A STUDY OF A HUMAN SKELETON FOUND IN ÖKÜZİNİ IN THE PROVINCE OF ANTALYA

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Docent Dr. Kılıç Kökten brought to me for study a human skeleton which he found in an excavation which he made in 1956 in Öküzini (the cave of the ox) near the village of Yağca in the province of Antalya. On this occasion I wish to extend my thanks to him.

According to the information supplied to me by Dr. Kökten this skeleton was found in a layer of 75 centimeters thickness, which occurs below the Chalcolithic stratum. Dr. Kökten states that in this layer including the human skeleton, which was found 25-30 centimeters below the base of the Chalcolithic stratum, he encountered potsherds of handmade, black, burnished coarse pottery and small flint knives and attributes this layer to "*the first ceramic settlement of Turkey*", that is to the Neolithic period.

This skeleton (see figs. 1-10), which was brought to me for study, consists of a skull, long bones, some vertebrae, a broken pelvis and of other bones to be described later on.

AGE AND SEX

In the skull of this individual the basilar suture is completely closed. The third molars have erupted[1] and in all the long bones the epiphyses have united. Therefore this skeleton belongs to an adult individual.

The pars bregmatica of the sagittal suture had been obliterated on the endocranial aspect of the skull, but was subsequently cracked. Other parts of the sagittal suture, the coronal suture and the lambdoid

[1] The skiagram of the left corpus mandibulae shows that the left lower third molar was lost before death. A small attrition facet observed on the tip of protocone of the left upper third molar indicates that the left lower third molar had erupted and had functioned for a short time before being lost.

suture are patent on the inner surface of the skull. In addition to these, sutura sphenoparietalis, sutura sphenosquamosa, sutura squamosa, sutura perietomastoidea and sutura occipitomastoidea are open on the endocranial aspect of the brain case. On the ectocranial surface of the skull all the sutures are seen to be open. Thus, this skeleton belongs to an individual of about 22-25 years of age.[2]

The morphological features of the pelvis, the skull and other bones show that a female individual is being dealt with here.

THE SKULL

This skull, which is moderately long but very narrow, is dolichocephalic (Table 1). In the skull of this individual the basion-bregma height-length index is orthocephalic, that is, in the middle group. The basion-bregma height-breadth index is akrocranic, that is the skull relative to its breadth is high. Indeed, in this skull the basion-bregma height is greater than the maximum breadth. In this respect the skull approaches the sub-branch of the Mediterranean type, that Coon calls Danubian.[3] In this skull, found in Öküzini, the porion-bregma height-length index is orthocephalic; that is again in the middle group. While the porion-bregma height-breadth index is metriocranic, it is on the borderline of akrocranic category. The transverse frontal index (79.13) is nearer to that of the group from Sialk that Vallois calls "Dolichocéphale II' which he attaches to the Mediterranean type, than to the group that he designates "Hyper-dolichocéphale I".[4] The transverse fronto-parietal index, which ex-

[2] For the synostosis of the sutures see Todd, T. W. and Lyon, D. W. 1924. Endocranial suture closure. Its progress and age relationship. Part I. Adult males of white stock. American Journal of Physical Anthropology, vol. VII, No. 3, pp. 325-384; Todd, T. W. and Lyon, D. W. 1925 [a]. Cranial suture closure. Its progress and age relationship. Part II. Ectocranial closure in adult males of white stock. American Journal of Physical Anthropology, Vol. VIII, No. 1, pp. 23-45; Todd, T. W. and Lyon, D. W. 1925 [b]. Suture closure. Its progress and age relationship. Part III. Endocranial closure in adult males of Negro stock. American Journal of Physical Anthropology, Vol.VIII, pp.47-71; Todd, T. W. and Lyon, D. W. 1925 [c]. Suture closure. Its progress and age relationship. Part IV. Ectocranial closure in adult males of Negro stock. American Journal of Physical Anthropology, Vol. VIII, pp. 149-168.

[3] See Coon, C. S. 1939. The races of Europe, New York. p. 85.

[4] See Vallois, H. V. 1939. Les ossements humains de Sialk. Contribution à

presses the minimum frontal diameter as a percentage of the maximum skull breadth, is eurymetopic; that is, the forehead is relatively wide. The horizontal circumference approaches the mean of the group from Sialk designated as "Dolichocéphale II" by Vallois.[5] In this skull from Öküzini the parietal arc is longer than the frontal arc. The mean thickness of the parietal bone (4 mm.) calculated from the measurements taken about one centimeter above the squamous suture, is medium.

The cranial capacity of this individual, calculated from Pearson's *812+0.00015 × length × width × basion-bregma height* formula,[6] is 1275.65 c. c. The cranial capacity, again calculated from Pearson's formula, but by using the porion-bregma height,[7] is 1246.80 c.c. According to Sarasin's classification the cranial capacity of this individual is in the medium category for women.[8]

The form of the Öküzini skull in norma verticalis is ovoid. The temporal fullness of the skull is medium. In this cranium the parietal bosses are weak. The development of the glabella and brow ridges is medium. The forehead, which is of medium height, shows a slope that is above the average. The development of the frontal bosses is submedium. In this skull the metopic suture is obliterated and there is no sagittal elevation (crest) on os frontale. The postorbital constriction is of medium extent. On the left side, behind the coronal suture a slight postcoronal depression is noticed. While this depression is more pronounced on the right side, it is probable that this may have been partly brought about by pressure in the ground. The highest point of the sagittal profile of the brain case is located behind the bregma and a little before the middle of os parietale. When viewed from

l'étude de l'histoire raciale de l'Iran ancien. *In* Girshman, R. 1939. Fouilles de Sialk, près de Kashan, Vol. II, Musée du Louvre-Département des Antiquités Orientales. Série Archéologique, Vol. V, pp. 136 and 143.

[5] The calculated mean from the measurements of four female skulls given by Vallois is 497. 5 mm. (see Vallois, 1939, p. 143).

[6] For this formula see Martin, R. 1928. Lehrbuch der Anthropologie, vol. II, Jena. p. 645.

[7] For this formula see *ibid.*, p. 645.

[8] For this classification see *ibid.*, p. 644. On the other hand, according to Flower and Turner's classification (see Martin, 1928, p. 644) the cranial capacity of this individual is small.

the side, the occiput of the Öküzíní skull is seen to possess a curvature of medium development. While a lambdoid flattening of average extent is seen on this skull, there is no plano-occipital flattening. The occipital torus, which is mound-shaped, is weak.

On the right side of the skull the form of pterion is seen to be H-shaped. The length-height index of squama temporalis, calculated from the measurements taken according to Schultz's technique, is relatively low (62.68), that is, it represents a primitive condition.[9] The depth of fossa mandibularis is of medium extent and the processus postglenoidalis shows a development that is above average. The external auditory meatus shows an ovoid shape. The tympanic plate is of medium thickness. The supramastoid crest is of average development. On the other hand, the mastoid process is seen to be very small.

