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Original Paper

An Integrated Approach to Technology: Stone Tools, Method, and Social Behavior as Factors for the Technologization of Society

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Abstract

Stone tools represent the spirit of invention and their underlying behavior that not only symbolize the character of inventive ability, but also the importance of interaction that establishes and reinforces cooperation. Given that social behavior is culturally derived, an acknowledgment of the place of culture within evolution is fundamental to an understanding of technology because the latter is founded upon the former. Technological endeavors affirm that technology is more than technological; it is also social as social structures themselves are fundamental to any technical process. Within the full extent of its meaning, technology may be defined as a description for human existence in all its manifestations as expressed by social behavior that originated in conjunction with stone tools and their methodic applications. The technologization of society results from the interrelationship of these factors.

Keywords

stone tools, method, social behavior, society, culture, technology

1. Introduction

Although the three factors included in the title to this paper could be discussed individually in sequential order as parts of a unified whole, it might be better to discuss them concurrently, since fundamental concepts for society's technologization are directly related to this paper's main theme of an integrated approach to technology. This theme is integrated because these factors are relevant to society as an essential collectivity of human reality, a collectivity that is indispensable for humanity. In its broadest meaning, society refers to group activities impacting members of a species, and in reference to humans, society may be defined as a group of individuals who share mutual interests

manifested by common relationships of shared institutions. There is nothing unusual in this definition because it presents a criterion for group interaction.

It is also commonly acknowledged that social behavior is derived from conditions that are supportive of individuals within a group that promotes and extends its creation and function. Although social behavior originally related to individuals, it must pass through the group if it is to survive, and if it is to survive, it must be culturally successful, that is, culturally applicable. Since social behavior is influenced by genetics, it concerns patterns of inheritance that describes a biological process in which genetic information is passed down generationally. And it is expressive of a mechanism of mutual origin, spirited on by group conformity and individual encouragement. The group, therefore, is merely a conglomerate of individuals who collectively maintain a unity of commonly prescribed behavior that results from an intricate network of interlocking patterns of actions and reactions, but variables may still exist within any unitary system. Any changes introduced remain as possibilities, although the probability of change is lessened because of conformity and habit. When changes do occur, they could threaten a behavior's normal performance. While ignoring the desire to find a commonality among all individuals, the quest still remains for us to look for it (Note 1).

An understanding of social behavior is merely one aspect of a much larger study of humanity, the scientific study of anthropology which describes the origin and development of human beings as the word itself indicates. It comprises the anatomy, society, and culture of human beings and their ancestors. In addition to anthropology, the specialty of paleoanthropology describes how humans evolved from earlier forms of primates, particularly from australopithecines ("southern apes"), a term coined by the paleoanthropologist Raymond A. Dart in 1925 that relates to more sophisticated humanlike primates, that is, more humanoid than anthropoid before humans appeared and from whom they are descended (Note 2). Nevertheless, more recent scholarship that is based on additional australopithecine fossils has reversed Dart's conclusions so that australopithecines are now considered to be more anthropoid than humanoid.

An australopithecine is believed to be neither an ape nor a human who first appeared about 4 million years ago. Notwithstanding, there is controversy concerning the relationship between australopithecines of which there are a few different types and their descendants. Originally presumed to have survived as vegetarians and later as scavengers, australopithecines have been accredited with the possibility of utilizing the first tools that were simply unmodified stones, to which should be added that there was nothing anatomically that would have prevented them from doing so. They and their descendants are assumed to be capable of inventing an array of tools that supplemented scavenging with hunting and foraging that represented a carnivorous and predaceous behavior. Although australopithecines could find food individually when they lived in trees, it was vital for them to utilize group effort when they descended to the ground. This group effort implies the development of a more elaborate network of social cooperation that was derived from the changes brought to bear within the hominid population affirming the idea that knowledge and its supporting behaviors are culturally transmitted.

Stone tools or lithic technology resulted from a slow and laborious process that was not measured by centuries or millennia, but by tens of thousands of years that eventually enabled hunting and foraging to evolve into hunter-gatherer societies. Although these societies must have manifested similarities to some extent, they imply that society itself is the result of a process, the effect of an evolving mechanism that became habitual. Before any society appears, fundamental characteristics are needed that impact social integration. Although a study of the first hominid societies may forever prevent us from uncovering their full nature because too little information is available, we can still offer reasonable assumptions on how they might have originated and how they relate to human society as we know it today. These assumptions concern the origins of social organization and their implications that indicate the consequences of behavior. We should not ignore, deny, or misdirect what information is available. The fossil remains and stone tools uncovered to date have allowed physical and cultural anthropologists to construct how these early societies functioned, in addition to comparing them with "primitive" societies in the modern age.

