Preface

In the late fall of 1998, when Pedro Souto and João Maurício discovered the remains of an ochre-stained child in rockshelter deposits in the Lapedo Valley, we hardly expected the discovery to provide us with more than some additional data on human biology and behavior in the earlier Upper Paleolithic of western Iberia. Several years later, following on extensive and intensive archeological and paleontological work at the site and in the laboratory, a complex image of human behavior at the Abrigo do Lagar Velho has emerged. It is the detailed results of that work, followed by paleontological and archeological perspectives on the human populations of the European earlier Upper Paleolithic, which we present here.

Early in our analysis of the human remains from Lagar Velho, we proposed (Duarte et al., 1999) that the child’s skeleton presented evidence of prior blending of local Neandertal and arriving early modern human populations in western Iberia. Our interpretation has been widely accepted as both interesting and reasonable, being rejected a priori only by those who are intellectually immune to the idea of Neandertal-modern human productive interbreeding. In this volume we document in much greater detail the anatomical mosaic present in this unusual child, followed by considerations of its implications. We do not expect universal acceptance of our conclusions. However, we would appreciate careful consideration of the data, analyses and arguments that we bring to bear on it. And in effect, this volume represents a further statement of our original challenge to the field of paleoanthropology — if you do not agree with our interpretation, provide us with an alternative explanation which is congruent with both the paleontological data (from Lagar Velho and elsewhere) and current evolutionary biology. To date, there have been few such alternatives proposed, and none has satisfied these criteria. We are open to other suggestions.

It is also apparent that the ritual burial of Lagar Velho 1 and the broader archeological context of the burial provide insights into human behavior during the European Gravettian. This is a period of human cultural evolution that has been coming increasingly into focus, and we hope that the placement of Lagar Velho 1 and the Gravettian archeology still under excavation at the Abrigo do Lagar Velho into this broader framework will further illuminate the behavioral complexity of these Late Pleistocene hunter-gatherers.

This volume is, needless to say, the result of the concerted efforts of many people, most of whom are authors of one or more of the included chapters. Throughout this period the project has been supported by the Instituto Português de Arqueologia, the agency of the Ministry of Culture devoted to the study, management and preservation of the archeological heritage of Portugal. Further support has been provided by the L.S.B. Leakey and Wenner-Gren Foundations, as well as the home institutions of many of the contributors. To all of them, and to all of the people who have helped in ways too numerous to mention, thank you.

João Zilhão and Erik Trinkaus
Lisbon and St. Louis, May 2002
Introduction
In August of 1998, the two of us participated in the first Gibraltar conference on the Neandertals and modern human origins, held to celebrate the sesquicentennial of the discovery of the Forbes’ Quarry Neandertal cranium. At that conference, which integrated various aspects of Late Pleistocene human ecology, behavior and biology, the focus seemed to keep coming back to the two questions which have plagued European Late Pleistocene paleoanthropology for much of the past century. How similar were the Neandertals to early modern humans in their behavior and adaptive patterns, and how closely related were these two groups of humans? Since southern Iberia appeared, in 1998, to be the last refugium of the Neandertals, the focus of the conference, on both of these general issues and the natures of the Late Pleistocene changes in Iberia, seemed to bring the various questions into focus, if not any closer to resolution.

After the conference, one of us (ET) accompanied the other (JZ) to Portugal to view the first of the Middle Paleolithic human remains from the Gruta da Oliviera (a manual middle phalanx from the fifth ray) and to discuss possible further human paleontological work in the context of ongoing archeological excavations in the Almonda karstic complex. It was a pleasant couple of days that ended with a casual agreement to continue the collaboration should further and interesting Paleolithic human remains be found. Little did we expect what would emerge less than three months later.

The discovery of the Abrigo do Lagar Velho and the child’s burial in late November of 1998 and the subsequent salvage excavation during December and early January 1999 (see Chapter 2) was initially carried out largely in secret, since the site was unprotected and there was fear of damage to the skeleton by curious but poorly informed onlookers. However, after it was announced by the Portuguese media on December 25, every effort was made to make information on the site, the burial and skeleton available to both the public and the profession. Indeed, other than the normal restrictions dictated by excavation, laboratory cleaning and reassembly, and curatorial concerns regarding the fragile specimens, we have made an effort to be as open as possible about the remains and the site, to colleagues and the general public.

It is in the context of our belief that paleontological data should be made available as soon as is reasonably possible that we have conceived of the current volume on the Abrigo do Lagar Velho and its Gravettian human remains. It is less than four years since the site was first discovered, and less than three years since all of the scattered cranial pieces of the child were recovered from the rockshelter. Moreover, extended excavations of the site have continued each year, with additional data on the geology, paleoecology and archeology of the preserved levels. For these reasons, our current study of both the site and the skeleton are not exhaustive — such a detailed level of analysis would take decades to be fully accomplished. However, the research has reached the point at which we feel that we have reliable information and inferences to present. This volume is the result.

