

Aurignacian, behavior, modern: issues of definition in the emergence of the European Upper Paleolithic

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“Most of the propositions and questions of philosophers arise from our failure to understand the logic of our language. (They belong to the same class as the question whether the good is more or less identical than the beautiful.) And it is not surprising that the deepest problems are in fact not problems at all.”

Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, proposition 4.003

ABSTRACT Because of their meaning in other realms (common language, biological sciences), the use of words such as “modern” or “behavior” to conceptualize aspects of human evolution has a strong impact in our current understanding of the emergence of the Upper Paleolithic in Europe; it implicitly conveys, and favors, teleological views of the process where the explanation of culture change is fully reduced to changes in the biological hardware of the protagonists of the cultural process. The problems of definition

involving the Aurignacian relate to a large extent to the fact that, in this framework, the word has become equated with “behavior of the early modern Europeans”. Such a practice should be abandoned, and the Aurignacian defined as a technocomplex, regardless of issues of authorship, so that we can work with a shared operational definition that holds in spite of adherence to paradigmatic views of what happened to Neandertals and early modern humans in the Europe of ca.40-30 kyr BP.

Introduction

In the mid-nineteenth century, when the term Aurignacian was coined, prehistoric research was carried out to a large extent under the paradigm that, given its time-depth, the archeological record represented a test-case of choice for the illustration of the validity of the Law of Universal Progress (Mortillet, 1867). The specific task of Science in this field was that of finding out the concrete stages, conceived and defined in the manner of geological eras and periods, through which human History had unfolded. In this framework, research questions were for the most part chronological (what stages are there and which cultural “fossils” differentiate between them) and stratigraphical (where exactly in the overall sequence does each stage fall).

Where the Aurignacian is concerned, these issues were largely settled by Breuil’s (1907, 1913) demonstration that it pre-dated the Solutrean. At that time, however, prehistorians were beginning to recognize that the stages named by preceding generations of researchers were not of universal validity. This led to a gradual redefinition of those categories as cultures in the ethnographic sense of the concept, and inspired research along new lines: relations between cultures and “races”; construction of valid regional sequences and establishment of the chronological correlations between them; origins of the different cultures and regionally variable roles played in their observed emergence by local invention, diffusion and migration.

The processual archeology of the 1960s added new dimensions of investigation, anchored on the concept of “archeology as human ecology” (cf. Butzer, 1982). It was recognized that artifact morphology was constrained by function as much as (if not more than) by norm, and that changes through time could be explained through interaction with the environment as well as (if not better than) by the movement of peoples. Coupled with the explosive development of radiometric dating techniques, which often allowed issues of culture-stratigraphic assignment to be effectively side-stepped, this paradigmatic change contributed to bring issues of long-term change, transformation, or evolution to the center stage of prehistoric research. In a way, this represented a resurrection of the nineteenth-century perspective; even if the investigation was now driven by the search for cause, not illustrative example, “progress” (toward a modern anatomy, a fully human intellect, a sophisticated behavior, a complex social organization, etc.) was equally assumed to underlie the historical process.

Necessarily building on previous work, the last thirty years of research on the Aurignacian combined investigative trends rooted in the different paradigms that successively dominated the discipline in the past. We continue to argue about the temporal and geographical boundaries, the internal organization, the associations and the definition of the phenomenon; in spite of the fact that something we argue about must indeed exist at some level, some have even gone as far as questioning whether “the” Aurignacian existed at all. To a large extent, however, these arguments tend to be seen as concerning mere “particulars”; over the last couple of decades, the “big picture”, the question that “implications” sections of research papers have almost never failed to address, the issue subsuming all those different research topics, has been that of how the Aurignacian relates to modern human origins.

This holds irrespective of paradigmatic affiliation. In the 1960s and the 1970s, the Aurignacian featured in the controversy between processual and culture-historical archeology in relation to the issue of functional variability versus cultural norm. Peyrony and Bordes’ notion of two parallel phyla (Perigordian and Aurignacian) played a supporting role in the latter’s view that the six Mousterian assemblage variants diagnosed in the Périgord represented true ethnic cultures, contra Binford’s interpretation of them as functional variants of a single adaptive system (Binford, 1973; Bordes, 1973). Today, whether arguing about such classic cultural-historical questions as origins or artifact typology, or about such novel processual questions as adaptation or behavior, the unifying thread is the search for answers relating to the two sides of the “big picture”: the Aurignacian as the archeological proxy for moderns in Europe; and the Aurignacian as the archeological evidence of fully modern human behavior. The extent to which this happens is made clear by carrying out a simple Internet search for “Aurignacian” with the Google search engine. At the top of the list come links to different encyclopedias and teaching resources posting near identical definitions, of which the following represents a fairly typical wording: “The story of the Aurignacian is that of the spread of anatomically modern humans across Europe. It is the first true Upper Paleolithic industry in Europe and the Near East, where it is thought to originate around 40 000 years ago” (<http://scarab.newport.ac.uk/pavi/page2.html>).

This is in spite of the fact that, beginning in the later part of the 1990s, a series of research papers (cf., for instance, d’Errico et al., 1998; Zilhão and d’Errico, 1999; Churchill and Smith, 2000; McBrearty and Brooks, 2000; Kuhn et al., 2001; Valladas et al., 2001; Conard, 2003) presented a considerable array of evidence showing that this view of the Aurignacian was in clear conflict with the empirical data. Those papers showed that modern behavior as traditionally defined had emerged, both in Africa and in Europe, before the Aurignacian; that the makers of the first Aurignacian remained unknown; that it could not be excluded that Neandertals had been involved in the phenomenon at its earliest stages; that, in central

and southeastern Europe, the absence of diagnostic fossils meant that such pre-Aurignacian early Upper Paleolithic industries as the Bachokirian or the Bohunician, although more likely associated with Neandertals, could conceivably be related instead (as suggested by Bar-Yosef, this volume) to the continent's first modern human populations; and that figurative art, heralded by some as the true criterion of behavioral modernity, only existed in the later part of the Aurignacian, none being known from sites dated to the first five millennia of its duration.

