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From the earliest occupations of Europe to recent bifacial productions

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During the XVIIIth UISPP congress at Paris in 2018, we organized sessions devoted to the first peopling of Europe (chronology, behaviour and environment) and the question of bifacial shaping over time and space. We aimed to discuss recent data regarding the earliest occupations in Europe and to investigate the onset of the bifacial phenomenon, not only in Europe, but also in Asia and Africa.

New data over the past two decades have pushed back the age of the earliest occupations in Europe and raised questions on the environmental conditions facilitating hominin occupations and on why hominins arrived so late in Western Europe. Europe is a cul-de-sac and was occupied later than the Levant and Asia where traces of hominins are now dated to around 2 Ma. For Western Europe, the earliest evidence dates to around 1.4-1.5 Ma (*i.e.*, Pirro-Nord in Italy), and current data cannot explain this late arrival. Hypotheses on the opening of available routes from the Levant to Europe or through central Asia are under discussion. It is possible that other corridors existed from the Levant towards Asia and provided potential routes for hominin dispersals. Auspicious environmental and climatic conditions are also taken into consideration to explain this period of occupation, but we must bear in mind taphonomic factors and the erosion of the sparse traces left in the landscape. Future research may push back the age of the occupation of western and central Europe further.

The site of Dmanisi, Georgia, indicates that hominins were at the gateways of Europe around 1.8 Ma and may have moved along the Azov Sea. Recent findings suggesting early occupations of Anatolia and Greece show that these areas were on the route to Europe. The scarcity of sites found so far may also be due to the location of sites along the coast, now under sea, or to poor preservation of sites further inland.

Current data and the paucity of hominin remains shed little light on the origin of the earliest occupations: the Levant, the south Caucasus, central Asia, or Africa by the Gibraltar Strait, as suggested by the southern location of the Spanish sites of the Gaudix Basa (> 1-1.2 Ma). Some French sites indicate that hominins moved to the north during favourable climatic periods, enlarging the available territories. The south may have been continuously occupied, but we do not currently know if that was really the case and the variability in technological behaviours could point to multiple waves of dispersals with no relationships to each other. Lithic assemblages indicate that hominins were able to adapt to local raw materials available around the sites, that they preferentially selected certain stone shapes and qualities, and that they applied more or less basic stone management methods.

In the interval from 900-700 ka, biface production appeared in Western Europe (la Noira and Moulin Quignon in France, La Boella in Spain and Notarchirico in Italy). Again, recent fieldwork has pushed back these ages and results indicate that biface manufacture traditions spread quickly to the north during milder conditions, but also perhaps during colder conditions (*i.e.*, the site of Moulin Quignon in the Somme Valley, MIS 16). Nonetheless, the origin of these traditions is still unexplained, and hypotheses of local evolution from previous occupations (Mode 1 or core-and-flake series) or arrivals of new populations (*Homo heidelbergensis*) are still being questioned. The site of Cueva Negra del Estrecho in Spain is an ideal case study for questions regarding the earliest evidence of bifaces in Europe and the environmental conditions under which hominins with this new ability dispersed in western Europe. Multidisciplinary studies and new dates on this site enrich the sparse corpus of evidence (Walker et al., this volume).

The aim of the second workshop was to focus on the diversity of bifacial shaping modes over time and space in order to discuss similarities and differences in technological features and in morphology and to discuss the possible cultural unity of this phenomenon (Garcia-Medrano et al., this volume). In particular, this session considered sites from the widest possible geographical area and chronology for the Palaeolithic. When we observe bifacial shaping from a broad perspective, all of Eurasia and Africa yielded handaxes over time. However, these bifacial tools might be considered as evidence of the diffusion of *Homo* traditions and/or sporadic or long-term convergences over time. Data do not indicate a linear trajectory from crudely made tools to well-worked tools over time. The Acheuleo-Yabrudian assemblages in the Levant raise questions on the meaning of such assemblages with few bifaces at the transition between the Lower and Middle Palaeolithic (Agam et al., this volume). What is the status of these tools, are they the remains of traditions, or are they a genuine part of the tool kit with a specific function? Likewise, after the MIS 12 glacial event, a change occurs in human occupation in Western Europe with more sites and the onset of innovations. Guado San Nicola is a key site, dated

to MIS 11-10. The use-wear analysis of the series with bifaces and early evidence of Levallois debitage is a way of understanding the technological changes that occurred during the long MIS 11 interglacial in Western Europe (Berruti et al., this volume). The Acheulean quarries discovered near Madrid and dated to around 200 ka indicate that Acheulean-type biface production continued over time, not only in Asia but also in Europe. Hominins selected flint, prepared debitage and possibly settled for generations to take advantage of large quantities of available flint. These sites attest that Late Acheulean hominids accessed primary formations in quarries, suggesting specific land use and raw material management. These series enable us to evaluate the skills of knappers and provide new data on social production and learning processes (Baena et al., this volume). Many questions are still unsolved and discrepancies still persist regarding the methodologies applied and regarding the definitions and names given to this kind of tool depending on regions and research schools. A common methodology and terminology for studying Acheulean LCTs is crucial in Europe. The diversity of approaches impedes discussions on traditions and the mobility of populations. Keilmesser tools also illustrate the difficulties involved in identifying traditions in western and central Europe for the Upper Pleistocene on account of the diversity of this emblematic tool and variable definitions (Frick and Herkert, this volume). The type of percussion used to work bifaces is also a crucial question; hard or soft hammers? (Clément, this volume). Were soft hammers used in Western Europe from 700 ka onwards, like in East Africa at 1 Ma? How should flakes from shaping and types of percussion be identified? All researchers tend to highlight (1) the strong impact of raw materials, (2) a large diversity of morphological vs. technological features, (3) a low ratio of handaxes in most sites, (4) diversified biface function over time and space and possible high mobility between sites and (5) dispersals of this process over time with discontinuity or continuity depending on areas, resulting from behavioural diffusion or multiregional arrivals.

The papers published in this special issue aim to cover a wide diversity of specialties (percussion techniques, tool functions and a common methodology to compare European LCTs) and territories, from the first occupations (Cueva Negra in Spain) to recent bifacial productions (late Acheulean quarries around Madrid in Spain, Acheuleo-Yabrudian in Israel and the Keilmesser tradition in Europe). They raise many questions for the future and highlight some of the discoveries made over the past decade.