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SCIENTIFIC ETHICS AND THE PENDULUM OF DEHUMANIZATION

The article contends that science is forsaking its core purpose, which is to meet human beings' intrinsic epistemological need to understand the world, know it and explain it fully for specific purposes. On the one hand are the pure scientists, overly concerned with solving their research problems but indifferent to the uses to which their work might be put. Another question is the system itself-companies, corporations and governments-which takes advantage of this negligence or indifference and develops applications or technologies for its own economic or political benefit, instead of meeting real needs of individuals or social groups. Finally, there are the students of science, who are not necessarily afforded a well-rounded humanistic education that might make them feel ethically linked to their environment and accountable before society for their scientific work. This combination of elements has led to a loss of meaning and a growing dehumanization as a corollary to the increasingly rapid, chaotic and disconcerting surge of new technology.

Keywords: *science, technology, ethics, development, humanities*

1. Introduction

Using a very simple explanatory criterion, the essay looks first at the characteristics, limits and scope of theoretical models for understanding and systematizing knowledge, and defines their diachronic criterion and the relativity of the scientific philosophical foundation. Next, it calibrates the isolation from the natural world in which contemporary society lives, including scientists, and considers the implications of this alienation for basic research and for subjection of the process of technological innovation to the values of productivity, growing monopolization, and control by governments and transnational corporations. Finally, it examines the aspects of disconnection, proposing formulas for integrating the ethical and humanistic formation of researchers and for reorienting and reversing the negative, distorting effects of scientific and technological developments.

2. The fragility of theoretical constructs

The critical element of all structures is rooted in a very simple proposition: that all objects of knowledge are subject to explanation by way of models. It would then make sense to start out by asking: what exactly is a model? It would seem that the object sitting before my eyes is not the same as trying to make a model of it. A photograph, for example, can be a model, but it is not necessarily one. If we set out to make a photographic model of a human being by taking the picture from the back, it is not hard to see that we are doomed to failure, because the photo will leave out the eyes, nose, mouth, ears (etc.), parts that we consider indispensable for characterizing that individual. It would be absurd to present that photo as an integral reflection of the person, because we *know* that model in *person*; we are sure of her physical appearance and evolution. Any sensible observer would take one look at the photograph and dismiss it. In this case, we all *know* that the representative Model of the human species as set forth in that photograph neither is nor ever could be emblematic or representative of that reality.

This leads us directly, and with simple words, not only to the ontological dimension of the object, but to the dimension of its probative (epistemological) intelligibility, as well as to human beings' potential to validate, to dismiss or, why not, to peer into what it means to generate new models. What then does a model do to reality? Could Science also be another point of view of reality? Inductivists thought that science starts by gathering observations or data, and then proceeds to infer laws and finally makes predictions on the basis of this information. Deductivists took the opposite view, contending that a person cannot observe anything without a theoretical underpinning [1]. What is the point of this? The point is that a theory, as an expression of

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scientific knowledge, is also a model [2], that can range from simple to enormously complex and that, in spite of its potential to complement or contradict other models, is necessarily limited and partial, because it comes from a fixed position that constitutes one viewpoint [3, p. 168], one that is situated in a certain moment and in specific circumstances.

The basic objects of research are simple systems. For the cognitive and practical assimilation of simple systems, it is enough to believe that the overall properties of their parts exhaustively define the properties of the whole. The part (element) is thought to have the same properties within or outside the whole. The relationship between the thing and the process is Representations of external events interpreted in a particular way: the thing (the body) is viewed as something primary in relation to process, and process is treated as the effect of one thing on another [3, p. 169].

In the stage of *non - classic* rationality, on the other hand, the main objectives of research are more complex, because it is self - regulating systems that are being examined. These systems are differentiated by relatively autonomous subsystems in which a wide range of stochastic interactions of elements takes place. According to Vyacheslav, the integrity of the system assumes the existence of a special control entity that ties the subsystems together both backward and forward [4], "Large systems are homeostatic. By necessity, they have a program of functioning that defines the control commands and adjusts system behavior based on feedback" [3, p. 171]. When it comes to complex self - regulated systems, the categories of the part and the whole take on new features. "The whole is no longer confined to the properties of its parts; it is necessary to take the systemic quality of the whole into account. The part has different properties within the whole or outside it. Organs and individual cells in multicellular organisms are specialized and, in that capacity, they exist only in respect to the whole" [3, p. 172].

