Contemporary Aesthetics

Volume 5 (2007)

2007

Paleolithic Flints: Is an Aesthetics of Stone Tools Possible?1

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Abstract
This paper asks whether an aesthetics of Paleolithic tools is possible, and if so, what it might be. The application of our own aesthetic sensibilities to artifacts of prehistory is not difficult. We easily recognize and appreciate their visual and tactile qualities. The more complicated questions that the paper explores are whether we can uncover the aesthetic sensibilities of their makers and, if we cannot, whether aesthetic examination of prehistoric tools from our own perspectives is adequate or useful. The paper is based on study of Paleolithic flints from French archaeological sites dating from about 500,000 years ago to about 11,000 years ago. The stone tools are held in the collections of the Wilson Museum (Castine, Maine, U.S.A.), and the paper is illustrated from these collections.

Key Words
anthropology and aesthetics, anthropology of the senses, cross-cultural aesthetics, paleolithic aesthetics, paleolithic tools, stone tools, trans-historical aesthetics

1. Introduction

The human relationship with stone is as old as humanity itself. The earth, our home, is made of rock and stone. For at least as long as we have been human we have used rock and stone for dwellings, tools, hearths, walls, landscape markers, and for objects we label "art." Our prehistoric ancestors lived in limestone caves and rock shelters. They used the walls of those habitations as a medium for creation, incorporating features of the rock surface into their engraved and painted images. But even before our ancestors made images on stone walls, they made stone tools. Their use of stone tools was one factor in the evolution of a truly human brain. Stone, therefore, is part of our being human.

Any material with which humans live so intimately accrues meanings that elaborate, complicate, and mediate our sensory experiences of that material. We can hardly doubt that stone and the bodily sensations that handling it induced carried important values and meanings for our Old Stone Age ancestors.[2]

That is the theme of this paper, which uses for its examples tools from the Old Stone Age of Europe. It will not discuss cave and rock imagery, which have large literatures of their own, nor will it treat portable stone artifacts, such as body decorations or small figurines. This paper, confined to stone tools, asks the question, "Is an aesthetics of Paleolithic flints possible?" This question embraces two large and related issues: One is the very possibility of a cross-cultural and trans-historical aesthetics; the other is the question of whether aesthetics is a universal category. The discussion is confined to Europe only because the Paleolithic collection on which it is based comprises only European materials. It is not meant to privilege European prehistory in any way.

Paleolithic stone tools, or flints, are durable surviving bits of the societies and cultures of our human ancestors. We have these flints in abundance, in addition to other evidence of Paleolithic life, such as cave images, hearths and food remains, body ornaments, figurines, and fossil bones. We learn about them from archaeological research and analysis, of course, and from the study of museum collections. Experiments in flint knappinghave taught us much about how flints were made and possibly used. Sophisticated analyses of microscopic patterns of wear on their edges have led to experiments that show how particular types of wear were produced, and hence how the tools were used in tasks such as chopping vegetable matter, scraping animal skins, woodworking, or butchering.

When we moderns look at and handle these stone tools from the past we cannot avoid seeing and feeling them in an aesthetic way; that is, experiencing them in a sensory way, especially through the visual and tactile, qualities that we value. There is an additional sensory frisson that comes from handling a tool that we know some unknown person, twenty thousand or

two hundred thousand years ago, made and used. Look, for example, at this cast of a laurel leaf point dating from between 22,000 and 17,000 years ago.

Cast of laurel leaf point, circa 22,000 - 17,000 years ago. Photos courtesy of the Wilson Museum.

But we recognize that even though some of the appreciating and valuing come directly from the sensory experience, meanings and values are attached to sensory experience that are learned, that are emotional and cognitive. The meaning enhances the sensory. Then should we not ask whether meanings enhanced the value and experience of the tool to its Old Stone Age users? Can we know anything about the thoughts, ideas, meanings, feelings, and values that were culturally engendered and that their makers and users attached to them?

We know from studies of living or recent hunters and gatherers who maintain a subsistence system similar to the subsistence of our Paleolithic ancestors that significant meanings and values are attached to stone and stone tools. But that knowledge leads to a fundamental problem in the anthropological interpretation of the past: Can we attribute the social and cultural features of living or recent peoples whom we have observed to prehistoric peoples because of similarities in technology and subsistence?[3]

We must see these flints as embedded in the social, economic, political, cultural, and ritual life of Paleolithic societies. That very embeddedness enhances their aesthetic value for us. If flints and flint production had significance in any or all of ritual experience, trade networks, personal relationships, food provision, or power over the distribution of resources could not its maker have felt that same added frisson in handling and appreciating its tactile qualities? I, for example, enjoy seeing and using my cooking pots and garden tools. My sensory appreciation is embedded in the social and emotional pleasures, as well as the sensual pleasures, of their association with food.

Surely all human beings are capable of associations that enhance sensory experience. Is it possible to grasp the experience of the flints for their prehistoric makers? Can we know what sensory modes were part of their making and use and which of these were more valued than others? Can we ever apprehend the sensory experience of these flints without recourse to our own formal and sensory categories? Perhaps recent work in cognitive archaeology and the anthropology of the senses will help.

First I will introduce the tools and their makers. Then I will discuss anthropological approaches to aesthetics and the possibility of entering the perceptual worlds of prehistoric people for whom we have only material remains. I will conclude with a discussion of whether and what kind of an aesthetics of Paleolithic flints is possible.

