

CULTURE IN HOMINIZATION AND ITS IMPLICATIONS IN AN EVOLUTIONARY VIEW

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Human behaviour is characterized by culture. Human presence is indicated by culture. The question is defining what we exactly mean by culture.

Some authors have a broad concept of culture. For example, Cavalli-Sforza and Feldman (1981) say: 'we apply the term "cultural" to traits that are learnt thanks to any process of non-genetic transmission, whether by imprinting, conditioning, observation, imitation or as a result of direct teaching'.

In this concept, recognizable in many animals, there is no specific human character.

Other authors limit the concept of culture to artistic and spiritual manifestations and to the language used by *Homo sapiens* 100,000 years ago. This concept of culture is too narrow. In fact, when the products of technology show some kind of planning and denote a symbolic activity, they reveal an abstractive mind and therefore a self-reflection which certainly indicates that the human threshold has been reached.

But the application of the concept of culture can give problems when identifying man at his origins.

Current taxonomy refers many species to the genus *Homo*, but it cannot be adopted as a criterion to recognize the presence of man. A skeletal remain attributed to the genus *Homo* because of its anatomic features does not necessarily imply that it represents man in a philosophical sense, i.e. a thinking man.

In paleoanthropology, identifying the species is problematic, as this method is based on morphological skeletal characters. The same difficulty appears in taxonomy based on the DNA analysis in ancient remains compared to DNA in modern humans. The use of morphological or biomolecular differences in skeletal remains, when applied as a criterion for fecundity between species, is problematic.

But when we happen to meet skeletal remains that are connected with products showing systematic and innovative work, the presence of man can

be inferred, whatever morphological and evolutionary level the remains are to be referred to.

What distinguishes human technology from non-human one (as it occurs in Apes and *Australopithecus*) is the complexity of actions by means of which this technology is performed and, even more relevant, the capacity of improving and innovating technique, and the significance assumed by the products in the context of everyday life.

According to Henry Bergson (1941) 'intelligence, considered in what seems to be its original feature, is the ability to manufacture artificial objects and particularly tools to make tools and to alter them in order to vary indefinitely their production'.

Jean Piveteau (1991) says: 'The reflection that characterizes man can be defined as conscience of deferred action in making tools. It is not credible that man since his origins, could have been *faber* earlier than *sapiens*'.

Planning capacity is revealed by tool making (purpose of products, variety, progress in technology, preservation of tools), and by the organization of the territory (shelters, camps). Intentionality reveals the notion of time; the subject elaborates images of the past and projects them into a future that he is able to prefigure. In the animal world one also finds techniques (at times very complex ones), but they are regulated biologically and do not exhibit innovation and progress. They do not constitute evidence of abstract ability to project into the future. In his manifestations of intentionality, man also shows capacity of choice, self-determination and liberty, an aspect that places him on the plane of values and thus ethics.

According to Paul Ricoeur, 'symbol leads to thinking'.

Julien Ries (1993) observed that flint flaking implies experimentation, imagination, choice of material and form; he also attributes a symbolic meaning to the organization of the territory.

Symbolization is the other characteristic of human behaviour. It consists in attributing to a sign (a sound or an object) a value that goes beyond the sign itself. By means of symbolization, realizations of techniques are enriched with meaning and value. A symbolic value, i.e. a symbolic activity, can be recognized in systematic manufacture of tools, in the organization of territory, in the subsistence economy and social organization. Instrumental culture reveals a symbolism which we suggest to call functional, distinguishing it from the social symbolism expressed in language and from the spiritual symbolism represented by artistic and religious expressions which are not connected with subsistence strategies (Facchini, 2000).

When the tool is produced for a purpose, in a variety of forms, when it is used in a given environmental context, when it is preserved (and not only

used occasionally and then discarded, as in Apes), when tool making is improved in time, only then can we say that all this expresses a symbolic system of connections.

Homo symbolicus is such because he is human, creator of tools and of art, able to communicate his internal world in various ways.

We agree with Deacon (1997) who stated: 'The introduction of stone tools and the ecological adaptation they indicate also mark the presence of socioecological predicament that requires a symbolic solution'. Deacon defines man as symbolic species, with reference to making tools, as a system of adapting to the environment.

