Towards an Archaeology of Gesture

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Abstract: This paper explores the possibility of an archaeology of gesture with specific reference to the analysis of prehistoric stone tools. It is argued that gesture is a critical concept for archaeological analysis in that it focus not on ideas trapped in the minds of people but rather on the linkage between cognitive processes and the body through disciplined action.

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To understand the way that archaeologists can use the concept of gesture it is useful to begin with two images. The first, familiar from our own lives and personal experience, is of a young boy standing at the edge of a pond, throwing stones into the water. The child reaches down to the ground, selects a stone, picks it up, performs a throwing motion, and the stone flies into the air. As the stone strikes the water it causes ripples to form that travel outwards in concentric rings. The child's action leave no physical trace, except for the fact that stones that had been near the edge of the lake now are under water. If one were to inquire into the mental state of the child, the question would refer to the mood or emotions of the child. One might infer that the child was bored, angry, reflective, or happy.

The second image is of a young woman living around 200,000 years ago in the area that is today the coast of Israel south of Tel Aviv. This woman is also at the edge of a lake, a shallow boggy body of water formed where dunes block the outlet of a river into the

Mediterranean. She is part of a group of people in the process of butchering a deer, cutting apart the carcass so that they can remove the meatiest joints to a place where the meat will be shared out and eaten. She does not work at the butchery but focuses on making sharp edged tools for the others to use. She works on a block of flint that she has carried with her to the site. Her movements are rhythmic and controlled, as she repeatedly strikes the flint with a hammer stone she has also carried with her. Every once in a while she pauses in her work to examine her block of flint and to plan her next move.

This second scenario is drawn from the excavation of the Lower Paleolithic site of Holon, Israel, which I have been working on with a group of colleagues (Chazan et al. 2001, Chazan and Horwitz in press). The formal actions of the boy at the lake and the prehistoric young woman are very similar. Both take a stone and swing it through the air. The boy releases his stone while the young woman keeps hers gripped firmly. Upon impact, the force of both stones creates an impact that travels out from the point of impact in a series of concentric waves. The ripples on the water flow towards the shore leaving no trace. Once the waves have subsided the lake is again placid. The young woman's blow creates stress that splits a flake off from the block of flint. On the flake the force of the impact creates what archaeologists call a bulb of percussion, a convexity formed at the point of impact (Figure 1b). The flint block, what archaeologists call a core, carries a negative impression of the bulb of percussion (Figure 1c). An archaeology of gesture is only possible in cases where gestures leave permanent traces. In the case of chipped stone tool manufacture, every successful gesture leaves a permanent trace.

Figure 1: A. Surface of a Levallois core before flake removal (modern replication). B. Core after flake removal showing the negative scar from the flake. The negative bulb of percussion is at the base of the scar. C. Ventral face of flake showing bulb of percussion at the base. (Photograph by Alexandra Sumner)

The first significant difference between the actions of the boy and the young woman is that only in the latter case is there a permanent trace left by the gesture. A second important difference has to do with the mental states involved in each case. For the young boy, the most relevant mental states have to do with emotion and mood. Certainly the people who made the tools we recover as archaeologists had such feelings, however as an archaeologist I have no access to these aspects of their experience. An archaeology of gesture is not interested in understanding the emotional aspect of mental states. However, this does not mean that archaeologists can have no access to mental states. In the case of the young woman engaged in a controlled technological activity the mental states concern the knowledge that guide her use of gesture. It is this knowledge that is potentially accessible to archaeological analysis. When she paused to plan her next gestures, what did she think? This is a question archaeologists can at least aspire to answer. An archaeology of gesture is interested in the connection between thought and action.

There is room to question whether gesture is the proper term for such a field of analysis. If we define gesture in terms of the specific movements made by the body then archaeology faces serious limitations. A theoretical example should clarify the nature of the problem. Imagine a core from which three flakes have been struck (figure 3). Based on the location of the bulb of percussion I can determine the direction from which the flake has been struck. This direction can be indicated by use of arrows. It is also possible to determine the order in which the flakes were struck. Because the scar left by flake 2 cuts into the scar left by flake 1, flake 2 had to have been struck after flake 1. The

same is true for the relationship between flake 2 and flake 3. However, there is no basis for determining whether the hammer was held in the right or left hand. Ethnographic studies show that there is actually a surprising range of ways in which the core is gripped. In some cases the core is not actually held but rather place in the ground before being struck (Jones 1988). The study of the precise body movements used in tool manufacture is largely accessible only to ethnographic studies. Such studies are often described as a branch of ergonomics (Bril 1991).