2. The Tools and Their Makers

The Paleolithic period in human prehistory began about 2.3 million years ago, when the unquestionably tool-using hominin *Homo erectus* evolved in east Africa. *Homo erectus* followed the African Australopithecines, some later species of which appear to have used tools around 2.5 million years ago.[4]

The earliest stone tools yet known, Oldowan pebble tools, are found in Africa. A conservative, indisputable date for their appearance in Europe is 500,000 years ago (ya), though the date may actually be as early as 730,000 years ago at Isernia la Pineta in Italy, or even 1.3 to 1.6 million years ago (mya) in southeastern Spain, depending on who is

writing about them.[5] Here is an Oldowan tool from France circa 500,000 years ago:

www.worldmuseumofman.org/oldowaneuropeartifacts1.htm

Homo erectus people and their Oldowan industry never, so far as we know, came to the Americas. Thus the cultural and technological successions in the Americas have their own terminology, even when some tools might resemble those of the Old World.[6]

The Paleolithic in Europe is conventionally divided into the Lower, Middle, and Upper. These technological divisions are based on morphological features of tool assemblages, but recent research appears to blur and question the boundaries of the Paleolithic technological stages that were first developed between 1860 and 1897.[7] In any case, the dates are not absolutely precise.

Table 1: Subdivisions of the Paleolithic in Europe

Lower Paleolithic:	500,000 to 300,000 ya	*Homo erectus*	(certain dates)
	1.6 mya to 300,000 ya	*Homo erectus*	(possible dates)
Middle Paleolithic:	300,000 to 40,000 ya	*Homo neanderthalensis*	
Upper Paleolithic:	40,000 to 11,000 ya	*Homo sapiens*	

The Paleolithic period ended around 11,000 years ago, at which time the archaeological record shows new techniques applied to stone tool making, as well as many other technological, economic, and organizational innovations that mark a new period in human prehistory. The new techniques of the Neolithic, or New Stone Age, added grinding and polishing to the original Paleolithic techniques of hammering and chipping. Here are two tools that illustrate the difference: the upper is a Paleolithic chipped biface; the lower is a polished and perforated Neolithic stone tool.

Paleolithic biface and Neolithic biface compared.

At around 500,000 years ago the archaeological record in Europe changes significantly in amplitude and quality, and begins to supply a great deal of information not just about tools, but about Paleolithic human societies.[8] We will begin at that time.

The ancestral hominins living in Europe half a million years were *Homo erectus*, the people of the Lower Paleolithic. Their stone industry is known as Acheulean, named for the archaeological type site in St. Acheul, France, near Amiens, France, in the Somme Valley. The tool that is always associated with the Acheulean tradition is the tool widely called the hand axe or *coup de poing*, but more properly called a biface. The first two names describe presumed function, but "biface" describes morphology and is therefore a safer and more neutral term. Here are the two sides of an Acheulean biface; that is, a tool worked on both sides. It comes from the type site of St. Acheul, as does the tool illustrated below.

Two sides of an Acheulean biface.

Acheulean bifaces come in diverse forms and presumably filled a range of cutting, chopping, butchering, digging, and scraping functions, but since no living or recent peoples make them, we have no ethnographic comparisons that might help us understand them. Experimentation shows their efficiency in animal butchering, and microwear analysis seems to confirm that

they were used on carcasses.[9]

Another Acheulean biface, two sides.

Homo erectus was followed in Europe by *Homo neanderthalensis* about 300,000 years ago. Neandertal culture is called Mousterian, after the type site of Le Moustier in the Dordogne region of France. Neandertals, as they are commonly known, are most likely not the direct ancestors of modern human beings. Modern *Homo sapiens* from Africa replaced the Neandertals in a mosaic fashion over a period of time ranging from about 40,000 years ago in most of Europe, to 25,000 years ago in some more remote locations.[10] Here are back and front views of two Mousterian tools, a round flake and oblong flake or blade, showing their unifacial rather than bifacial character. Notice the smooth back on the blade tool. Both come from Caverne du Placard, near Charente in the Dordogne Valley:

Mousterian tools, back and front views.

The Levallois technique of tool-making associated with the Neandertals had begun to appear at the transition from Lower to Middle Paleolithic. It involves striking flint flakes from a prepared, shaped core so that the flakes are wholly sharp-edged. These unifacial flakes could be either modified or used as struck. In any case, the technique allowed a much greater length of sharp edge in proportion to weight of raw material than did Acheulean bifacial manufacture, which involved shaping a flint lump or core.[11] This link illustrates the Levallois technique.

anthro.palomar.edu/homo2/images/Levallois_technique.gif

The raw materials for Mousterian tools often came from a distance, even when suitable materials lay at hand. We may wonder what preferences sent the Neandertals on their journeys. It is tempting to assume aesthetic preferences for special characteristics of the stone, but we must think of other possibilities, such as maintaining and expanding social and trade relations.[12] The Neandertals' planning, imagining, and choosing of materials might also suggest sensory appreciation of the qualities of stones and desirable shapes of flakes. Not all archaeologists agree, however, that a mental template came first.[13] Clive Gamble,

for example, argues that the making of Levallois tools was culturally learned, and embodied rather than envisioned: "Rather than learning the artifact's shape and then working to achieve it, the knappers master the actions of making. . . [The Levallois] technique disciplines the body to perform a routine sequence of gestures...." Later he wrote, ". . . the body provides an understanding of the skills and technique involved."[14] It is not clear that embodiment and envisioning are exclusive, but certainly the embodiment and actions of tool-making that Gamble emphasizes are aesthetic, even though we cannot know how the makers valued them.

