Chapter 9

The Peştera cu Oase and Early Modern Humans in Southeastern Europe

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Abstract. *Even though it has been considered the region through which early modern humans dispersed into Europe, southeastern Europe until recently yielded only fragmentary and/or poorly dated human fossils of late Neandertals and early modern humans. Neandertal fossils are still scarce and uninformative, but the direct dating of the Cioclovina and Muierii remains to the late Aurignacian and the discovery of ca. 35,000 BP cephalic remains at the Peştera cu Oase are beginning to shed light on the earliest modern humans in the region. Given the current dearth of early modern human fossils securely >28,000 BP elsewhere in Europe (the Mladeč sample and several immature mandibles, plus isolated teeth and jaw fragments), the Peştera cu Oase remains, in particular, indicate that although these earliest "modern" humans in Europe exhibit a suite of features considered skeletally diagnostic of recent humans, they also retain features that are rare or absent among later humans. Whether these archaic features indicate Neandertal affinities or phylogenetic retentions from other archaic humans, they are sufficient to indicate that the earliest modern Europeans were less "modern" than the title implies. They should help to qualify this morphological rubicon and permit a more dynamic view of Late Pleistocene human populations.*

Introduction

Scenarios of the peopling of Europe by early modern humans during oxygen isotope stage 3 have tended to implicitly or explicitly assume that their populations dispersed into southeastern Europe from Anatolia, ultimately from northeastern Africa via southwestern Asia, and then via the Danubian corridor or its adjacent ecozones into the central European plains. The route has appeared logical given both the inference of an African, or at least a southwest Asian, origin for those early modern human populations and the apparently early presence of anatomically modern humans in the hills north (Mladeč and Koněprusy-Zlatý kůn), south (Velika Pećina) and west (Vogelherd) of the Danubian Basin in central Europe. It has been further supported by models that have seen the Aurignacian technocomplex as deriving in southwestern Asia and spreading across Europe associated with, and hence a hallmark of, early modern humans.

These human populational scenarios have existed in the absence of secure paleontological data for the presence of early modern humans in southeastern Europe (or Anatolia, for that matter) during the critical period between maximally 40,000 and 30,000 years BP. Until recently, the presence and biological nature of these southeastern European early modern humans have remained largely hypothetical, based on paleogeography and unsubstantiated assumptions of associations between archeological complexes and human biology, accompanied by a few poorly dated and/or undiagnostic human remains. However, the 2002, 2003 and 2004 discoveries of early modern human remains in a paleontological (non-archeological) context in the Peştera cu Oase (Cave with Bones), Caraş-Severin, southwestern Romania, have provided a window, albeit narrow, on the biology of these earliest modern humans in Europe.[1] This has been accompanied by the recent direct dating of two later early modern humans from Romania, those from Peştera Cioclovina and Peştera Muierii.

Late Neandertals and Early Modern Humans in Southeastern Europe

The human fossil record in the region of concern, principally from the countries of Greece, Bulgaria and Romania, has been scattered and poorly dated, and as a result it has provided little insight into either late Neandertals or the earliest modern humans. Purported Neandertal remains have consisted of Mousterian-associated pedal and manual phalanges from Peştera Bordu Mare (Ohaba-Ponor) in Romania (Gaál 1928, 1943; Păunescu 2001), a Mousterian phalanx from the Peştera Livadilţa in Romania (Terzea 1977), an earlier Upper Paleolithic deciduous molar and mandibular fragment from level 11 of Bacho Kiro in Bulgaria (Gleń and Kaczanowski 1982), and an initial Upper Paleolithic lower molar from Lakonis in Greece (Harvati et al. 2003).

The ages of the Bordu Mare and Livadilţa phalanges are unclear, other than being Mousterian associated and probably beyond radiocarbon determination (Cârciumaru 1999; Păunescu 1988, 2001). Their morphological patterns need to be reassessed (Cârciumaru 1999; Păunescu 2001) and may not be diagnostic. The Bacho Kiro level 11 fragment may date to ca. 38 ka BP or be more recent in time (Churchill and Smith 2000); the deciduous tooth is undiagnostic in dimensions or in the presented morphology, but it does lack the taurodontism found in some, but not all, Neandertal deciduous molars (Gleń and Kaczanowski 1982; see discussion in Churchill and Smith 2000). The Lakonis fossil is associated with an initial Upper Paleolithic assemblage dated to ca. 38 ka BP, and it is aligned with the Neandertals on the basis of occlusal morphology (Harvati et al. 2003). Its principal feature, the presence of a mid-trigonid ridge, strongly supports but does not confirm its Neandertal affinities (Bailey 2002). More complete and well-dated material is clearly needed to establish the morphology and geological age distribution of the Neandertals in southeastern Europe.

