LAICALITY AND SECULARITY OF BIOETHICS: WHY I BELIEVE IN A BIOLOGICALLY FOUNDED ETHICS

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ABSTRACT. All living forms are worthy of respect and of bioethical consideration as they keep promoting the DNA of the species and the preservation of its intraspecific variability. However, the ethical consideration varies and has a different weight according to different biological complexity and its ontogenetic cycle. The socio-intellectual control on the environment in the natural system operated by Humanity can represent the quality leading to the fourth hierarchical level of ethical norms. The historically influenced bioethical behavior of humans can be related to morality which can assume different norms in different historical contexts. Morality could be therefore governed by religious or normalized by governments. Ethics is instead a pure biological and ecological discipline.

KEYWORDS: Morality, medical ethics, deontology, global bioethics.

Religious ethics, medical ethics, personalistic ethics, political ethics, environmental ethics, business ethics, bioethics: a sequence of qualifications of the term *ethics* which tends to define new way of behavior. The starting of the debate on ethics can be dated in 1892 when Felix Adler (1851-1933) challenged Christian and Hebrew control over moral dogmas by founding the Society for Ethical Culture in New York.

Two innovative elements of reflection joined this crisis, or ideological renewal, during the first half of this century:

1. *The ecological impact of man on environment*. It started with the industrial revolution in the XVIII century, but it manifested itself during and after the Second World War, with a quick and explosive demographic increase of human population, which changed from 1 billion in 1835 to 6 billion in less than 160 years (8 generations);

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2. *The innovative impact of science.* It started with the atomic physics, which destroyed the conceptual basis of matter with the fission of the atom. It was followed by biotechnology, which destroyed the concept of individual with the introduction of organ transplant, and by DNA chemistry and "genetic engineering" which had the same impact on the concept of species.

Man, or the science that human evolution produced, looks at nature as liveable environment (ecology) and as matter that he himself and all other living organisms are made of (comparative biology). "A reflection of the mind on matter, but the mind is made of that same matter" (Chiarelli 1995).

Bioethics is born in this context. Even if the real inventor of this discipline was Aldo Leopold with his book *A Sand County Almanac with other Essays on Conservation* (1949), it was R. Van Potter (1971), who coined the term 'bioethics' and defined it as the "*science of equilibrium between man and nature and as a bridge for the future*."

In the *historical tradition*, the first forms of ethics concerned relations between individuals and limitations of individual freedom towards others. "Others" includes those belonging to a definite social coexisting group such as father, mother, son, daughter, husbands, wife, servants, and so forth. In addition, ethics accounted for the property and pertinence belonging to each individual within his group. The Mosaic Law, from the fourth section on, is one of the more complete syntheses of these rules. The Mosaic "Commandments", which were eventually integrated by cultural and ethnic traditions from different populations, served as the foundation of the *Judeo-Christian morality*.

The following stage of ethics is tied to the Greek-Roman culture. This stage concerns relations between individuals and society, whereby society is understood as an indefinite group of known and unknown (or hypothetical) individuals and their properties and pertinence. The developments of Roman Law and of its well-defined norms, and the modern developments of the concept of democracy, are a successive extension of the concept of ethics to society.

A codification of the ethics that regularizes the interaction between man, Earth, animals and plants with whom we share the Earth, does not yet exist. The relations between man and the natural world are strictly economic. Anthropocentric Western ethics (or, better, morality) permit human rights over nature but do not account for any responsibility of man to nature.

The extension of ethics to this third element, i.e., the environment exploited by man, and generally to the other living beings (plants and animals) is a conceptual progression as well as an ecological need. Such an extension is also required now by the development of biotechnology and by the recently acquired knowledge of DNA chemistry.

Bioethics cannot be an individual prerogative or that of a single ideological group. *As a science, it has to find its roots in the logic of life on the basis of which it pretends to codify rules*.

A rational and naturalistic definition of bioethics must, first of all, propose as an essential fact and as principal foundation *the conservation of species' DNA and the maintenance of its intraspecific variability*.

Indeed, this aim of promoting the DNA of the species and preserving its intraspecific variability is the basic principle of bioethics.

The applicability of ethical norms to all biological entities whether they are species or preliminary forms of individuals (spores, gamete, embryos) or cloning products (cuttings), derives from this bioethical principle.

All these forms, even according to Hinduistic or Schweitzerian tradition, deserve respect and ethical consideration. However, such ethical consideration varies and they have a different weight according to the different biological complexity and its ontogenetic cycles.