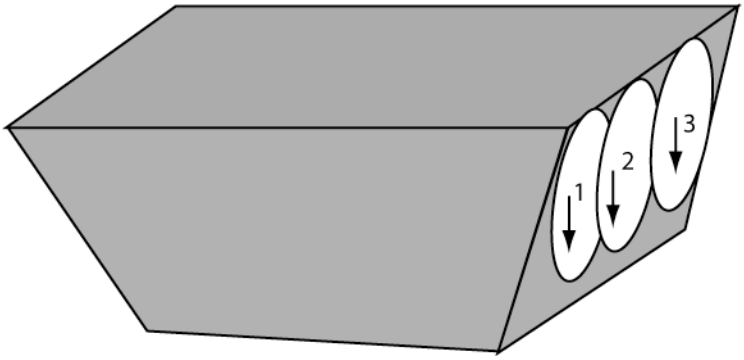

Figure 3: Theoretical core with three flake removals. The arrows show the direction from which the blow removing the flakes was removed and the number shows the sequence of removals (1 first and 3 last).

One reaction to the limitations of archaeological analysis is to deny the possibility of an archaeology of gesture. Another alternative is to stress the potential for the archaeological study of sequences. Peter Bleed (2001) has recently made a strong

argument for the importance of production sequences to understanding archaeological artifacts. Bleed points to the convergence of Japanese, American, and French archaeological traditions on methods of analysis aimed at recovering production sequences. However, an archaeology of gesture is significantly different from the study of sequences. Although archaeologists do not have access to ergonomics they do have access to a great deal more than a simple sequence of events. While Bleed is correct in drawing parallels between Japanese, American, and French approaches, he has missed a critically important aspect of the French concept of the *chaîne opératoire*, an aspect that provides a means of approaching gesture.

The pioneering efforts at applying the concept of the *chaîne opératoire* to the manufacture of stone tools have been made in the context of the archaeology of the Middle Paleolithic, the period when Neanderthals inhabited Europe (Boëda and Pelegrin 1980, Boëda 1991, Geneste et al. 1990, Chazan 1997). The critical insight derived from Leroi-Gourhan is that the dynamic process of manufacture is guided by a concept in the mind of the person carrying out the action. The knowledge (*connaissance)* of how to carry out the process is enacted through the skills (*savoir faire*) of the artisan. The *chaîne opératoire* is the acting out in time of knowledge and skill.

The great breakthrough of recent years in the study of stone tool technology has been the recognition that the knowledge involved in manufacture is a three-dimensional concept of the mass being worked. The term *method* refers to the rules guiding manufacturing process. These rules are not of a sequential nature (i.e., press button a then pull lever b) but rather they are rules about relationships that define the spatial organization of knapping. If these rules are not respected the artisan will not have control over the

manufacturing process. The term *technique* is reserved for the means of transmitting energy in the knapping process, including the distinctions between hard hammer (a cobble) and soft hammer (wood or antler) and between direct percussion (where the hammer strikes the core directly) and indirect percussion (where the hammer hits a punch set against the core).

The critical aspect of the *chaîne opératoire* is that it recognizes that the actions used to make tools are disciplined actions. The tool manufacturer disciplines their body to produce controlled action. In an ethnographic study of gesture one can follow the movement of the body through space and observe the way the body is disciplined to form gestures rather than undirected action. In the archaeology of gesture one cannot observe or even infer the motions taken by the body but one can infer the way in which movements have been disciplined to adhere to concepts underlying production.

In order to flesh out these ideas, as well as the problems of inference involved in analysis, we can return to the young woman by the lake at Holon. The site of Holon was occupied near the very end of the Lower Paleolithic during a climatic interglacial known as Oxygen Isotope Stage 7. The site covers a large area and does not appear to have been a single continuous occupation. Based on a number of independent lines of evidence we have reached the conclusion that the site is a palimpsest built up as the result of a series of independent events, which took place over a fairly narrow time period. A wide range of animal species is represented in the faunal assemblage from the site including auroch, deer, and an extinct elephant. There are butchery marks on some of the bones indicating that at least some of the carcasses were butchered using stone tools. The people living at Holon were among the last people to use handaxes. The tool assemblage found at the site includes handaxes and choppers, along with flake tools and cores (Figure 3). The handaxes and choppers were not made on the site but were brought on to the site, and

abandoned on the site, after being manufactured elsewhere. At least some of the flake tools were made on site. This is why I have created the story of a young woman making the flakes (the gender is of course a fictional devise, we have no way of ascertaining whether stone tool manufacture was gender specific during this time period).

