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ANCIENT CRANIAL TYPES AT CHATAL HÜYÜK AND TELL AL-JUDAIDAH, SYRIA*, FROM THE LATE FIFTH MILLENNIUM B. C. TO THE MID-SEVENTH CENTURY, A. D.

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FOREWORD

I would like to express my appreciation to the Turkish Historical Society for accepting this manuscript for publication in the *Belleten*. Specifically, I must acknowledge my gratitude to Secretary Mr. Uluğ İğdemir of the Executive Council. I can but hope that the manuscript is in keeping with the high scientific standards set and maintained by the Society.

To my good friend, Dr. Muzaffer Şenyürek, I am indebted for stimulating advice and discussion regarding the early peoples of Asia Minor generally, and Anatolia in particular. To him has fallen the arduous task of proof-reading and I hereby record my sincere thanks.

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* These sites excavated in 1932-1936 are now in Turkey, in the province of Hatay. — Ed.

I.

DESCRIPTIVE STUDY OF THE SKELETAL MATERIAL[1]

Location and Chronology of the Sites

In 1932-36 The Syrian Expedition of the Oriental Institute of the University of Chicago investigated three sites in the Plain of Antioch: Chatal Hüyük, Tell al-Judaidah, and Tell Ta'yinat. Chatal Hüyük and Tell al-Judaidah are near the town of Rihaniyyah. Tell Ta'yinat is just east of Jisr al-Hadid, where the Aleppo-Antioch highway crosses the Orontes. Under the direction of Drs. C. W. McEwan and R. J. Braidwood a series of burials were uncovered at Chatal Hüyük and Tell al-Judaidah. The skeletal material thus exhumed was sent to me for study in the Spring of 1937. On pages which follow I have outlined the material received, its state of preservation, and its degree of restoration. In Tables VI-VIII the detailed measurements and indices of the cranial material received for study are given.

In Table I the sequence of cultural phases is given for Tell al-Judaidah, Chatal Hüyük and Tell Ta'yinat. For Phases B-Q provisional dates have been assigned by Mrs. Linda Braidwood. For the present report skeletal material is available from Phases B, C, G, H, J, M, N, O, P, Q and T, as shown in Table II. The bulk of the material from Phase V, modern Arab, will form the subject of a later report[1a].

[1] This report was first written in 1938, revised in 1940-42, and brought to date in 1948-49. I acknowledge the critical judgment of my former colleague at the University of Chicago, Prof. Robert Braidwood; Profs. Brux, Frankfort and McEwan rendered aid also. The original craniometric data, and my basic interpretations, were, of course, set forth in 1938-40. The comparative data used in bringing my analysis to its present completion served, in most instances, to verify my original (1938) hypotheses and conclusions. For the form and content of this revised report I alone assume responsibility. I am grateful for the permission of the Oriental Institute of the University of Chicago to publish this report other than in their regular series.

[1a] It has been written up as an M. A. thesis, now on file at the University of Chicago Library, by Mr. R. M. Snodgrasse.

Number, Age, and Sex of the Burials

A total of 136 burials was uncovered. Many of these unfortunately were in such a deplorable state of preservation that it was impossible to do more than record their occurrence. Of the total number of crania, therefore, remains of only 42 were available for study. In Tables II and V these 42 are listed. The system of numbering is as follows: A = first, B = second season on Chatal Hüyük; Z = first, Y = second, X = third season on Tell al-Judaidah; T = fourth season on Tell Ta'yinat; TT = season on Tabbat al-Hammam. It must be noted that two burials were numbered ZS 3; both are from Phase Q, both are roundheaded, but one is female, the other male. These are now numbered ZS 3 and ZS3′ respectively. The 9 burials marked with asterisks in Table II were too fragmentary for reconstruction; they comprise 4 children and 5 adults.

In Table III are listed the 92 burials from which no material was received. The field notes indicate that the ascription of burials to given Phases is not in every instance definite; this is especially true of Phases R and T. The preponderance of burials in the earlier periods is to be expected.

The age and sex distribution of the burials is outlined in Tables IV and V. A word of caution is necessary here: the sex distribution in Table IV is only approximate. Wherever possible the field notes stated age [2] and sex, but this routine was not feasible in many instances, especially with regard to sexing. Fortunately, admirable photographs of each burial were made available to us, and in those instances where the field notes were noncommittal we estimated sex from the photographs. This is not as unscientific as it seems; we tested ourselves first on the photographs of the material available for study and then checked our estimate against the actual skull and/or skeletal parts. We are satisfied that the tabulation is accurate to within ± 5 per cent in the adult male and female columns.

[2] The age classification used is that drawn up for archeologists of the Oriental Institute by Dr. Bruno Oetteking: infant I, birth to *ca.* 7 years; infant II, *ca.* 7-14 years; juvenile, *ca.* 14-21 years; adult, *ca.* 21-45 years; mature, *ca.* 45-65 years; senile, over 65 years.

The approximate age of the adults studied, as determined principally by endocranial suture closure, is as follows: Mediterranean males, *ca.* 35-40 (1 each at 30-35, 35, 35-40, and an "adult„); Mediterranean females, *ca.* 30-35 (1 each at 25-30, 30-35, 35, and "adult„); Eurafrican males, *ca.* 30-45 (2 at 30 and at 45 +, 1 each at 35, 45, and "adult„); Alpine males, *ca.* 35-50 (1 each at 30-35, 35-40, 40, 40-45 and 50); Alpine females, *ca.* 25-45 (1 at 25-30, 4 at 30, 1 at 40-45, and 1 "adult„); Armenoid *males, ca.* 35 (2 at 35); Armenoid females, senile (1 at 65). The average age of the entire adult population studied is not far from 38 ± 2 years. The Armenoid female skull is worthy of special note in that it shows the marked osteoporosis associated with extreme senility. The cranial vault is of paper-thinness; alveolar absorption, accompanying a completely edentulous condition, is marked, especially on the mandible; the condylar heads of the mandible (cf. Figure 18) are reduced to mere plaques, the left measuring only 4.5 × 14.5 mm. It is possible that some of this articular change may be due to an arthritic condition.

In Table IV there are 22 subadult and 70 adult burials, a ratio of 24: 76. Of the adult burials 30 were male, 25 female and 15 unknown[3]. If we analyze the 55 adults of known sex, the male to female ratio is 55: 45.

In Table V only 3 of 42 burials are subadult, a frequency of less than 10 per cent. This ratio is almost certainly due to friability of young material. The age of these three has been carefully estimated by characters of dental calcification, tooth eruption, and appearance of skeletal centers of ossification. Of the 39 adults, 17 are female and 22 are male, giving a male to female ratio of 56: 44, which is in good agreement with the ratio calculated for Table IV.

If Tables IV and V be pooled, there are 25 subadult and 109 adult burials, a ratio of about 20 to 80. If the burials of known sex are considered, there are 53 males and 41 females, a ratio of 56: 44.

[3] The two listed as «age and sex unknown» are almost certainly adult.

CONDITION OF SKELETAL MATERIAL RECEIVED FOR STUDY

Below are listed the crania and other skeletal parts received. Most of the crania were in a more or less fragmentary condition. This was in no way due to post-exhumation conditions. All skeletal material was cleaned in the field and each piece of bone wrapped separately in tissue paper. In many instances fragmentation was so extensive that absolute identification of parts was impossible. Therefore, when parts are listed as "missing„, what is really meant is that in those crania certain areas could not be restored by replacement of bone but were restored by filling in with plaster of paris.

In the following list phase, sex, and age are given for each burial from which material was received.

AS2 Adult male. Late Phase O or Phase P.
Skull, mandible, left femur, right humerus, and right radius. Missing: portions of frontal, left parietal, occipital, right and left squamous areas of temporal, basi-sphenoid, ethmoid, and nasals. Restoration of vault good; face restored except in orbito-nasal area.

AS10? Adult male(?), Phase O. Left femur only.

AS12 Adult male. Late Phase M or Phase N.
Skull and mandible. Missing: Portions of frontal, right and left parietals, basi-occiput, right and left squamous areas of temporal, sphenoid, ethmoid, and nasals.
Restoration of vault good; face not restored.

BS1 Adult male. Phase T.
Skull only, base damaged; lower and mid-face incomplete.

BS22 Adult female. Phase T.
Skull and mandible. Condition excellent.

BS41 Adult male. Phase O.
Skull, mandible, left humerus, and right femur.
Missing: portions of frontal, right and left squamous areas of temporal, basi-occiput, sphenoid, ethmoid, and nasals. Restoration of vault good: lower face restored, but cranio-facial junction not effected.

BS43 Adult male. Late Phase M or Phase N.
Skull and mandible. Missing: portions of right parietal, occipital, right and left squamous areas of temporal, sphenoid, ethmoid, and nasals. Restoration of vault good; face not restored.

BS58*a* Adult female. Phase O.
Skull and mandible. Missing: portions of frontal, right and left parietals, occiput, right and left squamous areas of temporals, sphenoid, ethmoid, nasals, and right half of mandible. Restoration of vault fair; face not restored.

BS58*b* Adult male. Phase O.
Skull and mandible. Missing: portions of frontal, right and left parietals, occipital, petro-mastoid areas of temporals, sphenoid, ethmoid, nasals, and mandible. Restoration of vault good; of face only right orbit restored.

BS61 Adult male. Phase M.
Skull, mandible, and left tibia. Missing: portions of frontal, right and left parietals, occipital, right and left squamous areas of temporals, right petro-mastoid area of temporal, sphenoid, ethmoid, and nasals.
Restoration of vault good; palate restored, but balance of facial skeleton not restored.

BS62 Adult female. Phase M.
Skull, mandible, and left humerus. Missing: portions of right parietal, occipital, right and left squamous areas of temporals, sphenoid, ethmoids, and nasals. Restoration of vault satisfactory; face not restored.

BS64 Adult male. Phase M.
Skull and mandible. Missing: portions of frontal, right and left parietals, occiput, right and left temporals, sphenoid, ethmoid, and nasals. Restoration of vault only approximate; face not restored.

BS65 Adult male. Phase M.
Skull and mandible. Missing: portions of frontal, parietals, occipital, right and left squamous areas of temporals, sphenoid, ethmoid, and nasals. Restoration of vault good; face not restored.

TS5 Adult male. Late Phase O or Phase P.
Fragmentary skull and mandible. Vault restoration fair, face shattered beyond repair.

TS6 Adult male. Late Phase O or Phase P (? intrusive). Fragmentary skull and mandible. Vault restoration partial, face not attempted.

TS7 Adult female. Late Phase O or phase P (? intrusive). Fragmentary skull and mandible. Vault restoration very bad, face impossible.

TS24 Adult male(?). Phase J?
Too fragmentary to attempt any restoration.

TT1 (TTS1?) Adult male(?) of Tabbat al-Hammam, probably Phase Q. ("Late Iron Age„).
Very fragmentary skull and mandible; vault length and breadth only measurements attempted.

TTM (TTS2?) Adult male of Tabbat al-Hammam. Phase J(?).
Very fragmentary skull with edentulous mandible, with right ascending ramus broken. Vault height, length and breadth only measurements attempted.

XS1 Adult female. Phase M.
Skull. Very fragmentary; vault restoration attempted, but not very satisfactory.

XS2 Adult female. Phase M.
Skull and Mandible. Restoration impossible.

XS3 Adult female. Phase M.
Skull, mandible, and left humerus. Missing: portions of frontal, right and left parietals, occipital, right and left temporals, sphenoid, ethmoid, and nasals. Restoration of vault fair; face not restored.

XS4 Infant, *ca.* 3 years old. Phase M.
Skull and mandible. Restoration not attempted.

XS5 Adult female. Phase M.
Skull, mandible, fragments of right humerus, right femur, right fibula, right talus, cuboid, naviculare, cuneiform I-III, metatarsals I-V, eight miscellaneous phalanges. Missing: portions of frontal, left parietal, occipital, right

and left temporals, sphenoid, ethmoid, and nasals. Restoration of vault satisfactory; face not restored.

XS6 Adult female. Phase M.
Skull and mandible. Restoration impossible.

XS7 Adult male. Phase Q.
Skull and mandible. Missing: portions of frontal, left temporal, basi-occiput, sphenoid, ethmoid, and nasals. Restoration of vault good; restoration of face good except for nasal aperture and right orbit.

XS9 Infant, *ca.* $2\frac{1}{2}$ years old. Phase M.
Skull, mandible, fragments of humeri, clavicles, and femora. Restoration not attempted.

XS10 Infant, probably newborn. Phase M.
Skull and mandible. Restoration not attempted.

XS11 Adult female. Phase H.
Skull and mandible. Restoration impossible.

XS12 Adult male. Phase S.
Skull and mandible. Condition excellent.

XS14 Adult male. Phase G.
Skull and mandible. Condition excellent.

XS15 Adult male. Phase G.
Skull. Missing: portions of frontal, right and left parietals, occipital, right and left temporals, sphenoid, ethmoid, and nasals.
Restoration of vault good; face not restored.

XS20 Adult female. Phase C.
Skull and mandible. Restoration impossible.

XS21 Infant, *ca.* $3\frac{1}{2}$ years old. Phase B.
Skull and mandible. Restoration not attempted.

YS5 Adult male. Phase O.
Skull and mandible. Missing: portions of frontal, left squamous area of temporal, basi-occiput, sphenoid, and ethmoid. Restoration good, except for base and left side of face.

ZS3 Adult female. Phase Q.
Skull and mandible. Missing: right and left squamous areas of temporals, basi-occiput, basi-sphenoid and left

great wing, ethmoid, nasals, and left ascending ramus of mandible. Restoration of vault and face good.

ZS3′ Adult male. Phase Q.
Skull and mandible. Missing: right and left great wings of sphenoid, basi-occiput, and basi-sphenoid. Restoration of vault good; left side of face not restored.

ZS6 Adult male. Phase Q.
Skull and mandible. Condition good except for basi-sphenoid and ethmoid.

ZS12 Adult male. Phase Q.
Skull and mandible. Missing: portions of right parietal, right and left squamous areas of temporals, basi-occiput, sphenoid, and ethmoid. Restoration of vault good; face not restored.

ZS14 Adult female. Phase Q.
Skull and mandible. Missing: portions of left parietal, right and left squamous areas of temporals, basi-occiput, sphenoid, and ethmoid. Restoration of vault and face satisfactory; skull base not restored.

ZS18 Adult male. Phase Q.
Skull and mandible. Condition good except for some damage to skull base.

ZS19 Adult male. Phase Q.
Skull and mandible. Missing: portions of right parietal, right and left squamous areas of temporals, basi-occiput, basi-sphenoid, and ethmoid. Restoration of vault and face good; skull base not restored.

ZS20 Adult female. Phase Q.
Skull and mandible. Missing: portions of frontal, right parietal, right and left squamous areas of temporals, basi-occiput, basi-sphenoid, ethmoid, and nasals.
Restoration of vault good; face not restored.

ZS21 Adult female. Phase Q.
Skull and mandible. Missing: right and left squamous areas of temporals, right and left great wings of sphenoid, and ethmoid. Restoration of skull and face good.

ZS23 Adult female. Phase Q.
Skull and mandible. Missing: portions of right and left

temporals, occipital, sphenoid, ethmoid, nasals, and left ascending ramus of mandible. Restoration of vault good; face not restored except for left orbit.

ZS24 Adult female. Phase Q.
Skull, mandible, cervical vertebrae 2-7, left humerus, left femur, and right os coxae. Missing: basi-occiput, basi-sphenoid, and ethmoid. Restoration of vault and face good; skull base not restored.

Tables VI-VIII give the cranial, facial, and mandibular measurements and indices of this material.

Cranial Types

In earlier reports (*30*, pp. 239-267, esp. Table VII and p. 262, and *33*) I have considered in detail the cranio-facial characters of protohistoric and historic racial groups. It is unnecessary here to go into detail save to emphasize the basic dichotomy between long-and roundheaded groups, the former comprising Mediterranean and Eurafrican types, the latter Alpine, Dinaric and Armenoid types[4]. In the roundhead group the progressive decrease in cranial length culminates in the Armenoid, who may well be called shortheaded rather than roundheaded.

The problem of the definition of pre- or protohistoric racial (cranial) types is a very real one. It is necessary, perforce, to choose one of two alternatives, viz., to define in terms of present-day and better-known races, or to recognize a type or category based upon demonstrable ecologic continuity, and hence uniformity of type.

It is inescapable that in the Amouq material there are two long-headed cranial types. They are distinguishable craniometrically and craniologically, i. e., they differ in absolute size and in morphological detail. The one is smaller, less rugged; the other is larger, with more pronounced supraorbital ridges and lines of muscle attachment. To put it another way, one is more pedomorphic, the other more gerontomorphic. There is thus a fairly clear-cut dichotomy.

[4] To these should be added, perhaps, the Baltic type, although it appears that the Alpine-Dinaric-Armenoid complex is a fairly closely knit group, while the Baltic type is relatively extraneous, both in provenience and in time.

The first type is easily identifiable: It is what all would regard as the Mediterranean type, par excellence ("basic Mediterranean„ , "classic Mediterranean„, "gracile Mediterranean„). Here we have no real definitional problem. The second type is, as it were, at the antipodal end of a long-headed range of cranial variation; it is non-Mediterranean in the sense that it is a rather extreme departure from gracility and smoothness.

The second long-headed cranial type has been varyingly labelled: "Capsian„ by Dixon; "Eurafrican„ by Sergi, Şenyürek, Keith and others; "Afghanian„ by Coon; "Atlanto-Mediterranean„ by Hooton and Ehrich. In my earlier publications I have called it "Proto-Nordic„ , regarding cranial pedomorphism as Mediterranean and cranial gerontomorphism as Nordic; the "Proto-„ is in recog nition of a time element and of a possible developmental linking. Recently McCown (*38a*, p. 444) has raised what I consider a reasonable objection to my use of "Proto-Nordic„. He says that "an archaeologist or historian cannot unqualifiedly accept such a conclusion until there is some consensus among physical anthropologists as to what constitutes a Nordic skeletally, or until archeological evidence shows connections with a region which Nordics are believed to have inhabited.„ The first part of his statement can be met by stating that the Nordic cranial type has been fairly well and uniformly defined by Scandinavian and German physical anthropologists, from Retzius to Kollmann to Breilinger and on. The second part we can only partially resolve. I think there is reason to believe (see *31*) that the Aralo-Caspian area is, or was, the area in which the gerontomorphic (Nordic-type) longheads differentiated; and that from this area, via the Kurgan-type of the Steppes, the present Northwest European Nordics had their ultimate origin. But, it must be admitted, a complete chain of proof is not demonstrable. I might add further that the rugged, muscular Hissar longheads were, in dimensions and morphology, quite near the norm of the present-day (or historic) Nordic cranial type.

There is, as we shall see in this report, reason to believe that in pre-and protohistoric times there was cultural continuity from the circum-Mediterranean area clear across Asia Minor to Iran and possibly even to the Indus (see our Footnote 6 c). If this be

so, then I am prepared to concede that "Eurafrican„ is an acceptable term for the big-skulled longheads. I do not think the term is a perfect one, for these longheads show absolutely no African (Negro or Negroid) racial traits; the term, therefore, is a purely geographic one. North and Northeast Africa and Southern Europe form an ecologico-geographical continuity which stretches easterly into Asia Minor. Since both longheaded types are contemporaneous — indeed, the smaller-skulled type is earliest — I do not approve of calling the larger-skulled type "primitive„. Gerontomorphy can be primitive only in an evolutionary and emergent or relative sense.

While the emphasis is upon longheads versus roundheads, we must not forget the possible existence of an intermediate, middleheaded type. We are not yet certain, however, if the middleheads are a real type or merely the "no-man's land„ between long- and roundheadedness. The physical anthropologist classifies skulls with an L-B ratio of 75 or less as longheaded (dolichocranic), those with a ratio between 75 and 80 as middleheaded (mesocranic), those with a ratio over 80 as broadheaded (brachycranic), and those with a ratio over 85 as shortheaded (hyperbrachycranic). In practice a skull is "long„ if its index is, say, below 77, "round„ if its index is above 77; middleheades are therefore a sort of common ground. It would be an absurdity, however, to say that two skulls with cranial indices of 76 and 78, respectively, differ fundamentally in type.

Since over 95 per cent of the material studied in this report consists of skulls and mandibles, we must equate *cranial* with *racial* types. We are depending almost solely upon our analysis of the cranial material for an interpretation of racial groups and movements in Syria. In other words, we recognize in the present cranial material longheaded types (principally Mediterranean and Eurafrican), a broadheaded type (Alpine), and a shortheaded type (Armenoid), the last two grouped as roundheaded.

In general the several types conform to the characters usually associated with them. The occiput of the Mediterranean type is protuberant, that of the Eurafrican fully and evenly rounded; the Alpine type is curvoccipul, the Armenoid planoccipul. Supra-orbital ridges are strongly developed (together with a large

glabella) in the Eurafrican type; in the other types the ridges are small to moderate.

We may at this point note the occurrence of certain cranial features. The pterion is H (broad spheno-parietal contact) in all; in an adult female Alpine there is an *os epiptericum* on the right and left sides. Wormian bones are found at lambda in an adult female Alpine, and at lambda and asterion in an adult Armenoid male. A metopic suture is present in an adult female Mediterranean; in an adult female Alpine a metopic remnant extends 33 mm. above the nasion. Other than these general conditions there is little to note.

In Table IX the adult crania are tabulated according to Phases and racial types. Of the crania too fragmentary to restore it is possible that among the four adult crania the following racial types may be recognized: Phase M, female Mediterranean and female Alpine; Phase H, female Mediterranean; Phase B-C, female Mediterranean. These doubtful and unmeasured crania are given in parentheses. Actually, therefore, only 31 crania were measured and classified, although each of the 35 adults was classified. (This does not include the TS series). For the measurement and comparison there are available 9 Mediterranean crania (4 male, 5 female), 7 Eurafrican (all male), 12 Alpine (5 male, 7 female), and 3 Armenoid (2 male, 1 female). By far the majority of the material comes from Phases M to S, that is, from 1600 B. C. and later.

The problem of cranial (racial) types is a very real one in the reconstruction of the population history of a people. Angel (*1 a, 1 b, 1 c*) has given this problem serious thought and has clarified the issues. Typing, per se, be it based on either morphology or morphometry, must remain as a conceptual tool when we are dealing with an ancient-and hence relatively unknown-population. And yet that framework can exist only with reference to known cranial (racial) types. Thus, Angel (*1a*, p. 234) calls his *Type D* "Nordic-Iranian because of resemblances to aquiline Iranian crania as well as to virtual identity with Reihengräber skulls.„ Here, it seems to me, is the essence of cranial (racial) typology: there is no proof that this Greek skull-type studied by Angel had any association other than purely descriptive with either Nordic or Iranian; (indeed, the Reihengräber

crania are far removed in both space and time). And yet we must insist that craniology has a right to describe and identify, as far and as reasonable as is possible, on the basis of known type-categories. Indeed, it is virtually mandatory that we do so, else there might result a chaotic typology which was little else than site-type run rampant.

There is another aspect of cranial (racial) typing, viz, its purpose. It is descriptive and analytic; it assays to discern similarities and uniquenesses; it attempts on the basis of the former to weigh probable ethnic continuity, and on the basis of the latter possible ethnic intrusion; it aims, ultimately, at the establishment of more than a generic analysis: it hopes to set up a system of morphologic criteria with a *genetic* validity. Angel (*1b*, p. 374) has expressed it well when he says that "racial types..... have a considerable genetic reality, shedding light also on genetic changes which they are too artificial to express, and giving a much more dynamic picture of racial history than is available from arithmetic means. „

Mediterranean Type

In Tables X-XI the cranial and facial measurements and indices of this type are given in detail. Phases O, M, N, and G are represented, which gives 3500 B. C. as the earliest date [although an unrestored female skull from Phase B-C (5th millennium B. C.) is almost certainly Mediterranean in type]. With the exception of two male skulls from Phase O facial measurements are not available. The essential cranial indices for males and females are:[5]

	Male	Female
L-B index	Dolicho- to meso-cranic (70.87-78.61)	Mesocranic (75.14-78.55)
OH-L index	Ortho- to hypsi-cranic (58.82-63.04)	Chamae- to hypsi-cranic (57.55-65.89)
F-P index	Steno- to eurymetopic (61.90-73.13)	Steno- to eurymeto-pic (63.84-69.25)

[5] The abbreviations here used are: L-B index = lengthbreadth index; H-L index = height-length index; OH-L index = auricular height-length index; F-P

The skull type is essentially long, moderately broad across the parietals, moderately high, and with a tendency to an increased frontal breadth.[5a] It may be of import that the earliest representative is very long-and highheaded; increased cranial breadth and a lower vault come later. Whether this is due to emergence of type or to intermixture we cannot say.

The only facial indices which can be obtained are those of upper face, orbit, and nose. These are, respectively, mesen (50.86), mesoconch (80.26), and leptorrhine (46.31), thus giving a face of moderate breadth, an orbit of moderate height, and a narrow nasal aperture.