On the phenomenological level, culture reveals discontinuity compared with non-human forms, whatever the reason or nature of this discontinuity, because it does not follow biological laws. Culture, although related to the biological sphere, is characterized as extra-biological or meta-biological, in the sense that it achieves a transcendence with respect to purely biological laws or modalities of behaviour. In fact, even when it has some relationship with biological needs, culture occurs outside of any biological or behavioural determinism and, as mentioned above, is a sign of liberty and self-determination. This is particularly evident in the manifestations of spiritual and social symbolism.

According to Dobzhansky (1969), in the evolutionary history of life there have been two great moments of crisis. As a consequence of this, although the organization laws and modalities of the previous phase were conserved, there was an advancement beyond the previous organization to a new level. The author proposes to call these moments 'evolutionary transcendence'. A first transcendence was the passage from non-life to life. The laws of chemistry are not broken, but an organizational modality and a relationship with the environment are established: 'cosmic evolution transcended itself giving birth to life'. A second moment of transcendence was the appearance of man: 'biological evolution transcended itself giving rise to man'. The laws regulating living beings were not cancelled, but the organizational modalities of human society are set on another plane.

Ayala (2007) agrees with the previous statement and observes that moral behaviour is a biological attribute of *Homo sapiens*, but moral codes are not products of biological evolution, but of a cultural evolution.

When recognizing such discontinuity even in the simplest technological manifestations, it becomes difficult to identify the humans in the real sense of the word. This is an open problem in Paleoanthropology. In our opinion planning capacity and symbolism have been typically human since the origins of man, whatever their manifestations and the morphological level

may be. Still, attitude towards culture can be recognized even out of its simplest expressions, starting from pebble culture.

With the passing of time cultural manifestations become more and more meaningful and therefore human attribution turns out to be easier (acheulean culture with bifaces of the Lower Paleolithic, hunt organization, leptolithic culture of the Upper Paleolithic, artistic, aesthetic, religious manifestations). Innovation and intentional transmission for learning are fundamental in this respect.

If we want to represent culture development by a Cartesian coordinate diagram, it can be represented by segments of straight lines moving from the origin with a very small slope, but with the passing of time the distance of the segments of straight lines from the abscissa axis notably increases (Fig. 1).

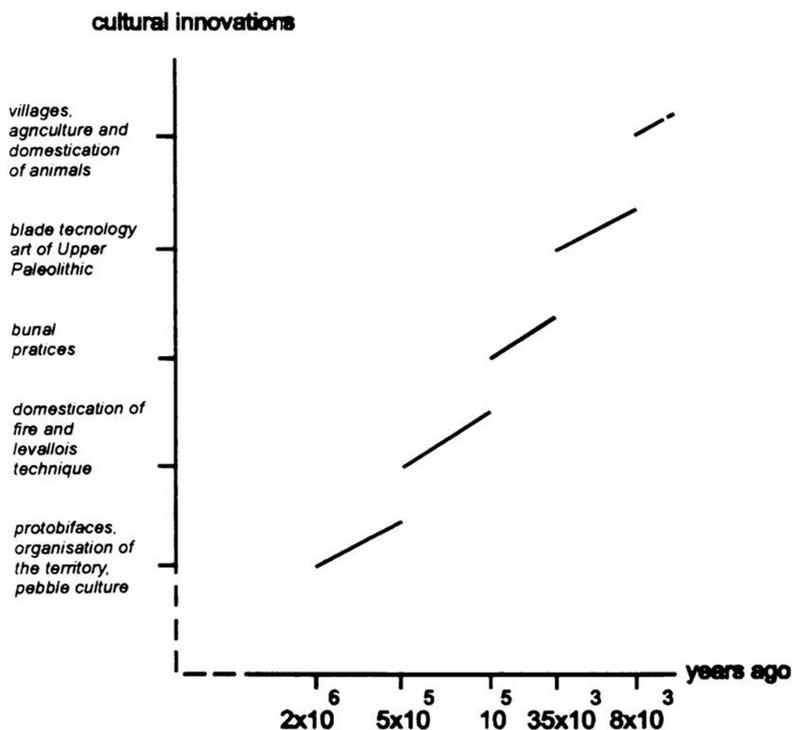


Figure 1. Hypothesis of graphic representation of the development of culture. In abscissa there is the time in logarithmic scale; in ordinate the quantification of cultural innovations. A greater distance from the abscissa axis, denotes a greater importance. The slope of the segments of straight lines is assumed to be constant.