Around 40,000 to 35,000 years ago anatomically modern *Homo sapiens* entered Europe from Africa and gradually replaced the Neandertals. The modern human beings of the Upper Paleolithic are generally thought to differ from Neandertals in thought processes and consciousness. In their language use, musical expression, and "cognitive fluidity" the people of the Upper Paleolthic were not different from ourselves.[15] In Europe, four stages of Upper Paleolithic culture are usually recognized. The simplest, but not the only, scheme is:

Table 2: Periods and Cultures of the Upper Paleolithic in Europe

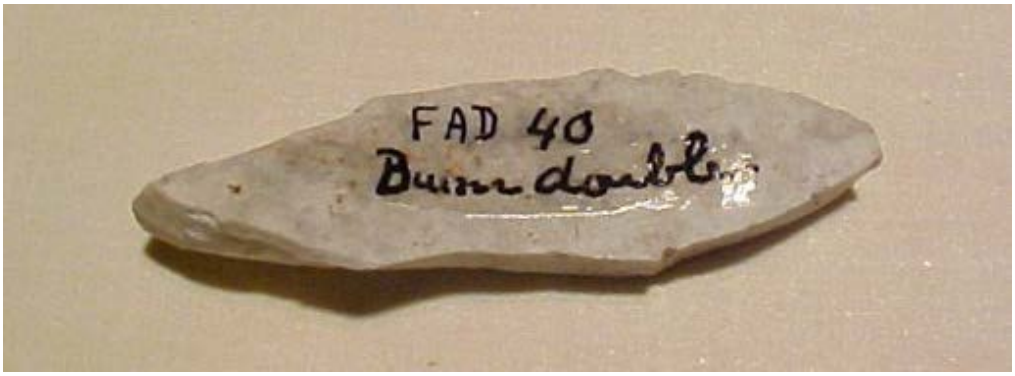
Aurignacian	circa 35,000 to 29,000 ya
Gravettian	29,000 to 22,000 ya
Solutrean	22,000 to 17,000 ya
Magdalenian	17,000 to 11,000 ya[16]

Front view of Upper Paleolithic small tools.

Back view of Upper Paleolithic small tools.

Magdalenian tools from Belloy, near Amiens, France: burins and scrapers.

Aurignacian burin, or engraving tool, and scraper, both from the Dordogne.



Back view of Aurignacian burin.

Upper Paleolithic people used new raw materials-ivory, bone, and antler; made new kinds of tools-needles, awls, fishhooks, and harpoons; and made new tools to make tools. Some researchers have tried to reconstruct Upper Paleolithic mentalité and world view, but their hypotheses are difficult to verify, even though such reconstructions may be useful in stimulating thought.[17]

Now that we have seen something of the basic tools and the hominins who made them, we may move to the central question. We will look at anthropological perspectives on aesthetics, and apply them to the question of whether an aesthetics of Paleolithic flints is possible.

3. Anthropology, Aesthetics, Art, Perception and the Senses

Let us adopt a general, basic, working definition of aesthetics: "the study of how and why objects and situations, natural and human-made, are experienced appreciatively through sensory perception." You will notice that the natural world is included; that both objects and situations are included; that there are no mentions of art, taste, and judgment; and that sensory perception and experience are required. I have considered this definition carefully for the purposes of this paper and for the purposes of an anthropological approach to aesthetics. When I use the word 'aesthetic' as an adjective I am always referring to sensory appreciation and valued sensory experience.

An anthropology of aesthetics, therefore, will adopt the usual elements of an anthropological perspective on anything; that is, it will be comparative, cross cultural, contextualized in society and in the social-physical environment, based on close empirical observation in many particular situations, but synthesizing these multiple cases and if possible generalizing. Thus an anthropology of aesthetics is the ". . . comparative study of valued perceptual experiences in different societies," to which I add, past and present.[18] Aesthetic perception is a lived phenomenon that pervades daily life and belongs to all human activities. It is attributable not just to objects, but is part of behavior and social life.

In the last half-century, if not longer, anthropology has emphasized the social and material contexts of which material production is a part. Anthropologists no longer put artifacts into separate domains that are categorized as "art." In this way of thinking about material things anthropology follows many non-Western ways of thinking. Many objects that Western thought categorizes as 'art' are embedded in daily life, making art a kind of pan-human activity to be understood in its particular social contexts.[19] In any case, we can distinguish conceptually any Western category we may call "art" from a larger category of culturally valued experiences of sensory perception. It is the study of that larger category that constitutes an anthropology of aesthetics. If we think of "aesthetics" as the study of valued experiences in the sensory apprehension of the material and social world then an anthropology of aesthetics means the comparative study of valued sensory perceptions across societies separated by geography or time or both. It also means the comparative study of how discussions of those valued experiences differ in culturally and historically divergent societies. Nevertheless, an anthropology of aesthetics poses its own questions about the transferability of aesthetic categories across times and cultures, and we will consider those issues next.

4. Is Aesthetics a Cross-cultural Category?

Anthropological interest in aesthetics has burgeoned since the 1970s, though certainly it was present before that. The emphasis in the past thirty years, especially in the United States, is perhaps related to what I see as a retreat away from the study of power, inequality, and social organization and into culture and symbolic organization as primary concerns. Those divergent and significant emphases were explicated in 1993 in debates that included a discussion of aesthetics as a cross-cultural category.[20] Howard Morphy argued that aesthetics is a cross-cultural category because aesthetics concerns sensory capacities of which human beings in every society are capable. That is, we can properly use aesthetics in cross-cultural analysis, but always "the aesthetics of objects should be analysed in the context of the society that produces them."[21] Joanna Overing argued the opposite, saying that aesthetics is not applicable to non-Western societies because it is a particularly Western consciousness and discourse about art with eighteenth-century philosophical origins.[22] The debates showed clearly that the two camps represented by Morphy and Overing were not talking about the same aesthetics. Those who agreed that aesthetics is a cross-cultural category focused on sensory experience. Those who disagreed focused on art and Western aesthetic discourse.