The origins of social organization indicate how hominids developed specific ways of organizing relationships among individuals within a community. Although any attempt at understanding social organization may be incomplete, the idea may still be proposed that hominids and present-day humans share common ground in reference to society, since the latter evolved from the former. It would be difficult to explain cultural advances unless we can connect them in some way with what followed, since later achievements were influenced by earlier innovations. Although it is a common assumption within anthropology that many characteristics attributed to early hominids cannot be confirmed, such a precarious situation should not ignore the societal systems that have developed and that are rooted in many expressions of social organization.

2. Stone Tools

Of all the characteristics associated with early hominid societies, none surpasses the importance and relevance of toolmaking, which is not innate, but a learned experience. These societies included not only the use of stone tools, but they also included an increase in the collective knowledge that accompanied them, the knowledge that influenced how to solve problems through ingenuity or imagination as a type of technicity on the way to technology. The making of tools as the simplest example of technology required communal involvement, the original development of which relied upon demonstrative instruction. Eventually, demonstrative instruction led the way to the gestural origin for language, but there is a disconnection between the possibility of language and the possibility of a tool (Note 3), since lodged between these possibilities are simple gestures and elementary gutturals that link speech and gesture together simultaneously, although not fundamentally, as a form of synchrony (Note 4).

Without communal involvement, the first tools would have remained isolated artifacts whose technology would not have been replicated. As will be discussed below, toolmaking evolved into a

repeatable method, in which the shape of tools had to be envisioned to some extent by the toolmakers. Despite these societies being small and insular, they promoted a solidarity derived from the need for survival converging into a mechanism that formed the basis of culture. Society in general may be described as an organization whose individual parts form a unity in which one part is coordinated or adjusted with many others. When difficulties are confronted, their solutions evolved into folkways that eventually became collective traditions or customs, either of which impacted beliefs and values that became habit-forming whenever possible. These early societies became integrated in which one activity influenced many others. Families eventually formed communities that bestowed even greater importance on technology. Social organization became merely one aspect of the systematic activity of existence that manifested the results of complex and clearly defined traditions.

Because the making and use of stone tools, the most archaic of all tools, were learned techniques that led to the realization of their effectiveness, these techniques and their supportive behaviors were transferable to subsequent generations. If a behavior is essential for the development of a skill, then it must also have been essential for the skill utilized by our ancestors, since seemingly complex and presumably long trajectories, like the paths of moving forces, are the platforms to all behaviors. It should also be concluded that the skills of later hominids would be more advanced and more technical than the skills of their ancestors.

Toolmaking was also accompanied by two other evolutionary changes: bipedalism and increased brain size (encephalization). Of these two evolutionary changes, bipedalism is believed to have appeared first and is assumed to be more important because it allowed free use of the hands to hold and make things, and the latter is a commonly held idea, since even Aristotle described the hand as an instrument for other instruments, thereby enabling the acquisition of various arts (Note 5). It was the invention of tools that was vital to everything else that followed. Although the first stone tools are believed to have appeared 2.4 million years ago as based, in part, on the archaeological research beginning in the 1930's of Louis and Mary Leakey (and others), the absence of tools by any other ancestral group probably condemned them to a slower evolutionary path, and perhaps to extinction.

As far as toolmaking is concerned, it may be surmised that everyone within these societies should have known and should have observed how to make tools as they should have been aware of many other aspects of their culture, although stone working probably was male dominated. Australopithecines are believed to have evolved into a hominid known as Homo habilis, who is attributed to have lived one to two million years ago, and who was able over time to modify stones by flaking and chipping. Homo habilis was followed by pithecanthropines ("ape-men"), also known as Homo erectus, who lived 1.8 million to 250,000 years ago. The earliest stone tools based on the fossil record are attributed to the Oldowan toolmaking tradition located at the Olduvai gorge in northern Tanzania (Note 6).

