

Late Pleistocene Human Fossils and Evolutionary Relationships

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The final scientific session began with a series of papers on the best-known form of extinct Late Pleistocene humans, the Neanderthals. Bernard Vandermeersch continued the trend of interpretation of the European later Middle Pleistocene fossils which dominated the previous session: namely, that most of these present derived features linking them to the true Neanderthals. Vandermeersch termed the European Eemian and most later Saale ("Riss") fossils such as Biache "preneandertals," as contrasted with some even earlier specimens (Swanscombe, Steinheim, Arago, and Petralona), which may lie on the Neanderthal lineage. In discussion, he was asked not about these earliest Neanderthals, but about the significance of the youngest well-dated specimen, from St. Césaire. He noted that this fossil, with typical Neanderthal morphology (as now agreed by all workers, it seems), was recovered from the upper of two Châtelperronian layers at the site. According to Vandermeersch, this culture, or phase, is quite restricted, with only a few well-documented sites in a small range. It is contemporary with the earliest Aurignacian, from which no human fossils are known, although Vandermeersch expects to find moderns (Cro-Magnons) associated with such levels. In sum, he said that the importance of St. Césaire was to show that Neanderthals lived longer than had been thought, disappearing only at the beginning of the Upper Paleolithic. He also offered his opinion that the Châtelperronian is not only derived from the Mousterian (a long-mooted point), but that it could well be included as the last phase of the Middle Paleolithic. More detailed discus-

sions of this question have recently been offered by Harrold (1983) and by Clark Howell (1984), the formal chairman of this session. Although Howell was unable to prepare the summary for this volume, his introduction to Smith and Spencer's recent book (Howell, 1984) on the origins of modern humans covers many of the points raised briefly here; other papers in that volume also offer different perspectives on these problems as well.

The second speaker was Jakov Radović, who reviewed Gorjanović-Kramberger's work at Krapina, especially in light of the search for modern humans contemporary with the Neanderthals there. He concluded that there is no evidence for such contemporaneity anywhere in Europe as yet, but suggested that the early occurrence of Aurignacian-like artifact assemblages in central and eastern Europe might indicate a "source area" for the Cro-Magnons. He was asked about the evidence for an Upper Paleolithic earlier in central than in western Europe and replied that although terminology is still variable, the early Aurignacian or Szeletian may be as old as 40,000 years BP, based on data from Istálloskö, Hungary. The results of the recent study of Bacho Kiro cave (Bulgaria) have been summarized by Ginter and Kozłowski (1982) and provide further information on this problem. The oldest layers in the cave (14-12) yield Middle Paleolithic assemblages of Mousterian type; a date of > 47,500 years BP has been obtained from layer 13. Layer 11 yielded artifacts of Upper Paleolithic facies that have been assigned to the Bachokirian, typologically similar to the assemblage from the dated level at Istálloskö. The warm layer 11 at Bacho Kiro pro-

duced a radiocarbon date on charcoal of > 43,000 years BP, but Mook (1982) suggests that because there was some activity in the sample, a 1- σ age-range may be provided: namely, 50,000 +9,000 years BP. This -4,000

places layer 11 between 45,000 and 60,000 years BP, contemporary with Neanderthals at Shanidar and in France. A single dP₃ ("dm₁") from this level is larger than moderns and is said by Ginter and Kozłowski (1982) to be possibly transitional between Neanderthals and moderns in some (undefined) ways—this point is not made by Glen and Kaczanowski (1982) in their description of the human remains.

Ralph Holloway summarized his studies of Late Pleistocene endocranial size and morphology, concluding that Neanderthals continue to be maligned in terms of having less well-developed brains than anatomically modern humans. His findings support and extend the view that Neanderthals had brains larger, on average, than early moderns and with well-developed Broca's and Wernicke's areas. In response to a question about the Neanderthal occipital lobe, he said that although this area is not significantly different in morphology from that of moderns, it may have been relatively larger. He mentioned ongoing work with native Australians that suggests a relatively larger visual cortex than in Caucasians, combined with "tremendous capacity for visuo-spatial integration and solving visual problems at a very, very early age." Holloway concluded that "in a romantic sense, I like to think of Neanderthals out there on the periglacial tundra facing all sorts of difficulties, not only with keen eyesight but also keen olfactory senses and so forth."

Jean-Louis Heim reviewed his work on problems of sex determination for Neanderthal crania. As much of this work has been published already (Heim, 1981–1982, 1983) no manuscript was submitted for this volume, but some of the major conclusions can be summarized briefly. The Neanderthals, for the first time in human paleontology, provide a series of specimens that can be accurately sexed on the basis of postcranial morphology. In turn, this allows a more precise evaluation of patterns of dimorphism in the skull of individuals of known sex. By comparison to modern humans, Neanderthals show a rather higher degree of sexual dimorphism in most cranial dimensions—length, breadth, and height. Overall size is

the best feature for cranial determination of sex, but that requires a sample for comparison. Of individual measurements for the Neanderthals, cranial length (glabella-opisthocranium) shows very strong dimorphism: the female to male ratio is 92.7, vs. 94 for Upper Paleolithic Europeans and 98 for living humans. Among other features, bregma is farther forward in females than males, so the forehead is higher (but the supraorbital torus protrusion does not vary with sex); occipital bun is higher in females and the mastoid process is weaker; and the parietal segment of the sagittal arc is greater than the frontal in females, with the reverse true for males.

