The End of Philosophy and the End of Physics: A Dead End

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Heidegger announced the "end of philosophy," i.e., the completion of the philosophical enterprise as the Greeks conceived it. This has been echoed by deconstructionists, who say that philosophy is merely literature expressive of personal attitudes, and by Marxists, critical theorists like Theodore Adorno, and pragmatists like Richard Rorty, who see it as a form of self-serving rhetoric. Now physicists are predicting a "Theory of Everything" which will be a "Final Theory" which will complete the history of physics. Stephen Weinberg has even suggested that this "Final Theory" will eliminate the need to determine any "initial conditions" for the universe and thus show that the universe as it actually exists is not only the only one possible but an absolutely necessary existent. This carries the Pythagoreanism of Plato to its ultimate conclusion.

Moreover, the consequences of relativity and quantum theories and the postulation by many scientists of the Anthropic Cosmological Principle in one or another of its various forms,[1] seems to some to make the existence of the universe dependent on the human observer, and thus eliminate the empirical realism of science. Thus the crisis of postmodernism is extended beyond the humanities to the hard sciences.

While this would seem to present Thomists with a grand opportunity for a hearing, in the twentieth century they have isolated themselves in various ways

[1] J.D. Barrow and F. J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1988). For a discussion see Errol E. Harris, *Cosmos and Anthropos: A Philosophical Interpretation of the Anthropic Cosmological Principle* (Atlantic Highlands, New Jersey: Humanities Press International, 1991). For some cautions see Stanley L. Jaki, *God and the Cosmologists* (Edinburgh: Scottish Academic Press, 1989), 189-192.

from the findings of the physical sciences, and left the field to the Whiteheadians. This withdrawal rests on certain mistakes in Thomistic exegesis.

There is a need to return to a more serious study of Aquinas' philosophy of nature understood in its own proper terms, and not merely as subject to metaphysical reflection. Central to such a study is the question of the knowability of the essences of material things, which is defectively treated in many accounts of St. Thomas' thought.

Steve Weinberg in a chapter on philosophy in his *Dreams of a Final Theory*[2] has also said that philosophy has done more harm to science than good, and cites the bad scientific notions spawned by mechanism, Marxism, Kantianism, positivism, sociologism and cultural relativism. "I know of *no one* who has participated actively in the advance of physics in the post-war period whose research has been significantly helped by the work of philosophers." (168f.). After quoting remarks of Wigner on the "unreasonable effectiveness of mathematics" in science, Weinberg says "I want to take up the other equally puzzling phenomenon, the unreasonable ineffectiveness of philosophy." (169) "Even when philosophical doctrines have in the past been useful to scientists, they have generally lingered too long becoming of more harm than ever they were of use." (169).

What Weinberg takes for granted is that science is not philosophy. Historically, however, the great scientists up to the eighteenth century all regarded themselves as natural philosophers. What Weinberg is calling "philosophy" is precisely those systems of philosophy which separated themselves from scientific practice and then worked to infiltrate science with alien ideas, whose influence, coming as it did from non-scientific sources, could only be harmful to science.

Before the eighteenth century natural philosophers, i.e., scientists, all aimed to understand the *reality* of the world accessible to our senses. They distinguished sharply between mathematical hypotheses about the universe which merely "saved appearances" but which might be only remotely related to the real state of affairs, for example the Ptolemaic system of epicycles, and genuinely physical theories that dealt with real entities and causes. The former type of knowledge was for them merely instrumental and provisional to achieving the latter kind of real knowledge.

It was with Descartes' "turn to the subject" in the seventeenth century and David Hume's reaction to Descartes in the eighteenth that some philosophers began to deny to science the possibility of achieving a knowledge of physical reality as such.

For Descartes what we know is our thinking selves and the bridge to

[2] (New York: Pantheon, 1992), Chapter VII, "Against Philosophy," 166-190.

physical reality becomes problematical. For Hume what we know is only our stream of consciousness and what produces that stream of impressions is unknowable.

Finally, Immanuel Kant profoundly influenced the whole of modern culture, including the way science is philosophically understood, when he defended Newtonian science against Hume. Kant conceded to Hume that the *Ding an Sich*, the real thing, is unknowable, but maintained that, nevertheless, we can impose an order on our stream of consciousness, although this order is rooted not in things but in the necessities of our own thought. Thus Newton's laws are valid because they supply a self-consistent way of imposing on sense data the categories of space and time inherent not in things but in our own minds. Since Kant assumed that all human minds have the same structure, he was assured that this "turn to the subject" would not reduce science to mere relativism.