Several different kinds of stones were used by toolmakers, such as flint, chert (siliceous rock), basalt, or obsidian, and different techniques of flaking and chipping stones developed as indicated by the fossil record. It took years of practice to become a skilled toolmaker, a skill that was passed down to

subsequent generations. Regardless how varied these tools were, their different shapes were limited, although It is conceivable that different techniques of flaking and chipping converged over time into a universal method. Knowing that techniques of any type are subordinate parts of a method, a method would naturally incorporate its individual parts. And it should include any emulative learning techniques, since emulation means that there may have been alternate ways in producing tools that were developed independently by trial and error rather than by copying the method already existing, but emulation in itself did not negate its result in the toolmaking process (Note 7). Although simple tools may have been made by emulation, more complex tools most likely were made by imitation that presupposed both a method(s) and greater social interaction.

What resulted from these techniques was a culture that was increasingly complex and predominantly technological, so technological in fact as to dominate every aspect of its culture. Stone tools of one type or another appear at many locations in Africa, Europe, Asia, and the Americas that allowed their makers to live in different environments. We should keep in mind that when stone tools first appeared, there was no agriculture or domestication, no metallurgy or writing, no established religions or law courts, no institutions of any kind that could augment them. Everything else remained as possibilities, but stone tools allowed hominids to venture out into the world and to discover new opportunities that behaviorally were critical. The end of the age of stone tools, described as the paleolithic, meant the end of the age of hunter-gatherers. Their well-being was derived from the skills of toolmaking as it was derived from the culture that enabled it to flourish.

Although the evolution of hunter-gatherer societies is much discussed and regardless of their development, they needed some kind of social or communal reinforcement in order for them to function. The benefits that hunter-gatherer societies received would have exceeded the benefits of individuals working alone, since working together fostered attributes of skillful interaction that individuals working alone would rarely have provided. Working together fostered the skills of more than merely trapping and hunting, or foraging and gathering, because they also fostered the skills of anything relevant to their performance. All of these abilities evolved into methods of technical expertise, but there was nothing radical in its development nor in the development of technology. Although it might seem to be so because technology is not natural, but then again nature is not radical either.

Regardless how distant hominid behavior began, whether 500,000 or 2.4 million years ago, it was buried deep in the past. When compared with recorded history, prehistory is far more extensive, not only for the length of its time, but also for what it conceived. Because behavior is evolutionary, a study of the past is essential. If it can be surmised that all hominid behavior is related, then it also can be surmised that there is a ground to behavior, and that ground is the behavior that led to toolmaking and the skills that accompanied it (Note 8). It led to the ability to devise new behaviors that were transmittable and were accompanied by the development of language (glottogenesis), no matter how slow and uncertain that development may have been. From the ability to use and modify stones came

the ability to use and modify the natural and social environments that had preexisted any technology. So well associated with life today, technology began humbly as an accessory to it, and it was influenced by physical limitations of many kinds, even the absence of large incisors and canines that were substituted by the perfection of stone cutting tools. At the most rudimentary level, the essence of behavior is poised to evolve into something. Like nature, it is not stationary, although it seems to be so when perceived by a temporal observer. Even when established, it must have begun somewhere at some time by someone. Although the social composition of hominids existed in the trees, their technicity began on the ground. And when established, the latter became methodic, that is, habitual. In its development, any behavior, including the behavior of lithic technology, may be either useful or useless, rational or irrational. In fact, the hominid who picked up the first stone probably descended to the ground many times before and most likely was accompanied by other hominids, both male and female. Any useful behaviors that they developed were supported by some underlying truth, and it was these behaviors that were likely to be applied and copied.

From prehistory to history, from scavenging to farming, society demonstrates a technicity in which stone tools were the first step. Subsequent societies described as pastoral, agrarian, feudal, industrial, and post-industrial not only reinforce the original formative technological framework, but also affirm society's becoming by means of technology. These subsequent societies did not completely displace the original hominid society. Rather, they were enhanced and supplemented. Even when individual societies demonstrate differences in communicative skills, all of them were based on technology as a cultural manifestation of their being. If technology is expressed through human culture, then society itself is a type of technology. Therefore, wherever hominids migrated, they brought more than just the knowledge of stone tools with them; they also brought their entire cultural apparatus that resulted from the technological understanding of toolmaking and its impact on culture in general that coincided with human evolution (Note 9). Their social behavior was unquestionably technological as their technology was unmistakably social. Without overstating the obvious, what is obvious concerns the technological basis to culture and the designation of society (the foundation to culture) as a technology. If technology presupposes an innate meaning because it embodies certain values, does society do the same? Certainly, if technology and society are interrelated, then this relationship would affirm society's own embodiment of values. If technology's values are positive, supportive, or beneficial, then society's values would be also. Similarly, negative values in one would generate negative values in the other. It is not so much that these respective values are related, but that they demonstrate what cannot be separated. In a sense, we would encounter an inevitability, positive values if we are fortunate, negative values if we are not.

