities of Different Groups as compared to Adittanalur Skulls

Gr. I.—Proto-australoid Group—

Kish Nos. 3, 5, 7 . (Buxton)	Alubaid Nos. 1, 2, 3, 4, 7 (Keith)	Mohenjodaro Nos. 2, 11, M (Sewell & Guha)	Veddah (Osman Hill)	
1417 cc.	1498.5 cc.	1490 cc.	1280-12 cc. (40)♂	Adittanalur
			1182.43 cc. (14)♀	(Chatterjee & Gupta) 1419.26 cc.♂ 1297.60 cc.♀

Gr. II.—Mediterranean Group—

Mohenjodaro Nos. 6, 7, 9, 10, 19, 26. (Sewell & Guha)	Nal (Guha)	Ur. (Keith)	Kish No. 4 (Buxton)	Anau Nos. 1 & 2 (Sergi)	Sialkot (Keith)	Bayana (Keith)
1332.5 cc.	1443.2 cc.	1413.5 cc.	1328 cc.	1378.1 cc.	1360 cc.	1250.5 cc.

It appears from Table IX that the cranial capacity of Adittanalur male skull is very close to that of Kish Nos. 3, 5, 7 and Ur, the difference being 2.26 cc and 5.76 cc respectively. The cranial capacity of the female Adittanalur skull approaches to that of male Veddah skull the difference being 17.48 cc. It should be remarked that certain difference is present between the male cranial capacity of Adittanalur skull and that of Mohenjodaro Nos. 2, 11 and M which were placed by Sewell and Guha under Proto-australoid group and subsequently Guha designated them as Caucasian. The difference between the two groups is 70.74 cc. It is interesting to note that the difference between the female Adittanalur and the Bayana skulls is 47.1 cc, whereas, 30.4 cc between the female Adittanalur skull and Kish No. 4. Difference of 5.76 cc only is observed between the Adittanalur male skulls and the skulls of Ur, which are, therefore, closest so far cranial capacity is concerned. The difference between the Adittanalur male skull and the Nal skull is 23.94 cc.

TABLE X

Comparative Table shows the mean values of linear measurements of Adittanalur and of different Aboriginal Skulls of India & Abroad (mm)

Measurements	♂ Kadar Skull (1)	♂ Panayan Skull (3)	♂ Polachi Skull (6)	♂ Pulayan Skull (4)	♂ Malé Skull (1)	♀ Malé Skull (1)	♂ Santal Skull (2)
Maximum cranial length	177	172.33	171.83	179.55	167	157	180
Maximum cranial breadth	132	122	132	129	121(?)	125	129
Auricular height	..	..	..	..	107(?)	105	112
Basilo-bregmatic height	126	128	127.33	131.25	..	118	129
Least frontal breadth	96	84.66	94.40	93.75	91.5	91	93
Greatest frontal breadth	..	..	..	..	111	100	108.1
Bimastoid breadth	119	109.66	115	109.5	99	100	..
Bizygomatic breadth	128	117.32	124.33	123.75	..	..	..
Orbital breadth (right)	38	38.6	40	39.75	..	34	40.1
Orbital breadth (left)	38	39	40.66	39.75	..	..	..
Orbital height (right)	34	35	31.16	31.25	..	31	33.1
Orbital height (left)	35	34	33.33	31.25	..	31	..
Length of the occipital foramen	35	32	33.33	34.75	33	33	..
Breadth of the occipital foramen	30	26	27.5	30	28	25	..
Sagittal cranial arc	356	354	353.83	357.25	344	330	368.1
Transverse cranial arc	290	284.66	300.83	298.5	..	283	..
Horizontal cranial circumference	495	475.33	489.50	492.50	462	455	497
Nasal height	47	46	47.5	45.5	..	41	47.1
Nasal breadth	23	23.66	24.66	23.50	..	21	24.1
Nasion prosthion line	59	57.66	63.16	61.25	..	52	..
Nasion lambda line	..	..	..	..	154	133	174
Nasioninion line	..	..	..	..	148	148	170
Nasion basion line	95	94.33	97.16	101.25	92	95	97.1
Basion prosthion line	..	..	..	..	..	85	..
Maxillo alveolar breadth	62	48.3	60	60.75	..	55	..
Maxillo alveolar length	47	47.33	52.16	54.25	..	..	..
Palatal length	43	43	46	47	..	..	..
Palatal breadth	38	35.33	36.16	35.75	..	35	..
Binocular breadth	..	..	..	..	10	103	180
Outer biorbital breadth	..	..	..	..	..	96	100
Inner biorbital breadth	..	..	..	..	..	90	..
Greatest occipital breadth	..	..	..	..	96	94	105
Biorbital nasal arc	..	..	..	..	..	97	..
Frontal arc	130	117.33	123.83	120.75	..	120	122
Parietal arc	120	122	124	131.5	..	117	130.1
Occipital arc	106	114.66	106	105	107	93	116
Frontal chord	112	102.33	109	109.25	..	101	108
Parietal chord	110	109	110.66	115.75	..	101	117.1
Occipital chord	91	96	89.66	91	85	77	92.1
Cranial capacity (cc)	1400	1186.66	1287.5	1320	..	970 (approx)	1195

TABLE X—contd.

Measurements	♀ Santal Skull (1)	♂ Bhuiya Skull (1)	♀ Bhuiya Skull (1)	♂ Paharia Skull (1)	♂ Kharia Skull (2)	♂ Kol Skull (5)	♀ Kol Skull (1)
Maximum cranial length	170	182	117	176	170	180-4(5)	158
Maximum cranial breadth	120	131.25	173	134	128.5	132-45	133
Auricular height	106	..	..	..	..	..	..
Basilo-hregmatic height	122	139.5	130	123	131-25	130-80(5)	123
Least frontal breadth	92	95.5	88.5	86	88-75	94-50(5)	91
Greatest frontal breadth	108	115	111	106	110-75	109-33(3)	115
Bimastoid breadth	..	133.5	96	104	..	103-38(4)	98.5
Bizygomatic breadth	..	131.5	14	129	122-15	132-00(3)	115
Orbital breadth (right)	40	44	43.5	43	42.5	43-32(4)	39
Orbital breadth (left)	..	43-25	42	43-7	42-00	42-62(4)	38
Orbital height (right)	33	28-75	37.5	33	32-85	33-15(4)	26-7
Orbital height (left)	..	30.5	39	32	33-00	32-90(4)	28.5
Length of the occipital foramen	..	37.5	33	37	36-15	34-50(5)	31
Breadth of the occipital foramen	..	31-85	29	33	29-75	29-04(5)	24
Sagittal cranial arc	349	370.25	362	350	341-50	365-20(5)	339
Transverse cranial arc	..	311-75	310	300	294	300-20(5)	291
Horizontal cranial circumference	485	507.5	491	493	493	506-60(5)	460
Nasal height	45	59-90	..	49.7	49.5	52(4)	37
Nasal breadth	22	26.25	..	25	22	24-62(4)	..
Nasion prosthion line	..	65-30	..	64	64-75	63-5(4)	52
Nasion lambda line	168	171-25	170	171	162-75	173-90(5)	154
Nasioninion line	158	173	160	166	163	166-60(5)	141
Nasion basion line	92	103.5	104	96	99.5	99(5)	88
Basion prosthion line	..	100.5	..	92.5	93-63	95-2(4)	89
Maxillo alveolar breadth	..	66.5	..	53	67-85	66-62(4)	60-3
Maxillo alveolar length	..	53-85	..	49.5	51.70	52-98(4)	49
Palatal length	..	45-50	..	47	43-10	45-12(4)	42.3
Palatal breadth	..	41.75	..	..	41-25	41-57(3)	39
Biauricular breadth	105	..	..	..	..	..	..
Outer biorbital breadth	98	..	..	..	..	..	..
Inner biorbital breadth	..	..	..	..	..	..	..
Greatest occipital breadth	102	109.5	98.0	108	..	105-70(3)	92
Frontal arc	117	128.5	130.5	125	120-25	125-10(5)	109
Parietal arc	132	119-75	123	115.5	116-75	124-2(5)	126
Occipital arc	100	122	108.5	108.5	104.5	115-9(5)	104
Frontal chord	103	112.5	113.5	111	105.5	109.5(5)	95
Parietal chord	115	107	112	106	104.2	110-76(5)	110
Occipital chord	87	98.5	91	90.5	90-25	98-26(5)	89.5
Cranial capacity (cc)	1240	..	..	..	..	..	..

TABLE X—*contd.*

Measurements	♂ Munda Skull (5)	♀ Munda Skull (2)	♂ Oron Skull (2)	♀ Oron Skull (1)	♂ Juang Skull (1)	♀ Juang Skull (1)	Bhuma Skull (1)
Maximum cranial length	179.2(5)	167.5(2)	187.75	175	180	164	180
Maximum cranial breadth	128.8(5)	117.5(2)	130	133	131	127	131
Auricular height	..	..	..	..	..	..	..
Basilo-bregmatic height	130.40(5)	128.75(2)	133.50	125.5	143	126	131
Least frontal breadth	88.50(5)	84(1)	90.75	91.00	95.5	87.5	86
Greatest frontal breadth	108.60(5)	99(1)	112.00	111.00	109.5	110	109.5
Himastoid breadth	99.70(5)	92.50(2)	102.50	96	103	93	103
Bizygomatic breadth	126.52(5)	115.5(1)	128.50	123	125	120.3	122.5
Orbital breadth (right)	40.90(5)	40(1)	42.85	41.3	4.7	40	43
Orbital breadth (left)	40.34(5)	39(1)	42.50	40	42	41	42
Orbital height (right)	30.76(5)	30(1)	31.60	31.7	34	32	..
Orbital height (left)	31.14(5)	30(1)	32.25	30.3	36.5	31	..
Length of the occipital foramen	35.80(5)	34.00(2)	34.30	34.5	35.5	32	36
Breadth of the occipital foramen	28.70(5)	27.50(2)	31.00	26	30	26	28.5
Transverse cranial arc	226.60(5)	288.50(2)	309.50	294	319	287	303
Sagittal cranial arc	369.80(5)	340(2)	382	353.5	369	341.5	361
Horizontal cranial circumference	500(5)	458(1)	520.5	487	492	463	500
Nasal height	47.46(5)	42(1)	50.15	46.3	49	44.3	46.3
Nasal breadth	25.44(5)	25(1)	27.65	23	25	26	24
Nasion prosthion line	58.62(5)	53(1)	63.65	60	61	57	64.5
Nasion lambda line	171.60(5)	160(2)	178	164	176	162	175
Nasioninion line	168.80(5)	153.5(2)	174.5	167.5	171	154	166
Nasion basion line	96.10(5)	95.5(2)	102	101	106	93	103
Basion prosthion line	91.70(5)	94(1)	97	90	102	84	88
Maxillo alveolar breadth	64.20(5)	63(1)	71.9	56	60.5	56.5	63
Maxillo alveolar length	49.96(5)	48.7(1)	51.35	49	52	47.7	55.7
Palatal length	43.17(3)	44(1)	46.35	41	..	38	47
Palatal breadth	41.96(5)	37.5(1)	44.75	35	37	35	38
Greatest occipital breadth	103.20(5)	93.50(2)	107.75	103.5	102	96	100
Frontal arc	122.30(5)	115.5(2)	129.5	118.5	120.5	121	123.5
Parietal arc	126(5)	123.0(2)	133	113	135	124.5	125
Occipital arc	117.5(5)	101.5(2)	119.5	122	113.5	9	112.5
Frontal chord	107.06(5)	100.4(2)	111.35	104	107	104.5	222.5
Parietal chord	115.4(5)	109.85(2)	120.25	103	110.5	109	112
Occipital chord	95.86(5)	86(2)	95.25	95.5	100	..	95
Cranial capacity (cc)	..	..	..	..	..	..	..

TABLE X--concl'd.

Measurements	♀ Rhima Skull (1)	♂ *Veddah Skull (44)	♀ *Veddah Skull (18)	♂ Australian Skull (103)	♂ Australian Skull (11)	♂ Additional Skull	♀ Additional Skull
Maximum cranial length	177.5	178.84(41)	169.78(18)	186.6(103)	173.9(11)	185.86	180.70
Maximum cranial breadth	124	126.36(44)	123.53(18)	130.8(103)	124(11)	130.57	128.25
Auricular height	..	110.77(31)	108.71(14)	112.4(103)	108.2(10)	117.33	114.25
Basilo-bregmatic height	125	132.73(41)	128.83(16)	133.8(103)	129.8(11)	173.50	126.66
Least frontal breadth	92.3	91.48(42)	88.65(17)	95.7(102)	95	93.90	92.75
Greatest frontal breadth	107	106.31(39)	105.56(16)	110.6(103)	104.2(11)	111.90	112.33
Bimastoid breadth	90	115.91(32)	111.57(14)	100.7(94)	94.2(11)	105.90	100.00
Bizygomatic breadth	125.3	120.71(41)	116.00(15)	135.1(92)	126.6(8)	126.00	128.00
Orbital breadth (right)	43	38.05(40)	36.54(4)	44.2(103)	43.6(11)	} 41.00	40.50
Orbital breadth (left)	40.7	..	..	..	..
Orbital height (right)	32.5	32.05(40)	31.14(14)	33.7(103)	33.5(11)	} 33.75	32.50
Orbital height (left)	34	..	..	..	..
Length of the occipital foramen	37.5	..	..	36.3(102)	34.6(11)	38.25	38.50
Breadth of the occipital foramen	26	..	..	30.7(100)	29.0(11)	32.33	30.25
Sagittal cranial arc	358.5	361.17(26)	344.67(9)	371.5(102)	351.5(11)	372.42	360.00
Transverse cranial arc	288	300.84(25)	287.22(9)	299(103)	291.4(11)	305.00	301.00
Horizontal cranial circumference	495	492.44(43)	473.76(17)	523.6(103)	489.9(11)	517.80	498.50
Nasal height	48	44.47(38)	41.08(12)	50.2(102)	48.6(11)	51.50	47.56
Nasal breadth	24	24.22(38)	22.79(14)	27.2(103)	27.3(11)	25.50	27.00
Nasion prosthion line	59	60.03(38)	56.17(15)	68.9(99)	64.2(11)	61.00	62.00
Nasion lambda line	173	..	..	..	..	179.83	166.50
Nasion-inion line	166	..	..	..	..	170.14	162.00
Nasion-basion line	91	98.13(42)	93.53(15)	..	97.2(11)	102.50	93.00
Basion-prosthion line	92	93.37(38)	87.20(15)	103.7(100)	..	93.50	101.50
Maxillo-alveolar breadth	64.5	58.34(28)	53.27(11)	..	62.1(9)	59.75	65.00
Maxillo-alveolar length	49.7	57.61(9)	51.00(4)	..	58.3(9)	51.00	53.00
Palatal length	44.7	50.36(29)	46.85(13)	..	49.4(10)	45.50	..
Palatal breadth	38.5	44.92(36)	42.67(15)	..	38(11)	38.00	..
Greatest occipital breadth	98	..	..	..	100.7(11)	111.60	102.50
Frontal arc	130.5	..	..	129.8(103)	119.8(11)	131.80	121.00
Parietal arc	122	..	..	128.8(103)	112.3(11)	133.33	124.00
Occipital arc	106	..	..	112.8(102)	108.4(11)	112.87	118.33
Frontal chord	111	..	..	124.4(103)	105(11)	114.60	107.00
Parietal chord	112	..	..	111.1(103)	111.5(11)	119.08	110.66
Occipital chord	85.3	..	..	93.6(102)	91.9(11)	92.62	96.00
Cranial capacity (cc)	..	1280-1240	1182-43(14)	1294-00(98)	1103-4(11)	1419-26	1297-60

*Averages calculated from Osman Hill's basic data.

It would appear that the maximum cranial length of Adittanalur skull differs a little from that of Veddah, Munda, Kharia, Paharia, Malé, Polachi, Paniyan and Kadar and approaches the Australian, Bhima, Juang, Oraon, Munda, Kol, Bhuiya, Santal and Pulayan skulls. It is interesting to note that the maximum cranial breadth of Adittanalur skull approaches to that of Australian, Bhima, Juang, Oraon, Kol, Paharia, Bhuiya, Santal, Pulayan, Polachi and Kadar and differs from Veddah, Munda, Kharia, Malé and Paniyan. Basilo-bregmatic height of Adittanalur skull is very close to that of Australian, Veddah, Santal and Pulayan. It should be remarked that the least frontal breadth of Adittanalur skull approaches to that of Australian, Veddah, Bhima, Juang, Oraon, Kol, Bhuiya, Santal, Malé, Pulayan, Polachi and Kadar. The greatest frontal breadth of Adittanalur skull is approaching to that of Australian, Veddah, Bhima, Juang, Oraon, Munda, Kol, Kharia, Paharia, Bhuiya, Santal and Malé. Bi-mastoid breadth of Adittanalur skull differs from Veddah, Polachi and Kadar; otherwise, it approaches to that of Australian, Juang, Oraon, Munda, Kol, Paharia, Bhuiya, Pulayan and Paniyan skulls. It should be remarked that the nasal height of the Adittanalur skull is approaching to that of Australian, Juang, Oraon, Munda, Kol, Kharia, Paharia, Bhuiya, Santal, Polachi, Kadar and the differences are 1.30, 2.50, 1.35, 4.04, 0.5, 2.00, 1.8, 0.60, 4.40, 4.0, 4.50 mm respectively. The breadth of the nose of Adittanalur skull is very near to that of Australian, Veddah, Bhima, Juang, Oraon, Munda, Kol, Kharia, Paharia, Bhuiya, Santal, Malé, (Female), Pulayan, Polachi, Paniyan and Kadar, the differences being 1.7, 1.28, 1.5, 0.5, 2.15, 0.06, 0.88, 3.5, 0.5, 0.75, 1.4, 0.50, 2.0, 0.84, 1.84, 2.50 mm respectively. Nasion-prosthion line of Adittanalur skull approaches to that of Veddah, Bhima, Juang, Oraon, Munda, Kol, Kharia, Paharia, Pulayan, Polachi, Paniyan and Kadar and the differences being 0.97, 3.5, 0, 2.65, 2.38, 2.5, 3.75, 3.0, 0.25, 2.16, 3.34, 2.0 mm respectively. It is interesting to note that the nasion-basion line of Adittanalur skull is very close to that of Veddah, Bhima, Juang, Oraon, Kol, Kharia, Bhuiya, Pulayan, the differences being 4.37, 0.50, 3.50, 0.50, 3.50, 3.0, 1.0, 1.25 mm respectively.