DIFFERENT IMPLICATIONS

The implications of culture in an evolutionary view can be recognized at different levels, which are interconnected.

a) *At paleoanthropological level*

Cognitive capacities disclosed by culture are to be related to brain development. Cerebralization characterizes the evolutionary trend in the Homioid and among them, in the Hominids and in the human line that is more and more cerebralized starting from the *Homo habilis/rudolfensis*. The process of cerebralization is a privileged direction in evolution according to many Authors (Piveteau, Dobzhansky, Teilhard de Chardin, etc).

While there are no doubts about the cerebral development in man, the factors which made it possible are still unknown. Genetic factors are usually mentioned, like e.g. the influence of a meat diet and of food cooking, but a correlation has been prospected also with tool making and with technological development. A material culture would have favoured the increase in brain size, according to the auto-catalysis model (Lancaster, 1967; Blurton Jones, 1980; Tobias, 1981). Natural selection would have rewarded Hominids more capable of technical operations because more endowed on the cerebral level. Importance of social organization and of cooperation in order to achieve a greater success is recognized (Lovejoy, 1981; Blumenberg, 1983). Man developed himself by means of culture, in a kind of crossed catalysis (Tobias, 1971; Eccles, 1981).

From a paleoanthropological point of view, a coexistence of biological evolution and cultural evolution is admissible. However, their rhythms are different: biological evolution is quicker in the long periods of Low and Middle Pleistocene, while cultural evolution is quicker in the Upper Pleistocene, in which somatic evolution slows down (Fig. 2, see p. 612).

b) *At evolutive level*

Culture enters in the mechanism of the evolution of the species. In fact, by means of culture man adapts himself to his environment and adapts the environment to himself. We must admit a differentiation and isolation from non-human relatives. Moreover cultural adaptation reduces natural selection in man. This can stop or prevent the process of isolation which is necessary to speciation, even if morphological differentiation does not cease.

We know of a microevolution in the population genetics and this can be admitted in human populations too. This can explain the difficulty in identifying the species in hominization. According to some Authors (e.g. Ferembach, Jelinek, Coppens, etc.) it would be better to speak of morphological grades or steps, rather than of species.

In paleoanthropology human species are only supposed, on the basis of morphological and ecological characters, not demonstrated (see Facchini, 2006).

c) *At ecological level*

Culture characterises the relation between man and environment, both from the structural and the functional viewpoint, and in this way it is linked to the concept of ecological niche of the species. The ecological niche is not to be intended as a habitat, but as 'the functional state of an organism within his community' (Elton, 1927).

In more recent literature the functional relation of species with the environment, seen as different from the habitat, is emphasized. 'In order to study organisms, knowledge of the habitat is just the beginning. To assess the state of an organism within his natural community, one should be able to know his activities, especially the way in which he feeds himself, his sources of energy' (Odum, 1971). According to Colinvaux (1982) the ecological niche is defined as 'the set of abilities to make use of resources, to survive risks and contentions, which is connected with a corresponding set of exigencies'.

And since, in the human species, culture is what characterizes the structural and functional adaptation to the environment, it may be stated that culture is the 'ecological niche' of man (Facchini, 1988, 2001) (Fig. 3 see p. 613).

This can explain the wide diffusion of man in the world. Man is an ecumenical species.

d) *At phenomenological level*

Discontinuity expressed by culture implies not only a difference with respect to the rules and properties of animals, but it also points out a new modality of behaviour expressed by planning capacity and by symbolism. Symbolic language is peculiar of man. Freedom is a property of man. These are to be considered extra-biologic properties and they are documented by products of technology too. Man shows subjective conscience and self-deter-

mination, which contribute to determine his behaviour. They are signs of transcendence and express a phenomenological discontinuity.