I too would argue that the canons and practices of Western aesthetics are not automatically applicable across cultures, but I would also argue, with Morphy, in favor of the commonality of human sensory perception and of the occurrence in many cultures of the kinds of discussion about sensory valuation that we in the West label "aesthetic." Our Western aesthetics is a particular kind of discourse that, among other things, has functioned to maintain hierarchies of power and class, and has, at least in the past, moved certain classes of objects that we call art away from sensory perception into a realm of distancing, objectification, and cognitive rather than sensory valuing.[23]

The equality of sensory endowment among all groups of human beings is not at issue. Nor is the understanding that judgments of beauty and taste diverge from one society and one period of time to another. The same can be said about aesthetic discourse.[24] If we think of aesthetics as the study of how sensory experience is interpreted and evaluated, then aesthetics is not only a study applicable to all human societies, but specific and divergent aesthetic discourses can be located in particular societies and studied comparatively.

Discourses vary, but it is even more important to recognize that sensory experiences and indeed the sensorium vary from one culture to another. We know, for example, that

Westerners place a premier value on vision, and disdain smell as of a lower order. Our visual abilities are usually more developed and refined than our olfactory abilities. That hierarchy is not universal, as anthropologists who have done ethnographic work in non-Western cultures can attest.[25] And because valuation and the sensorium are not the same in all societies, we must ask whether members of one society can truly enter into the sensory experiences and valuations of another. That problem is intensified when societies are separated not only by space and culture but also by time, as we are separated from Paleolithic societies.

At this point a quick review of an anthropology of aesthetics will be useful before I consider whether it can be applied to the stone tools of Paleolithic prehistory. First, an anthropology of aesthetics is independent of traditional Western aesthetic inquiry. It is not about the category that we call the arts, although it includes the arts. Song, dance, all kinds of narratives, personal decoration, design in pottery and fibers, painting, sculpture are, of course, universal, but an anthropology of aesthetics deals with valued sensory experience. The study of sensory values in a range of societiescomes next, and comparison and synthesis follow. Field research includes the cultural interpretation of sensory perceptions, the cultural determination of the sensorium, ascertaining the hierarchy of valuation, and the study of how individual people in any society learn culturally to experience and interpret sensory experience. In the largest sense, it is comparative research into the experience of the physical world in many societies. It requires the understandings that different areas of the sensorium are differently emphasized, that culture is embodied in the sensorium, and that the senses both shape and carry the culture. It further requires that research on sense perception of the world becomes an essential part of anthropological, including archaeological, description and interpretation.[26] The comparative study of culturally-specific aesthetic discourse that developed independently of the west is also important.[27] An infusion from the aesthetic axioms and ground rules of other societies might benefit Western aesthetics, as would recognition of its own embeddedness in the organization of power and class in the West.[28] In sum, an anthropological aesthetics drops any focus on art objects, defines aesthetics as valued perceptual or sensory experience, aims to understand and enter into the sensorium and the aesthetic discourse of the cultures it studies, and to compare and synthesize aesthetic investigations of particular cultures and societies.

The anthropological responsibility for exploring these questions ethnographically is clear. But what about the societies of the prehistoric past, tens and hundreds of thousands of years away from us? Our research method is not direct field observation, but archaeology and the interpretation that it demands.

5. Is an Aesthetics of Prehistoric Flints Possible?

Some scholars argue that there are means of uncovering valued sensory experience in the Stone Age.[29] They apply their methods and interpretations to what we Westerners commonly call art; that is, to wearable ornament, portable figurines, and rock images. But for tools, archaeologist Paul S. C. Taçon points out that "we have no indigenous insight into aesthetic and symbolic aspects of their form."[30] Nevertheless, their fine formal qualities and skilled crafting have been called "aesthetic" and seen as indicators of prehistoric aesthetic sensibility and pleasure in materials.[31] The question of meaning in the making and using of these tools moves us to think of the cognitive elements that enhance sensory appreciation. If we turn to ethnographic research among living peoples, we can see the richness of meaning and the conveyance of sensory appreciation in stone tools, even though, as I have already pointed out, the application of ethnographic comparison to prehistory is as much a question as an answer.

The Aborigines of the Western Desert in Australia, for example, have a special category for stones with distinctive color, shape, or texture, such as quartz crystals, mica, and oddly shaped bits of agate. The category includes prehistoric stone tools that the people of the Western Desert find and re-fashion, and even European detritus such as bits of bakelite plastic or eye-glass lens.[32] Some rocks come from long distances, have totemic associations, and offer valued qualities other than utility or ease of workmanship. They are called 'righteous rocks' because their values "demonstrably depend more upon ideational and symbolic aspects of human behavior than they do upon practical ones."[33] The people of the Western Desert often associate their tools with the power of ancestors and ancestral landscapes, an association strengthened by qualities of the raw material, especially

iridescence and light reflection. The brightness they value belongs to other substances too, such as fat, which are therefore considered aesthetically satisfying and "spiritually charged with power."[34]

Can these observations of the present and recent past be applied to the Paleolithic? Aurignacian archaeological sites yield gleaming objects: beads, figurines, and ornaments made of shell and mother of pearl; of coral, jet, schist and soapstone; of the bones, teeth, and antlers of mammals. Purposive polishing and cross-hatching develop their perceptual appeal.[35] We can enter into the perceptual experience of these objects and appreciate the valued sense perception they embody, but again, they are not stone tools. Certainly stone itself has aesthetic qualities of texture, hardness, shimmer, color, fracture, and susceptibility to polish. Associations with landscape features that themselves carry powerful sensory and cultural meanings may amplify those qualities, as they do among Australian Aborigines. Suggestive also are the Neolithic obsidian blades found in Franchthi Cave on the Aegean coast of southeastern Greece. The raw material was brought from the island of Melos, a dangerous sea trip, and at least one of its excavators, K. D. Vitelli, thinks the aesthetic qualities of the stonewere the primary attraction.[36]