Basion-prosthion line of the Adittanalur skull approaches to that of Veddah, Bhima, Oraon, Munda, Kol, Kharia, Paharia, but it could not be observed in other cases mentioned in Table X due to wanting of the data. It is interesting to note that the maxillo-alveolar breadth of Adittanalur skull is very near to that of Veddah, Bhima, Juang, Pulayan, Polachi and Kadar. Maxillo-alveolar length of the Adittanalur skull is very close to that of Juang, Oraon, Munda, Kol, Kharia, Paharia, Bhuiya, Pulayan, Polachi and Paniyan. It should be remarked that the palatal length of the Adittanalur skull approaches very closely to that of Veddah female, Bhima, Oraon, Munda, Kol, Kharia, Paharia, Bhuiya, Pulayan, Polachi, the differences being 1.35, 1.50, 0.85, 2.33, 0.38, 2.40, 1.50, 1.50, 1.50 and 0.50 mm respectively. It should be remarked that the bizygomatic breadth of the Adittanalur skulls approaches to that of Australian female, Bhima, Juang, Oraon, Munda, Pulayan, Polachi and Kadar, the differences being 0.6, 3.5, 1.0, 2.50, 0.52, 1.25, 1.67 and 2.0 mm respectively. It differs from the Australian male, the difference being 9.1 mm. The parietal arc of Adittanalur skulls is 133.33mm and that of Australian being 128.8, the difference is 4.53mm, whereas, in Oraon, Santal and Pulayan, the differences are 0.33, 3.23, 1.83 mm. Occipital arc of Adittanalur skulls is 112.87 mm and that of Australian male being 112.8, mm; the difference is negligible. The arcs of Bhima, Juang, Kol, Paharia, Santal and Paniyan being 112.5 mm, 113.5 mm, 115.9 mm, 108.5 mm, 116.0 mm and 114.66 mm respectively, their differences with that of Adittanalur are 0.5, 1.5, 3.9, 3.5, 4.0 and 2.66 mm respectively.

It would appear from Table XI that the length-breadth index of the Adittanalur male skulls approaches to that of Mediterranean type of Dixon, Australian (male), Bhima (female), Bhuiya (male), Santal (male), Juang (male), Kol (male), Pulayan (male) and Paniyan (male). The differences are 1.20, 0.2, 0.05, 2.29, 3.46, 2.87, 3.48, 2.03, 1.21, respectively.

TABLE XI

Comparative table shows the mean values of Indices of Adittanalur and other aboriginal Skulls of India and Abroad

Indices	Pohllachi Male (6)	Paniyan Male (3)	Pulayan Male (4)	Kadar Male (1)	Malé Male (1)	Malé Female (1)	Koi Male
Length-breadth index . . .	76.81	71.01	71.93	74.57	72.46	79.62	73.38(5)
Length-height index . . .	76.11	75.70	73.10	71.18	—	75.16	72.57(5)
Length auricular height index . . .	—	—	—	—	—	—	—
Breadth height index . . .	99.10	104.98	101.74	94.45	—	94.40	98.92(5)
Sagittal cranial curvature index . . .	—	—	—	—	43.02	44.85	45.61(5)
Transverse cranial curvature index . . .	—	—	—	—	—	22.64	—
Transverse fronto-parietal index . . .	71.60	69.10	72.70	72.70	75.61	72.80	71.44(5)
Index of the occipital foramen . . .	81.48	82.40	86.15	85.71	—	—	84.31(5)
Orbital index (Right) . . .	77.93(R)	90.55(R)	78.73(R)	89.45(R)	—	97.18(R)	76.56(4)R
Orbital index (Left) . . .	77.09(L)	87.17(L)	78.73(L)	92.08(L)	—	—	77.22(4)L
Nasal index . . .	52.26	50.75	51.95	48.93	—	60.98	47.65(4)
Maxille-alveolar index . . .	115.26(?)	109.12(?)	111.97(?)	131.90	—	—	126.12(4)
Palatal index . . .	79.02	83.15	75.03	88.37	—	—	93.22(3)
Longitudinal cranio facial index . . .	—	—	—	—	—	54.14	52.59(4)
Transverse cranio facial index . . .	94.28	96.22	95.94	96.96	—	—	97.09(3)
Mandibular index . . .	—	—	—	—	—	—	—
Remus index . . .	—	—	—	—	—	—	—
Fronto-parietal index . . .	97.50	—	109.13	92.31	—	97.50	99.21(5)
Fronto-occipital index . . .	85.73	—	87.30	81.54	—	77.50	92.42(5)
Parieto-occipital index . . .	85.52	—	79.98	88.33	—	79.49	93.92(5)
Fronto-sagittal arc index . . .	35.14	—	33.77	36.51	—	36.36	34.30(5)
Parieto-sagittal arc index . . .	35.25	—	36.79	33.70	—	35.45	34.02(5)
Occipito-sagittal arc index . . .	30.10	—	29.41	29.77	31.10	28.18	31.71(5)
Frontal curvature index . . .	88.11	—	90.47	86.15	—	84.17	87.35(5)
Parietal curvature index . . .	89.24	—	—	91.67	—	86.32	89.36(5)
Occipital curvature index . . .	84.73	—	86.66	85.85	79.44	82.80	84.91(5)
Upper Facial index . . .	50.96	51.84	49.42	46.06	—	—	48.22(3)
Cranial capacity (cc) . . .	1287.50	1186.66	1320.00	1400	—	970 (?)	—

TABLE XI—*contd.*

Indices	Kol Female (1)	Munda Male (5)	Munda Female (2)	Juang Male (1)	Juang Female (1)	Santal Male (2)	Oraon Male (2)
Length-breadth index . . .	84.17	69.57	73.19	72.77	77.43	73.36	70.17
Length-height index . . .	77.84	73.70	75.44	79.44	76.80	71.19	71.20
Breadth height index . . .	92.48	103.23	104.83	109.16	99.21	99.03	101.58
Sagittal cranial curvature index . . .	41.59	—	—	46.34	45.09	44.88	—
Transverse fronto-parietal index . . .	68.42	70.98	—	72.90	68.74	68.51	70.32
Index of the occipital foramen . . .	77.41	—	—	84.50	81.25	81.57	—
Orbital index (rt) . . .	68.46(R)	—	—	77.80(R)	80.00(R)	72.72(R)	74.45
Orbital index (lt) . . .	75.00(L)	74.96	—	86.94(L)	75.60(L)	79.06(L)	—
Nasal index . . .	70.27	54.54	—	51.02	58.69	53.84	53.41
Maxillo-alveolar index . . .	123.06	122.25	—	116.34	118.44	124.75	136.51
Palatal index . . .	92.49	80.79	—	—	92.10	—	94.06
Longitudinal cranio facial index . . .	56.32	52.08	—	56.66	51.21	50.00	52.14
Transverse cranio facial index . . .	86.46	98.91	—	95.41	94.12	96.21	97.80
Fronto-parietal index . . .	115.58	103.49	108.54	112.03	102.89	99.24	101.86
Fronto-occipital index . . .	95.41	93.05	86.32	94.19	79.33	87.21	90.76
Parieto-occipital index . . .	82.53	92.18	79.52	84.07	77.10	87.88	89.64
Fronto-sagittal arc index . . .	32.15	33.22	33.91	32.65	32.59	34.90	33.59
Parieto-sagittal arc index . . .	37.16	34.33	36.81	36.58	36.45	34.64	34.18
Occipito-sagittal arc index . . .	30.67	31.55	29.27	30.75	28.11	30.44	30.23
Frontal curvature index . . .	87.15	87.51	86.58	88.79	86.36	85.71	86.35
Parietal curvature index . . .	87.30	91.45	88.99	81.85	87.55	90.90	86.41
Occipital curvature index . . .	5	82.11	85.14	88.10	86.45	82.75	80.55
Upper Facial index . . .	45.21	46.43	—	48.80	47.38	—	45.36

TABLE XI—*contd.*

Indices	Oraon Female (2)	Kharia Male (2)	Paharia Male (1)	Bhuiya Male (2)	Bhuiya Female (1)	Bhima Male (1)	Bhima Female (1)
Length-breadth index . . .	76.00	75.62	76.13	72.19	75.14	72.77	69.85
Length-height index . . .	71.71	77.22	69.88	76.81	73.44	72.77	70.42
Breadth-height index . . .	94.36	103.15	91.79	106.31	97.74	100.00	100.87
Sagittal cranial curvature index . . .	—	47.74	47.42	46.70	44.19	45.98	46.34
Transverse fronto-parietal index . . .	68.42	69.08	64.17	72.76	66.54	65.64	74.43
Index of the occipital foramen . . .	—	82.48	89.18	84.73	87.87	79.16	69.33
Orbital index (Right) . . .	76.75	77.27(R)	76.74(R)	65.33(R)	86.20(R)	—	75.58(R)
Orbital index (Left) . . .	—	78.57(L)	73.22(L)	70.50(L)	92.85(L)	—	83.53(L)
Nasal index . . .	49.67	44.42	50.30	51.56	—	51.83	50.00
Maxillo-alveolar index . . .	114.28	131.23	107.07	123.53	—	113.10	129.77
Palatal index . . .	85.37	95.79	—	91.80	—	80.85	86.12
Longitudinal cranio facial index . . .	51.43	55.14	52.55	55.33	—	48.88	51.83
Transverse cranio facial index . . .	92.48	95.07	96.26	100.19	85.71	93.51	101.04
Fronto-parietal index . . .	95.35	97.17	93.20	93.25	94.26	101.21	93.48
Fronto-occipital index . . .	102.95	86.78	85.80	94.82	83.14	91.09	81.22
Parieto-occipital index . . .	107.96	89.63	93.13	102.07	88.21	90.00	86.88
Fronto-sagittal arc index . . .	33.51	35.21	35.71	34.71	36.04	34.21	36.40
Parieto-sagittal arc index . . .	31.96	34.22	33.28	32.38	33.98	34.62	34.03
Occipito-sagittal arc index . . .	34.51	30.55	31.00	32.90	29.97	31.76	29.56
Frontal curvature index . . .	87.76	87.76	88.80	87.56	86.97	90.28	85.05
Parietal curvature index . . .	81.10	89.53	90.98	89.36	91.05	89.60	91.80
Occipital curvature index . . .	79.09	86.56	83.41	81.04	83.86	84.44	80.47
Upper Facial Index . . .	48.69	53.21	49.61	49.66	—	52.65	47.09

TABLE XI—*concl'd.*

Indices	Vedda		Australian		"Mediterranean" type (Dixon)	Adittanalar	
	Male	Female	Male	Female		Male	Female
Length-breadth index . . .	71.24(44)	72.72	70.1 (103)	71.4 (11)	71.10	69.90(7)	70.55(4)
Length-height index . . .	74.64(42)	74.64	71.8 (103)	74.7 (11)	68.00	70.87(3)	65.30(3)
Length auricular height index . .	62.57	61.00	60.3 (103)	62.1 (11)	—	61.97(3)	64.83(2)
Breadth height index . . .	104.56	105.50	102.4 (103)	104.7 (11)	—	102.82(4)	103.61(2)
Sagittal cranial curvature index . .	49.16	49.80	—	—	—	45.77(7)	45.00(2)
Transverse cranial curvature index	38.10	38.70	—	—	—	38.12(3)	37.90(2)
Transverse fronto-parietal index . .	72.40	72.10	73.2 (102)	73.1 (11)	—	72.02(5)	72.36(4)
Index of the occipital foramen . .	—	—	84.6 (100)	83.8 (11)	—	80.39(6)	77.94(3)
Orbital index . . .	74.02	73.70	76.2 (103)	77.4 (11)	—	82.55(4)	80.33(2)
Nasal index . . .	54.24	57.30	54.0 (102)	56.2 (11)	43.40	49.48(2)	54.0 (1)
Maxillo-alveolar index . . .	103.80	114.30	110.9 (93)	106.7 (9)	—	120.58(1)	120.64(1)
Palatal index . . .	97.06	94.30	77.9 (94)	77.3 (10)	—	83.51(1)	123.00(1)
Longitudinal craniofacial index . .	—	—	—	—	—	52.33(1)	57.46(2)
Transverse craniofacial index . .	—	—	103.5 (92)	102.0 (8)	—	98.41(1)	103.22(1)
Mandibular index . . .	—	—	—	—	—	—	—
Ramus index . . .	—	—	—	—	—	—	—
Fronto-parietal index . . .	—	—	99.4 (103)	101.1 (11)	—	101.11(5)	98.34(1)
Fronto-occipital index . . .	—	—	—	—	—	84.72(5)	100.00(1)
Parieto-occipital index . . .	—	—	—	—	—	84.74(6)	96.96(2)
Fronto-sagittal arc index . . .	—	—	—	—	—	35.00(5)	33.42(1)
Parieto-sagittal arc index . . .	—	—	—	—	—	35.35(5)	32.87(1)
Occipito sagittal arc index . . .	—	—	—	—	—	30.01(7)	32.77(2)
Frontal curvature index . . .	—	—	86.7 (103)	87.7 (11)	—	86.96(5)	88.42(1)
Parietal curvature index . . .	—	—	91.0 (103)	90.5 (11)	—	89.48(5)	88.23(2)
Occipital curvature index . . .	—	—	83.1 (102)	85.0 (11)	—	83.07(7)	82.56(3)
Upper facial index . . .	49.00	49.00	51.1 (89)	51.6 (8)	55.20	47.6 (1)	54.61 (1)
Cranial capacity (cc) . . .	—	—	1294.0 (98)	1103.4 (11)	—	1419.26(5)	1297.60 (2)

Length-height index of the Adittanalur male skulls is very close to that of Mediterranean (Dixon), Australian (male), Bhima (male and female), Paharia (male), Santal (male), Kol (male), Kadar (male) and Pulayan (male). The differences are 2.87, 0.93, 1.9, 0.45, 0.99, 0.32, 1.70, 0.31, 2.23 units respectively.

The length-auricular height index of Adittanalur (male) is 61.97 and that of Australian (male) is 60.3, whereas the index is 62.57 in the case of Veddah. It appears that the index is very close to that of Australian and Veddah.

It is interesting to note that the breadth-height index of Adittanalur male approaches very close to that of Australian, Veddah, Bhima, Kharia, Santal, Juang (female), Kol, Pulayan, Paniyan and Polachi. The sagittal cranial curvature index of the Adittanalur (male) is very close to that of Bhima (male and female), Bhuiya (male and female), Paharia (male), Kharia (male), Santal (male), Juang (male and female), Kol (male), Mälé (male and female). The differences between the Adittanalur skulls and those skulls are 0.21, 0.57, 0.93, 1.58, 1.65, 1.97, 0.89, 0.57, 0.68, 0.16, 2.75 and 0.92 respectively.

Only in the case of Veddah and Mälé, transverse cranial curvature index was available for comparison with that of Adittanalur skulls and it appears that the index approaches very close to that of Veddah and it differs from the Mälé.

As regards transverse fronto-parietal index, it should be remarked that the index is very close to that of Australian male, female, Veddah (male and female), Bhima (female), Bhuiya (male), Kharia (male), Santal (male), Juang (male and female), Kol (male), Mälé (male and female), Kadar, Pulayan, Paniyan and Polachi. The differences are 1.18, 1.08, 0.38, 0.08, 2.41, 0.74, 2.94, 3.51, 0.88, 3.28, 0.58, 3.59, 0.78, 0.68, 0.68, 2.92, 0.42 respectively.

Index of the occipital foramen of the Adittanalur male skull is 80.39 and it approaches to that of Bhima (male), Kharia (male), Santal, Juang (male and female), Kol (female), Paniyan and Polachi. The orbital index of the Adittanalur skull approaches to that of Bhima, Kharia, Santal, Juang, Kol, Pulayan and Polachi.

It should be remarked that the nasal index of the Adittanalur skulls differ from that of Australian (male), Juang (female), Kol (female), Mälé (female), Mediterranean type of Dixon and it approaches to that of Veddah, Bhima (male and female), Bhuiya, Paharia, Santal, Juang (male), Kol (male), Kadar, Pulayan, Paniyan and Polachi.

It is interesting to note that the female nasal index of the Adittanalur skull approaches to that of Australian (male), Veddah (female) and Juang (female).

It should be remarked that the maxillo-alveolar index of the Adittanalur skull approaches to that of Bhuiya (male), Santal (male), Juang and Kol. The palatal index of the Adittanalur skull is very close that of Bhima, Kadar, Paniyan and Polachi. It differs from that of Australian, Veddah, Bhuiya, Kharia, Juang, Kol and Pulayan.

Fronto-parietal index of the Adittanalur skull approaches to that of Australian, Bhima, Kharia, Santal, Juang (female), Kol, Mälé (female) and Polachi.

Fronto-occipital index approaches to that of Bhuiya (female), Paharia (male), Kharia, Santal, Kadar, Pulayan and Polachi.

Parieto-occipital index of the Adittanalur skull is very close to that of Bhima (female), Bhuiya (female), Santal (male), Juang (male), Kol (female), Kadar (male), Pulayan (male) and Polachi (male). Frontal curvature index of the Adittanalur skull is approaching to that of Australian (male and female), Bhima (male and female), Bhuiya (male and female), Paharia (male), Kharia (male), Santal (male), Juang (male and female), Kol (male and female), Mälé (female), Kadar, Pulayan and Polachi.

Parietal curvature index of the Adittanalur skull is close to that of Australian (male and female), Bhima (male), Bhuiya (male and female), Paharia (male), Kharia (male), Santal (male), Juang (female), Kol (male and female), Mälé (female), Kadar and Polachi.

It is interesting to note that the occipital curvature index of the Adittanalur skull approaches to that of Australian, Bhima, Bhuiya, Paharia, Kharia, Santal, Juang (female), Kol, Mälé, Kadar, Pulayan and Polachi.

It should be remarked that the upper facial index of the Adittanalur skull differs to a certain extent from that of Australian and Kharia and in other cases, viz., Veddah, Bhima, Bhuiya, Paharia, Juang, Kol, Kadar, Pulayan and Polachi, it approaches them very closely.