Erik Trinkaus and Fred Smith completed the review of Neanderthals by examining their evolutionary fate. They postulated that a "transition" of some sort occurred from the typical Neanderthal morphology seen in Europe and Western Asia during the Eem and earlier Weichsel to modern human morphology, but were undecided as to whether this was an *in situ*, gradual evolution or the result of a migration/invasion. They evaluated the types of characters that changed during this transition, how much change occurred, and the possible functional explanations for such change. In response to a question, Trinkaus elaborated on his suggestion that Neanderthals might have had a longer gestation period than living humans (this work has now been published, see Trinkaus, 1984). Briefly, he indicated that Neanderthal pubic bones differ markedly from those of early moderns or living humans, while other aspects of the pelvis do not. The resulting larger pelvic aperture would permit passage of a skull some 20% larger than that permitted by modern pelvises. In terms of brain size and neonatal growth patterns of modern humans, that would mean an additional 2–3 months of fetal development. This fits well with estimates of how long human gestation "should" be, based on brain/body scaling and mammalian development patterns.

Smith was then asked how, in light of the divergent nature of Neanderthal morphology, he could conceive of a transformation of this morphology into that of early *Homo sapiens sapiens* in only 5–10,000 yr. He indicated that in central Europe there is a clear picture of gradual change from earlier to later Neanderthals through earlier and later moderns (see also Smith, 1984). In western Europe, this gradual modification is not clear, with St. Césaire being typically Nean-

derthal but late, although there then is a fair gap before the first well-dated moderns appear. Smith agreed that there was probably some gene flow from outside Europe, especially as modern-like populations occur in southern Africa by 65,000 years BP at least, and then in the Near East by about 40,000 years BP, but argued that continuity within Europe appears very strong. Trinkaus added that he felt the differences among most workers in this area were a result of varying emphasis on gene flow vs. regional continuity, and that there was little reason to expect that the pattern of replacement would have been identical from western Europe across to central Asia, much less farther east and south. The use of terms such as "transition" by Trinkaus and Smith may tend to polarize this discussion even farther, because they carry the implication of continuity. Howells (1976) discussed the alternative models of migration and local evolution explicitly, and various workers have paid lip-service to the complementary nature of these processes and their probable mixture in the Neanderthal case. Nonetheless, most authors have either sidestepped the issue (as do Trinkaus and Smith here) or taken a stand at one end of the philosophical "morphocline." Stringer (1982) has tried to suggest one path to a partial solution, involving the development of clear predictive hypotheses to be tested by fossils and archeology, and further work in this direction would be useful.

Ron Clarke moved the discussion out of Europe and back to Africa with a report on his recent research at the Florisbad locality. No new hominid remains have been recovered, but an early Middle Stone Age layer has been partly excavated *in situ* and should be chronometrically dated soon; it appears that the skull and other remains are of late Middle Pleistocene age. Clarke also was able to prepare a more accurate reconstruction of the Florisbad cranial fragments, resulting in a rather more archaic face. He was asked to clarify his views on the relationship and relative "modernness" of the Florisbad, Ngalooba, and Border Cave crania. He repeated that both Florisbad and Ngalooba (as judged from the cast) are less anatomically modern than Border Cave, which is very modern.

Alan Thorne discussed the "Origin of the Australians," bringing the audience much closer to the present but far afield geographically. Due to the press of other matters (see Lewin, 1984), he was unable to submit a manuscript, but some of the ideas he pre-

sented are to be found in Wolpoff et al. (1984) and the papers by Thorne cited therein; I shall summarize only his presentation here. Thorne argued that two regional morphs of long duration occurred in eastern Asia: a northern variant from China (Zhoukoudian through modern East Asia and the Americas) and a southern Javanese line ("Java Man" through Ngandong and the robust Australian fossils). Of the second group, Sangiran 17 shows a complex of features of the face (orbit shape, brow ridge form, and details of the floor of the nasal orifice, palate, and malar) that "are Australian in the morphological if not geographical sense." Moreover, Thorne noted, features of the asterion region and of the nuchal crest and torus are surprisingly modern. The Kow Swamp crania, between 10,000 and 16,000 yr old, show much similarity to the Javanese fossils. Kow Swamp 5 is "one of a group of Late Pleistocene Australian hominids which Peter Brown (Univ. New England) has suggested show artificial cranial deformation. He argues, in part from ethnographic analogy, that these people were deforming the shape of children's heads by manual or pedal pressure, over a period of about six months. I think he is probably right, but I'm not totally convinced yet of the arguments, particularly as there doesn't seem to be any long-term binding involved." From the new site of Coobool Creek, near Kow Swamp, Brown has recovered about 130 individuals, some with and others without deformation. Another large series comes from the most recently found site, Willandra Lakes in New South Wales. Using an experimental electron spin resonance approach, the oldest specimen, WLH 50, is far older than 30,000, perhaps something like 60,000 years old. It is rather similar to the Solo crania, with vault bone thickness between 14 and 17 mm (in part due to advanced individual age) and very low maximum breadth. For these people to have entered Australia from Indonesia, either via New Guinea and the north or through Timor and into the south, said Thorne, "involves a series of crossings, the maximum one being of the order of 80 to 100 km. It is most likely that we are dealing with purposive human behavior and the making of watercraft."

