

Zuttiyeh 面 骨

Songy Sohn Milford H. Wolpoff

(美国密执安大学人类学系古人类学研究室)

在以色列 Zuttiyeh 发现的额面骨破片距今至少已 120,000 年,认识到它如此古老就提示它有可能是任何地中海地区较晚居民的祖先。有些人认为它是早期尼安德特人,而另一些人则认为它是解剖学上已具现代特征的智人中的早期者。我们认为这个标本最适于与周口店直立人相对比。经过系统比较我们发现两者有着细节上的相似性。尽管两个地点在时间和空间距离上有差别。在本文中我们以人类进化地区连续性的解释讨论了这个相似性的含义。这对于理解晚更新世地中海地区居民的祖先及其关系是重要的。由于它表明亚洲至少是某些现生人类群体的重要发源地,所以对于现代人起源的“伊甸园”理论有着重要的含义。

(刘武 译)

ZUTTIYEH: A NEW LOOK AT AN OLD FACE*

Songy Sohn Milford H. Wolpoff

(Laboratory of Palcoanthropology, Department of Anthropology, University of
Michigan, Ann Arbor, MI 48109 USA)

Key words Zuttiyeh; *Homo erectus*; Neandertal; Zhoukoudian; Asia; Levant

Abstract

The frontofacial fragment from Zuttiyeh, Israel is at least 120,000 years old. Recognition of this antiquity suggests that it could be ancestral to any of the later populations of the Levant. Some workers have regarded it as an early Neandertal, and others as an early "anatomically modern *Homo sapiens*". We believe the specimen could most profitably be compared with the Zhoukoudian *Homo erectus* remains. From these systematic comparisons we find a detailed similarity in spite of the difference in time and the spacial distance between these sites. In this paper we discuss the implications of this similarity in terms of the regional continuity explanation for human evolution. This relationship is an important one for understanding the ancestry and relations of the Levantine populations of the Upper Pleistocene. It has significant implications for the "Garden of Eden" theory of modern human origins, since it shows Asia can be an important source area for at least some living populations.

As we celebrate the 60th anniversary of the first discovery of the east Asian *Sinanthropus* skulls, we wish to discuss Zuttiyeh, a less celebrated specimen from the Levant of western

* With thanks and appreciation to Yoel Rak for bringing this title to our attention by using it first.

Asia. We raise here the possibility that these two sites are related. The frontofacial fragment from Zuttiyeh, Israel, was also discovered in 1920's (Keith 1927). It was recently reported to be at least 110,000 years old (Gisis et al. 1974; Schwarcz et al. 1980; Bar-Yosef 1988, 1989). Since its first discovery, the Zuttiyeh face has been regarded as an advanced Neandertal, as an early Neandertal, and most recently as an early "anatomically modern *Homo sapiens*". Some have attributed the cause of the various interpretations to the fragmentary nature of the fossil (for instance Brauer 1989). However, we believe that the different interpretations of Zuttiyeh do not stem from the incomplete preservation, but rather from the different approaches of the various workers who have analyzed it. After all, paleoanthropologists more often than not work with fragmentary specimens without always producing numerous conflicting interpretations.

The hypothesis of a close relationship between the earlier east Asians from Zhoukoudian and the west Asian Zuttiyeh specimen has never been pursued, yet, visual inspection suggests the possibility of an ancestral relationship, in spite of the difference in time and the geographic distance between the two sites. For instance, when systematic comparisons were made during the 1985 *Ancestors* conference at the American Museum of Natural History, this relationship was widely discussed. If the "non-Neandertal" features in this Levantine specimen reflect an east Asian ancestry rather than an early appearance of modernity, an accurate understanding of the relationship between these populations of eastern and western Asia will help resolve the more general problem of the ancestry of modern human populations.

The Zuttiyeh or Galilee skull, discovered in 1925 by F. Turville-Petre (1927) is a frontofacial fragment which includes the entire frontal, right zygomatic and part of the right sphenoid. This specimen is associated with what we now regard as the Acheulo-Yabrudian tool industry, which has a high percentage of bifaces and flake scrapers. The Acheulo-Yabrudian industry of Mugharan tradition precedes the Mousterian tradition in this region (Bar-Yosef, 1989). Zuttiyeh therefore represents the population which existed before the other Levant populations associated with the Mousterian industry such as Qafzeh, Skhul, Tabun layer C, Kebara, and Amud.

Historically, the Zuttiyeh face was first regarded as a Levantine Neandertal variant. It was Sir Arthur Keith who originally suggested this (Keith, 1927). He contended the specimen was a young female (Keith, 1931) based on its frontal size and facial features. Unfused frontal and sphenoidal sutures indicated the young age. Keith regarded the cranium as that of a Neandertal variant that was distinguished from the European Neandertals mainly by a high but narrow forehead and an unusually broad supraorbital region, especially relative to the maximum breadth of the frontal.