It may be mentioned that as sufficient data are not available for comparison of the cranial capacities of the skulls, available data have only been compared with those of Australian, Mälé, Pulayan, Paniyan and Polachi. It appears from the data that the cranial capacity of the Adittanalur male skull is higher from that of Australian (male) by 125.26 cc and from Pulayan, Paniyan, Polachi, Kadar, Santal and Veddah by 99.26, 232.60, 131.76, 19.26, 224.26 and 139.14 cc respectively. As regards the Adittanalur female skull, it differs from the female skull of Australian, Mälé, Santal and Veddah by 194.2, 327.6, 57.6 and 115.17 cc respectively.

Superimposition of the diaptographic and diagraphic tracings of the Adittanalur skulls on different aboriginal and prehistoric skulls of India and abroad.

Superimposition of the diaptographic tracings of the profile view of the Adittanalur skulls Nos. 3, 7 and 13, has been attempted on the tracings of Oraon, Munda of Chota Nagpur, Kol of Madhya Pradesh, Kadar, Paniyan of South India, Veddah of Ceylon, Australian aboriginal skull, and prehistoric skull of Harappa. Tracings of the facial view of the Adittanalur skulls Nos. 7 and 13 have also been superimposed on the tracings of Polachi, Paniyan and Kadar of South India, as well as on those of two prehistoric skulls excavated one from Maski (Hyderabad) and the other from Harappa. It appears from the diagrams Nos. 1, 2 and 3 that the profile views of the Adittanalur skulls Nos. 3, 7 and 13 coincide with the male Oraon skull No. 610, male Kol skull No. 440 and male Munda skull No. 603, of the collection of the Department of Anthropology, Govt. of India, with the exception of certain minor variations towards the occipital and nasal regions; otherwise, the size, the height and the contour of those skulls resemble each other and thereby indicate the presence of similar racial strain among the living aboriginal population of India. The existence of slight variations may be due to miscegenation with other types of people. Superimposition of the profile view of the tracings of the Adittanalur skulls Nos. 3, 7 and 13 on the tracings of the skulls of Pulayan, Kadar and Panyani (*vide* diagram Nos. 4, 5 and 6) shows that the contour of the skull, height and the cranial length of the former skulls approach the latter skulls with the exception of a little variation towards the occipital region and orbital margin, otherwise indicate close affinity with those of tribes of South India.

The frontal views of the dioptographic tracings of the Adittanalur skulls Nos. 7 and 13 have been superimposed on Polachi, Paniyan, Kadar skulls (a collection of the Natural History Museum, Paris), which has been collected by Lapicque from South India particularly from Malabar and Coimbatore, during his scientific mission in India in the early part of this century, and the tracings of them were taken by one of us (Chatterjee). Superimposition has also been attempted on the frontal view of the skull of Maski (drawn and measured by us) excavated from a prehistoric megalithic burial site at Hyderabad and at present available in the collection of the Department of Anthropology, Government of India. Superimposition on a Harappa prehistoric skull of the Chalcolithic period has also been attempted. As a result of these it reveals that the contour of the Adittanalur skull coincides with the frontal view of Paniyan and Kadar, but it differs a little from that of Polachi (*vide* diagram Nos. 7 and 8). The frontal views of the tracings of Adittanalur skulls Nos. 7 and 13 show that a very little

difference is in existence in this respect among Adittanalur skull No. 13, Harappa and Maski except in the region of upper facial portion. It appears from diagram Nos. 9 and 10 that the frontal view of the Adittanalur skull stands the lowest when it is compared with the Harappa and Maski. Slight difference which has been observed between the Maski and the Adittanalur skull may be due to the presence of admixture, otherwise close racial affinity is observed.

It appears from the diagram No. 11 that the contour of the profile view of the Adittanalur skull No. 7 coincides with the Maski and differs from the Harappa skull No. H255(a) to a certain extent towards the frontal and occipital regions. The superimposition of the frontal view (*vide* diagram No. 12) of the Adittanalur skull No. 7 on Harappa skull No. H255(a) and Maski, shows that the frontal view of the Harappa differs in height and breadth from that of Adittanalur, and approaches to Maski to a certain extent.

Superimposition of the profile view of the diagraphic tracings of the Adittanalur skulls Nos. 3 and 7 on Veddah skull No. 555 of Ceylon, is a collection of the Department of Anthropology, and on Australian skull published by Wagner¹ shows that the contour of the Adittanalur skulls stands intermediary in frontal, parietal and occipital regions. The occipital region of the Australian skull differs from the Veddah and Adittanalur skulls to a certain extent (*vide* diagrams Nos. 13 and 14).

DISCUSSION

On the basis of craniometric study and observation of two Adittanalur skulls various theories were propounded by different anthropologists.

Lapicque is of opinion that the Adittanalur skulls at his disposal belonged to Proto-Dravidian type of people with negroid feature.² One skull was hyperdolichocephal. The theory of the presence of a negroid element in the Adittanalur skulls, as suspected by Lapicque, does not hold good, as the mere presence of alveolar prognathism is not a strong evidence to place them within the negroid stock. The Australians and the Proto-Mediterraneans also possess alveolar prognathism to a certain degree.

Thurston measured cranial length and breadth of six skulls but did not attempt any racial classification on that basis. He observed that two of the skulls were conspicuously prognathous.³

Elliot Smith asserts on examining only two skulls, that one of the Adittanalur skulls possessed the combination of characters present in the old woman of Grimaldi on the basis of the fact that the cranial sutures show no trace whatever of closure, yet the molar series in the lower jaw has disappeared and the alveolar process has been absorbed.⁴ On comparing the jaw of an Adittanalur skull he further pointed out that the jaw showed much closer relations to the Australoid and Mediterranean than any of the Negro people. Finally, Elliot Smith was of the opinion that one skull belonged to Proto-Australoid type and the other to a branch of Mediterranean, designated by him as 'Maritime Armenoid'.

Later on Zuckerman examined the same skulls, previously studied by Elliot Smith, and remarked that one skull belonged to Dravidian and the other to Australoid group.⁵ Considering certain characters, he found evidence in favour of the Pre-Dravidian theory.⁶ On the basis of superimposition of the reconstructed contour derived from the measurements of Australian and Tamil skulls on an Adittanalur skull, he observed that the latter skull more closely resembled the Australian skull than the Tamil.⁷

¹ Wagner, K.—The Craniology of the Oceanic Races, Plate, No. 1. Oslo, 1937.

² Lapicque—Bulletin Muséum d'Histoire Naturelle, 1905, p. 285, Tome Quatrième.

³ Thurston—Castes & Tribes of S. India, Vol. I, p. XXVI, Introduction.

⁴ E. Smith—Essays on the Evolution of Man, 2nd Ed. 1927, pp. 130, 136.

⁵ Zuckerman—Bulletin of the Madras Govt. Museum, New Series, Sec. Vol. II p8, 1930.

⁶ Zuckerman—Ibid, p. 19.

⁷ Zuckerman—Ibid, pp. 5-9.

On comparison of certain cranial measurements and their indices of the different groups of prehistoric skulls, viz., Kish, Alubaid, Mohenjodaro and modern Veddids skulls, Guha observed that the facial part of the Adittanalur skulls intended to approximate the Kish type. Supraorbital ridges are well developed in certain Adittanalur skulls and their measurements conform to that of Alubaid.¹

Guha further pointed out that two of the skulls (besides those two skulls studied by Elliot Smith and Zuckerman) were definitely Australoid with a low sagittal ridge, prominent supraorbital ridges and chamaerhine nose with nasal gutter at the lower margins. The others appeared to belong to a branch of the Mediterranean.²

Zuckerman asserted that the Adittanalur skull more closely resembled the Australian skull than the Tamil skull. It should be pointed out that it was not precisely stated by him, to which particular group of Tamil-speaking people the skull compared with actually belonged. But it is known that people of different strains speak that language, the dolichocephalic and brachycephalic for example. Further, we find the Adittanalur skulls have got greater resemblance with the existing tribal population of India (*vide* Table X, XI and the diaptographic tracings superposed).

In order to find out the racial affinities of the Adittanalur skulls, comparative materials were collected from the published and unpublished records. Craniometric data of different Indian tribes, viz., Kol., Munda, Juang, Santal, Oraon, Kharia, Paharia, Bhuiya, Bhima, Malé, Polachi, Paniyan, Pulayan and Kadar, have been taken into account for comparison. Craniometric data of the Vedda and Australian skulls were also considered. In certain measurements and indices the presence of resemblance in some characters was observed between the Adittanalur and the Vedda and Australian skulls. Majority of the skulls, however, show some affinity with Mediterranean type. Absolute measurements and indices on the various cranial characters of the prehistoric skulls excavated from different sites of India and abroad, viz., Chanhudaro, Mohenjodaro, Harappa, Maski, Badaria, Naquada, Alisar, Alubaid, Ur, Anau, Nal, Hisar and Jebel Moya skulls were also compared. As a result of these comparisons it is found that the Adittanalur skulls resemble some of those skulls in certain absolute craniometric measurements as well as indices (*vide* Tables Nos. VII & VIII). A considerable degree of racial affinity between the Adittanalur skulls and the existing tribal population of India has been observed (*vide* Table Nos. X and XI). The differences observed among them may be due to the presence of admixture in different degrees among the present day tribes.

CONCLUSION

The majority of the Adittanalur skulls are ovoides in shape having low and vertical forehead. The vault of the skulls are well-filled and moderately high with developed frontals. Glabella is found prominent only in the case of two individuals, and in other cases the portion of the skull is either missing or ill-marked. Supraorbital ridges are marked medially in six skulls and the depression of the nasal root is marked in three skulls, but unfortunately in other cases the portion is wanting. It should be remarked that alveolar prognathism is present in four individuals and it is not possible to observe it in other cases due to lack of the region. The shape of the orbit can be observed in five cases and it is found to be round in two cases and rectangular in three. Phaenozygosity is present in one individual but in other cases it could not be observed. Muscular ridges on the occipital region are marked in the majority of the skulls, out of nine skulls, it could be observed in eight. It is interesting to note that protruded and bulging occiput (occiput en chignon) is present in the majority of the cases the frequency being nine. The mastoid process is moderately developed in the

¹ Sewell, R. B. S. and Guha, B. S., 1931, *Human Remains in Mohenjo-Daro and The Indus Civilization*. Edited by Sir John Marshall. pp. 641-642, London 1931.

² Guha, B. S. *Census of India 1931*, Vol. 1, India part III, *Ethnographical Introduction*, p. IXIX.

majority of the cases. The presence of simple sutures in coronal, sagittal and lambdoid regions is the highest and six sutures are observed open and only three sutures are synostosed and basioccipital suture is observed fused in five skulls, and in others the portion is lacking. Deep Glenoid fossa is present in the majority of the skulls the frequency being six. The shape of the foramen magnum is oval in four, elliptical in two and circular in one skull. Dental arch is upsiloid in two and paraboloid in one skull, but unfortunately in other cases it could not be observed. It should be remarked that in one case transverse straightness of the anterior portion of the dental arch is distinct and a faint sagittal ridge has developed towards the vertex of the skull.

In one skull sulcus prenasalis is present and it has not been possible to observe in other cases due to absence of the region. Saddle-shape nasal bridge in two cases has been observed and the shape of the nasal aperture is pyriform in three cases and oval in one. Nasal bone is broad and flat while in two cases relatively narrow in three.

The presence of certain characters, viz., alveolar prognathism, chamaerhine nose, low and broad upper face, prominent malar transverse straightness of the anterior portion of the dental arch, sulcus prenasalis, depressed nasal root, low and retreating forehead, narrow 'least frontal breadth', indicate the primitiveness of these skulls. The presence of such characters are still to be observed among the primitive tribal population of central and particularly southern parts of India.

The study of the Adittanalur skulls in different methods like craniometry, morphological observations, diagraphic and dioptographic contour tracings and their subsequent superimposition on different aboriginal as well as prehistoric skulls from India and abroad, reveals that this dolichocephalic series of skulls shows resemblance with Veddoid or Australoid and Mediterranean types in many characters. Some skulls show affinity in some of the characters with either of the types, and as such do not warrant their being classed wholly in one group. The Adittanalur series, therefore, is not a homogeneous one, rather a medley of characters of two physical types. From a broad perspective, it would be better to assign those to a race having Veddoid-Australoid and Mediterranean strains, which also contribute towards the formation of the Dravidian speakers. In India the presence of Proto-Mediterranean type has been traced back to microlithic-mesolithic man of Gujarat and the semi-mineralised skull from Bayana. The Australoid and Mediterranean have been found from proto-historic Chalcolithic sites of Mohenjodaro and Harappa.

Adittanalur skulls Nos. 3, 5 and 10 however show more Veddoid-Australoid affinity, whereas skulls Nos. 2, 7, 9, 11 and 12 basically possess closer resemblance with Mediterranean type, apart from the two skulls Nos. 13 and 14 identified as Armenoid branch of Mediterranean and Proto-Australoid types by Elliot Smith and Zuckerman respectively.

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APPENDIX A

TABLE XII

The following (a) fragments of the skeletal remains were excavated from the site :

Broken pieces of femur	23
„ „ humerus	7
„ „ calcaneum	2
„ „ tibia	9
„ „ ulna	3
„ „ ilium	1
„ „ fibula	1
„ „ navicular	1
„ „ talus	3
1st phalanx of foot	1
Cuneiform	1 (the 3rd one)
Vertebra	1 (thoracic vertebra)
Pieces of unidentified bones	3

(b) fragments of skull bones (reconstruction not attempted) :

Right zygoma	1
Left zygoma	2
Zygoma	1
Temporal bone	7
Parietal bone	27
Frontal bone	4
Occipital bone	4
Parieto-occipital	4
Fronto-parietal	1
Sphenoid	1
Mandible	3
Teeth	2 molar, 1 premolar
Unidentified piece	several

APPENDIX B

TABLE XIII

Linear measurements and indices of the long and short Bones.

	(a) Talus No. 1	(b) Talus No. 2	(c) Talus No. 3
(1) Length	54.5 mm	—	55.5 mm
(2) Breadth	37 mm	35 mm (approx.)	35 mm
(3) Height	35 mm	—	—
(4) Length of the trochlea	32 mm	27 mm	24 mm
(5) Breadth of the trochlea	32 mm	27 mm	28 mm
(6) Length of the head	33 mm	—	—
(7) Breadth of the head	30 mm	—	—
(8) Length of the post articular surface of the calcaneum	35 mm	32 mm	29 mm
(9) Breadth of the post articular surface for the calcaneum	21 mm	17.5 mm	31 mm
(d) Calcaneum			
(1) Maximum length			84 mm
(2) Breadth across the sustentaculum			40.5 mm
(3) Least breadth of the body of the bone			27.5 mm
(4) Height of the body			42 mm
(5) Length of the body of the calcaneum			59.5 mm
(6) Breadth of the sustentaculum			10.5 mm
(7) Height of the tuber calcanei			44 mm
(8) Length of the post articular surface for the talus			30 mm
(9) Breadth of the post articular surface for the talus			21.5 mm
(e) Ulna			
(1) Maximum breadth of the Olecranon			24.5 mm
(2) Height of the Olecranon			26.5 mm
(3) Thickness of the Olecranon			26 mm
Indices			
(1) Thickness-breadth index of the Olecranon			06.28
(2) Height-breadth index of the Olecranon			108.16

APPENDIX C

TABLE XIV

Linear measurements of individual Adittanalar Skull (mm)

	Skull No. 1	Skull No. 2♂	Skull No. 3♂	Skull No. 4♂	Skull No. 5♂	Skull No. 6♂	Skull No. 7♂
Maximum cranial length	191(?)	193	189	186	..	186
Maximum cranial breadth	125	128.5	131(?)	133	136	126
Cranial height
(a) Auricular height	117.5	119	..	..	115.3
(b) Basilo-bregmatic height	130	..	..	131	132	130
Least frontal breadth	92	102.5	..	90	..	93
Greatest frontal breadth	114	111.5	..	110(?)	..	112
Bimastoid breadth	111.5(?)	106	..	107(?)	102
Bizygomatic breadth	126
Bimaxillary breadth	88	..	..	..	93
Nasal length	52	..	..	..	51
Nasal breadth	27	..	..	..	24
Interorbital breadth	22	..	..	..	20
Orbital breadth	43(?)	40(c)	..	..	34(?)
Orbital height	34(?)	32(r)	..	..	33(?)
Nasion prosthion line	65	..	..	..	60
Nasion basion line	106.5	..	99	..	99
Prosthion basion line	101	..	..	..	86
Maxillo alveolar breadth	61.5	..	..	..	58
Maxillo alveolar length	51	..	..	..	..
Palatal length	45	..	..	..	..
Palatal breadth	38	..	..	..	..
Occipital foramen
(a) length . . .	37	37	35	..	38	41.5	41
(b) breadth . . .	30	29	28	..	35	38	33
Blauricular breadth	108	120	123	112	..	115
Outer biorbital breadth	107	..	..	..	103
Inner biorbital breadth	103	..	..	..	95
Greatest occipital breadth . . .	102	99(?)	111	109	113	123	105

APPENDIX C—*contd.*TABLE XIV—*contd.**Linear measurements of individual Adittanalur Skull (mm)*

	Skull No. 8♀	Skull No. 9♂	Skull No. 10♂	Skull No. 11♂	Skull No. 12♂	Skull No. 13♂	Skull No. 14♂ (Zuckerman No. 1)
Maximum cranial length . . .	174.5	171	181	195	185	170	183
Maximum cranial breadth . . .	..	125	131	134	129	135	124
Cranial height							
(a) Auricular height . . .	..	..	..	..	..	116.5	112
(b) Basilo-bregmatic height . . .	122	..	..	141	..	..	128
Least frontal breadth . . .	..	..	94	90	95	94	90
Greatest frontal breadth . . .	..	111	..	115	109	114	..
Bimastoid breadth . . .	..	..	..	103(?)	..	100	..
Bizygomatic breadth . . .	..	..	..	..	..	..	128
Bimaxillary breadth . . .	..	..	..	..	..	89	..
Nasal length . . .	..	..	..	..	..	45	50 (Approx.)
Nasal breadth . . .	..	..	..	..	..	..	27
Interorbital breadth . . .	..	..	..	19	..	..	27.5
Orbital breadth . . .	..	..	43(?)	..	..	41(?)	40 (Approx.)
Orbital height . . .	..	..	34(?)	..	..	30(?)	35 (Approx.)
Nasion prosthion line . . .	..	..	58	..	..	62	70
Nasion basion line . . .	83	98	..	110	..	96	100
Prosthion basion line . . .	..	..	..	..	..	96	107 (Approx.)
Maxillo alveolar breadth . . .	..	..	..	..	..	..	65
Maxillo alveolar length . . .	..	..	..	..	..	..	33
Palatal length . . .	..	..	46(?)	..	..	..	..
Occipital foramen							
(a) length . . .	40	35	39	..	..	..	..
(b) breadth . . .	31.5	29	..	31	..	28	..
Biauricular breadth . . .	108	..	..	120	..	117.5	..
Outer biorbital breadth . . .	..	..	..	102(?)	..	100	..
Inner biorbital breadth . . .	..	..	95(?)	93.5(?)	..	93.5	..
Greatest occipital breadth . . .	100(?)	..	107	111	106	..	..