The sample of early modern humans from the region have consisted of specimens from three sites, a neurocranium from Peştera Cioclovina in Romania (Rainer and Simionescu 1942), skull and postcranial pieces from the Peştera Muierii (Baia de Fier) also in Romania (Gheorghiu et al. 1954; Haas, 1957), and isolated teeth with skull fragments from levels 6/7 of Bacho Kiro (Gleń and Kaczanowski 1982). The first specimen, formerly considered of uncertain antiquity despite the purported association with a few Aurignacian artifacts (Nicolăescu-Plopşor 1968; Cârciumaru 1999; Churchill and Smith 2000), has been directly dated to 29,000 ± 700 (LuA-5229) (Păunescu 2001). It is a robust, probably male cranium with morphological affinities to central European earlier Upper Paleolithic male specimens from sites such as Mladeč, Dolní Věstonice, Pavlov and Předmostí (Rainer and Simionescu 1942; Nicolăescu-Plopşor 1968; Churchill and Smith 2000). The Peştera Muierii specimens, from a slope deposit adjacent to Mousterian levels, consist of a female and largely modern cranium with suggestions of archaic features, a lateral mandibular piece, and sections of a scapula and a tibia (Nicolăescu-Plopşor 1968). Although considered of uncertain age stratigraphically and associated with a largely undiagnostic lithic industry (Necrasov and Cristescu 1965; Cârciumaru 1999), the mandible has yielded a direct AMS date of 30,150 ± 800 BP (LuA-5228) (Păunescu 2001), making it contemporaneous with later Aurignacian assemblages. The Bacho Kiro remains, which should date to ca. 32 ka BP (Mook 1982), consist of a skull piece, mandibular fragments and teeth (Gleń and Kaczanowski 1982). All of these Bacho Kiro human remains fit comfortably within European early modern human ranges of variation (Churchill and Smith 2000), despite comments in their original description (Gleń and Kaczanowski 1982) of Neandertal affinities.

To these relatively late early modern human fossils are added the human remains discovered in the Peştera cu Oase (Trinkaus et al. 2003*a*, 2003*b*; Moldovan et al. 2003). These remains (see below) consist of a complete mandible with five molars discovered in 2002 (Oase 1), an upper facial skeleton with six molars, associated neurocranial vault bones, and a complete temporal bone (Oase 2) found in 2003, and an occipital bone plus additional vault pieces of Oase 2 excavated in 2004. The first of these Oase remains has provided direct radiocarbon dates placing them ca. 35 ka BP, making it the oldest directly dated and clearly diagnostic early modern human fossil within Europe.

The Earliest Modern Humans in Europe

The assessment of the southeastern European early modern human fossils, principally from the Peştera cu Oase, needs, therefore, to be made in the broader context of early modern humans further west in Europe (for a discussion of late European Neandertals, see Hublin and Bailey this volume). However, the past half decade has witnessed a considerable cleansing of the European early modern human fossil record, as AMS radiocarbon dating has been applied increasingly to human remains (or clearly associated burial artifacts) purportedly greater than 28,000 years old. As a result of these analyses, the remains from Velika Pećina (formerly ca. 34 ka BP), Hahnöfersand (formerly ca. 36 ka BP), Zlatý kůn (Koněprusy) (formerly "Szeletian") and Vogelherd (formerly ca. 32 ka BP) have been shown to be Late Upper Paleolithic or Holocene in age (Smith et al. 1999; Terberger et al. 2001; Svoboda et al. 2002; Conard et al. 2004) and the Cro-Magnon and La Rochette remains (formerly "Aurignacian") are now dated to the Gravettian (Henry-Gambier 2002; Orschiedt 2002).

Probable early modern human remains in central and western Europe prior to the Gravettian, or older than ca. 28,000 years BP, are isolated teeth from a variety of sites (e.g., Leroi-Gourhan 1958; Formicola 1989; Garralda 1989; Gambier et al. 1990; Gambier 1992; Henry-Gambier et al. 2004), the undated but most likely later Aurignacian immature mandible and isolated teeth from Les Rois-à-Mouthiers (Vallois 1958), the probably

Aurignacian immature mandible from La Quina stratigraphically associated with a date of ca. 32 ka BP (Dujardin 2003), the now lost and probably early modern immature remains from the Aurignacian of El Castillo (Garralda et al. 1992), the purportedly but questionably associated Aurignacian remains from Fontana Nuova, Cova Foradada and Finocchieto (Segre and Ascenzi 1956; Chilardi et al. 1996; Arsuaga et al. 2001), the late Aurignacian but undated immature mandible from Miesslingtal (Szombathy 1950), and the directly dated (to ca. 31 ka BP but probably older; see Stringer 1990) and fragmentary and possibly undiagnostic (Keith 1927) maxilla from Kent's Cavern. In addition, efforts to directly radiocarbon date the substantial cranial, dental and postcranial sample from Szombathy's excavations at Mladeč (Wild et al. 2005) indicate that the human remains from that chamber of the karstic system are ca. 31 ka BP in age, rather than mid-30,000 year BP ages previously proposed (e.g., Svoboda et al. 2002); the human remains from other chambers within the Mladeč karstic system remain of uncertain age until directly dated, which appears unlikely given the low collagen preservation in Mladeč 5 (M. Oliva, personal communication 1996) and the destruction of Mladeč 6 and other remains in 1945.

Consequently, it is apparent from these redatings and reconsiderations of early modern humans in Europe, building on the earlier reassessments of Churchill and Smith (2000), that the sample of diagnostic early modern human remains principally post-date ca. 32 ka BP. Among these remains, only the Mladeč sample, plus the more recent remains from Cioclovina and Muierii, are securely dated and provide significant morphological information. Only the Peştera cu Oase remains provide older evidence for "modern" humans in Europe. These last fossils, although bracketed in their region of southeastern Europe by very incomplete, probably Neandertal, remains and later early modern human fossils, assume by default a pivotal role in our understanding of the earliest modern Europeans, not just in the lower Danubian region but across Europe.