Hrdlicka also examined the Zuttiyeh specimen in 1927, and he concluded that the specimen was male, not female, because of the prominent supraorbitals. Yet they both agreed on one thing—that the specimen was a Neandertal variant, a more "advanced type" than the Europeans. In addition as part of this discussion, Hrdlicka proclaimed that the newly described Zhoukoudian El cranium could also be incorporated in the Neandertal paradigm.

Weidenreich was less than happy with Hrdlicka's contention about the Zhoukoudian cranium. He discussed its dismissal at length in his 1943 monograph:

Never was a statement more astray than Hrdlicka's which brought Sinanthropus into the field of the Galilee skull. How little Sinanthropus has in common with this Palestine skull has been shown by McCown and Keith. In their monograph on the Mount Carmel Group, in which

Table 1 Comparisons from the Mount Carmel Monograph

	Zuttiyeh	Skhul 5	Gibraltar	Tabun
Supraorbital form	earlier robust		earlier less robust	earlier robust
Frontal height above FH	high	high	low	low
Frontal angle	high(64)	high (63)	low (55)	high (62.5)
Minimum frontal breadth	low(97mm)	low (99mm)	high (107mm)	low(98mm)
Supraorbital torus overhang	large (22mm)	large(23mm)	small (11mm)	small(15mm)
Maximum frontal breadth	small	small	large	large
Angle of inferior zygomatic border to the horizontal	straight, angle marked	incipiently notched, angle less marked	straight angle marked	
Body of the zygomatic relative to orbital pillar*	small	small	small	
Zygoproptosis**	slight	slight	none	
Alignment of orbital pillar	straight	straight	moderate bending	
Projection of lateral orbit border in front of greater wing of the sphenoid	greater (39mm)	lesser (37mm)	lesser (37mm)	
Extent of lateral pterygoid attachment on the greater wing of the sphenoid	slight	marked	absent	
Nasomalar angle (M77)	high (159)	high (156)	low (134)	intermediate (140)
Length difference between glabella and nasion horizontals	slight (3.0mm)	marked (10.5mm)	slight (3.0mm)	slight(3.0mm)
Recession of nasal root	shallow	deep	shallow	shallow
Superior internasal suture	fused	fused	open(in spite of age)	
Projection of nasals anterior to the frontal process of the maxilla	small	small	large	
Superior breadth across nasals	intermediate	small	intermediate	very large
Breadth of nasal root (bilachrymal)	intermediate	intermediate	small	large
Orbit width (M51)	less	slightly greater	slightly greater	less
Orbit height (M52)	large (37mm)	small (30mm)	large (39mm)	intermediate (33mm)

* The zygomatic is quartered with a horizontal line connecting the superior points on the zygomatic and zygomatic sutures, and a line orthogonal to it extending from the fmo point. According to McCown and Keith, the "modern" condition is to have a large zygomatic body (the inferoposterior quarter) relative to the size of the orbital pillar.

** Zygoproptosis, according to McCown and Keith (1939: 365), is the inferior projection of the masseteric attachment on the lower edge of the temporal process of the zygomatic bone. This contrasts with the straight lower border of Neandertals as described by Rak (1986).

they include the Galilee skull, they expressly decline to compare it with *Sinanthropus* because of their distant relationship.

But Weidenreich had not seen a cast, nor the original specimen of Zuttiyeh, and based his

conclusion (see Table 2) on the discussions in the McCown and Keith monograph (1939). Weidenreich's concern was really focused on the status of the *Sinanthropus* skulls and did not directly involve the Zuttiyeh skull. Weidenreich, in fact, agreed with Keith's earlier assessment that the specimen represented an advanced Neandertal variety.

In parallel, McCown and Keith had not seen casts of the Zhoukoudian remains, nor had these as yet been described in detail or even fully recovered, as they prepared their 1939 monograph on the Skhul and Tabun specimens. While McCown and Keith declined to use the Zhoukoudian material in their comparisons, it is unlikely that the question of an explicit comparison with Zuttiyeh figured prominently in their considerations of how to limit the sample they compared with the Mount Carmel specimens. In fact, they draw only a few specific conclusions about Zuttiyeh (see Table 1), particularly in the discussion of the Tabun female in which they contend that Zuttiyeh is "of the same type", linked to the Neandertals by characteristics of the frontal, zygomatic, and sphenoid bones.