The Paleolithic bifaces of 500,000 to 200,000 years ago are commonly recognized as being handsome as well as functional. Randall White, for example, proposes a Neandertal "interest in novel colors and forms,'' which he illustrates with a handsome color-banded biface and a lump of iron pyrites from Mousterian sites.[37] It is important, however, not to impose our own aesthetic assumptions about color on prehistoric cultures in which social, geographic, or symbolic associations could have been more significant.[38]

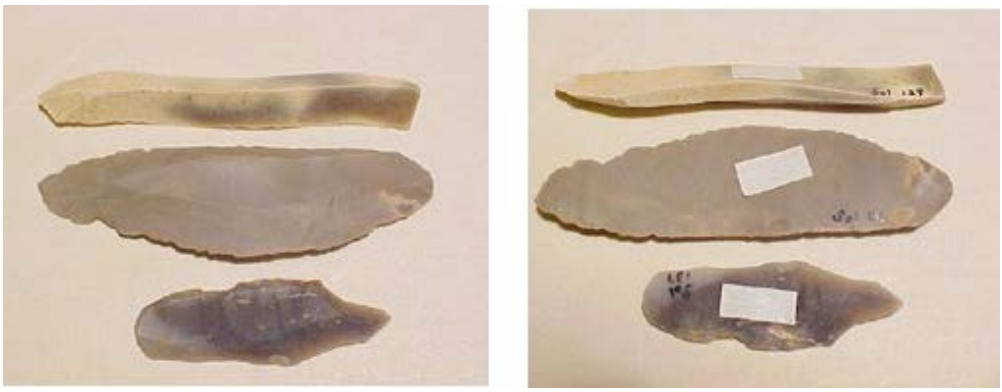
Assemblages of tools from different archaeological sites show varied and distinctive styles that may be related to the raw material. Whether the material determined morphological variation, or whether the maker chose specific materials to conform to an envisioned goal is an unresolved issue.[39] Some archaeologists believe that an ideal end product was visualized.[40] Another explanation of distinctive styles is morphological change over time, but the time periods involved are too short for current dating techniques to disclose. Nor can we know whether the variations are functions of variations in individual skill or of culture, that is, of learned traditions of shape and preference. Of course skills, learned traditions and envisioned goals are not always separable, nor do they exclude each other. Discussions of Acheulean biface style variations are ongoing, but rarely explicit in them is consideration of aesthetic preference.[41]

All material productions are culturally, socially and physically embedded. The traditions of manufacture, the means of manufacture, the social relations of manufacture and distribution, the ideals of form, the uses, and the perceptual values and sensory appreciations associated with the manufacture, exchange, and use of material things-all these are as one.[42] When tools are removed from their tradition, the density of behavior, feeling, and meaning is lost, and the tools are vulnerable to cultural appropriation and incorporation.[43] That is one argument against the possibility of developing an aesthetics of prehistoric flints that does not reflect our own. Even if cross-cultural aesthetics is possible, how much more difficult to think trans-historically about artifacts that are removed from us, not just in culture and geography, but in tens and even hundreds of thousands of years, and to identify Paleolithic aesthetic values in Paleolithic flints. There is an aesthetic component in all direct material production by human hands. The issue is the recognition in a way that does not mirror our own values of that component in the productions of long ago.

Here are some of the questions that such an attempt raises: Can we hope to uncover and enter the thought and value systems of the remote past? Is it illuminating to apply aesthetic notions learned from non-Western societies that we think are comparable to societies of the past because of comparable economies and scales? And even if we think some living or recent societies are comparable to ancestral societies, we can see variations among them, and must wonder if applying their aesthetic categories to the past is as mistaken as applying our own. Finally, is it useful or adequate in any way to study Paleolithic flints with our own categories? If no cross-cultural assessment of aesthetic value is possible, why should we look at Paleolithic flints aesthetically from our own point of view?

Let us look at a few more tools from the Upper Paleolithic in Europe before returning to these looming issues. The Solutrean period of the Upper Paleolithic, circa 22,000 to 17,000 years

ago, supplies some good examples. The first photo shows the back and front of a burin or engraving tool, a scraper, and a point:



Solutrean burin, scraper, and point, back and front views.

The second pair shows the back and front of three Solutrean shouldered points.

Solutrean shouldered points, back and front views.

All of these tools come from Caverne du Placard, Charente, France.

Solutrean peoples inhabited Spain and southern and central France. Characteristic tools define the Solutrean, especially leaf-shaped and shouldered points. Both kinds of point are distinguished not only by shape but also by manner of working, The large "laurel leaf" and "willow leaf" biface points are worked on both sides as well as along the edge. Both faces or surfaces of Solutrean leaf points are shaped by chipping, or retouching. Both retouched faces show concave scars where chips have been removed. The retouching process thins out the pointed end, but leaves a central lenticular cross section . The shouldered points may or may not show retouched surfaces, but their edges are always retouched.[44]

In addition to the large leaf points, which have so far been found only in France, Solutrean tool assemblages include all of the artifact forms that characterize the entire European Upper Paleolithic. There is a variety of stone burins, blades, and scrapers, and a variety of needles and awls made of ivory, bone, and antler. Shell objects also survive, but whatever else the Solutrean people surely made out of skins, fibers, wood, splints or other organic material has not survived. To secure shells the Solutreans traveled or traded or both over long distances, as did peoples all over the world into recent times. Shells for ornaments found in Solutrean archaeological sites came from marine shores as far away as 1500 km (900 miles), and commonly from of 250 km (150 miles) away.[45] Lithic raw materials were also transported, even when equally appropriate materials were available at hand. This willingness to transport and trade might well suggest aesthetic criteria in raw material selection. Surely there were valued tactile or visual qualities, or other sensory qualities that we may not now recognize.