Since toolmaking assumed planning and coordination of many different tasks that evolved with the development of the frontal lobe of the brain, the knowledge and skills required to make stone tools were controlled by and related to the cognitive skills of problem solving, language development, and increased capability that determined the ability to plan and organize. All of these skills were further

aided by an imitative behavior that exceeded the behavior of other primates (Note 10). Nevertheless, the physical capabilities of our ancestors, including australopithecines, must not be confused with cognitive and behavioral development. One development may have influenced others, but there is no proof that all three evolved at the same time, at the same rate, or for the same reason.

Because the factors described in the introductory paragraphs of this paper have been described many times before, it is not my intention to reiterate what has already been concluded. Rather, I aim to present an integrated approach to this analysis in light of society's technologization. Toolmaking was influential in the evolution of hominids because it began a process of technicity that impacted everything that followed, including an increase in the diversity of tools accompanied by a standardization of their types (such as scrapers, blades, or chisels) with different materials (stone, bone, antler, or wood) and a greater control of fire. It is because of this process of planning and organizing that both technology and humanity exist. And humanity exists not only by an openness to being by being ontologically free, but also because technology provides the basis for human culture that encourages ontological freedom to find expression. These thoughts cannot be overemphasized because they present a fundamental truth that is linked to a reality so evident and so unmistakable as to need no elaboration. This understanding should convince anyone that the meaning of technology concerns the plenitude of human existence in its initial presentation and in the manifestation of its fulfillments that ensue. It promotes the idea that knowledge is essential for the development of technology as it is the basis of culture. But it should not be said that technology is the essence to everything. This view cannot be supported because technology's essence is ontological, not technological. Technology can exist only with the aid of ontological freedom, but ontological freedom can exist by itself, although it would be primeval at best. Non-technological humanity would infer an insufficiency that can only be aided by creativity.

3. Method

The basis of technology's applications is the realization of its methods, to which we should emphasize that there is nothing more essential than technology's methodic imperative for both its expression and its necessity in the nature of things. In the absence of its methods, we would be impacted by more than its non-existence because we would also be impacted by the absence of its consequences so that its absence would be the equivalent of a void representing a meaningless and useless invalidity. This statement is not given to intimidate, but to reaffirm the necessity of technology's being. Technology should be taken as the equivalent of human existence that goes back not meanderingly or unintentionally, but directly to the unknown hominid who on that eventful day picked up a stone lying about. Not modified, not chipped, and not flaked, that stone prepared us for a momentous journey that we are still engaged with today. And that journey is eventful because technology is not comprised solely of computers, airplanes, and automobiles, not solely of stone castles, three-wheeled plows, and armored knights, not solely of cuneiform writing, horse-drawn chariots, and irrigation canals, but by

the entire gamut of inventions and innovations from the first to the last, all the way from stone tools to the international space station. Technology constitutes a plenitude, an expression of creativity in reference to human existence.

And when referring to technology, a human-based concept is meant, but it should be acknowledged that there are alternate meanings that equate technology (or technique) with other life forms because they supposedly possess mechanisms that also challenge the environment in order to survive.

As stated above, technology's application is the realization of its methods. By means of a method, an end is sought, and once it has been attained, it may be repeated through imitation. As a result, a pattern of behavior is set in place, but it does not have to be rational. If rationality implies being logical or thoughtful, being knowledgeable or sensible, having the ability to reason or maintain sound judgment, solving problems by seeking better explanations, or pursuing the corrections of errors, then none of these qualities are necessary for a method. Rationality does not have to be equivalent to applying a rational method because even a method irrationally appended can be rationally applied. The difference between a method and its application concerns the nature of what a method is because it is meaningful for the plan or adaptation it introduces, but not necessarily meaningful for any result or effect to which it is applied. And ignorance should not be confused with irrationality. The point is that there is nothing rational about a hominid picking up a stone and using it as a tool. Its universal application may be rational, but the initial event may not be. Although this event may have been important, what was truly important was its repetition, and that effect was the basis of a method that was repeatable, that is, the initial and spontaneous act of picking up and using a stone as a tool did not apply to the concept of method, but its applications did. Only those actions that are repeatable are valid as a method. Certainly, in reference to a method, it is likely that picking up a stone was done by many individuals, male and female, over great expanses of time. It may have taken place every now and then, and what was important was not the initial event itself, but its continuation, no matter how long it took.