Table 2 Comparisons in the Zhoukoudian Monograph Involving Zuttiyeh

Zhoukoudian female(s)	Zuttiyeh
Frontal sinus small	Large, and large in many Neandertals
No sphenoidal sinus	Sphenoidal sinus extending laterally to the pterygoid process, as in Ehringsdorf
Distinct frontal boss	Distinct frontal boss, also in Ehringsdorf and the Mount Carmel crania
Supraorbital tori are heavy and projecting, continuously connected by a robustly developed glabellar torus, separated from the anterior face of the frontal squama by a well defined supra-orbital sulcus	Same general supraorbital characteristics, also shared with the Mount Carmel crania
The facies cerebialis is transversely small and low, not exhibiting any special relief	The facies cerebialis is large, both in transverse and vertical directions, and shows relief. Gibraltar resembles Zuttiyeh, while the Ehringsdorf and Würm Neandertals resemble Zhoukoudian

McCown and Keith were far from alone in regarding Zuttiyeh as a Tabun-like Neandertal. The morphology of the Zuttiyeh face was similarly explained by workers including Coon (1963) and Suzuki and Takai (1970). Coon suggested that Zuttiyeh could be a descendant of populations similar to those represented at Krapina and Ehringsdorf. Suzuki and Takai, on the other hand, saw features more archaic and more closely resembling Shanidar and Tabun than the "more advanced" Amud. Weidenreich, like Hrdlicka earlier, clearly believed it was more like Skhul 5 than like Tabun. However, this opinion does not contradict the above as much as it might appear because McCown and Keith had written:

As our investigations proceeded we encountered so many characters which linked the Skhul to the Tabun type that we were ultimately obliged to presume that we had before us the remains of a single people.

Although McCown and Keith were the last to examine the entire Mount Carmel sample, their view that its range and pattern of variation was populational was ignored in subsequent publications by others. One consequence of this was that two differing opinions about Zuttiyeh's relationship to the other Levant populations came to summarize various workers posi-

tions. One view was that the specimen is most like the other Levant "Neandertals" (i.e. Tabun and later, Amud), while the other regarded it as most similar to the Levant so-called "modern *Homo sapiens*" (i.e. Skhul). These opinions became more distinct later, as the framework for interpreting the Levant hominids shifted. Largely due to the work of F. C. Howell (1958), suggesting that there were differences in dates, the comparison of the Tabun woman with the Skhul remains came to be regarded as reflecting a difference in evolutionary stage instead of as population variation. With a more distinct boundary recognized between the Neandertals of the Levant and other Levant hominids such as Skhul and Qafzeh, the issue of which group the Zuttiyeh skull more closely resembled became a more serious one. As Tabun came increasingly to be thought of as a European-type Neandertal, without any new discoveries or significant reanalysis, Zuttiyeh was shifted phylogenetically to become a non-Neandertal, which meant, almost by default a unique ancestor of "modern *Homo sapiens*".

Table 3 Comparisons of Zuttiyeh Morphology according to Hublin (1976)

Zuttiyeh is most similar to:				
	Skhul 5	European Neandertal	Broken Hill	Sinanthropus
The cranial height(from bergma to "subcerebral plan")*		×	×	
Curvature of the frontal, high in the middle of the frontal forming a frontal boss				×
Nasion-Bregma			×	
Supraorbital torus			×	×
Orbital height		×		
Malar bone			×	×
Naso-malar angle	×			
Shenoid				×

* subcerebral plane...the plane which is defined by the following three most medial points: on the frontomalar suture, on the parietomastoidal suture, and on the superior surface of the lesser wing of the sphenoid. According to Hublin, this plane was used earlier by Keith instead of Frankfort or Schwalbe planes because of their unapplicability to the Zuttiyeh fragment. This analysis shows the estimated height of the Zuttiyeh skull to be close to the higher part of the modern European range.

The shift in Zuttiyeh's position came as the more accurate assessment of the position of the specimen in the Levant chronology was determined. Eventually there was an absolute date for the "Acheulo-Yabrudian" of 110 to 150,000 (Schwarcz et al., 1980) years old. This showed clearly that Zuttiyeh is older than any of the other Levant crania, although curiously the recognition of greater antiquity did not reinforce the earlier case for its Neandertal status. To the contrary, Zuttiyeh came to be viewed as a potential ancestor for all or some of the other Levant populations and it became increasingly clear that it was relevant to consider how it may have contributed to them.

Hublin (1976) considered this question, and noted that some of the Zuttiyeh features are more archaic than any of the other Levant specimens. He made comparisons with Skhul 5, Gibraltar, Broken Hill, and the *Sinanthropus* skulls (see Table 3), the sample which Weidenreich discussed in his 1943 monograph. He concluded that Zuttiyeh is a transitional form

Table 4 Vandermeersch's (1989) Analysis of Zuttiyeh Showing "Modern" Morphological Features

Features	Modern <i>Homo sapiens</i> condition in Zuttiyeh*
Length of the frontal squama	Long (125mm)
Nasion-bregma chord/arc index	High: 90.4
Lateral thinning of brow-ridge	Exists (cf. Skhul 4, Predmosti 3)
Orientation of the frontal squama	Set vertically
Separation of brow ridge and frontal squama**	By supertoral sulcus
Minimum frontal width	Low(cf. Skhul 5, Predmosti, unlike Neandertals)
Orientation of nasion	Set back very little from the glabella
Nasal notch	Very weak (unlike Neandertals)
Maximum frontal width***	Smaller than Neandertals
Frontal sinus	Differently shaped and thinner than Neandertals
Nasal bones	Flat, and not shaped as Neandertals
Orbits	Rectangular (wider than high)
Zygomatic bone	Robust than Neandertals
Position of zygomatic body	Anteriorly facing unlike Neandertals

* By "Modern *Homo sapiens*" Vandermeersch actually means "non-Neandertal", He does relate these to what he regards as "proto-Cro-Magnons"(Skhul and Qafzeh specimens) and to at least a few of the early post-Neandertal Europeans (Predmost 1 and 3). However, by not comparing to other groups it is unclear whether these *uniquely link* the specimens he compared. Vandermeersch also notes Neandertal-like features in Zuttiyeh such as the large supraorbital torus or robust zygomatic. These features are compared with the Amud 1, Shanidar 1 and 2, and sometimes Tabun 1 in his analysis.