The Peştera cu Oase

The karstic chamber in the Banat region of southwestern Romania, known as the Peştera cu Oase (Cave with Bones), was discovered in 2002 during speleological documentation by members of the Pro Acva Grup. Associated on the surface with abundant remains of formerly hibernating *Ursus spelaeus*, as well as at least *Capra ibex*, *Canis lupus* and *Megaloceros giganteus*, the largely complete Oase 1 mandible was AMS radiocarbon dated to >35,200 (OxA-11711) and 34,290 +970-870 (GrA-22810) to provide a combined age of 34,950, +990, -890 BP (Trinkaus et al. 2003*a*). Subsequently detailed mapping of the Peştera cu Oase in 2003 yielded an exceptionally well-preserved splanchnocranium of an adolescent (Oase 2), associated parietal bones, and an almost complete temporal bone (Trinkaus et al. 2003*b*); although the temporal bone was originally identified as a separate individual ("Oase 3"), additional finds and work have shown that the temporal bone derives from the same cranium as the Oase 2 facial and parietal bones. All of the human cranial pieces discovered in the vicinity of the Oase 2 cranium either have been attached to it (fig. 1) or are likely to do so.

An initial attempt to date directly the Oase 2 parietal bones yielded no collagen, and a second attempt yielded insufficient organic material to permit complete decontamination of the sample (J. van der Plicht, personal communication 2004). However, as detailed in Trinkaus et al. (2003*b*) and discussed below, shared morphological attributes between Oase

Fig. 1. *Preliminary reassembly of the major cranial pieces of Oase 2 as of 2004, in lateral view. The three major sections, facial, temporo-occipital and neurocranial vault, are merely placed together, hence the small gaps along the supraorbital region and the squamous suture. It is expected that additional pieces will be added to the cranium, and that minor adjustments to the assembly will be made in the process.*

1 and 2, as well as the minimum age provided by the second attempt to date the Oase 2 parietal bones, provide confidence that these remains are penecontemporaneous.

Fieldwork in the Peştera cu Oase in 2004 involved systematic excavation in the vicinity of the Oase 2 discovery (fig. 2). Although analysis is in progress and further fieldwork is planned for 2005, a few preliminary observations are possible.

The surface bones are overwhelmingly those of *U. spelaeus* juveniles and adults but include rare remains of at least *C. ibex*, *M. giganteus* and *H. sapiens*. They were accumulated and rearranged hydraulically within the narrow side gallery of the Peştera cu Oase (the Panta Strămoşilor). The transport of the bones appears to have been during oxygen isotope stage 3, as a result of Late Pleistocene water flowing through the cave system, given a preliminary uranium-series age on an overlying stalagmite of ≥ 20 ka BP. The surface bones pro-

Fig. 2. View looking uphill in the Panta Strămoşilor along the surficial bone bed, July 12, 2004. M. Gherase is seated at the top of the gallery. The N32 square at the bottom has been excavated through levels 1 and 2. The white arrow points to the approximate position of the human cranial remains discovered in 2003 in square O34. All human finds in 2004 came from square O34 and the natural depression in square O33.

duced an almost complete "pavement" of bone within the upper portion of the Panta Strămoşilor (fig. 2), which extended for 5–10 cm below the surface (Level 1). The bones, although appearing as a disarticulated hydraulic jumble (hardly any bones were in anatomical connection), are generally excellently preserved with frequent preservation of fragile margins, thin cortical bone overlying trabecular bone, and thin plate-like portions of bones. There is little evidence of geological abrasion, rare evidence of carnivore gnawing, and no rodent damage to the bones. Significant abrasion and occasional gnawing/puncture marks are present principally on the bone in the deeper Level 2.

The human remains were found either at the head of the sloping Panta Strămoşilor (Oase 1 – in the Sala Mandibulei) or on the side of the Panta Strămoşilor (Oase 2) (fig. 2). Although the human remains are broken in places with minor degeneration of the broken edges, the Oase 1 and 2 alveoli are extraordinarily well preserved, and fragile portions such as the Oase 1 coronoid processes and the Oase 2 internal nasal and sphenoid areas, zygomatic process and squamous suture are exceptionally intact for bones mixed in a faunal jumble (figs. 3, 4 and 5). Broken pieces of the Oase 2 parietal bones and a section of the inferior nuchal plane