Figures 1-5 are lateral views of male and female Mediterranean crania. Figure 1 shows a male cranium of Phase N, Figure

index = transverse fronto-parietal index. The H-L index and the OH-L index are equated thus:

	H-L Index	OH-L Index
Chamaecranic	x — 69.99	x — 57.99
Orthocranic	70.00 — 74.99	58.00 — 62.99
Hypsicranic	75.00 — x	63.00 — x

[5a] Crania TS5, TT1 (TTS1?) and TTM (TTS2?) probably come into this category. Because of their extremely fragmentary condition little else may be said of them. The only measurements and indices taken on them are as follows*

	L	B	OH	L-B Index	OH-L Index
TS5, male Aged 20-25 years. Mediterranean type. Phase O-P	178 mm.	136 mm.	118 mm.	77.02	66.29
TT1, male(?) Aged 25-30 Mediterranean type. Phase Q?	180?? mm.	140?? mm.	—	77.78??	—
TTM, male Aged, 50+ Mediterranean type. Phase J?	190??	132??	113??	69.47??	59.47??

* The question marks register degree of doubt as to accuracy of measurement.

2 one of Phase M, Figure 3 one of Phase G, Figure 4 a female cranium of Phase O, and Figure 5 a female cranium of Phase M. The long, moderately high vault with full, protuberant occiput is clearly shown.

Eurafrican Type

In Tables XII-XIII the cranial and facial measurements and indices of this type are given in detail. Phases P and Q, O, N, M, and G are represented, the last going back to 3500 B. C. For this type facial measurements and indices are fortunately available over a long period of time. Only male crania are present.

The essential cranial indices are:

L-B index	Dolicho-to mesocranic	(67.96-76.21)
OH-L index	Chamae-to orthocranic	(56.31-62.16)
F-P index	Metrio-to eurymetopic	(65.95-75.37)

With the exception of the single skull from Phase N the type is very longheaded; breadth is moderate, height moderate to high, and the tendency to a broad forehead is pronounced. The absolute length of the skull, ranging from 185.00 to 206.00 mm., is in marked contrast to the range in the male Mediterranean type (182.00-187.00 mm.) On the other hand cranial breadth ranges from 132.00 to 142.00 mm. in Eurafricans and from 129.00 to 147.00 mm. in Mediterraneans. Similiarly the range for auricular height is 107.00-118.00 mm. in Eurafricans and 110.00-116.00 mm. in Mediterraneans. Craniometrically therefore, the principal difference lies in the excessive length of the Eurafrican and in a slight tendency to increase in height.

The essential facial indices are:

Upper facial index	Mesen to lepten (52.23-56.92)
Orbital index	Chamae- to hypsiconchic (74.07-92.50)
Nasal index	Mesorrhine (49.52-50.90)
Palatal index	Brachystaphylic (85.05-93.61)

The face is narrow, the orbit low, the nasal aperture of moderate breadth, and the palate moderately wide. This complex of proportions is not enough to separate the two longheaded types; once more absolute size must be a criterion. In upper facial height, bizygomatic breadth, nasal height and breadth, and

orbital height and breadth, the Eurafrican type markedly and consistently exceeds the Mediterranean.

There can be no doubt that the longheads of Amouq are of two types, Mediterranean and Eurafrican. Most important of all in the present series is that they are well-nigh contemporaneous. Both types are found in Phase G; the unrestored female of Phases B-C alone gives priority to the Mediterranean type.

Figures 6-8 are facial and lateral views of the Eurafrican type. Figures 6-6a are those of a male cranium from Phase P, Figures 7-7a those of one from Phase N and Figures 8-8a those of one from Phase G. The male cranium portrayed in Figure 6 is an extremely longheaded and rugged type, reminiscent of the "Pseudo-Australoid„, and other "primitive„ types mentioned by various writers. The male cranium of Figure 7 is mesocranic, that of Figure 8 dolichocranic.

Alpine Type

In Tables XIV-XV the cranial and facial measurements and indices of this type are given. Phases S, Q and P, and M are represented, the last extending back to 1600 B. C., but by far the majority of the crania are from Phases Q and P, which go back to only 500 B. C. The essential cranial indices for males and females are given below:

	Males	Females
L-B index	Brachycranic (83.65-83.69)	Brachycranic (83. 33-84.95 and 96.79?)
OH-L index	Chamae- to hypsicranic (55.43-66.26)	Chamae- to hypsicranic (53.84 ?-71.11)
F-P index	Metrio- to eurymetopic (67.62-70.12)	Steno- to metriometopic (63.57 ?-68.57)

It is evident that we are dealing with a broad-or roundheaded population [5b]. In both males and females the cranial index hovers around 83-84 (the index of 96. 79 of the female from Phase M is due to warping and faulty restoration). The index of

[5b] The very Fragmentary TS6 and TS7 probably share in this category. The only measurements and indices taken are as follows: *

cranial height, while it ranges from low to high, is more concistently near an upper range, indicating a high vault. The forehead, absolutely wide, is relatively narrow owing to biparietal expansion.

The essential facial indices are:

	Male	Female
Upper facial index	Mesen to lepten (50.67-62.81)	Euryen (44.74-46.45)
Orbital index	Mesoconch (79.54)	Chamae- to hypsiconch (75.94-88.54)
Nasal index	Leptorrhine (46.08)	Meso- to chamaerrhine (48.35-51.11)
Palatal index	Brachystaphylic (92.15)	Brachystaphylic (88.12-90.69)

The face is not as homogeneous as one might expect, even allowing for the small samples. The face is of moderate height and breadth, the orbits are moderately high, the nasal aperture is moderately broad, and the palate is broad. These features, while variable in the present series, are generally characteristic of an Alpine type. There may be some mixture with a long-and narrow faced type.

Figures 9-12 are facial and lateral views of male and female crania of the Alpine type. Figures 9-10 a are those of male crania from Phase Q; Figures 11-11a those of a female cranium from Phase T; and Figures 12-12a those of a female cranium from Phase Q. The crania shown in Figures 9-9a and 11-11a are of

	L	H	OH	L-B Index	OH-L Index
TS6	185?? mm.	152?? mm.	—	82.16??	
Aged 25 (±) years. Alpine type. Phase O-P (intrusive?)					
TS7, female	180?? mm.	147?? mm.	—	81.67??	
Aged 35 (±) Alpine type. Phase O-P (intrusive?)					

* The question marks register degree of doubt as to accuracy of measurement.

the curvo-occiput type; those in Figures 10-10a and 12-12a verge on the planoccipul type, the occipital flattening in the latter being almost Dinaroid.

Armenoid Type

When we first went over the Amouq skulls, we set aside three that showed the markedly flattened (hypsibrachycranic) occiput presumably diagnostic of the Armenoid type. After we went over them once more, the possibility of artificial deformation loomed up, especially since Dingwall (*9*, p. 83) states that "a good deal of evidence has accumulated that cranial deformation was practiced in Syria, both in ancient and modern times. „ [5c] We are reasonably certain, however, that the flattened occiput of these three crania is not artificial; it represents in our estimation the postporionic shortening characteristic of Armenoid crania.

In Tables XIV-XV the cranial and facial measurements and indices of the Armenoid type are given. Only Phases Q and P are represented, going back to 500 B. C. The essential indices of the male and female crania are:

	Male	Female
L-B index	Brachycranic (91.57)	Brachycranic (89.37)
OH-L index	Hypsicranic (74.09)	Hypsicranic (72.50)
F-P index	Stenometopic (63.06)	Metriometopic (68.53)

Here we are concerned with a *short* or roundheaded element of the population. The vault is uniformly high, the forehead moderately broad. If we compare the absolute cranial proportions of the two roundheaded types, Alpine (broadheaded) and Armenoid

[5c] Recently Ehrich and Coon (*10 b*) have studied the problem of planoccipul cranial types. They conclude, «while one cannot exclude the possibility of its occurrence genetically, one cannot at the same time apply the name Dinaric and Armenoid, as heretofore defined, to races in the genetic sense: most Dinarics and Armenoids exist as phenotypes.» (p. 185). With this I am in full agreement, adding that our knowledge of *all* cranial types is largely phenotypic. We simply do not know how vault dimensions and/or proportions behave genetically.

(shortheaded), we may observe the following similarities and differences (dimensions are in mm.):

	Alpine		*Armenoid*	
	Male	Female	Male	Female
Length	178.63	162.47	167.75	160.00
Breadth	149.50	143.27	153.50	143.00
Auricular height	108.32	111.35[6]	124.25	116.00

The Armenoid crania are shorter, broader, and higher; the Armenoid female cranium agrees with the Alpine female crania in length and breadth, but is slightly higher.

The essential facial indices of the male Armenoid type are:

Upper facial index	Euryen (48.66)
Orbital index	Mesoconch (84.38)
Nasal index	Leptorrhine (46.03)
Palatal index	Mesostaphylic (80.00)

The face is low and broad, the orbits are moderately high, the nasal aperture is narrow, and the palate is moderately broad. In its proportions and to a less extent in its absolute dimensions the Armenoid face is similar to that of the Alpine.

Figures 13-14a are facial and lateral views of male crania of the Armenoid type, both of Phase Q. The short, high vaulted head is clearly depicted. The edentulous upper jaw of the cranium in Figures 14-14a is noteworthy.

Summary of Cranial Types

Atlhough it is rather dangerous to attempt conclusions on the basis of small numbers, yet certain facts and implications apparently emerge: (1) In the Amouq material long- and roundheaded

[6] The auricular height of the female from Phase M has been omitted.

types are represented ; (2) the longheads are attributable to Mediterranean and Eurafrican types, the roundheads to Alpine and Armenoid types ; (3) the longheads are earliest, with the Mediterranean type apparently in advance of the Eurafrican ; (4) the roundheads are latecomers, with the Alpine type well in advance of the Armenoid ; (5) according to the chronology of the material available in the present study we first meet the Mediterranean type before 4000 B. C., the Eurafrican *ca.* 3500 B. C., the Alpine *ca.* 1600 B. C., and the Armenoid *ca.* 500 B. C. ; (6) there is some evidence, too slight to be rigidly assessed, that from *ca.* 1600 B. C. on there are Mediterranean - Alpine intermixtures.

It is our task now to see how these observations on cranial types fit into larger frames of space and time. But first we must consider the mandibles, the teeth, and the long bones.

Mandibles and Dentition

In Table XVI are the measurements and indices of the 25 mandibles received for study. They are classified by type and sex as follows: 3 male Mediterranean (AS12, BS41, BS65); 2 female Mediterranean (BS62, XS3); 7 male Eurafrican (AS2, BS43, BS61, BS64, XS12, XS14, YS5); 4 male Alpine (XS7, ZS3′, ZS12, ZS18); 6 female Alpine, (BS 22, ZS3, ZS14, ZS21, ZS23, ZS24); 2 male Armenoid (ZS6, ZS19); 1 female Armenoid (ZS20). The material is grouped by type and sex regardless of Phase, but as a general rule the longheaded types are before, the broad- and shortheaded after, Phase Q.

The small sample in each series and the generally equivocal type-differences prevent conclusions. Sex differences are obvious, e. g. the larger absolute size of the male mandible in contrast to the smaller mandible of the female. Certain measurements may be significant: the greater bicondylar width in the Alpine male, the greater symphyseal height in the Eurafrican male, and the greater minimum width of the ramus and the greater mandibular length in the Eurafrican and Alpine males. The high mandibular angle in the Armenoid female is due to senile changes in ramo-corporal relationships.

The mandibles of the Eurafrican and Alpine males are larger and more rugged than those in any other type group. The chin is more prominent, and the tendency to eversion of the mandibular angle is well developed.

Figures 15-18 are vertical views of male and female mandibles of the several types. Figure 15 shows male and female Mediterranean mandibles, Figure 16 male Eurafrican, Figure 17 male and female Alpine, Figure 18 male and female Armenoid. In Figure 18 the edentulous female Armenoid mandible is noteworthy.

The crown pattern of the teeth is typically human; it is a five-cusped modified Dryopithecus pattern on lower M1 and a four-cusped (plus-shaped) pattern for the other molars. Several anterior teeth (canines and incisors) were rotated on their axes, but no severe malocclusion was observed.

The dentition of the Amouq material in general, while incomplete, offers some interesting observations. The palatal shape is parabolic in the Mediterranean, female Alpine, and Armenoid types, a broad U-shape to parabolic in the male Alpine type, and U-shaped, horseshoe-shaped, and parabolic in the Eurafrican type. The bite tends to incisor edge-to-edge in the Alpine, overbite in the Eurafrican, and probably edge-to-edge in the Mediterranean. The wear of the teeth is rarely below stage 2 (loss of enamel) and usually is between stages 3-4 (exposure of pulp cavity). As a general rule there is only a slight facial prognathism and little or no alveolar prognathism. Among the female Alpine crania one instance of moderate facial and alveolar prognathism is observed. Actually the gnathic index, measurable only in male Eurafrican, female Alpines, and male Armenoids, is uniformly orthognathous. The female Alpine crania show two interesting conditions: in ZS24 (Figure 19) there is a constricted V-shaped palate which is very asymmetrical (the inner side of left M2 is 16 mm. from the midsagittal line and that of right M2 is 12 mm. from it) and may represent hemiatrophy; in ZS14 (Figure 20) the premaxillo-maxillary suture is partially patent on the palatal surface. This represents, however, a condition of lapsed rather than delayed union.

The dental pathology of the Amouq material is striking indeed. For observation here we have the following material:

	Skulls with Mandible	Skulls without Mandible
Mediterranean male	3	2
Mediterranean female	2	2
Eurafrican male	7	—
Alpine male	4	1
Alpine female	6	1
Armenoid male	2	—
Armenoid female	1	—

In going over the palate, mandible, and teeth (many of which were received separately and had to be identified) attention was paid not only to active carious lesions, but also to evidence of exfoliation due to dental disease. Pyorrhea, apical abscesses, and other inflammatory processes were noted. If the sum total of these observations be briefed, the fact emerges that among the male Mediterranean crania only 2 of 5 mouths were free from dental pathology, especially carious teeth; among the female Mediterraneans the ratio was 1:4, among the male Eurafricans 2:7, the male Alpines 0: 5, the female Alpines 2: 7, the male Armenoids 0: 2, the female Armenoid 1: 1. If the entire series be considered, only 7 crania of 31 had dentitions wholly free from disease—a percentage of less than 25. And this where the average age is about 40 years! Where dental disease is present, the number of teeth lost during life by disease or actively carious at the time of death ranges from two to a completely edentulous condition, with an average frequency of five diseased teeth per individual. In three instances apical abscesses penetrated the maxillary sinuses. In general the maxillary teeth were more prone to disease than the mandibular. The molars were by far the most frequently affected teeth, with upper and lower M1 and upper M2 well in advance of the others. In their dental pathology if in nothing else the Amouq crania are "modern„.

Long Bones

The Material consists of 6 humeri (AS2 [right], BS41 [left], BS62 [left], XS3 [left], XS5 [right], and ZS24 [left]); 1 radius (AS2 [right]); 1 os coxae (ZS24 [right]); 5 femora (AS2 [left], AS1O [left], BS41 [right], XS5 [right], and ZS24 [left]); 1 tibia (BS61 [left]).

Humerus :

The measurements made are : [6a]

No.	Sex	Type	Length	Sagittal Diameter	Transverse Diameter	Circum-ference	Bicondylar Breadth
AS2	m	E	325	26	27	75	70
BS41	m	M	280	19	18	58.5	55.5
BS62	f	M	—	19.5	14.5	58	—
XS3	f	M	284	21.5	22.5	67	58
XS5	f	M	—	20	19	63	—
ZS24	f	A	283	18	18	55.5	52

Four of the humeri have septal apertures, three are single and large, one is double and small.

Radius [6a] :

The measurements made are :

No.	Sex	Type	Length	Sagittal Diameter	Transverse Diameter	Circum-ference
AS2	m	E	244	12.5	11.5	44.5

Os Coxae :

The measurements made are : [6a]

No.	Sex	Type	Total Height	Length (from anterior superior spine to posterior superior spine)
ZS24	m	A	193	153

[6a] Abbreviations used are : m = male, f = female, M = Mediterranean, E = Eurafrican, A = Alpine; measurements are in mm.

Femur:

The measurements made are: [6a]

No.	Sex	Type	Length	Subtrochanteric sagittal diameter	Subtrochanteric transverse diameter	Sagittal diameter	Transverse diameter	Circumference	Bicondylar diameter	Platymeric index
AS2	m	E	515	32.5	40	36.5	32.5	107	94	81.25
AS10	m	M(?)	445	24	34	28	30.5	90	79	70.59
BS41	m	M	400	21	27	26	22.5	76	67	77.78
XS5	f	M	—	25	30	28	23	81.5	—	83.33
ZS24	f	A	403	24	28.5	24.5	23	76	70.5	84.21

The femora are all platymeric except the hyperplatymeric femur of the male Mediterranean (?) type (AS10).

If stature formulae be applied to these femora, the male Eurafrican (AS2) is 1781.25 mm. tall, the male Mediterraneans (AS10 and BS41) are 1607.35 mm., and the female Alpine (ZS24) 1512.28 mm., or roughly 5′ 11″, 5′ 4″, and 5′$\frac{1}{2}$″ respectively.

Two of the femora (AS2 and AS10) show a slight *fossa hypotrochanterica.*

Figures 21-22 show femora of Mediterranean, Eurafrican, and Alpine types. In Figure 21 those of Mediterranean and Eurafrican males are represented, in Figure 22 those of Mediterranean male and Alpine female are pictured.

Tibia:

The measurements made are: [6a]

No.	Sex	Type	Length	Platycnemic sagittal diameter	Platycnemic transverse diameter	Sagittal diameter	Transverse diameter	Circumference	Platycnemic Index
BS61	f	A	345	33	22	30	22	82.5	66.67

The tibia is mesocnemic.

The number of long bones is, of course, inadequate-as are indeed the measurements themselves-but we shall refer to them in a later and comparative section of this report.

II

COMPARATIVE STUDY OF THE SKELETAL MATERIAL

Geographic and Cultural Relations of the Sites

From the Pamirs as a dividing center two series of highlands and plateaus, an eastern and a western, serve to act as avenues in the Eurasiatic continent. The eastern series does not concern us here. The western series comprises the highlands and plateaus of Iran and Asia Minor, with a southern extension into Syria, Palestine, and Arabia. It is along this avenue that east - west and west - east racial movements have been directed. It is entirely possible, of course, that the major east - west migration occurred north of Syria, with the eastern end of the Mediterranean receiving only an eddying backwash or a counter-current; it is equally possible, however, that this same area received secondary east - west migrations from Iran and Asia Minor and primary west-east movements emanating from North and Northeast Africa. In a very real sense, therefore, the sites of Tell al-Judaidah and Chatal Hüyük are geographically strategic : they lie in the path of east-west racial or population movements from Iran and Asia Minor and of west-east movements from the contiguous northern and northeastern reaches of Africa. It is probable, at our present state of knowledge, that the impact of the latter migration was more pronounced earlier than later.

The prehistoric sequence of the eastern Mediterranean area, specifically Palestine, has been carefully delineated by Miss Garrod at two sites, Shuqbah and Mugharat al-Wadi, one of the caves of the Wadi-al-Mugharah (see *14*, p. 107 f., *15*, Plate XV, and *16*, p. 113). The sequence at Shuqbah is: A, recent to Early Bronze; B, an Upper Natufian industry; C and D, Upper Levalloiso- Mousterian. The sequence at Mugharat al-Wadi is: Bl, Upper Natufian; B2, Lower Natufian; C, Atlitian; D and E, Middle Aurignacian; F, Lower Aurignacian; G, Tabun Chimney and Ta-

bun B, Upper Levalloiso-Mousterian. A definitive culture, the Natufian, has emerged. The Upper Natufian is found in B of Shuqbah and in Bl of Mugharat al-Wadi; the Lower Natufian is found in B2 of Mugharat al-Wadi.

In a later study (*15*, pp. 17-21) Miss Garrod recognizes an Acheulean period in Palestine and states that "if the Acheulean of Palestine . . . . . should prove not to be derived immediately from Africa it must almost certainly be regarded as a sort of backwash from Europe.„ (*15*, p. 18). A further tie-up with Africa is seen by her in the fact that the Mt. Carmel and Nazareth racial types of the Levalloiso-Mousterian cultural period are closely similar to a rather late Levalloisian site at Eyassi in Tanganyika Territory (*5*, pp. 18 f.). The same period has cultural relations in the east also, for in southern Kurdistan a Levalloiso-Mousterian site resembling the Levalloiso-Mousterian period in Palestine has been reported by her (*15*, p. 19)[6b].

The Middle Aurignacian of Palestine, Miss Garrod (*15*, p. 19) holds, comes from a center "which may possibly lie in Iran, or even further east.„ From Palestine this cultural period spread to the Caucasus but not to the plains of southern Russia. It probably entered Europe along the north shore of the Black Sea, for caves in the Crimea have an Upper Paleolithic sequence similar to that of Palestine.

The problems of the origin, extent and duration of the Natufian are not amenable, at present writing, to clear-cut solution. Miss Garrod (*15*, pp. 19 f.) feels that the Natufian arose "somewhere to the north of Palestine, perhaps in Anatolia;„ it penetrates into Egypt "where it occurs in the surface station of Heluan„ (p. 19). It is not found in northern Arabia (p. 20). According to Keith further links with North Africa are seen in racial-type affinity (Mediterranean, but with a distinct bias towards the African variety of that stock represented by the pre-dynastic people of Egypt„ (*27* p. 211). The spread of the Natufian is thus extended from North Africa to (?) Anatolia, with cultural affinities and

6b Miss Garrod's general conclusions have been verified in principle and amplified in detail by Huzayyin (*21 a*), Caton-Thompson (*6 a*) and L. Braidwood, (*3 a*).

physical type so generally shared that exact origins remain in doubt.

The time element is indicated by Miss Garrod in her statement (*15*, p. 19) that the Natufian ("a specialized microlithic industry„) is Mesolithic. The Capsian, in turn, is equated by Miss Garrod (*15*, p. 20) with Upper Kenya Aurignacian. Leakey (*35*, pp. 106-108) correlates Lower Capsian with European Aurignacian and Upper Capsian with European Tardenoisian. Vaufrey (55, L'Anth. XLVI, p. 664) states that the final phase of the Capsian is found in the Neolithic ("Néolithique de tradition capsienne„). The Capsian, then, ranges in time from European Aurignacian to Neolithic. The Natufian is contemporaneous with the post-Aurignacian phase of the Capsian, as shown in Miss Garrod's (*15*, Plate XV) chronology for Mugharat al-Wadi, where Lower Natufian is stratigraphically above Upper Aurignacian.

Palestine and Syria, in Miss Garrod's opinion (*15*, p. 21), apparently have their closest affinities with Western Europe in the Upper Acheulean; in the Middle Paleolithic Egyptian and East African influence predominates and goes east; in the Upper Paleolithic Near or Middle Eastern influence gains the upper hand (cf. Huzayyin, *21a*).

The cultural evidence therefore supports the geographical, as, indeed, it should, for lines of diffusion are largely established by topography.[6c] We concentrate our attention upon comparative data accordingly: Iran, Asia Minor, eastern Mediterranean generally, Northeast and North Africa.

Longheaded Types

The Mediterranean Type

The most directly comparable data come from Palestine: Keith (*27*, *28*) on Natufians; Engberg (*11*) and Hrdlicka (*21*) on the inhabitants of Megiddo; Vallois (*53a*) on the people of Byblos (see also Albright, *1*).

[6c] Childe (*6 b*, pp. 34-35, quotes Pericot to the effect «that the complex of (Solutrean) bands whom we find in Europe... came in the last resort from Africa.» The Eurafrican cultural continuity is a very real one, from earliest times, and the line of cultural march is almost certainly south-to-north; then (?) a west-to-east backwash.

The people of Natufian I are contemporary with the Late Capsian of North Africa. (*27*, p. 206). At Megiddo the Chalcolithic is before 3000 B. C., the Early Bronze *ca.* 3000-2000 B. C. (*18*, p. 8). The Chalcolithic of Byblos is not "later than the third quarter of the fourth millennium„ (*1*, p. 3).

The Natufians (*27*, pp. 210 f. and *28*, pp. 46 f., *7a*, pp. 61-2) were dolicho- to mesocranic, with a cranial index ranging from 72-78. The occiput was "cap-shaped„, the vault long and narrow. The face was short and wide, with alveolar prognathism and only a moderately prominent chin. In the earlier publication (*27*, pp. 210 f.) Keith concluded: "Their type may be described as Mediterranean, but with a distinct bias toward the African variety of that stock represented by the predynastic people of Egypt.„ Later (*28*, p. 46) he concluded: "If we have to assign them [the Natufians] to a living branch of humanity it must be to that which is represented by the Mediterranean stock. The Natufians have affinities with the Neolithic people of Malta, with the negroid element represented amongst south Europeans in the Aurignacian period, and more distantly with the pre-dynastic inhabitants of Egypt and Late Paleolithic people of North Africa.„

When Keith in one of the foregoing quotations speaks of the "African variety„ of the Mediterranean stock, he is referring to geographic location rather than racial constituency, i. e., to the Mediterraneans *of* North Africa rather than to a Mediterranean-Negroid blend. The latter blend is referred to by him as of Aurignacian time in Europe, specifically as the Cro-Magnon-Grimaldi complex.

In the present Amouq crania there is no evidence of Negroid traits. There are two major possibilities: (1) there may be represented a different, localized offshoot of the basic and early Mediterranean type; (2) an inherent Negroid element may have been bred out. At all events the Amouq longheads were of unmixed Caucasic (White) stock.