** On the left side of the face there is a classic continuous supraorbital torus. On the right side a healed wound is present, perhaps contributing to the separation of the supraorbital into a superciliary arch and trigone by a shallow supraorbital groove.

*** maximum frontal length in Zuttiyeh is also smaller than "Proto-Cro-Magnons" and "Cro-Magnons", except for Qafzeh 9 and Skhul 5, according to Vandermeersch.

which evolved into the *Homo sapiens* populations of the Levant. It is interesting to note that Hublin's comparisons also show the Zuttiyeh specimen to resemble both Broken Hill and the *Sinanthropus* crania in 4 out of 8 features. These results are hardly expected from either Hublin's conclusion that the specimen is transitional between *Homo erectus* and the Mount Carmel hominids, or from Weidenreich's contention that there are no special resemblances between Zuttiyeh and the Zhoukoudian remains.

While Hublin first regarded Zuttiyeh as an ancestor of both Tabun and Skhul, his subsequent 1983 publication differs in dividing the Mount Carmel remains into two different populations of Neandertal (Tabun) and "modern" (Skhul) types. In this and later publications (1987) he considers Zuttiyeh as ancestral only to the "modern" populations of the Levant. This therefore excludes it from an ancestry for the Levant Neandertals, represented by the Tabun and Amud crania.

Vandermeersch, who expressed a similar position on the affinity of the Zuttiyeh skull (1985; Vandermeersch et al. 1985), has recently expanded the details (see Table 4) supporting the contention that Zuttiyeh should be considered uniquely ancestral to a "modern" lineage, and not ancestral to the Neandertals, the more archaic of the later Levant specimens. How

have both Hublin and Vandermeersch come to this conclusion? In their view, there are two contemporary lineages in the Levant; a line which leads to Skhul and Qafzeh, and another to Amud and Tabun. Since Zuttiyeh, in their minds, shows only a few features resembling the Neandertal line, they reason that Zuttiyeh is therefore ancestral to the other line of "non-Neandertals".

To try and resolve these issues we made a number of observations about the metrics and morphology of the Zuttiyeh face. We found that many of the issues surrounding Zuttiyeh's phylogeny stem from the confusion of grade and clade characteristics. In fact, we believe we can show that the obvious resemblances of Zuttiyeh to the frontofacial portions of the Zhoukoudian specimens are the reflection of a clade relationship which has never been examined systematically. Perhaps this is because Weidenreich was so adamant in denying any special relation existed, but in our opinion Weidenreich's reaction was unjustified and more in response to Hrdlicka's claim that *Sinanthropus* was a Neandertal variant than the result of any systematic analysis of Zuttiyeh on his part.

We focus here on the question of how Zuttiyeh differs from the other Levant crania, and ask if these differences may reflect its ancestry. If our hypothesis is correct, we would expect many, if not most, differences to be in the direction of the Zhoukoudian morphology. Conversely, the lack of clear resemblances to Zhoukoudian in the unique characteristics of Zuttiyeh would disprove the contention of a clade relationship between the earlier east Asians and Zuttiyeh. This would make it less likely that the non-Neandertal features in some of the Levant hominids can be explained by clade rather than grade. We wish to point out that this is not a formal cladistic analysis and we do not feel it is possible to validly ascribe character states to samples so closely related that they may be in the same species. In fact, if we attempted to do so, the clade relations (if any) would by definition be synplesiomorphic, making it impossible to test any hypothesis of ancestry.

In our metric analysis of Zuttiyeh, we examined 77 chord and arc measurements of the specimen and compared these with the corresponding data for the other Levant crania, which included Amud, Tabun and the full samples from Skhul and Qafzeh. The most obvious conclusion from the metric comparisons is an unsurprising one; for the vast majority of linear measurements and indices, Zuttiyeh closely resembles the other Levant crania (especially, Tabun and Qafzeh 3, both females), falling within the range of variation of the Levant sample. Moreover, virtually all of these measurements of the Levant samples themselves overlap, so that at least as far as the parts preserved on the Zuttiyeh fragment are concerned, few details separate the so-called "Levant Neandertals" from the "non-Neandertals".

Only a few metric features were found to separate Zuttiyeh from the other Levant crania, although these do not necessarily distinguish Levant samples from each other. We review all of these in the scatter plots of Figures 1-3. The distinguishing features are all associated with the frontal bone. No metrics of the Zuttiyeh zygomatic, or the middle face, clearly separate the specimen from the other Levant crania.