We may recall here the "righteous rocks" that Gould discovered in Australia, and the obsidian of Franchthi Cave. But we must also remember that trade observed among peoples who have been studied ethnographically fulfills important social functions, and we should not assume only aesthetic promptings for prehistoric journeys, nor do we know what other kinds of equally important activities and trading were carried on in the course of these journeys.

Some archaeologists have adopted and adapted the concept of *affordance* that J.J. Gibson, a psychologist of perception, originated. *Affordance* refers to the properties that things have in relation to the observer. The stimulus information is 'invariant,' but what is important is that the values, meanings, distinctive features, and classifications associated with them are learned.[46] Anthropologically this means that we, the observers, learn to interpret culturally, and the same invariant material things will be different to people in different cultures. In the archaeological translation of Gibson, environmental information comes to us from our surroundings, social and physical. From what we perceive directly of these surroundings we derive possibilities for our own behavior. Those perceptions are affordances--the potentials for action that the environment affords us.[47] Gibson focused on the individual psychology of perception. An emphasis more in keeping with the group and cultural focus of anthropology comes from the cultural ecological method and concept of Julian Steward, similar and prior to Gibson's idea of affordance. Environmental information is culturally interpreted, but further, the human group and what we conventionally call 'environment' are all one social-environmental system.[48] With Solutrean tools, for example, we can hypothesize that the raw materials used--generally flint in France and quartzite in Spain-"offered perceptual clues that afforded the expression of. . . salient skills."[49] This interpretation makes the skills prior, but it is equally possible that the raw material choices and the skills were originally worked out together and passed on through cultural learning. Anthony Sinclair argues that a "constellation of knowledge" surrounds the acts of tool-making. The artisan has a prior vision or notion, and then chooses a blank appropriate to that idea on which to work. That lithic blank is the right shape, size, and raw material. To shape that into the envisioned tool the artisan must know techniques of hammering and striking off flakes, must know the nature of the material, must understand variations in pressure and percussive technique, and must be aware of the final goal throughout the process. He points out that it is probable, for example, that the large, carefully made laurel leaf points were for special ceremonial purposes rather than daily use and were made on a learned cultural template.[50] In them the cognitive and the kinetic come together, and are organized into the entire social and economic matrices of production.

Paleolithic tools have been reproduced since the nineteenth century, and so we know that Solutrean laurel leaf points require time, skill, and patience.[51] But even if we can report on the sensory experience of reproducing them, the question remains of apprehending the Solutrean ways of experiencing and interpreting those sensations within their social, cultural, and environmental context.

6. Conclusion

We are all sensory beings, and we can be sure that our prehistoric ancestors were too, even though we live and perceive in different cultural and perceptual worlds. Anthropological approaches to the aesthetic understand the aesthetic as joined with all the other systems in a society, such as religious, political, ethical, kinship, and productive systems. Aesthetics is integrated into human social life, as well as into productive life.[52] Surely all direct, unmediated production by human beings is aesthetic, and thus aesthetics as a study is in theory applicable to all human societies past and present. But universalizing Western categories in the study of aesthetics does not advance the understanding of how sensory perception in material production is experienced in its own setting, or of prehistoric "bodily modes of knowing."[53] In the case of the Paleolithic, we can see conventional aesthetic criteria more easily in productions other than tools, and we call these productions art, but art and aesthetics are not to be conflated.

It is tempting to coerce prehistoric objects and collections, to force out of them for our own interpretive ends more than they might contain, and then to project such interpretations onto their prehistoric makers. As David Howes and Constance Classen have remarked, objects removed from their context may lose their "sense."[54] Aesthetic questions about the Paleolitihic may be more about our own ways of and reasons for collecting and exhibiting bits and pieces of ancient cultures. Museum collections also lead us to focus on objects, to study

materials, techniques, and modes of exhibiting. We more often call on our own aesthetic sensibilities in these efforts and not on the contexts and makers from which objects originally came.

We can be certain that the senses employed in the making and using of stone tools were culturally embedded and in turn were cultural shapers. Stone tools carry and signal sensory patterns to their makers and users, patterns that are transmitted through the teaching and learning of tool-making. We can also be sure that the making of stone tools and hence an aesthetics of stone tools was a part of social life. We can be almost sure that the attributes of stone influenced its selection as raw material, and that the senses activated and employed in the making and use of tools were important parts of the sensory range of Paleolithic peoples. We can even make tools ourselves, but the interpretation of the sense experiences in that making is ours and cannot be projected into the past. We can try to reconstruct the sequences of operations, the social processes and relationships, in which aesthetic values were created, but our hypotheses cannot be confirmed. In sum, we can appreciate that an aesthetics of stone tools existed in the prehistoric past, but we cannot be certain in reconstructing it.

At least one more question remains. Given the unknowables, can an aesthetic approach with its emphasis on sensory perception and valued experience contribute anything at all to our understanding of stone tools? Perhaps it can. That contribution is not a Paleolithic aesthetics; it is a possible route to understanding it. Any aesthetics of Paleolithic flints must be in the form of hypotheses. These may not be provable, but hypotheses help us to synthesize data, and to bring together the qualitative experiences of the cognitive, the emotional, the physical, and the social.