What has all of this brought us to in the field of science? To a realization that there was nothing absolute in the empirical grounding of objective science and that some theoreticians would have to acknowledge that science does not rest on bedrock. It brings us to a sober realization that scientists must resist the "delusions of 'scientism'" and treat "science for what it actually is: a specific, distinct culture with its own methodology, presupposition, and values," since science, much like ethics, "takes place within a complex human tradition" [5, p. 26].

3. The separation of the human being and the specialization of the scientist

The critique of the Western proposal undertaken in the 20th century by incisive thinkers from a wide range of disciplines (ethnologists, historians, sociologists and psychologists, among others) has laid the groundwork for a different approach, by shedding light on the increasingly erratic trajectory of the *modern* project and the need to reintegrate it at its true natural scale.

Man is a natural being. Being part of the whole, he is part of Nature. Individuals may realize that nothing is alien to Nature, or they may be ignorant of the fact, but that makes no difference. Their knowledge, their awareness in the final analysis is irrelevant, as the inexorability of the link is radical [6, p. 1].

It is not hard to see that human beings and their theoretical models, their scientific approaches, no matter how complex they are, reveal an almost inescapable separation from the cosmos, nature [7] and the world they were born into [8].

Inasmuch as the subjects *who do science* detach or distance themselves from this natural matrix or setting, the disorientation becomes a grave issue, almost insurmountable. Why? On the one hand, hard scientists' self - absorption and excessive concentration on miniscule aspects of reality only deepen the rift between the object of their activity, their cognitive interests and the relation or meaning that such close study of a particular point has with the larger context; this of course leads to a kind of science that rushes headlong toward inordinate specialization.

As we have seen, the act of explaining why things are as they are (what we call science) is intrinsically linked to the act of determining what is good and, in particular, of how human beings should make their life consistent with this purpose. In other words, it is linked to two essential domains of philosophy—Axiology and Teleology—also known as the theory of values and the study of the purposes of human endeavor, respectively.

In this sense, it would first be necessary to take a deeper look at the deterministic transcendence of the other option: the one exacerbated by the contemporary world's accelerated rate of change in the technological field. What is absurd about Western civilization is that it produces a plethora of inventions and technology that are good for nothing. It usually develops them without understanding. This is what makes us Westerners slaves of technology. Everything that people make ends up being technology. Thus, technology must be regarded as the extension of one or more of our senses, which, once developed, modify what human beings apprehend: their world [6].

As many observers have pointed out in recent decades, technology has driven changes that profoundly alter the conditions on which the life of humanity depends. Aside from these transformations, "environmental stimuli and demands have taken on an unprecedented pace and acceleration; no one can doubt that people's psyche, particularly their way of feeling, perceiving, imagining and wanting, have been impacted by the pressure, so rich and varied, of their transformed setting" [9, p. 43] and by the incessant need to react [10] to that pressure [11, p. 72 - 73], [12, p. 27].

Unfortunately, the surge of new technology does not come free of charge, as we insinuated above. It is coming faster and faster, causing ever more chaos and apprehension [13, p. 188]. "There are no filters to stop its emergence when it clearly harms

people, because it is usually released onto the market by the people who stand to profit the most from its acceptance" [13, p. 188]. As Eizaguirre contends on the basis of his study Social Values, Science and Technology" (*Eurobarometer 225*),

People do not feel any urgency to take part in scientific activity, while at the same time they feel underrepresented in decision - making about scientific policy; there is an increasing ambivalence and awareness regarding the protection of nature as opposed to "human well - being" (happiness, health) and–above all–regarding the "development of humanity" (innovation, growth); risk and benefit analysis is the standard that people put forth when it comes to evaluating technology, but guided at all times by the rule that scientists propose; the values and principles of action, such as the protection of nature and participation in decision-making, are seen as the most relevant for the immediate future; human health and the natural environment stand out as the areas where new technologies should be applied [11, p. 71 - 72].