The unique aspects of frontal bone size can be seen in the comparison of the bone's sagittal length from glabella plotted against maximum frontal breadth (Figure 1). The Zuttiyeh bone is narrower than any other of the Levant crania, and shorter than all but Amud (it is about same length as Skhul 9). The scatter plot shows Zuttiyeh totally within the Zhoukoudian cluster. In terms of absolute size and proportion, then, the Zuttiyeh frontal is unlike the later Levant crania but indistinguishable from the Zhoukoudian remains.

Frontal Bone Size

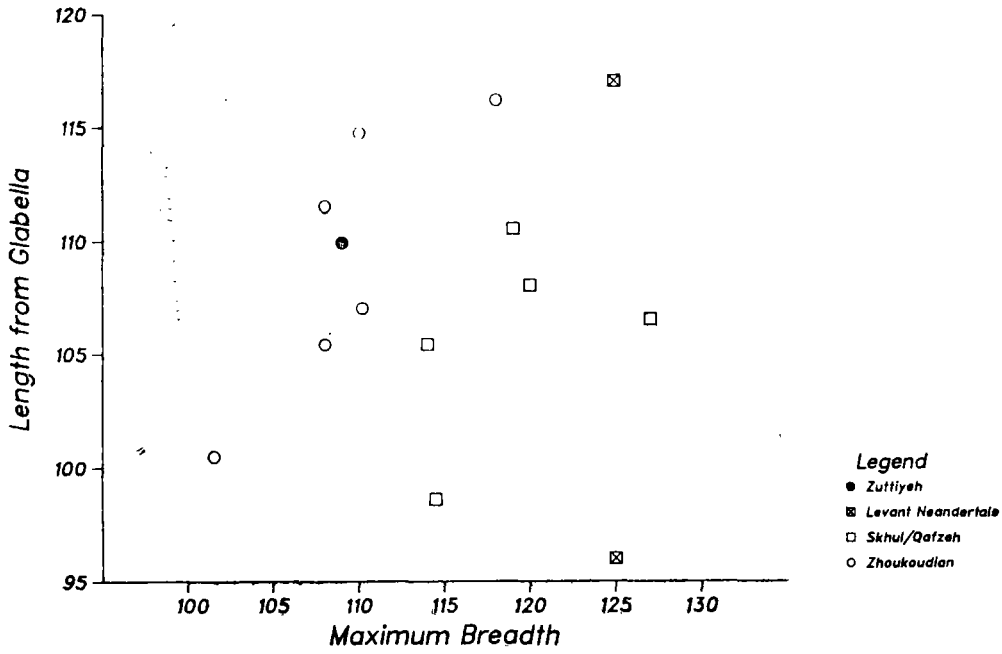


Fig. 1 Frontal Bone Size

Frontal Bone Shape

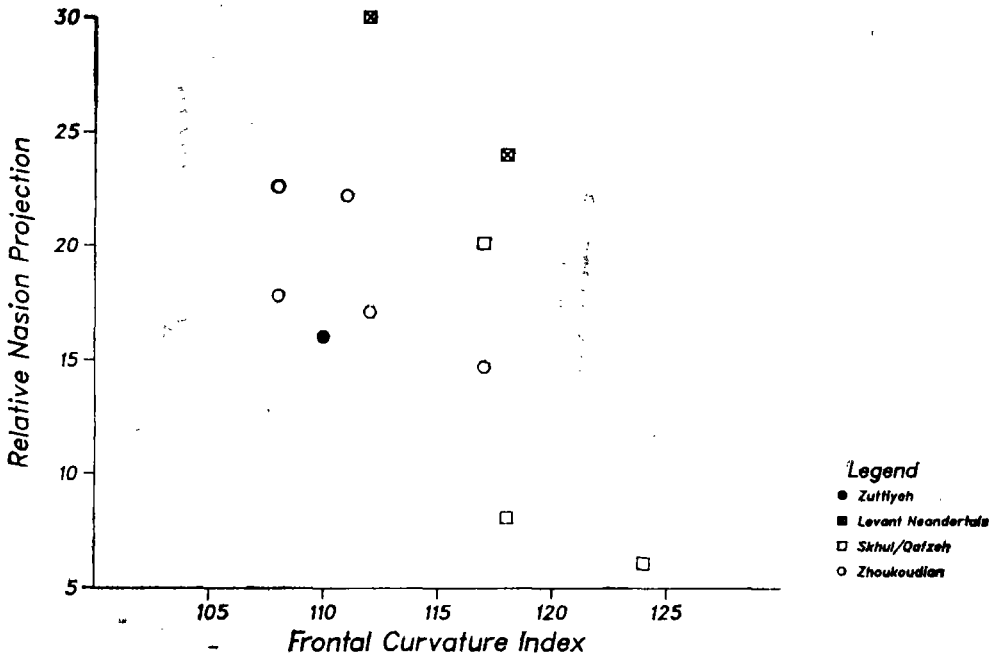


Fig. 2 Frontal Bone Shape

The distinguishing aspects of frontal shape (Figure 2), are found in the frontal curvature (arc/chord) index as calculated from nasion, and the relative projection of nasion anterior to the *bi-fmt* line (the projection is standardized as an index to the nasion-bregma length so it can be compared to the unitless index). These provide measures of the frontal curvature and of the flatness of the upper face. Zuttiyeh has a relatively uncurved (sagittally flattened) frontal squama, very flat as compared with the Levant Neandertals, while its upper face is transversely flat. Taken together, these shape measures fall very close to the Zhoukoudian cluster. We note that upper facial flatness is also not a European Neandertal feature, just as it does not characterize the Levant Neandertals, but the presence of transverse flatness in this region is also not necessarily a marker of "modern humans" since the Zhoukoudian specimens also have flat faces.