APPENDIX C—*contd.*TABLE XIV—*contd.**Linear measurements of individual Adittanalur Skull (mm)*

	Skull No. 1	Skull No. 2 ♀	Skull No. 3 ♂	Skull No. 4 ♂	Skull No. 5 ♂	Skull No. 6 ♂	Skull No. 7 ♂
Sagittal cranial arc	380	391	378	..	371
Transverse cranial arc	298	..	..	302	310	302
Horizontal circumference (max.)	530	..	513	..	508
Biorbital nasal arc	116	110 (approx.)	100 (approx.)	..	98
Frontal arc	133	128	..	132
Parietal arc	129	..	143	133	134	132
Occipital arc	116	119	124	114	118	120	107
Nasion lambda line	185	184	180	..	180
Basion lambda line	116	123	..	118	123	117
Nasioninion line	171	171	171	..	163
Frontal chord	115	111	..	115
Parietal chord	116	..	126.5	118	119	117
Occipital chord	93	95	102	96	86	96	90

APPENDIX C--concl'd.

TABLE XIV--concl'd.

Linear measurements of individual Adittanalur Skull (mm)

	Skull No. 8♀	Skull No. 9♂	Skull No. 10♂	Skull No. 11♂	Skull No. 12♂	Skull No. 13♀	Skull No. (Zuckerman) 14♀
Sagittal cranial arc	362	344	351	392	..	358	..
Transverse cranial arc . . . .	..	..	..	306	295	310	..
Horizontal circumference (max.) .	..	..	510(?)	528	506	491	..
Biorbital nasal arc	110 (Approx.)	..	104	..	..	100	..
Frontal arc	121	..	125	141	..	..	..
Parietal arc	119	..	123	135	..	..	..
Occipital arc	121	101	103	116	..	115	..
Nasion lambda line	166	168	170	189	..	167	..
Basion lambda line	116	105	..	121	..	115	..
Nasioninion line	160	160	171	184	..	164	..
Frontal chord	107	..	110	122	..	..	..
Parietal chord	103	..	112	122	113	..	..
Occipital chord	100	87	86	98	91	98	..
<i>Mandible</i>							
Bigonial breadth . . . . .	..	..	..	..	..	80	..
Height of the ramus . . . . .	..	..	..	..	..	53	..
Max. breadth of ramus . . . . .	..	..	..	..	..	44	..
Minimum breadth of ramus . . . .	..	..	..	..	..	35	..
Symphysal height . . . . .	..	..	..	..	..	25	..
Mandibular length . . . . .	..	..	..	..	..	67	..
Mandibular angle . . . . .	..	..	..	..	..	114°	..
Bicondylar breadth . . . . .	..	..	..	..	..	102-5	..
Height of the body of mandible—							
(a) Right side . . . . .	..	..	..	..	..	28	..

APPENDIX D

TABLE XV

(A) Linear Measurements on diagraphic tracings (mm)

	Skull No. 3	Skull No. 4	Skull No. 5	Skull No. 7	Skull No. 8	Skull No. 10	Skull No. 11	Skull No. 13
Nasion-lambda line . . .	186	184	178	179.5	166	175.5	190	—
Lambda-basion line . . .	121	—	116	113	118	—	122	—
Glabella-inion line . . .	173.5	174	176	167	163.5	173	188	—
Bregma-position line . . .	—	100.5	96	100	92	91	103.5	—
Calvarial height . . .	111	111.5	109	110.5	106	97	112	—
Lambda-calvarial height . . .	—	78	71	72.5	64.5	67.5	76	—
<i>Perpendiculars</i>								
Frontal perpendicular . . .	—	24	28.5	27	22	24.5	30	—
Parietal perpendicular . . .	—	30	26.5	26	28.5	23	25	—
Occipital perpendicular . . .	27	23.5	29	22	29	21	27.5	27
<i>Hemichords</i>								
n-fpp	—	50.5	48	53	45	61.5	68.5	—
fpp-b	—	72.5	76.5	73.5	71	58	67	—
b-ppp	—	77	58.5	69.5	56	62	68	—
Ppp-1	—	64.5	71	58.5	62	59	63.5	—
l-opp	51	46	47	47	53	44	55	51
opp-0	63	59	65.5	52.5	52.5	52	49	49

(B) Indices

Calvarial height index . . .	64.91	65.20	63.74	67.79	66.25	56.73	60.87	
Bregma position index . . .	—	58.77	56.14	61.35	57.50	53.22	56.25	
Lambda calvarial height index . . .	—	42.39	39.89	40.39	38.86	39.24	40.00	
Frontal perpendicular index . . .	—	20.87	25.68	23.84	20.56	22.27	24.59	—
Parietal perpendicular index . . .	—	23.72	22.46	22.22	25.22	20.54	20.49	
occipital perpendicular index . . .	26.47	24.48	33.72	24.44	29.00	24.42	28.06	27.55

DESCRIPTIONS OF THE DIAGRAPHIC TRACINGS (Mid-Sagittal Profile view) OF THE ADITTANALUR SKULLS

Fig. I—The linear measurements on the skull No. 3.

Fig. II—The angular measurements on the skull No. 3.

Fig. III—The linear measurements on the skull No. 5.

Fig. IV—The angular measurements on the skull No. 5.

Fig. V—The linear measurements on the skull No. 7.

Fig. VI—The angular measurements on the skull No. 7.

Fig. VII—The linear measurements on the skull No. 8.

Fig. VIII—The angular measurements on the skull No. 8.

Fig. IX—The linear measurements on the skull No. 10.

Fig. X—The angular measurements on the skull No. 10.

Fig. XI—The linear measurements on the skull No. 11.

Fig. XII—The angular measurements on the skull No. 11.

Fig. XIII—The linear measurements on the skull No. 13.

Fig. XIV—The angular measurements on the skull No. 13.

DESCRIPTIONS OF THE DIOPTOGRAPHIC TRACINGS (SUPERIMPOSED)

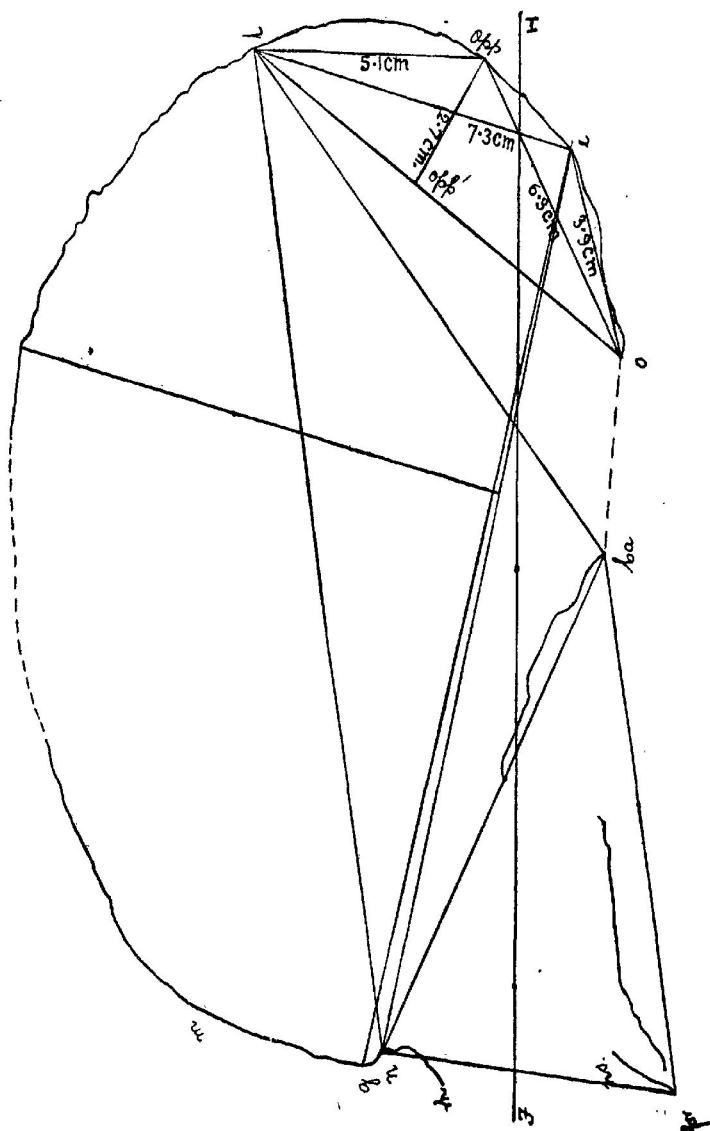
Diagram No. 1	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 7 over Oraon, Kol and Munda skulls.
Diagram No. 2	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 13 over Oraon, Kol and Munda skulls.
Diagram No. 3	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 3 over Oraon, Kol and Munda skulls.
Diagram No. 4	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 7 over Pulayan, Kadar and Paniyan skulls.
Diagram No. 5	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 3 over Pulayan, Kadar and Paniyan skulls.
Diagram No. 6	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 13 over Pulayan, Kadar and Paniyan skulls.
Diagram No. 7	.	.	.	The superimposition of the frontal view of the Adittanalur skull No. 3 over Polachi, Paniyan and Kadar skulls.
Diagram No. 8	.	.	.	The superimposition of the frontal view of the Adittanalur skull No. 7 over Polachi, Paniyan and Kadar skulls.
Diagram No. 9	.	.	.	The superimposition of the frontal view of the Adittanalur skull No. 7 over Harappa and Maski skulls.
Diagram No. 10	.	.	.	The superimposition of the frontal view of the Adittanalur skull No. 13 over Harappa and Maski skulls.
Diagram No. 11	.	.	.	The superimposition of the profile view of the Adittanalur skull No. 7 over Harappa and Maski skulls.
Diagram No. 12	.	.	.	The superimposition of the frontal view of the Adittanalur skull No. 7 over Harappa and Maski skulls.

DESCRIPTIONS OF THE DIAGRAPHIC TRACINGS (SUPERIMPOSED)

Diagram No. 13	.	.	.	The superimposition of the mid-sagittal profile view of the Adittanalur skull No. 7 over Veddah and Australian skulls.
Diagram No. 14	.	.	.	The superimposition of the mid-sagittal profile view of the Adittanalur skull No. 3 over Veddah and Australian skulls.

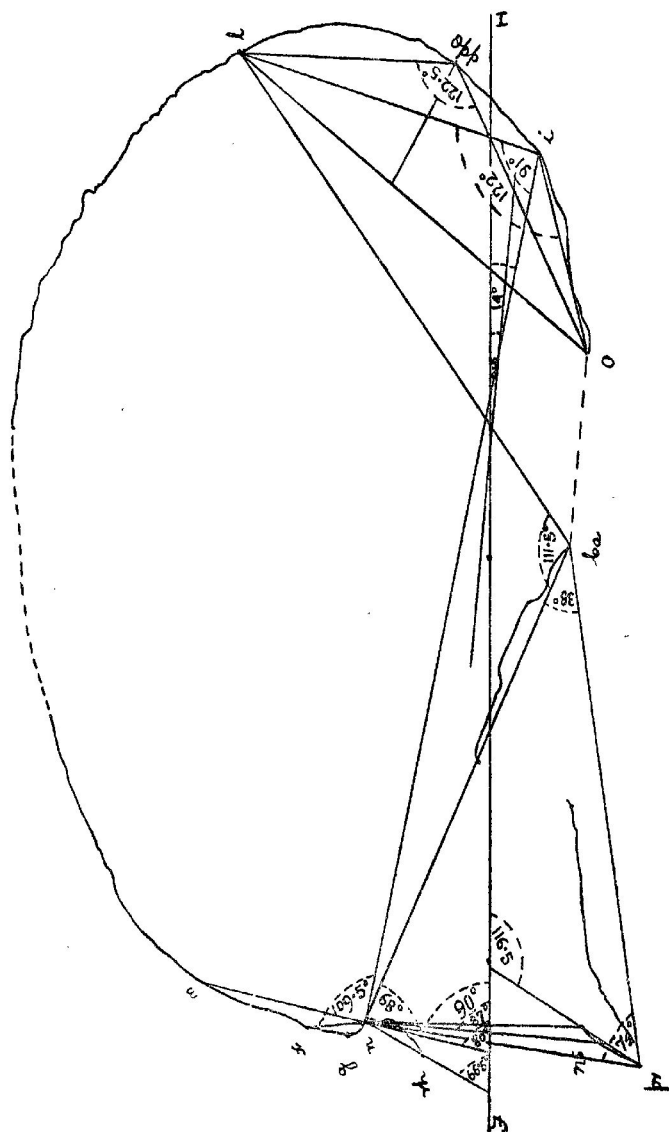
BIBLIOGRAPHY

- Buxton, L. H. D. D. & Rice, D. T. Report on the Human remains found at Kish (with preface by S. Langdon) -Jr. Roy. Anth. Inst., Vol. LXI., 1931.
- Chatterjee, B. K. Data (unpublished) on Polachi, Paniyan, Pulayan, Kadar.
- Chatterjee, B. K. & Mitra, A. K. Data (unpublished) on Oraon, Munda, Bhima, Kharia.
- Coon, C. Southern Arabia. 'A Problem for the Future'. In Studies in the Anthropology of Oceania and Asia, 1943. Peabody Museum Paper of American Archaeology & Ethnology, Harvard University, Vol. XX, 1943.
- Dixon, R. B. The Racial History of Mankind, New York, 1923.
- Giuffrida-Ruggieri V. (Translated in English from Italian by Haran Chandra Chakladar). The First outlines of a Systematic Anthropology of Asia, University of Calcutta, Anthropology Paper No. 6, 1921.
- Guha, B. S. The Racial Affinities of the People of India, Census of India, Vol. I, pt. III, Delhi, 1935.
- Guha, B. S. An outline of the Racial Ethnology of India, reprinted from An Outline of the Field Sciences of India. Published by the Indian Science Congress Association, Calcutta 1937.
- Guha, B. S. & Basu, P. C. Report on the human remains excavated at Mohenjodaro in 1928-29 in E. J. H. Mackay. Further Excavations at Mohenjodaro, Delhi, 1938.
- Henderson, J. R. Preface, Catalogue of Prehistoric Antiquities from Adichanallur and Perambair by A. Rea, pt. 3, 1915.
- Keith, A. Report on the human remains. In 'Ur' Excavations, Vol. I, Alubaid by Hall, H. R. & Wooley C. L., 1927.
- Krogman, W. M. Cranial types from Alishar Huyuk and their relations to other racial types, ancient and modern of Europe and Western Asia. In Osten H. H. with contributions by Krogman W. M., pt. III, Oriental Inst., Publication XXX, 1937.
- Krogman, W. M. The Cranial types at Alishar. In Alishar, Huyuk, seasons 1928-29 Oriental Inst. Publication by Schmidt, E. F. 1933.
- Krogman, W. M. & Sassaman W. H. Skull found at Chanhu-daro, In Chanhu-Daro Excavation 1935-36 by Mackay, E. J. H. Published by American Oriental Society, New Haven, Connecticut, 1943.
- Lapicque, L. Bulletin Museum d. Historie Naturelle, 1905, Tome Quzieme.
- Mitra, A. K. & Chatterjee, B. K. Data (unpublished) on Kol, Santal, Juang, Bhuia, Paharia.
- Mukherjee, R., Rao, C. R., Trevor, J. C. The ancient inhabitants of Jebel Moya, Cambridge, 1955.
- Osman Hill, W. C. The Physical Anthropology of the Existing Veddas of Ceylon, pt. I, Ceylon, Jr. of Science, III, 1941.
- Peake, H. Racial Elements concerned in the first siege of Troy, Roy Anthrop. Inst., XLVI, 1916.
- Rea, A. Archaeological Survey of India, Annual Report, Prehistoric Antiquities in Tennevelly 1902-03.
- Sarkar, S. S. Human Remains from a Male Cemetery, Trans. Bose Res. Inst., X, 1934-35.
- Sarkar, S. S. The Male of the Rajmahal Hills, Calcutta, 1938.
- Sergi, G. Description of some skull from the North Kurgan Anan in Pumpelly, Explanations in Turkistan. Vol. 11, Washington, 1908.
- Sewell, R. B. S. & Guha, B. S. Report on the Human Remains excavated at Mohenjodaro and the Indus Valley Civilization in Mohenjodaro edited by Marshall John, London, 1931.
- Sewell, R. B. S. & Guha B. S. Excavations in Beluchistan, Mem. Arch. Surv. Ind., No. 35, App. V, Simla, 1928.
- Schmidt, E. F. Tepe Hissar Excavations 1931. Mus. Jr. Univ. Penn., XXIII, 1933.
- Smith, E. Essays on the Evolution of Man, 2nd Ed., 1927.
- Sastri, K. A. Nilkanta A History of South India. Published by Oxford University Press, Madras, 1955.
- Stoessiger, Brendo, N. A study of the Badarian Crania, Biometrika. Vol. XIX, 1927.
- Thurston, E. Caste & Tribes of South India, Introduction Vol. I, Madras, 1908.
- Wagner, K. The Craniology of the Oceanic Races, Oslo, 1937.
- Zuckerman, S. The Adittanalur skulls, Bull. Madras Govt. Museum, III, pt. I (New Series), 1930.



