TÜRK TARİH KURUMU

BELLETEN

Cilt: XXXI OCAK 1967 Sayı: 121

MORPHOLOGICAL AND BIOMETRICAL EXAMINATION OF SOME SKULLS FROM THE SARDIS EXCAVATIONS

Dr. ENVER BOSTANCI
Assistant Professor, University of Ankara
Chair man of the Palaeoanthropology

The Sardis excavations are organised by an American Expedition under the direction of Professor Dr. G. M. A. Hanfmann who has regularly sent the human bones found to the Division of Palaeoanthropology[1]. As Consultant Palaeoanthropologist to the Expedition, I am undertaking the cleaning and repair of the bones and an examination of them is proceeding according to their importance. A report has been published giving an account of the examination of the parts on which it has been possible to take measurements[2]. The skeletons were obtained in the course of excavationxs undertaken in the years 1958, 1959, 1960 and 1961. Among these skeletons were nine

[1] For Sardis excavations see Hanfmann 1960. Excavations at Sardis 1959. Bulletin of the American Schools of Oriental Research No. 157 pp. 8-43. Hanfmann, 1961. The Third Campaign at Sardis (1960) Bulletin of the American Schools of Oriental Research No. 162 pp. 8-49. Hanfmann and von Saldern 1961. Exploration of Sardis. The News Bulletin, Institute of International Education. pp. 1-5. Hanfmann, 1962. The Fourth Campaign at Sardis 1961. Bulletin of the American Schools of Oriental Research pp. 1-57. Hanfmann 1963. Bulletin of the American School of Oriental Research pp. 1-65. Hanfmann 1962. Excavations at Sardis. A Short Guide pp. 3-15.

[2] Hanfmann, 1962. The fourth Campaign at Sardis 1961. Bulletin of the American Schools of Oriental Research p. 3.

skulls[3]. Some results were obtained regarding the metric and morphological characters of these skulls which show that the majority of the people who lived at Sardis were of the Mediterraenan type[4]. Although it can be seen that most of these groups are dolichocranic and mesocranic, brachycranic types can be observed particularly in the Byzantine period. The long and narrow skulls seen in the people of ancient Anatolia can also be found among the Sardis population. It can be understood from an examination of the long bones that the Sardis people were of medium height[5].

In the following report the skulls of four individuals belonging to the Byzantine period will be examined and compared with those which formed the subject of my earlier report and the latter will be re-examined in detail.

AGE AND SEX

As can be understood from the sutures, from the wearing down of the teeth and from other morphological and anatomical characters, the individual from Tomb No. 61.1 is a male aged about 50; from Tomb No. 62.13 it is a female aged about 45; from Tomb No. 62.12 it is a female aged about 60 and from Tomb No. 62.11 a female aged about 40. All these skulls came from tombs of the Byzantine period.

MORPHOLOGICAL AND BIOMETRICAL CHARACTERS OF THE FOUR SKULLS

Calvarium from Tomb 62.1. The processus styloides and mastoids are large[6]. The occipitalis is partially rounded and there is no occipital flattening[7]. The protuberantia occipitalis externa is rather pronoun-

[3] Hanfmann, 1963. The fifth Campaign at Sardis 1962. Bulletin of the American School of Orienteal Research p. 4.

[4] The bones from the excavations were extremely well packed and arrived at the Institute in good condition. I am very grateful to Mrs. E. H. Kohler for the care with which they were collected.

[5] Hanfmann, 1962. A Shorth Guide to the Excavations at Sardis, p. 4.

[6] Hanfmann, 1962. A Short Guide to the Excavations at Sardis, p. 7.

[7] The period to which the skeletons examined belong has been classified according to the material coming from the tombs. Among these the date of one individual is doubtful. The femur shows bullet holes and this individual have come to Sardis later. The skull does not show Byzantine characteristics, the occipital being flat. The individual was probably one of the invaders of Sardis.

ced. The linea plani nuchalis and the linea nuchae terminalis are strong. The foramen condylicum posterior to the processus mastoidea is rather large. The sutura lambdoides and the sutura occipito-mastoidea are open.

This individual has a rather receding frontal which is narrow compared with the posterior part of the skull. The linea temporalis shows a moderate development. The os parietals lie mostly on the posterior part of the calvarium where the diameter is widest. The coronal suture on the right and left side is open as far as the linea temporalis. The sutura spheno-frontalis and part of the sutura spheno-parietalis are closed. In this part of the skull the sutures close between 30 and 70 years of age [8]. The os temporalis is partly flat and the point were the muscle rests is weak. In this skull the sutura parieto-temporalis, the sutura spheno-squamalis and the sutura occipito-mastoidea are open.

When seen from the norma verticalis, it can be observed that the skull has a sphenoid form [9]. In skulls of this shape the greatest width compared with the length is on the posterior part.

The facial part of this skull is complete. On the frontal the arcus superciliaris is not too strong. The nose is narrow and the bridge is deep. The eye sockets approach a rather oblong shape. The zygomats do not project outwards. On the upper jaw the maxilla shows very slight procnatism. A large proportion of the teeth had fallen out during life and on the right side only M3 remains. The palate is U shaped and the lamina palatina is complete. The sutura transversa is of Type C and Group V according to the classification undertaken by myself on Anatolian skulls [10].

Calvaria from Tomb 62.13 The os frontalis is broken at the level of the centre of the orbitis; the temporalis is partly broken on both sides; the ala magna on the right and left and the norma basilaris are completely broken.

The os frontalis has a moderate slope backwards. The margo orbitalis are very thin. It is not possible to say much about the arcus superciliaris as this part is broken. Although the area where the

[8] Şenyürek, 1941. Table III.
[9] Krogman, 1949, Belleten, Vol. XIII, No. 51.
[10] Bostancı, 1953. Tablo X. Şekil C.

sutures are situated is broken, it can be seen that the sutura coronalis, sutura sagittalis and sutura lambdoides are open from inside and outside in this calvaria. The parietals are slightly protuberant from both sides and this characteristic has been observed in most of the Byzantine skulls. The processus mastoides are small in this individual.

The os occipitalis project backwards in the centre. There are two small holes on the left side of the occipital of this individual which suggests that she may have been killed by a weapon. On the right of the sutura lambdoides there are two vormion bones and on the left there is one. The point on the os occipitalis where the muscle rests is weak. The linea nuchae terminalis, the linea plani nuchalis and the protuberantia occipitalis externa are not well developed. There is no occipital or lambdoid flattening.

If the calvaria is examined from the norma verticalis, it can be seen to have an ovoid form.

Calvaria from Tomb 62.12. A large part of the os parietalis is broken on the left side. When the calvaria is examined from the norma verticalis it can be seen to have a rhomboid shape.

A large proportion of the sutures are closed both from the inside and outside. The sutura coronalis is joined as far as the sutura spheno-parietalis on right and left both from the inside and outside. The sutura sagittalis is closed as far as the lamda on the inside and outside. The sutura lamdoides is closed on right and left as far as the parieto-mastoidea from the inside and outside. On both left and right the sutura parieto-temporalis, the sutura spheno-parietalis and the sutura spheno-frontalis are open.

On the os frontalis the tuber frontale is pronounced. The arcus superciliaris is slightly developed and the margo orbitalis is thin. The os parietalis is protuberant three centimetres in front of the level of the obelians. The linea temporalis is not formed.

The os occipitalis projects strongly outwards at the level of the inion. In the lamda area a slight flattening can be observed. The protuberantia occipitalis externa is slightly marked, while the linea nuchae terminalis, and linea plani nuchalis are not very clear. The crista occipitalis externa is very weak. In this area the occipital is slightly flattened. The processus mastoides is moderately developed and the processus styloides is small. The foramen magnun is oval and the condylus occipitals inclines backwards.

Calvarium from Tomb 62.11. The processus zygomaticus and os nasalis, together with the ala magna, are broken. The os frontalis is rather steep. The tuber frontale is pronounced, while the linea temporalis is not so marked. The arcus superciliaris shows a moderate development. The foramen frontale laterale on the orbits in formed on the right side above the margo orbitalis.

The nose is narrow and the bridge is deep. The eye sockets approach an oblong shape. The maxilla is small and the palate is U-shaped. It is not possible to discern the pattern of the teeth as they are very much worn. On the right side there is one molar and two premolars, while on the left two premolars and one canine remain. The other molars had fallen out during life. The lamina palatina on the palate is complete and the sutura transversa has no characteristic form.

