Locating Gesture: Leroi-Gourhan among the Cyborgs

Michael Chazan
Department of Anthropology, University of Toronto

André Leroi-Gourhan is among the most enigmatic figures in the history of anthropology (Audouze 2002). His fieldwork ranged from ethnography in East Asia to archaeological excavation on Paleolithic sites in France. In France he has left a powerful imprint on anthropology and beyond and his impact is often considered on a par with that of Claude Levi-Strauss. Among his legacies are the Techniques et Cultures school of cultural anthropology, the chaîne opératoire approach to technology, and the decapage method of excavation. In North America Leroi-Gourhan is known only for his structural analysis of cave art.

Leroi-Gourhan never produced a succinct work that distills his key ideas as Marcel Mauss did in *The Gift* and Levi-Strauss did in *The Savage Mind.* Rather his critical concepts are found buried in encyclopedic works. The twin books *Milieu et Technique* and *L'Homme et la Matière* are present an overview of all human techniques from cooking to metallurgy. The two volumes of *Le Geste et la Parole* present a synopsis of evolution from fish to computers. Unfortunately, much of the data presented in *Le Geste et la Parole* is no longer valid in light of ongoing archaeological research. The concepts that lie at the core of Leroi-Gourhan's conception of technology are discussed in less than thirty pages spread through these four volumes.

A further difficulty of working through Leroi-Gourhan's ideas is that they are based on a mixture of anachronistic ideas about evolution and path breaking ideas about technology. These two strands of thought are tightly intertwined so that the anachronism cannot be simply discarded without affecting the overarching concepts. Leroi-Gourhan's view of evolution owed far more to Tielhard de Chardin and other late nineteenth century evolutionists than it did to Darwin. This line of evolutionary thought, often labeled neo-Lamackian evolution, was thoroughly discredited by the new evolutionary synthesis of that began in the 1950's to integrate the insights of population genetics into evolutionary thought. Leroi-Gourhan's view of evolution is unabashedly progressive and teleological. Much of the goal of *Le Geste et la Parole* is to discover the underlying direction of evolution. This is a project which finds little relevance today.

The teleological aspect of Leroi-Gourhan's ideas is clearly expressed in his use of the concepts of *tendance* and *fait* in the study of technology. *Tendance* is defined as a an evolutionary phenomenon which underlies specific manifestations of technology. To quote from *L'Homme et la Matière*: "[La tendance…pousse le silex tenu à la main à acquérir un manche" (LHM 27). Another example of *tendance* is decoration of the self. For Leroi-Gourhan it is because of the underlying power of the *tendance* that there are parallels in the ways societies around the world decorate themselves. The *fait* is the inverse of *tendance*. The *fait* is the unpredictable local manifestation of the *tendance*. In Leroi-Gourhan's words the *faite* "c'est un compromis instable qui s'établit entre les tendance et le milieu" (LHM 27). A forge is the compromise between fire, metal,

combustion, fusion, commerce, fashion, religion that is the concrete manifestation of the *tendance* of metallurgy.

The idea that there is a metaphysical evolutionary tendency underlying human action is sharply reminiscent of de Chardin conception of evolution (Kopp 1964). Certainly this has foreign to Darwin's ideas as expressed in *The Origin of Species*. How can we possibly accept the idea that there was an evolutionary force which made the tool want to have a handle? While it is tempting to quickly reject these concepts and insist that we must search deeper for Leroi-Gourhan's such an undertaking must be undertaken with care. The contrast between *tendance* and *fait* is at the core of Leroi-Gourhan's view of technology. Mixed with the teleology is a view of the tool as a materialization of the interaction between humans and their environment.

The critical concept Leroi-Gourhan brought to the study of technology is the *chaîne opératoire*. Contemporary prehistoric archaeologists draw heavily on this concept to recognize the dynamic process of tool manufacture and use. However, the utility of this concept has led many archaeologists, particularly in North America, to avoid its broader meaning and implications. Again we are hindered by the lack of a clear definition and discussion of the *chaîne opératoire* in Leroi-Gouhan's work. Rather than clearly introduce and define the concept he rushes headlong into its implications (GP 2)!

In order to ground the discussion of the *chaîne opératoire* it is useful to focus on the manufacture of stone tools. This is a critical technology as it provides the earliest

archaeological evidence for tool manufacture. Thus within Leroi-Gourhan's conception stone tool manufacture bridges between the animal world where the body is the tool and the human world in which the tool is 'liberated' from the body. Recent research on tool use by animals throws this basic distinction between animal and human techniques into question however I will not focus on this issue here.