Engberg (*11*, pp. 45 f.) reported on 27 skulls from the Chalcolithic period of Megiddo which "appear to conform to the Mediterranean 'river-bed' type of head.„ Of these 27, 16 male skulls had an average cranial index of 72.88, 11 female skulls an ave-

rage of 75.96. Of 5 crania from the Early Bronze, 3 male crania averaged 74.97, 2 female crania averaged 74.25.

At Byblos Vallois (*53a*, pp. 29-30) found in the Chalcolithic period a dolichocranic type related by him to the Mesolithic Natufians of Carmel and the Badarians of Egypt.

There are several sites in Palestine that must now be noted: Gezer, 'Ain Yabrud and Mt. Olivet (Ölberg), and 'Irq al-Ahmar. The 'Ain Yabrud skull is dated by Henckel (*20*, p. 239) as of early Copper-Bronze Age, that from Mt. Olivet (Öldberg) as about the beginning of the Christian era. 'Irq al-Ahmar is assigned by Vallois (*53*, p. 529) to Natufian I.

The crania at Gezer (36, pp. 59-62) were generally longheaded; the majority showed an average cranial index of 77, while a smaller group had an average of 72, the latter being commoner in the earlier period [7]. Macalister remarks that "the earliest inhabitants of the First Semitic Period were indistinguishable from those of the later occupations„ and further that in a level dating from *ca.* 1000 B. C. several crania "showed the elongated oval form with large parietal eminences which is common in Egypt....„ (p. 60). The upper face was moderately high (average index mesen), the nasal aperture moderately wide (average index mesorrhine), and the orbits high (average index hypsiconch). The face was on the whole orthognathous. "At least two crania were in shape, size, and facial character markedly negroid in type„ (p. 60), but the period to which they belonged is not stated.

We may conclude that at Gezer the dominant type is the Mediterranean ("Semitic„), with perhaps a roundheaded element coming in during the later Periods to raise the average cranial index.

At 'Ain Yabrud the fragmentary male cranium was longheaded (cranial index 75.41); the Mt. Olivet (Öldberg) male skull was longheaded (L-B index 75.28). The vault was moderately high (H-L index 74.16). The face was moderately broad (total

[7] It is worthy of note that Macalister says of the Gezer skeletal material: «A comparatively large number of these were bones of adolescents, which seems to indicate a disproportionately greater mortality of persons under 21 years» (p. 62).

facial index of 87.10) and high (upper facial index of 50.81). The orbits were moderately high (index of 80.00), and the nasal aperture was narrow (index of 44.68). In dimensions, proportions, and appearance the crania are Mediterranean in type (*20*, pp. 241-43). At 'Irq al-Ahmar (*53*, p. 530 f.) female skull No. 2 was longheaded (cranial index 72.04) and moderately high-vaulted (H-L index 70.16). The face was moderately broad (index 86.76) and moderately high (index 52.21). The orbits were low (index 75.61), and the nasal aperture was narrow (index 45.45). Vallois concludes that at 'Irq al-Ahmar the physical type is similar to that reported by Keith from Shuqbah and that in several characteristics it is akin to the longheaded type found at Azilian-Tardenoisian Mugem in Portugal (cf. 53, pp. 536-39).

It is not presuming too much, therefore, to conclude that Syria and Palestine were peopled by the same type, the Mediterranean, and that this type, present at Tell al-Judaidah and Chatal Hüyük before 4000 B. C., at Byblos by *ca.* 3500-3250 B. C., at the Natufian sites of Shuqbah, Mugharat al-Wadi, and 'Irq al-Ahmar before *ca.* 5000 B. C., at Gezer before 2500 B. C., at 'Ain Yabrud *ca.* 3000 B. C., was the earliest and basic type of the entire Eastern Mediterranean area.

In Palestine, as we come up in time, the population at Lachish studied by Risdon must be noted, for the basic Mediterranean type is even more clearly represented. The material dates to the 7th and 8th centuries B. C., contemporaneous with the 25th dynasty of Egypt. Material studied included 360 adult male crania, and 274 adult female. Risdon concludes (*50*, p. 142): "The evidence suggests quite clearly that the Lachish people were derived principally from a population of Upper Egypt which was itself derived principally from emigrants who left Lower Egypt about the time of the 18th dynasty.„ The cranial type at Lachish was dolicho-and orthocranic; upper facial index was mesen, orbital index mesoconchic, nasal index mesorrhine.

Since Vallois (*53a*, p. 30) has mentioned the Badarians, and Keith the Predynastic Egyptians, it may be well at this stage to consider these people.

Brunton (*5*, pp. 460 f. and 465) places the Badarian culture,

which was preceded by the Tasian, as beginning at *ca.* 5000 B. C.; the Fayyum A and B cultures he reports on the basis of an estimate by Miss Caton-Thompson and Miss Gardner to date from *ca.* 5500 to 4500 B. C. (p. 461); these were succeeded by the Amratian culture, which he places at *ca.* 4500 B. C. The Badarian crania have been studied by Miss Stoessiger (*52*) and by Morant (*41*). The male crania are longheaded (71.75) and moderately high-vaulted (72.90); the face is moderately high (54.78); the orbit is moderately high (80.25); the nasal aperture is moderately broad (51.45). The female crania are longheaded (73.74) and moderately high-vaulted (73.06); the face is narrow (55.06); the orbit is moderately high (79.70); the nasal aperture is moderately broad (51.75)[8]. Miss Stoessiger concludes (*52*, p. 125) that the Badarian crania are set apart from others in their small mean parietal (male 130.8 mm., female 130.3 mm.) and bizygomatic breadths (male 122.5 mm., female 117.7 mm.), though, as we shall see later, these dimensions are well within the range of variation for comtemporary Mediterranean-type crania. She also comments on the marked longheadedness, but this, too, is not an absolutely distinctive character. There seems to be no reason, therefore, why the Badarians should not be included with the early Mediterranean cranial type.

There is one feature which must be noted, namely that "from skull measurements alone it would be difficult to choose between the primitive Indian and Egyptian series as to the group to which the Badarians are closer„ (*52*, p. 131; cf. also Peake, *44*, pp. 122 f.). The coefficient of racial likeness for Badarian and Veddah males was 2.40 $\pm$.19; for Badarian and Early Predynastic males was 2.19 $\pm$.25 (*52*, pp. 119 and 125). We must insist, however, that such apparent metric identity is merely a measure of a common longheadedness and that it need not betoken basic similiarity in terms of origin.

The crania of Predynastic Egypt have been studied by Miss Fawcett (*12*) and by Morant (*40* and *41*). Miss Fawcett reports

[8] The average values are recalculated from Table II of Miss Stoessiger's report; they refer to length-breadth, height-length, upper facial, orbital, and nasal indices respectively.

on the Naqadah crania, while Morant offers a general craniometric analysis of Predynastic crania. Morant's classification of the material (*40*, p. 14 (Table I) is: Early Predynastic, from Nag'al-Amrah, al-Kawamil, Bait, 'Allam, Naqadah South, Abydos, and Hiw (or Hu); Middle Predynastic, from Naqadah A and Q. Late Predynastic, from Nag'al-'Amrah and Hiw. This representative grouping has been pooled, thus, showing (see our Table XVII) that the Predynastic male type is longheaded (72.11), with a moderately high vault (72.70); the face is high (55.40); the orbit is high (84.90); the nasal aperture is moderately broad (49.44). In size and proportions the Predynastic male crania are one with the Mediterranean cranial type under discussion.

In this same study of the Predynastic Egyptians Morant (*40*, pp. 4 f.) concluded that there was an early longheaded race in Upper Egypt "which may have been directly descended from the people whose palaeoliths are found on the high desert floor on either side of the Nile Valley.„[9] By common origin it was related to the main stock of Upper Egypt, but as a type it soon lost its identity. There remained as basic, in Early Predynastic times, two major and "distinct„ races, or types, one in the Thebaid and one in the Fayyum (Upper and Lower "races„). The Lower Egyptian type, characterized by an increased cranial breadth, smaller cranial height, and greater facial height, persisted until Ptolemaic times, unchanged but for a slight admixture "with some unknown foreign race.„ The Upper Egyptian type was by Late Dynastic times merged in the Lower. Both types were very longheaded.

We have already noted that the coefficient of racial likeness apparently demonstrates a very close affinity between the Badarian and Predynastic male crania. On this point Morant says (*41*, pp. 307-9) that while "the Badari type resembles most closely those of the other Predynastic Egyptian series available„ the

[9] Leakey (*35*, pp. 177 f) quotes Sandford on some skull fragments associated with the early stages of the Sebilian culture at Kum Umbu (Kom Ombo). The type is «more akin to the Predynastic Egyptian than to any other race of which we have full knowledge . . . . . The recognition of the Predynastic type at a date by the balance of probabilities, Palaeolithic, is an important event and one from which other discoveries will probably arise.»

resemblance is not so close that the two can be presumed to represent "precisely the same population". The resmblance between the Badarians and the Predynastic types is most marked in Early Predynastic times. In a very real sense one can scarcely expect that over a period of years—centuries, in fact—two samples may be considered as representing *precisely* the same population, whether in terms of supposed common origin or merely in terms of a comparative assessment. Lack of a precise identity need not preclude assignment of both to a single race, in this instance the Mediterranean.

The kinship of the Badarian and the Predynastic types to other peoples — Dravidian and African Negroids — may be a measure of an ultimate common origin or a convergence due to degrees of intermixture. At present we may record the impression that the apparent Badarian-Dravidian tie-up is due to Mediterraean genes in the Dravidians, not to a Dravidian ("proto-Australoid"?) influence upon the Badarians. The kinship is solely in terms of an early common racial element. As regards a Negroid element Miss Fawcett (*12*, p. 464) states of the Naqada crania that while "in some characters they resemble the Negro," they do "not appear substantially nearer to the Negro .... than the historic Egyptian....." On this same point Morant (*41*, pp. 307-9) observes that though the Badarian and Predynastic peoples are closer to Negroid types than are the later Dynastic peoples, the relationship is still a very distant one. The important idea here is the apparent thinning-out of Negroid traces in Mediterranean types in terms of the gradual loss of a possibly indigenous element by isolation or inbreeding of the former.

The Mediterranean type has been reported in several early North African sites: by Debruge and Cole at Mechta-el-Arbi (*7*), by Boule, Vallois, and Verneau at Afalou-bou-Rhummel (*2*), and by Marchand at Mouillah (*37*). Mechta-el-Arbi is dated as Upper Capsian, contemporary with the Ibero-Maurusian period (cf. Vaufrey, *55*, L'Anth. XLVI, p. 663 f.). Afalou-bou-Rhummel and Mouillah are therefore dated to the same period (cf. *2*, p. 74).

The Mechta-el-Arbi male crania (No. 1, No. 2, Mechta type skull) are weakly longheaded (76.50) and moderately high-vaulted (auricular-height-length index 61.90); the face is moderately high (54.29); the orbit is moderately high (83.33); and the nasal

aperture is moderately wide. Cole (*7*, pp. 188 f.) concludes that male crania I and II studied by him, and the Mechta-type male skull studied by A. Debruge, are Mediterranean in type; female skull III, studied by Cole, is Mediterreanean in type "with negroid characteristics.„ It is felt that these chracteristics are traceable to "a considerable amount of racial intermixture.„

At Afalou-bou-Rhummel (*2*, pp. 92, 122, 125 and 128) 50 crania were uncoverd. Of 36 of these, 17 are longheaded, 15 middleheaded, and 4 weakly roundheaded; all are moderately high-vaulted; 20 of 29 faces measured were broad; 16 of 19 facial profiles were orthognathous; of 29 nasal indices 13 were mesorrhine and 16 platyrrhine; of 32 orbital indices 17 were chamaeconch, 14 mesoconch, and 1 hypsiconch. The Mouillah crania were very fragmentary, but Marchand (*37*, p. 252) concluded that they belonged to the type of the people of Mechta-el-Arbi [10].

Again in the North African crania Negroid traits crop out, not only in the sites just mentioned but also at Asselar (cf. *2* and *35*, pp. 176 f.), which is of Upper Pleistocene Age. While Boule, Vallois, and Verneau (*2*, pp. 214-27) all feel that man of the Oranian (Ibero-Maurusian) culture has basic affinities with Cro-Magnon; Leakey (*35*, p. 176) suggests affinities with South African "Australoids„ and with types at Elmenteita.

We turn now to East Africa, principally to the material uncoverd by Leakey (*34*). Here there is an as yet unexplained Negroid element [11] in apparently Caucasic (Mediterranean) crania.

[10] The North African crania have been ascribed to a number of types: Delisle has equated them with Cro-Magnon, Bertholon with Neanderthal, Lagotala with a form evolving toward Cro-Magnon, Rutot with Combe-Capelle, Cole with Mediterranean plus Negroid (cf. *2*, pp. 191, 193, and 196 f.). Boule, Vallois and Verneau cut the Gordian knot by proposing «*type de Mechta-el-Arbi*» (cf. *2*, pp. 205 and 226).

[11] Weidenreich (*57*, pp. 55 f.) states that among the six skulls recovered at Aniba by Steindorff in 1912-14 are two longheaded and ultraleptoprosopic male adult crania (bizygomatic breadth 114 and 115 mm. respectively) with Europaid upper and Negroid lower face, such as are seen today among certain Nilotes, e. g. the Watussi or Wahima. Weidenreich groups Oldoway, Aniba, and the Watussi as in related sequence. Keith (*27*, p. 159) also accepts Oldoway as «an ancient Hamitic type», but Leakey (*34*, p. 121) states that Mollison, in a preliminary report, did not regard Oldoway as «a representative of the present modern Negro populations».

The material to be studied is from Elmenteita, Willey's Kopje, Makalia, and Nakuru. Leakey states that "the Elmenteitan culture belongs essentially to the rise and maximum of the Makalian wet phase which is very tentatively to be correlated with the series of oscillations known as Bühl Stadium of the European chronology„ (*34*, p. 57). Willey's Kopje and Makalia are related in time because at both sites Gumban A pottery was found; on this basis Leakey also relates them racially when he concludes that "these two sites represent burial-places of the same tribe, or race, of men„ (*34*, p. 97). Nakuru is of Gumban B, following Gumban A, and is of the recent Nakuran wet phase in East African chronology. Leakey dates this "Nakuran or last post-pluvial wet phase„ to *ca.* 850 B. C.; this is the time of the Kenya Neolithic cultures when "traders from the civilized areas farther to the north had already found their way down to central Africa„ (*34*, p. 98).

The range of time represented by the several sites is considerable, but probably does not extend beyond the period in which we are most interested, i. e., from about 5000 B. C. and on. We may accept Keith's general estimate (*27*, p. 171 f) that at the most the Elmenteitans, the earliest East African group under consideration, are contemporaneous with the Predynastic Egyptians.

In the tabulation below Elmenteitan males A, B, C, and E and females D, F, and F, and Willey's Kopje males I, II, and III are grouped; Makalia male I and Nakuru male IX are given singly (*34*, p. 79 and Table XVII).

	Length-breadth index	Height-length index	Upper facial index	Orbital index	Nasal index
Elmenteita, male	72.43	71.49	59.30*	83.06*	44.96*
female	76.95	73.08	55.33	82.46	43.14
Willey's Kopje, male	65.75	65.13	56.13	80.91	44.55
Makalia, male	73.35	67.81	54.29	77.78	50.45
Nakuru, male	69.25	70.32	58.33	80.68	50.00

* Based on A and B only.

All types are longheaded, Willey's Kopje and Nakuru males markedly so; Willey's Kopje and Makalia males are low-vaulted, the others moderately high-vaulted; in all the face and orbit are moderately high; the Elementeitan males and females and the Willey's Kopje males have narrow nasal apertures, the others moderately wide nasal apertures.

These characters, as a group, are quite acceptable for the Mediterranean type, yet the early East African types are not purely Caucasic: there is an all too evident intermixture with Negroid types. We may agree, up to a point, with Leakey's statement that "so far as we at present know them the Stone Age races of Kenya are not at all of the type which would be termed typically 'Negro'„ (*34*, p. 129). Keith is in fundamental agreement when he says that "the men discovered by Mr. Leakey are certainly not Negroes, but to my eye they are certainly Negroids or Hamites„ (27 p. 171).

It was my privilege to see the Elmenteita crania at the Royal College of Surgeons in London in 1931; skull A in vault contour and lowness of forehead, narrow forehead, bi-parietal area, and rounded lower nasal margin is quite Negroid (see Pls. XXIII-XXIV in Leakey, *34*); again, Gamble's Cave skull No. 4 is Negroid in vault contour, especially in occipital fullness (*ibid*, Pls. XIX - XX). In the cranium Negroid influences are surely evident; in the face Caucasic influences are equally prominent.

It is a difficult problem to decide just where we stand in the consideration of such mixed types: are they genuinely *mixed*, i. e., do they represent a blend of an originally distinct Caucasic type with an originally distinct Negro type? or do they represent a type emergent from elements originally common to both, i. e., did the Caucasic Mediterranean and the East African Negroes stem off from a much earlier form that was Caucasoid - Negroid without possessing in the fullest degree the major characteristics of each? Later and random recombination of heritable entities might have given rise to types quite different from each other.

The term "Hamite„ is almost as bad, in speaking of physical types, as the term "Semite,„ but both are useful and both, interestingly enough, betoken variants of the Mediterranean type. Of the two the "Hamite„ is the more mixed. At all events the

protohistoric East Africans are well within the dragnet of our investigation: they are Mediterraneans with either a basic or an acquired Negroid tinge.

We turn now to Anatolia, where at Alishar Hüyük the Oriental Institute has established the following sequence (*30*, p. 225): Chalcolithic, ending *ca.* 3000 B. C.; Copper Age, ending in the 24th century B. C.; Early Bronze Age, 24th-20th century B. C.; Hittite Empires, 20th-12th century B. C.; Post-Hittite-Phrygian, 12th-7th century B. C.; Medo-Persian, Hellenistic, Galatian, 7th-1st century B. C.; Roman-Byzantine, 1st-11th century A. D.; Seljuk, 11th-13th century A. D.; Osmanli, 14th-18th century A. D. At this site the Mediterranean type was present in the earliest periods, was swamped by roundheads, and, after reasserting itself, was again slowly submerged by roundheads and shortheads. In the Chalcolithic, Copper Age, and Post-Hittite-Phrygian periods the Mediterranean longheads were supreme. The grouped males from these periods (see Table XVII) are longheaded (72.60) and moderately high-vaulted (71.45); the face is moderately high (54.05); the orbits are high (85.30); the nasal aperture is wide (52.25). There can be no doubt that the Mediterranean was the type longhead of this site, present from earliest times.

For additional Anatolian cranial series we must note the crania from Ahlatlıbel (*23*) and Kusura (*25*) studied by Kansu. In addition there is available the excellent craniological summary and synthesis by Dr. Şenyürek (*51b*) for the Copper Age and Hittite populations. At Ahlatlıbel the dating is Copper Age (cf. *42a*, pp. 419 f.); at Kusura Period A = Chalcolithic, Period B is Copper Age, Period C is Hittite. At Ahlatlıbel the average dimensions of four crania (a fifth, poorly restored, skull is omitted) are as follows: length = 190.0 mm., breadth = 141.5 mm., total cranial height = 147.0 mm., auricular height = 117.0 mm.; the main derived indices are: breadth / length = 74.2, auricular height/ length = 61.3, auricular height/ breadth = 82.7. At Kusura the breadth/length index for Copper Age crania is given as 74.3 for a male, 72.3 and 81.2 for two females; in the Hittite Period the same index for two males is 76.7 and 83.1 There is an evident shift at Kusura from dolicho- to brachycrany.

Dr. Şenyürek has presented such a detailed discussion of

Anatolian prehistory that it is necessary here only to summarize his data, especially from Babaköy. We shall here note the Chalcolithic and Copper Age male crania (*51b*, Table 1):

Measurement * and Indices	Babaköy (1 ♂)	Tilkitepe	
		Chalcolithic (2 ♂♂)	Copper (3 ♂♂)
Cranial			
Length	183.0	191.0	183.7
Breadth	133.0	137.5	137.3
Height (ba-br)	140.0	131.0	129.5
Height (po-b) (OH)	121.0	112.0	110.0
B/L	72.6	72.0	74.9
H/L	76.5	69.7	72.1
OH/L	66.1	59.6	59.9
Facial			
Upper face H (na-pr)	69.0	65.0	65.5
Breadth	126.0	129.0	128.0
Orbital W	39.0?	—	38.3
„ H	33.0	—	31.0
Nasal H	50.0	—	49.5
„ W	23.0	—	23.8
Upper facial index	54.7	50.4	50.7
Orbital index	85.6	—	81.0
Nasal „	46.0	—	48.0

* It is to be noted that Şenyürek (*51b*, p. 237) has pointed out that the Babaköy measurements are by Angel, while those of Tilkitepe are by him.

Dr. Şenyürek has included in his original tabulation the Chalcolithic and Copper Age crania from Hisarlık II, Alishar, Kusura, and Ahlatlıbel, which have been mentioned separately in the present report. It is of moment that he goes beyond the craniometric data to assess cranial morphology as well. When he does this he comes to the conclusion that the crania are basically assignable to the Mediterranean type; the crania from Babaköy and Tilkitepe he assigns to the Eurafrican type. There are,

therefore, two dolichocranic types, according to Dr. Şenyürek, with the last-named defined by him as the more "primitive„.

Dr. Şenyürek's main conclusion that the earliest populations of Anatolia were predominantly dolichocranic is substantiated by all available comparable data.

The next sites to be considered are in Iran. At Tepe Hissar (*32, 33*) Dr. Erich F. Schmidt has established the following sequence: Period I, before 4000 to *ca.* 3500 B. C.; Period II, *ca.* 3500 — *ca.* 3000 B. C.; Period III, *ca.* 3000 — *ca.* 2000 B. C. Here the Mediterranean longheads were earliest and basic to the entire population. The grouped males are longheaded (70.45) and moderately high-vaulted (71.27); the face is high (55.27); the orbit is moderately high (78.14); the nasal aperture is moderately broad (49.49). In these as in all other characters the indigenous longheads of Tepe Hissar fit into the definition of the Mediterranean type.

The skeletal material excavated at Shah Tepé near Astrabad is reported by Fürst (*13*). There are 22 crania from Period I, 750-1000 A. D., 6 from Period II, 2500-1800 B. C., 5 from Period III, 3000-2500 B.C. We shall consider only Periods II - III here, the material from which was badly broken. From Fürst's Table A I have calculated the following average dimensions (mm.) and indices.

	Period II		Period III	
	♂ (4)	♀ (1)	♂ (3)	♀ (1)
Cranial:				
Max. length	189.8	184.0	187.0	176.0
Max. breadth	141.0	142.0	137.3	140.0
Basio-bregmatic height	122.0	—	—	129.0
Auricular height	114.0	—	—	111.0
Breadth-length index	74.3	77.2	73.4	79.5
Height-length index	63.9	—	—	73.3
Height-breadth index	89.7	—	—	92.1
Facial:	♂(1)	♀(—)	♂(—)	♀ (1)
Total face length	116.0	—	—	—
Upper face height	70.0	—	—	63.0
Bizygomatic width	123.0	—	—	117.0?
Nasal height	49.0	—	—	43.0
Nasal width	23.0	—	—	22.0
Orbital height	31.0	—	—	29.0
Orbital width	37.0	—	—	36.0
Total facial index	94.3	—	—	—
Upper facial index	56.9	—	—	53.8?
Nasal index	46.9	—	—	51.2
Orbital index	83.8	—	—	80.6

Fürst himself makes no attempt (pp. 24 f.) to identify precisely the numerically inadequate and fragmentary samples from Periods II - III, beyond a comparison with the contemporary basic longheaded type (Mediterranean?) found at Hissar, Kish, al 'Ubaid, Ur and Cyprus.

The skeletal material excavated at Sialk has been carefully studied by Vallois (*54*). Six horizons are recognized : I, end of fifth millennium B. C. ; II, beginning of fourth millennium B. C. ; III, mid-fourth millennium B. C. ; IV, end of fourth millennium B. C. ; V, Necropolis A, twelfth and eleventh centuries B. C. ; VI,

Necropolis B, tenth and ninth centuries B. C. Vallois differentiates four cranial types, found in III, I-III and V-VI, II-IV, and VI, respectively. The first three comprise two longheaded types and one roundheaded type ; the fourth is roundheaded. From Vallois' measurements in his Tables III, V, VII, and VIII I have calculated for these four types the average principal cranio-facial dimensions (mm.) and indices, as presented in the tabulation which follows. It is to be noted that Vallois has grouped the crania according to type or group rather than to Period. Thus his Group I includes crania from Periods I - III (Nos. 101, 104, 108, 109, 3 for males, 103, 106, 112 for females) ; Group II includes crania from Periods I, II, V, VI (Nos. 105, 122, 127 for males, 5, 107, 111, 123 for females) ; Group III includes crania from Periods I, II, IV, V (Nos. 4 for males, 102, 110, 116 for females) ; Group IV includes crania only from Period VI (Nos. 9, 11, 12, 117, 120, 124, 125, 126 for males, 6, 7, 8, 10, 118, 119, 121 for females).

