ANTHROPOLOGY OF TECHNOLOGY

When the contacts between Europeans and other peoples started to get more frequent, from the early 15th century onward, sailors, merchants, missionaries and soldiers frequently collected objects which found their ways into the "cabinets of curiosities" of western elites. Later, most of the founders of social and cultural anthropology were deeply interested in artefacts and they constituted huge collections which have been stored in museums. These sometimes enormous series of objects, organized in typologies, classified according to their georpgraphical origines nowadays often are the only traces we have of technological systems which have vanished in the course of the last two centuries. However, in spite of their frequent richness, they rarely allow for what contemporary anthropologists conceive of as an anthropology of technology. They constitute an approach of "material culture" which remains, sometimes out of a certain simplistic fascination with the exotic, too exclusively focussed on the "material" aspect of these objects, their morphology. The processes of their production, the gestures through which they were used, not to mention the symbolic systems which may have been associated to their production and use, often went unnoticed and unrecorded. It is as if a study of the present-day social life of the cell-phone would only touch upon the variations in size, shape, colours of this object, and would leave aside the economic, politic, symbolic, etc., dimensions of cell-phone use, the reasons why the models change so often, the way this new instrument quickly got to play a central role in social networking... (Horst and Miller 2006).

Marcel Mauss (1979 [1935]) was the first author to point to the necessity to pay considerably more attention to the social and cultural determinations of technological action. Interestingly, he did it in fact in a famous paper on "techniques of the body", in which he showed how some of basic physical actions (walking, sitting down, swimming, sleeping, giving birth, etc.), some of which we usually take as being merely physiological, are in fact more or less deeply shaped or even determined by the social and cultural dimensions of human life, hence presenting a high intercultural diversity. And if it is so with such simple actions which do not involve the use of artifacts, then there is obviously no reason to believe

that more complex techniques are not also the result of choices, or to believe that "nature" alone -- instead of social learning processes -- dictates the way tools are conceived and used. However, as Pierre Lemonnier (1992: 3) puts it:

> Despite the concerns of anthropologists and archeologists with portions of technological systems, the conclusion they come to are generally desappointing. Even with the right tags, artifacts alone do not have much to say (...). And the few economic anthropologists who are concerned with material culture usually are satisified with knowing the potential output or the immediately apparent form of the organization of work.
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> In most cases, technological systems are summed merely as static *constraints* without considering the social aspects of material culture. And in the few cases where the social aspects are explored, technological systems are reduced to statements about the shape of artifacts or, worse, their decoration: in other words, to their informational dimension. Action on matter is nearly always set aside.

And this is highly problematic,for a technique is precisely a socially informed action upon matter. It is a fact that Mauss did not exclude magical, religious or symbolic actions from the realm of techniques. According to him, in order to be technical, an "action" (voluntary movements of the body) needs to be "effective" (its outcome must match the intention) and "traditional" (that is, transmitted from the past through learning -- which may take place through a variety of more or less formal means). Rituals often are aimed at obtaining some physical results and they may match all these criteria. Through its symbolic efficacy, a ritual can indeed produce an effect on a person and her behaviour (as it has been documented by many ethnographic studies of magic). And, within the coherence of a certain cultural system, a ritual can be interpreted as having a practical outcome, eventhough an external observer referring to a different intellectual paradigm could not concur. Lemonnier (1992: 5) therefore thinks it is preferable to exclude rituals from the ethnotechnical domain considering that in order to be taken as "technical", an action has "to involve at least some physical intervention which leads to a real transformation of matter, in terms of current scientific laws of the physical world". This is not the case of, for instance, a prayer intended to bring rain to a region (even if pronouncing a ritual formula implies the production of sound waves). Such an objectivist stance often places ethnotechnology at odds with the usually deeply relativist recent trends in social studies of science and technology. If the debate

between these currents of thought continues in the coming years, there is no doubt the question of efficacy (or efficiency, or effectiveness) will indeed be at its core, therapeutical techniques being one of the areas where the issue looks especially stimulating.

Components of technologies

A technology therefore always has five essential and inter-related components:

-- Matter: what the technique acts upon, which may include the body of the social actor. Its characteristics and its presence or absence in a specific social setting may appear to determine a group's technological possibilities. One has however to be wary of too strict a vision of determinism by natural factors. The traditional japanese house, built according to the same model from the cold northern regions of the arquipelago to its hot and humid south is a case in point. And in a very heavily wooded region of the French Alps, traditional architecture makes almost no use of timber: the forest used to belong to the Crown and the trees were reserved for shipbuilding: this is case in which a political factor overrides the natural ones. Moreover, within the same society, different social groups may have distinct uses of the materials at hands. For instance, in so far as architecture is concerned, the social elite of a group may have the economic means for an ostentatious use of exotic materials brought from outside.

The study, by cognitive anthropology, of the mental categories through which a group organizes and classifies its environment can therefore play an important role in a technological analysis.

-- Energy: the forces which move or transform matter.

-- Objects: the "things" used to act upon matter, from the smallest and simplest artifact to the most elaborate factory in which many operational sequences are combined. As it has been already stressed, the study of artifacts considered in themselves, independently from the gestures that set them in motion, is not enough for a technological analysis.