While a distinct flattening is seen along the sagittal suture, when the skull is viewed in norma occipitalis, the general form of the skull is roof-shaped. No Wormian bones (ossa suturarum) are seen on the coronal and sagittal sutures. On the right side, above the asterion, there are two Wormian bones on the lambdoid suture. On the left side of the skull this part is broken.

In the Öküzini specimen the absolute length and width measurements of the face are relatively small. The transverse cranio-facial index is slightly higher than the mean for modern European women, given by Martin.[10] This situation is due to the relatively small size of the maximum skull breadth. On the other hand, the zygo-frontal index is near the means for modern Europeans, given by Martin.[11] In this skull the total facial index is leptoprospic and the upper facial index is mesen; that is the relative length of the face is of medium development. The orbital index is hypsiconch, that is the orbit is high relative to its width. While the nasal index is mesorrhine, it is near the border of leptorrhine category. The nasalia upper breadth (14.0 mm.)

[9] See Schultz, A. 1916. Form, Grösse und Lage der Squama temporalis des Menschen. Zeitschrift für Morphologie und Anthropologie, Vol. XIX, pp. 355 and 367.

[10] See Martin, 1928, p. 910.

[11] See *ibid.*, pp. 907-908. The zygo-frontal index of the Öküzini skull is at the same time near the mean of the females of a Negro group (74.9), that Martin (1928, p. 908) cites after Manouvrier.

is near the mean of Parisians (13.5 mm.), cited by Martin.[12] While the face as a whole is orthognathous (total facial angle measured on the Frankfurt plane is 89°), prognathism is seen in the alveolar portion (alveolar angle 74°).

As for the morphological features of the face, the anterior and lateral projection of the zygomatic bones is medium. The middle and external parts of the lower border to the orbit follow an approximately horizontal course. Sutura infraorbitalis is closed on the left side. On the other hand, this suture is observed to be patent on the right side. In this skull the nasion depression is of medium extent. The elevation of the preserved upper part of the nasal bones is of medium development. The anterior nasal spine, while broken, is inferred to have been small. The sill of apertura pyriformis is fairly sharp. Fossa canina is seen to be deep.

The morphology of the nose and the orthognathous total facial angle distinguish this skull from those of the Negroes.

The absolute external length and width measurements of the palate are very small (Table 2). While the external palatal index is in the mesuranic category, it is very near the border of the dolichuranic group. When viewed in norma basilaris, the shape of the upper dental arch approaches the U-form. In this skull sutura platina transversa is seen to follow a transversal course. The height of the palate is medium and there is no torus palatinus.

As is the case with the upper jaw, the mandible is also small (Table 3). The absolute thickness and the height-thickness index of the corpus are lower than all the means given by Martin.[13] The mean angle mandible appears to be below the means for Müncheners given by Martin[14] and that for Würtembergers given by Schulz,[15] but is within the limits of variation of the latter group.

When the mandible is viewed from the side, the chin is seen to form a positive projection of moderate development. In the mandible the alveolar prognathism is weak. The mental foramen is single on

[12] See Martin, 1928, p. 942.

[13] See *ibid.*, p. 979.

[14] See *ibid.*, p. 984.

[15] See Schulz, H. E. 1933. Ein Beitrag zur Rassenmorphologie des Unterkiefers. Zeitschrift für Morphologie und Anthropologie, Vol. XXXII, Heft 1-2, p. 322.

both sides and is located between and below the first and second premolars. Only on the anterior edge of the left foramen mentale a vascular orifice is observed. On the surface of ramus mandibulae the place of insertion of the masseter muscle is considerably excavated. The sides of angulus mandibulae are everted outward. On the internal surface of the mandible spina mentalis is weak. Fossa musculi biventris is well developed. The development of the place of attachment of the internal pterygoid muscle is of moderate degree. The linea mylohyoidea is seen to be prominent.

In the Öküzini skull Flower's dental index is 34.39, that is microdont.[16] The left P^3-M^3 length used in the calculation of this index is 35.60 millimeters. A comparison with the figures given by Flower [17] shows that this very small index is the result of both the large size of the basion-nasion length (Table 1) as well as the very short length of P^3-M^3 distance. Indeed, P^3-M^3 length of this Öküzini skull is smaller than the minimum of Bushman given by Drennan [18] and that of Bantus given by Shaw.[19]

With the exception of I^1, P^4, I_2 and P_4, the robustness values of the teeth of Öküzini skull (Tables 4-5) are smaller than those of a mixed series consisting of Europeans, ancient Egyptians, American Indians, Melanesians and Negroes, which I had published previously. [20] I^1, P^4 and P_4 are bigger than the corresponding teeth in the

[16] See Flower, W. H. 1884. On the size of the teeth as a character of race. The Journal of the Anthropological Institute of Great Britain and Ireland, Vol. XIV, No. 2, pp. 183-187. For a discussion of this index see Şenyürek, M. 1950. Büyük Güllücek'de bulunan Kalkolitik çağa ait bir muharibin iskeletinin tetkiki. Study of the skeleton of a Chalcolithic Age warrior from Büyük Güllücek. Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi (Revue de la Faculté de Langues, d'Histoire et de Géographie, Université d'Ankara), Vol. VIII, No. 3, pp. 276-277.

[17] See Flower, 1884.

[18] See Drennan, M. R. 1929. The dentition of a Bushman tribe. Annals of the South African Museum, Vol. XXIV, p. 75.

[19] See Shaw, J. C. M. 1931. The teeth, the bony palate and the mandible in Bantu races of South Africa, London. Table XXVIII.

[20] For this mixed series see Şenyürek, M. 1941. The dentition of Pleasianthropus and Paranthropus. Annals of the Transvaal Museum, Vol. XX, Part 3, Tables 1 and 2; Şenyürek, M. 1946. Türk Tarih Kurumu adına yapılan Maşat Höyük kazısından çıkarılan kafataslarının tetkiki. Study of the skulls from Maşat Höyük, excavated under the auspices of the Turkish Historical Society. Belleten, Vol. X, No. 38, Table 2.

mixed series. The robustness value of the second lower incisor is near the mean of the corresponding tooth of the mixed series.

As for the morphology of the teeth on hand (see figs. 5 and 7) the upper incisors are not shovel-shaped. While the root in P^3 and P^4 is single, it is broad in the bucco-lingual direction and presents vertical grooves on its mesial and distal surfaces. The first upper molar possesses four cusps. On the right side the hypocone is of medium size. On the left side an important portion of this cusp has been destroyed by a carie. There is no Carabelli cusp and no Carabelli pit on the lingual surface of this tooth. This tooth, on both sides, possesses three separate roots. The left upper third molar has three cusps. In this tooth the hypocone has completely disappeared and the metacone has been greatly reduced. In this tooth, which does not possess a Carabelli cusp nor a Carabelli pit, the three roots have fused.

