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Guest editorial

The first peopling of Europe and technological change during the Lower-Middle Pleistocene transition

This volume is the fruit of the XVIIth UISPP World Congress "*The First Humans in Europe*" Commission, which was divided into two Sessions. The first Session, entitled "*The first peopling of Europe*", dealt with the growing body of evidence for core and flake producing hominin occupations in Europe dating to the late Early Pleistocene (*ca.* 1.4–1.2 Ma onwards). The second Session, entitled "*Technological change during the Lower-Middle Pleistocene transition in Europe*", encompassed data from sites representative of the European Acheulian, from its first manifestations and throughout its early evolutionary phases. From the onset, our concern has been to focus upon new discoveries, original data and innovative advances in debates relating to these topics; thus avoiding redundant information.

Over the last few decades, the modalities of the 'first peopling of Europe' have been the centre of intensive research leading to exciting new discoveries that have considerably pushed back the age for the first hominin occupations. Furthermore, they changed the way that we perceive of the cognitive capacities of these oldest populations and, in turn, the relative sophistication of their survival strategies. These European sites have yielded lithic assemblages and often fossils of large vertebrates that sometimes bear traces of butchery (systematic breakage on fresh bone; cut marks attributed to stone tool edges), and only really occasionally human remains. In Europe, Spain has yielded an especially rich record concerning the oldest sites in a reliable chrono-stratigraphic context. Such is the case of the Sierra de Atapuerca sites: Sima del Elefante (1.2 Ma, level TE9; Carbonell et al., 2008; De Lombera-Hermida et al., 2015) and Gran Dolina (0.8 Ma, level TD6) (Carbonell et al., 1995; Ollé et al., 2013), while at Orce, in the Guadix-Baza basin, Barranco León and Fuente Nueva 3 (1.4 and 1.2 Ma, respectively) have yielded an exceptionally rich lithic and faunal record and, to date, the oldest human fossil in Europe (Toro-Moyano et al., 2010, 2013).

Within a slightly younger timeframe (*ca.* 0.1–0.8 Ma), lithic assemblages contain a majority of small sized flakes that were generally produced using unidirectional recurrent and/or orthogonal type core reduction strategies, although nascent centripetal knapping has been also documented. Such is the case of Gran Dolina-TD6 (Spain), Le Vallonnet (France) and Monte Poggiolo (Italy) (Lumley et al., 1988; Peretto, 2006; Arzarello and Peretto, 2010) and some other well documented sites situated mainly around the Mediterranean Basin. Alongside these outstanding sites, new discoveries and analyses presented here provide a welcome update contributing to our knowledge about the origins for the earliest inhabitants of Europe. New teams and archeologists of 'smaller-scale' excavations that participated in our session have furnished ample data to stimulate new contextual and theoretical proxies to expand on these matters.

Relating more specifically to this issue, Carbonell and colleagues, (2016) propose a theoretical approach to understanding the Oldowan/Acheulian transitional phase, arguing that technological change could have occurred through a series of non-linear, diachronical stages (*homogeneity*, *variability*, *diversity*, *multiplicity*). Illustrating their point of view mainly with lithics from the site of Ubeidiya, situated in the Levant (1.6–1.4 Ma), the authors suggest that the formal qualities observed in lithic assemblages may be structurally inter-linked by their morphological and technical features. It also suggests that the range of possible lithic morphotypes that we perceive as existing from one to another evolutionary stage are actually links in a continuous chain where qualitative features are constantly dictated by previously existing forms. This theory thus offers an explanation as to 1) how and why the same morpho-types appear in a relatively coherent succession in different areas of the globe where contact between populations was unlikely and 2) why human techno-typological evolution tends towards an exponential growth in its complexity.

Climate changes during the Early-Middle Pleistocene transition is the axis around which Rodríguez and colleagues, (2016) propose a computerized model illustrating the arrival of hominins into Western Europe. This formal modelling (which was the basis of an INQUA project) also proposes to examine potential distribution patterns, coupling components such as climate change and its effects on vegetation and landscapes, faunal shifts, as well as hominin dynamics and adaptations.