-- Gestures: organized and purposeful uses of the body, often made more effective by an extension provided by a tool. Technical gestures are organized in sequences: sub-operations,

operations, processes. Social sciences have been interested in the semiotics of gestual, non-verbal communication, but they have paid little interest to technical gestures, perhaps because these are extremely difficult to describe (exercise: describe in writing the act of tieing shoelaces or a necktie). However, new recording and analysis devices such as videocameras and computers are now offering new possibilities.

-- Specific knowledge: the implicit or explicit, conscious ou unconscious "know-how" and skills, all the perceived possibilities and the choices: the decision to use or not certain available materials or tools; the choice between different technological processes which could allow for a similar outcome; the decisions about how and by whom a certain technological action is to be performed (for instance according to hegemonic sex roles). This is where technological systems get to be directly influenced by social and cultural phenomena. The functioning of these systems is a social production, exactly in the same way as the goal they pursue. As it has been shown by economic anthropology, the definition and fulfillment of our "basic needs" is not immune from social and cultural influence.

Technologies as systems

These elements are organized in a system and the modification of one of them has an influence on the others. Moreover, the material being used in a technological process often is the result of another process. And technology can also be qualified as being "systemic" because of its interaction with other social dimensions such as the economic, political, legal, etc., systems. A technological system can thus appear to have reached a blocked state, to have become unable to incorporate innovation, be it endogenous or resulting from contact with another system, but this impossibility to evolve does not necessarily derive from its specific characteristics and properties (since it was able to evolve in the past) but, instead, of its interaction with its social setting. On these points, see Needham's study of China's technological stagnation, which he relates to a deficient scientific thought, bureaucracy, and the absence of capitalism. It is important to stress that the analysis of these relations can easily result in reductionist views, as shown by Lynn White's theory (White 1962) about the

effect of the introduction of the stirrup in Europe in the eighth century: the increased stability of horsemen gave them the ability to charge with a spear. According to this author, the subsequent development of heavy cavalry gave horsemen more military and political power, and feudalism would therefore have been caused by the introduction of the stirrup, an opinion which leaves aside a whole range of phenomena.

In fact, a central question here is that of technological choice. The possible development of two or more alternative techniques aimed at the same goal generally results in a society in fact apparently "choosing" one of them (the term "choosing" does not imply that it is a conscious, deliberate decision taken after a collective reflection, which is in fact an uncommon instance). Ethnographies have shown that such decisions are often shaped by totally un-technical considerations (see Lemonnier's example about salt-gathering in western France). These possible technological choices thus result in the existence of differences and variations, the constant production of which by societies undoubtedly is a central concern for any anthropological approach.

In class commentary of the first mandatory reading: Lemonnier 1992, Chapter 3, "Arbitrariness in technologies".

Spheres of technological actions

Even if they may vary, technological activities can be sorted in basic categories, each corresponding to a broad sphere of action upon the world (Leroi-Gourhan 1943, 1945). Technologies of acquisition allow humans to collect elements from the natural world, to control their development, or to shape their form: mining, water harvesting, hunting, gathering, agriculture and husbandry are their main categories. Weapons and all sorts of tools are essential in acquisition processes. Goods produced through technologies of acquisition are either consumed directly or used as raw material in a further sphere of processes of production and transformation: technologies of fabrication and assembling.

Technologies of fabrication can be organized in function of the two main categories of the raw materials they deal with, which can be solid, fibrous, or more less fluid, and of the

elementary means of action upon them: percussions (of various types), fire, water (with physical, chemical and dynamic effects), air, energy (human or animal muscular strength, weights, elasticity of springs, movements of fluids, expansion of gases, electro-magnetic force). Materials can be used directly (for instance many food products) or indirectly, that is after having been assembled (elaborate dishes, clothing, houses, etc.).

The final destination of the products define the sphere of the technologies of use and consumption. It is a domain in which changes the articulation between technical relations and social relations. In the first stages (the technologies of production), technical activities and social phenomena are linked by mutual influences. In further stages however, technologies express social relations: architecture, food practices, clothing clearly are means of expression of social relations. Being, to some extent, images of certain cultural characteristics of a certain group, they are frequently associated to feelings of identity. However, if they happen to undergo some modification, this fact does not have any influence on the basic social relations within the group. In fact, in so far as technologies of production are concerned, the choice of a solution to a practical problem is of technical nature, whereas it is cultural when we deal with use and consumption.

Ethnotechnological fieldwork and study

In class commentary of the second mandatory reading: Lemonnier 1992, chapter 2, "From field to files: description and analysis of technical phenomena".
Questions of methodology; the notion of operational sequence; the frontier between technological systems.

In conclusion, it is important to stress the role that ethnotechnology could play in development programs, especially when it is necessary to assess the possible consequences of the introduction of an exogenous technical innovation into a local system of production. Ethnotechnology's systematic methodology provides it with an excellent standpoint to deal with such situations in which, however, other, more general difficulties arise, linked to relations between different knowledges in intercultural settings, to the problems inherent to

technological pluralism.

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