The implication of this recent work should have been that research on the Aurignacian needed to be decoupled from the issue of modern human emergence and re-formulated again as a subject in its own terms, regardless of the potential implications for "big picture" issues. This has not been easy to achieve, to a certain extent because of inevitable inertia; the enduring influence exerted on practitioners of archeology and paleoanthropology by philosophical and paradigmatic bias and the misuse of language, however, has also played a very important role in the last twenty years of Aurignacian "troubles".

Human culture as modern behavior

Part of the problem is that, as the discipline changed and evolved, and as our perceptions of the external reality under investigation changed accordingly, the words created in the nineteenth century were retained to name scientific categories of a totally different nature. Because, as new paradigms emerge, the old ones inevitably survive alongside for some time, this creates a problem of communication — use of the same words to convey completely different meanings. On the other hand, the original choice of words, particularly if they were picked from common language instead of being created *ex-novo* as purely scientific jargon, inevitably reflects the paradigmatic view prevailing at the time. Thus, through the use of the same word, old meanings may become unconsciously incorporated in new concepts and may condition their understanding, interpretation and use by the profession; and, through the use of words borrowed from common language, the meanings associated with them in that realm come to influence the understanding of the scientific concept itself, whether that was originally intended or not, and even if that was originally explicitly rejected. Nowhere is this problem more apparent than in the current use in scientific language of the word "modern" to refer to the body morphology and the behavior of people that, in actual fact, lived more than 30 000 years ago.

Until the 1970s, European Upper Pleistocene hominids were referred to in the literature as "Neandertal" and "Cro-Magnon". Subsequently, the latter designation largely disappeared from technical papers, although one can still find it in works written for a wider audience, and was replaced by that of "anatomically modern humans". An explicit rationale for this change may exist somewhere in the literature of the late 1970s, but it is clear that the rapid acceptance of the new manner of speaking was related to the paradigmatic change in human evolution studies that occurred at about that time. In post-war years, the process was viewed by most practitioners as unilineal and stadial. It was the evolution of a single species with geographically differentiated, co-evolving populations going through similar stages of development, where biology and culture changed hand in hand. An influential European researcher, A. Leroi-Gourhan, designated those stages as Australanthropian, Archanthropian, Paleanthropian and Neanthropian. Where the origin of the latter was concerned, the answer was clear and unambiguous: they derived from their local Paleanthropian predecessors.

This view was to be replaced by one where evolution is bushy, and extinctions, bottlenecks, expansions and replacements are part of the process through which present-day

human populations came into being. In particular, it became clear, first on a paleontological basis and then also on a genetic basis, that Africa had played a key role in human origins at least twice: in the Lower Pleistocene emergence of Leroi-Gourhan's Archanthropians, first; and then in the Late Pleistocene dispersal from Africa into Eurasia of the Neanthropians. Put another way, Neandertal Paleanthropians had not evolved to become Cro-Magnon Neanthropians; in spite of potential admixture at certain times or places, in a long-term evolutionary framework it was appropriate to conclude that the latter had replaced the former (Stringer, 2002; Trinkaus and Zilhão, 2002).

In this context, using Cro-Magnon to designate the ancestral African populations from which descended the European humans associated with the designation would have been odd, even Eurocentric, and one can understand the need to find an alternative. In retrospect, however, the choice of the designation "modern" instead of, for instance, "Qafzeh-Skhul", or "Omo-Kibish", was a rather unfortunate one. Granted, this choice was appropriate within a certain explanatory framework, one that postulated the short-term extinction of all morphologically "archaic" penecontemporaneous human groups and their complete replacement, with no admixture, by populations exclusively descended from a very small group of people living somewhere in eastern Africa around 150 000 BP — the "mitochondrial Eve hypothesis" (Cann et al., 1987). In such a scenario, the Qafzeh-Skhul or Omo-Kibish group could be conceived as "us as we were then", i.e., as people as "modern" as our relatives of only two or three generations ago (in the sense that they were the direct ancestors of "us", the one species of humans living on planet Earth in modern times).

"Modern"

If, however, the strict replacement-with-no-admixture scenario is rejected, as it is becoming increasingly clear that it should be, the simple fact that the word modern is used to describe those in fact chronologically archaic Qafzeh-Skhul or Omo-Kibish people makes it especially and unnecessarily cumbersome to explain (and to obtain a correct understanding of) alternative views. This is related, to a great extent, to the meanings that both the word modern and the opposition modern versus archaic have in common language, where modern often means more evolved or superior. The Merriam-Webster on-line Dictionary (<http://www.m-w.com/cgi-bin/dictionary>), for instance, gives the following meanings for modern: "of, relating to, or characteristic of the present or the immediate past"; "of, relating to, or characteristic of a period extending from a relevant remote past to the present time"; "involving recent techniques, methods, or ideas". Archaic, in turn, often means less evolved or inferior; according to the same dictionary, it may mean "of, relating to, or characteristic of an earlier or more primitive time", "surviving from an earlier period" and "typical of a previously dominant evolutionary stage". As a result, referring to a group of people who lived more than 100 000 years ago as modern (i.e., both more evolved and present) and as completely different and separate from their archaic (i.e., both less evolved and typical of the past) contemporaries implicitly conveys the teleological concept that those modern people were somehow predestined to prevail and become what they (in fact "we") are today. By the same token, such a practice also sets the intellectual background for the search of a prime mover residing in the immanent properties of being modern that would explain such an ultimate prevalence.

