Ancient Roads to Europe

African ancestors may have entered Europe surprisingly early

By BRUCE BOWER

Southeastern Spain's Iberian peninsula features vast, rolling stretches of sun-soaked soil that share a haunting beauty with desolate landscapes in eastern Africa. Josep Gibert, a paleontologist based in northern Spain at the M. Crusafont Institute in Barcelona, ventured into the peninsula's parched heart 20 years ago hoping to unearth ancient animal bones from a dried-up lake bed near the Andalusian village of Orce (pronounced oar-say).

Gibert found what he came for—and much more. Bone fragments and stone implements discovered since 1982 at three Orce sites indicate that human ancestors lived there as many as 1.8 million years ago, he says. If preliminary dates for this material hold up, Orce will contain the remains of Europe's oldest known members of the human evolutionary family, or hominids.

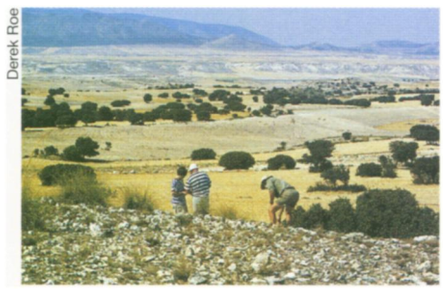
In fact, the sites would represent the European counterpart of eastern Africa's Olduvai Gorge, where scientists generally agree that hominids lived beginning around 1.8 million years ago.

Such antiquity—combined with evidence from other archaeological sites—would imply that African hominids could have taken any of several paths to Europe. Although usually thought to have traversed a land route running north from the Middle East and then westward across territory bordering the Mediterranean Sea or regions farther inland, they may have traveled across the Strait of Gibraltar from northern Africa or across the Bosporus Strait from Turkey.

Gibert's findings first reached a worldwide scientific audience in September 1995 at the International Congress of Human Paleontology, held in Orce. Since then, the Spanish discoveries have attracted great interest and spirited controversy. Much debate revolves around whether Gibert possesses sufficient data to pin such an advanced age on the Orce finds.

Scientists excavating sites in northern Spain's Atapuerca Mountains (SN: 8/12/95, p. 100), for example, suspect that hominids arrived at Orce and other parts of southern Europe more recently, approximately 1 million years ago. In addition, the fragmentary Orce fossils attributed to hominids by Gibert actually belonged to wild horses, the Atapuerca researchers argue.

Remarks Derek Roe of the University of Oxford, who independently examined the Orce sites and artifacts in 1993: "At this point, we can't prove or disprove the possibility that hominids occupied Orce 1.8 million years ago, but there's good evidence that they reached southern Spain by around 1 million years ago. That in itself is a new and unexpected element in European prehistory."



Derek Roe

Researchers examine ancient lake sediments at Orce.

Orce's increased international visibility comes at a time of heightened receptivity to the notion that hominids trekked from Africa to Europe and Asia long before the appearance of modern *Homo sapiens*, which many researchers place at about 200,000 years ago. Asian hominid remains have been dated to 1.8 million years ago on the Indonesian island of Java (SN: 3/5/94, p. 150) and at Dmanisi in central Asia (SN: 2/11/95, p. 85) and to 1.9 million years ago at Longgupo cave in China (SN: 11/18/95, p. 327).

Doubts have emerged about these proposed early Asian arrivals, however. Age estimates at Java and Dmanisi come from sediment lying below the hominid finds, and further work will probably yield later dates, some scientists contend. Moreover, others maintain that Longgupo's fossils and artifacts cannot confidently be attributed to hominids.

Disputes have also arisen in regard to proposed early hominid sites in Europe—particularly those in Orce.

Everyone agrees that the three excavation sites deserve much further study. The Andalusian government issued no permits for scientific work at Orce in 1996, but three research teams have filed applications to conduct extended work there beginning later this year. Gibert heads one of those groups; another is coordinated by Wil Roebroeks, an archaeologist at Leiden University in the Netherlands; and Alain Turq, an archaeologist at France's National Museum of Prehistory in Les Eyzies de Tayac, directs a third team.