We have lithics in abundance from the remote periods of the Middle and Lower Paleolithic. I am not among those who believe that we can read underlying cultural patterns or structures in the forms and styles of material things without consulting their producers.[55] But perhaps we can read some elementary values into the forms of such objects as the Acheulean bifaces and the Solutrean points we have seen, and in the Magdalenian burin I now show in several of its complex facets. This burin, about 3 cm. long as is, though one end is broken, comes from the Amiens region of France. Louis Delambre, curator at the Musée de Picardie, who sent it to the Wilson Museum as part of a large purchase, called it "merveilleuse":

Magdalenian burin, view 1.

Magdalenian burin, view 2.

Magdalenian burin, view 3.

Magdalenian burin, view 4.

All of these tools are harmonious, and, as C. Michael Barton points out for the Acheulean bifaces, have "complex life histories" before they reach the shapes we find in archaeological sites.[56] We may try to infer behavioral features from morphological analyses, but these remain inferences. We know that material production and technology cannot be separated from social experience and "bodily engagement in the material world."[57]

Attempts to perceive from the point of view of another culture and another time can only be enlarging, whether or not we know we are succeeding. That enlargement is not necessarily cultural appropriation, nor is it the mere application of our own concepts for our own enjoyment of Paleolithic artifacts. We must not mistake the descriptions of the past that we assemble from bits of evidence for the actuality of the past. But if we believe that aesthetics is not a subject matter, but a conceptual orientation and a way toward understanding our human world, its application to Paleolithic flints may be as useful as the application of other modes toward understanding, so far as we are able, a world remote from us.

Endnotes

[1] This paper began as a plenary presentation at the conference on the Aesthetics of Stone and Rock, 6th International Conference on Environmental Aesthetics, held from 11-14 June 2007 at Koli, Finland webit.pkky.fi/stoneconference/english/programme.htm

The Wilson Museum in Castine, Maine, opened its Paleolithic collections to me, and allowed me to use its photographs to illustrate my talk and this paper. I thank the entire staff: Patricia Hutchins, Sherman Hutchins, Brian Adams, Debbie Morehouse, Paula Dunfee, and Jamie Sarna. Yrjö Sepänmaa of the University of Joensuu organized the conference and made my participation possible, while Lisbe Svann of the Summer University of Northern Karelia managed details that made attendance free of trouble. Conference participants made valuable comments and suggestions. Chris Peebles of Indiana University helped me refine the final version.

[2] See Boivin and Owoc 2004 and Sieveking and Newcomer 1987 for examples of the symbolic, ceremonial, behavioral and social aspects of flint and other rocks and minerals in human societies past and present.

[3] The living or recent hunter-gatherers of Australia are most often pressed into service. The literature on the cultural, economic, and symbolic aspects of their stone tools is large. See, for example, Brumm 2004, Gould 1980, Taçon 1991, and their accompanying bibliographies. See also Trigger 1989:363-367 for a discussion of the problems and uses of ethnographic analogy in archaeology.

[4] Schick and Toth 1994:84. Australopithecines are not members of the genus *Homo*, and our understanding of the evolutionary links of their multiple species to Homo species is still in flux. *Australopithecus garhi*, dating from about 2.5 million years ago in Ethiopia, may have used tools, as mammalian bone associated with *garhi* fossils "showed cut marks and percussion marks made by stone tools" (de Heizelin, Clark, *et al*. 1999). See also Asfaw, White *et al*. 1999.

The term *hominin* is currently used to denote a group that includes all Homo species, modern and extinct, and the bipedal ancestors of *Homo*, including the Australopithecines. The older term *hominid* now denotes all the great apes (including *Homo* species) and their ancestors. Thus *hominid* (*Hominidae*) is the larger taxon that includes the *hominin* group (*Hominini*).

[5] Some Paleolithic specialists do not accept the early dates as securely proven, and prefer to date the first *Homo erectus* people and their tools in Europe to around 500,000 years ago, when the evidence is indisputable. See Gibert et al 1998 on the early Spanish sites. See Gamble 1999:115-119 for a discussion of "long chronologies" and "short chronologies" in European Paleolithic prehistory. Gamble supports the short chronology, beginning 500,000 years ago. He considers 750,000 years ago for Isernia la Pineta a dating error and the southeastern Spanish evidence as uncertain. For early dating of Isernia see Schick and Toth 1993:257; UNESCO 2006.

web.unife.it/progetti/isernia-la-pineta/

[6] American Clovis points date from circa 11,000 years ago, and resemble laurel leaf points of the French Solutrean period of circa 22,000 to 17,000 years ago. Many authorities consider the resemblance to be superficial. For brief summaries of the arguments for and against genetic relationship and historical links between Clovis and Solutrean peoples and cultures see www.athenapub.com/12firsta.htm and www.cdarc.org/pages/library/peo_asu.php. For a detailed critique by a Solutrean specialist, with bibliography, see Straus 2000.

[7] Bar-Yosef and Kuhn 1999; Monnier 2006. Trigger 1989:94-99 summarizes the history of Paleolithic periodization.

[8] Gamble 1999:98-99.

[9] Schick and Toth 1993:258-260.

[10] Gamble 1999:174-267; 268-283. Other authorities use later dates, 250,000 to 200,000 years ago, for the initial appearance of *Homo neanderthalensis* in Europe. In the United States, the spelling "Neandertal" is more frequent. In Britain "Neanderthal" is usual. In the binomial, *neanderthalensis* is usually considered correct (but see White 2003).

[11] Debenath and Dibble 1994:45-50; Wolpoff 1999:567-569

[12] Gamble 1999:208-209; 24.

[13] McPherron 2006 argues that patterns in the morphology of Acheulean handaxes are a function of raw materials and intensity of flaking rather than mental templates. Barton 1990 reviews some of the literature and shows the importance of re-working and consequent morphological and functional change in the histories of the discarded tools we find. See also McPherron 2000, Sheppard and Kleindienst 1996, Wynn 2002, Wynn and Tierson 1996.