The lower second incisor is also not shovel-shaped. In P_3 the lingual cusp is tiny. Both the P_3 and P_4 are single rooted. The left lower second premolar, as a result of the loss of left lower first molar long before death, has rotated and assumed an oblique position. On the right lower first molar are seen four main cusps and a small mesoconid (hypoconulid). As the tooth is worn, the plan on the chewing surface could not be determined. This tooth possesses two separate roots. On the right second lower molar there are only four cusps; that is the mesoconid has disappeared. On this tooth a slight protoconid-entoconid connection is observed.[21] The chewing surface of the left lower second molar has been destroyed by a large cavity. In this tooth, on both sides, the two roots have fused. The single alveolus of the right third lower molar indicates that in this tooth also the roots had fused (see fig.7).

In the Öküzini skull the available incisors and canines are distinctly worn. In the right and left upper first molars and in parts of these teeth not destroyed by cavities, some islands of dentine have

[21] For the protoconid-entoconid connection see Şenyürek, M. 1952 [a]. A study of the dentition of the ancient inhabitants of Alaca Höyük. Belleten, Vol. XVI, No. 62, p. 184; Şenyürek, M. 1952 [b]. The dentition of the Chalcolithic and Copper Age inhabitants of Anatolia. Part I. A morphological study of the permanent lower molars of the Chalcolithic and Copper Age inhabitants of Anatolia. Ankara Üniversitesi Dil ve Tarih Coğrafya Fakültesi Dergisi (Revue de la Faculté de Langues, d'Histoire et de Géographie, Université d'Ankara), Vol. X, Nos. 1-2, p. 61.

been exposed. On the other hand, in the left third upper molar, on the protocone only the enamel has been abraded. As for the lower molars, in approximately one half of the chewing surface of the right first molar the dentine has been exposed. On the other hand, in the right second lower molar only the enamel has been abraded. In this individual, as a result of the conspicuous wear on the front teeth, the upper and lower incisors meet edge-to-edge. On the anterior part of the right half of the mandible a slight crowding is seen in the teeth.

In this skull, the right and left M^1, the left P_3 and the left M_2 are carious. A distinct erosion is present on the cervical part of the distal surface of the root of the right second upper premolar. This erosion is located across from the cavity on the mesial surface of the right first upper molar. In addition to these, in this individual the right and left second upper molars, the left first lower molar and the left third lower molar had, probably as a result of caries, fallen before death. Moreover, slight signs of pyorrhea are visible on the jaws. Thus, although she is not of advanced age, it is seen that this individual had suffered a great deal in her lifetime from her teeth.

THE POSTCRANIAL SKELETON

Of the postcranial skeleton, in addition to some vertebrae and fragments of scapula and ribs, the whole or nearly the whole of the following bones have been preserved: the left clavicula, left humerus, left ulna, right and left radius, 5 ossa metacarpi belonging to the left and 3 to the right hand, two phalanges digitorum manus, left femur, right and left tibia, left fibula, left calcaneus, left os naviculare pedis and 5 ossa metatarsi belonging to the right and 3 to the left foot. The largest part of the pelvis has been preserved. The external end of the right clavicula is broken. The upper part of the right humerus and the distal end of the right ulna are missing. Only the corpus of the right femur and a small fragment of right fibula have been preserved.

The length of the clavicle (Table 6) is, according to the classification for women given by Oliver,[22] on the lower border of the

[22] See Oliver, G. 1951. Anthropologie de la clavicule. III.-La clavicule du Français. Bulletins et Mémoires de la Société d'Anthropologie de Paris, Vol. 2, series X, Fascicule 4-6, p. 124.

medium category. The length-thickness index is relatively small.[23] The middle circumference of the right clavicle is somewhat larger than that of the left bone. The length-thickness index of the Öküzini humerus (Table 7) is relatively small.[24] In both the right and left humerus fossa olecrani is seen to be perforated. The length-thickness index of the ulna (see Table 8) too shows a relatively small value.[25] The length-thickness index of the radius (Table 9) is smaller than the minimum of Europeans.[26] The right radius is seen to be slightly longer than the left radius (right 216.0 mm., left 214.5 mm.). When the available hand bones (Tables 10-11) are compared with those of modern European women, it is seen that while the metacarpal bones are slightly shorter than the means of the European women, the lengths of the available phalanges are near the means of the Europeans.[27]

In the pelvis of the Öküzini skeleton the height of os coxae, the maximum bi-iliac width and os ilium width (Table 12) are slightly lower than the means for European women given by Martin.[28] On the other hand, in the Öküzini pelvis the anterior widths, the maximum width of apertura pelvis minoris superior and the height of ala ossis ilium are greater than the means for European women cited by Martin.[29] The depth of fossa iliaca (Martin measurement no. 11) is equal to the mean for European women.[30] The width-height and the height-width indices of the pelvis are near or equal to the means of European women given by Martin.[31] On the other hand, the width index of the pelvis is above the mean of European women.[32] The index of os ilium is smaller than the mean of European women and is near to that of the males.[33] In this pelvis incisura ischiadica major is wide and relatively

[23] See *ibid.*, pp. 129-130.
[24] For comparison see Martin, 1928, pp. 1100-1101.
[25] For comparison see *ibid.*, p. 1112.
[26] See *ibid.*, p. 1109.
[27] See *ibid.*, p. 1118.
[28] See *ibid.*, p. 1126. These measurements given by Martin (1928, p. 1126) are cited after Verneau.
[29] See Martin, 1928, p. 1126.
[30] See *ibid.*, p. 1127.
[31] See *ibid.*, pp. 1125-1126.
[32] See *ibid.*, p. 1128.
[33] See *ibid.*, p. 1126.
[34] See *ibid.*, pp. 1135-1136.

shallow. While sulcus praeauricularis is present on both sides, it is more distinct on the left side. On the right side a large tubercle of the crest is seen on the outside of crista iliaca. On the left side this tubercle is weak. The sacrum of Öküzini skeleton of which a part is broken is of the hypobasilität form.