Turq joined Gibert's team in 1993 but left abruptly in 1995. The French investigator says he left because of disagreements with Gibert over how to proceed with the excavations and frustration with what he viewed as Gibert's "refusal to allow scientific discussions about Orce's significance."

At the center of such discussions are contrasting opinions about how long ago hominids lived in southern Spain. For now, dating estimates at Orce depend on the location of hominid finds relative to two sediment layers in which Gibert and his coworkers have measured reversals of Earth's magnetic field. The reversals have already been dated elsewhere in the world. Bones of extinct animals amid the hominid findings provide additional clues.

Gibert places one Orce site, Barranco Leon, at about 1.8 million years old. It has yielded more than 100 flint artifacts, mostly simple implements sharpened on one side and flakes chipped off larger pieces of stone. Barranco Leon excavations have also yielded a partial hominid tooth and a hippopotamus skeleton, according to the Spanish researcher.

Venta Micena, another Orce site, falls at about 1.6 million years old, Gibert holds. It consists of at least 15,000 animal bones, probably accumulated by hyenas or other carnivores. Creatures represented by these bones include wild dogs, bears, saber-toothed cats, rhinoceroses, horses, and mammoths. Hominids apparently arranged some of the large mammal skulls in groups at the site, he argues.

A cranial fragment and two small pieces of upper arm bone found at Venta Micena come from hominids, Gibert maintains. Four fragmentary hominid fossils have also turned up among numerous animal bones excavated since 1982 at the nearby Cueva Victoria dig, he adds.

The Venta Micena bones have "interesting hominidlike features," notes anthropologist Phillip V. Tobias of the University of the Witwatersrand in Johannesburg, South Africa. However, a case can also be made that the fragmentary fossils come from horses, Tobias adds.

Independent immunological tests of proteins extracted from the Orce fossils support Gibert's position. Spanish researchers at the University of Granada have detected human albumin and immunoglobulin in all three specimens. Jerold M. Lowenstein of the University of California, San Francisco discerned human albumin in two of the fossils.

The two groups also identified horse albumin in Orce fossils known to come from horses, and Lowenstein found bovine albumin in the bones of bisonlike creatures from Orce.

The final Orce site, Fontenueva 3, dates to around 1.5 million years ago, Gibert asserts. Researchers have unearthed more than 100 flint artifacts from three soil layers at this location, as well as the bones of mammoths, horses, and other animals.

Gibert suspects that hominids at Orce reached Spain by crossing the Strait of Gibraltar from northern Africa. Hippos, wild horses, and other animals at Orce apparently came from Africa and may have negotiated the same aquatic crossing, he proposes.

Declines in sea level that occurred between 2.4 million and 1.6 million years ago reduced the distance across the strait to 3 miles or so, with a small island poking up along the way as a rest stop, says the Spanish scientist. Crossing may then have been manageable by paddling on logs or rafts.

"The first Orce occupations were probably temporary, but we need further hominid finds to assess this possibility," Gibert remarks.

Tobias agrees that Orce's ancient inhabitants may have crossed a water-depleted channel at Gibraltar, but the sites may only be about 1.2 million years old, in his view. "Even if that's the case, these are still the oldest Europeans yet discovered."

Turq assigns an upper age limit of about 1.4 million years to the Orce sites. Hominid travel routes from Africa to Europe remain unclear, the French researcher argues.

However, the bones of large African animals lie adjacent to hominid material at both Orce's Venta Micena dig and central Asia's Dmanisi site, according to Turq. This suggests, in his view, that hominids followed migrating animal herds from Africa into Asia and on into Europe more than 1 million years ago.

"This is without a doubt a spectacular discovery that will require us to rethink our conceptions of climate and animal life in [Stone Age] Europe," Turq holds. "It affirms the idea of an ancient hominid colonization of Europe."