When the cranium is examined from the norma basilaris, it can be seen that the processus styloides in particular is small. The processus mastoides shows a moderate development. The foramen magnum is oval shaped and the crista occipitalis externa which extends from it is clear but the linea nuchae terminalis and the linea plani nuchalis are not very obvious. In this area the os occipitalis shows a slight flattening. It projects exactly in the centre and the protuberantia occipitalis externa is not present.

The os parietals are protuberant at the obelian level. They show a greater development towards the back and the linea temporalis is not marked. The sutura sagittalis, sutura coronalis and sutura lambdoides are all open, and it can be seen that the other sutures are not yet closed.

If the skull is examined from the norma verticalis, it can be seen to have an ovoid shape.

MEASUREMENTS OF THE SKULLS

The length of the glabella occipital in the male individual from Tomb 62.1 is 175 mm. and the width is 145 mm. The cranial index obtaines from these measurements is 82.85. According to Garson's classification this skull falls into the brachycranic category.[11] This

[11] Şenyürek, 1941. p. 221. According to Şenyürek, there are two types of dolichocephal skull in the the Chalcolithic and Copper Ages. The first is the Mediterranean type and the second the Europ-African type. The orbits of this second type are more strongly pronounced, the forehead is receding and the skull is scaphoid.

index in this male calvarium exceeds any found in the Sardis skulls which have been examined up to now. Amongst these there are three skulls which may be included in the brachycranic category, although they are only borderline cases[12] Of these one belongs to a 6-7 year old boy of the Byzantine period from the 1960 excavations, of which the index is 80.24. Also from the Byzantine period and the 1961 excavations the index on a 35 year old male from Tomb 61.28 is 80.67. In addition the index on a 8-10 year old girl from Tombs 61.35 belonging to the Roman period is 80.18. Therefore among the Sardis skulls the number which may be termed brachycranic is increased to four.

The indices obtained on the Sardis skulls are lower than those given by Krogman for Alpine types[13]. The indices approach those given by şenyürek for Brachycranic skulls of the Chalcolithic and Copper Age[14].

This index shows a similarity to the indices found in the brachycranic skulls of the Bronze Age and Hittite periods in Anatolia[15]. These results show that at Sardis slightly brachycranic types are found among the people of the Byzantine period, although it can be seen from our series that the majority of the skulls are dolichocranic and mesocranic. For example, the iddividual from Tomb No. 62.13 has an index of 74.41, that from Tomb No. 62.12 has an index od 76.33, and from Tomb No. 62.11 the skull has an index of 75.41. All these indices are included in the dolichocranic and mesocranic category. Thus in the Sardis skulls examined up to now, four are dolichocranic, four are brachycranic and five are mesocranic.

If the Basion-Bregma height-length index, that is the cranial length-height index is examined, it can be seen that this index in the skull of the individual from Tomb No. 62.1 is 77.71. This skull there-

[12] Şenyürek, 1941. p. 227. Kansu, 1939 pp. 127-131.

[13] Krogman, 1949, p. 423. According to Krogman the cranial indices for men and women for Alpein types are as follows Length - width indices for men are 83.65 to 83.69, length - width indices for women are 83.53 to 84. 95. The cranial indices in women may increase up to 96. 79.

[14] Şenyürek, 1941, Table IV. The indices given by Şenyürek differ between 81.1 to 83. 52.

[15] Şenyürek, 1941, Table VI. The cranial indices in Group 11 differ between 81. 75 to 83. 4 in brachycephalic skulls.

fore belongs to the Hypsicranic category[16]. According to this index the Basion-Bregma height is relatively more developed than the length of the skull. Of the skulls previously examined, it can be observed that according to this index they are mainly of Chamaeocranic and Orthocranic type, that is the Basion-Bregma height is relatively smaller than the length of the skull[17]. One of the skulls from Tomb No. 62.12 of the Byzantine period is Hypsicranic and another from Tomb No. 62.11 is Orthocranic.

The index in a girl aged 8-10 years from Tomb No. 61.35 belonging to the Roman period from the 1961 excavations is 74.47, which is in the Orthocranic category. In the skull of a woman of 50 years from Tomb No. 61.14 also from the 1961 excavations the index is 52.73, which is in the Chamaeocranic category, that is the Basion-Bregma height is relatively not well developed. The Basion-Bregma height-length index in a male individual of 65 years from of the Roman period in the 1960 excavations is 66.12. This individual is therefore within the Chamaeocranic category. In the skull of a boy of 6-7 years of the Byzantine period in the 1960 excavations, the Basion-Bregma height-length index is 74-07, that is within the Orthocranic category.

As can be seen from Table B, out of seven individuals two are in Chamaeocranic category, that is the Basion-Bregma height is relatively less developed than the length of the skull, while three skulls are included in the Orthocranic category, that is the Basion-Bregma height is moderately developed compared with the length. In two individuals the shape of the skull is Hypsicranic, that is the Basion-Bregma height is relatively more developed than the length. Therefore the majority of the skulls examined from the Sardis excavations are relatively low and long.

[16] The Basion - Bregma-Height-Length-Indices were obtained according to the formula given by Martin and Saller, 1957, p. 488.

$$\frac{\text{Basion-Bregma-Height} \quad (17) \times 100}{\text{Greatest length of the skull} \quad (1)}$$

chamaeocran	x — 69.9
orthocran	70.0 — 74.9
hypsicran	74.0 — x

[17] Bostancı, 1963, p. 124. The same resultes were received from the examinations of four skulls.

The Basion-Bregma height-breadth index[18] on a male indivitual from Tomb No. 62.1 of the Byzantine period is 93.79. According to this index this individual is in the Metriocranic category, that is the Basion-Bregma height shows a relatively moderate development. Again the index in a 60-year old woman from Tomb No. 62.12 of the Byzantine period is 100. This index comes within the Akrocranic category, that is the skull is relatively high compared with the width. In another woman of 40 years of age from Tomb No. 62.11 of the Byzantine period the Basion-Bregma height-width index is 96.21. According to this index this individual is in the Metriocranic category, that is the height of the skull is moderately developed compared with the width.

In the skull of an 8-10 years old girl from Tomb No. 61.35 in the 1961 excavations the Basion-Bregma height-breadth index is 92.88. This skull is also Metriocranic. The index in this case shows that it is possible to establish at an early age the shape which the skull will take in adulthood. In a 50-year old women from Tomb No. 61.14 from the 1961 excavations the index is 71.21. According to this index the skull is within the Topeinocranic category, that is the Basion-Bregma height is not so great compared with the width. The index in the skull of a man of the Roman period from the 1960 excavations is 89-78. This is also of the Topeinocranic type. The index in a boy of 6-7 years of the Byzantine period from the 1960 excavations is 92.30 This child's skull is within the Metriocranic category. Another skull in the same category with an index of 91.05 belongs to a 35 year old male from Tomb No. 61.28 of the 1961 excavations.

As can be seen from Table C, there are four individuals, two male and two female, coming within the Metriocranic category, three in the Topeinocranic category, one female and two male, and only one individual, a female, in the Akrocranic category.

According to the Porion-Bregma height-length index of 69.71, a male individual of 50 years of the Byzantine period from Tomb

[18] Basion-Bregma-Height-Width-Index was obtained according to the formula given by Martin and Saller, 1957, p. 489, which is also called Transverso - Vertical Index.

$$\frac{\text{Basion-Bregma-Height}}{\text{Greatest width of the skull}} \quad \frac{(17) \times 100}{(8)}$$

topeinocran	x — 91.9
metriocran	92.0 — 97.9
acrocran	98.0 — x

No. 62.1 comes within the Hypsicranic category, that is the Porion-Bregma height is comparatively more developed than the length of the skull. According to the same index, 61.71, a 40 year old woman's skull comes within the Orthocranic category, that is the Porion-Bregma height is moderately developed compared with the length of the skull. Another female individual of 45 years from the Byzantine period has a Porion-Bregma height -length index of 59.88, which is also within the Orthocranic category. The same index in a 60-year old woman from Tomb No. 62.12 of the Byzantine period is 67.45, which shows that this skull may be included in the Hypsicranic category.

As can be seen from Table D, the Porion-Bregma height-length index in the skull of a 6-7 year old boy of the Byzantine period is 70.30, that is within the Hypsicranic category. In a 8-10 years old child of the Roman period from Tomb No. 61.35 the index is 66.66 and this is also within the Hypsicranic category. All the children's skulls are not Hypsicranic. For example, in the 14-15 years old child the index is 58.82, which is within the Orthocranic category.

The index in a 50 year old woman's skull from Tomb No. 61.14 belonging to the Early Byzantine period is 59.01, that is Orthocranic. In a 65 year old male of the Roman period the index is 65.59, which is within the Hypsicranic category. In another a male skull found in the City Gate location an index of 62.67 was established that is Orthocranic. From these results can be seen that five individuals are Hypsicranic and five Orthocranic. Of these individuals six are female and four male Hypsicranic types are usually male, while the majority of Orthocranic types are female.