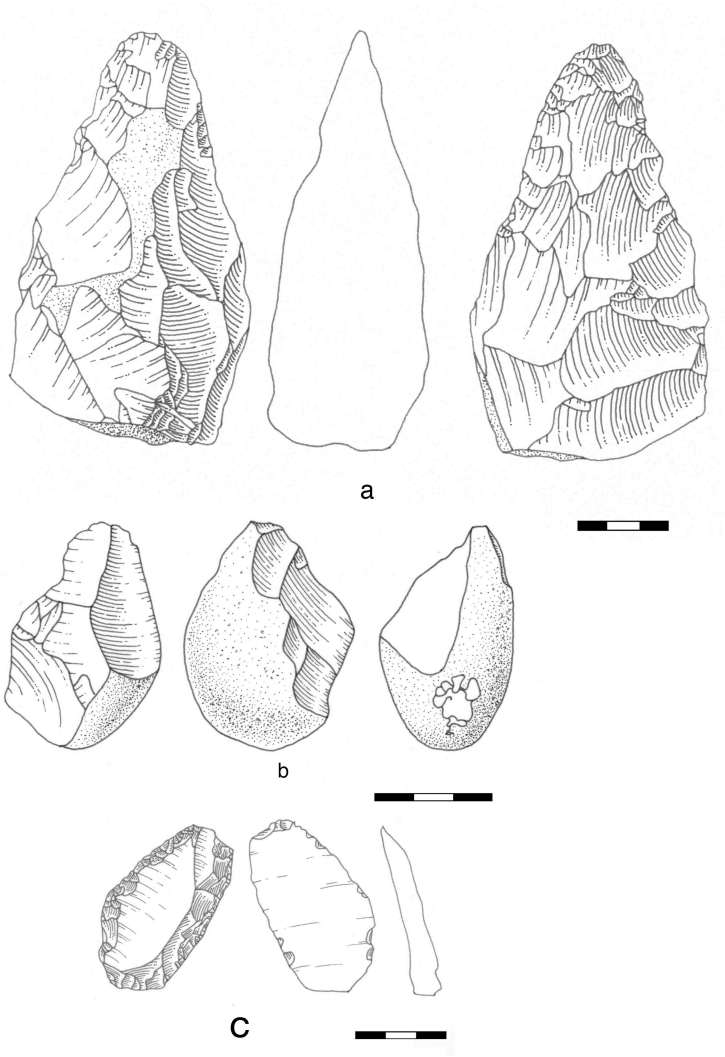

Figure 3: Tools from the Lower Paleolithich site of Holon, Israel. A: Handaxe. B: Chopper. C: Retouched Flake.

One question I asked when analyzing the stone tools from Holon was whether it was possible to determine the method used in making flakes at the site (Chazan 2000). In terms of the scenario I have presented here my question is what the young woman was thinking in the moments when she paused, regarded her core, and planned her next action. In my analysis it was possible to discard the possibility that she never made such a pause and that her movements were a random set of actions with fortuitous results. Controlled reduction of a core to produce consistent products requires not only skillful control of the body but also a successful strategy. Because the stone toolmaker (or knapper) actually creates the configuration of the core, which creates the potential for further action, it is not possible to operate on the basis of a sequence of stimulus-response cues. The successful knapper require a strategy in the same way that a skilled pool player needs an adaptable strategy to clear a table in a single run. There is very little evidence for error in flake production at Holon and everything points to highly skilled work. In examining the flakes at Holon I observed that a very high percentage had one oblique edge as the result of having come off of the edge of a core. This means that the way the core was configured resulted in the production of a large number of flakes from the edge of the core (Figure 4).