Early hominid settlements probably clustered in southern Europe without necessarily leading to incursions farther north, asserts Eudald Carbonell, an archaeologist at the Universitat Rovira i Virgili in Tarragona, Spain. Carbonell directs ongoing excavations of hominid-bearing caves in Spain's Atapuerca Mountains.

Atapuerca and Orce excavations suggest that hominids had entered Spain by about 1 million years ago, perhaps by moving north through the Middle East and then traveling west along the southern boundary of Europe, according to Carbonell. In support of this proposal, he


Derek Roe

The stone artifacts found in 1993 at Fuentenueva 3 site.

notes that one Israeli archaeological site dates to at least 1 million years old and contains stone tools derived from earlier African implements (SN: 3/23/96, p. 183).

Data on magnetic reversals in Atapuerca's sediment now indicate that the partial skeletal remains of five hominids at the site date to at least 800,000 years ago, Carbonell contends. Numerous stone tools and animal bones lay among those hominid fossils.

Signs of cannibalism appear on some of the hominid bones, the Spanish scientist argues. These include incisions and breakage typical of meat processing.

Unlike Gibert, Carbonell assigns all the Orce fossils to animals other than hominids. Nonetheless, he accepts Orce's stone artifacts as the products of hominids who reached the Iberian peninsula by around 1 million years ago.

"There may already have been permanent hominid occupations in southern Europe at that time," he proposes.

Roebroeks advances a far more skeptical view of proposed early hominid sites in Europe. "There are still problems with the Atapuerca and Orce dates," he contends. "The evidence from Atapuerca needs to be taken seriously and that from Orce retained as an intriguing possibility that merits independent verification."

Hominid-bearing soil at Atapuerca contains the bones of animals often found at northern European sites no more than 500,000 years old, raising questions about Carbonell's older age estimate based on magnetic reversals, he maintains.

Carbonell believes that the 500,000-year-old creatures in northern Europe inhabited southern Europe much earlier.

At Orce, the lack of detailed analyses of sediment layers and how they formed makes it difficult to pin down dates for the sites on the basis of magnetic reversals in the soil, according to Roebroeks.

In the September ANTIQUITY, Roebroeks and archaeologist Robin Dennell of the University of Sheffield in England assert that hominids may occasionally have entered southern Europe for temporary periods "well before" 500,000 years ago. Middle Eastern hominids may have taken a Turkish route across the narrow Bosporus Strait on those early European jaunts, Dennell and Roebroeks theorize. However, hominids did not settle in Europe permanently until 500,000 years ago, when clear evidence of their presence appears in many areas, the scientists hold.

Boxgrove, a 500,000-year-old quarry in southern England, represents a prime example of an undisputed scene of hominid activity (SN: 5/28/94, p. 342). Nearly complete excavations reveal that hunters gathered at Boxgrove to butcher game and perhaps store their prepared meat, says project director Mark B. Roberts of University College, London.

Finds include stone hand axes, hammers made of bone and antler, and the remains of at least four butchered rhinoceroses. Investigators have also noted a dried-up channel where a stream once coursed alongside the site.

The Boxgrove hominids exhibit signs of keen, humanlike intelligence, Roberts argues. For instance, incisions in rhino vertebrae show that the ancient hunters sliced meat off carcasses in a manner consistent with modern butchering techniques. Although no evidence of fire has emerged at Boxgrove, hominids designed the site for long-term use and apparently were proficient at keeping large animals away from their meat, Roberts adds.

"These were not modern humans, but they were a lot smarter than we've thought," he argues. Like Roebroeks, though, Roberts expresses a "nagging doubt" about the much earlier proposed dates for the Atapuerca and Orce hominids until further analyses are conducted.

Enough evidence now exists to assume that hominids reached southern Europe by approximately 1 million years ago, contends anthropologist F. Clark Howell of the University of California, Berkeley, who has trained many of the scientists now investigating Europe's prehistoric settlement. But the goals and itineraries of the ancient pioneers largely elude scientists, he remarks.

"We know terribly little, in many instances, about the population movements and cognitive capacities of those ancient hominids," Howell states. □