A Porion-Bregma height-breadth index of 84.13 is obtained on a male individual from Tomb No. 62.1 belonging to the Byzantine period. This index shows that the skull is in the Metriocranic category, that is the Porion-Bregma height is relatively more developed than the width. Another individual in the same category is a 40 year old female, with an index of 81.81, from Tomb No. 62.11 also from the Byzantine period. The same index in a 60 year old woman from Tomb No. 62.12 is 88.37, which is within the Akrocranic category, that is the Porion-Bregma height is relatively more developed than the with. A fourth skull from the Beyzantine period from Tomb No. 62.13 belonging to a woman of about 45 has an index od 80.46. According to this

index the skull is Metriocranic, that is the Porion-Bregma height shows a relatively moderate development.

The Porion-Bregma height-width index in the other skulls which were previously examined varies from 73.50 to 89.05.

As can be seen from Table, E, an index of 83.14 was obtained on the skull of agirl from 8-10 years from Tomb No. 61. 35 in the 1961 excavations. This index is Metriocranic. Again from the 1961 excavations, an index of 79.70 was obtained on a female of 50 years from Tomb No. 61.14. This index shows that the skull is within the Topeinocranic category, that is the Porion-Bregma height shows relatively less development than the width. This index on a male of 18-20 years from the 1958 excavations is 82.22, which is within the Metriocranic category. The same index in a male of about 65 years of the Roman period in the 1960 excavations is 89.05. This skull is of the Akrocranic type. In a 6-7 years old boy of the Byzantine period also from the 1960 excavations an index of 87.69 was obtained, which is also within the Akrocranic category. In this type of skull the Prion-Bregma height shows a relatively greater development than the width. In a 35 year old male from Tomb No. 61.28 from the 1961 excavations an index of 73.50 was obtained. This index is rather low and includes the skull in the Topeinocranic category, that is the Porion-Bregma height shows a relatively smaller development than the width. There is an index of 76.69 in a girl of 14-15 years from the Roman period, Tomb No. 61. 36 of the 1961 excavations, which is also in the Topeinocranic category. Out of 11 individuals examined five are of the Metriocranic type, three are Topainocranic and three Akrocranic. Of these two men three woman are Metriocranic, one man and two women are Topeinocranic and two men and one women Akrocranic.

The transverse fronto-parietal index expresses the relationship between the maximum width and minimum width of the frontal. An index of 63.44 was obtained on the skull of a male individual from Tomb No. 62.1 of the Byzantine period. According to this index this skull is in the Stenometopic category, that is the minimum width of the frontal is realatively less developed than the width of the skull. There is an index of 69.53 on a 45 year old female skull from Tomb No. 62.13 of the Byzantine period. This individual is included in the Eurymetopic category, that is the minimum width of the frontal shows a relatively greater development than the width of the skull.

The fronto-parietal index in a 60 year old woman's skull fromTomb No. 62.12 of the Byzantine period is 64.34. This individual is included in the Stenometopic category. Another individual in the Eurymetopic category with an index of 72.72 is a 40 year old woman from Tomb No. 62.11 of the Byzantine period.

An index of 70.38 was obtained on the skull of a boy of 6-7 years old from the Byzantine period in the 1961 excavations. This index is in the Eurymetopic category. The index on a 8-10 years old girl from Tomb No. 61.35 also from the 1961 excavations is 62.54, which is in the Stenometopic category. An index of 71.11 was found on the skull of a 60 years old woman from Tomb No. 61.5 of the Byzantine period in the 1960 excavations, which is in the Eurymetopic category. An indiviaual in the Metriometopic category with an index of 66.91 is a 14-15 year old girl from Tomb No. 61.36 of the Roman period in the 1960 excavations. In this type the minimum width of the frontal is moderately developed compared with the width of the skull. An index of 73.84 was obtained on a 45 year old woman from Tomb No. 61.7 of the Byzantine period from the 1960 excavations, which is in the Eurymetopic category. Another individual of this type is a 50 year old woman from the Byzantine period of the 1961 excavations with a fronto-parietal index of 71.58. A 65 year old male from the Roman period in the 1960 excavations has an index of 67.15, which is in the Metriometopic category. Two othar individuals in the Eurymetopic category are a male of about 18-20 from the City Gate location in the 1958 excavation with an index of 73.86 and a 35 year old male from Tomb No 61.28 of the Byzantine period of the 1961 excavations with an index of 70.19.

According to these results eight individuals are in the Eurymetopic category, two in the Metriometopic and three in the Stenometopic category. If the types are classified according to sex, of five males three are Eurymetopic, one is Metriometopic and one Stenometopic; of eight females five are Eurymetopic, one Metriometopic and two Stenometopic. As can be seen from Table F, the largest number of these Sardis skulls is in the Eurymetopic category. It can be observed that in the Sardis skulls there is a greater relative development in the frontal than in the width of the skull, which is a modern character. Therefore the Sardis skulls in general are of a narrow type.

The upper facial index expresses the relationship between the Byzygomatic dimameter and the Nasion-Prosthion length. This measurement in a 50 year old male from Tomb No. 62.1 of the Byzantine period from the 1962 excavations is 66 mm. and the byzygomatic diameter is 123 mm. The index obtained from these messurements is 53.65 which is in the Mesen category, that is the upper face length shows a moderate development compared with the byzygomatic diameter. The Nasion-Prosthion length on a 40 year old woman is 68 mm. and the byzygomatic diameter is 122 mm. This gives an index of 55.73. This is within the Leptene category, that is the upper face length is relatively more developed than the byzygomatic width. The upper facial index in a 8-10 years old girl from Tomb No. 61.35 of the Roman period from the 1961 excavations is 51.15. According to this index this individual is within the Mesen category.

The same index on the skull of a 65 year old male of the Roman period from the 1961 excavations is 52.80, which is also within the Mesen category, and another individual in the same category with an index of 50.34 is a 35 year old male from Tomb No. 61.28 of the Byzantine period. Of the five individuals examined, four are in the Mesen category, that is the face is not so long, and one in the Leptene category.

It was possible to obtain the total facial index in only one individual. This was a 65 year old male belonging to the Roman period. The Nasion-Gnathion length was 106 mm. and the Byzygomatic diameter 125 mm. From these measurements the index obtained is 84.80. According to Kallmann's classification of the total facial index, this is within the Euryprosopic category, that is the Nasion-Gnathion length shows a less than average development compared with the width of the face.

The nasal index is rather important as it provides information about the type of nose. In a male from Tomb No. 62.1 of the Byzantine period the length of the nose is 49 mm. and the width is 24.5 mm. From these measurements the index obtained is 50.00. Therefore this 50 year old male is in the Mesorrhin category, that is the width of the nose shows a moderate development compared with the height, which means the nose is of medium width. The nasal length in a 40 year old woman from Tomb No. 62.11 of the Byzantine period is 50 mm. and the width is 24 mm. The index obtained from these

measurements is 48.00 According to this index the nose is also within the Mesorrhin category, that is it shows an average width.

The nasal length on a girl of 8-10 years of the Roman period from the 1961 excavations is 41.00 mm. and the width is 14.50 mm. The index obtained from these measurementd is 35.36, which is within the Leptorrhin category, that is the width of the nose is relatively narrow compared with the length. The length of the nose on a 65 year old male from the Roman period in the 1960 excavations is 51.00 mm. and the width is 25.00 mm. The index obtained from these measurements is 47.02, which is included in the Mesorrhin category, that is the nose is of medium width. In a 35 year old male from Tomb No. 61.28 of the Byzantine period, the nasal length is 57.00 mm. and the width 19.00 mm. The index obtained is 33.33. This individual within the Leptorrhin category, that is he has a very narrow nose. Of the five individuals examined, three are in the Mesorrhin category and two in the Leptorrhin category.

When the Orbital index in the Sardis skulls is examined, the following results were obtained. In a male individual from Tomb No. 62.1 of the Byzantine period from the 1962 excavations the index is 80.23. According to this index the eye sockets of this individual is Mesoconch, that is the orbits are of average height. The orbital index in a 40 year old woman from Tomb No. 62.11 of the Byzantine period from the 1962 excavations is 68.13. Therefore this individual is within the Chamaeoconch category, that is the height of the orbits is relatively less developed than the width. The index in a 8-10 year old girl from Tomb No. 61.35 of the Roman period is 92.64. According to this index this child is within the Hypsiconch category, that is the orbital height is relatively much greater than the width.