A first hierarchical level of value must be attributed to the specific DNA of a biological entity characterized by a haploid order of genes such as a bacterium, a gamete, or a spore, or a haplophyte.

The second hierarchical level leading to complexity in the history of life are the diploid entities characterized by a diploid order of genes. They differ from the haploid because the fusion of the two haploid DNA filaments presupposes meiosis, which functions as a selective filter of casual mutations, the majority of which lead to the extinction of the haploid entity.

The ethical concern, however, is different if the diploid biological entity has no prospect of autonomous survival, as in the case of an embryo, if its reproductive cycle has already been completed; or if it is constituted by individuals whose existence is absolutely independent from specific DNA transmission as is the case in the subordinate classes of social insects or in the case of a cutting.

a) In the case of animals embryo or of plants seeds, the contribution of these biological entities to the preservation of specific DNA and of its variability in the following generations has very few chances; their existence and their reaching of individuality, in fact, are conditioned by many heterogeneous environmental incidents. These incidents eliminate a large percentage of the biological entities, as happens with plants seeds, and fecundated eggs (embryos) in animals. This condition of uncertainty restricts the bioethical valuation of these biological entities.

b) In the case of entities that have completed their reproductive cycle, they are biologically useless and therefore their existence has lost biological significance, although they can have a biosocial significance in some species of animals. Their survival is mainly a surplus for the population.

c) In the case of social insects' subordinate classes, the meaning of their existence is limited only to their own life. In life's hierarchy these conditions are not considered as complete and their life is limited to their specialized differentiation and for a specific service in their biosocial community.

d) In plants and in lower animals, diploid biological entities exist like cutting. It is not possible to attribute to them the concept of individual since, although they are bearers of species specific DNA, they do not have any variability. They are all identical copies of subsequent fractionation without sexual reproduction. These entities lack individuality, they are identical copies, do not promote biodiversity and do not allow for the perpetuation of genetic variability of the species; they are living entities, but do not have the same characteristics as individuals.

We are instead interested in considering the ethical norms for those animal species in which the concept of "individual" is present; individual being defined as a biological entity characterized by "*uniqueness, indivisibility and unrepeatability*" for the entire ontogenetic cycle (i.e., individuals resulting from the fusion of gametes produced by the meiotic process of parental generation) and in which the germinal line is potentially active in all individual members of the population. This is the third hierarchical level in the history of life.

In these organisms the preservation of the characteristic DNA of the species and its intraspecific variability is guaranteed by precise rules of *socialization*. Therefore, the ethical norms of these species are conditioned by the *biological stimulus of socialization*. Socialization thus means the stimuli needed to perpetuate the characteristic DNA of the species and its intraspecific variability. These stimuli are:

A) parental cure,
B) reproductive behavior,
C) cooperation for food acquisition,
D) cooperation for individual or group defense.

These stimuli are the target of ethical rules governing the social organization of vertebrates, man included.

These four factors, independently one to another, are the entities upon which are developed the ethical norms of the third hierarchical level in the natural system.

They could also be organized in a sort of equation. In fact, while A and B are strictly dependent on the species' biology, C and D are related to environmental conditions. It is thus necessary to introduce for both these last two elements a constant *k*, which is linked to environmental conditions in which the species or the population happens to live.

These four factors may be quantified in terms of consumptions of necessary energy (*calories*) and amount of time invested (*time*) in the fulfillment of the ethical imperative of the reproductive process. This allows one to arrange them in an equation whose result ought to give the minimum and maximum size (Δ) of the population of a given species that can survive in a certain territory.

$$(A+B) + k(C+D) = \Delta$$

From a genetic point of view, this delta could be identified with the concept of *deme*. The deme, in a local panmictic population, determines the minimum number of individual needed to guarantee genetic variability, which is essential for its subsistence for an unlimited number of generations.

In this definition of deme the essential presence of genetic variability is stressed. In order to keep constant the frequency of genes in a population, four conditions are necessary: 1) absence of selection, 2) panmixia, 3) absence of mutations, 4) absence of differential migrations. The minimum number of individuals in a population must therefore take into consideration these four factors.

The maximum number of the individuals of a population in a given territory depends on the carrying capacities of the territory, i.e., the *k* that relates the food requirement and the defense investment of the population to the specific biology of the species considered. It follows also that the interaction between the biological characteristics of a species and the productivity of the territory in which it lives determines the sociological characteristics of that species. The recent developments of animal ethology fully demonstrate this.