In our century, however, this assurance has been shattered by cultural pluralism, so that today philosophers are conning scientists into believing that scientific theories are simply culturally conditioned paradigms for giving some order to our chaotic experiences.

In this essay I want to raise the question whether the pre-Humean notion that science is able to understand, however imperfectly, something of the reality of things, of their *essences,* does not better correspond to the actual praxis of scientists than do Kantian interpretations of science. It is worth noting here that the term "essence" is from the infinitive *esse* of the Latin verb meaning "to be" (i.e., to be "real," to exist independent of what we think about it, so that when we think about it, it measures the truth of our thinking, not vice versa.)

IS THE UNIVERSE THE ONE REAL THING?

There is no sense asking about the essence of something unless we first know what thing it is whose essence we are trying to know.

Much scientific talk today makes it hard to identify what we are trying to understand, because it denies that the "things" of ordinary experience are independent realities. Rather it is asserted that the only real thing is the universe as a whole, of which all other entities are simply parts. A part of something cannot have an essence, because it exists only as a part of some larger whole, and it is this whole which has the essence that explains the part. If all the things of our experience are simply parts of a universe which as a whole transcends our experience, it seems futile to seek its essence in the empirical ways on which science depends. That is the problem with some recent cosmologies which propose to become a "Final Theory" or "A Theory of Everything." How can they ever be tested empirically, since they seek to explain all the parts of

universe by some primordial event which took place under conditions that cannot be experienced or repeated?

Those who believe the universe is a single thing, or in the language of ancient science, one "substance" of which the things of experience are merely parts, present us with the following picture.

The universe is a largely empty space which is growing more and more empty as the matter within it disperses into particles, stars, galaxies, supergalaxies moving farther and farther from each other. But these material bodies in space are actually not distinct from the space in which they exist since their presence modifies that space gravitationally and they fill it with waves of energy which pass through it in all directions. Thus, all space is, as it were, in a state of more or less intense agitation and matter is only those volumes of space that are most intensely agitated. Thus, the universe is like one great ocean in which the "things" we experience are simply parts where waves become most evident. To know reality, therefore, will be to discover the essence or fundamental law which will state why this vast ocean is agitated in various ways in its various parts.

ARE THERE MANY REAL THINGS?

This picture of the universe as one great thing is becoming more and more popular today and is replacing its opposite, which was formerly so uncritically accepted, namely, the *reductionist* view of physical reality.[3] According to this view, the universe is a collection of many things, but these things are in turn only collections of many smaller things, and so on down to the elementary particles, which are then resolved into quarks, and so *ad infinitum*. If that were the whole truth, of course, essences would again escape us, since every essence would turn out to be a mere conglomeration of other essences, and we could never reach any knowledge of what is really real.

Perhaps it is in reaction to this reductionism, that the fashion has now turned toward holism, and the picture of the universe as one great, evolving thing, which I have just described. No doubt science seeks to understand the universe as a whole, but is it not a big leap to say that we now know the universe so well that we are sure it is one single thing, rather than a more or less interacting

[3] One version of this trend which is especially interesting but in my opinion excessively organicist is the notion of an "implicate order" in which all parts of the universe are "enfolded" in each other, advocated by the distinguished physicist David Bohm. See his essay "The Implicate Order: A New Approach to the Nature of Reality" in David L. Schindler, ed., *Beyond Mechanism: The Universe in Recent Physics and Catholic Thought* (Lanham, Maryland: University Press of America, 1986), 13-37, with the reflections of the other contributors.

collection of things? Recently, a so-called "Gaia Hypothesis" has been proposed and become popular among activists in the ecological movement according to which our earth is a single organism.[4] We have no proof of that hypothesis. An ecological system is not necessarily a single organism, any more than our solar system is a single body, rather than an accidental but interacting system of bodies which have been unified to a degree by the presence of one body, the sun, which holds them together by its superior gravity, and floods them with its superior energy. In an ecological system living things have adapted to their environment and to each other, but they have not become parts of each other, the way our organs are part of our body. We must not force the analogy to an organism of the solar system or an ecological system to the point of failing to see that their kinds of unity are of very different orders.