Although a method serves as a guide, there is no guide before a method is devised, nor does it apply to an activity that occurred once and is not repeated. Apparently, other hominids also picked up and used stones so that this behavior was imitated, making it essential in the process of hominization. Their actions affirm that the idea of a tool resides in the mind of the toolmaker, not in the tool itself. Tools retain nothing within themselves in reference to toolmaking, but they do retain their individual forms that serve as models for future configurations, forms that can be copied and improved over time. A tool has no memory of what it is, of what it does, or why it exists, but it contains the potential for future innovations, and that potential is devised and used by the knowledge of the toolmaker.

Although the idea of a tool is derivable from the toolmaker, this is not to say that the tool exists solely and explicitly for the toolmaker, or that the toolmaker exists solely and explicitly for the tool (Note 11). The potential toolmaker could still be existent in his own right, even if no tools were ever made. Toolmaking became culturally imperative as a seminal activity that helped to establish a pattern of behavior predating many other patterns of behavior in their infinite varieties that reinforced the ability

of our ancestors to solve problems, remember their solutions, and develop language as a means to communicate their resolutions. This imitative act was primordial to many other events that followed, and it goes without saying that any method whatsoever denotes a primordial judgment that is rendered deliberate within a specific perspective (Note 12). In fact, it was primeval, and by being primeval, it was a part of nothing else. Perhaps acting on a whim, this act of picking up a stone aided the process of survival.

A method would normally presuppose its use sooner or later. Although it might be considered that a method would eventually be used, its existence guarantees nothing, nor is a method the equivalent of a technique. It remains a framework, presumably purposeful, but also subject to neglect or forgetfulness. Nevertheless, a possibility is not a method, but a method is a possibility. Although the nonuse of a method may seem to be a contradiction, the very existence of a method itself contains its own power expressed as dynamic energy, like the energy emitted from the sun. Presupposing an end, it is by way of the means that the end is achieved because the means contain the energy of its method. Without the means, regardless how they are expressed and regardless who expresses them, the end would be terminal. Since a method is not the equivalent of the means, it still contains its own mechanism of movement, but it cannot be reduced to the manner by which it is applied. Superior to any means, a method is an energetic structure that gives form to the world, and by being a structure, it is more than a status. In fact, it is the mechanism that makes the world, and by the world we mean the social (as well as economic and political) components directly and deliberately created as a result of humanity's presence. In this sense, the world is not to be confused with the earth that depicts nature and natural forces.

More than with a system, a method is associated with behavior that signifies a process in progress. Although a system indicates a group of interrelated elements integrated into a whole that are based on and derived from a method(s), it lacks the formative energy essential for a method. Therefore, a method symbolizes the movement as well as the reality of doing something by promoting policies and improving procedures. It is an active force motivating activity, as it is also the primary agency positioned or inherent at the foundation of subsequent events. A method is a mode of being that may be described as the underlying basis to something. Because it is expressive of a dynamism with an energetic core, a method may be described as the medium through which existence appears. The invention of anything, material or immaterial, and its subsequent innovations characterize method at its most fundamental level.

4. Social Behavior

What is indicative of a method is behavior that is a description for action as a function of choice. Because behavior evolves, it is adaptive, and one important adaptation is cooperation that helps individuals as it also assures the survival of the group. Cooperation, along with sociability and mutual assistance, increases the likelihood of survival as survival increases the likelihood of cooperation. Both

are mutually inclusive, and both are essential for the development of human life forms. If the impulses for cooperation are innate at birth, all that is needed is their cultivation. In theory, an individual remains a separate entity, but in fact, no individual can survive alone. A fetus requires a mother's womb in order to develop, and at birth, the mother remains essential as do other members of the group. Survival is grounded in cooperation that evolved throughout the eons. Cooperative behavior is aligned with culturally based methods as well as survival skills associated with them, skills that in addition to fostering mutual benefit also helped to increase the food supply. Toolmaking skills coupled with the sharing of food converged into an interdependent social and technological matrix. More than the methodic skills utilized by a toolmaker, by method is meant the societal device that uses planning in the completion of tasks that have long-term effects. Although the methods of toolmakers may come and go, the methods of society linger. The technology of toolmaking reinforced the technology of social behavior as the technology of social behavior reinforced the technology of toolmaking. Much like the relationship between tools and language, however distant that might have been, tools and social behavior were similarly connected.

