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Editorial

A systemic approach to bioethics

Un enfoque sistémico de la bioética

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In its initial phase, bioethics has developed widely as an evolution of medical ethics, imposed by the massive entry of technology into the field of medicine, due to which the possibilities of choice for the actors involved were much wider than those foreseen by the already codified norms and, therefore, the resolution of the dilemmas produced by these new situations was sought in the deepening and application of some general ethical principles, such as those of non-maleficiency, beneficiency, justice, autonomy, respect for dignity, protection of fragility, solidarity, sacredness of life, quality of life, responsibility and so on. Regardless of their differences, these theoretical solutions had the common characteristic of referring to the morally correct conduct of human individuals and their interpersonal relationships. In this sense we might say that they remained within an *anthropocentric* horizon characterized by two components, that is, the reference to man and the reference to a center. These two concepts find little space in current bioethical discussions, such as those of roboethics, environmental ethics, posthumanism and transhumanism, in which it seems that man no longer occupies the most relevant role. The other interesting aspect is that also the notion of center tends to disappear, that was connected to the idea of a privileged position, a point of reference, a criterion of unification and convergence. Some scholars regret this loss of the center, which they regard as the dissolution of every ideal of order, of orientation and as the source of relativism, particularly in the ethical domain.

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However, there is no reason to be so pessimistic because - certainly not from today - humanity has found other models to conceive order, correlation, purpose and even normativity, when it sought to investigate the nature and functioning of *complex* realities and phenomena.

In the case of bioethics, this complexity appears evident when we consider the different points of view, the different criteria of judgment, the different conditionings, the different fundamental values that are often present in the most important decisions that must be taken already in the field of medical ethics and that are even predominant when we consider the enlargements of bioethics that we have mentioned above. Today the theory of complexity and the theory of systems offer conceptual frameworks and concrete methodological indications which can profitably be used in bioethics and this is why we propose to briefly outline these perspectives now.

Complexity

The notion of complexity has different shades of meaning and occurs in both ordinary and scientific discourse where its characterization depends on the various disciplinary contexts.

Among these meanings, two relate essentially to the notion of a complex problem or complex object. C̈omputational complexityr̈efers to the search for the solution of a problem that can be achieved through an automatic calculation program and for that purpose different m̈easuresḧave been proposed. We are not interested in this specialized meaning in this article. A different concept of complexity has emerged from the study of dynamic systems far from the state of equilibrium: deterministic chaos and the emergence of new behaviors due to the interaction between the parts of a system are the best known themes treated in this approach. This concept has been called “complexity of interaction networks” and the notion of non-linearity occupies a central place in it. By omitting its technically mathematical presentation, we can synthesize its most significant intuitive characteristics by saying that it expresses the impossibility of decomposing a problem into subproblems and then r̈ecomposingẗhe partial solutions thus achieving the solution of the initial problem. This procedure had been advocated by Descartes in his *Discourse on method* and its application has constituted the model of modern scientific research, based on what has been defined as änalytical method.̈ Also in this case we shall omit the technical presentation of non-linearity and, translating this abstract mathematical discourse into more concrete terms, we can say that if several systems (each characterized by its typical

properties) are in correlation, the overall result will be a system with new properties, not owned by any of its parts. This brief analysis of the complexity of the networks of interactions allows us to see in it an intermediate level between the complete order and the complete disorder, that is, between rigid determinism (which was the ideal of "classical" science) and total chaos.

In this characterization of complexity, the term "system" has spontaneously occurred: it is an indication that the *systemic* point of view, that is, the approach based on the "general system theory", can be an essential instrument for handling complex problems, Therefore, it is useful to offer some clarification of the very concept of system, as it will be used in this paper.

Systems

System theory corresponds to a perspective which is based on a very common cognitive experience: things that we know always appear to be endowed with certain *properties* and a certain *structure*, which consists of a network of very precise *relationships* between their *parts,* which are in turn endowed with their properties and structure. If we call *system* any entity characterized at the same time by certain properties and a certain structure, we can say that the theory of systems (that is, "general system theory" or GST) is based on only two fundamental concepts, that of system and that of relation between systems. In addition, these concepts are strongly interdependent in the following sense: the parts are linked to each other through mutual relations and form a *complex unit*, ordered and endowed with its own individuality, since it is characterized by properties and ways of functioning different from those of the constituent parts (although they depend on them, to a certain extent). We could perhaps say, more simply, that by system we understand an ordered totality of interrelated parts, whose characteristics depend both on the characteristics of the parts and on that specific connection. These few words can express a clear meaning of the statement quite common, but vague, that "the whole is more than the sum of the parts": the analytical perspective tries to show that, in the end, the whole is constructed (or reconstructed) by adding the results of the study of its parts and, consequently, has the same nature of its parts (reductionism); the systemic perspective, on the contrary, recognizes and underlines the differences in properties and functions of the various parts and at the same time affirms and underlines that the whole has its own properties that "depend" on the properties of the parts (thanks to certain relationships between them) without being a "result" of them. It is customary to call *holistic* (from the Greek etymology in which *holos* means "totality") this perspective, which was defended in