In the excavation and analysis of the Abrigo do Lagar Velho, it was apparent to us from the beginning that any such project required a variety of expertises to produce a worthwhile result. In order to accomplish this, we put together a team, with JZ being concerned with the
excavation and analysis of the site and ET taking responsibility for the assembly and analysis of the human skeleton. Through all of this, absolutely critical work was undertaken and overseen by Cidália Duarte, who both excavated the skeleton in the field exquisitely (who else has excavated pedal phalangeal epiphyses identified as to digit from a Paleolithic burial?) and took care of the skeleton and all of the logistics surrounding its analysis in Lisbon. Even though she is not a co-editor on this volume and remains an author on only two chapters, she probably contributed more to the analysis of the skeleton than any one of us. The contributions of the others are evident in their authorships of the various chapters in the volume.

The volume is divided into two sections, one concerned with the site and the other with the skeleton, preceded by a brief history of work at the site and on the skeleton and followed by discussions of the human phylogenetic and behavioral implications of the remains. Even though fieldwork continues at the site, principally in Gravettian levels in the western portion of the shelter, we have limited the discussions here to those concerned with the overall structure of the prehistoric deposits, the human burial and skeletal remains, and the paleoenvironmental, archeological and chronological contexts of the remains.

In addition, it was decided that the comparative frameworks employed for the description of the site and its contents (since all description is by definition comparative) would be largely limited to currently available data and interpretive frameworks. In a few cases the contributors have engaged in the collection of additional comparative data specific to this project, but the vast majority of the comparative frameworks have been put together from the published literature, personal experience, and data and ideas shared by colleagues. It is expected that we, and others, will pursue further a number of the issues raised by this site, refining and enlarging upon the results presented here.

Ironically, it is the one aspect of Late Pleistocene paleoanthropology, human phylogeny, that was furthest from our primary interests which has sparked the pronounced and ongoing interest in “the Lapedo child.” Although both of us had written extensively on the transition from the Neandertals to early modern humans in Europe, and its complex interrelationships with the Middle-to-Upper Paleolithic transition, we had both been concerned principally with the behavioral dynamics of the two human groups, asking questions about the natures and the degrees of behavioral similarities and differences between them. Phylogeny had entered into those discussions, primarily to the extent that it had a bearing on the probable patterns of interactions in time and space between the two groups of Late Pleistocene humans. Following on this train of research, when we proposed in 1999 that the Lapedo child, Lagar Velho 1, exhibited evidence of Neandertal-modern human admixture in Iberia, our primary thrust was what it told us about the degree of similarity of their behavioral patterns that enabled them to regard each other as potential mates.

Yet, the intensity of the debate concerning whether Neandertals and early modern humans had interbred, both in the professional and public arenas, led us to realize that these are issues about which people feel very strongly. However, unlike most academic arguments that are primarily concerned with the reputations of the scholars involved, this one touched deeply on a concern that went far beyond academic rivalries and previous position statements. It became increasingly apparent to us that it confronted the issue of how special we, as modern humans, actually are, how distinct we are (or are not) from humans who were not quite “us.”

The Gravettian child from the Lapedo Valley cannot, despite our efforts, resolve that question. Yet, it is our hope that our presentation of its remains and the contents of the site into which it was buried after its untimely death 25 millennia ago will contribute a little to our understanding of the processes that led to the emergence of early modern humans, and of the people who were involved in that process.
The Lapedo Valley had been recognized for a number of years prior to 1998 as a potential locale for Paleolithic sites, given its karstic landscape and natural rockshelters, but the occasion to undertake a systematic archeological survey had not presented itself. However, during the fall of 1998, Pedro Ferreira, a local student in search of a subject for a term paper to give in his school (the Heritage Studies department at the University of Évora), decided to search for rock art in the area. He eventually came to notice what seemed to be prehistoric paintings sheltered under the overhang of one of the limestone cliff faces exposed in the valley, on its north side and towards its west end. Word of these finds made it to the Instituto Português de Arqueologia (IPA) via the Sociedade Torrejana de Espeleologia e Arqueologia (STEA) in Torres Novas and JZ asked two members of this Society who assist with the archeological projects of the Institute and had worked for many years with him, João Maurício and Pedro Souto, to check on Pedro Ferreira’s report.

The Encounter

On a Saturday morning, November 28, 1998, João Maurício and Pedro Souto visited the Lapedo Valley and authenticated Pedro Ferreira’s rock art; it consisted of three small anthropomorphic figurines painted in red, similar to Chalcolithic rock paintings known from elsewhere in the country. While at this site, and looking across the valley, they noticed along the opposite side, just east of the bridge for the small road that crosses the Ribeira da Caranguejeira, a long rockshelter that, even from a distance, looked like an optimal location for a Paleolithic site. They surveyed along it and verified that it had obviously been subjected to serious earth moving in the near past. However, rich Paleolithic deposits remained exposed in the horizontal fissures of the western half of the rockshelter. Lying on ground surface, directly below these remnant deposits, there were large amounts of faunal remains and lithic artifacts, a sample of which was collected for later inspection in the lab.

As part of their examination of the site, João Maurício decided to check on a pronounced recess in the eastern end of the shelter’s back wall. He thought that the area could correspond to the porch of a cave whose entrance would have become almost completely covered up by the accumulation of sediments. On close inspection, he noticed deposits that were quite loose, suggesting an animal burrow, and knowing from experience that burrowing animals frequently bring archeological remains from deeper levels to the surface, made a shallow subsurface probe of these loose sediments using a trowel and his hand. He found a few small long bones. Although he is not an osteologist, he recognized the bones as possibly human, carefully reburied them, and made notes on what he had found.