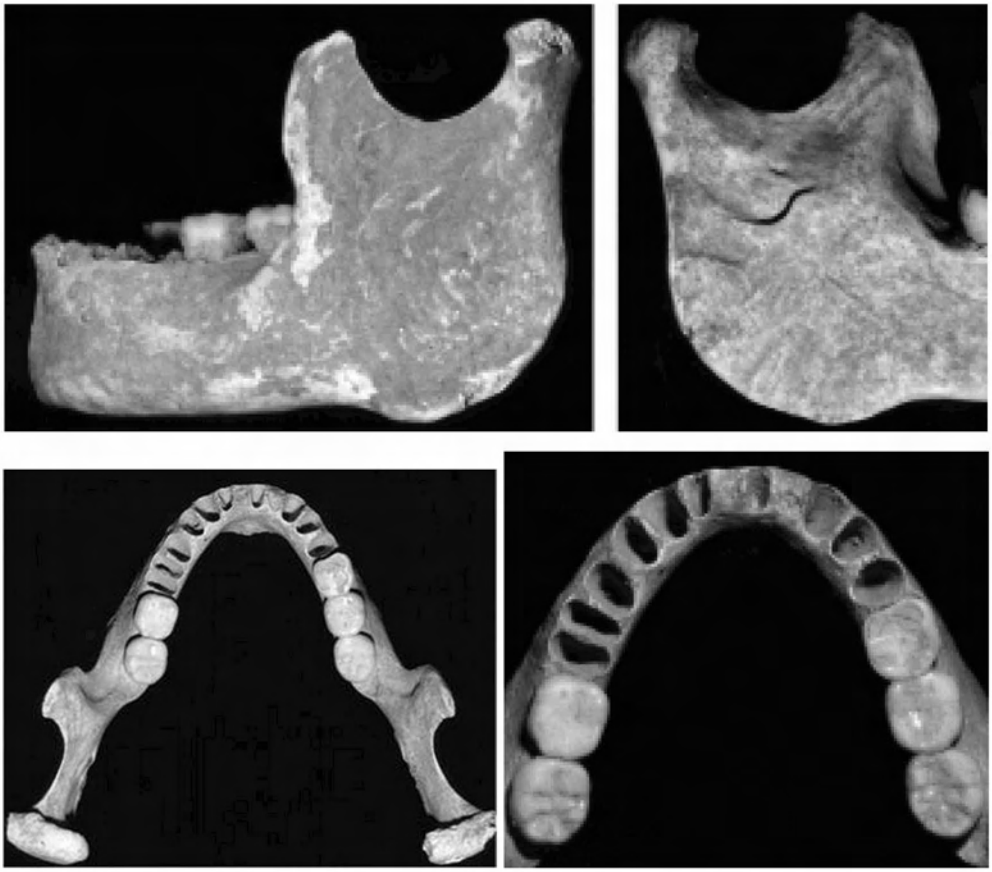


Fig. 3. *Views of the Oase 1 mandible. Upper left: left lateral; upper right: medial left ramus; lower left: superior; lower right: occlusal dental arcade.*

of the occipital bone were found in 2003, and additional neurocranial elements including frontal squamous, parietal pieces, a partial temporal bone, and occipital nuchal and squamous portions were discovered during excavation in 2004, as well as the formerly absent posterior right ramus of Oase 1. Most of these neurocranial elements were within one meter of the Oase 2 facial skeleton. Only a posteroinferior portion of the left parietal bone has been found so far further upslope in the Panta Strămoşilor, but systematic excavation has not yet reached the area more than half a meter upslope from the facial skeleton. Moreover, most of the human cranial elements were found on or close to the surface or in an erosional depression slightly downslope of the Oase 2 face and temporal bone. Several vault pieces were found under cave bear crania, and one was discovered in sediment ca. 10 cm within the nasal cavity of an *U. spelaeus* cranium. It is therefore apparent that the faunal and human remains were geologically mixed on and near the surface deposits after breakage of the human cranium,

Fig. 4. Anterior view of the Oase 2 facial skeleton.

but that small pieces of human skull principally remained in close proximity to the larger pieces from which they derived.

Furthermore, CT analysis of the Oase 2 left temporal bone revealed that the auditory ossicles have remained largely in anatomical position within the temporal bone (fig. 8), indicating some degree of mummification of the associated connective tissue, sufficient to maintain these small bones in position until sediment filled the bone. This observation, combined with the unusual preservation of fragile skeletal portions, suggests a complex process of partial decomposition with some mummification, disarticulation, and geological displacement of the human, bear and other mammalian skeletal elements within the cave system. The external sources of the non-ursid bones remain unclear, given karstic evolution of the cave and collapses of original external entrances to the galleries.

THE PEŞTERA CU OASE HUMAN REMAINS

As the only European "modern" human remains securely dated to >32 ka BP, the Oase human fossils remains provide a rare window on the morphology of these earliest modern Europeans.

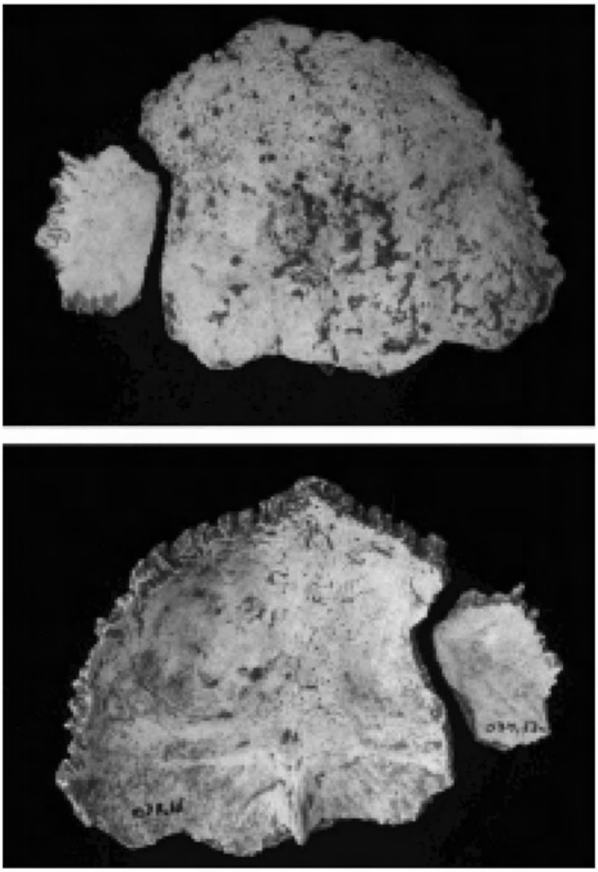


Fig. 5. Internal and external view of the Oase 2 occipital bone found in 2004. The larger piece (O33.16) came from the natural depression in square O33; the lateral portion (O34.62a) derived from the nasal cavity of an adult female Ursus spelaeus *cranium (O34.62b) on the surface of square O34. The pieces join and fit the preserved lambdoid suture of the parietal bones (fig. 1).*