An analogy drawn from the automobile industry helps to make this point more clearly. Automatic cars became common in the American market in the 1950s. Today, they are almost exclusive in that market. However, nobody refers to American automatic cars of the 1950s as

modern, and to their contemporary gear-shift cars as archaic, simply because the former ultimately prevailed and the latter went extinct or near-extinct. And nobody refers to twenty-first century European cars as archaic simply because they are gear-shift, not automatic. More importantly, no one these days refers to any car manufactured in the 1950s, either gear-shift or automatic, as modern; and people in search of explanations for why automatic cars ultimately prevailed in the American market do not propose to base such explanations in the mechanical properties of automatic transmissions. We look for explanations in how the different transmissions relate to the environment (user-friendliness, safety, fuel economy, corporate interests of the manufacturers, lobbying, market competition, etc.), and understand that their performance depends on both the inner mechanism and its interaction with the exterior world (the car as a whole, and its use in daily life). Yet, for the better part of the last two decades, when talking about late Middle and early Upper Pleistocene human populations, the wiring of the brain, genes coding for language, or the position of the larynx, have often played the same role in prevailing models as they would in imaginary theories of the “immanent-superiority-of-automatic-transmissions” that would be rejected up front as valid explanations when discussing cars instead of modern human origins.

And this is in spite of the fact that, where the latter are concerned, and contrary to twentieth-century car transmissions, we have no access to the observation of the inner mechanism, only to the byproducts of its performance. Thus, if performance is found to be equivalent across the spectrum of biological variation of later Pleistocene human populations, there should be no point in speculating on the specifics of the two putatively different inner mechanisms, given that the latter are completely beyond reach and that, at the end of the day, both got the job done. That such speculations nonetheless abound betrays the widespread acceptance of the notion that ultimate prevalence implies immanent superiority, but another simple analogy suffices to demonstrate the invalidity of such a notion. As a PC-user, I can understand that my computer-world conspecifics might find some comfort in the notion that PCs ultimately prevailed in the world of personal computing because of a superior hardware, and that Macs, at present already confined to niches, are doomed to extinction sooner rather than later. Naturally, Mac-users would strongly object to such a notion, and excellent cases for the technical superiority of Macs can actually be found in the computer literature. Thus, if indeed PC-users are to become the single species of personal-computer users on planet Earth, that may well be not because their hardware was superior, but in spite of the fact that it was inferior!

The use of the words archaic and modern in this context also carries another major implication. When we talked about Cro-Magnons, it was clear that we were talking about fossil people. When we talk about moderns, however, it is easy to conceive of our object simply as people like us and to forget that natural selection did not stop affecting humans once the set of anatomical features that we call modern morphology emerged. It is precisely in such an error, however, that, modern human origins research often tends to fall. A case in point is the practice of comparing the mtDNA of Neandertals with that of present-day modern humans as if the latter were representative of their Pleistocene predecessors, i.e., as if mutation and lineage extinction over the last 150 000 years had been non-existent or irrelevant.

“Species”

This problem is compounded by the notion that Neandertals and moderns were different species. The argument was originally based on morphological contrasts between fossils,

but has recently been made mostly on the basis of the genetic evidence. However, even if one were to accept that the amount of morphological difference is sufficient to warrant the classification of Neandertals as a separate paleontological species, no one-to-one correlation can be established between distances in morphology, genes, behavior and overall biology. And, even if one were to accept as legitimate the logically flawed mtDNA comparisons, the amount of genetic difference recognized is much smaller than that found at the inter-individual level in, for instance, separate populations of chimpanzees (Gagneux et al., 1999). By primate standards, therefore, the genetic evidence would in fact suggest that Neandertals and moderns were different populations or subspecies of the same biological species, not different biological species.

More importantly, the practice of referring to these populations as different species carries a series of implications related to the common scientific usage of the species concept, according to which a particular species is also characterized by a particular behavior. This sets the intellectual background for a research agenda where the aim of paleoanthropologists is supposed to be that of defining “Neandertal behavior” versus “modern behavior”. The basis for the agenda is the genetic evidence but, even if we were to accept that such evidence does substantiate a significant amount of biological difference between Neandertals and their modern contemporaries, this needs not have had any behavioral implications. The convenience of mtDNA for phylogenetic purposes resides in its fast mutation rate and in the fact that it is transmitted only along one line, with no recombination. But the DNA in our mitochondria is in fact a vanishingly small percentage of the total genome, and what it measures is drift, not change brought about by adaptation. Consequently, finding that there is a significant mtDNA difference between Neandertals and early modern humans carries, by definition, no meaning in terms of assessing their putative genetically-based behaviors (Zilhão and Trinkaus, 2001).

In any case, the expectation that adaptations must have been species-specific implies that there must be some biologically-based behavioral constants in what Neandertals and moderns did that (1) differentiate between the two, and (2) underlay the many apparently different concrete manifestations of such behaviors and, indeed, countless papers and tens of thousands of pages have been written where the empirical evidence from a particular site or region is used to make inferences on the behavior of the Neandertals or of the moderns. The underlying assumption is that whatever Neandertals, for instance, did with hearths, or raw-material procurement, or herbivore hunting, in, say, France, or Holland, is what Neandertals-as-a-species did at any place in their geographical distribution and at any time in their chronological range. The facts, however, show that the assumption is wrong: residential mobility, exploitation of marine resources, settlement features, manufacture of bone tools and ornaments, burial, etc., show a considerable degree of variation in Neandertal societies across time and space, much as it happens with coeval early modern societies.