The femur of the Öküzini skeleton is platymeric (Table 13). That the index pilastricus is over 100 shows that the linea aspera is well developed. This index of Öküzini femur is near the means of the French given by Martin.[34] The neck-shaft angle is, according to the figures given by Martin, equal to the mean of modern Swiss and exceeds the averages of other groups.[35] In this feature the Öküzini femur is distinguished from the femurs found at Şeyh Höyük.[36] The torsion angle is also smaller than those of the femurs from Şeyh Höyük.[37] The index of collum femoris length is slightly below the mean of the French women listed by Martin.[38] Öküzini femur is distinguished from Şeyh Höyük femurs in this index also.[39] In the Öküzini femur crista hypotrochanterica is well developed, but fossa hypotrochanterica is not present. The femur shows a slight anterior curvatu e. In anterior view, the distal epiphysis shows conspicuous bulges on both sides. The lower end of the femur which exhibits a primitive form resembles that of a specimen found at Anau.[40]

In the right tibia malleolus medialis is broken. While the malleolus medialis is also broken on the left side, a small portion of it has been preserved. Thus the length measurement listed in Table 14 is slightly lower than the actual length. The tibia of the Öküzini skeleton

[35] See *ibid.*, pp. 1143-1144.

[36] See Şenyürek, M. 1955. A note on the long bones of Chalcolithic Age from Şeyh Höyük. Belleten, Vol. XIX, No. 74, Table 4.

[37] See *ibid*, Table 4.

[38] See Martin, 1928, p. 1150.

[39] In my former study for the collum lengths of the femurs Martin's (1928, p. 1041) measurement No. 14 c was given (see Şenyürek, 1955, Table 4). Th means of collum lengths (caput femoris - collum femoris length) of Şeyh Höyük femurs, calculated from Martin's measurement No. 14, are 15.34 in two males and 14.80 in three females, that is the collum length of Şeyh Höyük femurs is shorter than that of Öküzini femur. The mean of males and females (15.02) is beneath all the means given by Martin (1928, p. 1150).

[40] See Mollison, Th. 1908. Some human remains found in the North Kurgan, Anau. *In* Pumpelly, R. Explorations in Turkestan, Vol. 2, Part VIII, Plate 94, fig. 4b.

is eurycnemic,[41] and there is no retroversion. In both tibiae a squatting-facet is seen on the external part of the anterior margin of the distal end.

In the Öküzini calcaneus (Table 16) the length-height index is above all the means of modern Man given by Martin. [42] Sustentaculum tali index is lower than all the means cited by Martin, [43] that is, advanced. The length index of corpus calcanei is slightly lower than the mean of Europeans (72.4) given by von Bonin, [44] that is, the heel is short. On the other hand, the length-height index of facies articularis posterior calcanei is higher than the means of Europeans given by Martin and is close to those of Tibetans and Fuegians, [45] that is, it represents a primitive condition. The deviation angle of facies articularis poster or calcanei is smaller than the figures for Europeans given by Martin. [46]

The form of os naviculare pedis of the Öküzini skeleton resembles that of Europeans, more than those of Negroes, Melanesians and Japanese.[47] The thickness index of this bone (Table 17) is smaller than the mean of Europeans and is equal to that of Fuegians, [48] that is, it exhibits a primitive condition.

The length of metatarsal bones (Table 18) are smaller than the means of European women given by Martin. [49]

THE STATURE

The stature calculated from long bones of the Öküzini skeleton by means of Pearson's formulae (Table 19), [50] is in the lower part of

[41] In the left tibia index cnemicus is 70.06, that is, on the borderline of mesocnemic category.

[42] See Martin, 1928, p. 1172.

[43] See *ibid.*, p. 1173.

[44] See von Bonin, G. 1935. European races of the Upper Palaeolithic. Human Biology, Vol. 7, p. 214. Von Bonin's figures for Europeans are after Reicher (ese von Bonin, 1935, p. 214).

[45] See Martin, 1928, p. 1174.

[46] See *ibid.* p. 1175.

[47] For pictures of os naviculare pedis in various groups see Volkov, Th. 1904. Variations squelettiques du pied. Bulletins et Mémoires de la société d'Anthropologie de Paris, Vol. 5, Series 5, fig. 24.

[48] See Martin, 1928, p. 1177.

[49] See *ibid.*, p. 1179.

[50] Pearson's formulae have been taken from Martin (1928, p. 1071).

the medium category accepted for women. [51] The mean stature calculated from the lengths of humerus, ulna, radius, femur, tibia and fibula by Manouvrier's method [52] (152. 29 cm.) is near the mean stature obtained from Pearson's formulae (152. 60 cm.)

PROPORTIONS OF THE BONES
(Table 20)

The claviculo-humeral index, which expresses the clavicle length as a percentage of the humerus length, is small; that is, the shoulder is relatively narrow. [53] The indices expressing the maximum pelvis width as percentages of the femur, femur + tibia and clavicle (bi-clavicular dimension) lengths greatly exceed the figures for the males and females of Upper Palaeolithic Man given by Matiegka and show values close to the means of European and Lapp women [54]. The mean of two Pygmy women given by Matiegka also approaches the indices of Öküzini skeleton and European and Lapp women. [55]

The humero-radial index expressing the radius length as a percentage of that of humerus is near the means of White women given by Dupertuis and Hadden and are lower than the means of Negro women. [56] Furthermore, this index of Öküzini skeleton is shorter than the indices of the fossil Grimaldi and Cro-Magnon men, and those of Afalou, Téviec and Mugem series;[57] that is, in this respect the Öküzini skeleton resembles the present-day Europeans.

[51] The reason for not using the formulae of Dupertuis and Hadden is that the lengths of the long bones are not great. For this see Dupertuis, C. W. and Hadden, J. A. 1951. On the reconstruction of stature from long bones. American Journal of Physical Anthropology, Vol. 9, New Series, No. 1, p. 51.

[52] See Manouvrier, L. 1893. La détermination de la taille d'après les grands os de membres. Mémoires de la Société d'Anthropologie de Paris, Vol. 4, Series 2, Table II.

[53] For comparison see Broca, P. 1862. Sur les proportions relatives du bras, de l'avant-bras et de la clavicule chez les nègres et les Européens. Bulletins de la Société d'Anthropologie de Paris, Vol. 3, p. 170; Martin, 1928, p. 1098; Matiegka, J. 1940. The skeletal trunk indices. American Journal of Physical Anthropology, Vol. XXVI, Table 2; Şenyürek, 1955, Table 9.

[54] See Matiegka, 1940, Table 2.

[55] See *ibid.*, Table 2.

[56] See Dupertuis and Hadden, 1951, Table 11.

[57] See Şenyürek, 1955, Table 9.

The femoro-tibial index expressing the tibia length as a percentage of femur length is near the mean of White women given by Dupertuis and Hadden and slightly below it.[58] This index of the Öküzini skeleton is smaller than the mean of Negro women given by Dupertuis and Hadden,[59] as well as those of the Upper Palaeolithic men and Afalou, Téviec and Mugem series.[60]

The intermembral index expressing humerus+radius length as a percentage of femur + tibia length is slightly higher than the means of both the Whites and Negroes,[61] that is, relative to the leg the arm is long.

The indices expressing the length of the third metacarpal bone and that of phalanx of prima of the third finger as percentages of the stature, which have been used by Verneau,[62] are shown below.