Can we, then, identify any real things that are not mere collections of other collections *ad infinitum* splintering into unknowable small bits, or which are not mere parts of one vast whole transcending our knowing powers? Is it not more scientific to begin with some objects of our experience which we can ascertain have an intrinsic unity, stability, and independence of existence which distinguishes them from mere collections or even collections that form systems? I would propose that according to present knowledge these are atoms, molecules, organisms. I think it is clear enough that the plant and animal organisms of ordinary experience have a distinct existence from the ecological environment in which they exist. It is true that a bamboo grove is the optimum environment for a panda, as a proper flow of blood is the right environment for the brain, and that the panda will die without bamboo, and the brain without blood; but this is a mere analogy, the sorts of unity between the panda and the forest, and between the brain and the body are of different orders, just as my unity as a person is of quite a different order than the unity of the family or the society of which I am a member. To read these analogies literally is to end in totalitarianism.

Why can we say that at least atoms, molecules, and organisms are real things? What about elementary particles? As I see it, atoms have a relative stability and capacity to maintain their independent existence against outside forces which is of different order than the existence of elementary particles. When these particles exist in the atom they exist not as things, but as part of the atom. When massive particles become separate from the atom their existence is transient and can be understood more as temporarily existing fragments, which are very soon incorporated in other atoms and become transformed as their parts. When the particles are photons, neutrinos, quarks, gravitons, "virtual"

[4] J. E. Lovelock, *Gaia: a New Look at Life on Earth* (Oxford: Oxford University Press, 1987). This is also discussed in Harris, *Cosmos and Anthropos*, 93-101.

particles, they can be understood rather as the action (energy exchange) of atoms on other atoms, or of one part of an atom on another part. In any case, they seem not to have the claim to be "things" that atoms have.

But what about the "empty" spaces that exist between the parts of the atom and among the atoms? In the space among the parts of our solar system and among the stars and even more among the galaxies the atoms are widely scattered and most of the universe is sheer space. The notion of "empty" space is one of the useless notions imposed on scientists by the mechanist philosophy of which Weinberg complained, and which Newton reintroduced into science, after even Descartes had seen its folly. How can we call space "empty" when it is always filled with waves of energy? While Einstein eliminated the notion of a mechanical ether, he replaced it with a space "curved" by the presence of matter, and eliminated the Newtonian notion of absolute space and time.

We need also to reject the reductionist view, another relic of mechanism, that atoms are composed of discrete particles, that molecules are simply a collection of atoms, and that organisms are collections of molecules. In each of these cases, when the lesser unit enters into the larger unity it is so modified that it becomes a part of, dependent for its existence in that form on, the whole. A atom incorporated in a molecule or a molecule in an organism is no longer identical with the atom or molecule before its incorporation or after the death of the organism.

Thus I would say that the relatively stable realities which science studies are atoms, molecules, and organisms in their coming to be, their interactions with one another, and their ultimate dissolution. In doing so it also studies their parts and the instruments of their interactions; and also their collection into larger systems, such as planets, stars, galaxies, the universe.

WHAT ARE THE ESSENCES OF THESE THINGS?

Now that we have identified at least some real things, we can ask whether it is possible to know their essences, i.e., not only *that* they are, but *what* they are, and perhaps even *why* they are? As I have said, the term "essence" simply refers to independent existence, to thingness. To know an essence of a thing is to understand its unity and stability. This requires us to know two facts.

1) We have to be able to isolate a thing in its independence. For example, To understand the atomic element gold, or the molecular compound water, I must obtain a pure sample. To study an organism, I must get a mature, healthy specimen and I must observe it reacting in a variety of situations, not merely when it is dormant or hibernating. In philosophical terms this means to

distinguish its nature or essence from the accidental circumstances or modifications resulting from its environment.

Thus, to understand human nature, we have to survey human history and the variety of human cultures, to find what is common and perduring for the human species everywhere and always. That this process of isolating the essential character of any particular kind of thing is sometimes difficult and subject to error does not mean that it is impossible. Who doubts that gold is really an element and not a mixture or compound, that water is H_2O, or that it is possible to classify the species of living things? The theory of evolution, of course, has led some to say that the differences between species of organisms is merely a matter of degree, but most evolutionary biologists admit that in any cross-section of the historical evolution of organisms, the organic world is made up of distinct, discontinuous species defined by the incapacity of closely related species to interbreed.