“Behavior”

The extraordinary influence that this environment continues to exert on current research is clearly apparent in the most recent review of the evidence relating to the origins of modern behavior (Henshilwood and Marean, 2003, p. 643-644); at the end of an exhaustive discussion of these issues, the authors present what is the most clear and fully explicit formulation of the otherwise often simply assumed, implicit rationale that human behavior is species-specific:

“... wildlife ecologists regularly describe the scope and variety of the anatomy and behavior of a species [...], and these descriptions form the definition of that species relative to others. No two species are exactly alike in their behavioral and anatomical repertoires, and these taxonomically based descriptions form the empirical starting points for the recognition of patterns in behavior and anatomy and eventually for the development of a general theory about the relations between such things as environment and social behavior. Could we seek similarly succinct definitions of *Homo sapiens* and *H. neanderthalensis*? If they are different species (and we believe that they are), then a singular description must exist for each; otherwise their divergent evolution followed an evolutionary pattern unknown among other animals. The description of *H. sapiens*, then, would be our definition of ‘modern human behavior,’ and we believe that symbolically organized behavior would be at its foundation. [...] We would extend this foundation by suggesting [...] that we need a new term for ‘modern human behavior.’ [...] We suggest ‘fully symbolic *sapiens* behavior.’ We see fully symbolic *sapiens* behavior as the culmination of a long line of developments toward modernity.”

Henshilwood and Marean then provide their solution for the key question of how can “fully symbolic *sapiens* behavior” be recognized in the archeological record: “The point at which we recognize it archaeologically must be when artifacts or features carry a clear symbolic message that is exosomatic — for example, personal ornaments, depictions, or even a tool clearly made to identify its maker.” Both personal ornamentation and body painting, however, are documented among Neandertals; personal ornaments are a well-known feature of the Châtelperronian, and the use of manganese crayons for body painting is documented in the MTA of Pech de l’Azé I (d’Errico et al., 1998; Soressi et al., 2002; d’Errico, 2003). Conversely, figurative art is not documented, at present, among anatomically non-modern humans, but the same is true of many human societies of the historical and ethnographic present. By Henshilwood and Marean’s own definition, therefore, Neandertals and moderns are not behaviorally distinct and, under the behavior-as-species-specific paradigm, there should be no escape to the conclusion that, therefore, they were not different species! Instead, these authors 1) suggest the existence of a problem of (poor) definition, particularly the use of inadequate trait lists and 2) disqualify the Neandertal evidence as “rare” and “relatively unspectacular”, i.e., unrepresentative.

It is easy to see, however, that the problem is not a definitional one. For instance, it is not difficult to compile a trait list effectively discriminating 100% of the time between industrial and hunter-gatherer societies of the historical and ethnographic present. Ever since the nineteenth century, however, most anthropologists have refused to frame the differences between such societies in terms of the emergence of the biological capabilities required for the development of “industrial behavior”. Instead, these differences are explained in terms of uneven development along separate, largely isolated historical trajectories. By the same token, the fundamental “behavioral” differences between industrial societies and those which preceded them in the corresponding trajectories are not framed in terms of the emergence of the biological capabilities for industrial behavior because different moments of a single developmental trajectory cannot be compared without adequate consideration of the time factor.

In fact, since human behavior, or “culture”, is cumulative, the passage of time, or “history”, is in itself a powerful explainer, through the build-up of social knowledge and population numbers, of differences between human societies separated by tens of thousands of years. The implication of the behavior-as-species-specific paradigm is that, organically and behaviorally, the Cro-Magnon people of 30 000 years ago had more in common with, say, the

paleoanthropologists of today, than with penecontemporaneous archaics (namely, the Neandertals). Simple common sense, however, suffices to understand that, even if that assertion may hold where anatomy is concerned, it certainly does not hold when it comes to culture. For instance, whereas paleoanthropologists are capable of elaborating at length on their own behavioral modernity, Cro-Magnon people of 30 000 years ago most certainly could not!

The “representativity” argument, on the other hand, is logically inappropriate and internally inconsistent. Henshilwood and Marean (2003, p.646) state that

“in contrast to the situation in Africa, the sample of Neandertal sites is huge, but the sample of symbolic material culture is tiny. Once modern humans enter Europe in the early Upper Paleolithic, there is a dramatic expansion in the record of this symbolic expression. Furthermore, we know that modern hunter-gatherers inhabiting these northern environments have elaborate material culture with regular external symbolic storage. While there are a few isolated finds that suggest some symbolic activity among Neandertals, there is a difference in kind here that is impossible to deny.”

By the same token, however, it can also be said that modern southern African hunter-gatherers have elaborate material culture with regular external symbolic storage, and that, while there are a few isolated finds that suggest some symbolic activity among early and mid-Upper Pleistocene south-Africans, “there is here a difference in kind that is impossible to deny”. That such differences in kind exist, however, does not mean that one can legitimately conclude that “fully symbolic *sapiens* behavior” only emerged in South Africa after ca.20 000 BP because, if ornaments and decorated bone tools are archeological criteria for “fully symbolic *sapiens* behavior”, then the issue is one of presence or absence, not of frequency. If “fully symbolic *sapiens* behavior” is a pre-requisite for the production of decorated bone tools and objects of personal ornamentation, that such items exist, whether their number is small or large, must be sufficient evidence that the behavior also exists.

