2. SCIENCE

Modern mythology is based on new discoveries in physics, astronomy, biology and the like which—in spite of their being constantly replaced by other new discoveries—are accorded the rank of true dogmas in the mind of ordinary man. However, the prestige science enjoys is not based on these discoveries, the immense majority of which, in their purest form, are incomprehensible to the non-specialist. If science is considered as the ultimate criterion of truth, it is rather because of its innumerable practical applications, which have transformed the world far beyond anything anyone could have imagined a few centuries ago. It is these practical applications, surrounding us on all sides and apparently working true miracles that have conferred upon science the immense privilege it enjoys in the modern world.

Descartes divided the world into two independent parts: *res cogitans*, or thinking substance, by which is understood the mind of man as assimilated to his soul, and *res extensa*, or matter which makes up the physical world, conceived of by him in a mechanical way... This speculation permitted one to see the physical world as a thing apart, which could be studied "from without", without the observer or his values and sentiments being implicated—at least, apparently. Thus was born the "scientific method" that Francis Bacon was to perfect with cold logic. This dualism, this radical separation between "matter" and "spirit", deprived the physical world of life, thereby permitting the scientists

> ...to treat matter as dead and completely separate from themselves, and to see the material world as a multitude of different objects assembled into a huge machine. Such a mechanistic world view was held by Isaac Newton who constructed his mechanics on its basis and made it the foundation of classical physics. From the second half of the seventeenth to the end of the nineteenth century, the mechanistic Newtonian model of the universe dominated all scientific thought. It was paralleled by the image of a monarchical God who ruled the world from above by imposing his divine law on it.

Over time, Cartesian dualism ended up discarding *res cognitans*, the "spirit" and leaving only "matter", which had the vital advantage of being able to be subject to empirical study. Little by little, reality came to be identified with an exterior world, supposedly composed of "matter" to which all other phenomena, including *res cognitans*, were reducible. The subjective pole was overshadowed to the point of almost disappearing entirely—forgetting the fact that it is the subject that knows, and that there can be no object without a subject, or anything known without a knower. The physical universe was the origin of everything; somehow, it had produced life and finally, man—having an apparently non-physical mind.

Science, with its refined, precise and objective methodology, does discover many things about how Nature works. But the sum of these discoveries gives birth to a "scientific vision of the world", in which only that which science has discovered and

interpreted according to its parameters is considered. What is not captured in the scientific "networks" is first ignored and then later denied. In this way, "scientism" is born, a form of conceiving the world that largely dominates the thinking of modern civilization. It is a *philosophy* that dresses up as science. For Huston Smith:

> Scientism adds to science two corollaries: first, that the scientific method is, if not the *only* reliable method of getting at truth, then at least the *most* reliable method; and second, that the things science deals with—material entities—are the most fundamental things that exist. These two corollaries are seldom voiced, for once they are brought to attention it is not difficult to see that they are arbitrary. Unsupported by facts, they are at best philosophical assumptions and at worst merely opinions.
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> The contention that there are no truths save those of science is not itself a scientific truth. [...] [Scientism] also carries marks of a religion—a secular religion, resulting from overextrapolation from science, that has seldom numbered great scientists among its votaries.

According to Terence McKenna:

> Science has great pretensions about itself; it basically regards itself as a meta-theory capable of passing judgment on all other theories. [These theories] are supposed to submit themselves to science to be told whether they are right or not.

Science is a new religion, its theories are the new dogmas, its representatives are the new priestly class. According to John Gray:

> Science alone has the power to silence heretics. Today it is the only institution that can claim authority. Like the Church in the past, it has the power to destroy, or marginalize, independent thinkers. [...] From the standpoint of anyone who values freedom of thought, this may be unfortunate, but it is undoubtedly the chief source of science's appeal. For us, science is a refuge from uncertainties, promising—and in some measure delivering—the miracle of freedom from thought, while churches have become sanctuaries for doubt.