The activity that man performs by means of culture (including instrumental culture) is external to fixed and constant biological schemes, is performed freely with ever innovative modalities based on individual experience, and is able to counteract natural selection. This is an absolute novelty in the history of life. In this regard the human species represents a paradox on the evolutionary plan: natural selection has produced a being capable of opposing it by a modality that no longer falls within the natural game of the competition of living beings with the environment. This is a unique case in the world of living beings, one can say an anomaly, explainable by the intervention of culture, a factor not to be found in other species.

g) At cosmological level

Some authors (Barrow and Tipler, 1986) proposed the Anthropic principle. On the basis of this principle astronomic constants turn out to be formed in order to let intelligent observers appear (strong expression of the Anthropic principle) or are such that they permit intelligent observers to be developed (weak expression).

At this regard Nicolò Dalla Porta and Secco (1991) observed that the strong principle is not demonstrable and that the weak one seems to assume more a character of ascertainment than of a proof.

Indeed, development of intelligent life is related to conditions that have actually taken place in the history of the planet, and of life on Earth, and in the whole cosmic and biologic evolution that predates man. This gives a new meaning to all reality. The Anthropic principle could be considered from another viewpoint. 'Our purpose, seen in hindsight, is attached to the purpose of the whole living world, in which it seems we are allowed to consider our appearance as a particular purpose', which is made possible by cosmological evolution (Leclerc, 2008).

However, beyond the problems raised by the Anthropic principle, through the thought and conscience of man, the entire universe is thought and becomes conscious.

f) At philosophical level

As pointed out above, Dobzhansky sees in the apparition of man a second form of transcendence in the history of life. Concerning the explanation

of the nature of this transcendence and its causes it is necessary to move beyond the phenomenological aspects into a purely philosophical plane.

The nature of discontinuity, represented by abstractive intelligence, self-awareness, symbolic communication and language, gratuitousness and freedom, all of which cannot be reduced to purely biological activities, introduces into the picture the spiritual dimension. If matter becomes thinking (Coppens, 2006), one can speak of a qualitative difference in comparison with animals, not of a difference of grade, as affirmed by Darwin (1871), according to whom 'the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind'.

The creation of the spirit is outside the realm of empirical evidences and can be dealt with only at the philosophical level whether we are talking about human phylogenesis or ontogenesis. The discontinuity that can be observed on the phenomenological level may be interpreted as a transcendence at the philosophical or ontological level

John Paul II so describes man's appearance: 'With man we find ourselves in the presence of an ontological difference, one ontological leap, one could say' (*Message to the Pontifical Academy of Sciences, 22 October 1996*; in *Papal Addresses to the Pontifical Academy of Sciences 1917-2002*, p. 373; Vatican City, 2003). If discontinuity is observed in a long time at the phenomenological level, at the philosophical level this discontinuity must be radical, no matter what its cultural expressions are, because the spirit cannot come out of living matter. As the Pope remarked: 'Theories of evolution which, in accordance with the philosophies inspiring them, consider the mind as emerging from the forces of living matter, or as a mere epiphenomenon of this matter, are incompatible with the truth about man' (*ibid.*).

In the address to the Plenary Session of the Pontifical Academy of Sciences (31 Oct. 2008) Benedict XVI reaffirmed 'that every spiritual soul is created immediately by God – it is not "produced" by parents – and also that is immortal' (*Catechism of the Catholic Church*, 366).

We can assume that the will of the Creator includes, at a certain moment of the evolutionary process, a corporeity enriched by spirit, not in the sense of an entity which is added to another one, almost placed on or beside it, but which, starting from a certain moment, exists inside the other one, as and when it is wanted by God, in a way similar to what happens in human ontogenesis. All this for ontological reasons, not for biological reasons, if we recognize the presence of the spirit in man. The analogy with ontogenesis is present also in the quoted address of Pope Benedict to the Academy.

There cannot be any form of intermediate psychism which would be only partially human, as Maritain noted. But there may have been intermediate forms of animal psychism between the human one and that of the apes, as it is right to think about the *Australopithecus* (overdeveloped animals, according to Maritain, 1973).

Nevertheless, the exact moment of passage into the spiritual realm, i.e. when the hominid becomes aware of himself, cannot be represented by scientific methods or our imagination, as remarked by John Paul II.

The obscurity in representing the appearance of the spiritual dimension is similar to what happens in ontogenesis.