Over time, the voice of alarm dies out; technologies are recombined, giving rise to a new generation of machines, which makes them almost impossible to dismantle, even if society were inclined to do so... We continue to see (technologies, *SIC*) as if they were separated, as if they were discrete systems, when that is not the case at all [13, p. 188].

4. Scientists' disjointed vision and education

In the final analysis, what piece is missing? What would be the best way to overcome these ruptures, and to rein in run - away science and technology, with all the risks and nonsense that they involve? The answer is not simple. On the one hand, the current state of affairs does not help. For example, science students do not receive a solid humanistic formation that would make them feel ethically linked to their surroundings and to themselves, not to mention accountable to society for their scientific work.

This is a glaring shortcoming that just happens to be *convenient* for a system that has helped to aggravate this vicious cycle. A combination of elements that has triggered a loss of meaning, a growing monopolization and manipulation of knowledge by powerful governments, international financial institutions, universities and specialized research institutes, and transnational corporations. In addition, dehumanization as a corollary of the ever more unbridled, chaotic and disturbing surge of new technology. Andoni Eizagirre wonders whether it is true that the ways of understanding, analyzing and assessing risks are really value - free [11, p. 71].

As Vyacheslav points out, it is indisputable today that the ideal for justifying or substantiating scientific knowledge must include an ethical assessment as an essential component. The understanding of scientific knowledge as a special component of culture and social life that determines their basic values represents the most solid epistemological justification for all of these transformations of the ideals and standards of science. For this reason, in the first place, "the researcher has to solve a number of ethical problems when defining the boundaries of possible changes to the system. Under these conditions, the internal ethics of science, while stimulating the search for truth and focus on the augmentation of new knowledge, is constantly associated with general humanist principles and values" [3, p. 177 - 178].

Furthermore, as Vyacheslav made clear at the beginning of this analysis, natural science is starting to incorporate another field of dynamic knowledge that comes from the social sciences and humanities: the ideal of historical reconstruction [14], which today represents a special kind of theoretical knowledge that is more and more widespread:

Among the historically developing systems of contemporary science, pride of place goes to the natural and social systems in which the human being himself is a component. Examples of such "human - dimensional" complexes might include medical and biomedical objects, objects of ecology, including the biosphere as a whole (global ecology), nanoscience objects, biotechnology (primarily genetic engineering), "human-machine" systems (including complex informational systems and artificial intelligence), and so forth [3, p. 177 - 178].

In the study of "human - dimensional" objects, the search for truth is related to the definition of the strategy and the possible ways to transform the object, which has a direct impact on humanistic values. One cannot freely experiment with such systems. The knowledge of the prohibition of certain interaction strategies that involve potentially catastrophic consequences for humanity plays a central role in the process of the research and practical assimilation of these systems.

Let us look again at the case of Physics. During the second half of the 20th century, even this field of knowledge would implement a significant shift in its diachronic focus. On the one hand, the development of contemporary cosmology to which we alluded briefly (General Relativity, the Big Bang, and Quantum Theory) led to the idea of the formation of different kinds of physical objects and their interactions. This in turn led to the concept of different types of elementary particles and emerging interactions during the evolutionary process as a result of the decomposition of some kind of initial interaction and its subsequent differentiation. On the other hand, the idea of evolutionary objects would be actively discussed in the thermodynamics of non - equilibrium processes (Ilya Prigozhin) and in synergetics. The mutual influence of these two lines of research would incorporate a notion of self - regulation and development in the system of physical knowledge [3, p. 175].

