

NEWS FROM ATAPUERCA IN ENGLISH



NEW HOMO ANTECESSOR REMAINS FOUND IN SIMA DEL ELEFANTE

>2008 dig described as 'excellent' by co-directors, Arsuaga, Bermúdez de Castro and Carbonell at a press conference in the future Human Evolution Museum building.

>Sima del Elefante. The most exciting find were new human remains at Level TEgc of what is known as Sima del Elefante (Elephant Pit), a first phalanx from finger V of a 1.2-1.3 million year old *Homo antecessor's* left hand. The phalanx is, in conjunction with the jawbone fragment unearthed last year, the oldest human bone yet discovered in Europe. Furthermore, work on the lowest levels of the same site has enabled us to identify remains of large and small vertebrates which may imply the presence of sediment dating back almost 1.5 million years, opening up the possibility of detecting human occupations from even earlier dates than those evidenced so far. In less than a decade, we have advanced from thinking that the oldest deposits in the Sierra were from no earlier than 800,000 BP to doubling the chronology of the caves in the Railway Cutting.

>Gran Dolina. New human remains from Level 6 in Gran Dolina, dated at roughly 900,000 BP, were also presented at the press conference. This year's *Homo antecessor* discoveries complete the holotype of the species identified in 1994. Special mention must be made of a short time phase in the Aurora stratum, during which the identified coprolites point to the cave's use as a den by hyenids. In the upper part of Gran Dolina, Level 10 yielded a large number of flint tools associated with bison remains. This seems to confirm an ongoing pattern of seasonal *Homo heidelbergensis* camps.

>Covacha de los Zarpazos. This year's main discoveries in 'Bear Claw Cavity' consist of numerous carnivore remains including a lion's upper canine and a jawbone, which has allowed us to estimate the weight of these big cats at around 300 kg. The site also yielded magnificent Acheulian tools including bifaces and cleavers from 400,000 BP.

>Portalón. At the Main Cave Porch site, digging at Chalcol-

A selection of highlights from the previous issue

ithic levels (4000 BP) documented a group burial. A large urn containing cereal remains and an awl made from a human radius (a forearm bone) are the main finds from the Bronze Age, when the cave was inhabited by agriculturalists and herdspeople.

>In Sima de los Huesos, we have continued our effort to complete the 28 *Homo heidelbergensis* individuals identified to date. A human radius, several phalanges from a hand, a young individual's hemimandible and an orbital bone are the most outstanding discoveries this season.

>Hotel California. Work at an open air site called Hotel California on the banks of the Pico River identified several Middle Palaeolithic occupations that contain a large volume of stone tools in largely individualized concentrations. This will help us to detect technological and functional aspects of the Neanderthal occupants.

>El Mirador. The conclusion of the sample dig underway since 1999 in El Mirador (Look-

>Opinion "CULTURAL" CANNIBALISM IN GRAN DOLINA

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Researchers tend to focus their attention on certain types of remains and archaeological assemblages because of their spectacular nature or the im-



portance of their meaning. Predictably, obvious questions arise in connection with these discoveries, but their high level makes them difficult to answer from a strictly scientific perspective. It then becomes tempting to enter the realm of speculation or lucubration. All the same, when they are

covered on Level 6 of Gran Dolina. As we know, the first analysis of these hominid remains in the 1990's brought to light numerous cut marks and deliberate fractures on the bones, suggesting that cannibalism was practised by human groups in the Atapuerca Hills more than 800,000 years ago. However, apart from the direct evidence of this activity,

signs on the bones enabled the assemblage on the Aurora Stratum in TD6 to be interpreted as a human campsite where cannibalism had been practised. >The second stage is still in progress. The outer TD6 grids now being dug have yielded more hominid bones, and they suggest lateral variations at the site, associated with water-courses and different input sources, confirming several episodes of cannibalism on the Aurora Stratum. The evidence all points to antropophagy as a "custom" that was part of the cultural habits of these hominids in the Atapuerca Hills. Palaeopathological analysis of these hominids' teeth back this hypothesis, as no evidence has been detected of food stress (e.g., famine), except for the weaning process. Consumption of human flesh at Gran Dolina is therefore beyond a purely subsistence issue, forcing us to seek cultural reasons underlying these events.

>I believe they were groups of the same biological species, *Homo antecessor*, who controlled the Sierra territories and had very deeply rooted behaviour patterns, including

attack other groups of the same species? The density of human populations in Europe during the Lower Pleistocene may have been higher than many authors think. Struggle for a territory with abundant resources like Sierra de Atapuerca may have been commonplace, with cannibalism used as the mechanism to ensure territorial domination and survival as a group in that space.

>Whatever the case, we are still digging, and these tentative hypotheses have to be checked. The most important priority is to keep working, to keep thinking... and to let our imagination, a fundamental part of scientific thought, run free. As Einstein said, "If you can imagine it, you can achieve it".