Measurement	Group I		Group II		Group III		Group IV	
	♂ (5)	♀ (3)	♂ (3)	♀ (4)	♂ (1)	♀ (3)	♂ (8)	♀ (7)
Cranial :								
Max. length	198.0	193.3	189.3	178.0	169.0	171.0	179.8	167.1
Max. breadth	134.0	133.3	141.7	130.7	134.0	138.7	152.0	144.6
Auric. height	118.6	113.3	117.0	110.2	102.0	109.0	119.8	114.0
Length-breadth index	67.60	68.96	74.76	73.43	79.20	81.03	84.60	87.07
Height-length index	59.90	59.50	62.10	60.13	60.30	63.30	66.69	68.71
Height-breadth index	88.18	85.50	83.03	84.25	76.10	80.10	78.77	78.76
	♂ (5)	♀ (2)	♂ (3)	♀ (1)	♂ (1)	♀ (1)	♂ (6)	♀ (4)
Facial :								
Upper face height	75.0	69.5	73.0	68.0	70.0	—	74.8	66.4
Bizyg. breadth	134.3	129.0	131.3	126.0	129.0	120.0	140.8	131.0
Upper face index	55.15	53.85	55.50	53.90	54.20	—	53.01	50.62
Nasal index	48.22	52.10	49.73	51.00	50.90	—	48.30	49.50
Orbital „	85.25	82.00	71.30	77.50	87.50	—	83.14	83.42
Palatal „	79.45	62.20	92.90	89.30	100.00	75.70	92.68	94.23

The type-features for each group (males), together with the range of each index in the samples, are summarized as follows:

Index	Group I	Group II	Group III*	Group IV
Length-breadth	hyperdolichocranic (65.0-69.3)	dolichocranic (73.9-75.7)	mesocranic (79.2)	brachycranic (80.0-92.8)
Height-length	chamaecranic (55.4-63.1)	chamaecranic (61.8-62.3)	chamaecranic (60.3)	chamaecranic (62.5-74.5)
Upper face	lepten (51.4-63.2)	lepten (53.9-56.3)	mesen (54.2)	mesen (48.5-58.8)
Nasal	mesorrhine (44.3-52.1)	mesorrhine (48.2-52.0)	mesorrhine (50.9)	mesorrhine (44.6-53.6)
Orbital	mesoconchic (76.1-88.5)	chamaeconchic (70.0-73.8)	mesoconchic (87.5)	mesoconchic (76.7-96.5)
Palatal	leptostaphylic (77.3-81.6)	brachystaphylic (84.8-101.0)	brachystaphylic (100.0)	brachystaphylic (81.6-101.0)

* Only one male skull; three females with an average length-breadth index of 81.03 (79.0-82.1) are brachycranic; the one male, with an index of 79.2, is essentially roundheaded in type.

In these four types there is an evident decrease in length, increase in breadth; vault height increases a bit absolutely, but remains relatively low throughout. Upper face broadens as skull breadth increases; nasal breadth remains quite constant, as does also orbital height, with the possible exception of the low-orbited male of group II; palate is narrow in group I, broader in groups II and IV.

The longheaded groups are of moment in our discussion of the Mediterranean type. Vallois recognizes the priority of this type in Asia Minor; he feels that the hyperdolicho-and dolichocranics are merely differentiated forms. The hyper-dolichocranics of I he would term "Proto-Iranian,,; the dolichocranics of II he terms "Proto-Mediterranean.,, His choice of "Proto-Iranian,, is un-

fortunate in that Haddon has already preëmpted the term, when he refers to a Eurasiatic roundheaded type as Pamiri or Iranian. (*H. alpinus* of Lapouge). Apart from this it seems that separation of group I and II solely morpho-metrically is somewhat of an over-refinement. I would prefer to class both longheaded groups as Mediterranean.

In Tables XVII-XVIII are summarized the cranio-facial measurements, indices, and characters of the male Mediterranean type as it occurred at the several sites we have been studying, and which have not been tabulated in the body of this report. Notwithstanding the fact that at most sites the samples have been entirely inadequate, the combined data are surprisingly homogeneous. The cranial length ranges from 178.0-197.17 mm., most of the crania hovering around 185 mm.; similarly cranial breadth ranges from 129.5-139.0, with 135 mm. as a central point; cranial height ranges from 128.5-135.71 mm., with 130-132 mm. as a central range. Facial dimensions are more variable, a feature too well known to need further discussion. At all events the male Mediterranean type may be summarized as longheaded and moderately high-vaulted, with face moderately high to high, orbit moderately high, and nasal aperture narrow to moderately wide. Only in one group, the East African, is there a noticeable yet uniform variation, a definite trend in the direction of a Negroid influence.

In Figures 23-24 the length-breadth ratios of Mediterranean adult male and female crania are graphically depicted. The data, to the nearest whole millimeter, are as follows:

PERIOD	MALE		FEMALE	
	Length	Breadth	Length	Breadth
Phase O	185	138	173	130
Phase N	186	134	—	—
Phase M	187	147	176	139
Phase G	182	129	—	—
Tepe Hissar II	189	131	178	132
Tepe Hissar III	186	133	180	132
Alishar Chalcolithic	—	—	179	130
„ Copper Age	182	135	177	137
„ Post-Hittite-Phrygian	186	132	—	—
Egyptian Badarian	182	131	177	130
" Predynastic	187	135	—	—
„ Dynasties VI-XII	183	134	—	—
„ Dynasties XXVI-XXX	185	139	177	136

With but one exception the males are longheaded, with length between 182 and 189 mm., breadth between 129 and 139 mm. The females, slightly smaller, show what is probably a sex tendency to middleheadedness.

We may conclude with a reasonable degree of certainty that the Mediterranean type was earliest and was basic to north and northeast Africa and the eastern Mediterranean area, Asia Minor and Iran. There is considerable reason to believe that it arose somewhere in the north Africa-south European area (the western Mediterranean area par excellence) and spread eastward to Asia Minor, Iran and India and southward (from Asia Minor to Syria and Palestine?) and to East Africa. It seems warranted to conclude that the longheaded Mediterranean cranial type had priority in the vast area comprising southern Europe, northern Africa, Asia Minor, and possibly the entire Middle East.

The Eurafrican Type

The presence of this type as far west as Syria in Phase G (*ca.* 3500 B. C.) is very surprising. It was possibly present at Tepe Hissar I (*ca.* 4000 B. C.), but was not certainly present until Tepe Hissar II (ca. 3500 B. C.). It was not found at Alishar

until Post-Hittite-Phrygian times (12th-7th century B. C.), and even then doubtfully so (skull no. 3218). According to Peake (*43*, pp. 155 and 165) male crania Nos. 1 and 2 of Hissarlık III (*ca.* 2225 B. C.) are "Nordic.„ According to Buxton (*6*, p. 77) there was found at Kish no skull "which showed in the remotest degree any resemblance to the 'Nordic, type.„ At Sialk Vallois (*54*) did not find a "Nordic„ type. In his Fig. 21, p. 182, he depicts the "Nordic„ ("type scytho-iranien [= nordique?]„) as present only at Tepe Hissar II-III. Here we have a problem compounded of sporadic occurrence and negative evidence: What date or period shall we set for the emergence and spread of the Eurafrican (= Nordic?) type?

In Table XIX are summarized the grouped cranio-facial measurements and indices of the type[12]. Uniformly the head is very long and the vault moderately high; the face is moderately high to high, the orbit is moderately high, and the nasal aperture moderately wide. It is in its absolute size rather than in its proportions that the Eurafrican skull type stands out; it is a large skull with strongly developed eyebrow ridges, mastoid processes, and sites for muscle attachment.

In Figure 25 the length - breadth ratios of the male Eurafrican crania from the several sites are graphically depicted. It is based on the following data, given to the nearest whole millimeter:

Period	*Length*	*Breadth*
Phases P and Q	206	140
Phase O	190	132
Phase N	185	141
Phase M	194	142
Phase G	194	140
Hissarlik III	192	137
Alishar 3218 Post-Hittite-Phrygian	196	134
Tepe Hissar II	188	137
Tepe Hissar III	192	136

[12] For the descriptions and measurements of the Hissarlik material see Schliemann (*51*, pp. 270-72 and pp. 507-12). For the measurements of the Alishar material see Krogman (*30*, Tables II-III)

Though there is a greater range of variation than for the Mediterranean males, the trend to larger size is evident, with length mostly between 190 and 200 mm., breadth between 130 and 140 mm., but definitely toward the upper range. The pronounced longheadedness is evident. The only exception is the lone middleheaded skull from Phase N.

In the report on the Alishar crania we stated (*30*, p. 271) that "a non-Mediterranean longheaded element is certainly not represented in Asia Minor until about 2500-2000 B. C.„ Apparently this must now be revised to provide for the Eurafrican type of Phase G, for that it *is* an Eurafrican cranial type we are reasonably sure. At Tepe Hissar the type (there called "proto-Nordic„ by me) is to be expected early, for it is near the Aralo-Caspian Steppe region, the probable area of characterization. If the type occurs in Tepe Hissar II and then is not found again until Hissarlik III and Alishar Post-Hittite-Phrygian, its occurrence in Phase G at Judaidah is a greater puzzle than ever. It may be that this western outpost, contemporaneous with Tepe Hissar II, is merely an indicator of the fact that the territory in between has not been completely explored; we may in future excavations fill the gap in space, just as now apparently we have filled the gap in time. Or the one male of Phase G may for some reason unknown to us be a "lone wolf„ slinking through the corridors of history almost a millennium in advance of the pack!

Roundheaded Types

Here we shall include the Alpines (broadheaded) and the Armenoids (shortheaded) types.

The Alpine Type

At Tell al-Judaidah this type was apparently not present until about 1500 B. C., yet there is evidence that roundheadedness in the Mediterranean area is much older. Cole (*7*, pp. 169-71 and 189) reports an infantile skull from Mechta-el-Arbi which is roundheaded and, according to him, Alpine in type. Boule and Vallois (*2*, p. 92) found that of 36 crania from Afalou-bou-Rhummel 17 were longheaded, 15 middle-headed and 4 weakly

roundheaded. Brunton (*5*, pp. 465 f.) states that the skulls of the Tasians, who seem to have preceded the Badarians, "are much rounder than the Badarian or the Predynastic; they have broad faces and square jaws, quite unlike the later type„. To which Peake (*44*, p. 123) adds that the Tasians are "of a type scarcely ever found in Africa, but which are more at home in the highland regions stretching from Tibet to Central Europe„. In Egypt roundheads begin to appear as a distinct minority type during Dynasties III-IV (*30*, Table VI).

Of early Crete Duckworth (*10*, p. 407) reports that out of 46 male skulls 65.3 per cent were longheaded, 26.15 per cent middleheaded, and only 8.55 per cent roundheaded. Hawes (*19*, pp. 229-31) shows that the frequency of round headedness increases with time: 5 crania from Gournia (Late Minoan I) have an average cranial index of 76.5; 7 crania of Late Minoan III have an average of 79.1. He traces the infiltration of roundheadedness from two sources; in western Crete from the tall northern "Illyric„ type, and in eastern Crete from the Asiatic roundheads of the uplands of Asia Minor.

Notwithstanding the evidence of these earlier roundheaded types, we are not in a position to define the type in terms of origin or exact time of arrival. It is probably reasonable to conclude that the full impact of the Alpine type was not felt in Asia Minor until the middle of the third millennium B. C. or a bit later. It may not have reached Syria until considerably later. Macalister (*36*, pp. 60 f.) lists 74 crania from Semitic periods III and IV (up to 550 B.C.) of which 24 are longheaded, 43 middleheaded, 7 roundheaded. Of the Hyksos (1800 - 1600 B. C.) Hrdlicka (*21*, p. 192) and Engberg (*18*, p. 226) report that the type was roundheaded, approaching that of the Alpines.

The most important relative and detailed comparative materials on the Alpine type come from Tepe Hissar, Alishar Hüyük, and Alacahüyük (see also Tables IV and VI in Şenyürek, *51b*). The dates for the crania are as follows : Tepe Hissar, *ca.* 3000-*ca.* 2000 B. C. (*33*, p. 6); Alishar Hüyük, 24th - 12 th century B. C. (*30*, p. 225); Alacahüyük, 3rd millenium B. C. (*22*, p. 36). Vallois (*54*, p. 171) provisionally calls his group III, present in Sialk I, II, IV, V, Alpine.

In Table XX the essential cranio-facial measurements and indices of the male Alpine type are given; these data are in addition to those given in the body of this report. The range in length is not great, 178.7-181.7 mm., but the range in breadth is unusual, 136.2-149.5 mm.; as a result the cranial index is likewise variable, from middle- to roundheadedness. The Amouq crania and the male skull from Alacahüyük are definitely roundheaded (83.67 and 82.1); the Tepe Hissar crania verge on longheadedness (76.73), while the Alishar crania verge on roundheadedness (79.15). All of the crania tend to high-headedness (60.84-64.60). The upper face is not homogeneous: the Alishar crania have a low face (48.35); in the Tepe Hissar crania the face is moderately high (51.56); in the Amouq crania it is high (56.74). The orbit is of average height in the amouq and Tepe Hissar crania (79.54 and 79.16), and in the Alishar crania it is high (87.9). The nasal aperture is narrow in the Amouq crania (46.08) and wide in the Alishar and Tepe Hissar crania (51.65 and 54.52).

The variable cranial ratio of the Alpine type is clearly shown in Figure 26. For the males the length falls in the 170-180 and 180-190 ranges, the breadth in the 130-140, 140-150, and 150-160 ranges; for the females the length falls in the 160-170 and 170-180 ranges, while the breadth hovers around the 140 line. To set them apart the female Alpines have been encircled by a dashed line, which elucidates their relative homogeneity. The figure is based on the following cranial length and breadth dimensions:

PERIOD	MALE		FEMALE	
	Length	Breadth	Length	Breadth
Phases S and T	184	154	168	140
„ P and Q	173	145	163	139
Tepe Hissar III	177	136	—	—
Alishar Early Bronze	180	142	—	—
„ Hittite Empires	183	145	174	141
Alacahüyük	179	147	169	141

The Alpine type as representative of a broad- and round-headed people was certainly a latecomer in the early history of

Asia Minor. It made its appearance in the mid-third millennium B. C., but only sporadically; not until much later did it play any considerable role in racial development. Its heterogeneity, as measured by the admittedly inadequate samples at hand, may have been an indication that only mixed types made bold to appear in an alien population; as the advance guard of the oncoming roundheads filtered through the indigenous longheads they reached the periphery (Syria) as mixed middleheads. This assumes that the roundheads emerged from Central Asia to encounter the longheads of Iran and Asia Minor. At all events, we may be reasonably certain that the original trend to broad- and roundheadedness developed well to the east of Asia Minor, and that the line of march was always westward.

The Armenoid Type

The shortheaded people defined as the Armenoid type do not appear in the present series until *ca.* 500 B. C. or later. They have been reported earlier in Asia Minor and considerably earlier in Mesopotamia. Buxton and Rice (*6*, pp. 75 f.) stated the type to be present at Kish (*ca.* 3000 B. C.). Virchow (*56*, pp. 123-25) classed the crania found at Bozüyük (*ca.* 1500 B. C.)as Armenoid. The type was apparently in Cyprus about 2000 B. C. but not earlier (*30*, p. 271). Sir G. Elliot Smith (cf. *47*, p. 83) concluded that the aliens at Gizah in the Second Dynasty (*ca.* 3000 - 2780 B. C.) are Armenoid. At Sialk Vallois (*54*, p. 169) concludes that his group IV, Period VI (10th century B. C. at the earliest) is Armenoid. He is apparently judging principally from the brachycranic length-breadth index, for the chamaecranic length-height index is certainly not typical of the Armenoid hypsibrachycranic skull. The range of 2500 years, from about 3000 to 500 B. C., for the first appearances of the type is in itself significant of the sporadic occurrence of either a new type, an incompletely differentiated type, an imperfectly defined type, or a type distinctly in the minority. If further comparative data be considered, the time range is greatly extended, namely to *ca.* A. D. 350 in the Sasanian period at Tepe Hissar and to between the 11 th and 18 th centuries A. D.

in the Seljuk and Osmanli period at Alishar Hüyük.[12a] Over a period of almost 5000 years the Armenoid type is represented as cropping up from time to time in Iran, Mesopotamia, Asia Minor, and Egypt.

In Table XXI are given the principal cranio-facial measurements and indices of male and female Armenoid crania fram Syria, Alishar Hüyük, and Tepe Hissar. Those from Tell al-Judaidah are separated by 1000-1500 years, more or less, from the types at Alishar and Tepe Hissar. The several crania are uniformly shortheaded (cranial index ranging from 87.5 to 91.57) and highheaded (H-L index ranging from 77.3 to 86.37). The upper face is low to moderately high (46.97 to 51.9); the orbit is moderately high to high (75.61 to 92.64); the nasal aperture is narrow to moderately wide (43.0 to 48.89). Again, as in the Alpine type, the cranial dimensions and proportions are more homogeneous than the facial. The decreased cranial length and generally increased cranial breadth of the Armenoid type is well brought out in Figure 26, based on the following dimensions:

Period	Male		Female	
	Length	Breadth	Length	Breadth
Phases P and Q	168	154	160	143
Tepe Hissar Sasanian	—	—	163	144
Alishar Turkish	167	146	—	—

The several Armenoid crania have been set off by a dotted line; the female crania are smaller in all respects than the male, and both clearly stand apart from the Alpine type. Length ranges between 160-170mm., breadth principally between 140-150 mm. and to some extent between 150-160 mm. The Alishar crania of the Seljuk-Osmanli period were probably Armenians (cf. *30*, p. 276), the others are of the Armenoid type. Certainly the Armenoid type was present in Syria and Iran at least by 500 B. C. on the basis of the foregoing comparative data. We are, however, concerned with the possibility of an earlier appearance.

[12a] I would here aknowledge Dr. Şenyürek's admonition (*51 a*) that the «Armenoid type» is *not* to be confused with the «Armenian nationality». The former is, of course, much more widespread than the latter.

In the report on the Alishar crania (*30*, p. 272) we concluded "that migrations of peoples of the truly Armenoid type did not occur much if at all before 2000 B. C., and that they reached their height between 2000 and 1500 B. C.„ There is no reason to change this very general conclusion despite their much later appearance at the sites we have been discussing. Their real impact, however, is after 1000 B. C.

What about the Armenoids at Kish and at Gizah? What about the "Hittites„ as Armenoids? The answer may be found in part in the statement by Peake and Fleure (*47*, pp. 82 f.) that from the time of the Second Dynasty in Egypt there is found "among the ruling class . . . . a type of head and face strongly reminiscent of the type now found in Anatolia . . . . .„ Two points must be considered here: (1) "the ruling class„; (2) "now found in Anatolia.„ The first point may explain the relative infrequency of occurrence of the type by assuming that it represented very early a familial head form transmitted in a sort of dynastic succession, much as the "Hapsburg lip„ in royal lines in Europe today. This in turn might lead to symbolizing or caricaturing, so that in time the representation of the "Armenoid„ or "Hittite„ type would be a stylized short-head. We are not unfamiliar with this idea today in our symbolizing the English "John Bull„ and the American "Uncle Sam„. It is quite possible, therefore, that a distinct minority in the population, or even a family line, might in time come to stand for the entire group. Our knowledge of the hypsibrachycephalic "Hittite„ is based almost solely on sculptural representations of the type [13].

The foregoing argument loses some weight when it is considered that the delineation of the "Hittite„ type occurs over an extensive area and for a long period of time: Kish, *ca.* 3000 B.C.; Cyprus; *ca.* 2000 B. C.; Bozüyük, *ca.* 1500 B. C.; Dinarics and "maritime Armenoids,„ *ca.* 2000 B. C.; Gizah, *ca.* 3000-2780 B.C.;

[13] On This point see Dingwall (*9*, p. 83), who suggests that cranial deformation is often limited to a minority group in a given population. See also Matiegkova (*38*, p. 68), who quotes Wreszinski (*58*, Vol. II, Pl. 2) to the effect that artistic delineations are not trustworthy in race-type analysis.

"Hittite troops," *ca.* 1200 B. C. The type, even though a minority, may have been a real entity, assuming (for the sake of argument) that all the artists were depicting the same - more or less stylized - type.

The second point may explain a mistaken cause-and-effect sequence, namely that, since the early "alien" round-heads came from Asia Minor and since that area today is in part Armenoid, the earliest types from that area must have been at the very least proto-Armenoid. A good example of this may be seen in Peake and Fleure, Fig. 43 (*47*, p. 83), where the "profile of a skull from the Gizah necropolis showing Armenoid traits" is shown. If the picture be reasonably accurate, the type is not Armenoid, that is, a sortheaded, highheaded cranium with greatly reduced postporionic length. It appears to be rondheaded and highheaded and must, therefore, be included with the Alpine rather than the Armenoid type. The point is simply this: the Armenoid is a latecomer in the history of Asia Minor and has probably evolved [14] from Alpine roundheads who in early historic times were the only roundheads of Asia Minor. The trend of human skull-conformation is seemingly toward round-headednsss, if we may judge by the uniformly longheaded Paleolithic types. Roundheadedness came in apparently in Mesolithic times, relatively recently and has made tremendous strides since then. It is not too much, therefore, to surmise that the earliest "Armenoids," so-called, were Alpine or possibly Dinaric, for the sequence is very probably Alpine-Dinaric-Armenoid. In a very real sense we have observed a trend and the emergence of a type.

The Mandible

Comparative data on the mandible, as on the cranium, are available chiefly for the Mediterranean type. In Table XXII these data

[14] Kappers has suggested (*26*, pp. 605 f. and Tables I-III) that roundheaded peoples apparently have transmissible hyperbreadths, which may by inbreeding become expressed. This succession must be considered speculative, for our knowledge of the genetics of cranial form is too imperfect to warrant the assumption of a hyper-breadth as a genetically dominant trait.

are tabulated.[15] The bicondylar width is fairly uniform except for the Makalia male. Symphyseal height is variable, but alveolar absorption accompanying incisor loss may be a partial explanation. In general, as revealed by the measurements of the minimum width of the ramus, the East African mandibles are more robust. The transverse dimensions of the dental arch are fairly uniform, as is also the mandibular angle. The Amouq mandibles are smaller, if one may judge by the meassurement of corpus length and of mandibular length. If we accept Morant's statement (*42*, p. 116) that "mandibular characters tend, on the average, to be more variable intraracially than cranial characters when allowance is made for differences in absolute size,„ then the several series appear to be relatively homogeneous.

For comparison with the Alpine male type there are available Kansu's data from Alacahüyük (*22*, *p.* 37).

	Tell al-Judaidah and Chatal Hüyük	Alacahüyük
Bicondylar width (w')	126.50	140.00
Symphyseal height (h')	29.25	30.00
Minimum width of ramus (rb')	34.75	32.00
Bigonial breadth (gogo)	98.67	100.00
Coronal height (crh)	61.50	60.00
Mandibular angle (M<)	119.75°	116.00°

Apart from the unusual bicondylar width of the male from Alacahüyük the two samples are similar.

The mandible by itself has not been studied sufficiently to yield convincing evidence of racial affinities. Its chief function, therefore, lies in the direction of corroboration. In this sense the

[15] The data are from Marchand (*37*, pp. 243-47, Leakey (*34*, p. 80, p. 104, p. 109, p. 118), Krogman (*31*, Table XXXIII), Morant (42, p. 96), and Şenyürek (*51c*, p. 254). [It must be noted that of the Copper Age skeleton ≠ 7 at Maşat Höyük Şenyürek (p. 250) observes that due to its immaturity it is not possible to say whether it is Mediterranean or Eurafrican].

mandible offers additional proof of the validity of the type groups in the report, particularly the Mediterranean type [16].

The Long Bones

We shall consider here only the femur, the tibia, and calculated stature.

The Femur

In Table XXIII are selected measurements from Elmenteita (Gamble's Cave II and Bromhead's Site), Willey's Kopje, Makalia, and Nakuru (Leakey, *34*, pp. 55 f., 82, 103, 105, 111, 118), Tepe Hissar (Krogman, *31*, Table XXXIV, Alacahüyük (Kansu, *22*, p. 38), and Mouillah (Marchand, *37*, p. 249). Macalister offers additional data from Gezer (*36* pp. 59 and 63 f).

In every instance, regardless of type or sex, the femora listed in Table XXIII are platymeric, the Makalia male and the Alacahüyük female excessively so. The maximum length is small in the Mediterranean males from Amouq and Tepe Hissar, uniformly great in the East African males. At Gezer Macalister found platymeria among the Pre-Semites, but eurymeria occurred also; the same was true of later Semitic periods, but here a few instances of stenomeria occurred.

The Tibia

In Table XXIII are selected measurements of the tibia. The sources of the data are as for the femur. In the tabulated data are found platycnemic tibiae among the Makalia and Nakuru males, mesocnemic tibiae among all the rest except the eurycnemic Tepe Hissar III females. Macalister (*36*, pp. 59 and 63 f.) reports that about 30 per cent of the Gezer Pre-Semitic tibiae were platycnemic, and that "a fairly large proportion of the tibiae showed platycnemia„ in later Semitic periods. The tibiae of the Philistine period were not platycnemic.

[16] The dental pathology of the Amouq crania may be compared to that found at Gezer: «From 1000 B. C. onwards . . . . dental caries became more and more common, and the teeth of some of the Hellenistic and Byzantine skulls were in a dreadful condition.» (Macalister, *36*, p. 68). For a detailed discussion of dental pathology in various population groups see Krogman (*32*).