The orbital index in a 65 year old male from the 1960 excavations is 92.00, which is also within the Hypsiconch category. In a 6-7 year old boy from a tomb of the Byzantine period the orbital index is 91.66, which is again of the Hypsiconch type. The orbital index is 85.36 on a 35 year old male from Tomb No. 61.28 of the Byzantine period of the 1961 excavations. This is individual is also in the Hypsiconch category. Of the six individuals examined, one is in the Chamaeoconch category, one Mesoconch and four Hypsiconch.

SUMMARY

In this article 13 skulls from the Sardis excavations were examine. of which 3 belong to the Romen and 10 to the Byzantine Period. The skulls found in the roman tombs belong to 3 individuals of which one is an adult and two are belonging to children. The adult individual in an about 65 years old male, one child is between 8-10, the second between 14-15 years old, both of them are female. Six of the Byzantine Period skulls belong to female individuals, the age of them is about 60, 45, 50, 60, 45 and 40 years. Three skulls belong to male individuals of age about 20, 35 and 50 years and one is of a child between 6-7 years of age. From the complete skulls 25 measurements on each were taken and 17 indices obtained. All measurements and indices are shown in the tables.

The results of the biometrical measurements show that among the Sardis population there were types belonging to the brachicranic category although they are only borderline cases. The indices obtained from the brachicranic skulls differ from 80-18 to 82.85. These indices are rather close to the indices found in the brachicranic skulls of the Bronze Age Hithite Periods in Anatolia. In the Sardis skulls examined up to now 4 are dolichocranic, 4 are brachicranic and 5 are mesocranic.

The morphological and biometrical characterictics of the skulls confirm the opinion that the people who lived at Sardis were mainly of the Mediterranean type. The indices obtained from the mesocranic skulls differ from 75.41 to 76.70 and the dolichocranic skulls from 73.53 to 74.41.

After a careful examination of the Basion-Bregma-Height-Length-Index it can be seen that the majority of the skulls of the Sardis population were relatively low and long. One skull from the Roman and two skulls from the Byzantine Period are orthocranic type, one skull from the Roman and one skull from the Byzantine Period are chamocranic type. (seen Table B).

As can be seen in Table C the Basion-Bregma-Height-Breadth-Index shows that there are 4 individuals, two male and two female, coming within the metriocranic category, three in the topeinocranic category, one female and two male and only one individual, a female, with in the akrocranic category. According to the Porion - Bregma-Height-Length-Index 5 individuals are hypsicranic and 5 orthocranic.

Of these individuals six are female and four male. Hypsicranic types are usually male, while the majority of the orthocranic types are female. The Porion-Bregma-Height-Width-Index in all the skulls which were examined varies from 73.50 to 89.05. Out of eleven individuals examined five are of the metriocranic type, three are topeinocranic and three akrocranic. Of these two men and two women are topeinocranic and two men and one women akrocranic.

The Transverse-Fronto-Parietal-Index expresses the relationship between the maximum width and the minimum width of the frontal. The results obtained from this index show that 8 individuals belong to the eurymetopic category, two to the metriometopic and three to the stenometopic category. (see Table F). It can be observed that in the Sardis skulls there is a greater relative development in the frontal than in the width of the skull which is of modern character.

It was possible to obtain the Total Facial Index in only one individual. According to Kallmann's classification of the Total Facial Index this is within the euryprosopic category, that is the Nasion-Gnathian-Length shows a less than average development compared with the width of the face. The Nasal-Index is rather important as it provides information about the type nose. Of the five individuals examined three are in the mesorrhin category and two in the leptorrhin category.

When the orbital index in the Sardis skulls was taken the following results were obtained: Of six individuals examined one is belonging to the chamaeoconch category, one to mesoconch and four to the hypsiconch category.

LITERATURE

BOSTANCI, E. 1953. Anterior ve Posterior Mediopalatin kemikleri. Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi dergisi. Val. XI, No. 2, 3, 4 pp. 213-239. Plates 1-XI.

BOSTANCI, E. 1963, An examination of some human skeletal remains from the Sardis excavation. Antropoloji Vol. I, No. I. pp. 121-131.

HANFMANN, G. M. A., 1960. Excavation at SARDIS 1959. Bulletin of the American Schools of Oriental Research No. 157, pp. 8-54.

HANFMANN, G. M. A., 1961. The Third Campaign at Sardis (1960) Bulletin of the American Schools of Oriental Research No. 162. pp. 8-49.

HANFMANN, G. M. A., 1962 The Fourth Campaign at Sardis (1961) Bulletin of the American Schools of Oriental Research. pp. 1-57.

HANFMANN, G. M. A., and Von Saldern, A. 1961 Exploration of Sardis. The News Bulletin Institute of Intenational Education. pp. I-5.

HANFMANN, G. M. A., 1962 Excavations at Sardis. As Short Guide. pp. 3-15.

HANFMANN, G. M. A., 1963. The Fifth Campaign at Sardis (1962). Bulletin of the American Schools of Oriental Research. pp. 1-65.

HAFMANN, G. M. A., 1965. The Seventh Campaign at Sardis (1964) Bulletin of the American Schools of Oriental Research. pp. 2-37.

KANSU, Ş. A., 1939 Anadolunun ırk tarihi üzerine Antropolojik bir tetkik. Belleten No. 9. pp. 127-131.

KROGMAN, W. M., 1937., Cranial types from Alişar Hüyük and their relations to other racial typs, ancient and modern, of Europe and Western Asia. In Von der Osten's Alişar Hüyük, seasons of 1930-1932. Part III. OIP, vol. XXX. Researches in Anatolia, vol. IX, Chicago, pp. 213-293.

KROGMAN, W. M., 1949. Ancient cranial types at Çatal Hüyük and Tell Al-Judaidah, Syria, from the late fifth millenium B.C. to the mid-seventh century, A.D. Belleten vol. XIII, No. 51. pp. 407-477.

KURTH, G., 1954. Einige Probleme der Körperhöhenbestimmung aus den langen Gliedmaszenknochen. Homo, 5 Band 2-4 Heft.

MARTIN, R. 1928. Lehrbuch der Anthhropologie. 2 Band 2 Aufl. Fischer Jena.

ŞENYÜREK, M. 1941. Anadolu Bakır çağı ve Eti sekenesinin Kronolojik tetkiki. Belleten No. 19. pp. 219-229.

ŞENYÜREK, M. 1946. Türk Tarih Kurumu adına yapılan Maşat Hüyük kazısından çıkarılan kafataslarının tetkiki. Study of the skulls from Maşat Hüyük, excavated under auspices of the Turkish Historical Society. Belleten, vol. X, no. 38, pp. 231-242 and pp. 243-254.

ŞENYÜREK, M. 1947. A note on the duration of life of the ancient inhabitantse of Anatolia. American Journal of Physical Anthropology, vol. 5, n.s., No. 1, pp. 55-66.

ŞENYÜREK, M. and TUNAKAN, S. 1951. Şeyh Höyük iskeletleri. The skeletons from Şeyh Höyük. Belleten, vol. XV, no. 60, pp. 431-438. and 439-445.

ŞENYÜREK, M. 1954. A note on the skulls of Chalcolithic Age from Yümüktepe. Belleten Vol. XVIII. no. 69. pp. 1-25.

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. Cranial Suture closure. Its progres and age reletionship. Part II. Ectocranial closure in adult males of white stock. American Journal of Physical Antropology. vol. VIII, no. 1, pp. 23-45.