MORE ARG ACTIVITIES

>Journal of Archaeological Science publishes research papers by RUTH BLASCO and MANUEL VAQUERO. Blasco's article is about tortoise consumption by human groups that inhabited Bolomere Cave in Tavernes (Valencia), 250,000 years ago. Vaquero has published a study of the way an analysis of the formation and arrangement of stone tool assemblages at a prehistoric archaeological site can facilitate the inference of behaviour and strategies in stone tool resource supply and exploitation by hunter-gatherer populations over time at the site.

>Quaternary International has published a study by biologist JAN VAN DER MADE on the phylogenetic relationships between Megaloceros and Sinomegaceros, large prehistoric deer species that lived in western and eastern Eurasia.

>CARLOS DíEZ and MARCOS TER-RADILLOS have been invited to write the chapters about the oldest time periods in a book entitled *Lodoso*, which covers the history of this small town in the Úrbel Valley (Burgos Province). After a short period of archaeological prospection, they have produced an up-to-date tour of each site in the area.

>MAURICIO ANTÓN, in conjunction with Alan Turner and Lars Werdelin, has published his research into the large family of European hyenas in the journal *Geobios*.

>EUDALD CARBONELL and his closest colleagues at the IPHES have conducted a study on the reason why hominids left Africa. They claim that this exodus was not triggered by climate change or chasing large herds of animals, but instead the emergence, socialization and perfection of a new technology, Mode 2, which facilitated the development of our adaptive capacity. The article has been published in Issue 64 of the *Journal of Anthropological Research*.

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TIMOTHY D. WEAVER, CHARLES C. ROSEMAN, AND CHRIS B. STRINGER

CLOSE CORRESPONDENCE BETWEEN QUANTITATIVE- AND MOLECULAR-GENETIC DIVERGENCE TIMES FOR NEANDERTALS AND MODERN HUMANS

> (...) **Neandertal and Modern Human Divergence.** We estimate that Neandertals and modern humans diverged 311,000 years ago (95% C.I.: 182,000-466,000) assuming mutation drift equilibrium or 435,000 years ago (95% C.I.: 308,000-592,000) assuming V0-0. For both estimates, we added 25,000 years to account for the fact (averaging dates) that Neandertals lived 50,000 years ago. When we compare Neandertals with only male recent humans, the point estimates and C.I.s decrease by 10,000 years, so our estimates would not be strongly biased, even if the entire Neandertal sample were male. It is difficult to decide which V0 model is most appropriate. The V0-0 result is probably an overestimate for at least two reasons. (i) Because the Neandertal sample is too small to accurately estimate within-population variation in Neandertals, we used the human value for both V1 and V2. If Neandertals were actually less variable than present-day human populations, the V0-0 result would be an overestimate (i.e., the Neandertal lineage would maximally deviate

from mutation drift equilibrium less than the modern human lineage). (ii) The additive genetic variance in the last common ancestor of Neandertals and modern humans must have been greater than zero, making the V0-0 result an overestimate. In contrast, the mutation-drift equilibrium, V0- (V1-V2)/2, result could be an underestimate for at least two reasons. (i) Human populations have grown in size recently, which would make the mutation-drift-equilibrium result an underestimate as long as this growth in census size corresponds to growth in effective size. (ii) Postdivergence gene flow between Neandertals and modern humans would make the mutation-drift-equilibrium result an underestimate. Given this uncertainty, the mean of the two estimates, 373,000 years ago, seems to be a reasonable point estimate.

DISCUSSION

If we consider the maximum extent of the 95% confidence limits for both the mutation-drift equilibrium and the V0-0 estimates,

then the Neandertal and modern human lineages split between 182,000 and 592,000 years ago. Although this range is quite large, it still allows for some observations with respect to the human fossil record. First, even the lower limit is within the Middle Pleistocene, suggesting a relatively deep divergence of Neandertals and modern humans, which is consistent with the presence of derived Neandertal features on Middle Pleistocene fossils from Europe. Second, recent dates suggesting that the Sima de los Huesos site is 530,000 years old would put the fossils from this site, which appear to have multiple derived Neandertal features, at or potentially before the split of the Neandertal and modern human lineages. Third, although the 800,000-year-old Atapuerca-TD6 humans could be ancestral to Neandertals and modern humans, their morphology may not be representative of the source population that actually gave rise to Neandertals and modern humans, because they date from, at minimum, 200,000 years before the split time.

out) Cave was another major event of the season. After ten years and twelve vertical metres of hard work on an immense rockfall from the cave roof, the lack of safe conditions now prevents any further advances downwards. A new work plan will have to be designed in order to gain access to the Palaeolithic levels from a new angle.

well understood, these sorts of proposals help to excite people's imagination and trigger the mechanisms we need to formulate more solid hypotheses, which then have to be tested scientifically to get closer to the point where we can solve these problems.

>In the case of Atapuerca, one such discovery has been the assemblage of human bones dis-

covered on Level 6 of Gran Dolina. As we know, the first analysis of these hominid remains in the 1990's brought to light numerous cut marks and deliberate fractures on the bones, suggesting that cannibalism was practised by human groups in the Atapuerca Hills more than 800,000 years ago. However, apart from the direct evidence of this activity,

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