The single Alpine female tibia from Tell al-Judaidah did not have the so-called "squatting facet„ reported in male tibiae at Tepe Hissar (*31*, p. 35) and in Pre-Semitic and Semitic tibiae at Gezer (*36*, pp. 59 and 63).

No bone pathology was found in the present Amouq material [17].

Stature

Stature has been calculated from the femora [18] (except at Shah Tepe, where Fürst used upper and lower limb bones) listed in Table XXIII, also obtained directly from data by Boule, Vallois, and Verneau for Afalou-bou-Rhummel (*2*, p. 162 f.), by Keith for the Natufian (*28*, p. 46), by Duckworth for the early Cretans (*10*, p. 408), by Petrie for the Hyksos (*49*, p. 220), by Macalister for the people of Gezer (*36*, p. 63), by Vallois for Byblos (*53a*, p. 27), by Fürst for Shah Tepe (*13*, p. 22), by Vallois for Sialk (*54*, pp. 135 and 154), and by Kansu for Ahlatlibel (*23*, p. 35).

Site	Male (mm	Female (mm)
Tell al-Judaidah and Chatal Hüyük		
Mediterranean type	1607	—
Eurafrican type	1781	—
Alpine type	—	1512
Natufian	1600 - 1650	1524
Gezer	1650 - 1700	1575 - 1625
Byblos	1567	1472
Hyksos	1550	—
East African		
Gamble's Cave	1790	—
Bromhead's Site	1722	—

[17] It is worth noting here that Macalister (*36*, pp. 67 f.) calls attention to a humerus (he states the same for the long bones of both legs) of the 3 rd century which «shewed pathological changes which in a modern skeleton would undoubtedly be considered syphilitic.»

[18] This material has been calculated on the basis of Pearson's formula: male stature = 1.880 (femur length) + 813.06 mm., female stature = 1.945 (femur length) + 728.44 mm.

Site		Male (mm)	Female (mm)
Willey's Kopje		1768	—
Makalia		1722	—
Nakuru		1755	—
Afalou-bou-Rhummel		1730	1720
Mouillah		1650	—
Crete		1625	—
Alacahüyük		1590	—
Ahlatlıbel		1652	1632
Tepe Hissar		1654	1528
	(Period II	1662	1554
Shah Tepe	(Period III	1601	1504
Sialk	(Group I	1740	—
	(Group IV	1620 - 1740	1570

We are struck by the uniformly tall stature of the East African groups—they are truly Nilotic in their tallness. It is apparent that the East African native is inherently tall and has not achieved his height by hybridization with tall whites. The fact that his tall stature antedates the possibility of white intermixture raises the question of East African stature as contrasted with West African. Uniformly the Eastern groups are very much taller, though in most bodily and cranio-facial characters conforming fairly well to the generalized (West) African type. The range at Gezer is, according to Macalister's data, a measure of the average increase from pre-Semitic to late Semitic periods. The unusual height of the female from Afalou-bou-Rhummel is probably due to chance variation in a small sample.

The early Mediterranean type probably averaged 5′ 6″ for males, 5′ 2″ for females. In East Africa (due to Negroid influences?) the average went up to 5′ 10″ for males.

Conclusions

In the cranial material from Tell al-Judaidah and Chatal Hüyük there are two major cranial types, longheaded and roundheaded. The former may be divided into Eurafrican and Mediterranean types, the latter into Alpine (broadheaded) and

Armenoid (shortheaded) types. The longheads precede the roundheads; Mediterraneans are in advance of Eurafricans, Alpines probably well ahead of Armenoids. This sequence may be stated chronologically: Mediterranean, basic and before 4000 B. C.; Eurafrican, not a real factor until mid- or late third millennium B. C.; Alpine, an incomer about 2500 B. C.; Armenoid, a latecomer about 500 B. C. Actually, Eurafricans are met here as early as 3500 B. C., while Alpines are not met until about 1600 B. C.

The identification of these types in terms of present-day groupings or geographic continuity is based on a recognition of the probability that cranial types were definitely established by the time the earliest levels of Tell al-Judaidah and Chatal Hüyük were laid down. The long- and roundheadedness of the material is inescapable; the ascription of each major type to the stated racial subdivisions is perhaps somewhat conjectural. The fact remains, however, that if our definitions of cranial types are at all valid they *must* apply to the material under discussion.

The general conclusions at Tell al-Judaidah and Chatal Hüyük find confirmation in the comparative data considered in this report. The Mediterranean type appears to be earliest and therefore basic to North Africa, Egypt, East Africa, Palestine, Syria, Anatolia, and Iran. An unmistakably Negroid element occurs early in North and East Africa as a distinct racial force, but elsewhere it does not seriously influence type development. The Eurafrican type, apparently indigenous to the Aralo-Caspian area, appears as early as 4000-3500 B. C., but not until much later (2500-2000 B. C.) does it emerge as a real factor in cultural development. The Alpine type, certainly earlier than the Eurafrican and perhaps only slightly later than the Mediterranean, plays a minor refrain until about 2500 B. C. The possibility that this broadheaded type through genetic selection finally gave rise to shortheaded types is suggested by several Dinaroid skulls from Phases P and Q. Be that as it may, we may affirm our earlier conclusion (cf. *30*, p. 271, and 33, p. 300) that the Armenoid type was not distinct in Asia Minor until *ca.* 1500 B. C. at the earliest, and probably not until 1000-500 B. C. If we accept the general trend of cranial evolution in Man as going from longheadedness,

to roundheadedness, then shortheadedness, which is the veritable epitome of roundheadedness, would by definition be late. We feel, in general, that roundheadedness evolved to the east of Syria and Anatolia, and possibly Iran.

The Mediterraneans set the stage and then joined the cast of Alpines, Eurafricans, and Armenoids, as each took up the role allotted by destiny.

. . . . . .

This report offers a good opportunity to discuss the relation between the archeologist and the physical anthropologist. The relation is a close and dependent one, namely, the physical anthropologist must rely upon the archeologist for field data, care of exhumation, care of packing for shipping to the laboratory, and he must rely upon the archeologist to save *all* skeletal material uncovered by his digging. The archeologist is, in a real sense, the ultimate determinant of much of the help the physical anthropologist can offer him. He saves thousands of sherds, flints, and other cultural objects; why, then, should he expect precise information from a relative handful of skulls and a few long bones? Granted that there are more cultural objects than skeletons, but *all* of *both* types of remains should be saved. In recent years this condition has come nearer realization than in earlier archeological history. The relative paucity of human skeletal material, compared to human cultural material, is one reason why the findings of the physical anthropologist have not coincided more closely with those of the archeologist.

There is another reason, namely that the comparison of physical types and cultural traits is not a direct one. Speiser (*51a*, p. 29) hits a keynote here when he observes that "the process of racial leveling is immeasurably older than that of cultural blending." To this we might add that the one-physical type—is conservative, while the other—cultural complex—tends to be more dynamic. Culture is often uniformly progressive, changing in a given direction; the physical type possessing this culture remains almost absolutely unchanged, excepting for possible family-line emphasis. Thus it is that if, for example, pottery types gradually change the archeologist should not expect a change in physical type. If a

radical change in culture occurs then a new physical type may be suspected, but not necessarily, for ideas travel ahead of the people who originate them. But if a new people did come in then the physical anthropologist must have a sample of respectable size before he can be sure. Range of variation in human crania and long bones is such that intra-racial differences are obscured in small series. If a white culture were obliterated by a Negro culture, then a few skulls might tell the story. But if a white culture were sumberged by a neighboring white group then only a statistically adequate series would tell the story.

The physical anthropologist is eager to help the archeologist and is grateful to him for making human skeletal material available to him. But he asks the archeologist to bear with him whenever he cannot point to a new physical type every time a new pot-handle or new flint-type is found. He can and will fill in the broader racial movement picture, leaving to the archeologist the filling in of precise details of times and avenues of migration.

I cannot end this plea without saying that my affiliation with the Oriental Institute has been a most happy one. They have hearkened to my pleas and have given me every possible cooperation. To Professor Braidwood I acknowledge that aid which comes only via a most cordial personal friendship. In a sense this report is largely his: he recovered the material, I but interpreted it.

LITERATURE CITED

The following abbreviations are used:

JRAI = Journal of the Royal Anthropological Institute (of Great Britain and Ireland).

OIP = Oriental Institute Publication (Oriental Institute, University of Chicago).

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TABLE I

Sequence Of Cultural Phases In The Plain Of Antioch, With Approximate Dates *

Phase	Description	Approximate Date	Tell al-Judaidah	Chatal Hüyük	Tell Tayinat
V	Modern Arab		?	X	X
U	Medieval Arab			I	
T	Byzantine			I	
S	Early Christian		I	?	
R	Roman		II	II	
Q	Hellenistic	300-64B. C.	III	II	?
P	Syro-Hellenic	500-300B. C.	III	II	?
O	Syro-Hittite	1000-500B. C.	IV	III	I
N	Levanto-Helladic IV (Sub-Mycenaen)	1200-1000B. C.	V	IV	II
M	Levanto-Mycenaean	1600-1200B. C.	VI	V	
L	Qatna affinities (ca. 17th-18th B. C.)	1800-1600B. C.	VII	X	
K	Hama, etc., affinities (ca. 18th-20th B. C.)	2000-1800B. C.	VIII	X	
J	Chalciform pot series	2400-2000B. C.	IX	X	X
I	Smeared-wash pot series	2600-2400B. C.	X	X	X
H	Red-black burnished pots (Early Dynastic affinities)	3100-2400B. C.	XI	X	X
G	Jemdet Nasr affinities	3500-3100B. C.	XII		X
F	Uruk affinities	4000-3500B. C.	XIII	X	
E	Obeid affinities	4500-4000B.C.	?		
D	Derived Halaf and earliest Obeid affinities, etc.	±4500B.C.	?		
C	Developed primitive and true Halaf affinities	5000-4500B. C.	XIV		
B	Developed primitive and first painted wares, etc.	± pre-5000B. C.	XIV		
A	Primitive burnished ware	?	XIV		

* In this table X = « present » ; the Roman numbers denote those which had been originally assigned to Periods at the individual sites.

TABLE II

Distribution By Cultural Phases Of Skeletal Material Received For Study

Phase	Material		
B	XS21*[a]		
C	XS20*		
G	XS14	XS15	
H	XS11*		
J?	TTM24*		
M	BS61	XS1	XS5
	BS62	XS2*	XS6*
	BS64	XS3	XS9*[a]
	BS65	XS4*[a]	XS10*[a]
Late M, or N	AS12	BS43	
O	AS10[b]	BS58b	
	BS41	YS5	
	BS58a		
Late O, or P	AS2	TS6[c]	
	TS5	TS7[c]	
Q (earlier part)	XS7	ZS14	ZS23
	ZS3	ZS18	ZS24
	ZS3'	ZS19	
	ZS6	ZS20	
	ZS12	ZS21	
Q?	TTS1		
S''	XS12		
T	BS1	BS22	
V	TS1	and TS8-23	
	TS2		
	TS3		
	TS4		

'' Found in a well containing material from N-S, hence must be assigned to S.

* Crania too fragmentary to restore and measure.

a Infant I

b Femur only

c Possibly intrusive

TABLE III

Distribution By Cultural Phases
Of Skeletal Material Not Available For Study

Phase	Burials
B and C	XS18, XS19
F	XS16, XS17
M	BS63, BS66, BS67
N	BS59, BS60
O	AS11, BS24, BS48, BS49, BS50, BS53
O, P, Q, R	BS54, BS55, BS56, BS57
P and Q	XS8, YS1, YS2, YS3, YS4, ZS1, ZS4, ZS5, ZS7, SS8, ZS9, ZS10, ZS11, ZS15, ZS16, ZS17, ZS22, ZS25, ZS26
P, Q, R	BS8, BS46, BS51, BS52
P, Q, R, T	BS29, BS30, BS31, BS36, BS37
R	AS1, AS3, AS4, AS6, AS7, AS8, AS9, BS13, BS21a, BS21b
R or T	BS42
S	BS2, BS3, BS4, BS9, ZS2, ZS13
T	BS5, BS6, BS7, BS10, BS11, BS12, BS14, BS15, BS16, BS17, BS18, BS20, BS23, BS25, BS26, BS27, BS28, BS32, BS34, BS38, BS39, BS40, BS44, BS47
T and V	BS 45
V	AS5
Unknown	BS33, BS35

TABLE IV

Age and Sex Distribution of Material Listed in Table III [1]

Site and Phase	Infant I	Infant II	Juvenile	Adult Female	Adult Male	Adult Sex?	Totals
Judaidah							
B or C	—	1	1	—	—	—	2
G	—	2	—	—	—	—	2
O	—	—	—	—	—	1	1
Q or P	—	1	3	2	10	3	19
R	—	1	1	2	—	6	10
S	—	—	1	2	2	1	6
V	—	—	—	—	—	1	1
Chatal Hüyük							
M	—	2	—	—	1	—	3
N	2	—	—	—	—	—	2
O	—	—	—	3	1	1	5
O, P, Q, or R	—	1	—	1	2	—	4
P, Q or R	—	—	—	2	1	1	4
P, Q, R or T	—	—	—	3	2	—	5
T	—	3	2	9	10	—	24
T or S	—	1	—	—	—	—	1
T or V	—	—	—	—	1	—	1
Unknown	—	—	—	1	—	1	2
Totals	2	12	8	25	30	15	92

[1] For the age classification see our Footnote 2.

TABLE V

Age And Sex Distribution Of Material Listed In Table II*

Phase	Immature	Adult Male	Adult Female	Totals
H	—	—	1	1
J	—	2?	—	2?
M	3	3	6	12
M or N	—	2	—	2
O	—	4?	1	5?
O-P	—	3?	1?	4?
Q	—	7?	6	13?
S	—	1	—	1
T	—	1	1	2
Totals	3	23?	16?	42?

* The immature individual of Phase B has been omitted because of its very extreme fragmentation.

TABLE VI

Cranial Measurements and Indices of Material Received For Study*

No.	Phase	Type*	Sex	Age	l	b	b'	h'	oh	lb	gl	g'	s	s1	s2	s3	u	ba	100b/l	100h'/b	100h'/b	100 oh/l	100 oh/b	100 b'/b	100 gl/lb
AS2	O-P	E	♂	35	206	140	101	—	118	—	—	325	390?	134?	136	120	553	112	67.96	—	—	57.28	84.28	72.14	—
AS12	M-N	M	♂	30-35	186	134	98	—	111?	—	—	—	—	138?	127?	—	527	—	72.04	—	—	59.67?	82.83?	73.13	—
BS1	T	A	♂	40-45	184	154	108	—	102	—	—	—	—	137?	—	—	546?	—	83.69	—	—	55.43	66.23	70.12	—
BS22	T	A	♀+♂	30	168	140	96	124	106.5	90	85	300	358	120	122	117	500	104	83.33	73.80	88.57	63.39	76.07	68.57	94.44
BS41	O	M	♂	35	184	132	91	—	116	—	—	303	371?	128	131	112?	502	—	71.73	—	—	63.04	87.87	68.93	—
BS43	N	E	♂	45+	188	141	96.5	—	106	—	—	321	—	130	120	—	521	—	75.00	—	—	56.38	75.17	68.43	—
BS58*a*	O	M	♀+♂	Adult	173?	130	83?	—	114	—	—	315	—	—	118	—	483?	104	75.14?	—	—	65.89?	87.69	63.84?	—
BS58*b*	O	M	♂	Adult	185?	144?	98	—	—	—	—	—	—	—	—	—	516?	—	77.83?	—	—	—	—	68.05	—
BS61	M	E	♂	Adult	193	145	94	—	109	—	—	322	—	119	—	—	543	—	75.12	—	—	56.47	75.17	64.82	—
BS62	M	M	♀+♂	25-30	178	133	87.5	—	—	—	—	—	—	122?	127?	—	494	—	74.71	—	—	—	—	65.78	—
BS64	M	E	♂	45+	200+?	140+?	—	—	129?	—	—	—	—	—	145	—	—	—	70.00?	—	—	64.50?	92.14?	—	—
BS65	M	M	♂	40	187?	147	91	—	110	—	—	312	—	120?	122?	—	526?	—	78.61?	—	—	58.82?	74.82	61.90	—
XS1	M	A	♀+♂	Adult	156?	151?	96?	—	84?	—	—	—	—	—	—	—	—	—	96.79?	—	—	53.84?	55.62?	63.57?	—
XS3	M	M	♀+♂	30-35	175?	134.5	101	—	101	—	—	—	—	116?	131?	—	497?	—	76.85	—	—	57.71?	75.09	75.09	—
XS5	M	M	♀+♂	Ca. 35	176?	148?	99?	—	101	—	—	—	—	127	—	—	519?	—	84.09?	—	—	57.38?	68.24?	66.89?	—
XS7	Q	A	♂	40	181	156	105.5	—	109	—	—	340	369	123	124	122	532	124?	86.18	—	—	60.22	69.87	67.62	—
XS12	S	E	♂	30	185	141	93	139	115	104	102	312	373	126	132	116	514	110	76.21	75.13	98.58	62.16	81.56	65.95	98.08
XS14	G	E	♂	45	194	140	100	137	114	110	105.5	305	376	130	130	117	524	120	72.16	70.61	97.85	58 76	81.42	71.42	95.91
XS15	G	M	♂	35-40	182	129	91?	—	114	—	—	—	—	136?	126?	—	506	—	70.87	—	—	62.63	88.37	70.54	—
YS5	O	E	♂	30	190	132	99.5?	—	107	—	—	304	375	122	140	113	520	110	69.47	—	—	56.31	81.06	75.37	—
ZS3	Q	A	♀+♂	40-45	164	139	92	—	110	—	—	317	353	122	124	111	482	105	84.75	—	—	67.07	79.13	66.18	—
ZS3'	Q	A	♂	35-40	162	134	92?	—	111	—	—	313	—	122?	123	—	474	116	82.71	—	—	68.51	82.83	68 65	—
ZS6	Q	Ar	♂	35	161.5	151	99	139.5	121	100	98	328	352	116	121	115	493	115	93.49	86.37	92.38	74.92	80.13	65.56	98.00
ZS12	Q	A	♂	30-35	174	148?	96	—	122.5	—	—	—	—	129	122?	—	524	—	85.05?	—	—	70.40	82.77?	64.86	—
ZS14	Q	A	♀+♂	50	160	132	98.5	—	114(R)	—	—	—	330?	118?	107	105	457	107	82.50	—	—	71.25	86.36	74.62	—
ZS18	Q	A	♂	Ca. 50	176	142	98.5	—	116	—	—	321	353	128	120	105	507	—	80.68	—	—	65.90	81 69	69.36	—
ZS19	Q	Ar	♂	35	174	156	94.5	—	127.5	—	—	335	—	131	129	—	523	127	89.65	—	—	73.27	81.73	60.57	—
ZS20	Q	Ar	♀+♂	Senile	160	143	98?	122?	116	—	—	333	351?	120?	129	102	484	109	89.37	76.25?	85.31?	72.50	81.11	68.53?	—
ZS21	Q	A	♀+♂	30	161	138	91	137	118	98	87	308	348?	113	121?	115	476	112	85.71	85.09	99.27	73.29	85.50	65.94	88.78
ZS23	Q	A	♀+♂	30	161	141	80?	—	115	—	—	334	—	121?	128	—	483	105	87.57	—	—	71.42	81.56	56.73?	—
ZS24	Q	A	♀+♂	25-30	171	144?	91	—	124	—	—	334	374?	138?	121	115	502	—	84.21?	—	—	72 51	86.11?	63.19?	—

* A = Alpine; Ar = Armenoid; M = Mediterranean; E = Eurafrican: restoration impossible or not attempted on XS.2, XS4, XS6, XS10, XS11, XS20, XS21

TABLE VII

Facial Measurements And Indices Of Material Received For Study*

No.	gh	g'h	gb	j	nhl	nb	de	o, 'l	o, l	o_2 l	g, ′	g_2	fml	fmb	100 gh/j	100g'h/j	100 gh/gb	100g'h/gb	100nb/nhl	100 0_2l/0,'l	110g_2/g,′	100 fmb/fml	100 j/b
AS2	132 ?	76 ?	105	139	55 ?	28	—	—	40.5 ?	30	47	44	—	—	94.96 ?	54.67 ?	125.71?	72.38 ?	50.90 ?	74.07 ?	93,61	—	99.28
BS1	—	76 ?	92.5	121 ?	—	27	—	—	—	—	—	—	—	—	—	62.81 ?	—	82.16 ?	—	—	—	—	78.57 ?
BS22	102	59	86	127	45	23	25	36.5	39.5	30	43	39	34	27.5	80.31	46.45	118.60	68.60	51.11	75.94	90.69	80.88	90.71
BS41	—	59 ?	91	116	—	—	—	—	—	—	—	—	—	—	—	50.86 ?	—	64.83?	—	—	—	—	87.87
BS43	—	65	—	—	—	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BS58*b*	—	59.5	—	—	47.5	22 ?	—	—	38 (R)	30. 5(R)	—	—	—	—	—	—	—	—	46.31	80.26 (R)	—	—	—
BS61	—	—	—	—	—	—	—	—	—	—	43.5	37	—	—	—	—	—	—	—	—	85.05	—	—
XS7	122.5	68	105	143 ?	54.5	25	—	—	41.5	33,5	42 ?	44	—	—	85.66?	47.55 ?	116.66	64.76?	45.87	80.72	104.76 ?	—	91.66 ?
XS12	128	74	101	130	53	26.5	—	41	43	32	49.5	45	36.5	33	98.46	56.92	126.73	73.26	50.00	74.41	90.90	90.41	92.19
XS14	121	70	103.5	134	52.5	26	22	41	44	33.5	45	41.5	34.5	33	90.29	52.23	116.90	67.63	49.52	76.13	92.22	95.65	95.71
YS5	123	—	—	—	—	—	—	—	40 (R)	37 (R)	—	—	—	—	—	—	—	—	—	92.50 (R)	—	—	—
ZS3	116	65	87.5	—	46	22	—	—	38 5	33.5	41 ?	39.5	—	—	—	—	132.57	74.28	47.82	87.01	96.34 ?	—	—
ZS3'	—	59 ?	—	—	—	—	—	—	37?(R)	29 (R)	—	—	—	—	—	—	—	—	—	78.37? (R)	—	—	—
ZS6	103	62	90	129	48	22	—	—	40	33.5	40	32 ?	34	29	79.84	48.06	114.44	68.88	45.83	83.75	80.00	85.29	85,43
ZS14	101 ?	61 ?	85.5	—	46	21	—	—	37.5	35.5	39.5 ?	37	—	—	—	—	118.12?	71.34 ?	45.65	94.66	93.67 ?	—	—
ZS18	—	71	97	132 ?	54	25	—	—	44	35	44	35 ?	—	—	—	53.78 ?	—	73.19	46.29	79.54	79.54 ?	—	92.95
ZS19	109 ?	66 ?	100	134	53	24.5	23.5 ?	—	40	34	—	—	—	—	81.34 ?	49.25 ?	109.00?	66.00?	46.23	85.00	—	—	85.89
ZS20	—	—	—	124	—	—	—	—	34 ?	31.5	—	—	—	—	—	—	—	—	—	92.64	—	—	86.71
ZS21	95	53	84	122 ?	43	21	20.5 ?	34.5	37	29	36.5	39	31	31	77.86 ?	43.44 ?	113.09	63 09	48.83	78.37	93.58 ?	100.00	88.40 ?
ZS23	—	—	—	—	—	—	—	—	34 ?	34	—	—	—	—	—	—	—	—	—	100.00	—	—	—
ZS24	106 ?	58 ?	87.5	126	45 ?	23	—	—	37.5	31	45	31	—	—	84.12 ?	46.03 ?	121.14?	66.28 ?	51.11?	82.66	68.88	—	87.50 ?