TABLE A

Cranial Index in the Sardis Skulls

Year	Period	Tomb No	Age	Sex	Index	Type
1960	Byzantine	—	6-7	♂	80.24	Brachycranic
1961	Roman	61.35	8-10	♀	80.18	Brachycranic
1960	Byzantine	61.5	60	♀	76.70	Mesocranic
1961	Roman	61.36	14-15	♀	76.43	Mesocranic
1960	Byzantine	61.7	45	♀	75.80	Mesocranic
1961	Early Byzantine	61.14	50	♀	74.04	Dolichocranic
1960	Roman	—	65	♂	73.65	Dolichocranic
1958	'City Gate'	V.20	18-20	♂	73.53	Dolichorcranic
1961	Byzantine	61.28	35	♂	80.67	Brachycranic
1962	Byzantine	62.1	50	♂	82.85	Brachycranic
1962	Byzantine	62.12	60	♀	76.33	Mesocranic
1962	Byzantine	62.13	45	♀	74.41	Dolichocranic
1962	Byzantine	62.11	40	♀	75.41	Mesocranic

TABLE B

Basion-Bregma height-length index in the Sardis skulls

Year	Period	Tomb No	Age	Sex	Index	Type
1960	Byzantine	—	6-7	♂	74.07	Orthocranic
1961	Roman	61.35	8-10	♀	74.47	Orthocranic
1960	Byzantine	61.5	60	♀	—	—
1961	Roman	61.36	14-15	♀	—	—
1960	Byzantine	61.7	45	♀	—	—
1961	Early Byzantine	61.14	50	♀	52.73	Chamaeocranic
1960	Roman	—	65	♂	66.12	Chamaeocranic
1958	'City Gate'	V.20	18-20	♂	—	—
1961	Byzantine	61.28	35	♂	—	—
1962	Byzantine	62.1	50	♂	77.71	Hypsicranic
1962	Byzantine	62.12	60	♀	76.33	Hypsicranic
1962	Byzantine	62.13	45	♀	—	—
1962	Byzantine	62.11	40	♀	72.57	Orthocranic

TABLE C

Basion-Bregma Height-Length Index

Year	Period	Tomb No.	Age	Sex	Index	Type
1960	Byzantine	—	6-7	♂	92.30	Metriocranic
1961	Roman	61.35	8-10	♀	92.88	Metriocranic
1960	Byzantine	61.5	60	♀	—	—
1961	Roman	61.36	14-15	♀	—	—
1960	Byzantine	61.7	45	♀	—	—
1961	Early Byzantine	61.14	50	♀	71.21	Topeinocranic
1960	Roman	—	65	♂	89.78	Topeinocranic
1958	'City Gate'	V.20	18-20	♂	—	—
1961	Byzantine	61.28	35	♂	91.05	Topeinocranic
1962	Byzantine	62.1	50	♂	93.79	Metriocranic
1962	Byzantine	62.12	60	♀	100.00	Akrocranic
1962	Byzantine	62.13	45	♀	—	—
1962	Byzantine	62.11	40	♀	96.21	Metriocranic

TABLE D

PORION-BREGMA HEIGHT-LENGTH INDEX

Year	Period	Tomb No.	Age	Sex	Index	Type
1960	Byzantine	—	6-7	♂	70.30	Hypsicranic
1961	Roman	61.35	8-10	♀	66.66	Hypsicranic
1960	Byzantine	61.5	60	♀	—	—
1961	Roman	61.36	14-15	♀	58.82	Orthocranic
1960	Byzantine	61.7	45	♀	—	—
1961	Early Byzantine	61.14	50	♀	59.01	Orthocranic
1960	Roman	—	65	♂	65.59	Hypsicranic
1958	'City Gate'	V.20	18-20	♂	62.67	Orthocranic
1961	Byzantine	61.28	35	♂	—	—
1962	Byzantine	62.1	50	♂	69.71	Hypsicranic
1962	Byzantine	62.12	60	♀	67.45	Hypsicranic
1962	Byzantine	62.13	45	♀	59.88	Orthocranic
1962	Byzantine	62.11	40	♀	61.71	Orthocranic

TABLE E

PORION-BREGMA HEIGHT-WIDTH INDEX

Year	Period	Tomb No.	Age	Sex	Index	Type
1961	Byzantine	—	6-7	♂	87.69	Akrocranic
1961	Roman	61.35	8-10	♀	83.14	Metriocranic
1960	Byzantine	61.5	60	♀	—	—
1961	Roman	61.36	14-15	♀	76.69	Topeinocranic
1960	Byzantine	61.7	45	♀	—	—
1961	Early Byzantine	61.14	50	♀	79.70	Topeinocranic
1960	Roman	—	65	♂	89.05	Akrocranic
1958	'City Gate'	V.20	18-20	♂	82.22	Metriocranic
1961	Byzantine	61.28	35	♂	73.50	Topeinocranic
1962	Byzantine	62.1	50	♂	84.13	Metriocranic
1962	Byzantine	62.12	60	♀	88.37	Akrocranic
1962	Byzantine	62.13	45	♀	80.46	Metriocranic
1962	Byzantine	62.11	40	♀	81.81	Metriocranic

TABLE F

TRANSVERSE FRONTO-PARIETAL INDEX

Year	Period	Tomb No.	Age	Sex	Index	Type
1961	Byzantine	—	6-7	♂	70.38	Eurymetopic
1961	Roman	61.35	8-10	♀	62.54	Stenometopic
1960	Byzantine	61.5	60	♀	71.11	Eurymetopic
1961	Roman	61.36	14-15	♀	66.91	Metriometopic
1960	Byzantine	61.7	45	♀	73.84	Eurymetopic
1961	Early Byzantine	61.14	50	♀	71.58	Euremetopic
1960	Roman	—	65	♂	67.15	Metriometopic
1958	'City Gate'	V.20	18-20	♂	73.86	Eurymetopic
1961	Byzantine	61.28	35	♂	70.19	Eurymetopic
1962	Byzantine	62.1	50	♂	63.44	Stenometopic
1962	Byzantine	62.12	60	♀	64.34	Stenometopic
1962	Byzantine	62.13	45	♀	69.53	Eurymetopic
1962	Byzantine	62.11	40	♀	72.72	Eurymetopic

TABLE G

TRANSVERSE FONTAL INDEX

Year	Period	Tomb No.	Age	Sex	Index
1961	Byzantine	—	6-7	♂	87.14
1961	Roman	61.35	8-10	♀	73.89
1960	Byzantine	61.5	60	♀	82.00
1961	Roman	61.36	14-15	♀	78.41
1960	Byzantine	61.7	45	♀	—
1961	Early Byzantine	61.14	50	♀	82.55
1960	Roman	—	65	♂	48.93
1958	'City Gate'	V.20	18-20	♂	86.66
1961	Byzantine	61.28	35	♂	83.13
1962	Byzantine	62.1	50	♂	76.03
1962	Byzantine	62.12	60	♀	79.04
1962	Byzantine	62.13	45	♀	81.65
1962	Byzantine	62.11	40	♀	89.71

TABLE H

CALVARIAL HEIGHT-LENGTH INDEX

Calvarial Height II - Glabella-Lamba Length

Year	Period	Tomb No.	Age	Sex	Index
1961	Byzantine	—	6-7	♂	44.02
1961	Roman	61.35	8-10	♀	39.71
1960	Byzantine	61.5	60	♀	41.48
1961	Roman	61.36	14-15	♀	30.47
1960	Byzantine	61.7	45	♀	40.76
1961	Early Byzantine	61.14	50	♀	36.18
1960	Roman	—	65	♂	33.13
1958	'City Gate'	V.20	18-20	♂	35.12
1961	Byzantine	61.28	35	♂	45.73
1962	Byzantine	62.1	50	♂	63.63
1962	Byzantine	62.12	60	♀	47.90
1962	Byzantine	62.13	45	♀	55.11
1962	Byzantine	62.11	40	♀	46.82

TABLE K

CALVARIAL HEIGHT-LENGHT INDEX

Calvarial Height I and Glabella-Inion Length

Year	Perriod	Tomb No.	Age	Sex	Index
1961	Byzantine	—	6-7	♂	59.43
1961	Roman	61.35	8-10	♀	50.29
1960	Byzantine	61.5	60	♀	55.49
1961	Roman	61.36	14-15	♀	53.82
1960	Byzantine	61.7	45	♀	52.18
1961	Early Byzantine	61.14	50	♀	54.85
1960	Roman	—	65	♂	54.34
1958	'City Gate'	V.20	18-20	♂	54.46
1961	Byzantine	61.28	35	♂	48.83
1962	Byzantine	62.1	50	♂	30.63
1962	Byzantine	62.12	60	♀	37.80
1962	Byzantine	62.13	45	♀	25.64
1962	Byzantine	62.11	40	♀	32.93

TABLE L

SAGITTAL FRONTO-PARIETAL INDEX

Bregma-Lamda Arc and Nazion-Bregma Arc

Year	Period	Tomb No.	Age	Sex	Index
1961	Byzantine	—	6-7	♂	100.82
1961	Roman	61.35	8-10	♀	110.23
1960	Byzantine	61.5	60	♀	97.50
1961	Roman	61.36	14-15	♀	104.91
1960	Byzantine	61.7	45	♀	96.00
1961	Early Byzantine	61.14	50	♀	99.63
1960	Roman	—	65	♂	121.35
1958	'City Gate'	V.20	18-20	♂	118.23
1961	Byzantine	61.28	35	♂	123.07
1962	Byzantine	62.1	50	♂	96.15
1962	Byzantine	62.12	60	♀	108.69
1962	Byzantine	62.13	45	♀	—
1962	Byzantine	62.11	40	♀	196.00