As soon as they left the valley, in the afternoon of that same day, João Maurício and Pedro Souto tried to reach JZ by phone to report on these finds. They couldn’t, because at the moment JZ was aboard an airplane, on his way to Kyoto, Japan, to participate in the
meeting of UNESCO’s World Heritage Committee where the committee was to vote on the inclusion of the open air Paleolithic rock art of the Côa Valley, in northeastern Portugal, into its list. He was informed of the discoveries in Lapedo when he called home upon landing, and arranged for a visit to the site immediately upon his return. With the Côa Valley successfully named a World Heritage Site, he arrived in Lisbon on December 4, and on Sunday morning, December 6, with Ana Cristina Araújo and Cidália Duarte, drove up to Lapedo, where Pedro Ferreira as well as João Maurício, Pedro Souto and other members of STEA were already waiting.

From a quick inspection of the faunal remains collected when the site was found, JZ immediately recognized the characteristic association of red deer, horse and rabbit, indicating an Upper Paleolithic age for the deposits. Moreover, technical features in the butts of a couple of blades suggested the presence of a Middle Solutrean component in the occupations that were now destroyed for the most part. As JZ proceeded with analysis of the sediments preserved in the fissures and of the samples of lithic and faunal materials collected by Pedro Souto and João Maurício, the latter took Cidália Duarte to the opposite end of the shelter, where the two of them probed the loose sediments to recover the bones he had identified as possibly human in the visit of the previous weekend. Cidália Duarte immediately recognized among them arm bones (radius, ulna and phalanges) of a single individual, a juvenile human.

A few minutes later, when the two groups met to exchange views about the site and what should be done with it, Cidália Duarte showed the bones to JZ, who immediately noted that they were saturated with red ochre. This observation, combined with the assessment of the age of the sediments in the fissure, the location of the stratigraphic level of the bones (a couple of meters below), the reasonably horizontal nature of the archeological deposits, and the lack of associated human bones in a Paleolithic site under normal circumstances, led, in a split second, to the realization that the location probed by João Maurício could well correspond to a child burial of pre-Solutrean age. Red ochre stained human burials are a well-known feature of the Gravettian, but the difference in elevation between the bones and the remnant deposits suggested, assuming typical rates of sedimentation for Portuguese Upper Paleolithic stratigraphic successions, that several millennia separated the two epochs of human activity. Therefore, a late Middle Paleolithic age for the hypothesized burial couldn’t be excluded, although a Gravettian age seemed more likely. If this were to be proven, this human ritual burial would not only be the first Paleolithic burial to be discovered in Iberia, but, for the Gravettian, in Europe west of Liguria and south of Wales (with the exception of the Cro-Magnon burials, if these are indeed Gravettian).

The Excavation

The potential implications of the find were discussed with great excitement during the car trip back to Lisbon, which was to be interrupted by a couple of stops on the side of the road to open and re-open the bags and inspect and re-inspect the bones in order to make sure that what they had identified as ochre-staining was indeed what it seemed to be. Given the recent terracing of the site, and the loose nature of the sediments where the child’s bones were collected, it was not clear, however, if the hypothesized burial was still for the most part in situ or if what had been collected was simply what had been left at the site after destruction.
The arm bones, in fact, had been recovered under the small overhang that had led João Maurício to suspect a cave entrance and prompted his probing of deposits at ground level. If the child’s body had been buried at that level, it could well have been destroyed by the earth moving equipment that removed most of the sediment from the shelter. That earth moving had been done some time at the end of the year 1994, in an effort by the landowner to clear a larger path between the cliff and the Ribeira de Caranguejeira and make a horizontal surface to place equipment (Jornal de Leiria, January 5, 1995). It was possible that only the left arm and some adjacent bone protected by the small overhang had been preserved and that the remainder of the skeleton had been destroyed.

Even if only a remote possibility, the chance that an intact or almost intact Paleolithic burial existed at the site, covered by no more than a few centimeters of loose deposits, and the fact that the place was now a known, unprotected archeological site, made a salvage operation mandatory. Work at this, as yet unnamed, rockshelter in the Lapedo Valley began the following weekend, December 12-13, as a short-term expedition to initiate the task of profiling and recording the remnant deposits preserved above extant ground surface and to verify by subsurface archeological testing if an in situ skeleton was still there. Cidália Duarte, helped throughout by Ana Cristina Araújo, excavated the burial, while JZ investigated the remnant deposits and started work towards the establishment of a preliminary stratigraphic framework for the site. A horizontal grid was laid out over the existing surface and the area over which it was likely that a juvenile skeleton could be laid began to be slowly excavated. Finally, in the late afternoon of Sunday, December 13, at a depth of 5-10 cm, and after several cranial fragments and the mandible (which preserved the symphysis and almost all of the left side) were recovered in disturbed sediments, an extensive red stain was observed. It was roughly the size of a 4-5 year old child, the age inferred by Cidália Duarte from the dentition preserved in the mandible that had been excavated the day before.