Glabella-nasion line (g—l) = 17.35 cm.
 Calvarial height = 11.1 cm.
 Facial height (n—pr) = 9.6 cm.
 Facial depth (na—pr) = 10.05 cm.

Occipital Chord (l—o) = 9.90 cm.
 Calvarial base line (n—l) = 17 cm.
 Cranial base line (n—ba) = 10.4 cm.
 Lambda-calvarial base line (n—l) = 18.8

*Angles on Frontal Quadrilateral*
 $\angle l. ba. n = 111.9^\circ$
Angles on Facial triangle
 $\angle pr. n. ba = 94^\circ$
 $\angle n. ba. pr. = 38^\circ$
 $\angle ba. pr. n = 74^\circ$
Other Angles
 Occipital curvature angle $\angle l. opp. o = 122.8^\circ$

 Occipital flexion angle $\angle l. i. o = 132^\circ$
Angles with FH as base
 Nasal profile angle (n-as on FH) $= 90^\circ$

 Primal profile angle (p-pr on FH) $= 87^\circ$

 Alveolar profile angle (a-al on FH) $= 80^\circ$

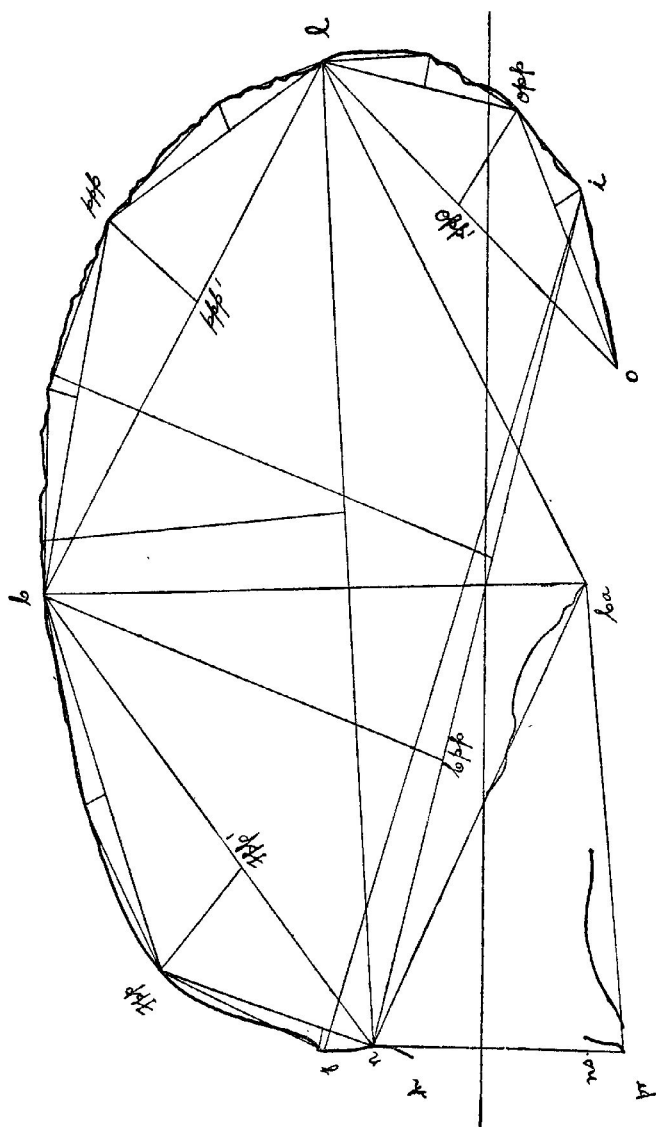
 Profile angle of nasal root (n-rh on FH) $= 66.5^\circ$

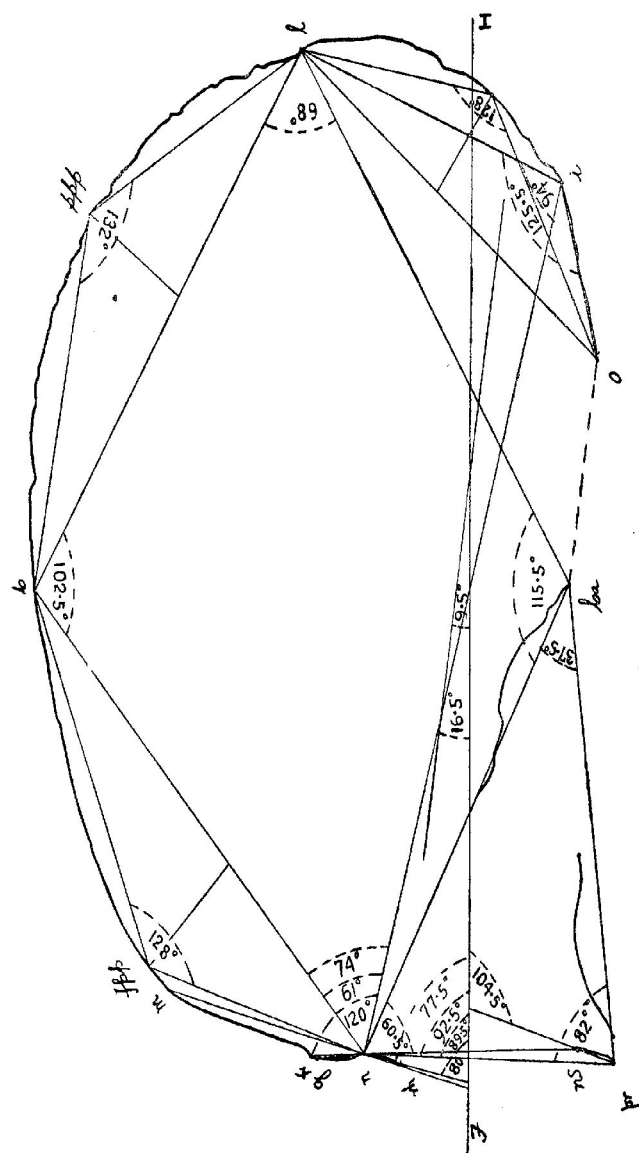
 Alveolar profile angle (pr-as on FH) $= 116.3^\circ$

 Inclination of occ. foramen (ba-o) $= 6.5^\circ$

 Calvarial base angle (u-i on FH) $= 14^\circ$
Angles with n-i as base
 Frontal angle at Schwalbe (fr-on n) $= 109.5^\circ$

 Lambda angle of Schwalbe (l-i on n) $= 91^\circ$

[illegible]



Angles on Cranial Quadrilateral

\angle ba. n. b.	=	74°
\angle n. b. l.	=	102.5°
\angle l. ba.	=	68°
\angle l. ba. n.	=	115.5°

Angles on Facial Triangle

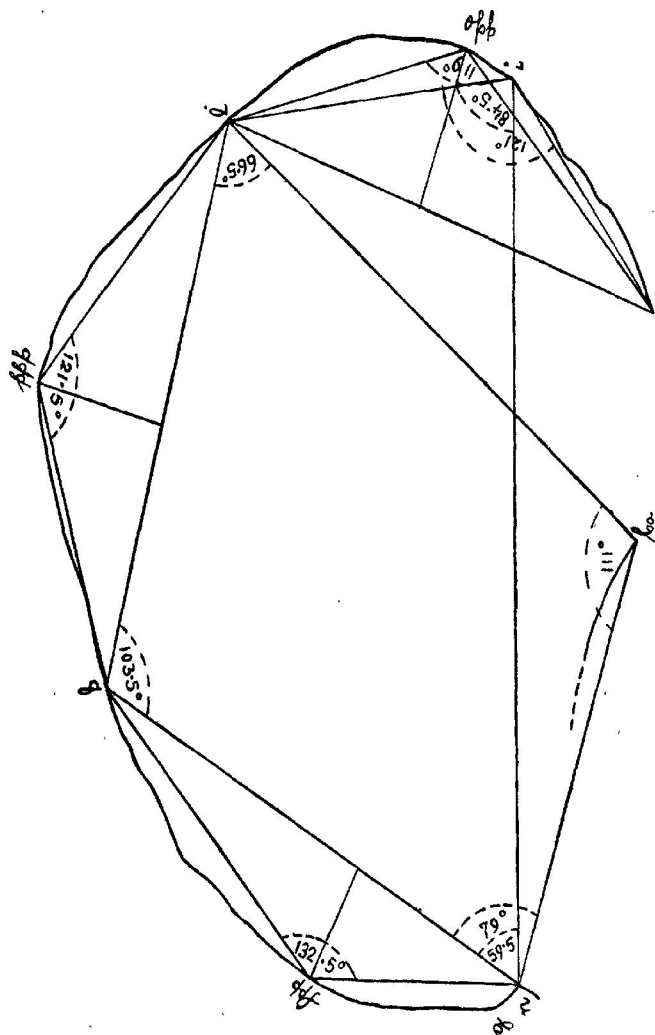
\angle n. pr. ba.	=	82°
\angle pr. ba. n.	=	37.5°
\angle ba. n. pr.	=	60.5°
Frontal curvature angle	=	128°
Parietal " "	=	132°
Occipital " "	=	126°

Angles with FH as a base

1. Nasal profile angle (n-na)	=	92.5°
2. " " (n-pr)	=	89°
3. " " (pr-na)	=	77.5°
4. Profile angle of nasal roof (n-rh)	=	80°
5. Alveolar Profile angle (pr-na)	=	104.5°
6. Inclination of occ. foramen (ba-o)	=	9.5°
7. Calvarial base angle (n-i)	=	18.5°

Angles with n=i as base

8. Frontal angle of Schwalbe (f-na)	=	180°
9. " " (b-na)	=	61°
10. " " (l-i)	=	64°
11. " " (l-i)	=	64°



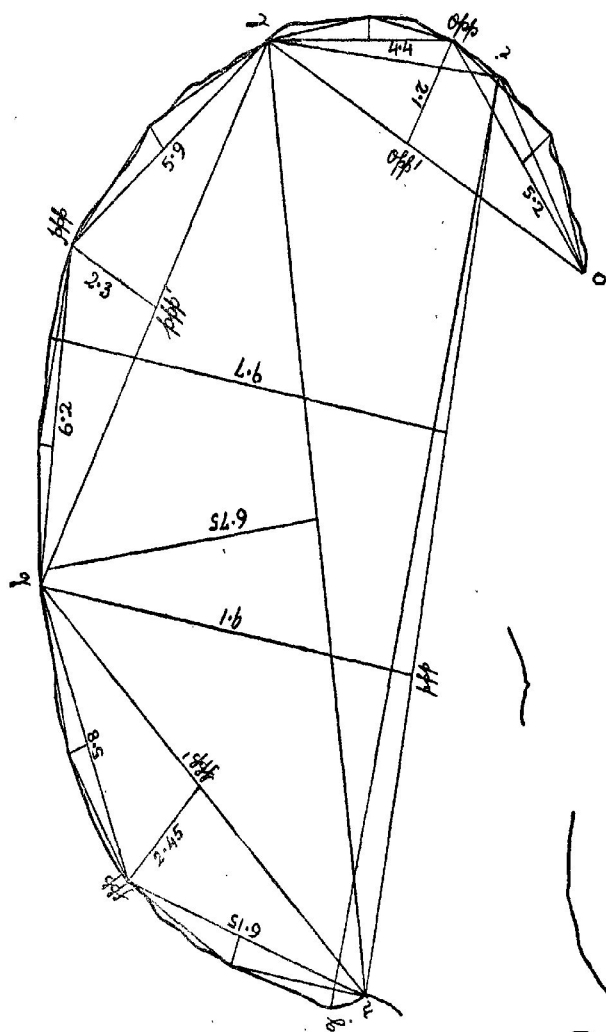
Angles with n-i as base

Bregma angle of Schwalbe (b. n. i)=69.5°
 Lambda angle of Schwalbe (l. i. n)=84.5°

Angles on Cranial Quadrilateral

$\angle n. b. i = 103.5^\circ$
 $\angle b. l. ba = 66.5^\circ$

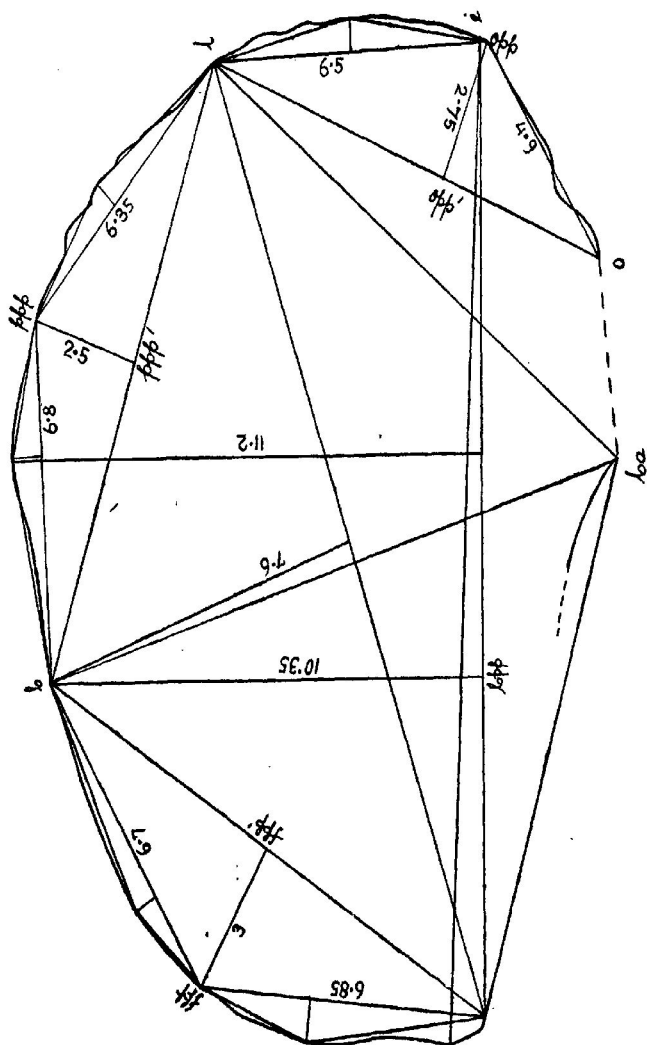
$\angle l. ba. n = 111^\circ$
 $\angle ba. n. b = 79^\circ$
 Frontal curvature angle (n. fpp. b)=132.5°
 Parietal curvature angle (b. ppp. i)=121.5°
 Occipital curvature angle (l. opp. o)=119°
 Occipital flexion angle (l. i. o)=121°



Frontal Chord (a-t)	= 10.9 cm.
Parietal Chord (b-l)	= 11.2 cm.
Occipital Chord (l-o)	= 8.05 cm.
Calvarial base line (a-l)	= 16.96 cm.
Lambda-calvarial base line (a-l)	= 16.2 cm.
Bregma-position line (b-bpp)	= 9.1 cm.
Glabella-inion line (g-i)	= 17.3 cm.
Calvarial height	= 9.7 cm.
Lambda-calvarial height	= 9.75 cm.

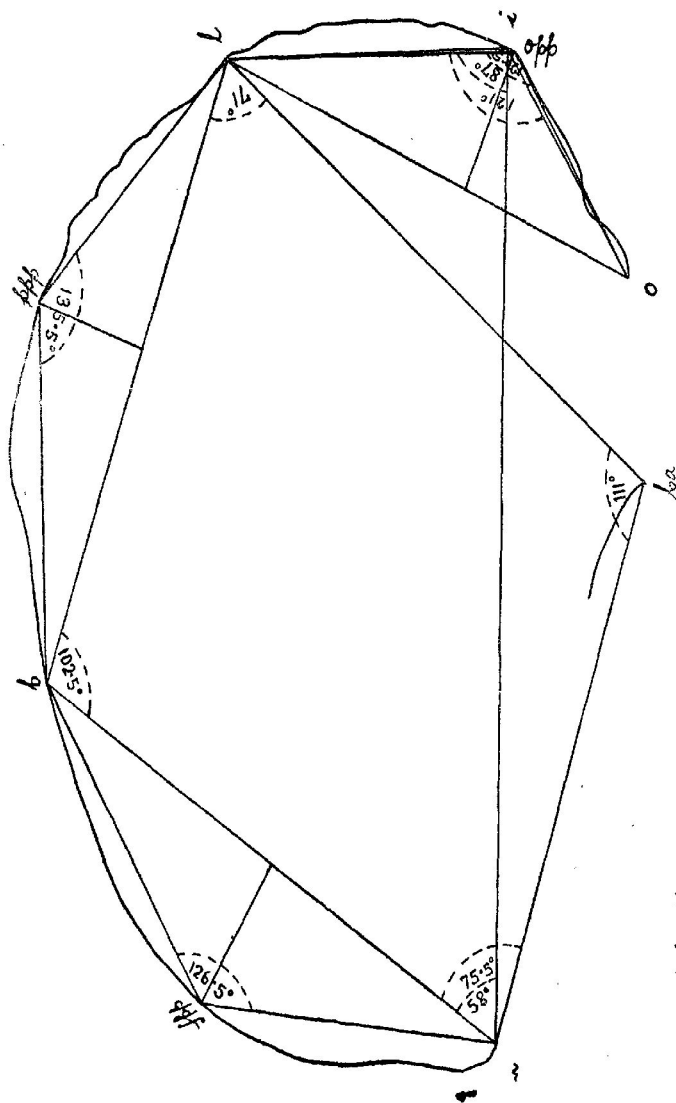
Hemichords	
fpp-fpp'	= 9.45 cm.
ppp-ppp'	= 2.3 cm.
opp-opp'	= 2.1 cm.
Perpendiculars	
n-fpp	= 6.15 cm.
fpp-b	= 2.5 cm.
lpp-b	= 6.2 cm.
ppp-l	= 5.9 cm.
lpp-l	= 4.4 cm.
opp-o	= 5.2 cm.