Supraorbital dimensions of Zuttiyeh closely resemble those of the other Levant crania in medial and mid-orbital positions, and indeed the Levant hominids cannot be separated into different samples on the basis of these measurements. However, in its most lateral aspect Zuttiyeh is vertically thinner than any specimen except Amud, while its projection anterior to the endocranial surface is greater than all of the Levant crania. It lies between the Levant frontals and the Zhoukoudian sample in the scatter plot showing the relation of these two variables (Figure 3).

Lateral Supraorbital Torus

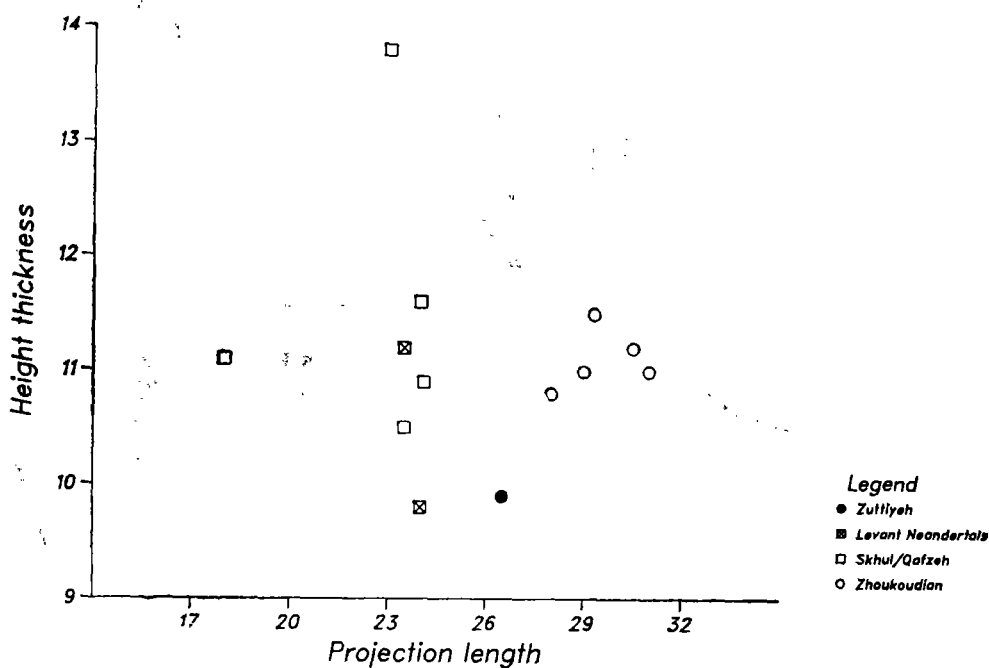


Fig. 3 Lateral Supraorbital Torus

Perhaps the most unexpected result from examining the features in which Zuttiyeh is unique is that these seem to either clearly align the specimen with Zhoukoudian samples, or show Zuttiyeh to be intermediate between these earlier east Asians and the later Levant sam-

ples. To further examine the possibility of a link between Zuttiyeh and the earlier east Asians, we also undertook a series of morphological comparisons (see Table 5). Our conclusion is that the morphological similarities of Zuttiyeh with the Zhoukoudian crania are striking and largely unique. There are obvious similarities in the frontal shape (curvature, as indicated in the metric comparisons, and narrowness of the centrally located boss) although unlike the Zhoukoudian specimens there is no frontal keel, and the squama thickness is generally less. The temporal notch is equally short in an anteroposterior direction, while its internal wall is more vertical in Zuttiyeh. The size, shape, and depth of the well excavated supratatorial sulcus is identical, this identity extends to the transversely flattened supraorbital region. Glabella is not prominent, in fact, from above, the central supraorbital region is slightly depressed at the midline.