The Creator's will was accomplished without mediation of material agents in the first humans and continues in every human being, even if with the collaboration of parents.

Cultural manifestations cannot help in determining the exact moment of the achievement of the human threshold, but only can help in stating if that threshold can be considered as reached.

g) At moral and ethic-social level

We can point out another expression of transcendence in man: the wealth of values and meaning, unrelated to biological needs, that can be found in the responses man is capable of eliciting for biological needs; the same applies to human behaviours not directly related to the biological sphere, e.g. manifestations of spiritual symbolism. Man is able to internalize the responses to biological needs by attributing to them different values, related to the internal world of the person or to the social sphere.

If one looks at the manifestations of spiritual symbolism (art, religion, gratuitousness) the transcendent nature of man is even more evident.

Connected with cultural attitude and freedom is ethical behaviour, which requires the ability to recognize certain values and to choose freely.

According to Ayala (1987) three conditions are necessary for an ethical behaviour: a) the ability to foresee the consequences of one's own actions; b) the ability to make value judgments; c) the ability to choose between series of alternatives actions.

Following this line of reasoning we can state that the connection between means and ends can be detected in the ability to construct tools. The variety of technological products shows a freedom of choices.

As we remarked, cultural behaviour reveals ability for abstraction and not a stereotyped or automatic technological behaviour since the earliest stages of mankind.

The capacity for planning and symbolic activity is revealed by the products of technology, as we pointed out in the first considerations.

Very important and significant were the different forms of cooperation in the life strategies of prehistoric man, among them we must stress gratuitous behaviour.

Spiritual symbolism is recognized in particular rituals of the early Paleolithic and in the burials or decorations of the last hundred thousand years.

All this attests to freedom and capacity of values that are at the basis of the ethical behaviour connected with cultural attitude and are evident in modern humans, but must be supposed also in prehistoric man.

In conclusion we must point out the uniqueness of the human being in the living world for his cognitive activity, for his ability to ask questions about himself, his past and future, for his freedom.

During hominization, culture starts a process of humanization, defined as 'the way in which man, after appearing in the centre of nature, starts marking it with his presence' (Martelet, 1998).

It is a process that starts with the beginnings of humankind, but lasts in time, and is characterized by a growth of culture. Man, through technology and the development of symbolic systems of communication, builds a life environment that is increasingly marked by his presence.

In other terms, culture influences the environment, adapts it better to humans, increases cooperation, improves welfare.

Teilhard de Chardin speaks of a process of 'planetization' referring to the increase in socialization and relationships among the people. The process of globalization characteristic of present day humankind can be viewed in this perspective.

Even taking in account a lot of contradictions, human history is marked by a general progress of culture. It is marked by a growth of humanization, i.e. of the ability to influence nature, in order to make it more suitable to the development of humankind.

But freedom brings into the picture the responsibility of man regarding the use of technology in order to build his future. The building of the future is exposed to the risks arising from a bad use of science and technology.

We cannot disregard the severe and numerous problems regarding the relation of man with the environment, the concrete possibilities of destroying nature, and the contradictions and conflicts that mark the history of humankind and that can reach a planetary level. We cannot be silent about the risks of a de-humanization.

New scenarios seem to open up with the development of biomechanics and of genetical engineering. I am referring in particular to intervention related to personality, e.g. the ones operating on cerebral areas. Androids are being introduced in the picture, as a kind of hybridizing between human brain and computers, that could be possible thanks to genetic engineering practices and cybernetics. Even a meta-anthropos, a term whose meaning is not well defined, seems to be in the realm of possibilities.

According to Morin (2001), 'Man too *sapiens* becomes ipso facto *demens*'. Would it be a dramatic change in the course of the human evolution?