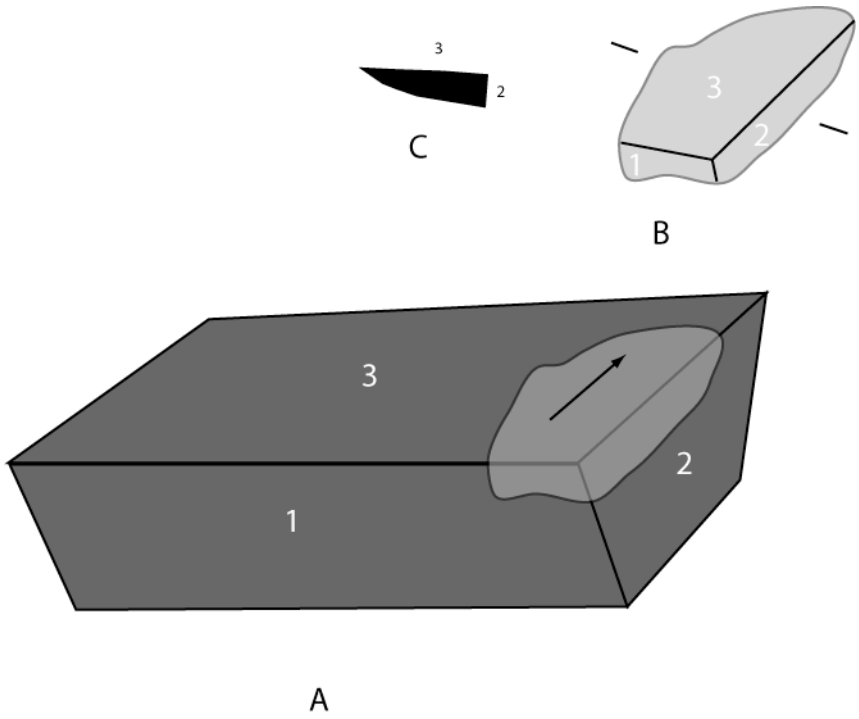

Figure 4: Diagraim showing the removal of a flake from the edge of a core. A: The core with the flake removal indicated by lower shading. The hammer strikes surface 1, which serves as the platform for the flake removal. The flake comes off surface 3 along the edge where this surface meets surface 2. B: The flake includes the platform from surface 1 and the back, or dorsal face, of the flake, which comes off the intersection between plane 3 and plane 2. C: A cross section of the flake shows that the right edge is oblique because it was struck off the edge of the core.

A number of methods have been recognized in the analysis of Paleolithic stone tool production. These methods are abstractions from the archaeological data that are believed to approximate the concepts prehistoric people used to make tools. The best known method is the Levallois method, which was used on many Middle Paleolithic sites associated with Neanderthals (Figure 1). The Levallois method allows for the controlled

production of a wide range of flakes by treating the core as two faces that meet at a single plane of intersection. These two surfaces are hierarchically related with one surface serving as the platform for the removal of large flakes from the other face. The shape and size of these large flakes is predetermined by the knapper through the control of the convexities on the surface of the core. The Levallois method is a highly effective and flexible concept that was widely used in Africa, Europe, and the Middle East for over 100,000 years.

Some of the flakes from Holon look like the large flakes produced using the Levallois method but other aspects of the collection do not fit with what is expected from the use of this method. Particularly important is the presence of a high percentage of flakes coming from the edge of the core. Such flakes are not produced in large numbers when one works following the Levallois method. Also, most the cores left behind do not show the kind of hierarchical relationship between surfaces characteristic of the Levallois method.

A number of other methods have been identified based on analyses of Paleolithic stone tool collections, two of which do produce the kind of flakes found at Holon. My analysis suggests that the people making the stone tools at Holon used what has become known as the trifacial method (Boëda 1991). In the trafacial method the volume of the core is triangular in section (Figure 5). Two faces are utilized for the production of large flakes. The third surface is smaller and serves primarily as a striking platform. As shown in figure 5, there is some variation in the way this method can be employed. The cores from

Holon tend to be triangular in section, as would be expected with the use of the trifacial method (Figure 6).