	Length of Metacarpal × 100 / Stature	Length of Phalanx prima × 100 / Stature
Öküzini	3.85	2.68
Cro-Magnon Man (Grotte des Enfants and Barma Grande 1 and 2). Verneau, 1906	3.85—4.1	2.53—2.62
French. Verneau, 1906	3.4	2.63

These figures show that Öküzini skeleton approaches the Cro-Magnon Man in the relative length of the third metacarpal and modern Man in the relative length of phalanx prima of the third finger. That the phalanx prima of the third finger is relatively long is also seen in the following index.

[58] See Dupertuis and Hadden, 1951, Table 11.

[59] See *ibid.*, Table 11.

[60] See Şenyürek, 1955, Table 9.

[61] See Verneau, R. 1906. Les grottes de Grimaldi (Baoussé-Roussé). Vol. II, Fascicule 1, Part III, Anthropologie, pp. 65 and 129; Şenyürek, 1955, Table 9.

[62] See Verneau, 1906, pp. 114 and 116.

	Length of phalanx prima of 3rd finger × 100 / Length of 3rd metacarpal
Öküzini	69.60
Cro-Magnon (Grotte des Enfants).[63] Calculated from Verneau (1906)	66.22
Cro-Magnon (Barma Grande 1). Calculated from Verneau (1906)	63.29
Cro-Magnon (Barma Grande 2). Calculated from Verneau (1906)	65.71
European males. Calculated from Martin (1928, p. 1118)	69.10
European females. Calculated from Martin (1928, p. 1118)	68.89

Thus in the relation of phalanx prima - metacarpal length the Öküzini skeleton is distinguished from Cro-Magnon Man[64] and resembles modern Man.

CONCLUSION

The Öküzini skeleton approaches the Mediterranean type in most of its morphological features. The measurements and indices of the Öküzini skull approach those of the skull of a female (Alişar No. cx 18), which was found in the Chalcolithic stratum (Upper Chalcolithic) of Alişar and described by Krogman.[65] As in the Öküzini skull, in this Alişar specimen also alveolar prognathism is observed.[66]

[63] Calculated from the means of right and left bones.

[64] For the length of phalanges and metacarpals in Cro-Magnon Man see Verneau, 1906, pp. 114-116; Boule, M. and Vallois, H. V., 1952. Les Hommes fossiles. Eléments de Paléontologie Humaine, p. 309.

[65] See Krogman, W. M. 1937. Cranial types from Alişar Hüyük and their relations to other racial types, ancient and modern, of Europe and Western Asia. *In* von der Osten. 1937. The Alishar Hüyük, seasons of 1930-1932, Part III. OIP, Vol. XXX, Researches in Anatolia-Vol. IX, Table II.

[66] While regarding this skull Krogman (1937, p. 215) states that "..... *there is no prognathism*", a scrutiny of the photograph shows that alveolar prognathism is present (see Krogman, 1937, fig. 236). It is probable that this statement of Krogman refers only to the total facial angle.

In connection with the existence of alveolar prognathism in Öküzini skull and Alişar specimen, I consider it worthwhile to record here that this primitive feature

The most noticeable difference between the Öküzini and Alişar skulls is seen in the frontal region. Whereas in the Alişar skull the forehead is, as in the advanced examples of the Mediterranean type, approximately vertical and the glabella weak,[67] in the Öküzini cranium the forehead is sloping and the glabella is of medium development. The morphology of the forehead at the same time brings the Öküzini skull closer to that of the Eurafrican type which is more primitive than the Mediterranean type.

The Öküzini skeleton which represents a primitive example of the Mediterranean type indicates that this type is of considerable antiquity in Anatolia.[68]

is not confined to the Negroes and that it is found in some Cro-Magnon specimens (see Boule and Vallois, 1952, pp. 307-308), in some other reces living today (see Martin, 1928, p. 913) and also in some primitive examples of the Mediterranean type (see Vallois, 1939, pp. 138-139, 143 and 164; Angel, J. L. 1944. A racial analysis of the ancient Greeks. An essay on the use of morphological types. American Journal of Physical Anthropology, Vol. 2, New Series, No. 4, pp. 343-344).

[67] See Krogman, 1937, p. 215 and fig. 236.

[68] This matter will be taken up in greater detail in my later studies.

TABLE 1
Skull [1]

a. Glabello-occipital length	180.00
b. Glabella-inion length	167.50
c. Glabella-lambda length	173.00
d. Nasion-basion length	103.50
e. Maximum breadth	128.00
f. Minimum frontal diameter	91.00
g. Maximum frontal diameter	115.00
h. Biauricular breadth	108.50
i. Basion-bregma height	129.00
j. Porion-bregma height	110.00
k. Calvarial height I (maximum height above glabella-inion line)	101.00
l. Calvarial height II (height of bregma above glabella-lambda line)	56.00
m. Horizontal circumference	498.00
n. Transverse arc	301.00
o. Nasion-bregma arc	105.20
p. Bregma-lambda arc	109.00
q. Lambda-opisthion arc	95.50
r. Mean thickness of parietal	4.00
s. Nasion-gnathion length	105.00
t. Nasion-prosthion length	61.70
u. Bizygomatic diameter	120.00
v. Orbit-width (Dacryon-ectoconchion)	37.50
w. Orbit height	34.00
x. Nasal length	46.50
y. Nasal width	22.00
Cranial index $\left(\frac{e \times 100}{a}\right)$	71.11
Basion-bregma height-length index $\left(\frac{i \times 100}{a}\right)$	71.66
Basion-bregma height-breadth index $\left(\frac{i \times 100}{e}\right)$	100.78
Porion-bregma height-length index $\left(\frac{j \times 100}{a}\right)$	61.11
Porion-bregma height-breadth index $\left(\frac{j \times 100}{e}\right)$	85.93
Calvarial height-length index $\left(\frac{k \times 100}{b}\right)$	60.29

TABLE 1 (Continued)

Skull[1]

Calvarial height-length index	$\left(\frac{l \times 100}{c}\right)$	32.36
Transverse frontal index	$\left(\frac{f \times 100}{g}\right)$	79.13
Transverse fronto-parietal index	$\left(\frac{f \times 100}{e}\right)$	71.09
Sagittal fronto-parietal index	$\left(\frac{p \times 100}{o}\right)$	103.80
Sagittal parieto-occipital index	$\left(\frac{q \times 100}{p}\right)$	87.61
Transverse cranio-facial index	$\left(\frac{u \times 100}{e}\right)$	93.75
Zygo-frontal index	$\left(\frac{f \times 100}{u}\right)$	75.83
Total facial index	$\left(\frac{s \times 100}{u}\right)$	87.50
Upper facial index	$\left(\frac{t \times 100}{u}\right)$	51.41
Orbital index	$\left(\frac{w \times 100}{v}\right)$	90.66
Nasal index	$\left(\frac{y \times 100}{x}\right)$	47.31

[1] With the exception of stature (see Table 19), the measurements given in the tables are in millimeters.