TABLE M

SAGITTAL-PARIETO-OCCIPITAL INDEX

Bregma-Lamda Arc and Lamda-Opisthion Arc

Year	Period	Tomb No.	Age	Sex	Index
1961	Byzantine	—	6-7	♂	78.68
1961	Roman	61.35	8-10	♀	78.57
1960	Byzantine	61.5	60	♀	—
1961	Roman	61.36	14-15	♀	83.59
1960	Byzantine	61.7	45	♀	—
1961	Early Byzantine	61.14	50	♀	88.88
1960	Roman	—	65	♂	82.56
1958	'City Gate'	V.20	18-20	♂	81.61
1961	Byzantine	61.28	35	♂	89.84
1962	Byzantine	62.1	50	♂	96.80
1962	Byzantine	62.12	60	♀	84.00
1962	Byzantine	62.13	45	♀	—
1962	Byzantine	62.11	40	♀	61.22

MEASUREMENTS OF SKULL FROM SARDIS

BYZANTİNE PERIOD

Sex : ♀ Tomb 62.12
Approx. Age : 60 Box : 27

MEASUREMENTS	mm.
a) Glabella-occipital length	169
b) Glabella-inion length	167
c) Glabella-lambda length	164
d) Nasion-basion length	94
e) Maximum breadth	129
f) Minimum frontal diameter	83
g) Maximum frontal diameter	105
h) Biauricular breadth	—
i) Basion-bregma height	129
j) Porion-bregma height	114
k) Galvarial height I (maximum height above glabella-inion line)	80
l) Calvarial height II (height of bregma above glabella-lambda line)	62
m) Horizontal circumference	480
n) Transverse arc	310
o) Nazion-bregma arc	115
p) Bregma-lambda arc	125
q) Lambda-opisthion arc	110
r) Mean thickness of parietal	4
s) Nasion-gnathion length	—
t) Nasion-prosthion length	—
u) Byzygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	—
w) Orbit height	—
x) Nasal length	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ Tomb 62.12
Approx. Age : 60 Box : 27

Cranial index	$\frac{e \times 100}{a}$	76.33
Basion-bregma beight-length index	$\frac{i \times 100}{a}$	76.33
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	100.00
Porion-bregma height-length index	$\frac{j \times 100}{a}$	67.45
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	88.37
Calvarial height-length index I	$\frac{k \times 100}{b}$	47.90
Calvarial height-length index II	$\frac{l \times 100}{c}$	37.80
Transverse frontal index	$\frac{f \times 100}{g}$	79.04
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	64.34
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	108.69
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	84.00
Transverse cranio-fazial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ Tomb 62.11
Approx. Age : 40 Box : 41

MEASUREMENTS	mm.
a) Glabella-occipital length	175
b) Glabella-inion length	173
c) Glabella-lambda length	167
d) Nasion-basion length	96
e) Maximum breadth	132
f) Minimum frontal diameter	96
g) Maximum frontal diameter	107
h) Biauricular breadth	100
i) Basion-bregma height	127
j) Porion-bregma height	108
k) Calvarial height I (maximum height above glabella-inion line)	81
l) Calvarial height II (height of bregma above glabellalambda line)	55
m) Horizontal circumference	500
n) Transverse arc	300
o) Nazion-bregma arc	125
p) Bregma-lambda arc	245
q) Lambda-opisthion arc	150
r) Mean thickness of parietal	6
s) Nasion-gnathion length	—
t) Nasion-prosthion length	68
u) Byzygomatic diameter	122
v) Orbit width (dacryon-entoconchion)	R.43, L.43
w) Orbit height	R.29, L.30
x) Masal length	50
y) Nasal width	24

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ Tomb 62.11
Approx. Age : 40 Box : 41

Cranial index	$\frac{e \times 100}{a}$	75.41
Basion-bregma height-length index	$\frac{i \times 100}{a}$	72.57
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	96.21
Porion-bregma height-length index	$\frac{j \times 100}{a}$	61.71
Perion-bregma height-bregadth index	$\frac{j \times 100}{e}$	81.81
Calvarial height-lenght index I	$\frac{k \times 100}{b}$	46.82
Calvarial height-length index II	$\frac{l \times 100}{c}$	32.93
Transverse frontal index	$\frac{f \times 100}{g}$	89.71
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	72.72
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	196.00
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	61.22
Transverse cranio-facial index	$\frac{u \times 100}{e}$	92.42
Zygo-frontal index	$\frac{f \times 100}{u}$	78.68
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	55.73
Orbital index	$\frac{w \times 100}{v}$	68.13
Nasal index	$\frac{y \times 100}{x}$	48.00

MEASUREMENTS OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ Grave 62.13
Approx. Age : 45 Box : 20

MEASUREMENTS	mm.
a) Glabella-occipital length	172
b) Glabella-inion length	127
c) Glabella-lambda length	156
d) Nasion-basion length	—
e) Maximum breadth	128
f) Minimum frontal diameter	89
g) Maximum frontal diameter	109
h) Biauricular breadth	—
i) Basion-bregma height	—
j) Porion-bregma height	103
k) Galvarial height I (maximum height above glabella-inion line)	70
l) Calvarial height II (height of bregma above glabella-lambda line)	40
m) Horizontal circumference	49
n) Transverse arc	—
o) Nazion-bregma arc	—
p) Bregma-lambda arc	115
q) Lambda-opisthion arc	—
r) Mean thickness of parietal	4
s) Nasion-gnathion length	—
t) Nasion-prosthion length	—
u) Byzygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	—
w) Orbit height	—
x) Nasal length	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ Grave 62.13
Approx. Age : 45 Box : 20

Cranial index	$\frac{e \times 100}{a}$	74.41
Basion-bregma height-length index	$\frac{i \times 100}{a}$	—
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	—
Porion-bregma height-length index	$\frac{j \times 100}{a}$	59.88
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	80.46
Calvarial height-length index I	$\frac{k \times 100}{b}$	55.11
Calvarial height-length index II	$\frac{l \times 100}{c}$	25.64
Transverse frontal index	$\frac{f \times 100}{g}$	81.65
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	69.53
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	—
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	—
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{u \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♂ Tomb 62.1
Approx. Age : 50 Box : 1

MEASUREMENTS	mm.
a) Glabella-occipital length	175
b) Glabella-inion length	165
c) Glabella-lambda length	173
d) Nasion-basion length	96.5
e) Maximum breadth	145
f) Minimum frontal diameter	92
g) Maximum frontal diameter	121
h) Biauricular breadth	118
i) Basion-bregma height	136
j) Porion-bregma height	122
k) Calvarial height I (maximum height above glabella-inion line)	105
l) Calvarial height II (height of bregma above glabella-lambda line)	53
m) Horizontal circumference	513
n) Transverse arc	32.5
o) Nazion-bregma arc	130
p) Bregma-lambda arc	125
q) Lambda-opisthion arc	122
r) Mean thickness of parietal	6
s) Nasion-gnathion length	—
t) Nasion-prosthion length	66
u) Byzygomatic diameter	123
v) Orbit width (dacryon-entoconchion)	R.43, L.43
w) Orbit height	34.5
x) Nasal length	49
y) Nasal width	24.5

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ Tomb 62.1
Approx. Age : 50 Box : 1

Cranial index	$\frac{e \times 100}{a}$	82.85
Basion-bregma height-length index	$\frac{i \times 100}{a}$	77.71
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	93.79
Porion-bregma height-length index	$\frac{j \times 100}{a}$	69.71
Porion-bregma breadth index	$\frac{j \times 100}{e}$	84.13
Calvarial height-length index I	$\frac{k \times 100}{b}$	63.63
Calvarial height-length index II	$\frac{l \times 100}{c}$	30.63
Transverse frontal index	$\frac{f \times 100}{g}$	76.03
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	63.44
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	96.15
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	96.80
Transverse cranio-facial index	$\frac{u \times 100}{e}$	84.82
Zygo-frontal index	$\frac{f \times 100}{u}$	74.79
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	53.65
Orbital index	$\frac{w \times 100}{v}$	80.23
Nasal index	$\frac{y \times 100}{x}$	50.00

MEASUREMENTS OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀ 1961 season
Approx. Age : 35 Tomb 61.28