There is immense richness in the world surrounding us, both exterior and interior. But science examines some parts only and leaves aside others. Why? Scientific methodology is only applicable to what is measurable, quantifiable. The unquantifiable is first ignored, and then "reduced" to be quantifiable. Once this is done, science strives to show that this is the real world.

Thomas Nagel observes the dominance of this mentality in many branches of science:

> For all I know, most practicing scientists may have no opinion about the overarching cosmological questions [...]. But among the scientists and philosophers who do express views about the natural order as a whole, reductive materialism is widely assumed to be the only serious possibility. [...] Physico-chemical reductionism in biology is the orthodox view, and any resistance to it is regarded as not only scientifically but politically incorrect.

What would we think if someone tried to explain music based on equations of physical aspects of sound? This aspect is the only quantifiable one, and therefore would be the most "scientific". The physical aspect of sound is obviously real, but in no way

explains music. That is exactly what scientism does with the world around us. As the saying goes: look under the lamp—where light is shed—for the coin that was lost in a dark corner.

According to Kuhn, science does not limit itself to gathering facts; rather it only achieves meaning when these facts are integrated into the framework of a "paradigm", a vision of the world of suppositions that are not proven, yet accepted as obvious. All theoretical aspects, even methodological aspects of science are justified by this unconscious philosophical vision. Observation marks the frontiers of science, but does not produce it. According to Kuhn, the paradigm conditions the scientist's perceptions to the point that one could say that the very world of the scientist is composed of the paradigm.

The reigning paradigms of a given era leave out many things, including those parts of science which do not fit into the model in fashion. The history of science thus has many "underground currents"; theories and discoveries overlooked by official science. In order to gain access to scientific conferences and forums, to be offered scholarships and research grants, to be able to publish in specialized journals, to be able to get a good professional position and be an influential and respected scientist, one must fit into the paradigm of the moment; a very different vision often means professional suicide—or else, in the unlikely event of success, leads to becoming the great revolutionary responsible for the birth of a new paradigm.

The Dalai Lama warns us about a future where business possibilities will play a significant role:

> With the new era in biogenetic science, the gap between moral reasoning and our technological capacities has reached a critical point. [...] Much of what is soon going to be possible is less in the form of new breakthroughs or paradigms in science than in the development of new technological options combined with the financial calculations of business and the political and economic calculations of governments. [...] Given that the stakes for the world are so high, the decisions about the course of research, what to do with our knowledge, and what technological possibilities should be developed cannot be left in the hands of scientists, business interests, or government officials. Clearly, as a society we need to draw some lines. [...] We need a much higher level of public involvement, especially in the form of debate and discussion, whether through the media, public consultation, or the action of grassroots pressure groups.

During the 1920s, several physicists, such as Niels Bohr, Werner Heisenberg, Erwin Schrödinger, Wolfgang Pauli, Louis de Broglie and Paul Dirac, discovered the laws of what was to be called quantum physics, destined to inflict a decisive defeat on the Newtonian vision.

The atom, at the heart of matter, could no longer be seen as a "solid" mass, behaving according to mechanical laws. Light and the diverse subatomic "units" behaved alternatively according to the nature of the experiment, either as particles or as waves. A

famous theorem demonstrated that it was impossible to know both the position and velocity of an electron; the more precise one measurement was, the less precise became the other. Causality, the main key of classic physics, lost its determinant reign to be replaced by the concept of "probability".

This new quantum physics no longer presented an image that was "visible" or conceivable in visual terms of the atomic and subatomic reality; from now on, phenomena of this kind can only be represented by complex mathematical equations whose correspondence to "reality" is, we might say, "symbolic". Matter, apparently the most "solid" concept of physics, became de-materialized and lost all familiar reference.

The particles influence one another independent of distance: this is known as the principle of non-locality. In the EPR experiment, two electrons that move in opposite directions instantly "know" what the other is "doing" from distances that can be huge. How can this information be transmitted faster than the speed of light? The only answer is that these two electrons comprise a unity beyond time and space and they only appear to be separated. David Bohm compared this experiment to a fish whose image appears on two different televisions; the two fish are obviously one and the same. If we consider that the real fish is neither of those images, everything becomes simple. This led Bohm to speak of an "implicit order", "unmanifested", by means of which the parts are connected to each other beyond time and space. Henry Stapp called it "*the* most important finding of science, ever."