Bourguignon and colleagues, (2016) present an interdisciplinary study of the Bois-de-Riquet site, level US2 (Lézignan-la-Cèbe, France), including a detailed description of the site formation and its stratigraphic sequence. The biostratigraphic data points to an age between 1.3 and 1.1 million years, which places this site among the oldest in Europe. The authors analyze the large mammal faunal remains, highlighting that some bones have cut marks. They also present an analysis of the microfaunal remains, explaining their biochronological significance. Besides this rich paleontological record, some basalt artifacts were recovered. The aim of the authors is to differentiate anthropically produced basalt artifacts from natural fragments or blocks. This objective has been achieved through an experimental program of basalt knapping, and a rigorous technological analysis of the lithic objects found at the site.

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Arzarello and colleagues, (2016) document the more significant features of the lithic record recovered in the two earliest sites of the Italian Peninsula: Pirro Nord and Ca' Belvedere di Monte Poggiolo. The authors stress that it is not easy to compare between the reduction sequences applied in the most ancient sites of Europe because of the different kinds of raw materials utilized and the low number of artifacts represented at most of the earliest sites. According to the authors, the first settlers of Europe show an outstanding capacity to adapt their technological strategies to the available raw materials. They conclude that the features shared by the lithic assemblages dated to around 1 Ma in Europe seem to have a common origin and to share many features with the African Mode 1.

Shchelinsky and colleagues, (2016) introduce a multidisciplinary study of the recently discovered site of Kermek, adding new data to the available record from the Taman Peninsula in Western Ciscaucasia. Together with the nearby sites of Bogatyri/Sinyaya Balka and Rodniki 1, the Kermek site leads to the distinction of the "*Tamanian industry*", with a time-range of 1.6–1.2 Ma, which shows some transitional characteristics between the Oldowan and the Acheulean, such as the shaping of picks and the production of large flakes.

At the Iberian Ebro Basin, Montes and colleagues, (2016) present surface finds from the ancient fluvial terraces of the Las Fitas and San Quílez localities (Spain). Both are isolated platforms situated 200 m above the present-day riverbeds, composed by gravels coming from the Pyrenean and Pre-Pyrenean mountain ranges. Pedogenetic and paleomagnetic analyses point to a chronology between 1 Ma and 780 Ky for Las Fitas, and *c*. 600 Ky for San Quílez. Unfortunately, none of these localities has yielded faunal remains, but there are two small assemblages of lithic artefacts. The assemblage from Las Fitas contains flakes, cores, choppers and chopping-tools, while the assemblage from San Quílez has yielded two handaxes, one pick, two choppers and one core. The scarcity of items, as well as the preliminary work so far performed at these localities does not allow the authors to ascribe these lithic records to any specific techno-complex.

Interesting recent findings from Vicente and colleagues, (2016) are provided by the presentation of the new site of Alto de Picarazas (Spain). It is a complex of karstic cavities containing Early and Middle Pleistocene deposits. Substratum IV of one of the cavities contains an archeo-paleotological record of large mammal remains with cut-marks and seven lithic artefacts (four flakes, one retouched flake, one core and one pebble), on different raw materials. The presence in this level of *Allophaiomys ruffoi* and *Soergelia minor* clearly points to an Early Pleistocene occupation. The excavation is still in progress, so perspectives regarding the possible correlation of Alto de Picarazas with the oldest Iberian hominin occupations are to be awaited in the near future.