[14] Gamble 1999:217; Gamble 2007:180-181.

[15] Mithen 2006:266. See Lewis-Williams 2003 for a discussion of Upper Paleolithic 'mind.' I enclose that term in quotation marks because it is most likely a Western folk category that reifies processes and functions. See Gamble 2007:42-49 for a summary of the literature on and arguments concerning qualitative mental differences between the people of the Middle and Upper Paleolithic, especially in Europe. Africanists point out the Eurocentrism in those arguments and stress continuity, greater time depth, and emergence of innovations in Africa long before the European Upper Paleolithic (McBrearty and Brooks 2000). See also Mithen 1996.

[16] In France, a contemporaneous regional variation on the Aurignacian is recognized and named Perigordian. Some schemes recognize the continuation of the Magdalenian to 9500 years ago (www.beloit.edu/~museum/logan/paleoexhibit/upperpaleo.htm). In some European locations, a Middle-to-Upper Paleolithic transition is evident, with Neandertal skeletal material and Upper Paleolithic artifacts occurring together. This Châtelperronian period is contemporaneous but not conterminous with the Aurignacian (Wolpoff 1999:688-690). The divers regional naming schemes reflect the growing diversity of human cultures in the Upper Paleolithic.

[17] See for example Bell 1994; Lewis-Williams 2003. Gamble 2007:115-117 stresses bodily experience and material culture in the development of sociality and individual psychology.

[18] Coote 1992:247.

[19] Morphy and Perkins 2006: ch. 1; White 2003:20-23.

[20] Ingold 1996:249-293.

[21] Morphy 1996:255.

[22] Overing 1996:260-266.

[23] Eagleton 1990 presents a critical and historical discussion of the features and political functions of Western aesthetics.

[24] See Price 1989, and especially pp. 108-123, for a discussion of the complexity of issues related to Western presuppositions about non-Western art, aesthetics, and aesthetic discourse.

[25] Paul Stoller, for example, shows the significance of sound, smell, and taste for the Songhay people of Niger (1989). He argues unexceptionably that good ethnographic fieldwork requires descriptions and evocations of the sensory qualities of food, land, and the entire daily world as experienced by the members of a society (29-31).

[26] See, for example, Classen 1993; Coote 1992; Gell 1998:1-7; Howes 1991b, 1991c; Howes and Classen 1991; Layton 1991; Morphy 1992, 2005, Morphy and Perkins 2006; Seremetakis 1994; Stoller 1989.

[27] See, for example, Marchianò and Milani 2001. Chinese aesthetics, for one example, has a history and tradition apart from Western ideas (Pohl 2001). Robert Farris Thompson, for another, explains Yoruba aesthetic discourse and shows us its relationship to Yoruba religion (1973 [2006]).

[28] Lamarque 2005:31-2; Eagleton 1999.

[29] For example, Lewis-Williams 2002; Also Lewis-Williams and Pearce 2005.

[30] Taçon 1991:192.

[31] For example, Schick and Toth argue that Acheulean bifaces indicate aesthetic sensibility (1994:282-283). Randall White proposes a Neandertal interest in shape and color (2003:64-65).

[32] Gould 1980:134.

[33] Gould 1980:158.

[34] Taçon 1991:198-199.

[35] Gamble 1999:329-330.

[36] Vitelli 2006. The Franchthi excavations exposed an unbroken record from 22,000 years ago to 5,000 years ago; that is, from Upper Paleolithic to end of Neolithic.

[37] White 2003:65; Taçon briefly reviews contradictory views on whether the features of bifaces reveal aesthetic sensibility in their makers (1991:192-194).

[38] For examples of such associations see Boivin 2004:9; Scarre 2004.

[39] Wynn and Tierson 1990:81.

[40] Schick and Toth 1994:282-283.

[41] See, for example, McNabb et al. 2004; McPherron 2000; Sheppard and Kleindienst 1996; Wynn 2004; Wynn and Tierson 1990

[42] Clive Gamble, following André Leroi-Gourhan, explicates the archaeological concept of *chaîne opératoîre*, or sequence of operations, which packs together in a single term the social, cultural, material, and temporal relations of material production (1999:82-84). See also Karlin and Julien 1994. The term is often used to mean the reduction sequence whereby a piece of raw material is fashioned into a tool, used, re-fashioned, and so reduced. But the broader meaning is explained in Gamble. See also Gamble 2007 and Boivin and Owoc 2004 for expansion on and illustration of the relational emphasis in contemporary archaeology. See Dobres 2000 for an insistence on the oneness of human physicality and human technology.

[43] Lamarque 2005:22; Heyd 2003.

[44] Sinclair 2000:197-198.

[45] Gamble 1999:321.

[46] Gibson 1966:285.

[47] Sinclair 2000; Webster 2001.

[48] Steward 1972:30-42.

[49] Sinclair 2000:208.

[50] Sinclair 2000:200-207. Not all archaeologists concur in this interpretation of tool morphology. See note 41.

[51] Sinclair 2000:206.

[52] See Leuthold 1998:14-27 for clear discussion. See Welsch 2004 for discussion of aesthetic sensibility in non-human animals as well.

[53] Howes 1991:3.

[54] Howes and Classen 1991:267.

[55] See, for example, Lechtman 1977. Also see Washburn 2006, who interprets the pottery designs that Hopi people say they prefer as reflections of social and ritual reciprocity in Hopi society.

[56] Barton 1990:70.

[57] Dobres 2000:81. Dobres, following Martin Heidegger, emphasizes the potential for understanding the Paleolithic in apprehending the physical, sensual, and social as one with technology. See also Gamble 2007; Gero 1989.

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Published October 24, 2007