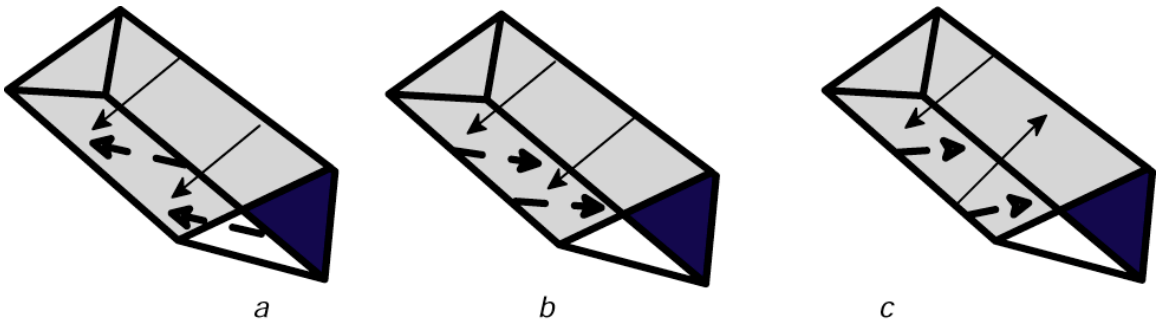

Figure 5: Schematic representation of variants of the trifacial method. The volume of the core is triangular in section. Two faces are utilized for the production of large flakes. The third surface (the butt) is smaller and serves primarily as a striking platform. In a the butt serves as the platform for unidirectional removals off both faces. In b the butt serves as the striking platform for the upper exploitation surface which itself serves as the platform for the lower surface. In c both exploitation surfaces also serve as platforms. On the upper exploitation surface the removals are bidirectional as the butt also serves as a platform. The pattern of exploitation can shift in the course of reduction and there is also the potential for removals tangential to the main striking axis. However, the overall configuration of the core is maintained throughout the reduction sequence.

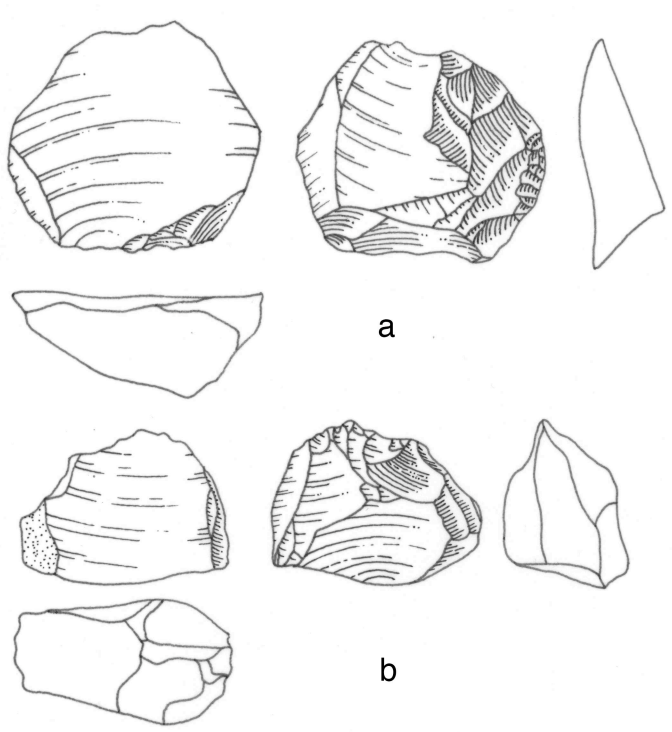

Figure 6: Cores from the Lower Paleolithic site of Holon, Israel

The identification of the trifacial method at Holon is not the reconstruction of a single sequence of operations. It is the inference of an underlying concept that guided the gestures used to make tools at the site 200,000 years ago. This concept is what the evidence suggests the young woman was thinking of when she paused in the process of producing flakes from her core. This concept is the underlying idea that disciplined her actions. My interpretation is that a single method was shared by all of the people who made flake tools at Holon. This interpretation implies that these concepts were transmitted by learning and perhaps even by active teaching.

The methodological issues involved in such an analysis in which I as the analyst claim the ability to infer the ideas held by people in the past are complex and, at this point,

poorly developed (Renfrew and Zubrow 1994). Gesture is critical to this form of analysis. The importance of gesture is that it recognizes the linkage between cognitive processes and the body through disciplined action. My goal as an archaeologist is not to recover concepts trapped in the minds of prehistoric people. As much as one might like to know about the emotional lives of early hominids, we do not have access to these aspects of their lives. We do however have evidence about sequences of technical actions, which allow us insight into the interaction between concepts and action. Going back over 2 million years we can explore the changing ways in which concepts shaped action in technical processes. We can only do this if we recognize the importance of gestures that are not sequences of action but rather sequences of disciplined movement.

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