In the case of the Neandertals, moreover, the frequency is not even that low. In fact, the total number of Châtelperronian sites with some preservation of organics currently known is 65, of which nine (14%) contain ornaments and bone tools. The number of Aurignacian sites with some preservation of organics currently known may be estimated at some 230; Geißenklösterle, Vogelherd, Höhlenstein-Stadel, Hohle Fels and Stratzing are the only Aurignacian sites (2% of the total) with sculptured depictions of animals and humans (Conard, 2003). Thus, if the Austrian and German finds are representative of early modern human behavior, then the much less exceptional (in fact, seven times more frequent) occurrence of ornaments and bone tools in the Châtelperronian must be considered as no less representative of Neandertal behavior (Zilhão and d’Errico, 2003).

The Aurignacian as modern human emergence

Henshilwood and Marean (2003, p. 646) acknowledge that “the criteria used to define modern human behavior, derived from modern people, are present among non-modern people such as Neandertals”. However, instead of accepting that evidence for what it is worth in the framework of the body of theory they themselves embrace or put forward, they remain unshaken in their twin “belief” that Neandertals and moderns must have been different species and, hence, must have had different behaviors. After decades of trying, all attempts to put together an empirical case in favor of such a view have failed. Notwithstanding, the paradigm

survives, and with it the use of words and concepts that entrap the discussion in frameworks so fixed that the debates tend to revolve in circles, and progress in a common understanding of the issues becomes difficult, if not impossible.

The current situation of Aurignacian research is perhaps one of the most extreme examples of this. Because of the practice of equating the Aurignacian with “modern human behavior” and with “evidence for moderns in Europe and the Near East”, interpretations and positions tend to be excessively conditioned by conscious adherence to explicit paradigms or unconscious adherence to implicit meanings; as a result, the scientific discourse is all-too-often disconnected from the empirical record to an extent that consensus through hypothesis-testing cannot be reached and special pleading replaces Occam’s Razor and the principle of parsimony as the logical basis for the evaluation of the likelihood of the different hypotheses. Given how value- and meaning-laden the word has become, even a simple discussion on whether a certain assemblage is or is not Aurignacian inevitably goes way beyond a straightforward evaluation of its technological and typological features, and often gains such emotional overtones as one might otherwise find hard to believe the simplest of stone artifacts, related to the most mundane of daily activities, had the power to rouse.

The Aurignacian in relation to the Châtelperronian

That paradigmatic bias tends to carry more weight than fact in the modern human origins debate is not new, and can be seen very clearly in the change of meaning the categories Aurignacian (and Châtelperronian) went through in the last two decades of the twentieth century. In the late 1960s and 1970s, it was suggested that the units of European Upper Paleolithic systematics should be understood as technocomplexes (cf., for instance, Clarke, 1979), not chronological subdivisions (as originally formulated, in the nineteenth century), or ethnic cultures (as in the earlier part of the twentieth century). But, in the context of the paradigmatic changes reviewed above, the establishment of associations between the Châtelperronian and Neandertals, on one hand, and between the Aurignacian and anatomically modern humans, on the other hand, eventually led to their treatment as actualized manifestations of the species-specific behaviors of the two species.

Thirty years ago, for instance, Paul Mellars (1973) was of the opinion that “the arguments in favor of ethnic and cultural continuity between the Châtelperronian and latest Mousterian populations in southwest France are virtually conclusive” and that “there seems to be little doubt that the first exponents of upper paleolithic technology in southwestern France were of essentially local, as opposed to exotic, origin”. Throughout the 1990s, however, he eventually came to argue the exact opposite, i.e., that the Châtelperronian was a product of mimicking behavior (Mellars, 1999); impacted by the arrival of Aurignacian moderns, the last Neandertals of France would have copied their culture without really understanding its full meaning. Hence, from being the earliest Upper Paleolithic, the Châtelperronian was downgraded to the status of an epigonal Middle Paleolithic. Since the empirical basis of these opposite views remained the same, this complete reversal of position can only be explained by the fact that, meanwhile, the Châtelperronian had been shown to be made by Neandertals, not moderns (Lévêque and Vandermeersch, 1980; Hublin et al., 1996). Because, in the framework of the paradigm that behavior is species-specific, Neandertals were not allowed to have modern behavior, the empirical evidence had to be re-evaluated accordingly, and the Châtelperronian, once an essentially local development, became acculturation under the influence of an intrusive culture (the Aurignacian) brought by exotic people (moderns).

Definitional implications

Where the Aurignacian is concerned, the impact of this paradigm went beyond re-evaluation and in fact amounted, in practice, to a definitional implosion, both at the level of the characterizing cultural traits and at the level of the time limits bounding the phenomenon. For instance, because it was equated with moderns, and because the re-evaluation of the Châtelperronian as acculturation required an early arrival of moderns in Europe, an Aurignacian earlier than or contemporary with the Châtelperronian had to exist, leading to an “earliest Aurignacian rush” that to this day still runs quite unabated. As a result, 1) assemblages were some times too quickly dubbed Aurignacian even when no sound evidence for the diagnosis existed, 2) any radiocarbon results that might provide some support for the notion that the Aurignacian, not the Châtelperronian, represented the earliest true Upper Paleolithic of Europe were all too uncritically accepted, and 3) direct ancestor-descendent links between the Aurignacian and previous industries (that is, under the behavior-as-species-specific paradigm, in the explicit or implicit understanding that those industries also stood for an early presence of early moderns) were proposed without due consideration of the actual technological evidence and of the differences that exist between the transmission of cultural traits and that of biological ones.