It was clear, therefore, that a largely intact burial was indeed preserved at that place, and the prominent chin of the mandible indicated that this was a modern human child, not a Neandertal. This convinced the team that, as initially suspected, the burial was of early Upper Paleolithic age, in accordance with the extensive ochre-staining and with the fact that the weekend’s product of the work in the hanging remnant stratigraphically above confirmed the presence of Solutrean and Proto-Solutrean or Terminal Gravettian components. The test area was carefully covered, sealed and disguised, and arrangements were made with the landowner for surveillance of the site during the day by a member of STEA until the team could come back to conclude the salvage work, the following Friday, December 18.

On the evening of December 13, the same day the burial was confirmed, and realizing the potential significance of the discovery, JZ sent an e-mail message to ET describing the site and finds and asking for advice on how to proceed with the excavation (Fig. 2-1). Copies of the same message were sent to a few other colleagues, namely Francesco d’Errico, Paul Goldberg, Tony Marks, Paul Pettitt and Chris Stringer. Starting December 18, JZ began to take digital images of the burial excavation and send them to ET by e-mail, for both his edification and to ask questions regarding the daily progress of the work. Although JZ had plenty of experience excavating Paleolithic sites and Cidália Duarte was highly knowledgeable and experienced in the excavation of human burials, neither of them had ever excavated a Paleolithic human burial. ET, although less experienced in field excavations, had excavated and reconstituted Paleolithic human remains in the laboratory, most recently the Dolní Věstonice 3 postcrania that had been removed years before to the Moravské Zemské Muzeum en bloc.
Gradually, the skeleton emerged (see Figs. 2-2 to 2-5), exposing the shoulder region, the thorax, lumbar and pelvic areas, legs and feet. The remainder of the left hand bones were found in the same disturbed area close to the shelter’s wall that yielded the bones of the left forearm of the original discovery, but the right arm and shoulder were largely destroyed (being furthest from the shelter wall). The axial skeleton, the lower limbs and the right hand, however, were exceptionally well-preserved and undisturbed (see Chapter 11). Most of the cranium was lacking, because, laying at higher elevation, it had been hit by the earth-moving equipment and its fragments dragged and scattered eastward, as eventually shown by the post-salvage work at the site (see below).
FIG. 2-2 — December 19, 1998. Cidália Duarte prepares for continued excavation of the surface exposed in square L20 during the previous weekend, when red staining in the sediments confirmed the presence of an intact burial.

FIG. 2-3 — December 20, 1998. The burial feature at the end of the day, as the thorax and upper legs began to be exposed and the first evidence of charcoal in the lower limb area of the burial pit is found.

FIG. 2-4 — December 21, 1998. Work advanced towards the lower legs and feet of the child, and abundant charcoal is uncovered, confirming that fire had been part of the burial ritual.

FIG. 2-5 — December 27, 1998. The skeleton is fully exposed, drawn and mapped. The different body parts are now going to be taken out of the ground and moved to the lab.
The excavation continued every day until January 8, 1999, including Christmas and New Year’s Day. The team left the site earlier than usual only on Christmas Eve, the traditional time in Portugal to celebrate the holiday with one’s family, but they returned to work the next morning. Among others, there were two main kinds of reasons to be at the site every day. First, it was a salvage excavation with fragile Paleolithic juvenile human remains exposed on the surface; the cold and humid weather (it rained almost without interruption throughout those long three weeks after December 18) made it difficult or impossible to apply consolidants, and every day of aerial exposure of the skeleton visibly altered the condition of the bone and the color of its ochre-cover. Second, local people started to notice this group of persons heading to the site on a daily basis and curiosity started to arise on what might be happening there. Both reasons impelled the team to try to complete the operation with the shortest possible delay and while being out of the public’s eye, to guarantee the needed tranquility.

For this reason, in fact, the find was not divulged, and only a very small number of people were informed of the reasons why JZ, then director of the IPA, Portugal’s antiquities department, had suddenly disappeared from his office in Lisbon. Inside the profession, only the head of the Physical Anthropology department at the University of Coimbra, Eugénia Cunha, was informed. The team invited her to come to the site for a first hand acquaintance with the fossil as it was being exposed and she would eventually visit the excavation on December 23.

By then, a few local visitors had also appeared at the site to see what was being done, and it became clear that security was a major concern. From the beginning, the team had lived in fear that someone, more out of curiosity than malice, would destroy the skeleton before it could be fully and properly excavated and, with the help of the municipality and the district governor, security personnel was hired to ensure the site’s protection on a 24-hour basis, beginning on the night of Christmas Eve, December 24. This was timely because, the following day, the Portuguese Public Television (RTP) (a crew of which had been invited by the team to produce a professional video record of the excavation after December 21 and took extensive footage of the discovery from then until the end of the salvage operation) opened the holiday evening’s news with the story of the “Christmas child” that had been found in the Lapedo Valley. It featured interviews made at the site with the excavators and views of the skeleton, exposure of which had become basically completed that same day. Even if, at the request of the team, the exact location of the find was not given, the Lapedo Valley was easily identified by local people and the news of where the work was taking place spread very quickly. The other media, both TV and newspapers, national and regional, became interested and guaranteed extensive coverage of the find almost on a daily basis until mid-January (Fig. 2-6). As a result, hundreds of visitors started to pour into the site, to the extent that formal, scheduled (morning, lunch-time and late afternoon) tours of the excavation had to be organized in order to satisfy the curiosity of the public while, at the same time, securing for the team as much as possible of daylight time and the peace and quiet needed to conclude the last stage of the excavation, the removal to the lab of the exposed skeleton.