In sum, the first part of our volume dedicated to the earliest European cultural evidence underlines the growing body of data dating from *ca*. 1.4 Ma and extending to *ca*. 0.8 Ma. We underline that, in spite of the quasi-absence of sites in cave contexts (with some exceptions as Sima del Elefante and Gran Dolina in Atapuerca and Le Vallonnet), advances made in the multidisciplinary study of open-air occurrences (notably geochronology and biochronology) have contributed greatly to our ideas about the origins and context of these early cultural occurrences. Concerning the lithic assemblages presented here, we note that their main features reinforce those that are known from other documented assemblages dating to the beginning of the Middle Pleistocene: lack of bifacial technology, a low level of typological and technological standardization, local raw material procurement patterns, lack of LCTs and no evidence for elaborated retouched toolkits … Finally, we may also raise the issue of denomination, questioning the validity of applying the eponymous term "Oldowan" (Leakey, 1936) when referring to these European occurrences. This problematic, resolved by some authors who choose alternatively to replace this term by the more generic "Mode 1" as suggested by Clark (1969), remains to be satisfactorily resolved for the European context.

Regarding the second part of this volume, a number of issues are addressed by the range of articles presented here. For example, questions relating to the arrival or the emergence of the Acheulian in Western Europe (convergence, replacement) and how this may be contrasted in relation to other areas of the globe. Also discussed are issues relating to chronology and migrations, taking into account climate change and paleo-landscapes during this period in Western Europe. One of the issues is the relative scarcity of archeological evidence in Europe dating to between *ca*. 0.8 and 0.5 Ma which has led some researchers to suggest that there may have been a relative depopulation of Europe during the Early-Middle Pleistocene transition (Dennell et al., 2011; MacDonald et al., 2012; Mosquera et al., 2013). This topic is addressed in the present volume by the presentation of new data dating to this period.

The archeological record in Africa relative to the Oldowan/Acheulian transition seems to reflect a relatively abrupt change, there are still discussions as to the existence or not of different *facies* of a 'Developed Oldowan' (Leakey, 1971) and some clarifications as to its definition in contrast to the 'Early Acheulian' are still in order (De la Torre and Mora, 2005; Semaw et al., 2009; Beyene et al., 2013). It should be remembered that the definitions provided in Africa for the Acheulian in general, and the Early Acheulian in particular, are quite different from the picture in Europe. There, the shift from the Oldowan to the Acheulian is heralded mainly (although not exclusively) by a change from core and small-sized flake assemblages to the production of large flakes from giant cores and the transformation of these into large cutting tools (cleavers and handaxes, but also picks and unifaces) (Isaac, 1969; Beyene et al., 2013). The emphasis is therefore on a higher cognitive complexity required to produce these flakes from hierarchized core systems that are poorly represented in the earlier, Oldowan techno-complexes.

But this salient feature in the shift to the Acheulian, also reported from India and the Levant (Sharon, 2009 and references therein), is not, for the moment, well documented in Western Europe; with the exception of the Iberian Peninsula, and this remains to be explained. We may, however, concede that the Acheulian worldwide is heralded by change: technological and surely functional and behavioural as well, no matter how scanty the archeological record may appear. Hierarchized knapping systems and preconceived shaping; in particular of picks, bifaces and cleavers, also characterize the shift to the Acheulian in Western European toolkits. Additionally, there is a significant increase in the number of retouched items (at first mainly denticultate tool types, Barsky et al., 2013). In Europe (as elsewhere), the Acheulian is generally reflected by higher density occupations, and by successive occupations at single sites. There is evidence for growing demographic trends and for wider ranging hominins.

Correctly evaluating the timing of these changes is vital if we are to understand the origins and the nature of the hominins responsible for these accumulations and if we hope to evaluate their cognitive capacities. How might the changes we observe in lithic technology and typology reflect that new activities were being carried out by hominins? Does the Acheulean in Europe reflect a local evolution or did it arrive by cultural diffusion or population input? In any case, it is clear that in Europe by *ca*. 0.5 Ma, the Acheulian is represented by a growing register of sites.

This issue is especially brought to the fore in the paper by Mosquera and colleagues, (2016), who present the study of the lithic assemblages found at the three localities of Barranc de la Boella (Spain): La Mina, El Forn and Pit 1. These open-air sites in an alluvial context provide a rich archeo-paleontological record,