From this sort of equation, which may be applied to all vertebrate species (mammals in particular), it is possible to derive one that is more specifically suited to man. This formula contemplates, in fact, his cultural development, which can be generally indicated with an exponential function of human intelligence (e^i). For mankind the formula will be written as:

$$[(A+B) + k(C+D)]\, e^i = \Delta_H$$

This socio-intellectual control on the environment in the natural system can represent the quality leading to the fourth hierarchical level of ethical norms.

Also, in this case is the minimum and maximum limits of Δ_H (H, the numbers of individuals utilizing a certain territory) that impose the ethical norms of behavior for our species. For this reason the minimum or maximum number of individuals that constitute the deme may vary according

to different environments in which various human populations live in the different historical contexts.

In other words, for humans, it is the interaction between the biosocial and intellectual characteristics of the population and the productivity of the territory in which they live, that contributes to determine the ethical norms characterizing the historicized behavior of the different human populations.

As in animal populations, the interaction between the environment and the human exploitation produces the rules that characterize historical behavior (*tradition, customs, morality*). They facilitate human survival and cohabitation. After all, even the Christian Commandments, from the fourth section on, are rules that codify the four fundamental stimuli of social interaction.

The adaptive choices of human social structure and the ethical choices of mankind (even biotechnological and biomedical) must account for the interaction between human populations and the environments in which they live. They must be, moreover, independent from the influence of religious and political leaders whose ideologies of power do not respect this equilibrium. The achievement and maintenance of such equilibrium is fundamental to the survival of our species.

Nature, in fact, might not be interested in human survival. Modern man, *Homo sapiens*, as all other animal species, is a product of the same evolution. Similar to other species in the past, humanity is now involved in an unorganized exploitation of available resources. Humans are now capable not only of self-destruction, but also of the destruction of the plant and animal species that share our same environment. It is important to note, however, that humanity, on a geological timescale, represents but a few microseconds in the over four billion year history of life on Earth.

Bioethics, therefore, must be understood both as a biological and a naturalistic science relevant to anthropology and ecology.

Its presence in medical faculties is only a nominal mistake. Medical faculties should be responsible for the development of "medical ethics," which have to resolve the problem caused by the recent expansion of biotechnology to physicians' professional deontology. Real bioethics issues are different. To clarify this distinction, we, along with Van Potter, have proposed the term "global bioethics." In addition, we have founded a journal with this title (*Global Bioethics*) and I published a book with the same title (Chiarelli 1993).

The historically related bioethical behavior of humans can be linked to morality that can assume different norms in different historical contexts. Morality could be therefore governed by religions or be normalized by governments. Ethics is instead a pure biological and ecological discipline.

Man with industry and technology, the product of his intellectual abilities, can now expand the resources of a given territory.

The adaptative choice of the human social structure and the ethical choices must depend on the interaction between human population and natural environment in which they live. This equilibrium must be maintained or sought after for the very survival of our species.

TABLE

BASIC ETHICAL PRINCIPLE IN THE HISTORY OF LIFE (BIOETHICS)

The definition of Bioethics: "Preservation of the DNA typical of the species and maintenance of its intraspecific variability."

HIERARCHICAL ORDER IN THE HISTORY OF LIFE AND ITS ETHICAL SIGNIFICANCE

FIRST LEVEL	HAPLOID (n): microorganisms, gametes, spores, haplophytes
SECOND LEVEL	DIPLOID (2n): sexual reproduction (meiosis). In this 2nd level peculiar ethical concerns must be reserved to the biological entities as: a) *cutting:* they are identical copies of an original individual, ad they do not have variabilities, they are produced asexually. It regards mainly cultivated plants and lower animals, now also artificial cloning in animals and possibly man (nucleo-transfer). b) *subsidiary class of social insects: t*hey do not transmit the DNA of the species and they do not have reproductive potentialities. c) *early stages of life as embryos and seeds:* they have no certitude to reach the reproductive stage. d) f*inal stages* as they have lost reproductive potential. *Diploid Biological Entities:* defines moreover the individual as unique, unrepeated and indivisible for its entire biological cycle.
THIRD LEVEL	*Vertebrate animals* in which the maintenance of the DNA variability typical of the species and its intraspecific variability is assured by socialization defined by the interaction of internal and external factors (A. mother-offspring relation; B. sexual partner relation; C. cooperation in food research; D. cooperation in defense) and quantitative formula could be created to give the maximum and minimum number of individuals who could survive in a certain environment. $(A+B) + k(C+D) = \Delta$
FORTH LEVEL	*Mankind* in which the maintenance of the DNA typical of the species and its intraspecific variability is assured also by the product of the brain activities (history, traditions etc.). In this case, ethics can also become moral code ad the four types of socialization input can be influenced by history.

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