In the meantime, ET was in St. Louis finishing the fall semester and exchanging almost daily e-mails with JZ. They had become connected the previous year when JZ had contacted ET asking him if he would be willing to work on the Middle Paleolithic human remains that were starting to be found in the Gruta da Oliveira in the Almonda karstic system, near Torres Novas (Chapter 1). ET had thus become the unofficial human paleontologist for the team, since there were no Portuguese human paleontologists despite a long tradition of Holocene skeletal biology among Portuguese anthropologists.

Shortly before Christmas ET could resist no longer, and with his family’s permission arranged to go to Portugal to see the “Lapedo child” during the week between New Year’s
A criança que veio do passado

Esqueleto quase intacto do Paleolítico Superior, com mais de 25 mil anos, foi descoberto em Leiria e é um achado raro

João Zilhão

FIG. 2-6 – December 27, 1998. Diário de Notícias article reporting on a 25 000 year old child burial found near Leiria and emphasizing its contemporaneity with the Côa Valley rock art.

FIG. 2-7 – January 3, 1999. João Maurício, Pedro Souto, Ana Cristina Araújo and Cidália Duarte have already excavated around the thoracic cage and prepared a box for its en bloc removal, the last stage of the salvage operation.
and the start of the spring semester. He was delayed a day by the closure of the St. Louis airport and made it through New York as the snow was falling, but arrived in Portugal in time to help with the final excavation of the thorax but mostly to begin cleaning and reassembling the portions of the skeleton that had been taken out in sections and were in the laboratory in the Museu Nacional de Arqueologia in Lisbon. He did this principally for the mandible, the left temporal region, and the long bones of the left arm and the legs. The idea was principally to get enough information to assess age-at-death, overall body size and general preservation, for both the planning of future analysis and the preparation of a preliminary report on the discovery. While he was in the museum working, Cidália Duarte arrived with the last of the skeleton, the thorax en bloc (Fig. 2-7). The “Lapedo child,” after many millennia in the ground, had found a new home and people to take care of it.

The site also had a name. Even though it continued to be referred to by the valley name, the site had since been named by JZ the Abrigo do Lago Velho, after the old (velho) ruined olive oil press (lagar) at the edge of the rockshelter. The child became, following human paleontological convention, Lagar Velho 1.

**The Preparation, Excavation and Analysis**

Once the child had been taken to Lisbon, and before ET returned home and the excavation team took a well-deserved rest, Cidália Duarte, JZ and ET discussed what should be done next. It was apparent, that with a principally Portuguese team from the IPA, JZ would lead a systematic excavation of the site starting the following summer, to provide a context for the burial, recover any remains of the child that might have been scattered by the bulldozer, and see what other archeological remains might be present under the modern land surface. ET suggested putting together a team for the paleontological analysis of the skeleton, proposing initially two individuals who were already working with him on the Pavlov and Dolní Věstonice Gravettian human remains in Moravia, Trenton Holliday and Simon Hillson. It was also suggested that Jaroslav Brůžek (another member of the Moravian team) and Chris Ruff might be appropriate. Subsequently, as more cranial remains were discovered in the subsequent field season, Fred Spoor, Robert Franciscus, and the team of Christoph Zollikofer and Marcia Ponce de León were invited to bring their expertises to the project.

The following May, ET and Trent Holliday spent two weeks in Lisbon, the latter excavating the axial skeleton from its block in the laboratory and ET continuing the process of cleaning, reassembling and cataloging the cranial, dental and limb remains. Chris Ruff visited Lisbon in August 1999 to study the limb bones and collect data for cross-sectional geometric analysis of the limb bone diaphyses. In January 2000, Simon Hillson joined ET in Lisbon to continue the analysis, and then during the summer of 2001 Trenton Holliday returned to complete his analysis of the axial skeleton, and the remainder of the team (Franciscus, Spoor, Zollikofer and Ponce de León, plus ET) visited Lisbon, where the skeleton had been transferred to the Instituto Português de Arqueologia, to CT scan the remains and collect the remainder of the paleontological data. And since additional teeth had been found in the screened sediments since January 2000, Hillson returned for a final trip in January 2001.

In the meantime, during the stay of Holliday and ET in Lisbon in May 1999, a television crew from American Public Television (NOVA) visited Lisbon for the first of several foreign television groups to record footage on the discovery. When JZ and the television
crew visited the site, they were accompanied by Trent Holliday and met there by João Maurício and Pedro Souto. While JZ was being interviewed on camera, Holliday and Maurício prospected along the cliff to the east of the burial site and discovered a handful of tooth crowns and cranial fragments from the child. These finds strengthened the team’s belief that indeed portions of the cranium and dentition had been scattered around the burial, as inferred during the salvage excavation. The inference would be confirmed by the systematic excavation and screening of the disturbed sediments in the area surrounding the burial, carried out the next summer by Cidália Duarte. At the same time, JZ organized the systematic excavation of the area just to the west of the burial for stratigraphic reasons and further west to determine what else archeological might have been preserved. These archeological excavations were subsequently taken over in 2000 by Francisco Almeida, who discovered a rich later Gravettian living surface a few centimeters below ground level, directly below the westernmost, archeologically richest area of the hanging remnant.