The second, northern lineage is documented, according to Thorne, not only at Zhoukoudian, but also at Dali and Maba of late Middle Pleistocene age, and in later Pleistocene fossils from the Upper Cave in

north China and from Ziyang and Liukiang in the far south. In Australia, the Keilor, Lake Mungo, and several Willandra Lakes hominids in the 32,000–20,000 yr range represent the same lineage. Fossils of intermediate geographical position are known from Wajak, Okinawa, and Tabon (Philippines). In Australia, these more gracile populations show no evidence of cranial deformation; they are often buried with a sequence of cremation, bone smashing, and reburial and then interment; and they are associated with a much more complex cultural assemblage than is found with the robust forms. Thorne suggested that the use of bamboo as a major cultural raw material by Indonesian hominids (see also Pope, 1983; Pope and Cronin, 1984) might have led to its utilization in simple raft-building, as is still done today in China. He thus saw the two groups independently crossing large water barriers to reach different areas of Australia before contacting each other. In conclusion, Thorne said that "an interesting question is that if people are moving across ocean gaps of a substantial nature in East and Southeast Asia, is this also the mechanism which may involve the processes leading to the occupation of the Americas?"

In discussion, Thorne was asked to comment on Birdsell's trihybrid theory of Australian population formation. Originally, Birdsell (1949) proposed a succession of three human entries into Australia: first, the so-called Oceanic Negritos, rain-forest people seen in Tasmania and northeast Queensland; second, the "Murrians," best represented in the Murray River Valley of southeastern Australia; and third, the Carpentarians. This last group, said Thorne, can be separated out as very recent immigrants from New Guinea and Indonesia into northern Australia, where they mixed with already present populations in a broad band. Given the coastal movement of people, Thorne continued, the Tasmanians might fit with the coastal southern Australian "gracile" group, such as Keilor and Lake Mungo. The earliest immigrants were not these people, for Thorne, but the robust group whose descendants are the Murrians. Ron Clarke asked Thorne to comment on what he saw as a similarity between the Ngaloba hominid and the oldest specimen from Willandra Lakes, WLH 50. Thorne agreed that from a

brief look at the Ngaloba cast, there were "very many detailed characteristics which I would see, from my part of the world."

Finally, Arun Sonakia gave a short presentation on a new find from India. Sonakia had not been invited to speak originally, but as he had new information of potentially great interest, the organizers decided to grant him some time. As it turned out, this talk was one of the highlights of the symposium, representing almost the first public announcement of what paleoanthropologists have long sought—a truly archaic hominid from the Indo-Pakistan subcontinent. Much of a calvarium was recovered by Sonakia from a conglomeratic layer in the Narmada Valley, which he dated to the late Middle Pleistocene. The skull vault is low, the bone relatively thick, and the supraorbital torus well developed. Sonakia has suggested alignment with late *Homo erectus* populations or archaic *H. sapiens* as known in Europe, but not Neanderthals. Gyani Badam of Pune, working in the U.S. on Pleistocene mammals, visited the A.M.N.H. in the summer of 1984 and commented on the age of the deposits. As discussed in his 1979 book, he argued that it is unlikely that this hominid is older than early Late Pleistocene or possibly latest Middle Pleistocene. Badam thought that the faunal assemblage listed by Sonakia is mixed, with some later Middle Pleistocene forms possibly associated with younger taxa. He noted that a radiocarbon date of about 32,000 years BP was obtained on molluscs from the cemented sandy gravels near Devakachar (Badam, 1979, p. 178). Moreover, several of those who observed a cast of the Narmada hominid in New York thought that it was rather more similar to late archaic *Homo sapiens* than to *Homo erectus*, although they agreed with Sonakia that it was not a Neanderthal. I would guess that a date between 100,000–150,000 years and association with a Middle Stone Age cultural tradition might be expected eventually. Further study of the morphology of Narmada Man and of the faunal and possible cultural association, as well as a better estimate of the age of the deposits, are awaited eagerly. This area will certainly be a focus of much attention over the coming years, and the description of its first paleoanthropological fruit was a fitting climax to the "Ancestors" symposium.

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