This environment may explain, for instance, why the age of ca.39 000 BP suggested for the Aurignacian at El Castillo on the basis of samples from the excavations of the 1980s (Cabrera and Bischoff, 1989) went virtually unchallenged for a whole decade. As it eventually became clear (Zilhão and d’Errico, 1999, 2003), in the excavated area there were virtually no diagnostic Aurignacian items, and certainly no ornaments, bone tools or art objects; the dates were presented as “Aurignacian” because of stratigraphic correlation with level 18 from early twentieth-century excavations, which did indeed contain some Aurignacian items. The “level” from that earlier work, however, was a one meter thick palimpsest containing also a major Mousterian component (such a multi-component nature having since been confirmed beyond any reasonable doubt by the dates of ca.43 000 and >47 300 BP obtained on two samples of deciduous elephant molars likely to have belonged to the same individual — Stuart, 2005). The correlation was therefore extremely weak, but the results were nonetheless widely accepted.

A similar age has recently been proposed for the Aurignacian of the Geißenklösterle, in spite of the fact that, again, that level is a palimpsest of occupations by carnivores (particularly cave bears) and humans, and that none of the 12 dates that were obtained on samples from bones with anthropic marks came out earlier than ca.36 500 BP (and, out of a total of 33, only one, in fact, has a mid-point of ca.40 000 BP) (for an extensive discussion, cf. Conard and Bolus, 2003; Conard et al., 2003; Zilhão and d’Errico, 2003; Teyssandier et al., this volume). Moreover, it was suggested that such an age represented evidence for early modern humans in the region, even if 1) no modern human skeletal remains dated to before ca.35 000 exist anywhere in Europe (Trinkaus et al., 2003), and 2) the results available for the two individuals from the Neandertal type-site in neighboring Rhineland place them precisely at ca.40 000 BP (Schmitz et al., 2002). In this context, even if one were to accept that the single bone from the Geißenklösterle dated to ca.40 000 BP related to Aurignacian human behavior, application of Occam’s Razor should have led to the inference that such an early Aurignacian had been made by Neandertals, not that moderns had already settled the Swabian Alb at that time. Notwithstanding, the Geißenklösterle results now tend to replace those from El Castillo as evidence for the very early presence of moderns in Europe, with all the correlates (art, etc.) that such a presence has in the framework of the behavior-as-species-specific paradigm (Sin-

clair, 2003). The archeological basis of such interpretations, however, is no stronger in southern Germany than it was in northern Spain.

It is also understandable and almost inescapable that, in an intellectual background generating the expectation that a very early Aurignacian should exist, the criteria to identify the presence of the entity are relaxed; given the right date, even a glimpse of evidence goes very quickly from being suggestive to become conclusive. The result, often, is that, at the operative level, carinated scrapers are taken as Aurignacian index fossils, and, at the conceptual level, the Aurignacian is implicitly redefined as an ethnic entity — the complete, integrated package of a genetic configuration with a physical type and a set of cultural traits. Paradoxically, given the oversimplified nature of the archeological criteria underlying them, such uses of “the Aurignacian” in fact enable a school of opponents of the paradigm to counter that “the Aurignacian” as a past cultural or behavioral entity has no real existence, and that the word should be treated as no more than a convenient short-hand for the transitional time period during which Neandertals and the Middle Paleolithic were replaced by or transformed themselves into modern humans and the Upper Paleolithic (cf. Straus, 2003). The consequence is that, in the early twenty-first century, whereas other aspects, issues and periods of Prehistory fully benefit from the incorporation into mainstream practice of the processual and post-processual critiques of traditional archeology, namely the understanding of the taxonomic units of the Paleolithic as technocomplexes, research on the Aurignacian has remained to a large extent entrapped in the more than fifty-year old “culture” versus “period” dichotomy.

Authorship implications

This becomes especially apparent when “origins” issues are at stake (and those kinds of issues do carry a lot of weight in current research as a result of the binding relation that came to be established between the Aurignacian and the emergence of modern humans). Because moderns are supposed to have originated somewhere else, so must the Aurignacian too have a point of origin outside of Europe. Establishing it somewhere in the east substantiates models of Out-of-Africa dispersal, but, by the same token, for Out-of-Africa opponents, identifying that point of origin somewhere in western Europe scores a significant number of points towards refutation of that model. Throughout the 1990s, at least two attempts were made to root the Aurignacian in previous traditions that are good examples of these intellectual mechanisms; even if their solutions and ultimate objectives were different, if not antagonistic, the logic of the argument was basically the same.

In the framework of the Aurignacian-as-moderns paradigm, a phyletic connection with the later Aurignacian was argued for the Bachokirian of Bulgaria, not yet quite Aurignacian but on the evolutionary track to Aurignacian-ness (Kozłowski and Otte, 2000): in the beginning, there were thick blade blanks shaped by lamellar retouch, which, over the millennia, gradually evolved into true carinated scrapers-cores for the production of bladelets. Thus, cultural change was represented as proceeding through the mechanisms of biological evolution, as if stone tools were organic entities that could generate their own selection-shaped descent, while at the same time, completing the full circle, such an evolution of the Bachokirian into the Aurignacian substantiated the notion that the latter had indeed been made by modern humans, as was putatively the case with the Bachokirian. At the other end of Europe, it was proposed, on the contrary, that the early “Aurignacian” of El Castillo had evolved out of the local Mousterian, and that the assemblage from level 18 in fact represented a “Transi-

tional Aurignacian” conceptually akin to the Bachokirian, the implication being that of a Neandertal, or at least part-Neandertal authorship for the Aurignacian (Cabrera et al., 2001). The conclusion and the implication were different, but the mechanism proposed for northern Spain was also based on an organic view of the development of lithic assemblages whereby such things as the simple scrapers made on the distal end of thick blades of the Bachokirian could be conceived as the evolutionary ancestors of carinated pieces.