For Phase, sex, cranial type and age see Table VI

* No facial measurements possible on AS12, BS58*a*, BS62, BS64, BS65, XS1, XS3, XS5, XS15, ZS12

TABLE VIII

Mandibular Measurements And Indices Of Material Received For Study

No.	W_1	W_2	h,	rb'	g_2'	cycr	gogo	crh	cl	rl	ml	M Angle	100 crh/ml	100 rb'/rl
AS2	—	88	37	35	41	38.5	85	66	83	67	99	111°	66.66	52.23
AS12	—	109	28.5	27.5	51	33.5	105	64	59	52	93	131°	68.81	52.88
BS22	113.5	91	28 5	27	48	32	87	58	54.5	54	78	117.5°	74.35	50.00
BS41	120	98	29	32	43	37	96	55	62	51	81	116°	67.90	62.74
BS43	121	108.5	34	34	47	36	104	76	70	65	92.5	114.5°	82.16	52.30
BS61	116	105	33.5	31	50	32	100	68	63	59	92	123°	73.91	52.54
BS62	—	89	27	29.5	49?	36	81	59	74	55	86	107°	68.60	53.63
BS64	134	109	37	34	50	41	104	82	75	74	108.5	120.5°	75.57	45.94
BS65	—	94?	33	33	49	—	—	59	70?	—	94?	114.5°	62.76?	—
XS3	115	89.5	—	31	45	38.5	86.5	63	58	59	84	117.5°	75.00	52.54
XS7	132	111	36	39	48	35	107	64.5	69	64	98	107°	65.81	60.93
XS12	123	107	38.5	34.5	49	33	103	62	60	53	95	129°	65.26	65.09
XS14	123.5	111	35.5	36	48	33	106.5	66.5	70	60	100	120.5°	66.50	60.00
YS5	112	96	36	31	43	33	92	61	62	42	95	132°	64.21	73.80
ZS3	—	—	33	31.5 (R)	45	33	—	57	62	48	88	124.5°	64.77	65.62
ZS3'	121	98	30?	33	—	33	94	56	70	53	96	121°	58.33	62.26
ZS6	106.5	97	30	31	47?	32	89	60	63	45	92.5	130.5°	64.86	68.88
ZS12	—	102	30	34	45	42.5	95	61	60	56	100	127°	61.00	60.71
ZS14	114.5	91	27	24.5	44	30	84.5	55	52.5	41	84	130°	65.47	59.75
ZS18	—	102?	21	33	47.5?	39 (R)	—	64.5	62	54	82.5	124°	78.18	61.11
ZS19	—	103	30	31.5	49	33 (R)	96	76	68	60	86	103°	88.37	52.50
ZS20	114	87	21	26.5	54?	35.5	80	46	63	47	88	138°	52.27	56.38
ZS21	112.5	87.5	23	28	43	35.5	80	53	56	45	81	121.5°	65.43	62.22
ZS23	—	—	27.5?	—	—	—	—	—	56?	45	78	124.0°?	—	—
ZS24	108.5	88.5	27	32	43	35 (R)	84	55	63.5	49	90	123°	61.11	65.30

For Phase, sex, cranial type and age see Table VI

TABLE IX

Distribution of Crania According to Racial Types*

Phase	Alpine		Armenoid		Mediterranean		Eurafrican	Totals
	Male	Female	Male	Female	Male	Female	Male	
B-C	—	—	—	—	—	(+1)	—	(+1)**
G	—	—	—	—	1	—	1	2
H	—	—	—	—	—	(+1)	—	(+1)
M	—	1 (+1)	—	—	1	3(+1)	3	8(+2)
N	—	—	—	—	1	—	1	2
O	—	—	—	—	2	1	1	4
Q-P	4	5	2	1	—	—	1	13
S	1	1	—	—	—	—	—	2
	5	7 (+1)	2	1	5	4(+3)	7	31(+4)

* The fragmentary TS and TT crania are not here included, since the few dimensions taken have been referred to in the body of the report (see Footnotes 5 a, 5 b).

** The parentheses, e. g. (+1), refer to doubtful Phase designation; such material is not figured in tabulations.

TABLE X

Cranial Measurements and Indices of the Mediterranean Type

	Phase O		Phase N	Phase M		Phase G
	♂ (2)	♀ + (1)	♂ (1)	♂ (1)	♀ + (3)	♂ (1)
Dimensions						
Length (l)	184.50	173.00	186.00	187.00	176.33	182.00
Breadth (b)	138.00	130.00	134.00	147.00	138.50	129.00
Min. forehead diameter (b′)	94.50	83.00	98.00	91.00	95.83	91.00
Basio-bregmatic height (h′)	—	—	—	—	—	—
Auricular height (oh)	116.00	114.00	111.00	110.00	101.00	114.00
Basio-nasion diameter (lb)	—	—	—	—	—	—
Basio-prosthion diameter (gl)	—	—	—	—	—	—
Transverse arc (q′)	303.00	315.00	—	312.00	—	—
Sagittal arc (s)	371.00	—	—	—	—	—
Frontal arc (s_1)	128.00	—	138.00	120.00	121.67	136.00
Parietal arc (s_2)	131.00	118.00	127.00	122.00	129.00	126.00
Occipital arc (s_3)	112.00	—	—	—	—	—
Horizontal circumference (u)	509.00	483.00	527.00	526.00	503.33	506.00
Biasterionic breadth (ba)	—	104.00	—	—	—	—
Indices						
Cranial (100b/l)	74.78	75.14	72.04	78.61	78.55	70.87
Height-length (100h′/l)	—	—	—	—	—	—
Height-breadth (100h′/b)	—	—	—	—	—	—
Auric. height-length (100 oh/l)	63.04	65.89	59.67	58.82	57.55	62.63
Auric. height-breadth (100 oh/b)	87.87	87.69	82.83	74.82	71.67	88.37
Transverse fronto-parietal (100b′/b)	68.49	63.84	73.13	61.90	69.25	70.54
Gnathic (100gl/lb)	—	—	—	—	—	—

TABLE XI.

Facial Measurements and Indices of the Mediterranean Type

	Phase O
	♂ (2)
Dimensions	
Total morphological face height (gh)	—
Upper morphological face height (g'h)	59.25
Midfacial breadth (gb)	91.00
Bizygomatic breadth (j)	116.00
Nasal height (nhl)	47.50
Nasal breadth (nb)	22.00
Interorbital width (dc)	—
Orbital breadth (o, 'l)	38.00
Orbital height (o_2 l)	30.50
Palatal length (g, ')	—
Palatal breadth (g_2)	—
Foraminal length (fml)	—
Foraminal breadth (fmb)	—
Indices	
Total facial (100 gh / j)	—
Upper facial (100 g'h / j)	50.86
Total midfacial (100 gh / gb)	—
Upper midfacial (100 g'h / gb)	64.83
Nasal (100 nb / nhl)	46.31
Orbital (100 o_2l / o, 'l)	80.26
Palatal (100 g_2 / g, ')	—
Foraminal (100 fmb / fml)	—
Transverse cranio-facial (100 j / b)	87.87

TABLE XII.

Cranial Measurements and Indices of the Eurafrican Type

	Phase Q and P ♂ (1)	Phase O ♂ (1)	Phase N ♂ (1)	Phase M ♂ (3)	Phase G ♂ (1)
Dimensions					
Length (l)	206.00	190.00	185.00	193.67	194.00
Breadth (b)	140.00	132.00	141.00	142.00	140.00
Min. forehead diameter (b')	101.00	99.50	93.00	95.25	100.00
Basio-bregmatic height (h')	—	—	139.00	—	137.00
Auricular height (oh)	118.00	107.00	115.00	114.67	114.00
Basio-nasion diameter (l b)	—	—	104.00	—	110.00
Basio-prosthion diameter (g l)	—	—	102.00	—	105.50
Transverse arc (q')	325.00	304.00	312.00	321.50	305.00
Sagittal arc (s)	390.00	375.00	373.00	—	376.00
Frontal arc (s_1)	134.00	122.00	126.00	124.50	130.00
Parietal arc (s_2)	136.00	140.00	132.00	132.50	130.00
Occipital arc (s_3)	120.00	113.00	116.00	—	117.00
Horizontal circumference (u)	553.00	520.00	514.00	532.00	524.00
Biasterionic breadth (ba)	112.00	110.00	110.00	—	120.00
Indices					
Cranial (100 b / l)	67.96	69.47	76.21	73.37	72.16
Height-length (100 h' / l)	—	—	75.13	—	70.61
Height-breadth (100 h' / b)	—	—	98.58	—	97.85
Auric. height-length (100 oh / l)	57.28	56.31	62.16	59.12 (56.42)*	58.76
Auric. height-breadth (100 oh / b)	84.28	81.06	81.56	80.83 (75.17)*	81.42
Transverse fronto-parietal (100 b' / b)	72.14	75.27	65.95	66.62	71.42
Gnathic (100 g l / l b)	—	—	98.08	—	95.91

* The values given in parentheses are based on crania BS61 and BS43 only.

TABLE XIII.

Facial Measurements and Indices of the Eurafrican Type

	Phase Q and P ♂ (1)	Phase O ♂ (1)	Phase N ♂ (1)	Phase M ♂ (2)	Phase G ♂ (1)
Dimensions					
Total morphological face height (gh)	132.00	123.00	128.00	—	121.00
Upper morphological face height (g'h)	76.00	—	74.00	65.00	70.00
Midfacial breadth (gb)	105.00	—	101.00	—	103.50
Bizygomatic breadth (j)	139.00	—	130.00	—	134.00
Nasal height, (nhl)	55.00	—	53.00	—	52.50
Nasal breadth (nb)	28.00	—	26.50	23.00	26.00
Interorbital width (dc)	—	—	—	—	22.00
Orbital breadth (o, 'l)	40.50	40.00*	43.00	—	44.00
Orbital height (o_2l)	30.00	37.00*	32.00	—	33.50
Palatal length (g, ')	47.00	—	49.50	43.50	45.00
Palatal breadth (g_2)	44.00	—	45.00	37.00	41.50
Foraminal length (fml)	—	—	36.50	—	34.50
Foraminal breadth (fmb)	—	—	33.00	—	33.00
Indices					
Total facial (100gh/j)	94.96	—	98.46	—	90.29
Upper facial (100g'h/j)	54.67	—	56.92	—	52.23
Total midfacial (100gh/gb)	125.71	—	126.73	—	116.90
Upper midfacial (100g'h/gb)	72.38	—	73.26	—	67.63
Nasal (100nb/nhl)	50.90	—	50.00	—	49.52
Orbital (100 0 l_2 or r/0,'l)	74.07	92.50*	74.41	—	76.13
Palatal (100g_2/g,')	93.61	—	90.90	85.05	92.22
Foraminal (100fmb/fml)	—	—	90.41	—	95.65
Transverse cranio-facial (100j/b)	99.28	—	92.19	—	95.71

* Measurements taken on right orbit

TABLE XIV

Cranial Measurements and Indices of the Brachychycranic Types

	Alpine Type					Armenoid Type	
	Phase S		Phase Q and P		Phase M	Phase Q and P	
	♂ (1)	♀ (1)	♂ (4)	♀ (5)	♀ (1)	♂ (2)	♀ (1)
Dimensions							
Length (l)	184.00	168.00	173.25	163.40	156.00?	167.75	160.00
Breadth (b)	154.00	140.00	145.00	138.80	151.00?	153.50	143.00
Min. forehead diameter (b')	108.00	96.00	98.00	90.50	96.00	96.75	98.00
Basio - bregmatic height (h')	—	124.00	—	137.00	—	139.50	122.00
Auricular height (oh)	102.00	106.50	114.63	116.20	84.00	124.25	116.00
Basio - nasion diameter (lb)	—	90.00	—	98.00	—	100.00	—
Basio - prosthion diameter (gl)	—	85.00	—	87.00	—	98.00	—
Transverse arc (q')	—	300.00	324.67	323.25	—	331.50	333.00
Sagittal arc (s)	—	358.00	361.00	351.25	—	352.00	351.00
Prontal arc (s_1)	137.00	120.00	125.50	122.40	—	123.50	120.00
Parietal arc (s_2)	—	122.00	122.25	120.20	—	125.00	129.00
Occipital arc (s_3)	—	117.00	113.50	111.50	—	115.00	102.00
Horizontal circumference (u)	546.00	500.00	509.25	480.00	—	508.00	484.00
Biasterionic breadth (ba)	—	104.00	120.00	107.25	—	121.00	109.00
Indices							
Cranial (100 b/l)	83.69	83.33	83.65	84.95	96.79?	91.57	89.37
Height - length (100 h'/l)	—	73.80	—	85.09	—	86.37	76.25
Height - breadth (100 h'/b)	—	88.57	—	99.27	—	92.38	85.31
Auric. height - length (100 oh/l)	55.43	63.39	66.26	71.11	53.84?	74.09	72.50
Auric. height - breadth (100 oh/b)	66.23	79.07	79.29	83.73	56.62	80.93	81.11
Transverse fronto - parietal (100b'/b)	70.12	68.57	67.62	65.33	63.57?	63.06	68.53
Gnathic (100 gl/lb)	—	94.44	—	88.78	—	98.00	—

TABLE XV

Facial Measurements and Indices of the Brachycranic types

	Alpine Type				Armenoid Type	
	Phase S		Phase Q and P		Phase Q and P	
	♂ (1)	♀ (1)	♂ (3)	♀ (5)	♂ (2)	♀ (1)
Dimensions						
Total morphological face height (gh)	—	102.00	122.50	104.50	106.00	—
Upper morphological face height (g'h)	76.00	59.00	66.00	59.25	64.00	—
Midfacial breadth (gb)	92.50	86.00	101.00	86.13	95.00	—
Bizygomatic breadth (j)	121.00	127.00	137.50	124.00	131.50	124.00
Nasal height (nhl)	—	45.00	54.25	45.00	50.50	—
Nasal breadth (nb)	27	23.00	25.00	21.75	23.25	—
Interorbital width (dc)	—	25.00	—	20.50	23.50	—
Orbital breadth (o,'1)	—	39.50	40.83	36.90	40.00	34.00
Orbital height (o_2l)	—	30.00	32.50	32.60	33.75	31.50
Palatal length (g,')	—	43.00	43.00	40.50	40.00	—
Palatal breadth (g_2)	—	39.00	39.50	36.63	32.00	—
Foraminal length (fml)	—	34.00	—	31.00	34.00	—
Foraminal breadth (fmb)	—	27.50	—	31.00	29.00	—
Indices						
Total facial (100 gh / j)	—	80.31	85.66	80.99	80.59	—
Upper facial (100 g' h / j)	62.81	46.45	50.67	44.74	48.66	—
Total midfacial (100 gh / gb)	—	118.60	116.66	121.23	111.72	—
Upper midfacial (100 g'h / gb)	82.16	68.60	68.98	68.75	67.44	—
Nasal (100 nb / nh l)	—	51.11	46.08	48.35	46.03	—
Orbital (100 o_2l / o,'l)	—	75.94	79.54	88.54	84.38	92.64
Palatal (100 g_2 / g,')	—	90.69	92.15	88.12	80.00	—
Foraminal (100 fm b / fml)	—	80.88	—	100.00	85.29	—
Transverse cranio-facial (100 j / b)	78.57	90.71	92.31	87.95	85.66	86.71

TABLE XVI

Mandibular Measurements and Indices of Alpine, Armenoid, Mediterranean and Eurafrican Types

	Alpine		Armenoid		Mediterranean		Eurafrican
	♂ (4)	♀ (6)	♂ (2)	♀ (1)	♂ (3)	♀ (2)	♂ (7)
Dimensions							
Bicondylar width (w,)	126.50	112.25	106.50	114.00	120.00	115.00	121.58
Mandibular angle width (w_2)	103.25	89.50	100.00	87.00	100.33	89.25	103.50
Symphyseal height (h,)	29.25	27.67	30.00	21.00	30.17	27.00	35.93
Minimum width of ramus (rb')	34.75	28.60	31.25	26.50	30.83	30.25	33.64
Dental arch width (g_2')	46.83	44.60	48.00	54.00	47.67	47.00	46.86
Condyle to coronoid (cycr)	37.38	33.10	32.50	35.50	35.25	37.25	35.21
Bigonial width (gogo)	98.67	83.88	92.50	80.00	100.50	83.75	99.21
Coronal height (crh)	61.50	55.60	68.00	46.00	59.33	61.00	68.79
Corpus length	65.25	57.42	65.50	63.00	63.67	66.00	69.00
Ramal length (rl)	56.75	47.00	52.50	47.00	51.50	57.00	60.00
Mandibular length (ml)	94.13	83.17	89.25	88.00	89.33	85.00	97.43
Mandibular angle (m< ·)	119.75°	123.42°	116.75°	138.00°	122.17°	112.25°	121.50°
Indices							
Height-length (100crh/ml)	65.83	66.23	76.62	52.27	66.49	71.80	70.61
Ramal breadth-length (100rb'/rl)	61.25	60.58	60.69	56.38	57.81	53.24	57.41

TABLE XVII

Comparative Cranio-Facial Measurements and Indices of the Male Mediterranean Type

	Tell al-Judaidah and Chatal Hüyük	Mt. Olivet (Öldberg) I	Ain Yabrud I	Irq-al Ahmar	Badarian	Predynastic	Dynasties VI-XII (Denderah)	Dynasties XXIV-XXX (Gizeh)	Lachish	Elmenteita A, B, C, E	Willey's Kopje	Makalia I	Nakuru IX	Alishar Hüyük	Tepe Hissar (Periods II-III)
Length (l)	184.88	178.0	183.0	186	182.3	186.84	182.5	185.3	184.5	193.00	197.17	189.5	187	184.3	187.69
Breadth (b)	137 00	134.0	138.0	134	130.8	135.07	134.3	138.9	136.8	138.75	129.67	139	129.5	133.7	131.85
Basio-bregmatic height (h')	—	132.0	—	130.5	132.9	135.71	134.8	132.4	133.8	135.25	129.50	128.5	131.5	130.2	133.47
Auricular height (oh)	112.75	113.0	—	—	111.0	—	—	113.4	115.1	113.63	109 00	113	111	113.15	114.34
Cranial index (10o b/l)	74.08	75.28	75.41	72.0	71.75	72.11	73.59	74.96	74.3	72.43	65.75	73.35	69.25	72.6	70.45
Height-length index (100 h'/l)	—	74.16	—	70.2	72.9	72.7	73.86	71.45	72.7	71.49	65.13	67.81	70.32	71.45	71.27
Auricular-height-length index (100 oh/l)	61.04	63.48	—	—	60.89	—	—	61.20	62.4	59.66	54.80	59.63	59.36	61.45	60.92
Upper morphological face height (g'h)	59 25	63.0	—	71	67.1	69.63	69.9	70.4	70.1	80.5	76.0	76.0	80.5	68.05	69.14
Bizygomatic breadth (j)	116.00	124	—	136-140	122.5	129 59	124.5	128.7	128.4	135.75	135.5	140	138	126.05	124.89
Upper facial index (100 g'h/j)	50.86	50.81	—	52.2	54.78	55.40	56.14	54.70	54.6	59.3	56.13	54.29	58.33	54.05	55.27
Orbital breadth 0, 'l)	38.00	40	—	41	40	39.2	—	40.75	41.5	42.75	46.25	45	44	39.1	40.86
Orbital height (0_2l)	30.50	32	—	31	32.1	33.2	—	33.83	32.9	35.5	37.50	35	35.5	33.25	32.15
Orbital index (100 0_2l/o',l)	80.26	80	—	75.6	80.25	84 9	—	83.66	79.4	83.06	80 91	77.78	80.68	85,3	78.14
Nasal breadth (nb)	22.00	21	—	25	24.9	25.07	25.8	24.36	25.2	26.00	24.5	28	27	25.45	24.98
Nasal height (nhl)	47.50	47	—	55	48.4	50.96	—	51.5	51.4	57.75	55.0	55.5	54	49 65	50.03
Nasal index (100 nb/nhl)	46.31	44.68	—	45	51.45	49.44	—	47.31	49.4	44.96	44.55	50.45	50	52.25	49 49

TABLE XVIII

Comparative Cranio-Facial Characters of the Male Mediterranean Type

	Cranial shape	Vault height	Upper face height	Orbital height	Nasal aperture width
Syria					
Tell al Judaidah and Chatal Hüyük	Long	Moderate	Moderate	Moderate	Narrow
Mt. Olivet I	Long	Moderate	Narrow	Moderate	Narrow
Ain Yabrud I	Long	—	—	—	—
Irq al Ahmar	Long	Moderate	Moderate	Low	Narrow
Palestine					
Lachish	Long	Moderate	Moderate	Moderate	Moderate
Egypt					
Badarian	Long	Moderate	Moderate	Moderate	Wide
Predynastic	Long	Moderate	High	Moderate	Moderate
Dynasties VI-XII	Long	Moderate	High	—	—
Dynasties XXVI-XXX	Long	Moderate	Moderate	Moderate	Moderate
East Africa					
Elmenteita	Long	Moderate	High	Moderate	Narrow
Willey's Kopje	Very long	Low	High	Moderate	Narrow
Makalia I	Long	Low	Moderate	Moderate	Narrow
Nakuru IX	Long	Moderate	High	Moderate	Narrow
Anatolia					
Alishar Hüyük	Long	Moderate	Moderate	Moderate	Wide
Iran					
Tepe Hisar, Periods II-III	Long	Moderate	High	Moderate	Moderate

TABLE XIX

Comparative Cranio-Facial Masurements and Indices of the Male Eurafrican Type

	Tell al-Judaidah and Chatal Hüyük	Hisarlık Period III	Alishar	Tepe Hissar
Length (l)	193.73	192.00	196.00	189.58
Breadth (b)	139.00	136.75	133.50	136.47
Basio-bregmatic height (h')	138.00	—	—	137.75
Auricular height (oh)	113.23	110.00	113.00	118.87
Cranial index (100b/l)	71.83	71.20	68.10	72.00
Height-length index (100h'/l)	72.87	—	—	72.66
Auricular height-length index (100oh/l)	58.73	57.28	57.70	62.77
Upper morphological face height (g'h)	71.25	—	—	72.11
Bizygomatic breadth (j)	134.33	—	128.00	128.27
Upper facial index (100g'h/j)	54.61	—	—	56.85
Orbital breadth (o, 'l)	41.88	38.00	40.00	41.52
Orbital height (0_2l)	33.13	30.00	32.50	30.67
Orbital index (100 0_2l/o, 'l)	79.28	78.90	81.30	75.26
Nasal breadth (nb)	25.88	24.50	—	25.26
Nasal height (nhl)	53.50	48.00	—	52.36
Nasal index (100nb/nhl)	50.14	50.95	—	48.29

TABLE XX

Comparative Cranio - Facial Measurements and Indices of the Male Alpine Type

	Tell al-Judaidah and Chatal Hüyük	Alishar	Alaca Hüyük	Tepe Hissar
Length (l)	178.63	181.70	179.0	177.40
Breadth (b)	149.50	143.55	147.0	136.20
Basio - bregmatic height (h')	—	130.95	—	134.40
Auricular height (oh)	108.32	114.70	—	114.06
Cranial index (100b/l)	83.67	79.15	82.1	76.77
Height - length index (100h'/l)	—	72.90	—	75.77
Auricular height - length index (100oh/l)	60.85	63.15	—	64.60
Upper morphological face height (g'h)	71.00	64.30	—	66.80
Bizygomatic breadth (j)	129.25	132.65	—	129.60
Upper facial index (100g'h/j)	56.74	48.35	—	51.56
Orbital breadth (0,'l)	40.83	38.05	38.0	40.20
Orbital height (O_2l)	32.50	33.30	—	31.80
Orbital index (100 O_2l/o,'l)	79.54	87.90	—	79.16
Nasal breadth (nb)	26.00	26.05	—	25.40
Nasal height (nhl)	54.25	50.65	—	47.00
Nasal index (100nb/nhl)	46.08	51.65	—	54.52

TABLE XXI

Comparative Cranio Facial Measurements and Indices of the Armenoid Type

	Tell al-Judaidah and Chatal Hüyük ♂	Tell al-Judaidah an Chatal Hüyük ♀	Alishar ♂	Tepe Hissar ♀
Length (l)	167.75	160.00	167.0	163.00
Breadth (b)	153.50	143.00	146.0	144.00
Basio-bregmatic height (h')	139.50	122.00	130.0	126.00
Auricular height (oh)	124.25	116.00	112.8	115.00
Cranial index (100 b/l)	91.57	89.37	87.5	88.34
Height-length index (100 h'/l)	86.37	76.25	77.9	77.30
Auricular height-length index (100 oh/l)	74.09	72.50	67.6	70.55
Upper morphological face height (g'h)	64.00	—	70.3	62.00
Bizygomatic breadth (j)	131.50	124.00	135.3	132.00
Upper facial index (100 g'h/j)	48.66	—	51.9	46.97
Orbital breadth (0, 'l)	40.00	34.00	39.3	41.00
Orbital height (0_2l)	33.75	31.50	33.8	31.00
Orbital index (100 0_2l/0, 'l)	84.38	92.64	86.2	75.61
Nasal breadth (nb)	23.25	—	23.0	22.00
Nasal height (nhl)	50.50	—	53.8	45.00
Nasal index (100 nb/nhl)	46.03	—	43.0	48.89

TABLE XXII

Comparative Mandibular Measurements and Indices of the Mediterranean Type

	Tell al Judaidah and Chatal Hüyük		Egypt, Dynasties IV - XI		Mouillah	Elmenteita		Willey's Kopje	Makalia I	Nakuru IX	Tepe Hissar Period II		Tepe Hissar Period III		Maşat Höyük
	♂	♀	♂	♀	♂	♂	♀	♂	♂	♂	♂	♀	♂	♀	♂
Dimensions															
Bicondylar width (W_1)	120.00	115 00	113.8	108.0	—	113.50	108.33	116 25	129.00	115.50	113.20	105.50	114.08	110.12	—
Mandibular angle width (w_2)	100.33	89 25	—	—	—	95.33	90.00	96.50	104 00	104.50	96.17	91.60	95.00	91.74	—
Symphyseal height (h_1)	30.17	27 00	33 8	31.0	32 50	35.08	32 67	30.00	37 00	37.50	36.86	32.80	34.60	32.29	30 00
Minimum width of ramus (rb')	30.83	30.25	32 2	31.6	33 50	37.92	37 00	34.50	41.00	32.00	33.43	33.60	33.26	32.00	31.00
Dental arch width (g_2')	47.67	47 00	44 6	42.3	—	41.67	41.00	44.50	43.00	47.00	45.00	42.50	42.55	44.08	—
Condyle to coronoid (cycr)	35.25	37.25	34.4	32.2	—	32.70	34 00	35.00	31.50	32.50	34 57	34.75	35.50	34.74	—
Bigonial width (gogo)	100.50	83.75	90.5	83 5	—	—	—	—	—	—	91.83	88.00	91.09	88.04	89.00
Coronal height (crh)	59.33	61.00	65.1	58.7	—	67.70	59.10	63.75	72.50	68.50	62.67	55.75	62.12	59.25	—
Corpus length (cl)	63.67	66 00	74.8	71.2	—	—	—	—	—	—	75 50	75.00	75.90	72.42	—
Ramal length (rl)	51.50	57 00	61.4	55.4	55.00	59.33	54.50	60.75	66.50	64.50	60 17	56 00	60.34	57 46	—
Mandibular length (ml)	89 33	85.00	105 2	100 7	—	107 83	105 67	109.25	113.00	108.50	105.33	101.75	106.37	102.11	—
Mandibular angle (m<··)	122.17°	112.25°	124.1°	124.8°	116.33°	117.42°	121.17°	118.50°	112.00°	125.50°	106.33°	122.25°	123.50°	124.11°	127°
Indices															
Height-length (100crh/ml)	66.49	71.80	62.1	58.1	76 65	61.19	55.93	58.40	64.16	63.13	59.61	54 88	58.55	57.96	—
Ramal breadth-length (100rb'/rl)	57.81	53.24	52.9	57.5	—	64.42	68.32	57.00	61.65	49.61	58 30	60.94	55.31	54.06	—