TABLE 2

The Maxilla

a. Palate-external length	47.50
b. Palate-external width	52.30
External palatal index $\left(\frac{b \times 100}{a}\right)$	110.10

TABLE 3
The Mandible

a. Bigonial width	93.50
b. Minimum breadth of ascending ramus	27.50
c. Height of corpus (at foramen mentale)	28.30
d. Thickness of corpus (at foramen mentale)	9.60
e. Bimental width (distance betcween the two foramina mentalia)	37.00
f. Symphysis length	29.00?
g. Mean angle mandible	122°
Height-thickness index of the corpus $\left(\frac{d \times 100}{c}\right)$	33.92

TABLE 4
The Teeth

Maxillary teeth	Length	Breadth	Robustness Value[1]	Crown Index[2]
I^1	(8.7)	7.6	(66.12)	(87.35)
I^2	(6.5)	6.5	(42.25)	(100.00)
C^1	7.6	8.4	63.84	110.52
P^3	6.7	9.5	63.65	141.79
P^4.	6.7	9.8	65.66	146.26
M^1	——	11.3	——	——
M^2	7.3	10.3	75.19	141.09

[1] Breadth × Length.
[2] $\frac{\text{Breadth} \times 100}{\text{Length}}$.

TABLE 5
The Teeth

Mandibular teeth	Length	Breadth	Trigonid breadth	Talonid breadth	Robustness Value	Crown index	Trigonid-talonid index[1]
I_2	(5.9)	6.3	——	——	(37.17)	(106.77)	——
C_1	(6.8)	7.6	——	——	(51.68)	(111.76)	——
P_3	6.7	8.0	——	——	53.60	119.40	——
P_4	7.4	8.7	——	——	64.38	117.56	——
M_1	10.6	(9.9)	(9.9)	9.6	(104.94)	(93.39)	(94.94)
M_2	10.0	10.0	10.0	9.4	100.00	100.00	94.00

[1] $\frac{\text{Talonid breadth} \times 100}{\text{Trigonid breadth}}$.

TABLE 6
Clavicula

a. Maximum length (Martin 1)	129.00
b. Circumference in the middle of corpus claviculae (Martin 6)	25.00
Length-thickness index $\left(\frac{b \times 100}{a}\right)$	19.37

TABLE 7
Humerus

a. Maximum length (Martin 1)	297.00
b. Minimum circumference (Martin 7)	49.00
Length-thickness index $\left(\frac{b \times 100}{a}\right)$	16.49

TABLE 8
Ulna

a. Maximum length (Martin 1)	233.50
b. Physiological length (Martin 2)	202.00
c. Minimum circumference (Martin 3)	29.00
Length-thickness index $\left(\frac{c \times 100}{b}\right)$	14.35

TABLE 9
Radius

a. Maximum length (Martin 1)	215.25 (Mean)
b. Physiological length (Martin 2)	204.50 (Mean)
c. Minimum circumference (Martin 3)	33.00 (Mean)
Length-thickness index $\left(\frac{c \times 100}{b}\right)$	16.07 (Mean)

TABLE 10
Lengths of Ossa Metacarpi

I	II	III	IV	V
39.90	60.00	58.90	52.70	48.40

TABLE 11
Lengths of Phalanges Digitorum Manus

	Phalanx Prima
Third finger	41.00
Fourth finger	39.40

TABLE 12

Pelvis

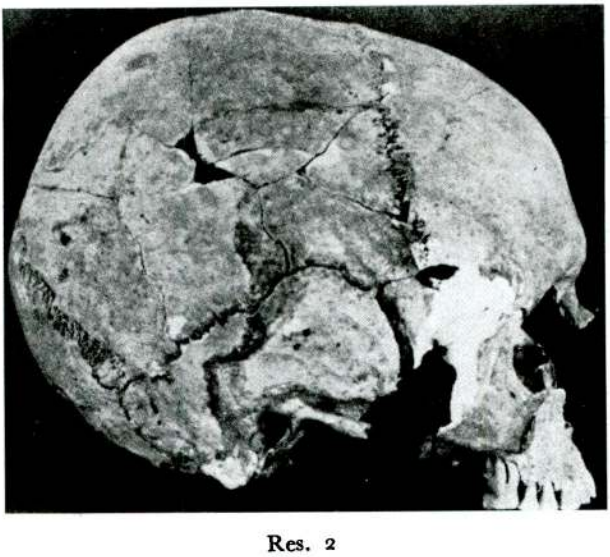
a. Height of os coxae (Martin 1)	194.00
b. Maximum pelvic width (Martin 2)	262.00
c. Anterior width of pelvis: between the two spina iliaca anterior superior (Martin 5)	230.00
d. Anterior width of pelvis: between the two spina iliaca anterior inferior (Martin 5,1)	203.00
e. Maximum width of apertura pelvis minoris superior (Martin 24)	146.00
f. Height of os ilium (Martin 9)	129.00
g. Width of os ilium (Martin 12)	153.00
h. Height of ala ossis ilium (Martin 10)	96.50
i. Breadth of fossa iliaca (Schultz, 1930)[1]	95.00
j. Depth of fossa iliaca (Martin 11)	7.00
k. Depth of fossa iliaca (Schultz, 1930)[1]	14.00
l. Maximum diameter of acetabulum (Martin 22)	45.50
m. Height of os ischii (Martin 15)	68.30
Width-height index of pelvis $\left(\frac{a \times 100}{b}\right)$	74.04
Height-width index of pelvis $\left(\frac{b \times 100}{a}\right)$	135.05
Width index of pelvis $\left(\frac{e \times 100}{b}\right)$	55.72
Index of os ilium $\left(\frac{g \times 100}{h}\right)$	158.54
Depth index of fossa iliaca $\left(\frac{k \times 100}{i}\right)$	14.73
Os coxae-os ischii height index $\left(\frac{m \times 100}{a}\right)$	35.20

[1] See Schultz, A. H. 1930. The skeleton of the trunk and limbs of higher Primates. Human Biology, Vol. II, No. 3, p. 347.