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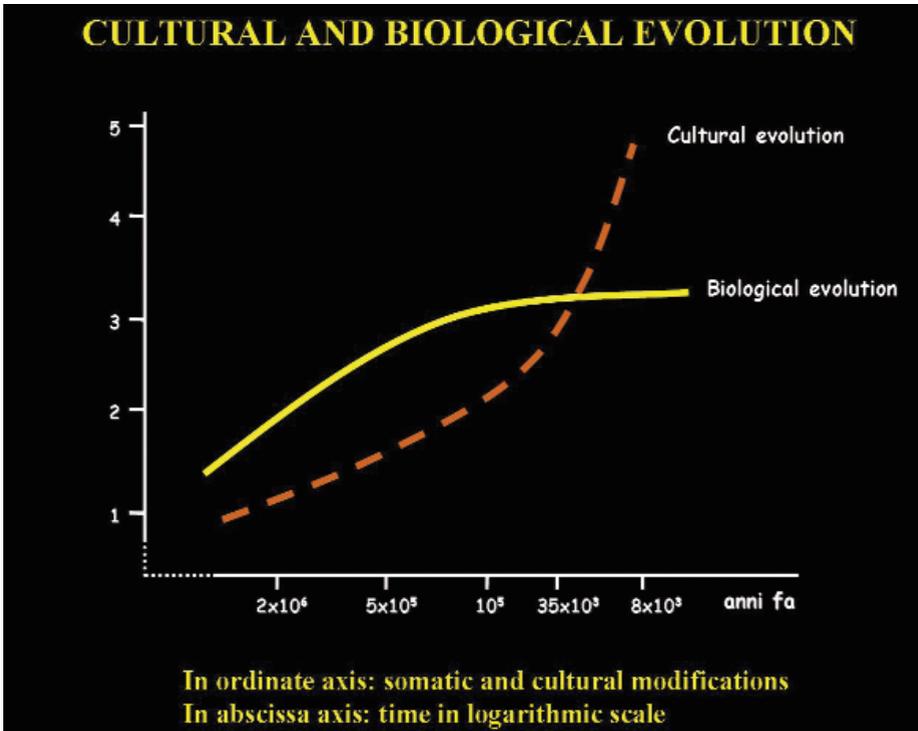


Figure 2. Hypothesis of graphic representation of cultural and biological evolution.

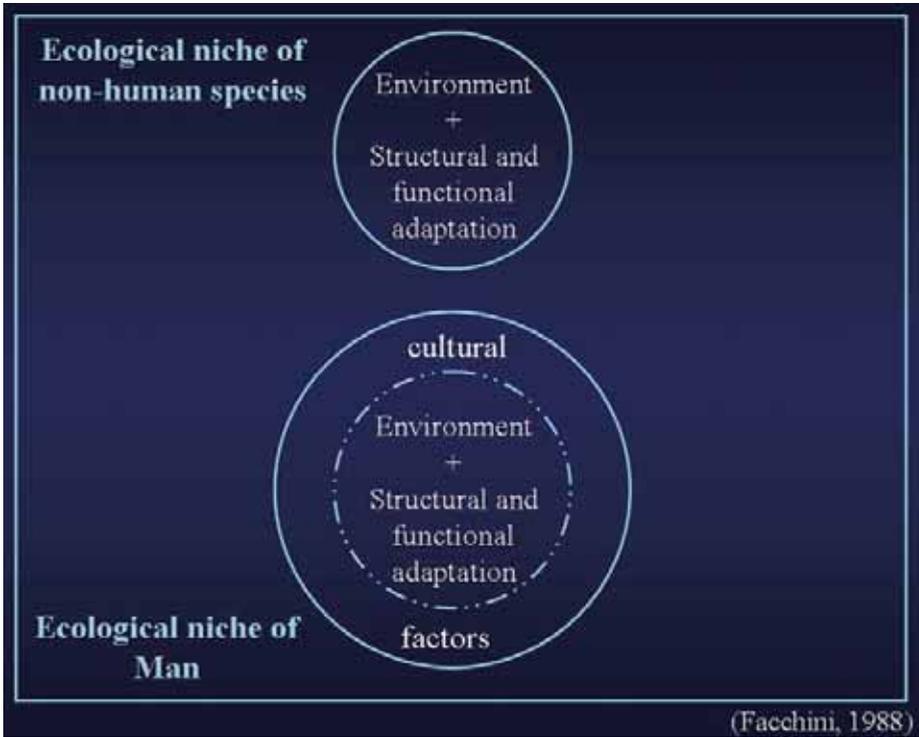


Figure 3. Graphic representation of the ecological niche for non-human species and for Man.