This relationship brings us once again to the meaning of technology, whether applicable in the past or the present, as the equivalent of human existence in all its manifestations that comprises a plenitude—technically, culturally, historically (Note 13). Everything in some way has a connection to technology, whether directly as the result of a tool or devise that is explicitly or implicitly designed, or indirectly as the result of a behavior, even for those behaviors that are merely presumed to be connected to technology in some way. Technology's impact cannot be limited merely to material objects, an interpretation that ignores or belittles technology's underpinning (Note 14). We should keep in mind that technologies are invented by individuals and promoted by the cultures from which they are derived. Stone tools preceded metalworking, metalworking preceded electricity, and electricity preceded the internet. In what sense are these inventions not related despite being separated by great expanses of time or by being segregated by differences in cultural adaptations? In what sense are (or were) their respective cultures supportive of new technologies? Since it is of the nature of a culture to sustain itself, it achieves this by promoting its own becoming, a becoming that may be seen as the nexus to its own unfolding.

We can say that if a culture is an adaptation to an environment, and a society is a group of people finding an adaptive mechanism for survival, then both adaptations and mechanisms are methodic. Whether or not these facts are accepted as true cannot undermine their importance de rerum natura. A culture describes distinct ideas of shared values or knowledge commonly applied. Although these ideas are variable, they are implicitly, not explicitly, interpreted by their supporters. The variability of cultures is grounded upon the variability of human society, but the latter is more fundamental (or limited) than the former because society is the basis upon which all cultures are founded. Although seemingly innate, ideas are acquired knowingly and consciously by their supporters, and they are representative of the conceptions or mental formulations that influence human reality in all its aspects.

Whether or not these representations should be described as symbols, they should be differentiated from imagination that relates to perceptions or mental images brought to mind in the absence of the cause or object that gave rise to them. Because a culture is not elaborate or complex, there are and there have been hundreds of cultures in prehistoric and historic times, and it is ethnology or cultural anthropology that attests to this fact. All of these descriptions characterize technology as the general designation of a planned and hopefully rational approach to life's uncertainties.

Although we have described society as a technology, this is not to say that all aspects of society are rationally placed because there are some aspects that are incorporated within society's lesser comprehensive categories that may be disruptive to certain proposals or discriminating to certain individuals. These thoughts take us back to our discussion of rationality given above in which the latter is meaningful to a method, but it may not be meaningful to an event or activity to which it is applied. Despite basic features of society being methodic in their original design, there is no guarantee that later additions would also be methodic, since the latter may attest to the frustrations we feel for many actions, both public and private. This is to say that whatever feature is technological must also be methodic because one is contained within the other. Similarly, what is identified as non-technological is presumed to manifest a non-methodic approach to reality. One would assume that the differences between technological and non-technological, or between methodic and non-methodic would be substantial, but in fact these differences are much reduced, in fact, so reduced as to be almost unnoticeable. Because technology develops within society, society is transformed into a technology, and not only because society is founded upon a method, but also because technicity within society forms the basis to all societies at any time and in any place. The technicity of computer technology, to cite an example, is directly related to the technicity of stone tools, however separated by vast expanses of time, as it is also related to the development of the wheel, pottery, metallurgy, agriculture, and all the rest. The technicity of our current social behavior that impacts present technologies is derived initially from the technicity of the first technologies.