MEASUREMENTS	mm.
a) Glabella-occipital length	—
b) Glabella-inion length	171
c) Glabella-lambda length	164
d) Nasion-basion length	98
e) Maximum breadth	151
f) Minimum frontal diameter	106
g) Maximum frontal diameter	127.50
h) Biauricular breadth	103.50
i) Basion-bregma height	137.50
j) Porion-bregma height	111
k) Calvarial height I (maximum height above glabella-inion line)	83.50
l) Calvarial height II (height of brogma above glabella-lambda line)	75
m) Horizontal circumference	517
n) Transverse arc	308
o) Nazion-bregma arc	104
p) Bregma-lambda arc	128
q) Lambda-opisthion arc	115
r) Mean thickness of parietal	—
s) Nasion-gnathion lenght	—
t) Nasion-prosthion length	72
u) Bizygomatic diameter	143
v) Orbit width (dacryon-entoconchion)	41
w) Orbit height	35
x) Nasal length	57
y) Nasal width	19

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♂ 1961 season
Approx. Age : 35 Tomb 61.28

Cranidal index	$\frac{e \times 100}{a}$	88.30
Basion-bregma height-length index	$\frac{i \times 100}{a}$	—
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	91.059
Perion-bregma height-lenght index	$\frac{j \times 100}{a}$	64.913
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	73.509
Calvarial height-length index I	$\frac{k \times 100}{b}$	48.8304
Calvarial height-length index II	$\frac{l \times 100}{c}$	45.731
Transverse fronto-parietal index	$\frac{f \times 100}{g}$	83.137
Transverse frontal index	$\frac{f \times 100}{e}$	70.197
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	123.076
Sagittal parieto-occpitial index	$\frac{q \times 100}{p}$	89.843
Transverse cranio-facial index	$\frac{ü \times 100}{o}$	94.701
Zygo-frontal index	$\frac{f \times 100}{u}$	74.125
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	50.349
Orbital index	$\frac{w \times 100}{v}$	85.365
Nasal index	$\frac{y \times 100}{x}$	33.333

MEASUREMENTS OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♂ 1960 season
Approx. Age : 65 Box : 17

MEASUREMENTS	mm.
a) Glabella-occipital length	186
b) Glabella-inion length	184
c) Glabella-lambda length	172
d) Nasion-basion length	94
e) Maximum breadth	137
f) Minimum frontal diameter	92
g) Maximum frontal diameter	188
h) Biauricular breadth	95
i) Basion-bregma height	123
j) Porion-bregma height	122
k) Calvarial height I (maximum height above glabella-inion line)	100
l) Calvarial height II (height of bregma above glabella-lambda line)	57
m) Horizontal circumferenxce	522
n) Transverse arc	305
o) Nazion-bregma arc	103
p) Bregma-lambda arc	125
q) Lambda-opisthion arc	103.20
r) Mean thickness of parietal	—
s) Nasion-gnathion length	106
t) Nasion-prosthion length	66
u) Bizygomatic diameter	125
v) Orbit width (dacryon-entoconchion)	37.50
w) Orbit height	34.50
x) Nasal length	51
y) Nasal width	25

INDICES OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♂ 1960 season
Approx. Age : 65 Box : 17

Cranial index	$\frac{e \times 100}{a}$	73.65
Basion-bregma height-length index	$\frac{i \times 100}{a}$	66.129
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	89.781
Porion-bregma height-lenth index	$\frac{j \times 100}{a}$	65.591
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	89.051
Calvarial height-length index I	$\frac{k \times 100}{b}$	54.347
Calvarial height-length index II	$\frac{l \times 100}{c}$	33.139
Transverse frontal index	$\frac{j \times 100}{g}$	48.936
Transverse fronto-partietal index	$\frac{f \times 100}{e}$	67.153
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	121.359
Sagittal partieto-occipital index	$\frac{q \times 100}{p}$	82.560
Transverse cransnio-facial index	$\frac{u \times 100}{e}$	91.240
Zygo-frontal index	$\frac{f \times 100}{u}$	73.600
Total facial index	$\frac{s \times 100}{u}$	84.800
Upper facial index	$\frac{t \times 100}{u}$	52.800
Orbital index	$\frac{w \times 100}{v}$	92.000
Nasal index	$\frac{y \times 100}{x}$	72.463

MEASUREMENTS OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♀
Approx.
Age: 60

1960 Season
Tomb 61. 5
Box : 6.A

MEASUREMENTS	mm.
a) Glabella-occipital length	176
b) Glabella-inion length	173
c) Glabella-lambda length	170
d) Nasion-basion length	—
e) Maximum breadth	135
f) Minimum frontal diameter	96
g) Maximum frontal diameter	117
h) Biauricular breadth	—
i) Basion-bregma height	—
j) Porion-bregma height	—
k) Calvarial height I (maximum height above glabella-inion line)	96
l) Calvarial height II (height of bregma above glabella-lambda line)	56
m) Horizontal circumferenxce	520
n) Transverse arc	—
o) Nazion-bregma arc	120
p) Bregma-lambda arc	117
q) Lambda-opisthion arc	—
r) Mean thickness of parietal	—
s) Nasion-gnathion length	—
t) Nasion-prosthion length	—
u) Bizygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	—
w) Orbit heigt	—
x) Nasal length	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

LYZANTINE PERIOT

Sex : ♀
Approx.
Age: 60

1960 season
Tomb 61.5
Box : 6.A

Cranial index	$\frac{e \times 100}{a}$	76.704
Basion-bregma height-length index	$\frac{i \times 100}{a}$	—
Basion-bregma height-bregadth index	$\frac{i \times 100}{e}$	—
Porion-bregma height-length index	$\frac{j \times 100}{a}$	—
Porion-bregma height-bregadth index	$\frac{j \times 100}{e}$	—
Calvarial height-length index I	$\frac{k \times 100}{b}$	55.49
Calvarial height-length index II	$\frac{l \times 100}{c}$	41.481
Transverse frontal index	$\frac{f \times 100}{g}$	82.000
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	71.111
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	97.500
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	—
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Uppet facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM

BYZANTINE PERIOD

Sex : ♀ 1960 season
Approx. Tomb 61.7
Age: 45 Box : 6.B

MEASUREMENTS	mm.
a) Glabella-occipital length	171.50
b) Glabella-inion length	162
c) Glabella-lambda length	167
d) Nasion-basion length	—
e) Maximum breadth	130
f) Minimum frontal diameter	96
g) Maximum frontal diameter	—
h) Biauricular breadth	—
i) Basion-bregma heigth	—
j) Porion-bregma height	—
k) Calvarial height I (maximum height above glabella-inion line)	89.50
l) Calvarial height II (height of bregma above glabella-lambda line)	53
m) Horizontal circumferenxce	497
n) Transverse arc	—
o) Nazion-bregma arc	125
p) Bregma-lambda arc	120
q) Lambda-opisthion arc	—
r) Mean thickness of parietal	—
s) Nasion-gnathion length	—
t) Nasion-prosthion length	—
u) Bizygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	—
w) Orbit height	—
x) Nasal length	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♀
Approx.
Age: 45

1960 season
Tomb 61.7
Box : 6.B

Cranial index	$\frac{e \times 100}{a}$	75.80
Basion-bregma height-length index	$\frac{i \times 100}{a}$	—
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	—
Porion-bregma height-length index	$\frac{j \times 100}{a}$	—
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	—
Calvarial height-length index I	$\frac{k \times 100}{b}$	52.186
Calvarial height-length index II	$\frac{l \times 100}{c}$	40.769
Transverse frontal index	$\frac{f \times 100}{g}$	—
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	73.846
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	96.000
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	—
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♀ 1961 season
Approx. Tomb 61.35
Age 8-10 Box : 20

MEASUREMENTS	mm.
a) Glabella-occipital length	166.50
b) Glabella-inion length	171
c) Glabella-lambda length	172.50
d) Nasion-basion length	85
e) Maximum breadth	133.50
f) Minimum frontal diameter	83.50
g) Maximum frontal diameter	113
h) Biauricular breadth	85
i) Basion-bregma height	124
j) Porion-bregma height	111
k) Calvarial height I (maximum height above glabella-inion line)	86
l) Calvarial height II (height of bregma above glabella-lambda line)	68.50
m) Horizontal circumference	501
n) Transverse arc	313
o) Nazion-bregma arc	127
p) Bregma-lambda arc	140
q) Lambda-opisthion arc	110
r) Mean thickness of parietal	—
s) Nasion-gnathion length	—
t) Nasion-prosthion length	55.50
u) Bizygomatic diameter	108.50
v) Orbit width (dacryon-entoconcihion)	34
w) Orbit height	31.50
x) Nasal length	41
y) Nasal width	14.50

INDICES OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♀
Approx.
age: 8-10

1961 season
Tomb 61.35
Box : 20

Granial index	$\frac{e \times 100}{a}$	80.18
Basion-bregma height-length index	$\frac{i \times 100}{a}$	74·474
Basion-brogma height-breadth index	$\frac{i \times 100}{e}$	92.883
Porion-bregma height-length index	$\frac{j \times 100}{a}$	66.666
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	83.146
Calvarial height-length index I	$\frac{k \times 100}{b}$	50.292
Calvarial heigth-length index II	$\frac{l \times 100}{c}$	39.710
Transverse frontal index	$\frac{f \times 100}{g}$	73.893
Transverse fronto-parietal index	$\frac{f \times 100}{c}$	62.546
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	110.236
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	78.571
Transverse cranio-facial index	$\frac{u \times 100}{o}$	81.273
Zygo-frental index	$\frac{f \times 100}{u}$	76.958
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	51.152
Orbital index	$\frac{w \times 100}{v}$	92.647
Nasal index	$\frac{y \times 100}{x}$	35.365

MEASUREMENTS OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♂ 1960 season
Approx. Age : 6-7 Box : 5.