2) We have to determine the essential properties of the thing, once isolated from merely superficial, accidental modifications. For example, we must determine the properties of gold, water, or a particular species of organism. By a property we mean some observable aspect of the thing which it always has and which if lost means its destruction as a thing, and by which we can identify every other individual which we classify with it as of the same species. For example, gold has an atomic weight not possessed by any other metallic element, and a transformation of gold that would deprive it of this atomic weight would mean its transformation into some other kind of element. Water has a characteristic way of freezing not found in any other compound; an elephant has a kind of trunk not possessed by any other organisms, and so on. There are, of course, many qualifications to what I have just said. In organisms some properties are apparent only in fully mature species and only at certain times. Water exists as a gas, a liquid, and solid and exhibits some properties in one of these states that it does not in another. But ultimately it is possible to say that each of these kinds of things has proper characteristics.

3) We have to discover the inter-relation of these properties, and ultimately that property which is most fundamental and in which the other properties are rooted. For example, we now know that the color, malleability, melting point, weight, chemical activity and stability. of the element gold are all grounded in its unique atomic number, which reveals the composition of its nucleus and planetary electrons. Thus, gold is not just a random collection of properties, these properties form an ordered set that expresses its most profound characteristics. We also know that the properties of water can be understood in terms of its chemical structural formula and the bonding between its compounded

atoms which this expresses. In the case of organisms we are dealing with a vastly more complicated set of properties, anatomical, physiological, and in the case of animals, psychological. Yet even here it is obvious that there is an orderly relation among the properties. For example, in a cat or any of the members of the feline genus, its highly specialized carnivorous way of eating explains many features of its anatomy and physiology. Finally, in the most privileged case of all, our human species, it has long been understood that it is our intelligence, our capacity to think symbolically, and thus to be able to create a culture, which marks us off from all other living organisms, and which explains why we have the most complex of brains, and how the rest of our nervous system and the physiology and general human anatomy has been modified in the service of our brain.

4) We now come to a fourth and final step. After we have discovered the properties of a thing, and found which of these properties is the most fundamental, we need to view the thing not merely as an ordered collection of properties but as a whole, in its entire structure and unified function, in its unique way of existing as an independent thing. To know the thing in this unified way is what has always been meant when philosophers talked about knowing a thing's essence: knowing it essentially and profoundly, not merely superficially. The essence is not some hidden core concealed within the phenomena by which the thing is known to us. Rather it is the thing taken as a whole in its reality but understood in a fundamental way. Thus, to say that we know the essence of Mr. Smith is not to know something secret about Mr. Smith, but to know Mr. Smith as he really is, in all his complexity, but precisely as he is human, a member of that species whose whole life is permeated by the capacity to think. Similarly, to know the essence of water, is to know so much about water and the interrelation of its properties that we begin to understand water in a truly profound way in all its uniqueness, and what it would mean to our planet and therefore to the universe if our planet were as dry as the moon or Mars.

DO WE KNOW THESE ESSENCES EXHAUSTIVELY?

Let me hasten to say that this kind of essential knowledge is never complete or perfect. We know ourselves as human in a uniquely deep way, yet to say that "man is a rational animal" is not to know ourselves thoroughly. Although "rational" is the supreme and defining human property that reveals our essence, we only know very imperfectly what that term "rational" means. To know it perfectly we would first have to be able to see it as the root of all the observed properties of the human being, which would mean a perfect understanding of

our special kind of animality, i.e., our anatomy, physiology, and psychology. We know a great deal about such things, but not everything, and never will know everything.

We would then have to understand what it is to think in a human way, and this too we only imperfectly understand. But to say that we know the human essence incompletely and imperfectly does not mean that we do not know it at all. When it comes to the rest of things, it has been common in neo-scholasticism to say that our essential knowledge goes no further than the broad genera: atoms, molecules, plants, animals.