North American archaeologists have long recognized that the manufacture of chipped stone tools is a sequence of operations in which a block of stone is reduced to form desired tools (Bleed 2001). Already in the 19th century William Henry Holmes demonstrated that allegedly 'primitive' tools were in fact spear and arrowhead points that were discarded in an early stage of production. The term reduction sequence is used to refer to the sequence of steps involved in the manufacture of a stone tool. Steps might include roughing out a core, removing blades, and then shaping the blades. Stone tool analysts are very adept at identifying the byproducts of each stage in the sequence.

A similar recognition of the dynamic nature of chipped stone tool manufacture focuses on the life history of the tool itself. The 'frison effect' recognizes that refashioning the edges, in a process known as retouch, can continuously resharpen chipped stone tools. The 'frison effect' recognizes that the shape of tools will change through use life to reflect this process of resharpening.

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. 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. This mass can be considered as a volume or as a set of surfaces depending on the method one is following. The method refers to the rules guiding manufacturing process. These rules are not of a sequential nature (i.e., press botton 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 concept of a reduction sequence recognizes only the dynamic process of tool production. The result is often presented as a flow chart of a series of stages. Publications of *chaîne opératoire* analysis also often use flow charts. However, these flow charts encompass only one aspect of the analysis. The strength of the *chaîne opératoire* approach is that it recognizes that the dynamic enactment of the technical process takes place in interaction with static concepts or sets of rules.

In fact if we look deeper the concept of the *chaîne opératoire* is far more complex than simply the interaction between knowledge and skill. I would like to argue here that the ideas presented by Leroi-Gourhan lead to a recognition of the fundamentally ambiguous position of the gesture. The gesture is at once individual and collective, concrete and abstract. The gesture is the place where human technique comes into being.

Before launching into an attempt to justify these rather vague and grandiose statements it is necessary to clarify what is meant by gesture. For Leroi-Gourhan gesture is the equivalent of speech. Gesture is not simply the movement of the body anymore then speech is the movement of air through the larynx. Gesture is usefully defined in the Oxford English Dictionary as "a manner of carrying the body" (OED 2). Examples of the use of this term indicate that gestures are often used to express an attitude or an emotion. Essential to the concept of the gesture is that it is a trained and controlled movement of the body. Marcel Mauss brought attention to gesture in his discussion of *technique du corpes*. The *chaîne opératoire* deals with the subset of gestures that can be termed technical gestures. Technical gestures are those trained and controlled movements of the body which have as a goal a physical effect on the environment or which are part of a sequence of gestures meant to have such an effect. Thus, although one could describe the sequence of gestures involved in a dance these would not necessarily be a *chaîne opératoire* unless they are an element in a technical process. On the other hand the process of butchery or tilling a field would fit within the frame of the *chaîne opératoire*.

The *chaîne opératoire* recognizes that the point of interaction between the trained human body and the physical world is a sequence of events. With these points as background it is possible to return to the rather vague and grandiose statements about gesture. Leroi-Gourhan emphasizes the collective knowledge that stands behind human action. Humans do not act on the basic of instinct, as is true of many animals, but rather on the basis of learned patterns of behavior. These patterns are at times conscious and coded in language but we are often not aware of the basis of our actions. Human gesture only exist in concrete instances carried out by individuals. Although we might in rare cases label a certain gesture, i.e., forechecking in hockey, this label has no meaning apart from the reality of the gesture. Although it is an absurdly obvious point, it is important to stress that a gesture can only be carried out by an individual. Although terms like "a collective gesture of atonement" have a certain metaphoric appeal such a collective gesture would only be possible if we were able to collectively inhabit a single body! Let us take the example of a dragon boat powered by a team of synchronized rowers. Here the trained movements of the team, acting in unison through the medium of manufactured tools, propel a boat through water. The gesture here exists in the movements of the individual rower.

However, the ambiguity of the gesture lies in the fact that it is the trained body that carries out the gesture. The training of the body is based on behavioral patterns learned from participating in the social life of a group. In some cases the training is conscious and delibarate but in many cases the training of the human body takes place within the context of the ordinary daily-life. Moreover, the gesture is not simply the

skilled movement of the body but also the knowledge that guides the skillful sequence of actions. Leroi-Gourhan stressed the social nature of memory in human societies. Memory is not the property of the individual but rather of the collective members of society. Thus, to say that gesture is concrete and individual presents only one side of the coin. While this is true, it is equally true that gesture is necessarily collective and abstract in the sense that gesture involves not only the movement of the body but also the knowledge that structures this movement.