Table 5 Levant Distribution of Features Shared by Zuttiyeh and the Zhoukoudian Crania

	Tabun	Amud	Qafzeh	3	5	6	9	Skhul	4	5	9
Frontal Curvature	○	×	—	—	×	—	○	○	○	○	○
Narrow Boss	×	○	○	×	○	○	○	○	○	○	—
Short Temporal Notch	—	○	—	—	×	×	○	○	○	○	—
Supratatorial Sulcus: size and morphology	×	○	○	×	×	○	○	○	×	×	×
Glabella Depression	×	○	×	—	○	—	×	○	○	○	—
Flat Nasal Root	×	○	×	—	○	—	×	○	○	○	—
Nasal Bones Transversely Flat	—	○	○	—	○	—	—	—	—	—	—
Tubercle on Zygomatic Anterior Face	—	×	—	—	×	×	○	○	○	○	—
Anterolateral Orientation of Zygomatic	—	○	—	—	×	×	○	○	○	○	×
Unangled Superior Nasal Bones (vertical orientation)	—	○	×	—	○	—	—	—	—	—	—

×: present; ○: absent; —: part not preserved.

Directly below glabella, the nasal region is extremely flattened, both above and below the frontonasal suture, where the nasal bones are transversely as flattened as ZKT D1 and L1, and even flatter than H3, L2, and L3. The Zuttiyeh and Zhoukoudian nasals are also similar in their lack of a sagittal keel, the flat (undepressed) nasal root, and the vertical orientation of the preserved superior portion of the nasal bones. The zygomatic is somewhat more laterally oriented than in L3, and is more similar to the L2 reconstruction in its anterolateral angulation (for instance as seen from above). The isolated L1 zygomatic, a male, is more robust than Zuttiyeh, where comparable. However, Zuttiyeh is similar to it in the marked development of a tubercle along the inferior third of the anterior face, above the tuberosity for the masseter attachment (which is missing on Zuttiyeh).

On the whole, Zuttiyeh shares many features with comparable portions of the Zhoukoudian crania, most of which are regionally specific to this north Chinese *Homo erectus* sample. We do not mean to imply that Zuttiyeh is a Zhoukoudian-like *Homo erectus*, for there are differences as well as the similarities we mention above. Nevertheless, we find that the contention of a relationship between these is well supported.

Are the features Zuttiyeh shares with the Zhoukoudian remains uniquely regional? To answer this, it is important to know whether these features characterize Middle Pleistocene po-

pulations from other areas. *Our comparisons show that they do not.* For instance, none of the metric distinctions of Zuttiyeh or its specific detailed morphological similarities to the Zhoukoudian remains characterize the Steinheim or Arago 21 females. Nor do they characterize the male vault from Petralona. If these members of the Middle Pleistocene European clade are regarded as an outgroup for comparative purposes, the similarities Zuttiyeh shares with the Zhoukoudian crania are clearly highlighted as being different and thereby unique. Similarly, when we compare Zuttiyeh with African *Homo sapiens* specimens old enough to be ancestral (Broken Hill, Ndutu, and Bodo), we find only a few similarities—none for all three specimens. Of the 11 morphological comparisons that uniquely link Zuttiyeh and the Zhoukoudian sample, no shared features link Ndutu (the only female of the three), one links Bodo and two link Broken Hill. Furthermore, if Ngaloba (Laetoli Hominid 18) and Florisbad were to be considered potential ancestors (they may be too young), three of the features link Zuttiyeh with Florisbad, and only one links it with Ngaloba.

We conclude that Zuttiyeh preserves a number of unique clade features from east Asia, many of which also appear in the later populations of the Levant—both the Neandertals and the so-called “modern *Homo sapiens*” remains. There is no convincing evidence to suggest that Zuttiyeh is uniquely or more closely related to one of these than it is to the other, whatever level of relationship exists between the later Levant populations. Therefore, if we can assume that any of these Levant populations (Neandertals, so-called moderns, or both) are ancestral to living people, the significant elements of earlier east Asian ancestry in the Late Pleistocene populations of the Levant demonstrates that no African populations can be the unique ancestor of all modern populations.

It would appear that at least some Levantine features regarded as “modern” are actually non-Neandertal, in many cases because they are east Asian. It is this potential for confusing a grade with a clade explanation that in our opinion underlies the lack of earlier agreement about the relations of Zuttiyeh. The east Asian features in Zuttiyeh, combined with what we regard as the east Asian relations of the (probably) earlier Narmada vault from India (De Lumley and Sonakia 1985), suggest a more Pan-Asian distribution of regional features than is normally recognized. We think that the links between Zuttiyeh and the east Asian hominids reflect what probably were broad and ancient connections between the peoples of western Asia and many populations just to the east. It is this set of east Asian features that provides the genesis of at least some of the non-Neandertal characteristics in the Levant populations, but non-Neandertal is not necessarily modern. And unless one believes that all modern human populations have a unique recent origin in Asia, it is clear that region as well as grade could profitably be included as a valid source of Pleistocene human variation.