For John Archibald Wheeler:

> Nothing is more important about the quantum principle than this, that it destroys the concept of the world as "sitting out there", with the observer safely separated from it by a 20 centimeter slab of plate glass.

Nature now appears as a whole, an extremely complex network of relationships with no concrete objects, with no solid "materials". The parts and phenomena—to the degree that, apparently, they can be separate from the whole—depend upon each other; the world cannot be separated and broken up into autonomous and independent units. And, in this totality, the observer, consciousness, forms a fundamental part.

The "quantum revolution" has clearly demonstrated the inadequacy of our conceptions, namely the Newtonian vision. A philosophical reassessment of presumptions and paradigms upon which current science is based appears to be more urgent than ever. Nevertheless, this revolution of the philosophy of science—nearly a century after discoveries that should have shaken former beliefs to the core—has not happened.

The holistic vision can provide answers to problems that are thought to be insoluble. Thus, many scientists and philosophers have been surprised that the Universe could be comprehensible to man. Einstein said: "The most incomprehensible thing about the Universe is that it can be comprehended." If we think of man as a separate and independent piece that observes an exterior world, the latter would have no reason to adjust itself to the mental structures of the former.

In order to be able to forecast and construct theories, science must assume undemonstrated axioms. One basic axiom is that physical laws are invariable over time and in space. Modern science places a dynamic vision above all else and emphasizes the "evolution" of the Universe, the Earth, and beings. However, in the context of a world in continuous movement, it considers the laws of Nature to be the only domain that is invariable and unaffected by change. "If the Universe evolves, why should not the laws of nature evolve as well?" Rupert Sheldrake asks. "Were all the laws of nature already present at the moment of the Big Bang, like a cosmic Napoleonic code?"

It is supposed that the fabric of the world is the same throughout the entire Universe. In this way, it is assumed that matter is uniformly distributed throughout space, with just a few local fluctuations of moderate density, lacking structure or design. The age of the Universe (10 billion years) is calculated based on the "Big Bang" hypothesis and presupposes there have been no changes in the speed of expansion or in its laws and constants. All of this contains inevitable axioms, without which very little could be said about the Universe, yet they are mere hypotheses. Geological dating is also based upon the unproven assumption of the invariability of natural laws.

According to Titus Burckhardt:

> If the ancient cosmogonies seem childish when one takes their symbolism literally [...] modern theories about the origin of the world are frankly absurd. They are so, not so much in their mathematical formulations, but because of the total unawareness with which their authors set themselves up as sovereign witnesses of cosmic becoming, while at the same time claiming that the human mind itself is a product of this becoming. What connection is there between the primordial nebulae, this material whirlwind from which the universe, life, and man, are supposed to have originated, and this little mental mirror that loses itself in conjectures [...] and yet feels so sure of discovering the logic of things within itself? How can the effect make judgments regarding its own cause?

We need a humble science, conscious of its limits, which accepts other modes of knowledge. *Science* should give way to *the sciences*: different rational processes to approach reality. The world is much vaster than what natural science can see and explain.

Mary Midgley argues for an understanding of the world from many points of view and on different levels, each and every one of which are valid. Just as different maps offer variable information about one place, the world is too vast and complex to be contained in only one explanation or vision.

> At the beginning of an atlas, we usually find a number of maps of the world. Mine gives, for instance: world physiography [...], world climatology [...], world vegetation, world political, world energy, world food, world air routes and a good many more. If we want to understand how this bewildering range of maps works, we do not need to pick on one of them as "fundamental". [...] We have to see the different maps as answering different kinds of question, questions which arise from different angles in different contexts. But all these questions are still about a single world, a world so large that it can be rightly described in all these different ways and

many more. It is that background—not a common atomic structure—which makes it possible to hold all the maps together. The plurality that results is still perfectly rational. It does not drop us into anarchy or chaos.