MEASUREMENTS	mm.
a) Glabello-occipital length	162
b) Glabella-inion length	159
c) Glabella-lambda length	159
d) Nasion-basion length	86.50
e) Maximum breadth	130
f) Minimum frontal diameter	91.50
g) Maximum frontal diameter	105
h) Biauricular breadth	90
i) Basion-bregma height	120
j) Porion-bregma height	114.50
k) Calvarial height I (maximum heigt above glabella-inion line)	94.50
l) Calvarial height II (height of bregma above glabella-lambda line)	70
m) Horizontal circumference	475
n) Transverse arc	305
o) Nazion-bregma arc	121
p) Bregma-lambda arc	122
q) Lambda-opisthion arc	96
r) Mean thickness of parietal	—
s) Nasion-gnathion length	—
t) Nasion-prosthion length	—
u) Byzygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	36
w) Orbit height	33
x) Nasal length	
y) Nasal width	

INDICES OF SKULL FROM SARDIS

BYZANTINE PERIOD

Sex : ♂ 1960 season
Approx. Age : 6-7 Box : 5

Cranial index	$\frac{e \times 100}{a}$	80.24
Basion-bregma height-length index	$\frac{i \times 100}{a}$	74.074
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	92.307
Porion-bregma height-length index	$\frac{j \times 100}{a}$	70.307
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	87.692
Calvarial height-length index I	$\frac{k \times 100}{b}$	59.433
Calvarial height-length index II	$\frac{l \times 100}{c}$	44.025
Transverse frontal index	$\frac{f \times 100}{g}$	87.142
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	70.384
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	100.825
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	78.688
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	91.666
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM SARDIS

EARLY BYZANTINE LEVEL

Sex : ♀ 1961 season
Approx. Tomb 61.14
Age: 50 Box : 21

MEASUREMENTS	mm.
a) Glabella-occipital length	183
b) Glabella-inion length	175
c) Glabella-lambda length	175.50
d) Nasion-basion length	97.50
e) Maximum breadth	135.50
f) Minimum frontal diameter	97
g) Maximum frontal diameter	117.50
h) Biauricular breadth	100
i) Basion-bregma height	96.50
j) Porion-bregma height	108
k) Calvarial height I (maximum height above glabella-inion line)	96
l) Calvarial height II (height of bregma above a glabella-lambda line)	63.50
m) Horizontal circumference	503.30
n) Transverse arc	315
o) Nazion-bregma arc	117
p) Bregma-lambda arc	135
q) Lambda-opisthion arc	120
r) Mean thickness of parietal	—
s) Nasion-gnathion length	—
t) Nasion-prosthion length	—
u) Byzygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	—
w) Orbit height	—
x) Nasal length	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

EARLY BYZANTINE LEVEL

Sex : ♀
Approx.
Age: 50

1961 season
Tomb 61.14
Box : 21

Cranial index	$\frac{e \times 100}{a}$	74.04
Basion-bregma height-length index	$\frac{i \times 100}{a}$	52.731
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	71.217
Porion-bregma height-length index	$\frac{j \times 100}{a}$	59.016
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	79.704
Calvarial height-length index I	$\frac{k \times 100}{b}$	54.857
Calvarial height-length index II	$\frac{l \times 100}{c}$	36.182
Transverse frantal index	$\frac{f \times 100}{g}$	82.553
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	71.588
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	99.630
Sagittal parieto-occipita index	$\frac{q \times 100}{p}$	88.888
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♀
Approx.
Age: 14-15

1961 season
Tomb 61.36
Box : 22

MEASUREMENTS	mm.
a) Glabella-occipital length	174
b) Glabella-inion length	170
c) Glabella-lambda length	169
d) Nasion-basion length	89
e) Maximum breadth	133
f) Minimum frontal diameter	89
g) Maximum frontal diameter	113.50
h) Biauricular breadth	—
i) Basion-bregma height	—
j) Porion-bregma height	102
k) Calvarial height I (maximum height above glabella-inion line)	91.50
l) Calvarial height II (height of bregma above glabella-lambda line)	51.50
m) Horizontal circumference	495
n) Transverse arc	312
o) Nazion-bregma arc	122
p) Bregma-lambda arc	128
q) Lambda-opisthion arc	107
r) Mean thickness of parietal	—
s) Nasion-gnathion length	—
t) Nasion-prostihion length	—
u) Byzygomatic diameter	—
v) Orbit width (darcyon-entoconchion)	—
w) Orbit height	—
x) Nasal length	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

ROMAN PERIOD

Sex : ♀
Approx.
Age: 14-15

1961 season
Tomb 61.36
Box : 22

Cranial index	$\frac{e \times 100}{a}$	76.43
Basion-bregma height-length index	$\frac{i \times 100}{a}$	—
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	—
Porion-bregma height-length index	$\frac{j \times 100}{a}$	58.820
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	76.691
Calvarial height-length index I	$\frac{k \times 100}{b}$	53.823
Calvarial height-length index II	$\frac{l \times 100}{c}$	30.473
Transverse frontal index	$\frac{f \times 100}{g}$	78.414
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	66.917
Sagittal fronto-parietal index	$\frac{p \times 100}{o}$	104.918
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	83.593
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—

MEASUREMENTS OF SKULL FROM SARDIS

'CITY GATE' LOCATION

Sex : ♂ 1958 season
Approx. Age: 18-20 Box 10

MEASUREMENTS	mm.
a) Glabello-occipital length	179.50
b) Glabella-inion length	172
c) Glabella-lambda length	176.50
d) Nasion-basion length	—
e) Maximum breadth	132
f) Minimum frental diameter	97.50
g) Maximum frontal diameter	112.50
h) Biauricular bradth	—
i) Bastion-bregma height	—
j) Porion-bregma height	112.50
k) Calvarial height I (maximum height above glabella -inion line)	93.50
l) Calvarial height II (height of bregma above glabella-lambda line)	62
m) Horizontal circumference	505
n) Transverse arc	320
o) Nazion-bregma arc	117
p) Bregma-lambda arc	136
q) Lambda-opisthion arc	111
r) Mean thickness of parietal	—
s) Nasion-gnathion legth	—
t) Nasion-prosthion length	—
u) Byzygomatic diameter	—
v) Orbit width (dacryon-entoconchion)	—
w) Orbit height	—
x) Nasal lenght	—
y) Nasal width	—

INDICES OF SKULL FROM SARDIS

'CITY GATE' LOCATION

Sex : ♂ 1958 season
Approx. Age: 18-20 Box : 10

Cranial index	$\frac{e \times 100}{a}$	73·53
Basion-bregma height-length index	$\frac{i \times 100}{a}$	—
Basion-bregma height-breadth index	$\frac{i \times 100}{e}$	—
Porion-bregma height-length index	$\frac{j \times 100}{a}$	62.674
Porion-bregma height-breadth index	$\frac{j \times 100}{e}$	85.227
Calvarial height-length index I	$\frac{k \times 100}{b}$	54·360
Calvarial height-length index II	$\frac{l \times 100}{c}$	35·127
Transverse frontal index	$\frac{f \times 100}{g}$	86.666
Transverse fronto-parietal index	$\frac{f \times 100}{e}$	73.863
Sagittal frento-parietal index	$\frac{p \times 100}{o}$	118.239
Sagittal parieto-occipital index	$\frac{q \times 100}{p}$	81.610
Transverse cranio-facial index	$\frac{u \times 100}{e}$	—
Zygo-frontal index	$\frac{f \times 100}{u}$	—
Total facial index	$\frac{s \times 100}{u}$	—
Upper facial index	$\frac{t \times 100}{u}$	—
Orbital index	$\frac{w \times 100}{v}$	—
Nasal index	$\frac{y \times 100}{x}$	—