Acknowledgements

This paper was prepared for the International Symposium on Palaeoanthropology In Commemoration of the 60th Anniversary of the Discovery of the First Skull of Peking Man, held in Beijing (October 19 through 24, 1989). We would like to thank Professor Wu Xinzhi for inviting us to present this paper. We also would like to extend our deepest appreciation to Professors Wu Rukang, Li Zhuangwei and Zhang Yinyun and many other Chinese colleagues who made the stay at the symposium memorable and pleasant with their great hospitality. Tal Simmons, A. B. Falsetti, and Fred H. Smith graciously made available their unpublished ma-

terial on Zuttiyeh, and Geoffrey Pope provided many useful comments for the first draft of this paper. We also thank the following individuals who made the original specimens available for our study: J. Zias of the Rockefeller Institute, C. B. Stringer of the British Museum (Natural History), Y. Rak of the University of Tel Aviv, W. W. Howells of the Peabody Museum, Harvard University, V. Vandermeersch of the Universite de Bordeaux, and J-L. Heim of the Institute de Paleontologie Humaine.

(Received April 3, 1990)

References

- Bar-Yosef, O., 1988. The date of South-West Asian Neandertals. Ed. M. Otte. In: *L'Homme de Neandertal*, Vol. 3: L'Anatomie. Liege: *Etudes et Recherches Archeologiques de l'Universite de Liege*, 30: 31—38.
- Bar-Yosef, O., 1989. Geochronology of the Levantine Middle Paleolithic. Eds. P. Mellars and C. Stringer. In: *The Human Revolution: Behavioral and Biological Perspectives on the Origins of Modern Humans*. 589—610. Edinburgh University Press, Edinburgh.
- Brauer, G., 1989. The evolution of modern humans: a comparison of the African and non-African evidence. Eds. P. Mellars and C. Stringer. In: *The Human Revolution: Behavioral and Biological Perspectives on the Origins of Modern Humans*. 123—154. Edinburgh University Press, Edinburgh.
- Coon, C., 1963. *The Origin of Races*. Altred A. Knopf, Inc., New York.
- Gisis, I. and O. Bar-Yosef, 1974. New excavation in Zuttiyeh Cave, Wadi Amud, Israel., *Paleorient*, 2: 175—180.
- Howell, F. C., 1958. Upper Pleistocene men of the Southwest Asian Mousterian. Ed. G. H. R. von Koenigswald. In: *Hundert Jahre Neanderthal*. 185—198. Kemink en zoon, Utrecht.
- Hrdlicka, A., 1930. The skeletal remains of early man. *Smithsonian Institution Annual Report for 1928*. 593—623.
- Hublin, J. J., 1976. L'homme de Galilee, Unpub. Memoire de D. E. A. de Paleontologie, Universite de Paris VI.
- Hublin, J. J., 1983. Les origines de l'homme de type moderne en Europe. *Pour la Science*, (62): 62—71.
- Hublin, J. J., 1987. Qui fut l'Ancestre de l'*Homo sapiens*? *Pour la Science*, (113): 26—35.
- Keith, A., 1927. A report of the Galilee skull. Ed. F. Turville-Petre. In: *Researches in Prehistoric Galilee*, 1925—1926. 593—623. Council of the British School of Archaeology in Jerusalem, London.
- Keith, A., 1931. *New Discoveries Relating to the Antiquity of Man*. Williams and Norgate, London.
- Lumley, de. M. A. and A. Sonakia, 1985. Premiere decouverte d'un *Homo erectus* sur le Continent indien, a Hathnora, dans le Moyenne Vallee de la Narmada. *L'Anthropologie*, 89(1): 13—61.
- McCown, T. D. and A. Keith, 1939. *The Stone Age of Mount Carmel: The Human Remains from the Levallois-Mousterian. Vol. II*. The Clarendon Press, Oxford.
- Rak, Y., 1986. The Neanderthal: a new look at an old face. *J. Hum. Evol.* 15(3): 151—164.
- Schwartz, H., P. Goldberg and B. Blackwell, 1980. Uranium series dating of archaeological sites in Israel. *J. Earth Sciences*, 29: 157—165.
- Suzuki, H. and F. Takai Eds., 1970. *The Amud Man and his Cave Site*. University of Tokyo Press, Tokyo.
- Turville-Petre, F. Ed. 1927. *Researches in Prehistoric Galilee*, 1925—1926. Council of the British School of Archaeology in Jerusalem, London.
- Vandermeersch, B., 1985. The origins of the Neandertals. Ed. E. Delson. In: *Ancestors: The Hard Evidence*. 306—309. Alan R. Liss Inc, New York.
- Vandermeersch, B., 1989. The evolution of Modern Humans: Recent Evidence from Southwest Asia. Eds. P. Mellars and C. Stringer. In: *The Human Revolution*. 155—164. Edinburgh University Press, Edinburgh.
- Vandermeersch, B. and B. Arensburg, 1985. Les Hommes du Paleolithique. *Dossiers de l'archeologie*, 100: 38—49.
- Weidenreich, F., 1943. The skull of *Sinanthropus Pekinensis*: a comparative study of a primitive hominid skull. *Paleontologia Sinica* (n. s. D) 10 (whole series 127).