Some have said that this is what divides philosophy from science, that philosophy has essential knowledge, science does not. This is a false distinction. It is true that we can state the distinction of the aforesaid genera of things with considerable precision, but it is not true that our essential understanding goes no further. As I have already indicated modern chemistry has developed a taxonomy of elements and compounds and physics explains this taxonomy with a high degree of precision and thus we have some degree of essential understanding of the non-living world. Similarly, biologists have developed a remarkable taxonomy of the species of living things, not only in our present time, but also throughout much of evolutionary history. For a long time, however, this taxonomy although accurate in distinguishing species did so on the basis of relatively superficial anatomic differences. To give a positive understanding of a species it is necessary to know its living behavior: how a plant nourishes and reproduces, how an animal does these things and also acts by instincts and learning in unique ways. We are yet pretty far from a taxonomy of organisms based on behavior. The present study of genetics seems to open a way to explain the connection among the properties of living things, but until we can relate genetics to behavior and not merely to anatomy and physiology, we will not have gone very deeply into an essential knowledge of living things.

DOES MATHEMATICS YIELD ESSENTIAL KNOWLEDGE?

Physicists understand that mathematics is one thing, while physics, for all its use of mathematics, is another. Natural scientists, even physicists who most depend on mathematics, know that their interests and ways of thinking are quite different than that of pure mathematicians. Why then is mathematics, as Wigner said, so "unreasonably effective" in understanding physical reality? The Pythagoreans and Plato actually thought that the essences of material things were numbers, but this cannot be so, since the essence of material things is dynamic, while numbers belong to a realm utterly unchanging. But if Plato

was wrong and mathematics cannot attain to the essence of any physical thing, why has it proved so immensely helpful in coming to know essences?

We can answer this question, I believe, if we remember that the properties of a thing through which we come to know its essence are not all of one kind but pertain to various categories. They are qualities, actions, relations, timings, spatial orderings, etc. But in a physical body all other categories of properties presuppose a characteristic quantity of parts and their spatio-temporal relations. Thus, in an atom of gold, the number of particles and their interrelations in space and time are the fundamental essential properties of the thing. Similarly, in a human being nothing about humanity can be understood without knowing our gross and fine anatomy and chemical composition. This does not mean that the other properties can be reduced to quantity, but only that they presuppose it as form presupposes matter, a whole the parts. Consequently, all science must rest on a quantitative understanding of a thing, and quantitative relationships are most clearly expressed and easy to manage in human thinking when we treat them abstractly in the discipline of mathematics.

Yet in using mathematical abstraction to help us arrive at an essential knowledge of things, we must not forget the following. (a) The application of mathematical abstractions to real quantities is always approximate. We can be certain that what is mathematically impossible is not physically possible, but we can never be sure that what is mathematically possible, is in fact the way things really are physically. Thus, to arrive at an essential knowledge of things that is truly certain, and not merely hypothetical, we must do so in terms of the observation of physical quantities and not merely mathematical models. (b) We must not fall into reductionism, by thinking that when we understand the quantitative relations in a thing, its measurements, we have an essential understanding of it until we can also understand it in physically *causal* terms. Thus, to tell us the range of normal human height and weight, or the gross size of the human brain is not very illuminating until we understand how these measured quantities are related to human physiology and function. (c) Quantity expresses the parts of a whole, not the unity of the whole, and essential knowledge must attain to an understanding of the unity of a thing. To know the parts of human anatomy does not tell us why all these parts work together and produce various kinds of behavior. (d) Mathematics abstracts from change, reducing time to a static geometry, and the dynamism of change and causality to timeless functional relationships. A mathematical picture of the world, therefore, is essentially static, while reality is dynamic. Thus, natural science is not merely an effort to invent mathematical models whose self-consistency and beauty is not contradicted by the facts of the real world, but is a genuine philosophy that

more and more reveals the real world to us, and ultimately an understanding of our own selves as human, thinking, scientific organisms.

Thus, the reason for insisting that we do in fact have essential knowledge of physical things is that this interpretation of science overcomes the dichotomy that has so troubled human culture since the seventeenth and especially the eighteenth century, the split between philosophical, humanistic knowledge, and scientific knowledge, the "Two Cultures" that C.P. Snow made famous,[5] with the resultant split between values and facts. Once we see that science is not limited to a superficial, reductionistic understanding of the world, but that science has in fact deepened our essential knowledge of reality, and opened the way, therefore, to deal with all the greatest problems that trouble humanity, our culture will be delivered from its present confusion.

[5] *The Two Cultures, And a Second Look*, 2nd ed. (Cambridge, Massachusetts: Cambridge University Press, 1964).