TABLE XXIII

Comparative Measurements of Femur and Tibia

Femur

	Tell al-Judaidah and Chatal Hüyük				Gamble's Cave - II		Bromhead's Site	Willey's Kopje I - III		Makalia I		Nakuru IX		Tepe Hissar Period III				Alacahüyük		Mouillah
	Eurafrican	Med.		Alpine																
	♂	♂	♀	♀	♂		♂	♂		♂		♂		♂		♀		♀		♂
	L	R+L	R	L	R	L	R+L	R	L	R	L	R	L	R	L	R	L	R	L	R+L
Maximum length	515	422.5	—	403 0	520	—	483.75	507	509.5	484	483	500	502	447.5	446 5	411.0	402	467	416	—
Subtrochanteric sagittal diameter	32.5	22.5	25	24	25	23	23.25	26.5	25.7	24	26.5	25	23.5	33 2	33.4	30 3	29.1	—	—	—
Subtrochanteric transverse diameter	40	30.5	30	28.5	34	31	32.17	34.2	33	40	38	31	30.5	25 3	25 7	23.3	23.4	—	—	—
Midshaft sagittal diameter	36.5	27	28	24.5	30	30.5	32.08	35	34.5	34	33	38	35	—	—	—	—	—	—	26.65
Midshaft transverse diameter	32 5	26.5	23	23	23.5	24	25 5	26.5	25.8	29.5	28.5	25.5	25.5	—	—	—	—	—	—	24
Platymeric index	81.25	74.19	83.33	84.21	73.53	74 19	72 34	77.9	77 8	60	69.7	80 6	77	76.4	76.7	76.9	79 6	—	61.7	—

Tibia

	Tell al-Judaidah	Gamble's Cave - II		Bromhead's Site No. 2 & 5 No. 1,3,4		Willey's Kopje I - III		Makalia I - II		Nakuru IX		Tepe Hissar Period III				Mouillah
	Alpine															
	♀	♂		♂		♂		♂		♂		♂		♀		♂
	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R+L
Maximum length	345.0	440	438	353.3	388.3	435.7	439 5	420.3	414 5	434	439	353.9	356.4	322.7	322.6	—
Platycnemic sagittal diameter	33	—	—	31.3	36.3	38 8	39.3	41.5	41 8	41	40	23.6	23.8	22.2	22.4	—
Platycnemic transverse diameter	22	—	—	19.5	23.2	24.8	24.7	24	25.5	24	25	36.1	36.2	31	31.8	—
Midshaft sagittal diameter	30	31	31	26.5	31.2	34.8	34.2	34.5	35	36	33	—	—	—	—	30.4
Midshaft transverse diameter	22	22	22	18	21.7	22.3	22 3	22.3	23	24	23.5	—	—	—	—	21
Platycnemic index	66.67	—	—	62 91	63.69	63.5	63.4	57.8	61.14	58.5	62.5	65.6	66 3	72.1	70.5	—

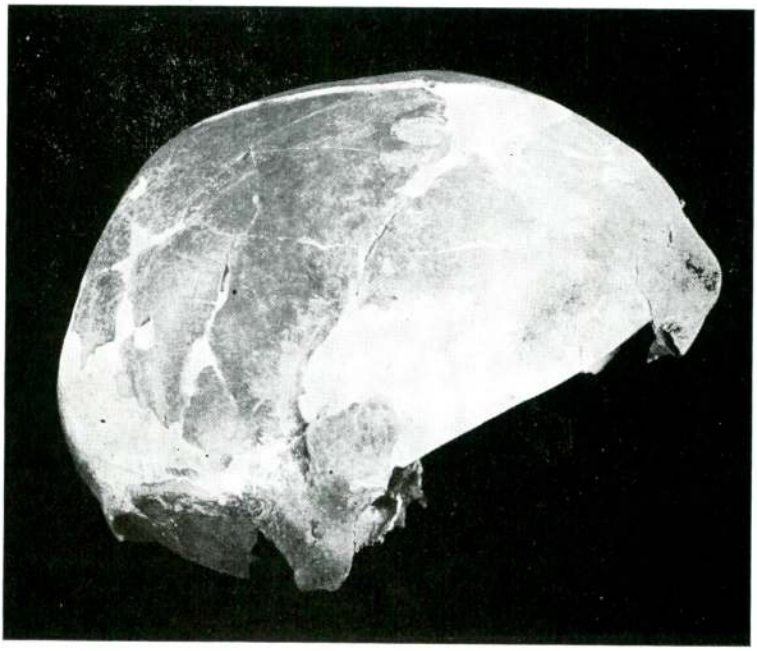


Fig. 1

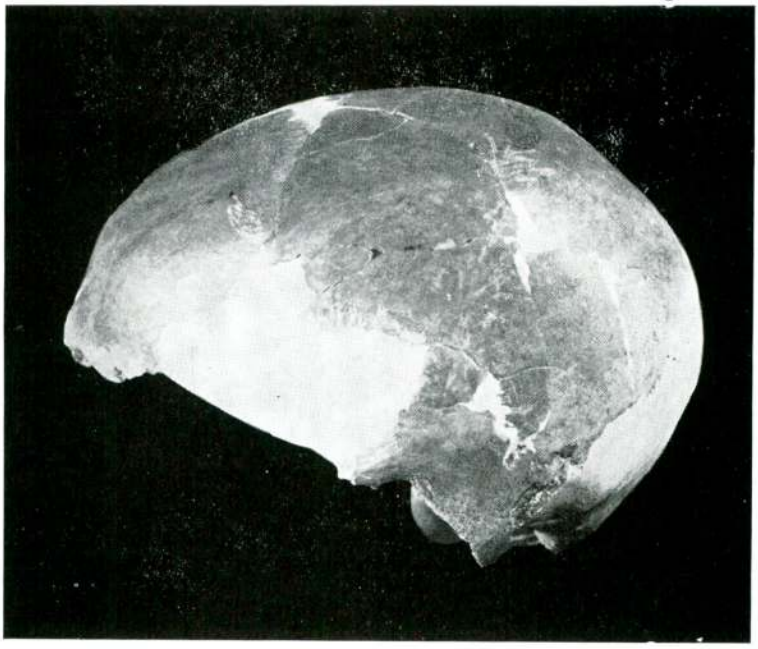
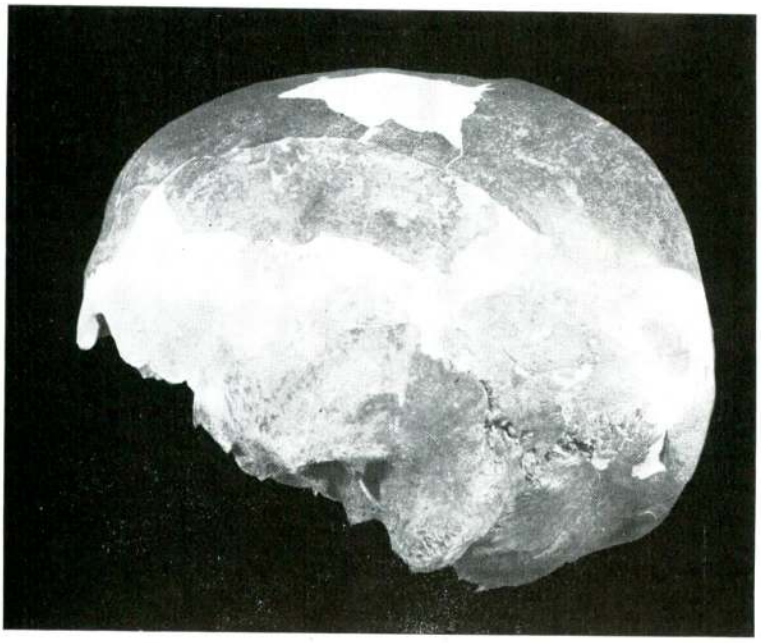


Fig. 2



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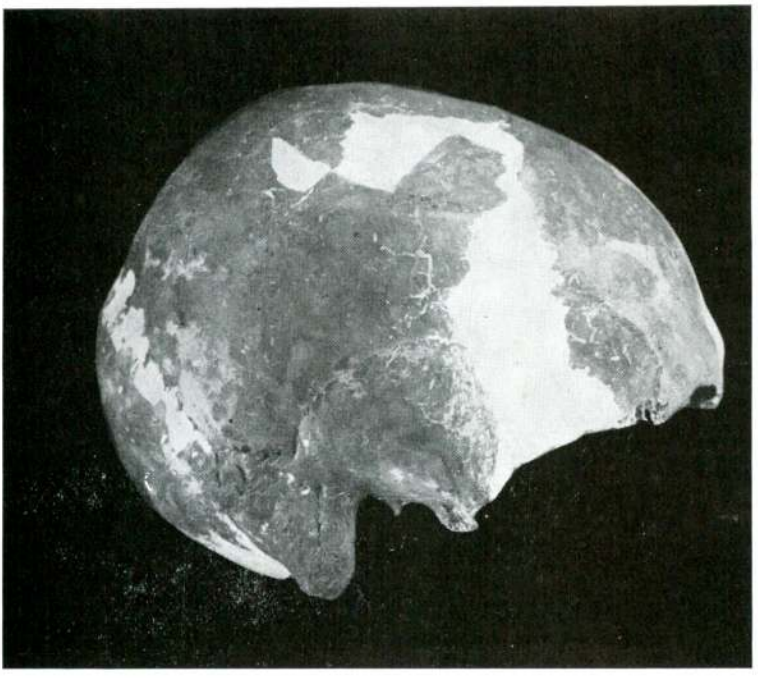


Fig. 4

Fig. 5

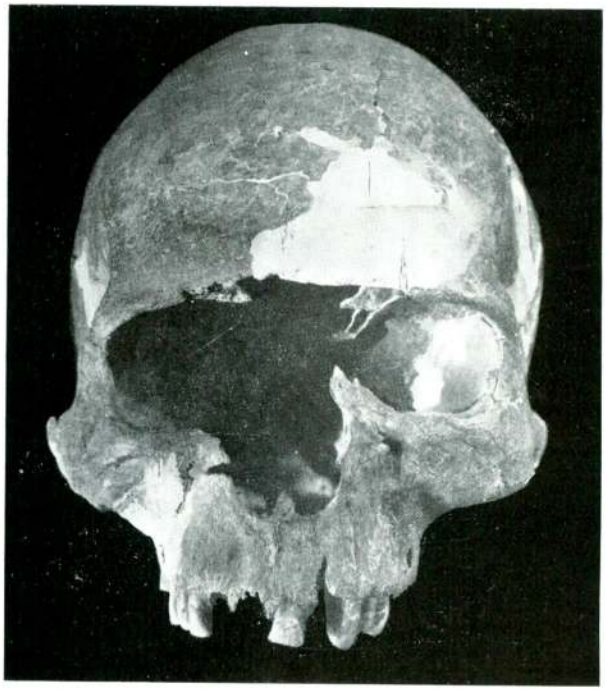


Fig. 6

Fig. 6 a

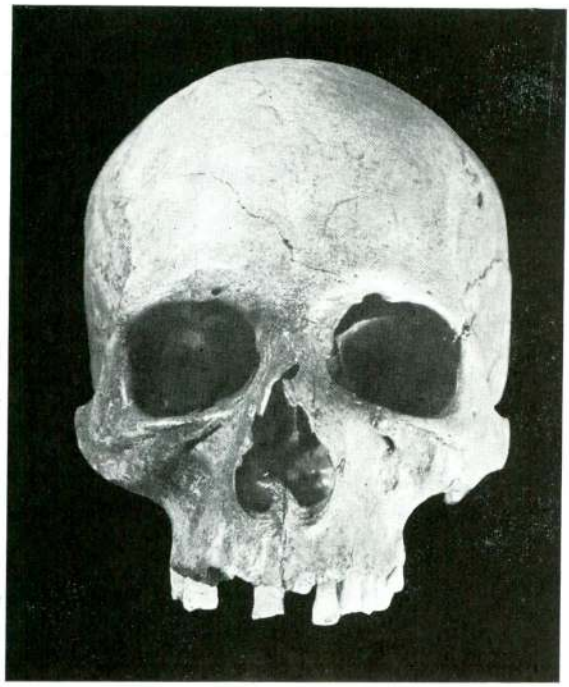


Fig. 7

Fig. 7 a

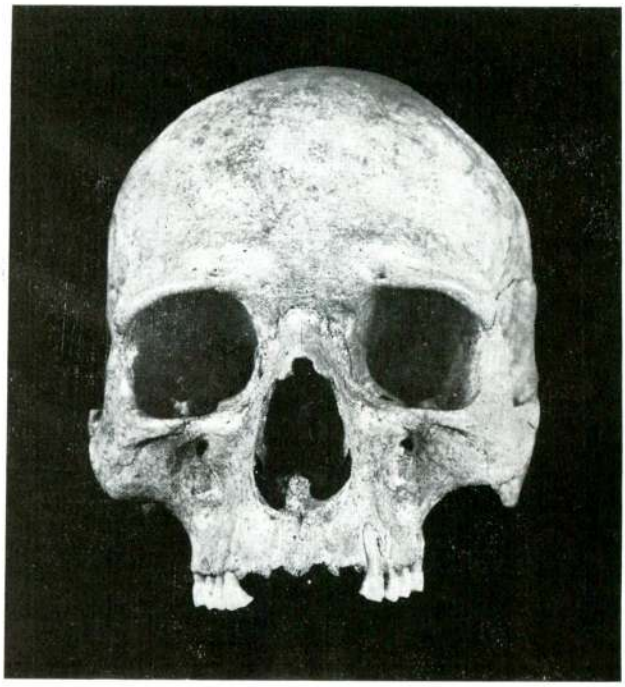


Fig. 8

Fig. 8 a

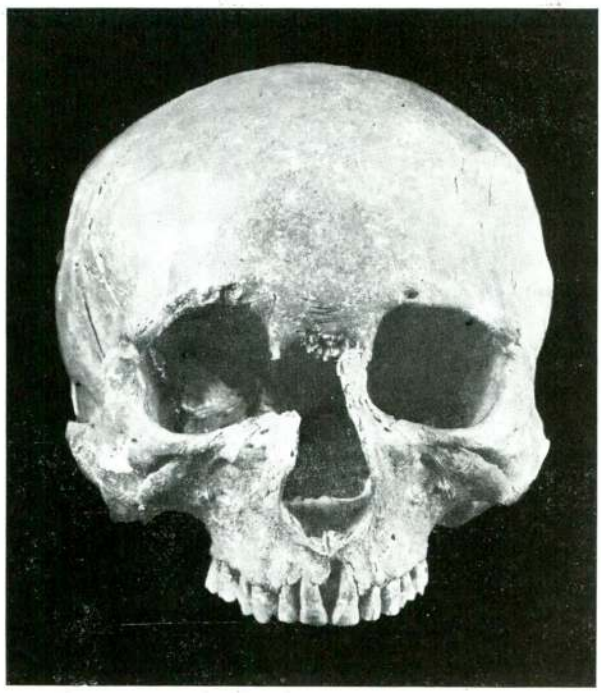


Fig. 9

Fig. 9 a

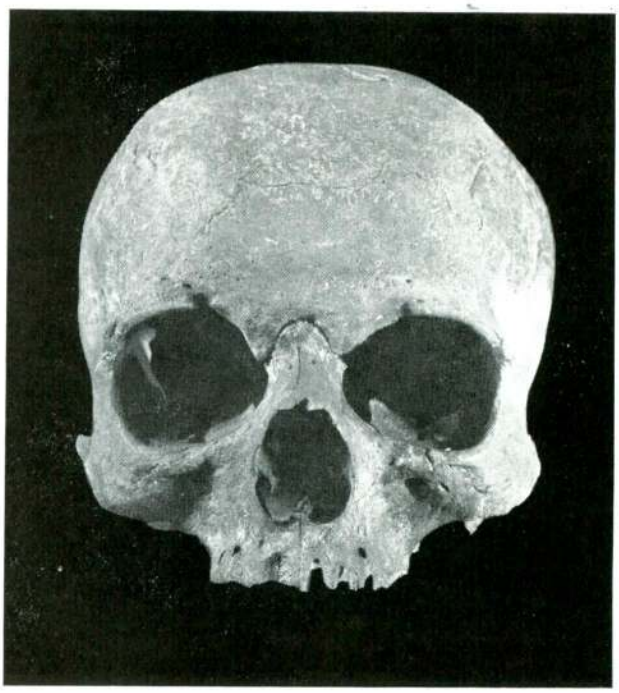


Fig. 10

Fig. 10 a

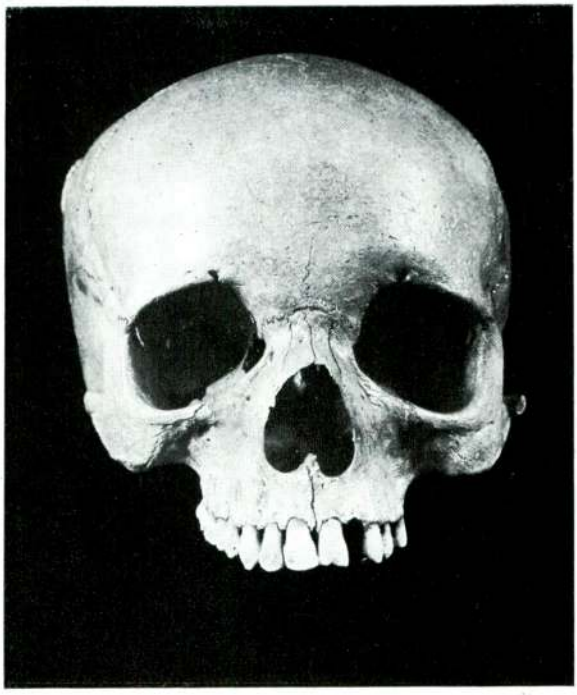
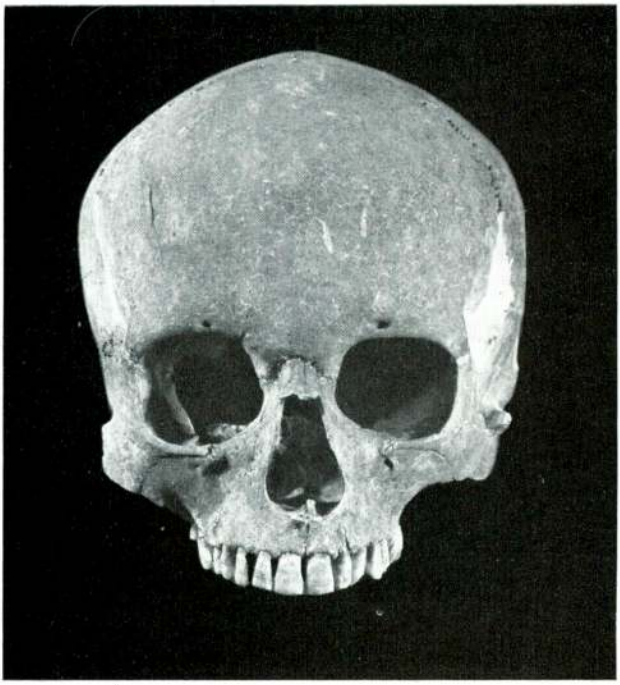


Fig. 11

Fig. 11a



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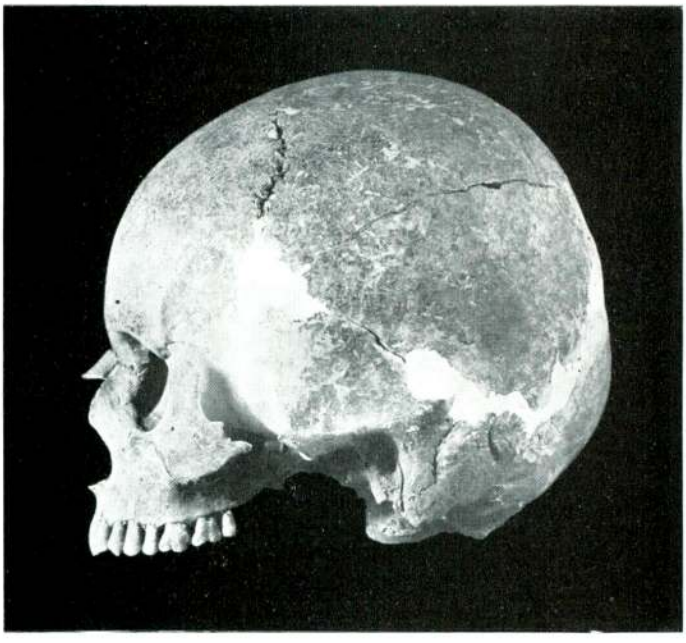