The Hybrid Hypothesis

During the excavation and the initial assessment of the remains, both in the field by Cidália Duarte and in the laboratory in January 1999 by ET, it was assumed that Lagar Velho 1 was a well preserved Gravettian early modern human juvenile. Although skeletons of adults from this time period were reasonably well known from across Europe, well-preserved remains of juveniles were rare (see Chapter 33), and it therefore promised to fill in our knowledge of the growth and development of these Middle Upper Paleolithic early modern humans. This assessment was initially based on the clear presence of a prominent chin on the mandible, and nothing that was observed on the remains initially suggested otherwise.

In the meantime, after the announcement of the skeleton to the Portuguese media in December, a short note was sent with an in situ photograph to Science and subsequently to Archaeology (Holden, 1999; Harrington, 1999), and in later January JZ and ET composed a brief announcement of the discovery which was sent with the digital image of the in situ skeleton to colleagues with a request to forward it on to other interested colleagues. One recipient, Karen Rosenberg, thanked us for the information and noted that, unlike other human paleontologists, we did not behave as though we were part of the Manhattan Project.

During the winter of 1999, ET and JZ began the preparation of a preliminary description of the site and the skeleton, to be submitted to the Proceedings of the National Academy of Sciences. They were waiting in part for the results of radiocarbon analyses by the Oxford and Gröningen laboratories on fragments of the skeleton, bones and charcoal associated with the burial, and remains from the hanging remnant. The first failed due to poor organic preservation, but the others confirmed the Terminal Gravettian and Solutrean age of the hanging remnant and placed the burial between 24 and 25 kyr BP, close in age to similar ritual Gravettian burials elsewhere in Europe (Chapter 7). Incidentally, this result coincided with the standard answer provided by the team, when, during excavation, they were pressed by reporters to give their best guess as to the epoch of the burial event: “some time between 21 000 and 30 000 years ago, most likely ca.25 000 years ago, based on the stratigraphic evidence and estimates of sedimentation rates” (see Fig. 2.6).

As ET began writing up a descriptive assessment of the portions of the skeleton known so far, he noticed something very curious. The crural index of the essentially complete right femur and left tibia was exceptionally low, below those of European early modern humans (mature and immature), similar to those of Neandertal adults, and virtually the same as that...
of the La Ferrassie 6 juvenile Neandertal. It was a few days before it finally struck him; the Lapedo child’s legs not only looked like a Neandertal, they provided solid evidence of some degree of Neandertal ancestry. He immediately e-mailed JZ and Cidália Duarte with the news, carefully pointing out that a mistake in his notes could not be excluded (Fig. 2-8). To make sure, Cidália Duarte remeasured the lengths of the femur and tibia; the new measurements were within a millimeter of ET’s original lengths.

The idea of using body proportions, and particularly limb segment proportions, as a marker of ancestry was nothing new. ET had documented the contrast between the low brachial and crural indices of Neandertals and the high ones of European and Near Eastern
early modern humans two decades before (Trinkaus, 1981), building on the earlier remarks of Vallois (1958b) and Coon (1962). Given that they remained largely stable in immigrant recent human groups and were established early in development, he used this to suggest that European early modern humans had had some significant degree of tropical (probably African) recent ancestry (see Chapter 32). This work had been elaborated extensively by Holliday (1995), and had been used explicitly as part of the evidence for an Out-of-Africa model of modern human origins (e.g., Hublin, 1983, 1999). If it could be used to document gene flow from or population movement of early modern humans out of Africa and into Europe, then by the same biological criteria it had to be valid to employ such body proportions to indicate Neandertal ancestry in Lagar Velho 1; it was both or neither.

The manuscript in preparation consequently evolved from an announcement to the presentation of an interpretation of admixture between local Iberian Neandertals and in-dispersing early modern humans, with the implication being that Out-of-Africa occurred but without the complete replacement that had been advocated by a number of human paleontologists and molecular biologists (see Chapter 32). However, since the Proceedings of the National Academy of Sciences, as with Nature and Science, places a media embargo on their articles until publication, we kept this largely (but not entirely) under our hats. ET ran it past Trent Holliday and Chris Ruff to see if they could take the argument apart. He gave a departmental colloquium at Washington University, at which one of the foremost experts on non-human primate interspecific hybridization, his colleague Jane Phillips-Conroy, was present. And he gave a presentation of the arguments to Fred Smith and his colleagues and a few students at Northern Illinois University. Although, to quote Fred Smith, this largely involved “preaching to the choir,” all of the people involved had constructive comments and none of them saw any fundamental flaws in the arguments.