It is clear that a given stone tool technique has to be invented and ameliorated by some person or persons belonging to some group or groups. The problem, however, is that the amount of time involved in the process is in the order of magnitude of the days or weeks that an experienced knapper would need to perfect the technology; a longer period of time is then necessary for an individual’s invention to become socially adopted and, therefore, archeologically-visible, but the duration of time required for testing, improving and spreading across the wide and open exchange networks of hunter-gatherer societies is in the order of magnitude of a few generations. Because of the poor chronometric resolution of archeostratigraphic sequences and dating methods in such remote time periods as that of the “Transition”, it is to be expected in the first place that such kinds of spreads will be so rapid that the emergence of the innovation in the archeological record will appear as instantaneous to the observer across vast expanses of geography. As a result, establishing a specific “origin” becomes difficult, if not altogether impossible, as it seems to be indeed the case with the Aurignacian. However, the fact that such a pattern of instantaneity exists is in itself highly informative of the demographic and social properties of the human occupation network in place during the specific time interval and in the specific geographical range concerned. Thus, even if the kind of Aurignacian origins-research guided by simplistic correlations between biology and culture that of late has featured so prominently and with such far-reaching implications is in fact a rather unproductive enterprise, that should not be taken as meaning that, if appropriately conducted, research on the Aurignacian and its distribution across time and space is devoid of implications for the modern human origins debate.

For instance, if, in spite of poor chronological resolution, different kinds of innovations, especially if in different realms, are observed to appear simultaneously and covering a similar geographical range, the hypothesis that a link exists between them is legitimate and warrants pursuit of explanations for the nature and causes of the hypothesized link. The skeletal evidence for modern human morphology indicates that it appears in Europe no earlier than ca.35 000 BP (Trinkaus et al., 2003), that is, in the same time interval and in the same geographical range occupied by early Aurignacian industries of the Proto-Aurignacian variety (cf. the papers by Bon and Bordes, this volume). Their fairly uniform stone tool technology, as well as the widespread distribution of the distinctive split-based bone points of the subsequent Typical Aurignacian stage (cf. Liolios, this volume), contrast markedly with the preceding panorama of regionally differentiated pre-Aurignacian, initial Upper Paleolithic techno-complexes, which, as documented for the Châtelperronian, are likely to have been the work of Neandertals. This discontinuity is, thus, a powerful argument in favor of the establishment, in Europe, of a connection between the emergence of the Aurignacian and that of modern humans.

The difference between biological and cultural dispersals

However, there is no reason to think that the establishment of such a connection is the equivalent of an effective demonstration that the Aurignacian was indeed a fully integrated

and inseparable biocultural package. Because their mechanism of transmission is Lamarckian, not Darwinian, ideas and techniques can spread much faster than genes, and in different directions; as a result, contemporaneity within an “instant” of time that may in fact have lasted up to two or three millennia may be accounted for in many different ways, some of which, in the light of the ethnographic evidence, are equally if not more viable than the complete package model. For instance:

a) The Aurignacian may have been a technology developed by modern human groups once they start to spread into Europe. Ensuing interaction with local Neandertals would have originated the formation of hybrid zones, resulting from biological admixture (cf. Eswaran, 2002) and where technology introduced through exchange with the moderns ultimately prevailed. As continued gene influx from the east forced a gradual westward displacement of the hybrid zone, the Aurignacian spread with it. The appearance of the early Aurignacian in the archeological record of a given region could thus represent a proxy for the passing-through of the hybrid zone, i.e., a proxy for admixture, not for complete replacement.

b) The Aurignacian may have been invented somewhere in western Asia and in a biologically modern milieu, prior to the expansion of modern human groups into Europe. The innovations would have been somehow acquired by groups of Neandertals in nearby regions who, in turn, diffused them across the rest of the Neandertal world. When Aurignacian modern human groups finally entered Europe, they would have encountered, mixed with, or altogether replaced, Neandertal populations that, at the time, had already become Aurignacian as well.

c) The Aurignacian may have been invented in Europe by Neandertals just before modern human groups started to disperse into the continent. Because this technology was judged to perform better in the new environments that they were settling, incoming moderns could have adopted it, either in the framework of biological admixture processes or through the occasional situations of contact and exchange that must have occurred even in a migrationist scenario of complete replacement with no admixture. Then, through alliance and exchange networks, the acquired technology would also have spread eastward to Asia, way beyond the westward moving Neandertal/modern frontier and in the opposite direction.

Testing these different alternatives (and there are of course others) is not easy. For instance, even in the extreme example of Neandertal bones being found in an early Aurignacian context in, say, France, or southern Germany, that would not necessarily refute the notion that the technocomplex originally emerged among modern human populations, and that the contrast between a fragmented pre-Aurignacian and a technologically fairly homogeneous Aurignacian Europe is related to the spread of modern humans across the continent. Under alternative b) above, the notion and the find are fully compatible.

The point made by these examples is that letting models of human evolution influence the definition of the archeological categories of the Middle to Upper Paleolithic transition so that they can be accommodated to favored views of how biological modernity emerged and spread is counterproductive and can only lead to an ever-growing confusion of the issues. A good example of the potential (and, in fact, actual) problems is the recent paradoxical suggestion that the origin of the Aurignacian is to be sought in regions where the known assem-

blages are the least Aurignacian-like (central Asia, Afghanistan), and that the “Aurignacian-ness” of assemblages is best recognized in regions (France) where it arrived latest and, hence, should be considered least typical, even if that is where it was originally defined and is currently better known: “as it diffuses westward, the Aurignacian constitutes itself as such, while at the same time undergoing such a transformation that it can hardly be identified at its Atlantic extremity, where it is very specialized and relatively late” (Kozłowski and Otte, 2000, p. 13; my translation from the French original).