Fig. 12 a

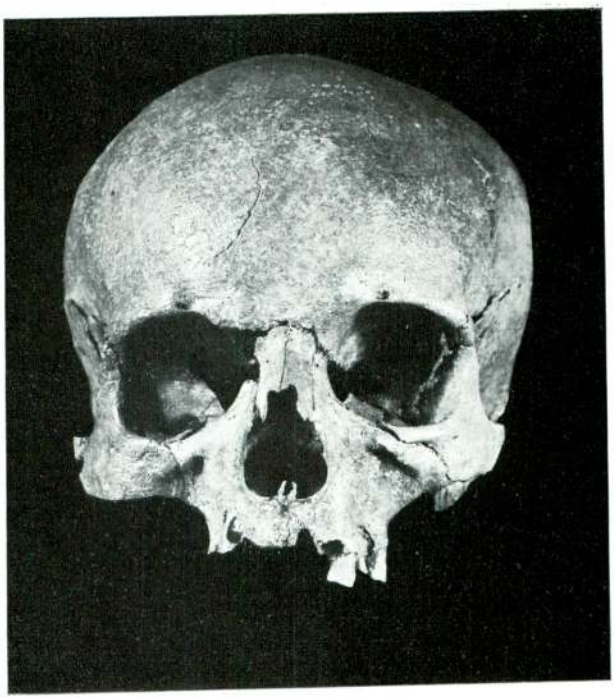


Fig. 13

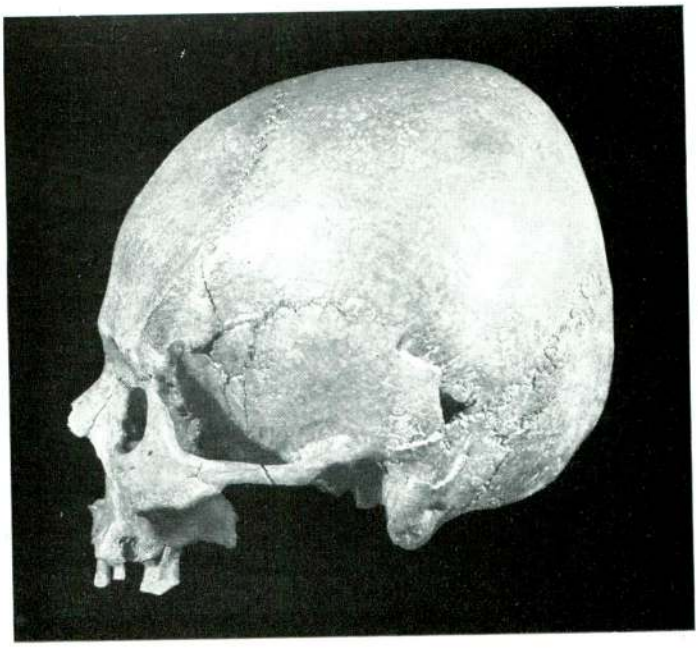


Fig. 13 a

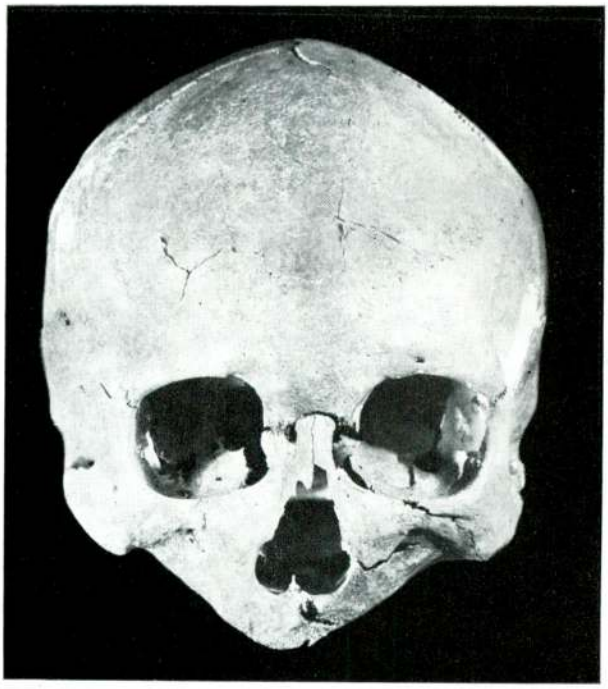


Fig. 14

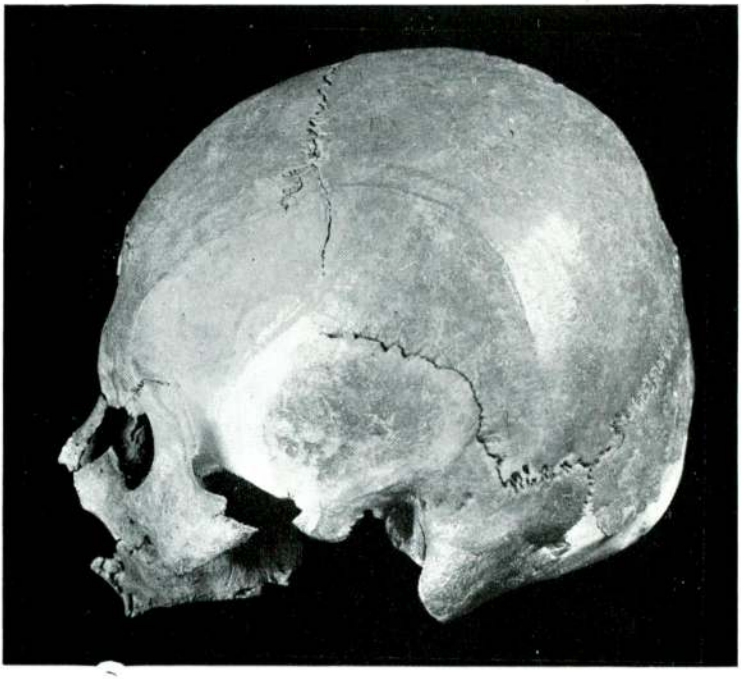


Fig. 14 a

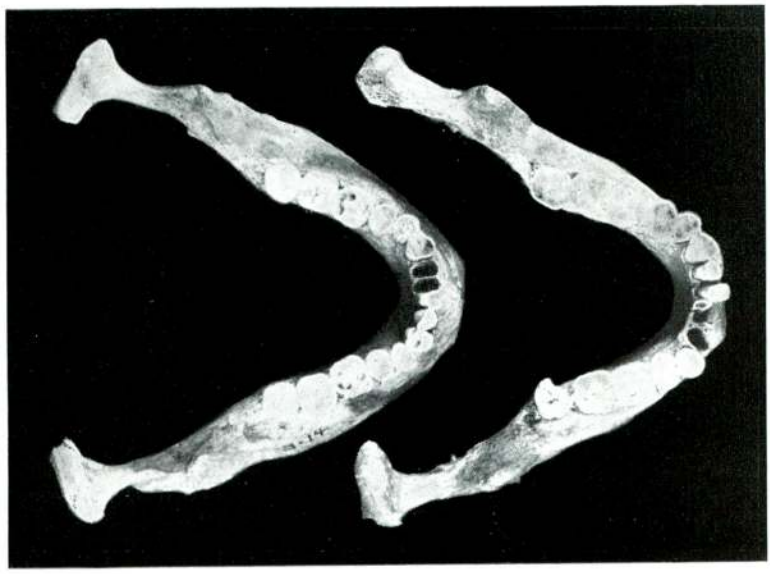


Fig. 16

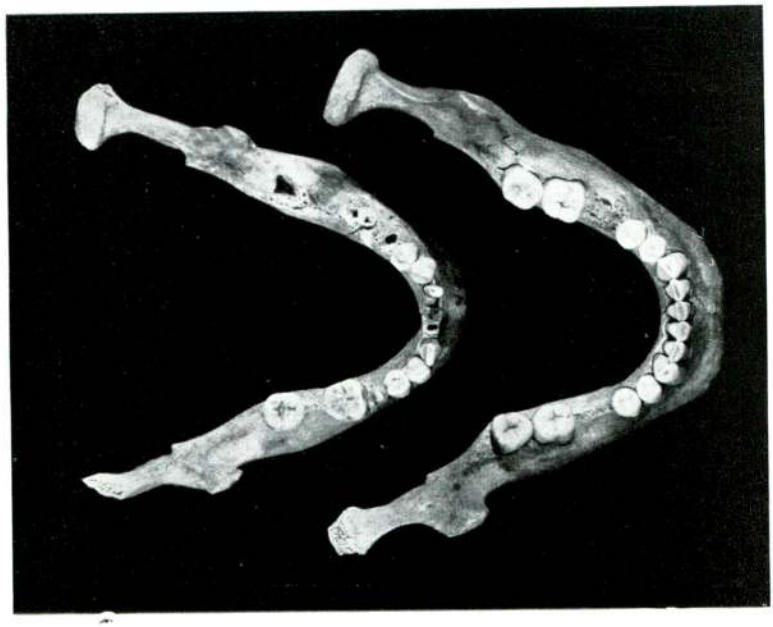


Fig. 15

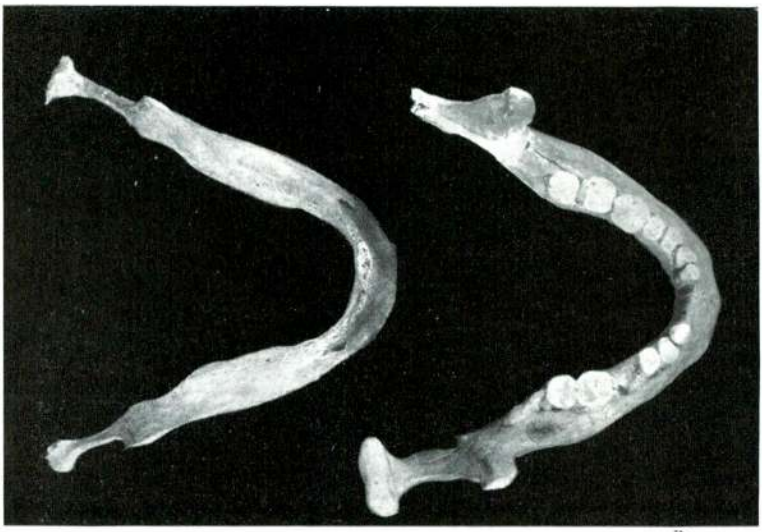


Fig. 18

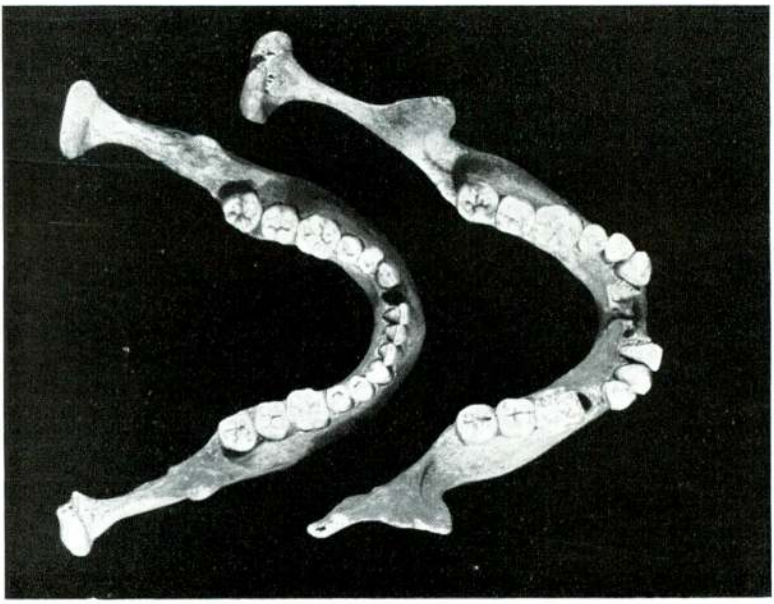


Fig. 17

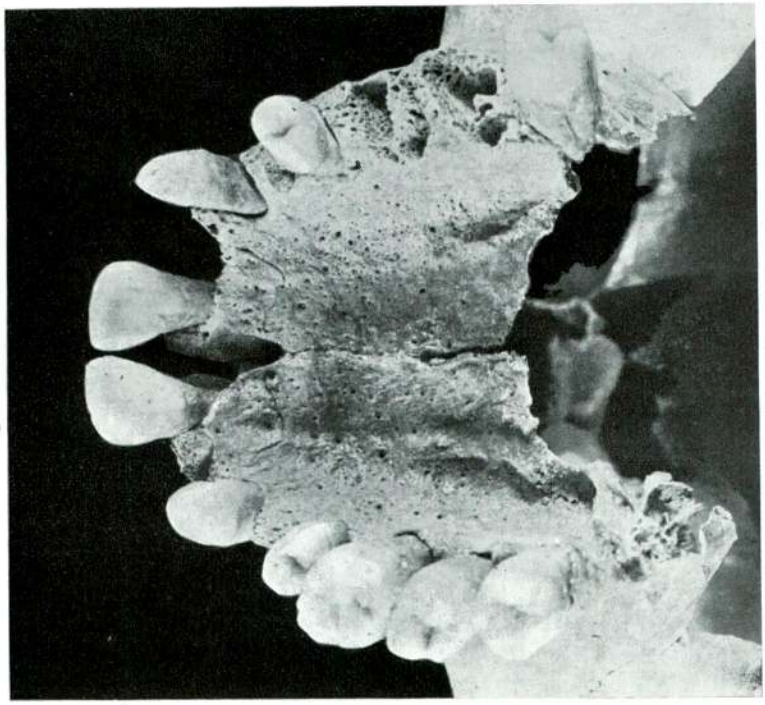


Fig. 20

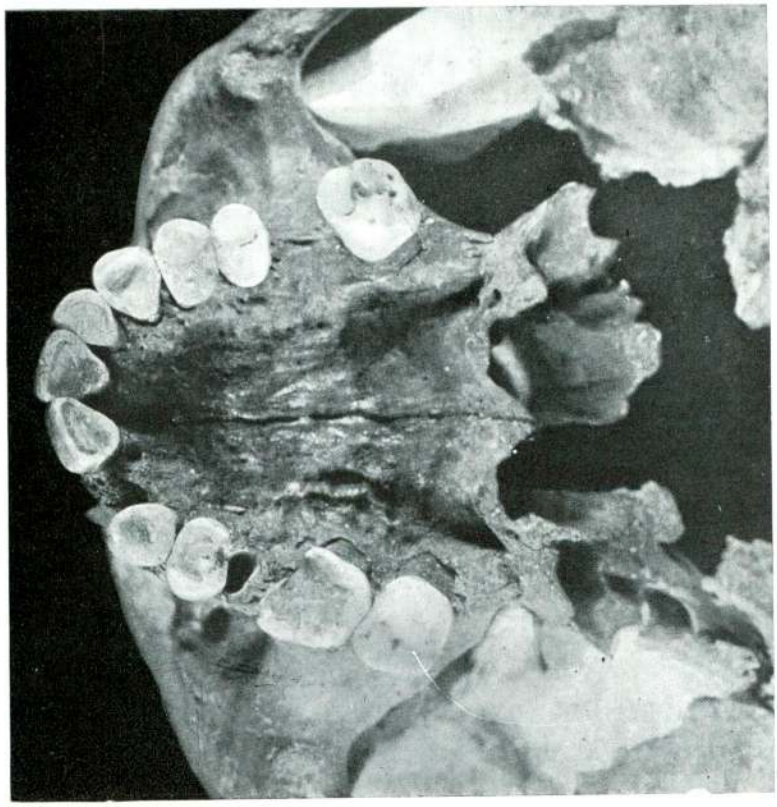


Fig. 19

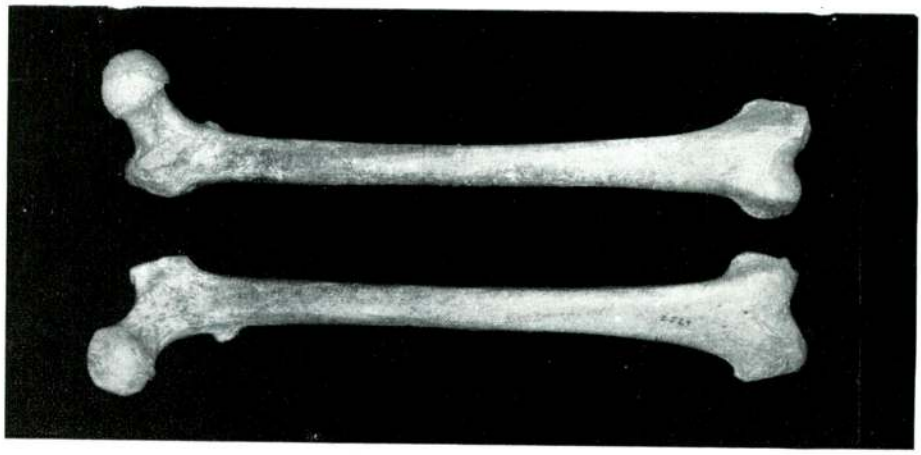


Fig. 22

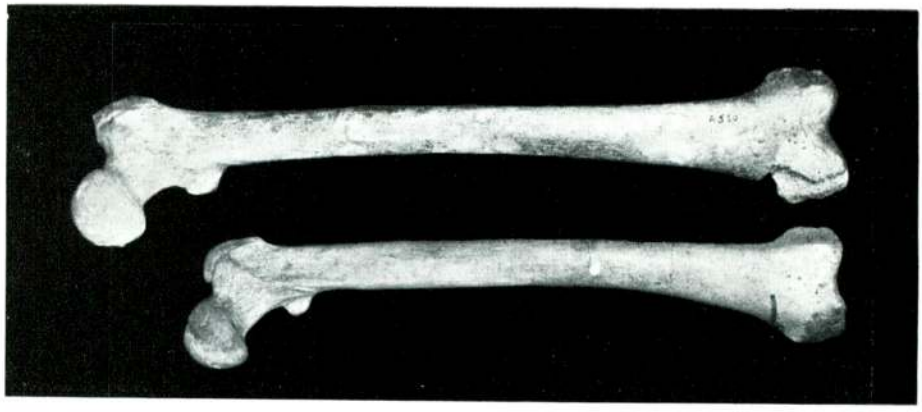
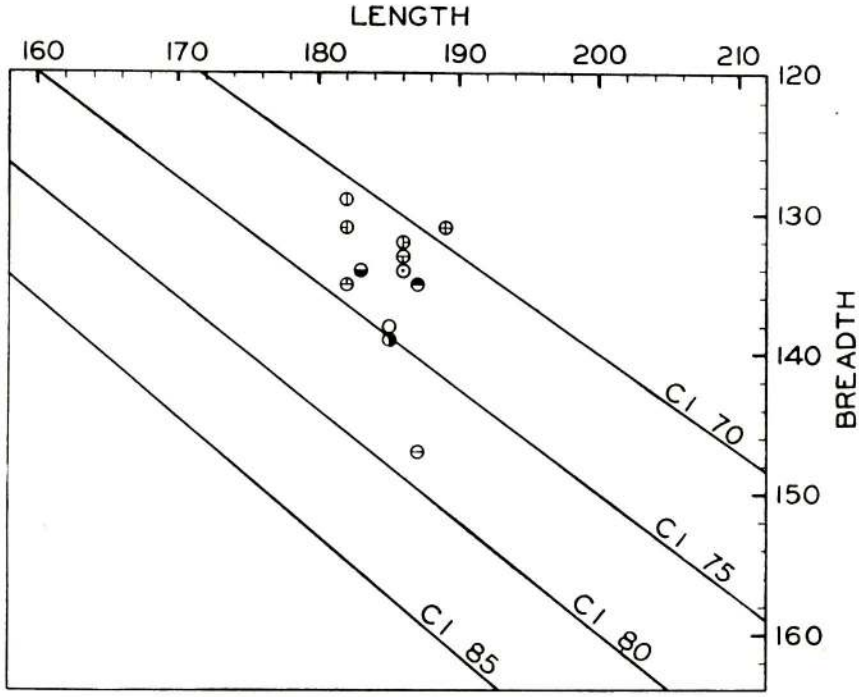


Fig. 21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210
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130
140
150
160
BREADTH
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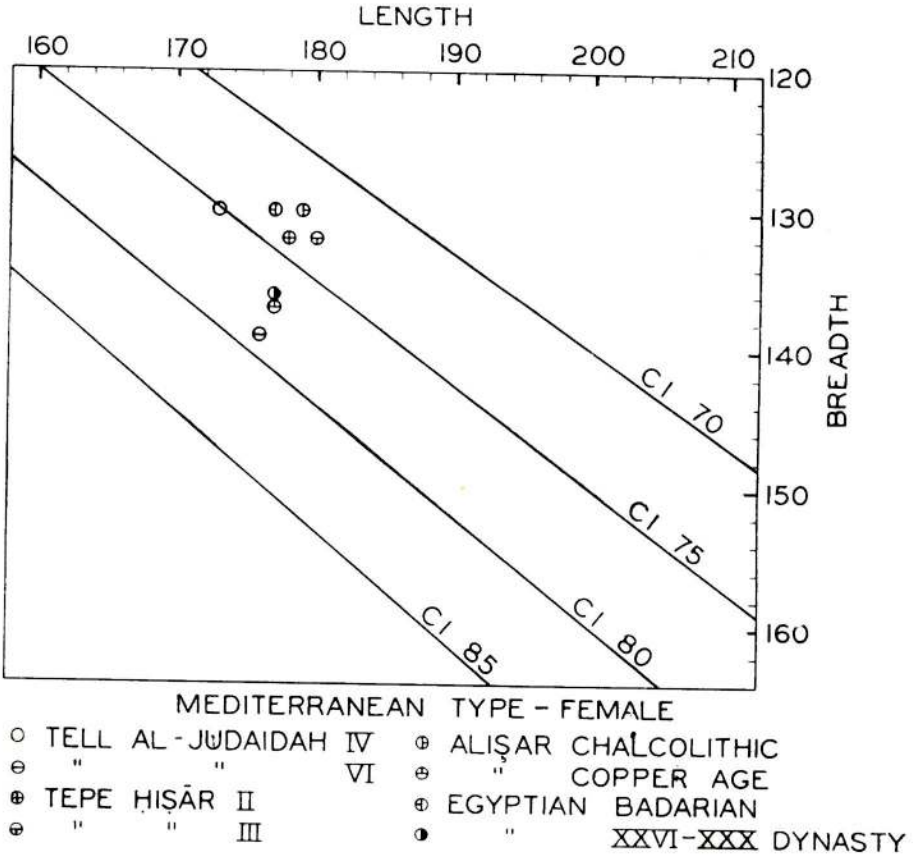
CI 75
CI 80
CI 85
MEDITERRANEAN TYPE - MALE
○ TELL AL-JUDAIDAH IV
⊙ " " V
⊖ " " VI
◐ " " XII
● TEPE HIŞĀR II
◒ " " III
⊕ ALIŞAR COPPER AGE
⊕ " POST-HITTITE-PHRYGIAN
⊕ EGYPTIAN BADARIAN
◓ " PREDYNASTIC
◒ " VI-XII DYNASTY
◑ " XXVI-XXX DYNASTY

Fig. 23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BREADTH
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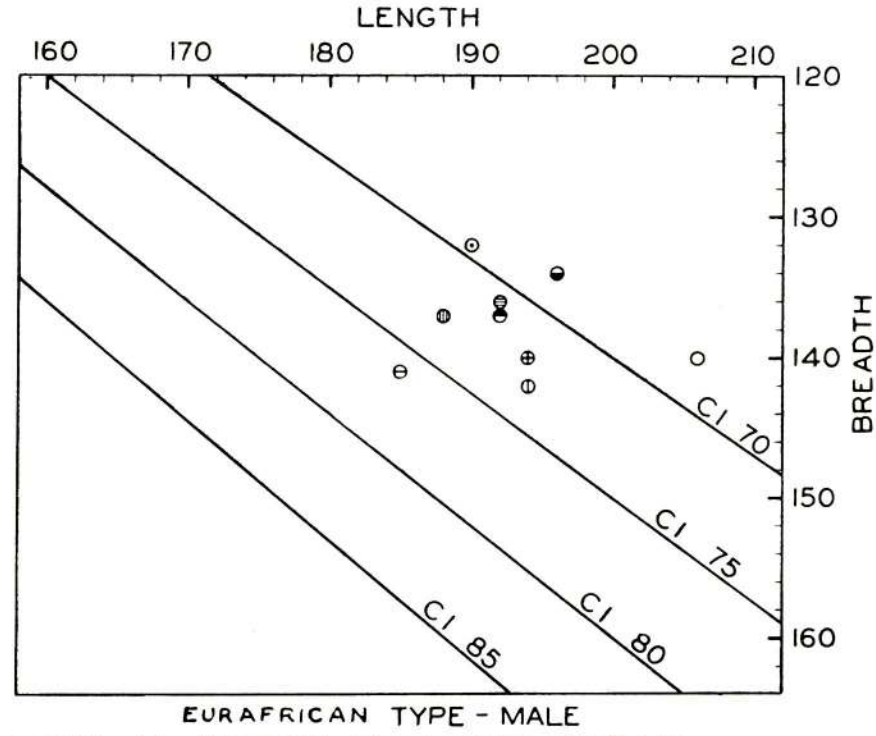
CI 75
CI 80
CI 85
MEDITERRANEAN TYPE - FEMALE
○ TELL AL-JUDAIDAH IV
⊖ " " VI
⊕ TEPE HIṢĀR II
⊖ " " III
⊕ ALIṢAR CHALCOLITHIC
⊖ " COPPER AGE
⊕ EGYPTIAN BADARIAN
◑ " XXVI-XXX DYNASTY

Fig. 24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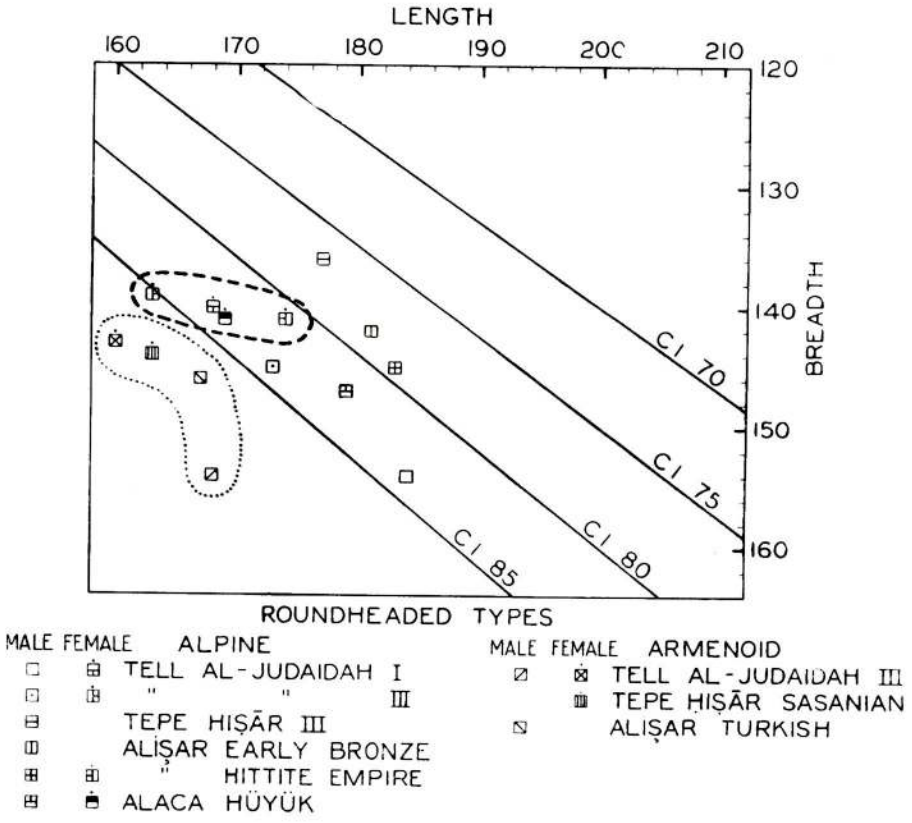
160
BREADTH
CI 70
CI 75
CI 80
CI 85
EURAFRICAN TYPE - MALE
○ TELL AL-JUDAIDAH III
⊙ " " IV
⊖ " " V
◐ " " VI
⊕ " XII
◍ TEPE HIṢĀR II
◉ " " III
◒ ALIŞAR POST-HITTITE-PHRYGIAN
⊖ HISARLIK III

Fig. 25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160
BREADTH
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CI 75
CI 80
CI 85
ROUNDHEADED TYPES
MALE FEMALE ALPINE
TELL AL-JUDAIDAH I
" " III
TEPE HIŞĀR III
ALİŞAR EARLY BRONZE
" HITTITE EMPIRE
ALACA HÜYÜK
MALE FEMALE ARMENOID
TELL AL-JUDAIDAH III
TEPE HIŞĀR SASANIAN
ALIŞAR TURKISH

Fig. 26