Aside from the considerations expressed up to this point, one final, but no less important, suggestion can be made to assure the indispensable counterpoint or counterweight. In addition to humanistic formation of science students, there is also a need for science and technology to be understood by the general public,

to form part of their scientific culture [15]. This would help to democratize scientific and technological development, offering a certain guarantee that it will benefit society at all levels, without excluding the majority of the population [16]. The development of new technologies and the furthering of scientific research must go hand in hand with the cultivation of character integrity, engendering thereby "a new quality of human mutuality, in which the human individual will cease to be a mere instrument on the path of other's success. Individuals are thus more clearly seen as genuinely irreducible to the political (totalitarian, or not) order" [17, p. 106].

5. Conclusions

As we have discussed, all objects of knowledge are susceptible to being explained through models, which present reality according to specific viewpoints, contexts and times. This ontological dimension of the object and its probative intelligibility is also an expression of theories or models of scientific knowledge, which can be very simple or enormously complex, depending on whether they deal with simple objects or systems, self - regulating systems, or objects of systemic integrality in transition toward other self - regulating systems. Notwithstanding, the empirical basis of objective science is not absolute in the least; it is partial and in a certain sense static.

The critique of the Western project as undertaken in the 20th century highlighted the almost inescapable separation of human beings from the cosmos, nature and the world they were born into. This discordance tended to be axiomatic in the case of hard science as well. Why? For many reasons, especially those related to scientists' scant humanistic formation. The subjects who actually do science, from this perspective, detach or distance themselves from their natural matrix or setting and concentrate their analytical focus on ever smaller fragments, untethered from reality. This inconvenience or rupture becomes a serious issue when researchers are not aware of their effort to demonstrate the conditions in which they claim to be stating their truth. This is a totally false obsession that manifests a banal intention to dominate *Natura*.

On the other hand, the act of explaining why things are the way they are (which we call science) cannot do without ethical and teleological considerations, linked to the humble willingness of the inquiring subject, and that belong to two essential areas of Philosophy: the theory of values and the study of the purposes of human behavior. These areas or sub - disciplines were relegated to the fringes of scientific work by the positivistic vision of science in the 17th century, and even today sometimes represent marginal concerns for certain discoverers, scientists or inventors [18].

Indeed, technology is imposing changes that profoundly modify human beings' life - support conditions and psyche. Transformations, stimuli, and environmental demands coming at an unprecedented and accelerating pace give rise to a *dyssynchrony* [19]. This combination of elements has led to disorientation, loss of meaning, and a growing monopolization and manipulation of knowledge by governments, financial institutions, universities and, obviously, transnational corporations [19].

So, what mechanism needs to be put into place? What would be the best way to repair these ruptures, to avoid scientific - technological risks and mistaken purposes? The answer is not simple. Aside from renewing the *vita contemplative,* hope would seem to lie in the changes in approach that have gradually been undertaken in recent years, enhancing the humanistic foundation and vision of the exact sciences by including ethical assessment as an essential component, and the historical reconstruction of phenomena and developments. Understanding scientific knowledge as a special component of culture, social life and the Humanities represents the epistemological foundation *par excellence* of all of these transformations of the ideals and standards of science.

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[10] The Problem, as Social Perceptions Suggest, Is Associated with the Reduction of the Social Impact of Science and with Measuring Whether the New Developments Are Necessary or Desirable. Unlike what happened in the economic sciences, where classical free - market theories that underestimated environmental issues and risk management ("externalities") have been challenged, citizens on the contrary perceive no similar changes in their day - to - day experience. As a result, they insist that information should recognize the analyses that point to the reversible nature of technologies, as well as viability regarding the environment and social well - being.

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[15] Although efforts have been made in many countries to foment scientific and technological literacy and communication, they are still insufficient. As Martha Vergara and Ramón Rueda Koyama contend, "bringing science closer to the general public is a high - priority goal that involves States, the scientific community and communicators. Citizens have yet to develop forms of group organization or participation mechanisms to take their place alongside experts and government representatives in identifying issues or opportunities related to science and technology, in defining the parameters that delimit the issues, in selecting alternatives for solution and in following up on the application of these alternatives" [16].

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