However, in the middle of April, when the results of the radiocarbon analyses had come in to JZ, he gave an interview to the Lisbon newspaper, Público, to announce the dates. During the course of the interview he let it slip that we thought that we had evidence of admixture, or a “hybrid child.” The next issue of Público (Friday, April 16, 1999) announced on the front page that “Neandertal cruzou-se com o homem moderno. Fóssil de criança encontrado em Leiria pode ajudar a resolver mistério da evolução humana” and the accompanying article (de Sá, 1999) explained the general outline of the interpretation (Fig. 2-9). We thought that the story would remain local, but on the morning of Monday April 19th the telephones of both JZ and ET began to ring; it had been posted on the web by the Associated Press correspondent in Lisbon. During the subsequent two weeks, the story was carried by newspapers around the world (including the front page of the Sunday April 25 New York Times — Fig. 2-10), it was on BBC World Radio, a number of television stations, web posting of most major news sites, and subsequently in a series of popular science and archeology magazines. The following week, ET gave a long since scheduled talk at the New York Academy of Science and attended the annual meetings of the Paleoanthropology Society and the American Association of Physical Anthropologists; at all of them he gave invited impromptu talks on the skeleton. Subsequently, to deal in part with the continuing media interest, ET and JZ composed a FAQ (frequently asked questions) page that was posted on the web site of the Instituto Português de Arqueologia (Trinkaus and Zilhão, 1999a).

As much as the attention was appreciated, it appeared at the time to be excessive. Consideration of it afterwards suggested what should have been apparent from the beginning; the issue was not merely an academic argument over the phylogenetic fate of the Neandertals, but it touched on a popular nerve concerning the distinctiveness of modern humanity and the issue of how “innate” to our species war and aggressiveness were (Fig. 2-11). If Neandertals
Discovery Suggests Humans Are A Bit Neanderthal

By JOHN NOBLE WILFORD

Neanderthals and modern humans not only coexisted for thousands of years long ago, as anthropologists have established, but now their little secret is out: they also cohabited.

At least that is the interpretation being made by paleontologists who have examined the 24,500-year-old skeleton of a young boy discovered recently in a shallow grave in Portugal. Bred in the boy’s bones seemed to be a genetic heritage part Neanderthal, part early modern Homo sapiens. He was a hybrid, they concluded, and the first strong physical evidence of interbreeding between the groups in Europe.

“This skeleton demonstrates that early modern humans and Neanderthals are not all that different,” said Dr. Erik Trinkaus, a paleoanthropologist at Washington University in St. Louis. “They intermixed, interbred and produced offspring.”

Although some scientists disputed the interpretation, other scientists who study human origins said in interviews last week that the findings were intriguing, probably correct and certain to provoke debate and challenges to conventional thinking about the place of Neanderthals in human evolution. Neanderthals and modern humans presumably were more alike than different, not a separate species or even subspecies, but two groups who viewed each other as appropriate mates.

Recent DNA research had appeared to show that the two people were unrelated and had not interbred. Neanderthals lived in Europe and western Asia from 300,000 years ago until the last of them disappeared on the Iberian peninsula about 28,000 years ago. In the prevailing theory today, modern humans arose in Africa less than 200,000 years ago and appeared in great numbers in Europe, starting about 40,000 years ago.

The new discovery could, at long last, resolve the question of what happened to the Neanderthals, the

FIG. 2-9 – April 16, 1999. Facsimile of the cover (left) and feature article (right) of Público releasing the admixture interpretation to the Portuguese public.

FIG. 2-10 – April 25, 1999. Facsimile of the front-page lead to the feature article of the New York Times reporting on the admixture interpretation to the American public.
whatever happened to the Neanderthals, those stocky, big-brained "cave men" with the sloping brows? For years, anthropologists speculated that Neanderthals were slaughtered and driven to extinction by modern humans, the Cro-Magnons, as they swept out of Africa and into Europe.

It's a theory that seemed to jibe with our species' bellicose history. The theory became myth, a paleo-ontological Cain and Abel story, that we used to explain human beings' proclivity to violence.

No wonder Croats can't live with Serbs, and Serbs can't live with Muslims. No wonder Hindus and Muslims do battle in the streets. No wonder Israelis and Palestinians both pine for a homeland devoid of the other and Protestants and Catholics in Northern Ireland can't trust each other enough to turn in their weapons.

We just can't get along. We can magnify the slightest difference, whether in language, religion or dress, into reason to kill. And we're all members of the same species.

But, if Erik Trinkaus, a paleoanthropologist at Washington University is correct, Cro-Magnons didn't wipe Neanderthals out. They mated with them instead. The evidence? A 24,500-year-old skeleton discovered last winter in Portugal that had the facial features of Cro-Magnon and the body of Neanderthal — a hybrid born 4,000 years after Neanderthals were believed to have disappeared. This young boy's remains were not the product of a stolen moment of subspecies' passion but the descendent of two lines that had long intermingled.

If true, it's a more cheerful conclusion to the perplexing mystery surrounding the fate of the Neanderthals. They were simply incorporated into the European lineage, proving that they were just as human as the Cro-Magnon latecomers and not some evolutionary dead end or separate species.

Maybe the lesson we should draw is one celebrating diversity. Instead of fearing difference, we should embrace it. Apparently, our ancestors did.

(who were human but not quite "us") had interbred with early modern humans (who were "us"), then the distinction between ourselves and the rest of the biological world became a bit less. This was welcomed by the overwhelming majority of the media and general public, but it also seemed to trigger feelings that this was not quite proper (after all, the Neandertals were not quite "human").