Since technicity is defined as the capacity or efficacy in order to produce an effect that relates to technology, this definition is understood as a universal term with nearly unlimited applications (Note 15). Seemingly, technicity becomes even more universal when it pertains to technology, but not necessarily to material effects. Technicity may be included in any discussion of society because society is a technology. And the technicity of society is more fundamental and more meaningful than technology as an object. As Simondon states, but does not pursue, technicity is not limited to technical objects, but pertains to the world at large (Note 16). Although objects fulfill basic roles in the world, they remain subordinate to humans, thereby confirming that objectivity is grounded in and derives its importance from subjectivity. An object is meaningless or superficial to a subject until it is encountered, and when encountered, the subject increases in meaning because of the relationship between the two. The presence of objects increases the importance of subjects in relatio (Note 17). These thoughts preface the notion of technologization that describes the process in which technology and its underlying

technicity formulate and fabricate their effects. It denotes a mechanism of dynamic capabilities whose effects are unknown. Being open-ended, it contains both advantages and disadvantages, benefits and dangers that are liable to chance.

The manner in which technologization is expressed is through environmental adaptations that may be applied in different ways. They may be applied by individuals who change themselves to fit the environment, or who change the environment to fit themselves, or who create a new environment to replace the old. All of these adaptations are representative of adaptive intelligence that affirms ingenuity. And whatever is adaptive by a society must satisfy something so fundamental and so indispensable as to be irreplaceable within the general scheme of things, to be efficient as the manner devised by a few that may offer benefits for the many. It is by means of transmission that these adaptations over time become part of society's matrix and by extension, to culture itself. The knowledge and skills acquired can be transmitted to future generations, and it is society or the social environment that allows this transmission to take place. Any transmission is precarious because less useful adaptations may replace more useful ones. In this sense, there is no guarantee for anything, least of all progress, but the survival and transmission of human culture, wherever it originated and however it was transformed, cannot deny the reality of its existence or its impact in prehistory and history alike. However imperfect as it may be, society remains a feature of human existence and a connection to the totality of life's experiences as culture itself exemplifies societal variability.

Technology is included within cultural manifestations because the latter are derived from technology's mechanisms. Both technology and culture are conterminous and coextensive, although culture is characterized by more than just beliefs, manners, and traits of behavior, since it is also characterized by open-ended knowledge of their performance. Although serving as the basis for culture, technology cannot exist separately in the universe of things. It must be appended to the process of hominization. No matter how technological, industrial, or cybernetic we become, the society they represent and the culture they support will not eliminate humans, for even robots need humans as their inventors.

When technology is increased, its corresponding culture is increased, and when a culture is increased, its corresponding technology is increased. It is impossible for one to be broadened or augmented without broadening or augmenting the other. Any culture may adopt technology that originates elsewhere, and when it does, whether completely or partially, it transforms itself into something different. This fact is evident in the transmission of stone tools in the past and of nuclear energy in the present. This relationship affirms that technology in its fullest meaning is a cultural phenomenon despite how infrequently it is acknowledged. This understanding is reinforced by the definition of society given above that relates to mutual interests in socially transmitted behavioral patterns. Since technology and society evolved together, they illustrate that human culture is more than a revelation of humanity's presence. They indicate that human culture is a revelation of humanity's worldly being within its full ontological meaning. Culture is a disclosure of the world for hominids and humans alike who are temporally fixed and circumstantially defined by choice, such as the choice to use a stone as a

tool. Whether or not that choice was rational is undetermined, but its continuous use enabled its initial application to have lasting consequences and illustrate that choice itself is a product of creativity.

5. Conclusion

Although the use of a stone as an object is the result of its being, it must exist first before it can be used. The hominid who picked up a stone on that eventful day made a choice, rationally or irrationality, with an object that was not accessible when living in the trees. The stone that was picked up was transformed by its use into an extension of its being, inferring that the descent to the ground was monumentally important and offered opportunities that did not exist before. The use of a stone may have started as an incidental event, that is, as an event of lesser importance, but eventually it became crucial for hominid evolution.

If we can acknowledge that technology began on the ground and not in the trees, we should also acknowledge that what existed in the trees was a society that in its simplest manifestation possessed a type of prototechnology because society itself is an example of technology.

We should also acknowledge that social behavior is derived from the technicity of its methods, and since technicity relates to the capacity or efficacy to produce an effect, this effect is manifested in the becoming of its being, the being that supports the development of social interaction that leads to more than just the cultivation of sociability. It also leads to the introduction and advancement of basic survival skills. The attributes of what became human behavior were derived from the development of speech, more complex tool technology, tools made from other materials (especially bone), a diversified diet, and the ability to travel long distances. Most likely, these attributes occurred at different times and places, but all of them led to an intensification of social life. Individuals within these circumstances used these and other resources to develop group identity, as they also promoted communicative and organizational skills that aided cultural diffusion. Their social desires developed and refined behavior that advanced them beyond all other forms of life. These attributes introduced and strengthened the technologization of society.