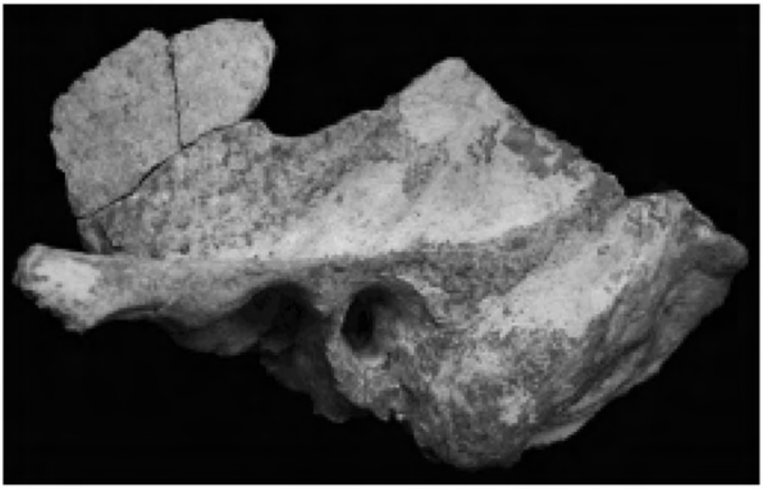
The Oase 1 mandible (fig. 3) is a relatively large and moderately robust mandible with a suite of features that distinguish it, at least in a European context, from late archaic humans and align it morphologically with more recent modern humans (Trinkaus et al. 2003*a*). These characteristics include a distinct but moderately projecting mentum osseum, a mesially placed mental foramen, a moderately thin lateral mandibular corpus, the absence of a retromolar space, a low coronoid process with a symmetrical mandibular notch, and a medially placed mandibular condyle. At the same time, its symphysis is vertically oriented such that its anterior and cross-sectional symphyseal angles place it in the narrow overlap zone between late archaic and early modern humans. Its left mandibular foramen exhibits lingular bridging, a Neandertal lineage feature (Lebel and Trinkaus 2002; Crevecoeur and Trinkaus 2004), even though the right one lacks that feature. The rami are unusually wide, being most similar to those of the similarly aged northeast African Nazlet Khater 2 mandible (Thoma 1984; Crevecoeur and Trinkaus 2004). The anterior teeth were lost postmortem, but the preserved molars are large and become progressively larger as they go distally. The "areas" (length x breadth) of the M_2s and M_3s are larger than any known for the Late Pleistocene,

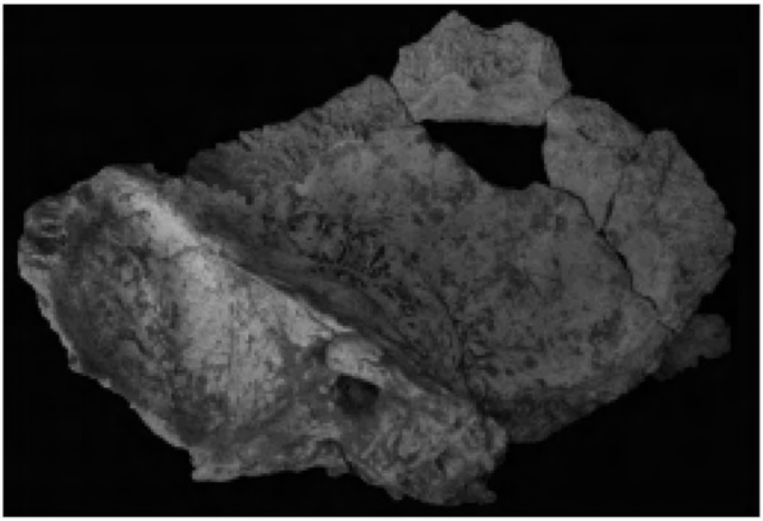
Fig. 6. *Inferior* ***(left)*** *and lateral* ***(upper right, opposite)*** *and medial* ***(lower right, opposite)*** *views of the Oase 2 temporal bone, prior to it being joined to adjacent bones. Note that the middle portion of the squamous suture was absent when the lateral view was taken, but it was subsequently identified and is present in the medial view. All of the superior margin is the original squamous sutural margin.*

and the "area" of the M_3s is matched only by those of a couple of pre-400 ka BP Middle and Early Pleistocene *H. erectus* specimens.

The Oase 2 facial skeleton (Trinkaus et al. 2003*b*) is that of a large, robust, early modern human (figs. 1 and 4). The superciliary arches, although large for an adolescent, have the morphology seen in more recent Upper Paleolithic (and some recent human) males such as Cioclovina 1, Cro-Magnon 3, Dolní Věstonice 16, Pavlov 1 and Předmostí 3. There is a pronounced glabellar region, slight supraglabellar sulcus, sharp orbital margin, flat lateral trigone, and hence no evidence of a supraorbital torus. The canine fossae are pronounced, forming distinct hollows lateral of the nasal aperture. The anterior zygomatic arches are pronounced, laterally flaring, anteriorly positioned, and would fit well with the wide rami of the Oase 1 mandible.