Towards a definition of the Aurignacian as a technocomplex

Faced with the unsurpassable contradictions and paradoxes of the “Aurignacian-as-modern-behavior” model, some authors have been led to argue for degrees of biological and cultural continuity across the Middle-to-Upper Paleolithic transition that would make such categories as Aurignacian or Châtelperronian essentially useless and misleading (cf. Clark and Lindly, 1991; Riel-Salvatore and Clark, 2001; Straus, 2003). This trend, however, is not very helpful either. Human intelligence requires the use of categories to organize and reduce the infinite diversity of the outside world, and science requires standard definitions of the categories operative in the different fields of research. It should be possible to achieve a widely shared definition of the Aurignacian that holds irrespective of paradigmatic adherence to models of modern human emergence, much as such definitions exist for other taxonomic units of the Paleolithic, like, for instance, the Solutrean, the Creswellian or the Acheulian. Granted, all such definitions also have their problems, but in no other case are they of the level of magnitude of those currently afflicting the Aurignacian. There is no reason for this state of things. If Levallois cores and Upper Paleolithic-type blade technologies have a temporal and spatial distribution that cuts across biological boundaries, and if nowadays it is widely accepted that they are per se not indicative of anything in terms of modern human origins (cf. Bar-Yosef and Khun, 1999), why must carinated technologies be so special as to make the Aurignacian different in that regard?

The only productive way to move forward in the understanding of the Middle to Upper Paleolithic transition in Europe is to achieve refined and widely shared definitions of the relevant basic archaeological categories that do not convey implicit or unconscious assumptions about the nature of the processes involved. For instance, we need paleontological definitions of Neandertals and “moderns” that allow discrimination between them, and appropriate classification of osteological remains that hold irrespective of the different evaluations of the paleobiological status of the two paleontological taxa; accordingly, fossil “moderns” should be more adequately renamed. By the same token, we need an operative definition of the Aurignacian that holds irrespective of any interpretation of the historical significance of the category. Such a definition should be based exclusively on lithic technology, which is the basis of Paleolithic taxonomy; other items of material culture, which frequently do not preserve archaeologically (bone tools, ornaments, art), should not be included in the basic definition, although they may play an important complementary role, particularly in attempts at defining more circumscribed time-space units with the potential to approach ethnographic categories (culture area, ethnic entity, language group, etc.; cf., for Aurignacian ornaments, Vanhaeren, 2002).

The basis of this definitional work was laid down in post-war years by F. Bordes, J. Combier, H. Delporte and D. de Sonneville-Bordes, and significantly improved by the introduction of the *chaîne opératoire* concept and the technological perspectives developed by

A. Leroi-Gourhan and J. Tixier. If the proof of the pudding is in the eating, then the simple fact that, most of the time, predictions derived from the type-list diagnosis of an assemblage as Aurignacian are independently verified by radiocarbon dating must mean that the basic elements of that definition are valid. Numerous lithic analysis studies carried out since (cf., recently, Chiotti, 1999; Lucas, 2000; Bon, 2002; Bordes, 2002; Teyssandier, 2003) have shown that such a success is due to a real, broad technological regularity, with many procedures being shared throughout space and time: 1) the production of large blades from single platform prismatic cores; 2) the careful preparation of blade cores (through abrasion of the edge or faceting of the platform) in the optimal stage of reduction sequences, when soft hammers were systematically used, resulting in parallel-sided blades with lipped platforms that serve as blanks for endscrapers and knives; and 3) the re-use of the debris from prismatic-core preparation and renewal (thick, often cortical flakes and blades), and of broken or exhausted tools, set up as thick “scrapers” (carinated or nosed) and thick “burins” (carinated or busked), to be used as cores for the extraction of blanks for different subtypes of Dufour bladelets.

Recent work has also shown that attention needs to be paid to workshop sites, because there are indications that, in the Aurignacian, extraction and consumption tend to be more spatially dissociated than is generally the norm in the Upper Paleolithic, with implications for the logistics of raw-material procurement and for stone tool economics (Zilhão, 1997). It is also increasingly clear that many different things are subsumed in the umbrella designation of Dufour bladelet; a refinement of the category on the basis of the technology of blank production and the mode of retouch might provide clues on temporal and regional variability and help organize the current database of sites and assemblages in more informative ways. Also, our view of the Aurignacian is essentially based on the assemblages from the earliest parts of its time range, between ca.36 000 BP and ca.30 000 BP. More attention needs to be paid to the later Aurignacian, if nothing else because, in such peripheral regions of Europe as southern and western Iberia or the Crimea, the Mousterian lasts longer and such a late Aurignacian in fact marks the beginning of the Upper Paleolithic. Finally, because carinated reduction is a feature of the Aurignacian but is not exclusive of it, archeological entities that have entered the literature with the “Aurignacian” tag attached to them (the “Pre-Aurignacian” of Bacho Kiro, the “Levantine Aurignacian” of the Levant, the “Aurignacian V” of southwestern Europe, etc.) should be appropriately redefined and accordingly renamed.

If the profession pays adequate tribute to the old motto “Render therefore unto Caesar the things that are Caesar’s, and unto God the things that are God’s”, and work on the Aurignacian as a technocomplex is effectively decoupled from the issue of “modern” human origins, these tasks should not be too difficult. The papers assembled in the present volume, at least, show that there is good reason to hope.

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