Let us make these thoughts eminently clear because without method, there would be no technicity or the latter's effect on social behavior. Although there are many different types of social behavior, we are concerned primarily with the behavior that lies at the foundation to society with a far-reaching influence on technology as a cultural phenomenon and on human evolution in general. It should be apparent that the technicity of stone tools implies the development of hominid sociability, but how difficult is it for us to accept this simple truth? How can it not confirm where we are in the world and how we got there? The collective knowledge of stone tool technology was acquired from the means of inventive ingenuity. Without the support of the collective community in the development of stone tools, its technology would not have been implemented. The technology of stone tools assisted in the development of methods that impacted communal well-being. It led the way to social behavior and fostered cultures that aided survival.

Notes

Note 1. Clifford Geertz, The Interpretation of Cultures: Selected Essays, 3rd ed., New York: Basic Books, 2017, p. 37-61.

Note 2. Raymond A. Dart, "Australopithecus africanus: The Man-Ape of South Africa," Nature, 115, no. 2884 (1925), 195-99.

Note 3. Contrary to André Leroi-Gourhan, Gesture and Speech, trans. Anna Bostock Berger, Cambridge [MA]: MIT Press, 1993, pp. 113-15.

Note 4. David McNeill, How Language Began: Gesture and Speech in Human Evolution, Cambridge: Cambridge University Press, 2012, pp. 27-32.

Note 5. Aristotle, Parts of Animals, 687a20-24. See The Complete Works of Aristotle: The Revised Oxford Translation, ed. Jonathan Barnes, 2 vols., Princeton: Princeton University Press, 1984, vol. I, p. 1072.

Note 6. L.S.B. Leakey et al., eds., Olduvai Gorge, 5 vols. in 6 parts, Cambridge: Cambridge University Press, 1965-1994, vol. 2: The Cranium and Maxillary Dentition of Australopithecus (Zinjanthropus) Boisei by P.V. Tobias (1967), pp. 236-40.

Note 7. Jayne Wilkins, "The Point is the Point: Emulative Social Learning and Weapon Manufacture in the Middle Stone Age in South Africa," in Convergent Evolution in Stone-Tool Technology, ed. Michael J. O'Brien et al., Cambridge [MA]: MIT Press, 2018, pp. 153-73.

Note 8. Stanley H. Ambrose, "Paleolithic Technology and Human Evolution," Science, new series, 291, no. 5509 (March 2, 2001), 1748-53.

Note 9. Leslie A. White, The Evolution of Culture: The Development of Civilization to the Fall of Rome, New York: McGraw-Hill Book Co., 1959, pp. 18-28.

Note 10. Kathleen R. Gibson, "Tool use, language and social behavior in relationship to information processing capacities," in Kathleen R. Gibson & Tim Ingold, eds., Tools, Language and Cognition in Human Evolution, Cambridge: Cambridge University Press, 1993, pp. 256-60.

Note 11. Mark B.N. Hansen, Embodying Technesis: Technology beyond Writing, Ann Arbor: University of Michigan Press, 2000, p. 104.

Note 12. Justus Buchler, The Concept of Method, New York: Columbia University Press, 1961, pp. 67-68.

Note 13. Arthur Bradley, Originary Technicity: The Theory of Technology from Marx to Derrida, New York: Palgrave Macmillan, 2011, pp. 14-16 equates technology with life in the sense of its coming into being or its creative powers as "originary technicity."

Note 14. Gernot Böhme, Invasive Technification: Critical Essays in the Philosophy of Technology, trans. Cameron Shingleton, London: Bloombury, 2012, p. 19.

Note 15. Jacques Ellul, The Technological Society, trans. John Wilkinson, New York: Vintage Books, 1964, p. xxv renders technicity as technique as "the totality of methods rationally arrived at and having absolute efficiency."

Note 16. Gilbert Simondon, On the Mode of Existence of Technical Objects, trans. Cécile Malaspina & John Rogove, Minneapolis: Univocal Publishing, 2017, pp. 167-78.

Note 17. Theodore John Rivers, "Technological artifice and the object-subject relationship," Technology in Society, 59 (2019), article # 101178 (pp. 1-5).