The inferior nasal aperture lacks the angulation of the sill and the depressed nasal floor of the Neandertals. The inferior margin has separate lateral crests with joined turbinal and spinal crests, the pattern absent from later Neandertals and variably present in African *Homo* and western Eurasian early modern humans (Franciscus 2003). The nasal aperture breadth is modest, falling in the middle of a Gravettian human sample, and separate from the Middle Paleolithic archaic and early modern human samples. The interorbital breadth is among the largest of the Late Pleistocene values, but it is matched by several Middle Paleolithic and earlier Upper Paleolithic specimens (including Muierii 1 and Mladeč 2). It is principally the combination of a narrow nasal breadth and a broad interorbital breadth that is striking in the





context of its Middle Paleolithic predecessors, but the combination is also found in the more recent Mladeč 2, Muierii 1 and Předmostí 9 crania.

The palate and remaining six molars indicate a large dentition, although none of the anterior teeth have been recovered (fig. 7). The first and second molar crown breadths are at or slightly more than two standard deviations above the means of Late Pleistocene Neandertal and early modern human samples. The size of the third molars, however, is exceptional, as is that of the Oase 1 third molars. The Oase 2 breadths are between three and four standard deviations from Neandertal and Gravettian samples, and completely separate from the three modest third molars from Mladeč and Les Rois. The resultant crown "areas" place them completely outside of Late Pleistocene human ranges of variation, as well as those of Middle and Early Pleistocene *Homo*. They match an *Australopithecus afarensis* mean (Wood 1991).

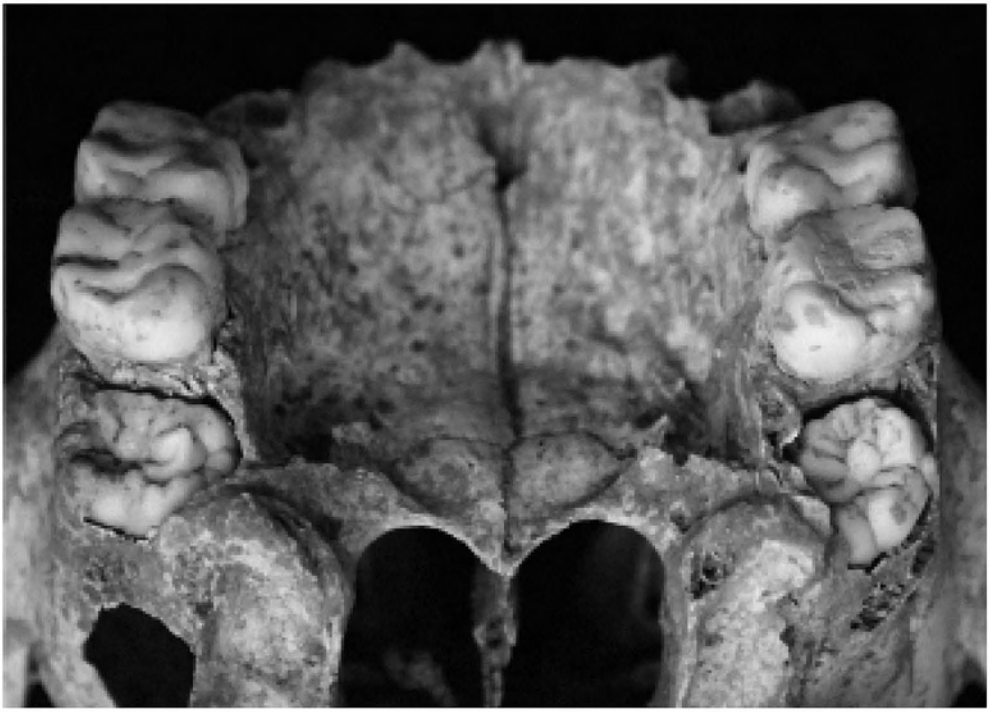


***Fig.** 7. Posteroinferior view of the Oase 2 palate and maxillary molars, showing the occlusal complexity of the M^3s.*

In addition, the unworn third molars exhibit extremely complex occlusal surfaces. Each one possesses no less than eleven independent 'cusp' tips, making it a challenge to identify individual cusps. Several of the cusps are identifiable only as general areas within which there are additional features, and in places it is difficult to determine whether the relief indicates cusps or elements of the cingulum. Similar teeth are exceptional among late archaic and early modern humans, and they occur rarely among recent humans. An isolated Middle Paleolithic molar crown from Obi-Rakhmat in central Asia (Krivoshapin et al. 2004) approaches the Oase morphology, as do the late Gravettian Pataud 1 third molars (Legoux 1975) and an isolated Middle Pleistocene molar from Arago.

The Oase 2 parietal bones are indistinguishable from those of recent humans, with an apparently high and rounded vault and prominent but rounded parietal bosses (Trinkaus et al. 2003*b*). There is no indication of a Neandertal "forme-en-bombe" to the neurocranium in norma occipitalis, and this is reinforced by its bulbous mastoid processes. A metric assessment of the mid-sagittal curvature, using the bregma-lambda arc and chord, shows a continuum of proportions from Neandertals to Gravettian specimens, with most of the more recent specimens having longer arcs. The Oase 2 mid-sagittal arc falls in the overlap zone.