biology especially by the theorists of "vitalism" in opposition to "mechanism" during the 19th century and was taken up more rigorously (avoiding the weak aspects of vitalism) precisely by a biologist, Ludwig von Bertalanffy, founder of system theory, n the first half of the 20th century. It is natural that this theory originated in the field of biology, since the living organism is the clearest and most familiar example of a systemic entity; however, there is a very large number of complex entities in the natural, social, historical, cultural world and for this reason the systemic approach has proved very fruitful in many areas (as Bertalanffy himself had already pointed out in his time).

In a special way, it is an approach that helps us understand how enormously important the presence of technology is in our current world. It is very common to see the expansion of technology in our lives as a gigantic spread of machines, of material artefacts with which it is difficult to live together even if they serve us and we believe we are simply *using* them. In reality, technology is much more, it is a true *technological* s*ystem*, which has its characteristics, its dynamics, its autonomy, its tendency to grow without limits, so our technological civilization is very different from a simple m̈achines civilization.F̈or this simple reason, the fact that bioethics arises as a response to the unprecedented situations produced by the advances of biomedical technologies imposes on us to correctly understand which relationship ethics has to establish, in particular, with the technological system.

The notion of environment

What does ënvironmentm̈ean? This word has quite different meanings. The most basic is spatial: environment is the place where you are; for example, referred to an audience that is listening to a lecture, we say that the environment is the room where people gets together. But already in ordinary language we find many other ways of talking about the environment: we use expressions such as s̈ocial environment, c̈ultural environment, p̈olitical environment, ḧostile environment, f̈riendly environmentänd so on. In some of these cases the environment is considered to be ëxternalẗo the reality we are talking about, and at other times to mean an ïnternals̈ituation. Thus, for example, for each organ of a human body the entire body constitutes the environment in which the organ is inserted, and in turn the single human individual is inserted into wider natural, social, cultural, political environments. What emerges from what has been said is the two-fold face of complexity: on the one hand, a complex reality is such because it consists of coordinated parts that ensure its features and functions, and each of these parts can be analyzed in a similar way. On the other

hand, this same reality is complex because it finds itself immersed in an environment with which it also has various kinds of correlations that, at least partly, influence its way of existing and functioning (we conventionally call s̈yntheticc̈omplexity this second face of complexity).

Traditionally complexity has been studied from the analytic point of view, while today problems are often faced related to the synthetic complexity of many processes and realities and this is why the interest in the environment has taken on particular importance.

As we have already seen, the questions of complexity can be translated directly and with greater clarity into the systemic point of view. In fact, every system is considered embedded in a more complex reality called its *environment*. Therefore, every subsystem from which a given system is constituted, has as its environment the entire system. On the other hand, each system is embedded in its environment, which in general is simply a larger system which, in turn, is not ïsolated, as it is embedded in a larger environment. We can therefore conclude that when we consider any reality from the point of view of system theory (or, as is usually said, within a systemic perspective), we are always in the presence of a kind of endless game between systems, environment and subsystems.

Examples of problems of bioethical interest that lend themselves to a reading in systemic terms come spontaneously to mind and we will not delay in presenting them. More interesting, on the other hand, is to see how the systemic perspective helps to better appreciate the specific space and function of ethics in bioethical discourse where, apparently, s̈eriousänd worthy of consideration points of view may seem to be only medical, technological, economic, social, legal points of view. It is instead sufficient to realize that in the structure and functioning of any society there exists (alongside the energy system, the industrial system, the economic system, the educational system, the legal system, the communications system and so on) also a very precise *ethical system*. It contains the set of principles, norms, concepts, theories, which, within that given society, concern the way individuals and institutions öught to behave, regardless of the fact that this, öught to beïs then translated into explicit legal norms. From a systemic point of view also the ethical system has its place and its function, since it must maintain correlations with all the other subsystems, receiving from them explicit or implicit requests for guidance and elaborating responses to such requests, precisely from an ethical point of view. In this way the ethical requirement in the functioning of the various systems of a society no longer appears as a kind of moralistic intrusion, but rather as a systemic condition for the good functioning of

that society. These discourse applies also for all the other subsystems and therefore allows us not to be scandalized, for example, that the industrial system pursues its research for profit on the market of drugs, or that the military system tends to ensure its autonomy and influence within a nation, also absorbing a significant part of its economic resources. The legitimacy of these aspirations can only derive from a suitable correlation, in particular also with the ethical system, tending towards that *optimization* in which no system achieves the maximization of its objectives but is not even sacrificed below a certain critical threshold and the result is just a good global functioning of the whole society. Following this logic, we attain the openness with respect to globalization, roboethics, environmental ethics and eco-ethics in an even more general sense.