The *chaîne opératoire* is a framework for recognizing the ambiguity of the gesture. However, the attention specifically to technical gesture adds another level of complexity beyond the individual/concrete and collective/abstract dualism. Technical gesture involves the interaction of gesture with the material world. Thus beyond the constituents of knowledge and skill one must also take into consideration the material world beyond the body. The *chaîne opératoire* only comes into being in the process of transforming the material world. The complication (if any more were needed) is that the physical world is often structured as the result of gesture. Leroi-Gourhan recognized this aspect of technology by stressing the tendency towards the emergence of machines which themselves replace elements of gesture. The tool itself is a first move in this tendency towards the machine.

Much of *La Geste et la Parole* is taken up with the idea of liberation. The first step in human evolution is the liberation of the hand from the mouth. Once independent the mouth and hand follow similar trajectories towards the evolution of language and

gesture. It is here that Leroi-Gourhan approaches Teihard de Chardin, although lacking de Chardin's optimism. Leroi-Gourhan writes towards the end of *La Geste et la Parole*: "Il faut donc concevoir un *homo sapiens* complètement transposé et il semble bien qu'on assiste aux derniers rapports libres de l'homme et du monde naturel. Libéré de ses outils, de ses gestes, de ses muscles, de la programmation de ses actes, de sa mémoire, libéré de son imagination par la perfection des moyens télé-diffusés, libéré du monde animal, vegetal, du vent, du froid des microbes, de l'inconnu des montagnes et des mers, l'*homo sapiens* de la zoologie est probablement près de la fin de sa carrière" (GP 2: 266).

There is much more that could be written about Leroi-Gourhan's concept of liberation, particularly in terms of placing it within the intellectual milieu in which he was writing. What I would like to do here is to argue that by stressing a trajectory towards increasing liberation Leroi-Gourhan missed some of the power of his own ideas. Rather than becoming irrelevant in a world of computers the recognition inherent in the concept of the *chaîne opératoire* of the ambiguous position of the gesture has relevance to recent discussions of the interaction between the human body and machines. Much of this discussion takes place in the context of artificial intelligence and cyborgs.

As opposed to Leroi-Gourhan's prediction that we are near the end of our evolutionary trajectory as the human body become irrelevant and we become beings of mind alone in a sea of technology recent work on cyborgs highlights specifically the essentially ambiguous nature of the relationship between social knowledge, the individual mind, the body, and the physical world. The cyborg is the image of the penetration of

the machine into the human body. The cyborg points to a trajectory very different from the liberation of the mind from the body envisioned by Leroi-Gourhan. Rather than leading to an increasing externalization of the mind through technology, the cyborg represents the blurring of the line between the mind and the external world.

One passage from a recent book on cyborgs provides a sense of how far contemporary ideas are from Leroi-Gourhan's concept of 'liberation'. In the final section of *Natural Born Cyborgs* Andy Clark writes:

> Human thought and reason emerges from a nest in which biological brains and bodies, acting in concert with nonbiological props and tools, build, benefit from, and then rebuild an endless succession of designer environments (Clark 2003: 197) .

From such a conception of the human mind, liberation from the body and the material world is not an option.

The theoretical issues raised by the cyborg are vast and beyond the scope of this discussion. However, it is important to point out that the penetration of the body by the machine can be viewed as a threat to the essential centrality of the gesture. Experiments with animals have enabled movements of machines in the external world, often at a great distance, to be caused by brain impulses transmitted by implanted electrodes. The performance artist Telarc has experimented with a mechanical hand that is controlled by signals received from electrodes that detect motion in four muscles in the leg and abdomen (Clark 2003: 115). In Telarc's performances muscles in the abdomen and the

leg control the movements of an artificial hand. In this case we could argue that the gesture has simply been displaced from one muscle group to another. However, the possibility of 'gestures' that bypass the body certainly raise major questions.

The concept of the cyborg challenges the concept of liberation as found in the writing of Leroi-Gourhan. At the same time, the concept of the *chaîne opératoire* emerges with renewed relevance. The central aspect of the *chaîne opératoire* is that the interaction between the technical gesture is at the confluence of the mind, body, social world, and material world. The gesture cannot be understood in isolation but rather as a dynamic process.

Both the strength and the weakness of Leroi-Gourhan's thought on technology was his understanding that the gesture is more than a movement, the tool more than an object. The weakness was his insistence on a highly teleological model of evolution tending towards the liberation of the mind from the body. This aspect of his thought, most clearly embodied in the concept of *tendance* is very much a product of the times in which he wrote and finds an interesting resonance in the ideas of Teilhard de Chardin. The strength of Leroi-Gourhan was his understanding of the centrality of gesture and of technology as more than simply objects and information. The *chaîne opératoire* is a concept with enduring value, not only for archaeology but for many aspects of the study of technology.

References

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