FIG. XI—ADT 11



<i>Hemichords</i>	n-fpp	0.85 cm.
	fpp-b	0.7
	b-ppp	0.7 cm.
	ppp-l	0.30
	l-opp	0.5 cm.
	opp-o	4.9 cm.
<i>Perpendiculars</i>		
	fpp-fpp*	3 cm.
	ppp-ppp	2.5 cm.
	opp-opp	2.75

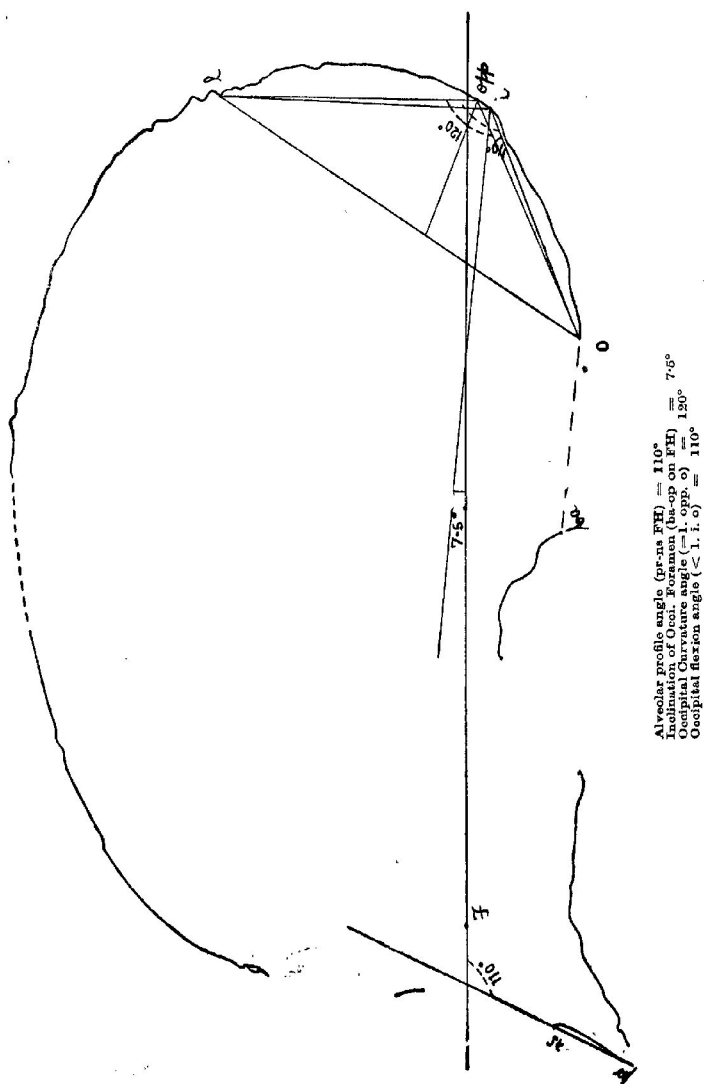
Frontal Chord (n=3)	=	12.2 cm.
Basal Chord (n=3)	=	12.2 cm.
Occipital Chord (n=2)	=	9.9 cm.
Occipital base line (n=3)	=	18.3 cm.
Lambda-cervical base line (n=1)	=	19.0 cm.
Cranial base line (n=3a)	=	10.9 cm.
Glabella-cision line (g=1)	=	18.8 cm.
Calvarial height	=	11.2 cm.
Lambda-cervical height	=	7.6 cm.
Bregma-position line (b=1hyp)	=	14.2 cm.
Bregma-cision line (b=2)	=	14.2 cm.
Bregma-cision line (b=3a)	=	3.7 cm.
Lambda-cision line (l=1a)	=	12.2 cm.

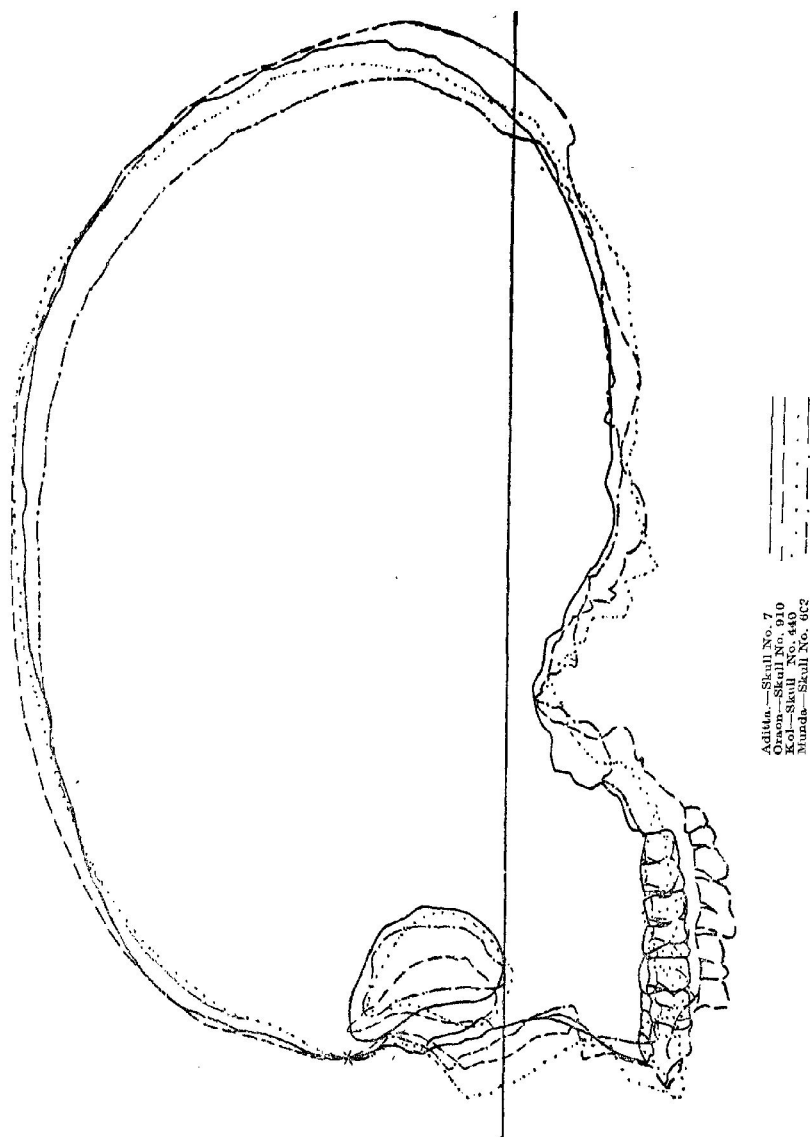


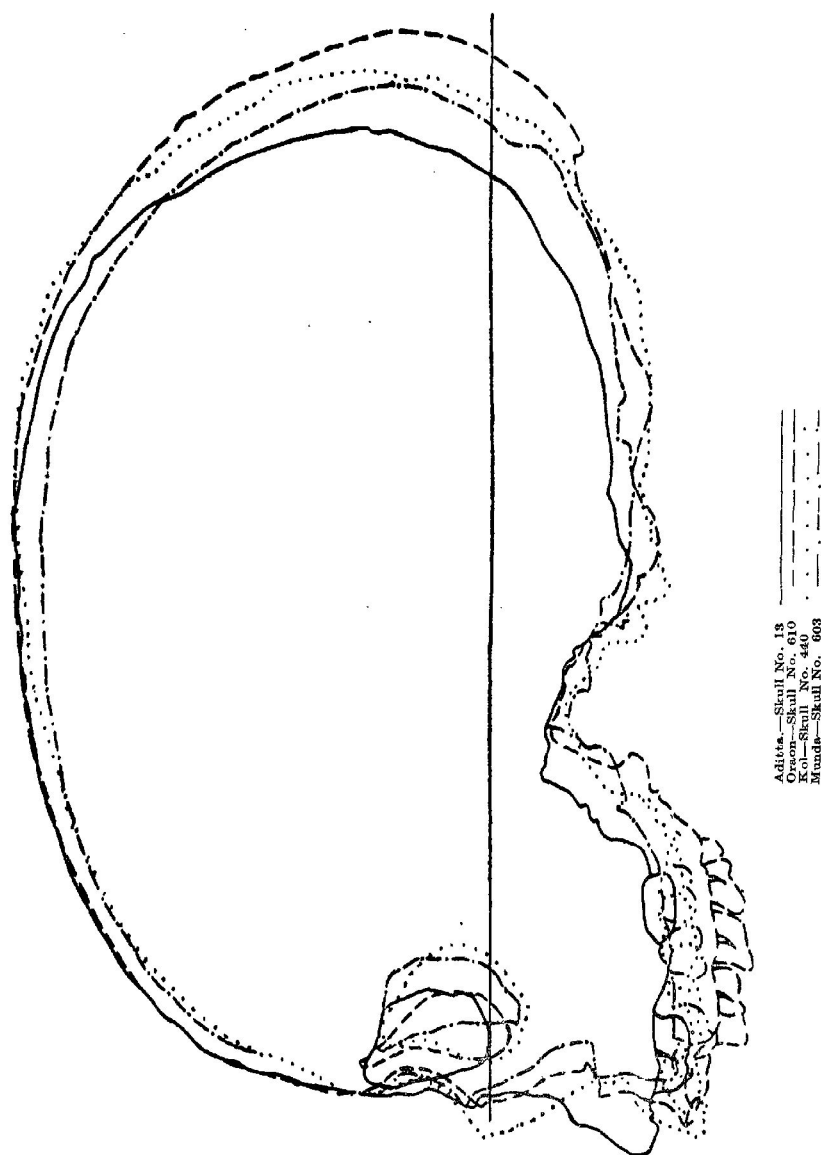
Angles with n-i as base
 Frontal angle of Schwalbe (b. n. i) = 68°
 Parietal angle of Schwalbe (i. i. n) = 87°
 Angles on Crural Quadrilateral
 ∠ n. b. i. = 102.5°
 ∠ i. b. n. = 70°
 ∠ i. b. i. = 111°
 ∠ b. a. n. b. = 75.5°

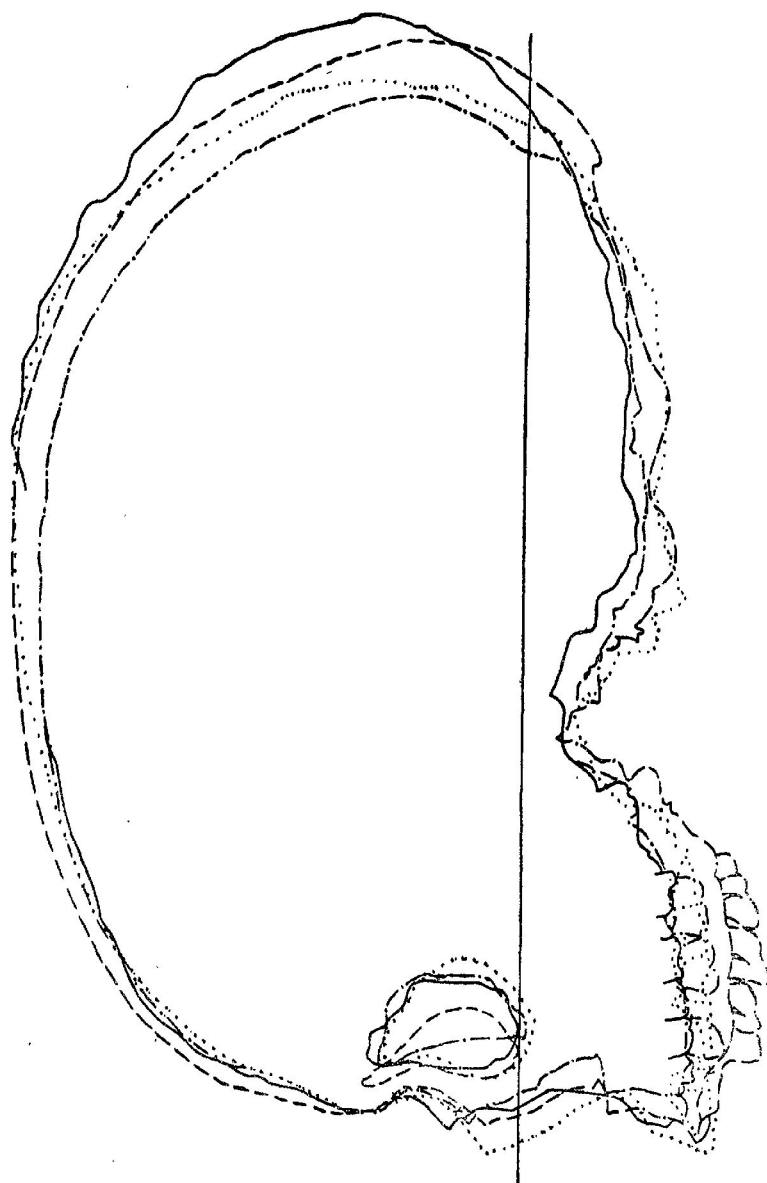
Other Angles
 Frontal curvature angle ∠ n. i. p. b. = 129.5°
 Parietal curvature angle ∠ b. p. p. i. = 135.5°
 Occipital curvature angle ∠ i. o. p. o. = 130.5°
 Occipital flexion angle ∠ i. i. o. = 131°

FIG. XIV—ADT—13
(before reconstruction of the Skull)