The additional neurocranial vault pieces from 2004 include the mid-sagittal frontal squamous from the internal frontal crest to the coronal suture and the missing anteromedial corner of the right parietal bone. These anterior vault pieces provide a continuous midline connection between the superciliary region and the parietal bones, extending laterally beyond stephanion on the right side. The largely complete occipital squamous found in 2004 (figs. 1 and 5) joins to a piece of the nuchal plane with opisthion found in 2003 to form a continuous midline arc for the bone with only an 11-mm gap in the middle of the nuchal plane. As a result, Oase 2 retains an essentially complete mid-sagittal contour from the palate around to the posterior foramen magnum (fig. 1). Only the anterior foramen magnum with the basioccipital is absent from the mid-sagittal plane. Metric comparisons are not yet available, but the preserved portions suggest modest sagittal flattening of the frontal squamous, combined with well-developed curvature of the parietal and occipital bones.

The Oase 2 occipital bone has little relief in the region of the superior nuchal line, no nuchal torus, no external occipital protuberance, and no depressed area (suprainiac fossa) above inion. The occipital plane shows two very modestly prominent areas suggesting multiple supreme nuchal lines. There is little relief in the area of the semispinalis capitis fossae. The bone does present a distinct occipital bun, but it most closely approaches the "hemibuns" found in a number of more recent Upper Paleolithic specimens in Europe (Smith 1984; Franciscus and Vlček 2005).

The Oase 2 temporal bone (fig. 6) exhibits a suite of features that separate it from the Neandertals. The most prominent of these early modern human aspects are the horizontal plane of the zygomatic process above the auditory porous, the anteroinferiorly oriented auditory porous, and the rounded and bulbous mastoid process. However, the squamous suture is long and moderately low, a pattern rare among recent humans but characteristic of most archaic humans. In addition, there is a prominent juxtamastoid eminence, extending almost as far as the mastoid process tip and projecting posteroinferiorly from the mastoid process. This is an archaic feature that is nonetheless found in some more recent Upper Paleolithic modern humans (Trinkaus 2002).

Internally, the semi-circular canals (fig. 8) fall within the ranges of variation of early and recent modern humans. In particular, the relatively high position of the posterior canal relative to the lateral canal places it among modern humans and distinguishes it from most, but not all, of the Neandertal specimens (Ponce de León and Zollikofer 1999; Spoor et al. 2003).

Implications of the Peştera cu Oase Human Remains

These aspects of the Peştera cu Oase human remains present a mosaic with respect to the common dichotomy between "archaic/Neandertal" and "modern" human morphological configurations within the northwestern Old World. The Oase fossils exhibit a suite of characteristics that align the sample predominantly with recent humans. These features include a projecting mentum osseum (a chin), a gracile mandibular corpus, a modest supraorbital region (no supraorbital torus), anteriorly placed zygomatic arches, deep canine fossae, a moderately long bregma-lambda arc, no occipital torus, the absence of a suprainiac fossa, a superior zygomatic root position on the temporal bone, the auditory porous shape and orientation, and the semi-circular canal configuration.

Yet, these remains also have aspects that appear "archaic" with respect to both Upper Paleolithic and recent "modern" humans. Among these features are the mandibular foramen bridging (albeit unilaterally present), the wide mandibular ramus (although it is present in at

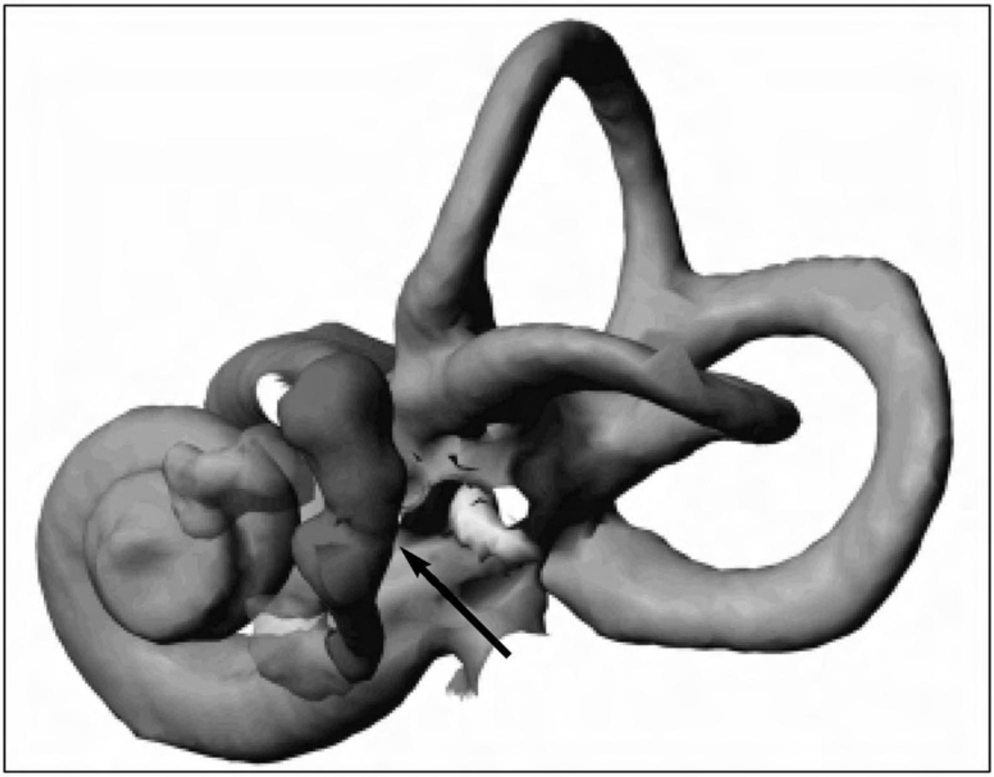


Fig. 8. *Computer reconstruction of the cochlea (left) and semicircular canal labyrinth (right) of the Oase 2 left temporal bone, with the malleus (indicated by arrow) in its anatomical position.*

least one north African early modern human), the large dental arcades, the large mandibular third molars and the exceptionally large maxillary third molars, a large juxtamastoid eminence, and the low temporal squamous suture.