TABLE 13
Femur

a. Maximum length (Martin 1)	402.00
b. Length in natural position (Martin 2)	399.00
c. Caput femoris: vertical diameter (Martin 18)	41.30?
d. Caput femoris: sagittal diameter (Martin 19)	39.00?
e. Caput femoris-collum femoris: length (Martin 14)	66.00
f. Collum femoris: vertical diameter (Martin 15)	26.40
g. Collum femoris: sagittal diameter (Martin 16)	21.30
h. Upper breadth of femur (Martin 13)	89.00
i. Breadth of subtrochanteric part of diaphysis (Martin 9)	30.00
j. Antero-posterior diameter of subtrochanteric part of diaphysis (Martin 10).	22.30
k. Antero-posterior diameter in middle of diaphysis (Martin 6)	25.50
l. Breadth (lateral) in middle of diaphysis (Martin 7)	23.80
m. Circumference in middle of diaphysis (Martin 8)	78.00
n. Epicondyle breadth (Martin 21)	71.00
o. Torsion angle (Martin 28)	20°
p. Neck-shaft angle (Martin 29)	133°
Length-thickness index $\left(\frac{m \times 100}{b}\right)$	19.54
Robusticity index $\left(\frac{k+l \times 100}{b}\right)$	12.35
Index platymericus $\left(\frac{j \times 100}{i}\right)$	74.33
Index pilastricus $\left(\frac{k \times 100}{l}\right)$	107.14
Robusticity index of caput femoris $\left(\frac{c+d \times 100}{b}\right)$	20.12?
Index of collum femoris length $\left(\frac{e \times 100}{b}\right)$	16.54
Index of cross-section of collum femoris $\left(\frac{g \times 100}{f}\right)$	80.68
Diaphysis-epicondyle breadth index $\left(\frac{l \times 100}{n}\right)$	33.52

Res. 1
Fig. 1



Res. 2
Fig. 2

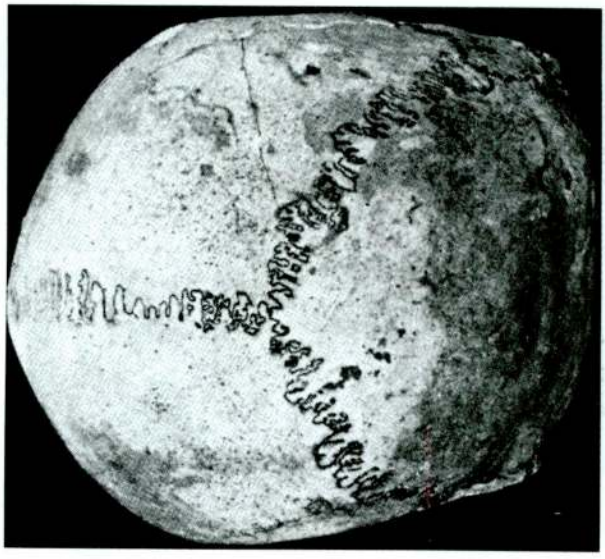


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Fig. 4

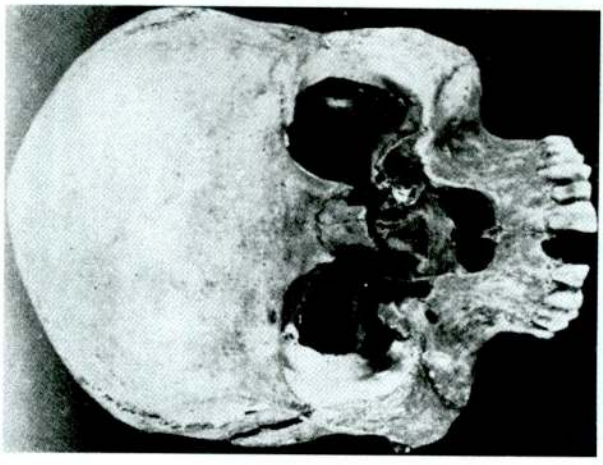

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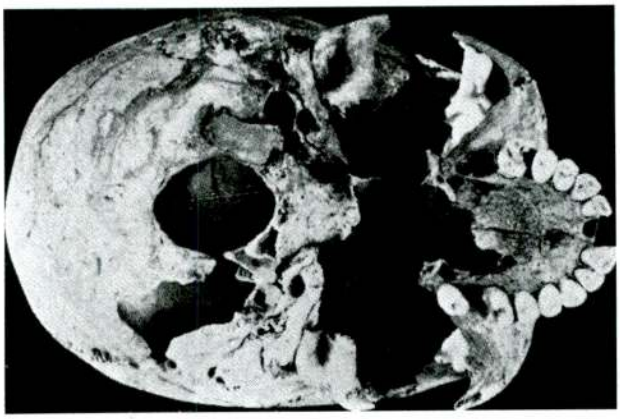
Fig. 3



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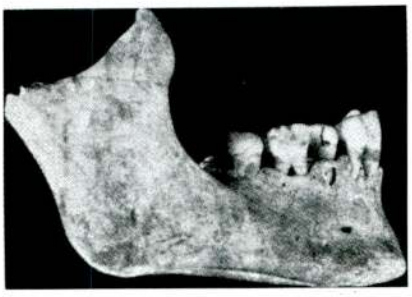