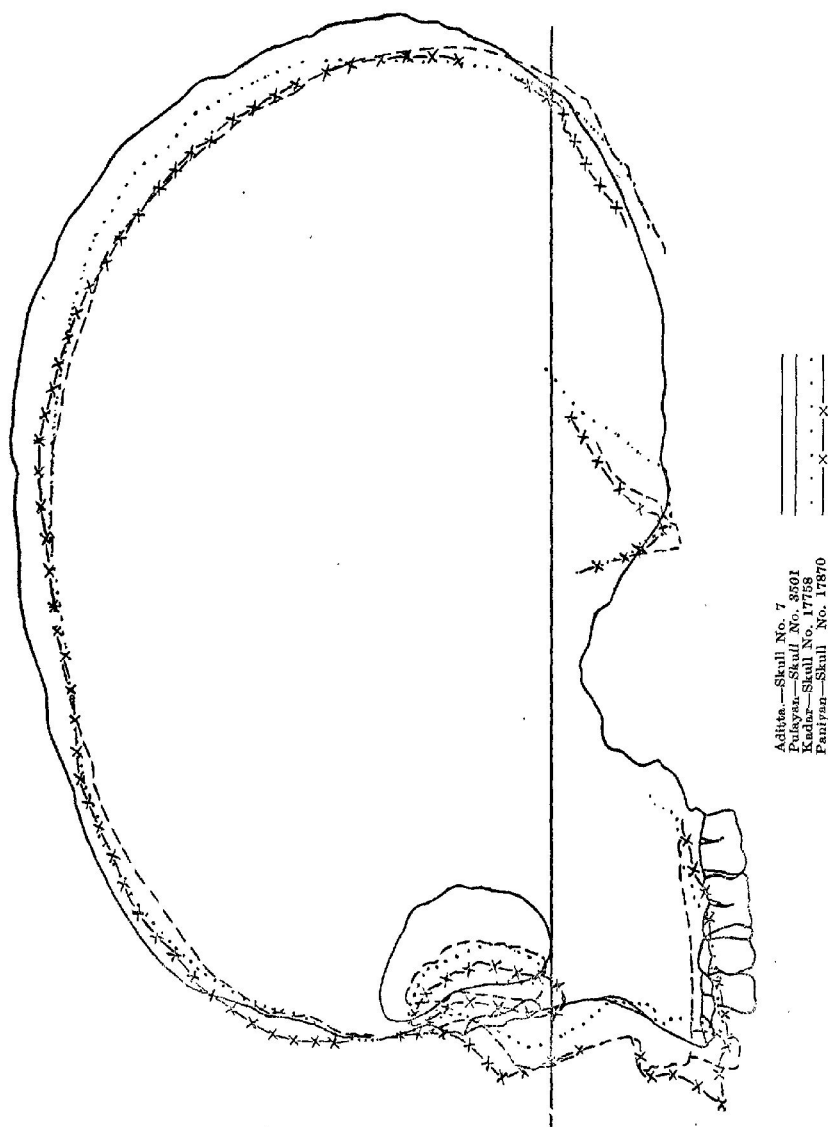


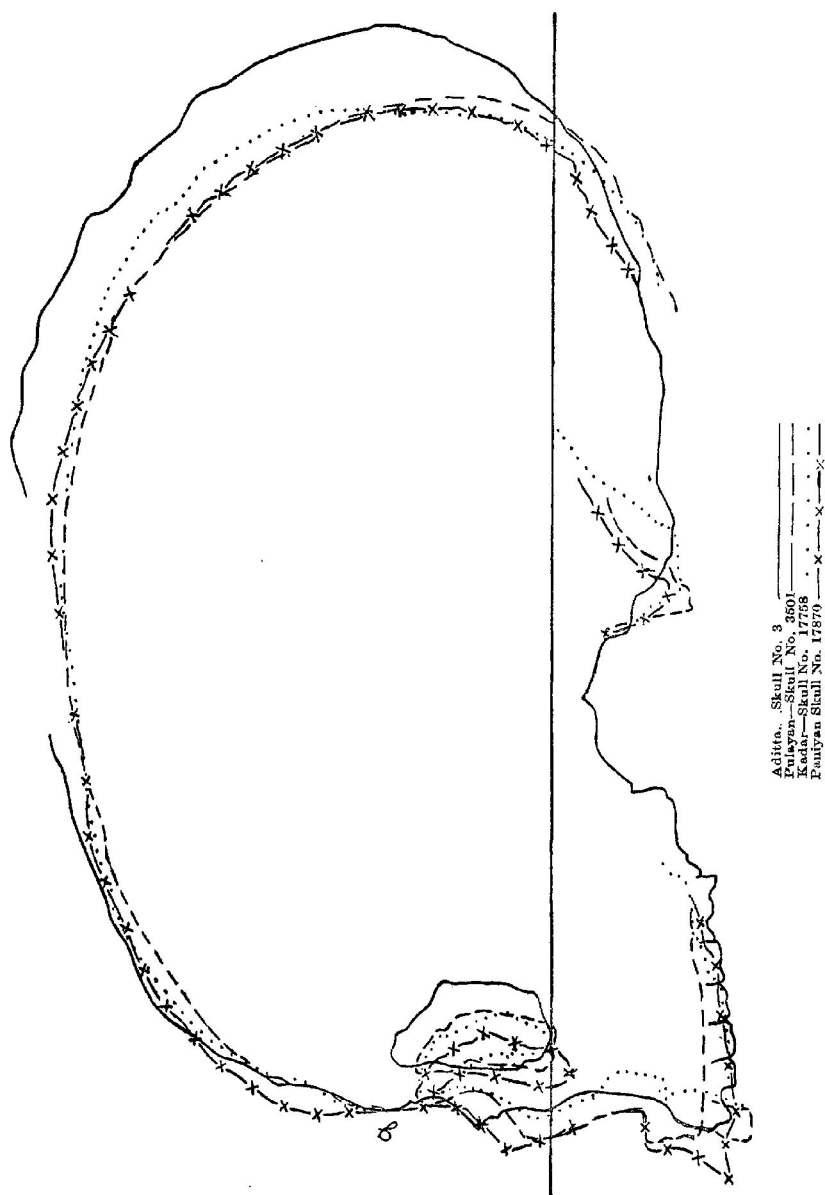


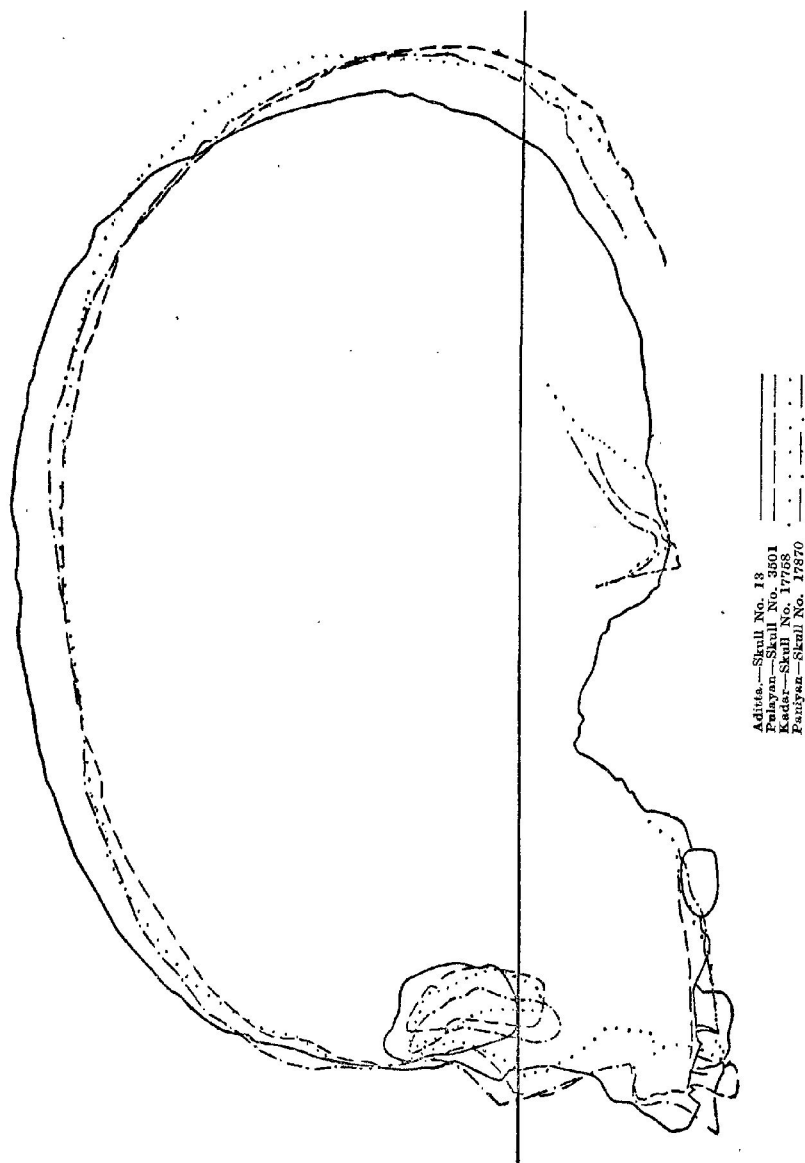


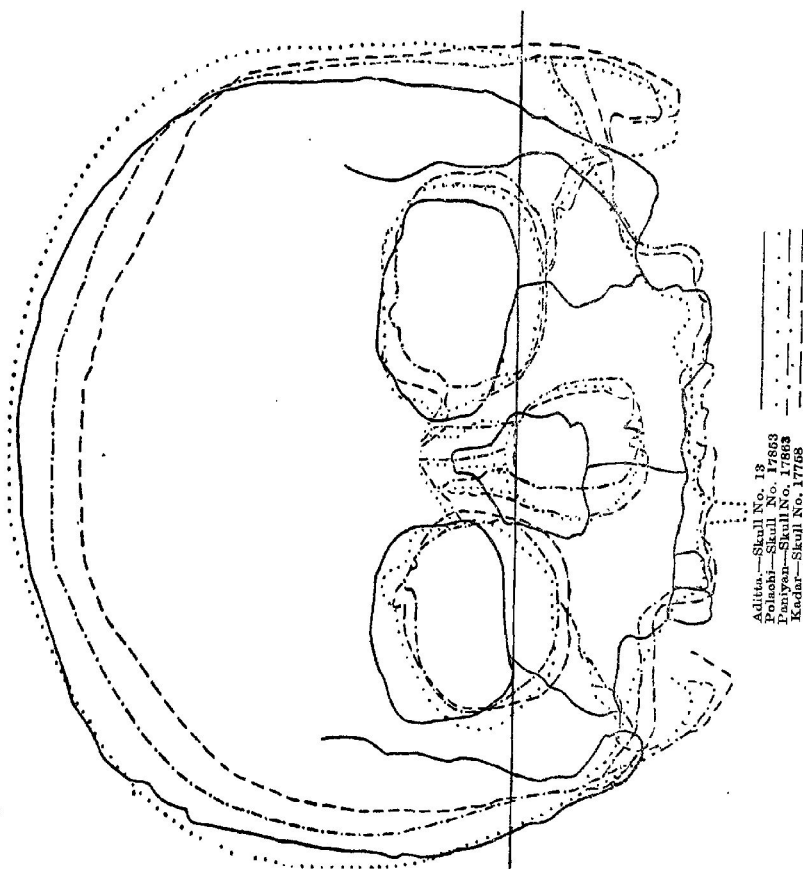


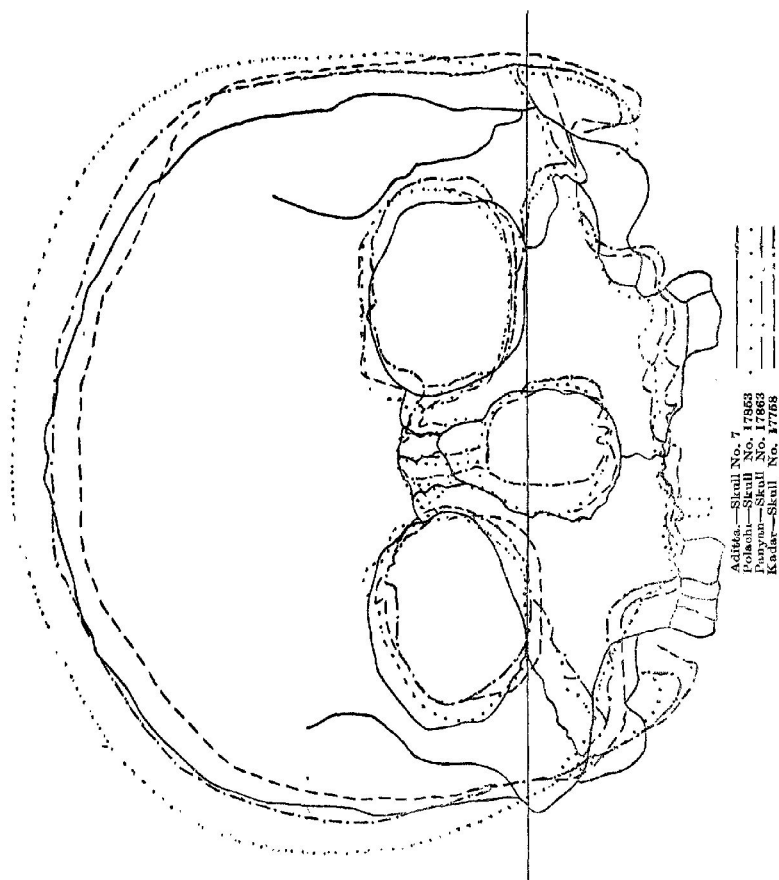
Aditta—Skull No. 3	_____
Kooda—Skull No. 610	_____
Kooda—Skull No. 611	_____
Munda—Skull No. 602	_____