The outpourings from the general public were the most surprising. ET in particular received unsolicited e-mails for weeks from people thanking him for "explaining Uncle George" and wanting to know whether certain anatomical features that they had indicated Neandertal ancestry. Indeed, one woman mailed him a set of radiographs of her head asking for such a diagnosis; they were those of a normal modern human. Unfortunately, these messages and a number of media postings (e.g., the New York Times) stated or implied that it had been shown that living humans had direct Neandertal ancestry. In fact, as stated in the posted FAQ (Trinkaus and Zilhão, 1999a), "We have not the slightest idea if there are ('Neandertal genes' in modern European populations), and neither does anybody else." It was never stated that there was Neandertal genetic continuity to the present; only that some of it occurred across the transition to early modern humans.

It was also argued that this was not the result of a simple, opportunistic mating between a lone Neandertal and a lone early modern human, since the child lived at least a couple of millennia after the probable period of first encounter between these two groups in southwestern Iberia. Following on the theme of the song by the Supremes, it was stated that Lagar Velho 1 was "not a love child," a theme that was quoted and misquoted in the media.

Whereas the public reaction to the interpretation of Lagar Velho 1 as indicating some degree of Neandertal-early modern human admixture was overwhelmingly positive (with few
exceptions), the academic reactions were highly mixed. In retrospect, there were very few surprises. Most of the anthropologists who saw some role for the Neandertals in European early modern human ancestry responded positively, either enthusiastically or cautiously. Those who had taken hardline positions against any Neandertal-modern human continuity rejected the interpretation without serious consideration. The primary skeptics eventually persuaded by the evidence and the arguments were Paleolithic archeologists who had never been deeply invested in the issue.

The Publication

As the media attention was continuing, the manuscript was finalized (with the addition of the radiocarbon dates) and submitted to the *Proceedings of the National Academy of Sciences* (PNAS), to eventually appear officially on June 22, 1999 (Duarte et al., 1999). As with many such publications, the PNAS has outside commentaries written to accompany select articles, and this article was chosen (with the authors’ approval) for such treatment. ET even provided copies of slides of Lagar Velho 1 for the commentators. The identity of the commentary authors remained anonymous until publication.

However, the Friday before publication, ET learned through a communication with the PNAS editorial office that the commentary had been written by Ian Tattersall and Jeffrey Schwartz. He immediately sent an e-mail to the editor-in-chief of PNAS predicting that the commentary would be a disaster. Those two individuals not only had repeatedly espoused an approach to human paleontology that made any dynamic aspect of human population biology (including gene flow and admixture) a priori impossible, but they had established a reputation for a cavalier approach to the empirical realities of the paleontological record. Disaster was expected, and when the commentary arrived it was as predicted.

The resultant commentary by Tattersall and Schwartz did not just reject the admixture hypothesis as a “brave and imaginative interpretation” (1999, p. 7119), but in attempting to so do it accumulated more than thirty errors, ranging across anatomical misidentifications, misuse of anatomical terminology, misquotes of sources, misuse of cladistic terminology, failures to account for well-documented variation in features, lack of biomechanical understanding, and lack of appreciation for developmental processes. These errors were detailed in a reply (Trinkaus and Zilhão, 1999b), which (given that the PNAS commentary had already received global print and electronic distribution) was distributed to colleagues by e-mail and posted on the IPA’s web site. It also contained an explicit, if logical, statement on the inappropriateness of the authors of the commentary to write on the subject.

The episode was unfortunate. Rather than provide constructive commentary, even with criticism, the contribution of Tattersall and Schwartz (1999) did little more than confuse the issues and the empirical record. The responses in the media consisted mainly of name-calling, some of it anonymous, by individuals resenting the media attention which Lagar Velho had generated.

The Continuation

Since the summer of 1999, fieldwork has continued at the Abrigo do Lagar Velho, primarily extending the excavation of the Gravettian levels discovered below the hanging remnant. As research progressed, updates of the original PNAS article, focusing for the most part on the
implications of the find for the issue of modern human origins, were published in other scientific journals (Trinkaus et al., 1999b, 2001; Zilhão 2000c, 2001b; Zilhão and Trinkaus, 2001). As part of the team’s continued policy of openness to colleagues, several anthropologists took time to inspect the skeleton when they happened to be in Lisbon, including Juan-Luis Arsuaga, Eugénia Cunha, Eric Delson, David Frayer, and Anne-Marie Tillier, and open invitations were extended to a number of other human paleontologists.

The laboratory work, which forms the basis for much of this volume, continued in Lisbon and elsewhere, through the international team assembled to deal with the many aspects of the site and the skeleton. The fragmentary cranial remains have yielded much more of the skull than was thought originally possible (Chapter 17), especially when combined in a computer-assisted reconstruction (Chapter 22). The admixture interpretation has gradually become accepted by a significant proportion of paleoanthropologists (Chapter 32), although the final decision on that issue for many has been postponed until the publication of this volume. As a unique Gravettian isolated juvenile ritual burial, the burial and its associated ornaments have provided insights into Gravettian social patterns (Chapters 10, 11 and 33). From its initial stages of discovery and excitement, and then unexpected results, the Lagar Velho project has become more routine.

Since, as the famous baseball player Yogi Berra once stated, “prediction is difficult, especially of the future,” we do not know how our results will be received and what reanalyses of the data in this volume might produce. However, we hope that it will bring neither acrimonious debate nor uncritical acceptance. It should be what we intended from the beginning, one more piece in the puzzle of modern human emergence.