Only one of these "archaic" features is distinctly "Neandertal" among archaic *Homo*, the lingular bridging of one mandibular foramen (Lebel and Trinkaus 2002), and it occurs, if very rarely, in recent human samples (Jidoi et al. 2000). However, it is absent from securely dated and currently available earlier Upper Paleolithic European modern humans. Any further employment of these "archaic" features of the Oase human remains to argue for Neandertal affinities must be based on the temporal and geographical proximity of the Oase remains to those regional late archaic humans. It then becomes a question of which archaic samples are seen as potentially ancestral to the Oase human population, given that all of these archaic features are absent in the southwest Asian Middle Paleolithic Qafzeh-Skhul sample (and the earlier Omo-Kibish 1 specimen), and only one feature (large mandibular ramus breadth) has been documented so far in north African late archaic or early modern humans. If they indicate some Neandertal ancestry, then these "archaic" features would support some degree of blending, however modest, of Neandertal and early modern human populations from the beginning of the spread of modern humans into Europe. If these features are not seen as indicating Neandertal ancestry, then it is necessary to explain how they might have appeared in the Oase human fossil sample after being absent in the Qafzeh-Skhul sample.

It remains possible that most of these archaic features are derived from northern African late archaic/early modern humans, such as those represented by the Nazlet Khater 2 skeleton and the northwestern African Aterian remains from sites such as Dar-es-Soltane and Témara (Vallois and Roche 1958; Thoma 1984; Ferembach 1976, 1998; Ménard 1998, 2002). Such affinities are suggested by the similarity in mandibular ramus breadth between Oase 1 and Nazlet Khater 2 (Crevecoeur and Trinkaus 2004). However, there are contrasts in molar proportions between Oase 1 and the three north African specimens providing data, and the north African sample is variable in features such as supraorbital morphology, mandibular corpus robusticity and mandibular symphyseal shape and orientation. If indeed the Oase population is best seen as being derived from this variably archaic north African sample, a reasonable hypothesis given the "African" affinities of the Oase 2 nasal morphology, then it becomes necessary to account for the morphological mosaic of the north African sample as well as that of the Oase human remains.

In these considerations of traits and trait lists, it is appreciated that these features are not necessarily independent and that several of them are secondary reflections of more primary aspects of their biology. Moreover, the genetic bases of these traits are unknown and are likely to be complex. Yet, independent of phylogenetic issues, they serve to emphasize that these, the earliest well-dated and sufficiently complete modern human remains from Europe, possessed complex morphological mosaics of what we perceive to represent "modern" versus "archaic" humans. In other words, they were not particularly modern, while being modern!

There is a problem here. What does it mean to be "modern"? The problem is not a trivial one, nor a new one, since terms such as "modern" and "archaic" (or formal taxonomic synonyms) are routinely used to talk about Late Pleistocene human evolution, including in the discussion above. Yet, it is apparent from a paleontological perspective that we have created a taxonomic rubicon, an artificial one, that samples such as the Oase fossils violate. We could use better terms than "modern" and "archaic," but any terms will serve to create boundaries, boundaries that an improved fossil record seems inevitably to obscure.

Moreover, this problem is not unique to human paleontology, since recent discussions in Paleolithic archeology (e.g., McBrearty and Brooks 2000; d'Errico 2003; Henshilwood and Marean 2003; Shea 2003) have attempted to identify archeological correlates of "modernity" and to use their distributions in time and space to argue for scenarios of modern human behavioral emergence. Yet, the trait lists employed are no better, and in some cases much worse, than the anatomical trait lists employed here and elsewhere in human paleontology. And those archeological trait lists have all of the conceptual problems and pitfalls inherent in identifying anatomical modernity.

Conclusions

Even though most scenarios of modern human emergence and Neandertal disappearance in Europe invoke population dispersal through southeastern Europe, the human fossil record for both late Neandertals and early modern humans in the region has been uninformative. The recent, and ongoing, discoveries at the Peştera cu Oase in southwestern Romania have altered this situation. Most portions of the cranium and mandible, plus molars, are represented and date to about 35,000 BP. They therefore provide a small but informative window on the nature of human cephalic biology close to the probable time of early modern human dispersal into the land west and north of the Bosporus.

The glimpse provided by these postmortem denizens of an ursid hibernation chamber is one of a biological mosaic, at least from our twenty-first century perspective of "modern" versus "archaic" versus "Neandertal." Whatever the implications of the Peştera cu Oase remains might be for the reproductive encounters of these people with the interpleniglacial aboriginal populations of Europe, they are sufficient to indicate that our paleontological dichotomies, however useful heuristically, often obscure the more complex biologies and histories of these Late Pleistocene humans.

Endnote

[1] The principal authors were not able to attend the conference in Tübingen/Blaubeuren in July 2004. At that time they were involved in fieldwork at the Peştera cu Oase, preliminary results from which are included here. Note that the integration of the human remains discovered in 2004 with those found in the same area of the cave in 2003 has not yet been fully undertaken, even though most of them clearly derive from the same specimen and join together. The observations on preservation and morphology are preliminary, given the ongoing nature of the fieldwork and the paleontological analysis. Moreover, radiocarbon dating and other laboratory analyses are in progress and will be presented in the future.

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