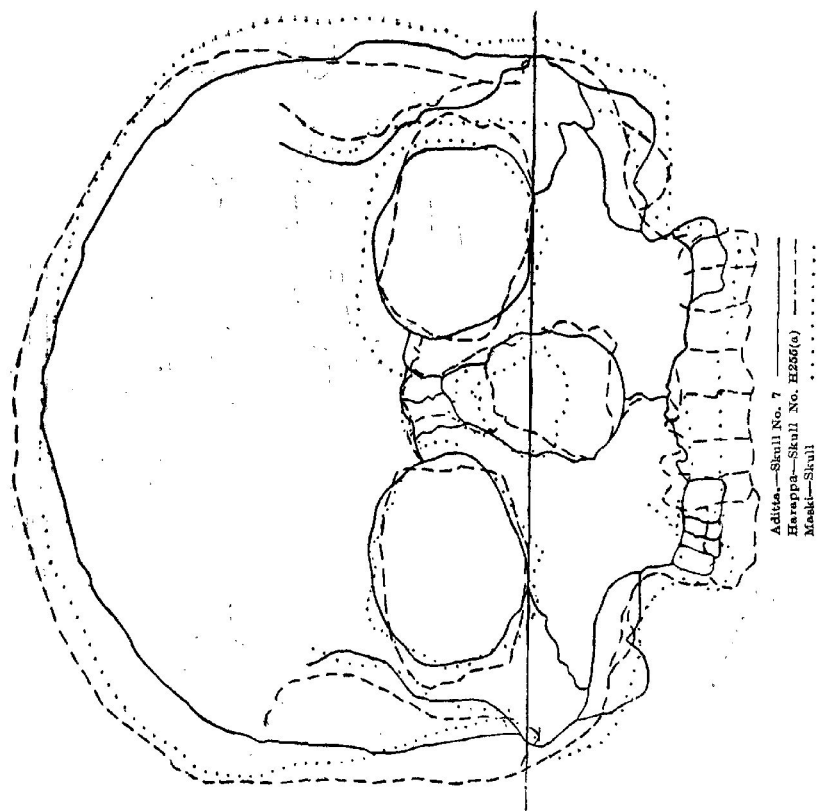


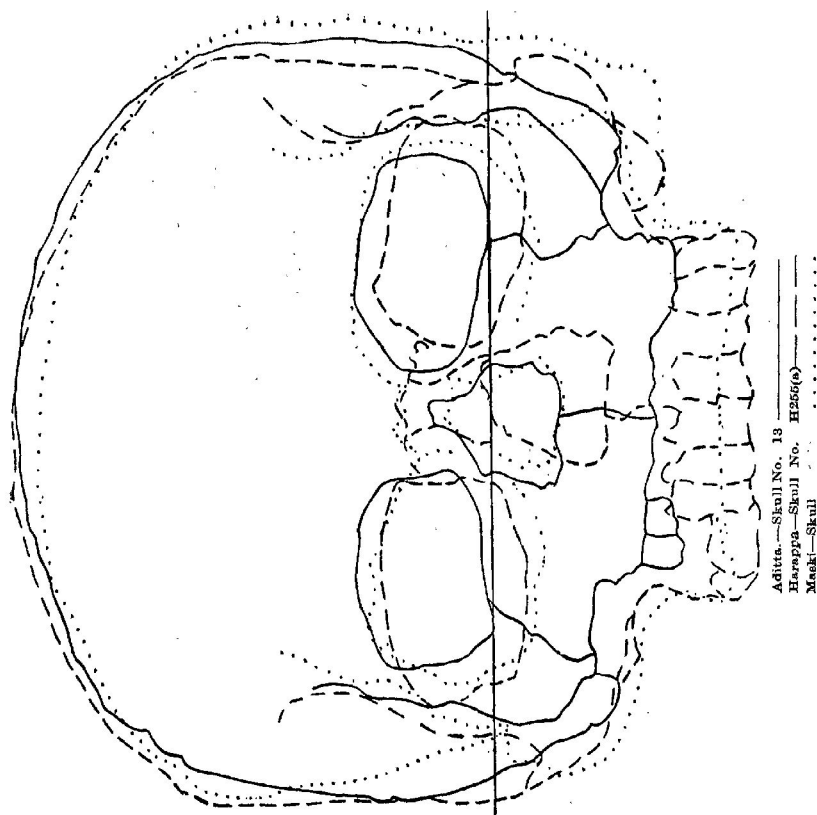


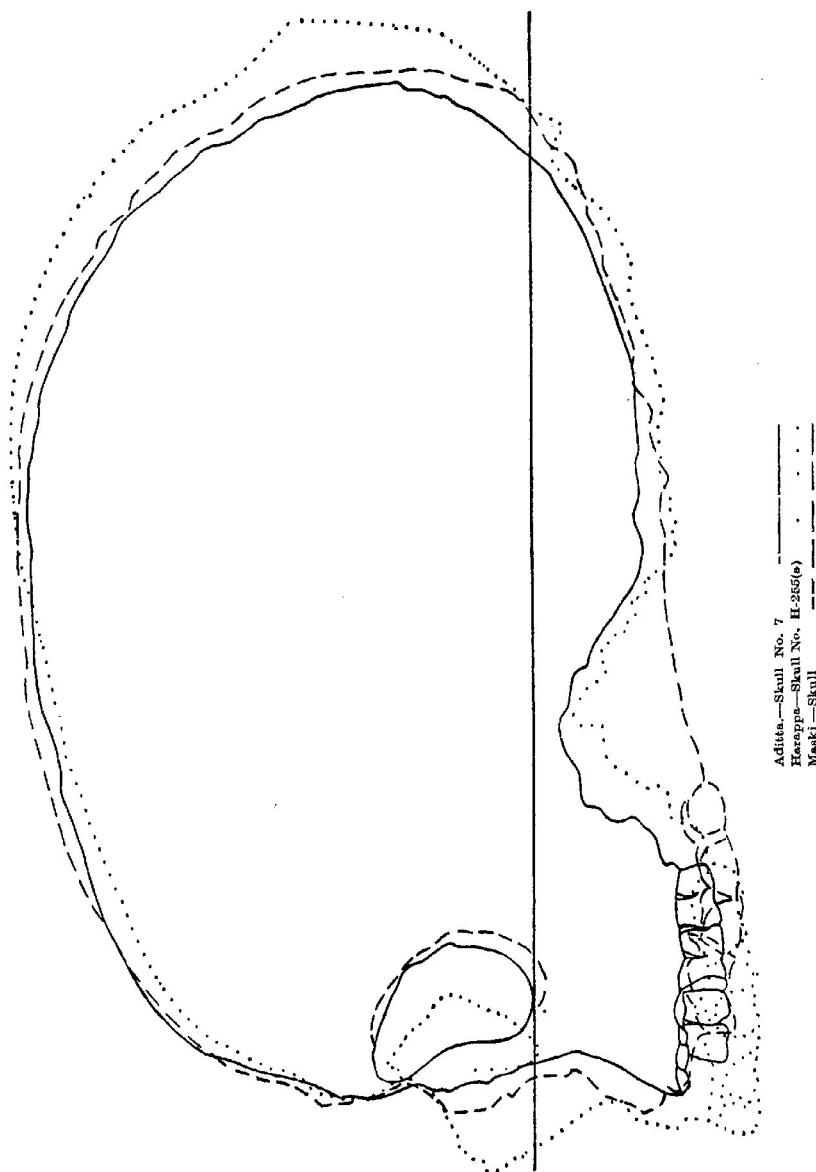


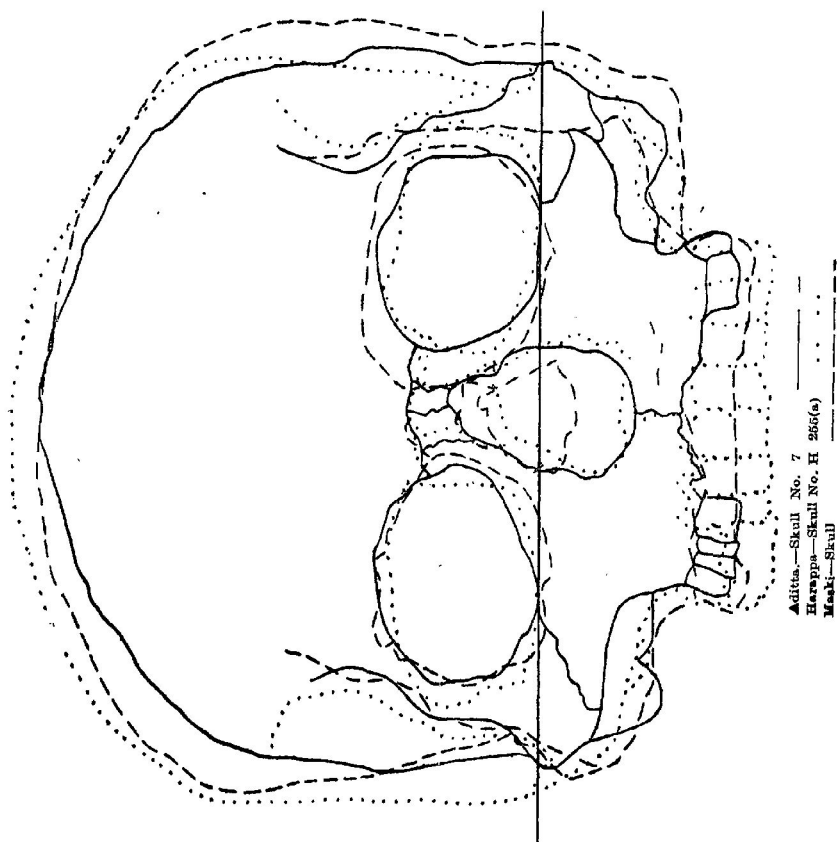




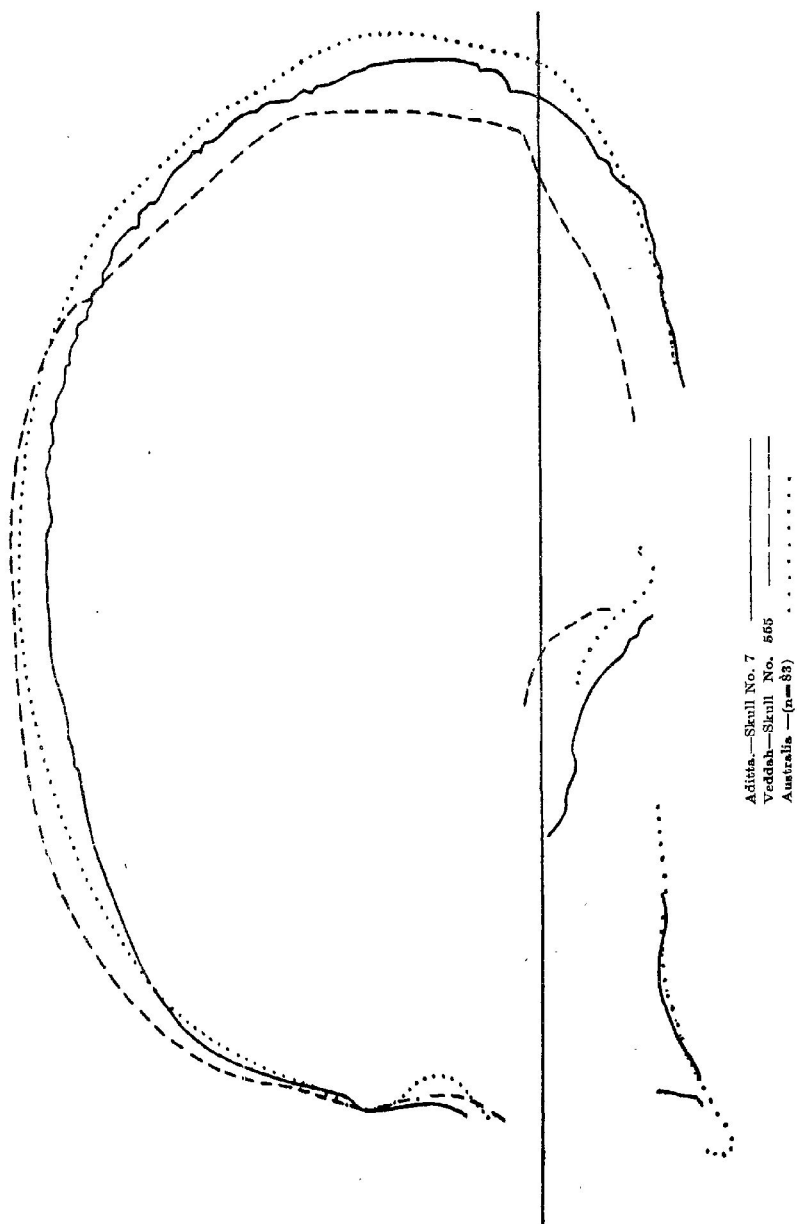


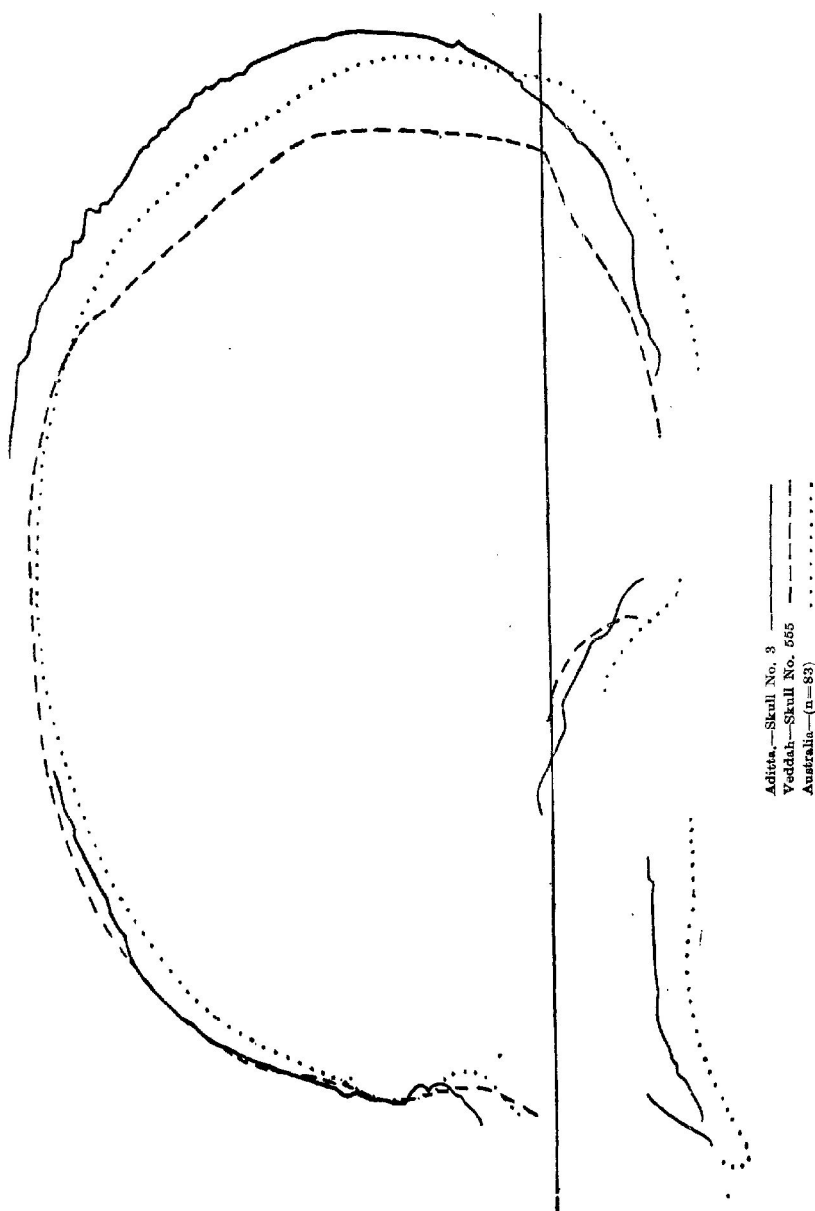






Aditta.—Skull No. 7
Harappa.—Skull No. H 256(a)
Mooki.—Skull





DESCRIPTION OF PLATES

PLATE	DESCRIPTION		PLATE	DESCRIPTION	
I	Skull	A D T 1 Occipital view	IX	Skull	A D T 9 Fig. 1 Frontal view Fig. 2 Basal view Fig. 3 Vertical view Fig. 4 Occipital view Fig. 5 Lateral left view Fig. 6 Lateral right view
II	Skull	A D T 2 Fig. 1 Frontal view Fig. 2 Occipital view Fig. 3 Vertical view Fig. 4 Lateral right view Fig. 5 Lateral left view	X	Skull	A D T 10 Fig. 1 Frontal view Fig. 2 Occipital view Fig. 3 Vertical view Fig. 4 Basal view Fig. 5 Lateral right view Fig. 6 Lateral left view
III	Skull	A D T 3 Fig. 1 Occipital view Fig. 2 Basal view Fig. 3 Frontal view Fig. 4 Vertical view Fig. 5 Lateral right view Fig. 6 Lateral left view	XI	Skull	A D T 11 Fig. 1 Vertical view Fig. 2 Occipital view Fig. 3 Frontal view Fig. 4 Lateral left view Fig. 5 Lateral right view
IV	Skull	A D T 4 Fig. 1 Lateral right view Fig. 2 Frontal view Fig. 3 Occipital view Fig. 4 Vertical view	XII	Skull	A D T 12 Fig. 1 Frontal view Fig. 2 Vertical view Fig. 3 Basal view Fig. 4 Occipital view Fig. 5 Lateral right view Fig. 6 Lateral left view
V	Skull	A D T 5 Fig. 1 Lateral right view Fig. 2 Lateral left view Fig. 3 Frontal view Fig. 4 Basal view Fig. 5 Vertical view	XIII	Skull	A D T 13 Fig. 1 Frontal view Fig. 2 Vertical view Fig. 3 Occipital view Fig. 4 Basal view Fig. 5 Lateral right view Fig. 6 Lateral left view
VI	Skull	A D T 6 Fig. 1 Occipital view Fig. 2 Basal view Fig. 3 Frontal view Fig. 4 Vertical view Fig. 5 Lateral right view Fig. 6 Lateral left view	XIV	Mandible	A D T 14 Fig. 1 Lateral right view Fig. 2 Lateral left view
VII	Skull	A D T 7 Fig. 1 Occipital view Fig. 2 Vertical view Fig. 3 Frontal view Fig. 4 Basal view Fig. 5 Lateral left view			
VIII	Skull	A D T 8 Fig. 1 Basal view Fig. 2 Occipital view Fig. 3 Vertical view Fig. 4 Lateral right view Fig. 5 Lateral left view			

PLATE NO. I



1



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2



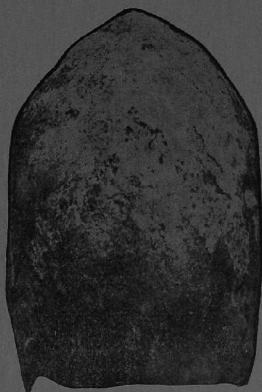
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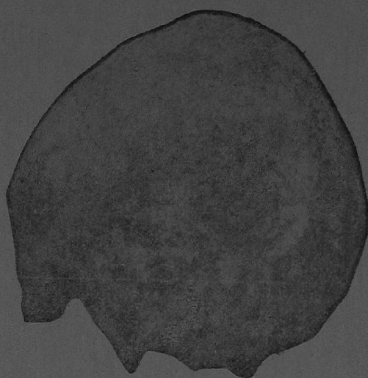
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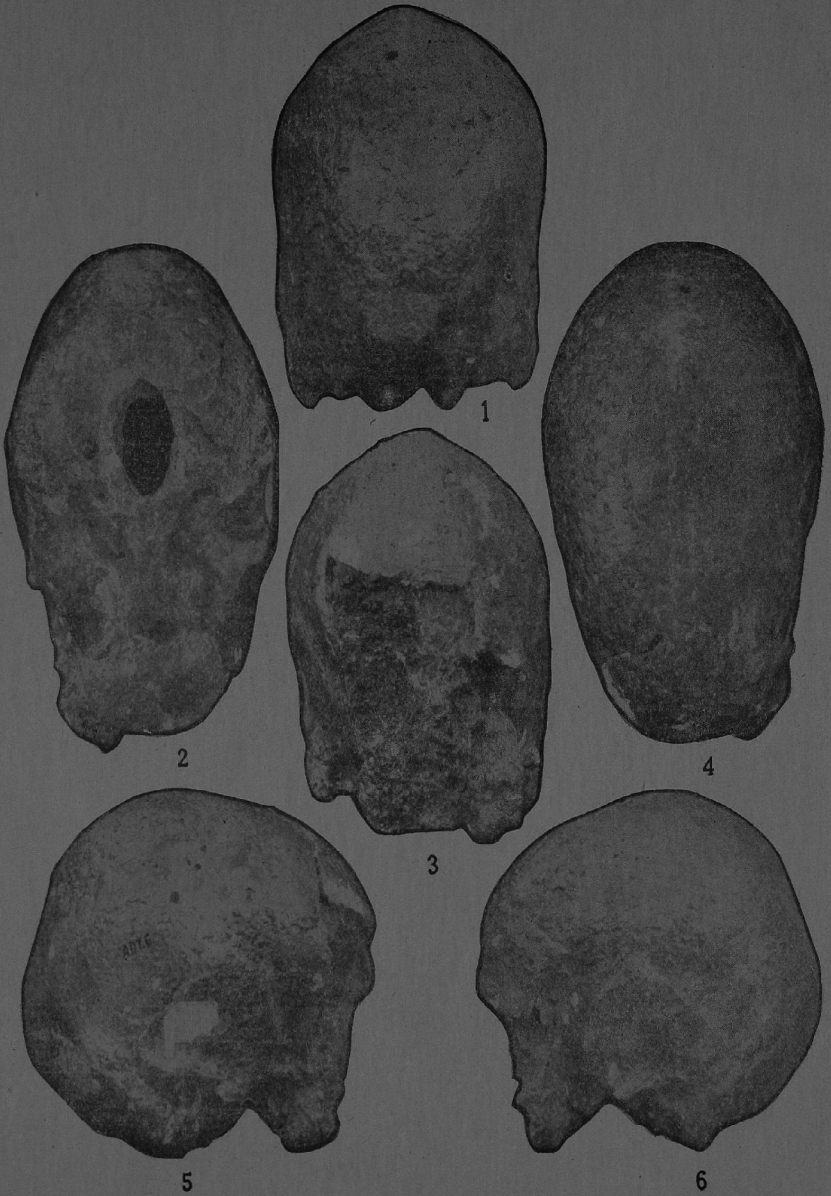
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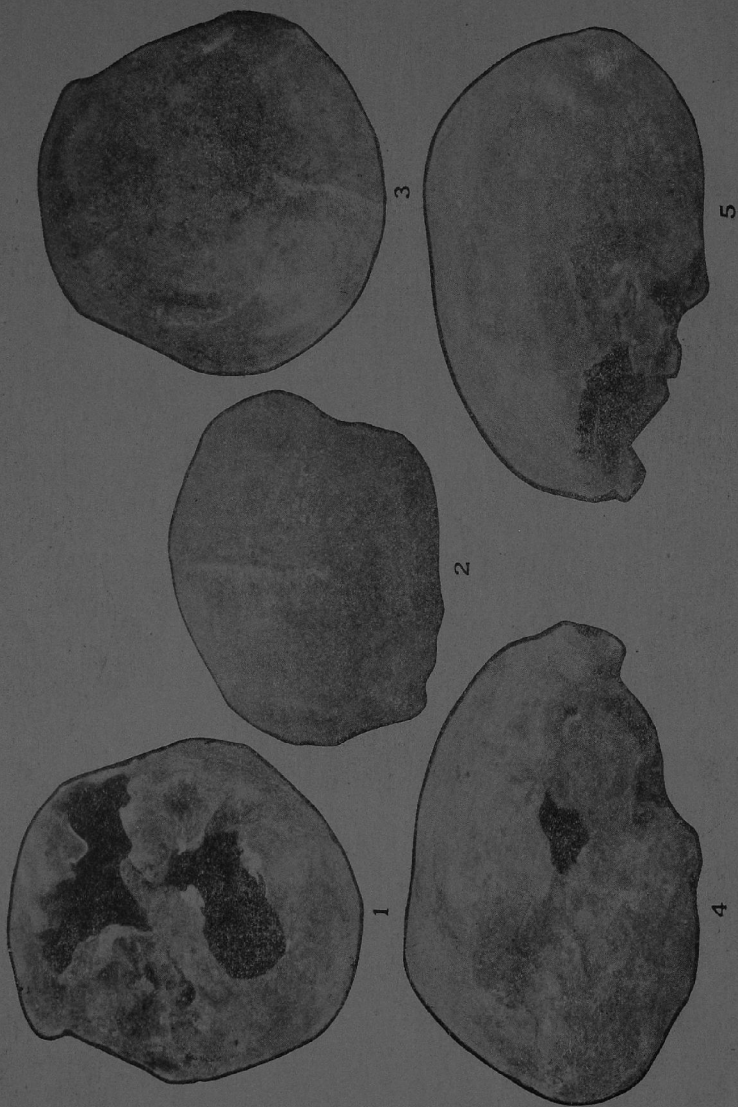
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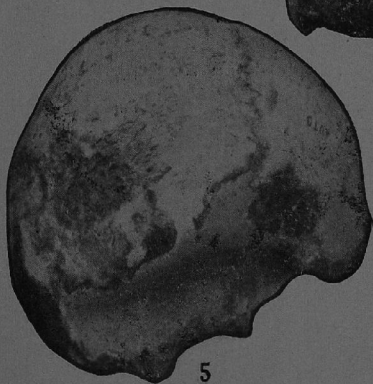
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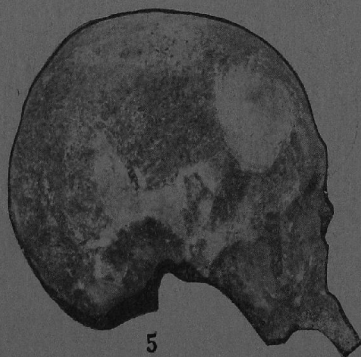
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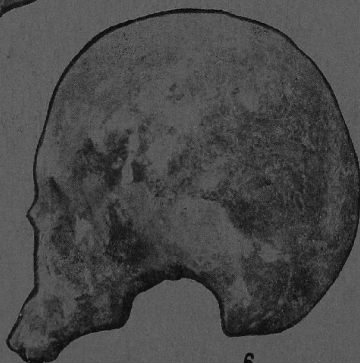
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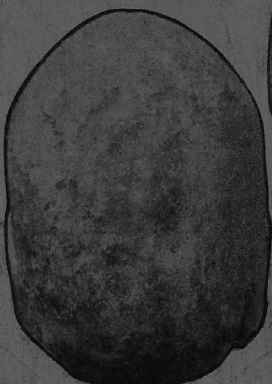
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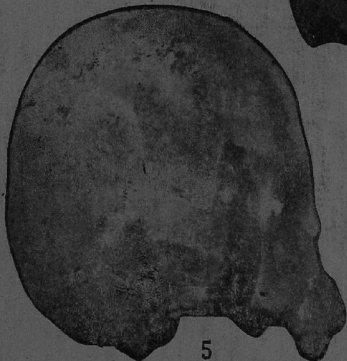
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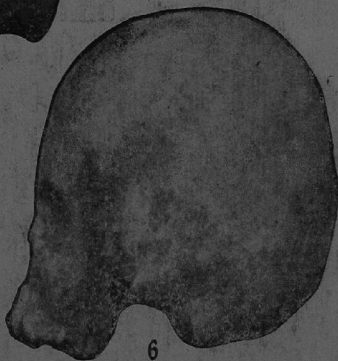
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