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Fig. 6

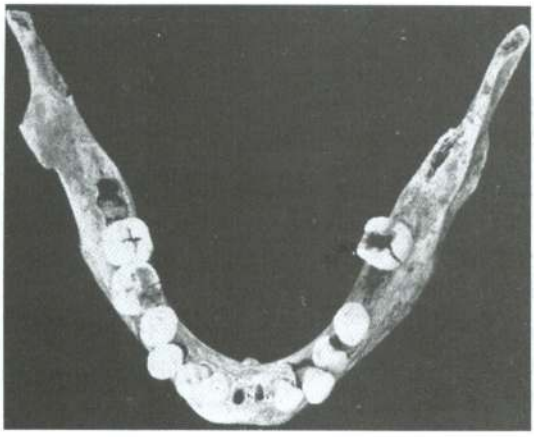

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Fig. 7

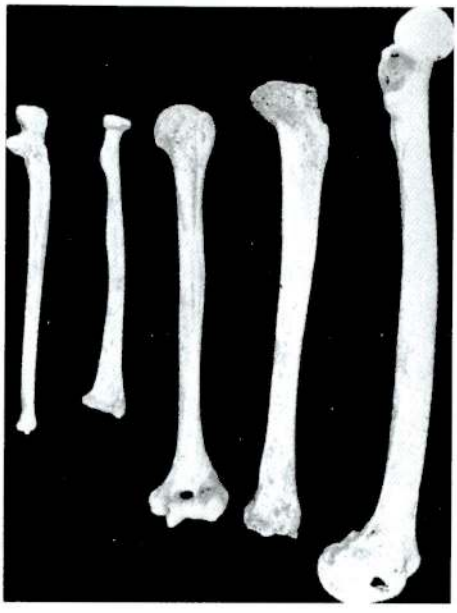

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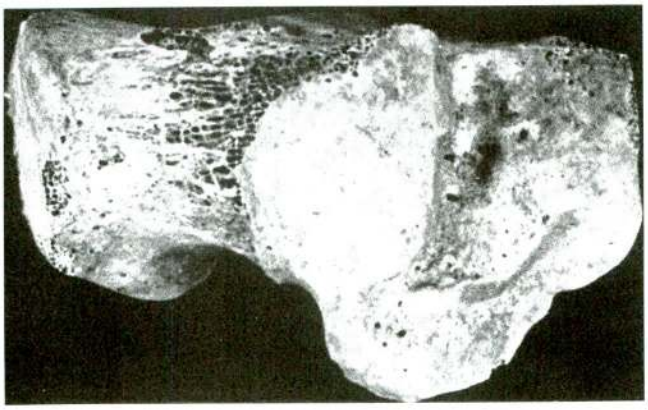
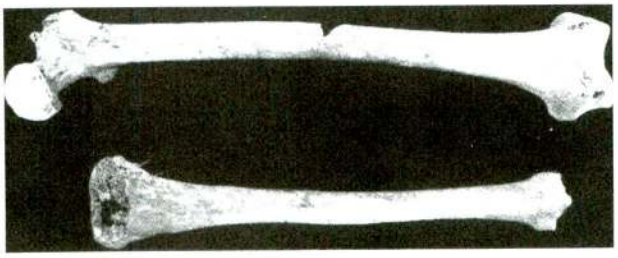
Fig. 8



Res. 10
Fig. 10



Res. 9
Fig. 9

TABLE 14
Tibia

a. Maximum length (Martin 1)	314.00+
b. Antero-posterior diameter at foramen nutricium (Martin 8a)	27.50
c. Breadth (lateral) measurement at foramen nutricium (Martin 9a)	22.00
d. Antero-posterior diameter at middle of diaphysis (Martin 8)	23.00
e. Breadth (lateral) measurement at middle of diaphysis (Martin 9)	18.30
f. Minimum circumference (Martin 10b)	60.00
Length-thickness index $\left(\frac{f \times 100}{a}\right)$	19.10
Index cnemicus $\left(\frac{c \times 100}{b}\right)$	80.00
Middle index $\left(\frac{e \times 100}{d}\right)$	79.56

TABLE 15
Fibula

a. Maximum length (Martin 1)	313.00
b. Minimum circumference (Martin 4a)	32.00
Length-thickness index $\left(\frac{b \times 100}{a}\right)$	10.22

TABLE 16

Calcaneus

a. Calcaneus: maximum length (Martin 1)	70.00
b. Calcaneus: length (Martin 1a)	66.50
c. Corpus calcanei: length (Martin 5)	50.00
d. Corpus calcanei: middle width (Martin 2)	38.70
e. Corpus calcanei: minimum width (Martin 3)	24.00
f. Calcaneus: height (Martin 4)	37.50
g. Sustentaculum tali: width (Martin 6)	11.00
h. Tuber calcanei: height (Martin 7)	43.00
i. Tuber calcanei: width (Martin 8)	29.00
j. Facies articularis posterior calcanei: length (Martin 9)	29.00
k. Facies articularis posterior calcanei: width (Martin 10)	22.00
l. Facies articularis posterior calcanei: height (Martin 11)	6.50
m. Facies articularis posterior calcanei: deviation angle (Martin 14)	43°
Length-width index $\left(\frac{d \times 100}{a}\right)$	55.28
Length-width index $\left(\frac{e \times 100}{a}\right)$	34.28
Length-width index $\left(\frac{e \times 100}{b}\right)$	36.09
Length-height index $\left(\frac{f \times 100}{b}\right)$	56.39
Corpus calcanei: length index $\left(\frac{c \times 100}{a}\right)$	71.42
Sustentaculum tali index $\left(\frac{g \times 100}{d}\right)$	28.42
Tuber calcanei: height-width index $\left(\frac{i \times 100}{h}\right)$	67.44
Facies articularis posterior calcanei: length-width index $\left(\frac{k \times 100}{j}\right)$	75.86
Facies articularis posterior calcanei: length-height index $\left(\frac{l \times 100}{j}\right)$	22.41

TABLE 17

Os Naviculare Pedis

a. Os naviculare pedis: width (Martin 1)	36.00
b. Os naviculare pedis: height (Martin 2)	26.50
c. Os naviculare pedis: minimum thickness (Martin 7)	7.30
d. Os naviculare pedis: maximum thickness (Martin 8)	17.30
e. Facies articularis posterior: maximum length (Martin 3)	25.60
f. Facies articularis posterior: width (Martin 4)	20.00
g. Facies articularis posterior: depth (Martin 5)	4.00
h. Facies articularis cuneiformium: maximum length (Martin 6)	32.00
Width-height index $\left(\frac{b \times 100}{a}\right)$	73.61
Thickness index $\left(\frac{c \times 100}{d}\right)$	42.19
Facies articularis posterior: length-width index $\left(\frac{f \times 100}{e}\right)$	78.12
Facies articularis posterior: length-depth index $\left(\frac{g \times 100}{e}\right)$	15.62
Os naviculare width-facies articularis posterior length index $\left(\frac{e \times 100}{a}\right)$	71.11
Os naviculare width-facies articularis cuneiformium index $\left(\frac{h \times 100}{a}\right)$	88.88

TABLE 18

The Lengths of Ossa Metatarsi

I	II	III	IV	V
53.60	66.10	64.00	63.50	55.70

TABLE 19
Stature

Formula[1]	Stature
71.475+2.754 Humerus	153.26
81.224 + 3.343 Radius	153.18
72.844 + 1.945 Femur	151.03
69.911 + 1.628 (Humerus + Radius)	153.79
67.435 + 1.339 Femur + 1.027Humerus	151.76
Mean	152.60

[1] For the Pearson formulae utilized see: Martin, 1928, p. 1071. The stature is given in centimeters.

TABLE 20
Proportions of the Bones[1]

$\frac{\text{Clavicula length} \times 100}{\text{Humerus length}}$	43.43
$\frac{\text{Maximum width of pelvis} \times 100}{\text{Femur length}}$	65.66
$\frac{\text{Maximum width of pelvis} \times 100}{\text{Femur} + \text{Tibia length}}$	36.74
$\frac{\text{Maximum width of pelvis} \times 100}{^2/_3 \times \text{Clavicula length}}$	101.55
$\frac{\text{Radius length} \times 100}{\text{Humerus length}}$	72.22 (left)[2]
$\frac{\text{Tibia length} \times 100}{\text{Femur length}}$	78.69
$\frac{\text{Humerus} + \text{Radius length} \times 100}{\text{Femur} + \text{Tibia length}}$	71.73[3]

[1] The length of femur used in the calculation of the indices shown in this table is the length in natural position. In the indices the length of the left radius (214. 5 mm.) has been used.

[2] The index calculated with the mean length of right and left radius (215.25 mm.) is 72. 45.

[3] The index calculated with the mean length of right and left radius is 71. 84.