Science's Deepest Belief

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> "*Happy is the man who can recognize in the work of today a connected portion of the work of life and an embodiment of the work of eternity*." — James Clerk Maxwell

To understand the deep connection between science and religion, we need to study the assumptions lying at the roots of scientific thought. No discourse ever starts from nothing; we always make assumptions. When a discourse is young, these assumptions are debated and open to the light of day, but with the passage of time they start to be taken for granted and gradually slip into subconsciousness. When people say that science and faith are opposed to each other, they do not reflect on the creed which natural science professes. This creed is not always clearly and openly presented when scientists talk about their discoveries or give interpretations of what goes on in the world. Nevertheless, science assumes that events occur according to rules, which scientists call laws of nature. These rules are thought to be independent of our will.

The principal occupation of science is obtaining knowledge about these laws. Knowledge of the laws of nature enables us to predict future events and also to reconstruct the events of the past—although one has to remember that, according to the modern view, these laws are not deterministic but statistical, admitting a certain degree of flexibility. There is a very intricate play between chance and necessity in nature which together make our world so rich. The laws' predictive power is of the utmost importance. Science does not just systematize facts about the world, bringing them into some tidy order. The system and the order are considered to be good only insofar as they enable us to make accurate predictions. Knowledge, in order to be reliable, must be predictive and verifiable. By insisting on reliability, this approach narrows the field of science.

There is some question as to whether natural science can put claims on everything, including human behavior, or whether there is a line or even lines separating the world of inanimate matter from creatures with intentions and emotions—and eventually from those, like us, with intelligence and the capacity for reflective thinking. Some think that there is no essential difference between the human sphere and the rest of the world, and hence that natural science can (at least in principle) explain it all. Others think that science is just a human invention making obviously wrong pronouncements about human nature, and on this basis do not take it seriously even when it speaks about inanimate objects. I think that the latter point of

view is too extreme. For the purpose of the present narrative, it is enough to assume that natural science has complete authority as far as inanimate objects are concerned.

A widespread belief holds that the principal adversary of science is religion, with its belief in the "supernatural." In fact, the concept of the supernatural is not a necessary attribute of religion, as is evident from the fact that the foundations of science were established by deeply religious people. The very idea of the natural laws—without which science does not exist—was conceived in the religious society centered on the ancient Greek philosopher Pythagoras. These ideas were later developed by Plato and Aristotle, both very religious people, even though their religion was not that of the masses. The founder of the modern European science, Isaac Newton, was deeply religious, as were such other great scientists as Michael Faraday, James Clerk Maxwell, Max Planck, Kurt Gödel, and Werner Heisenberg. And although Albert Einstein, Erwin Schrödinger, Eugene Wigner, and Paul Dirac were not religious in the conventional sense, it would be preposterous to call them atheists.

A quotation from Albert Einstein illustrates this thesis:

> The interpretation of religion, as here advanced, implies a dependence of science on the religious attitude, a relation which, in our predominantly materialistic age, is only too easily overlooked. While it is true that scientific results are entirely independent from religious or moral considerations, those individuals to whom we owe the great creative achievements of science were all of them imbued with the truly religious conviction that this universe of ours is something perfect and susceptible to the rational striving for knowledge. If this conviction had not been a strongly emotional one and if those searching for knowledge had not been inspired by Spinoza's *Amor Dei Intellectualis*, they would hardly have been capable of that untiring devotion which alone enables man to attain his greatest achievements.[1]

One reason for the conflict between science and religion is a misunderstanding of the ontological status of natural laws. Experience acquired in scientific research tends to suggest that these laws constitute a logical structure for always-changing world events. In other words, scientists believe that the world changes, but the laws do not—otherwise science would have no predictive power. To maintain that the universe is supplied with a logical structure is tantamount to maintaining that it is ruled by reason or logos. The following quotations from Albert Einstein and the British mathematician Alfred North Whitehead illustrate this point:

> . . . ultimately the belief in the existence of fundamental all-embracing laws also rests on a sort of faith. All the same, this faith has been largely justified by the success of science. On the other hand, however, everyone who is seriously engaged in the pursuit of science becomes convinced that the laws of nature manifest the existence of a spirit vastly superior to that of men, and one in the face of which we with our modest powers must feel humble.[2]

> In the first place, there can be no living science unless there is a widespread instinctive convic-

[1] Albert Einstein, "Religion and Science: Irreconcilable?" *The Christian Register* 127 (June 1948): 19–20.

[2] Albert Einstein to P. Wright, January 24, 1936, quoted in Max Jammer, *Einstein and Religion: Physics and Theology* (Princeton: Princeton University Press, 1999), 93.

> tion in the existence of an Order Of Things. And, in particular, of an Order Of Nature . . . .The inexpugnable belief that every detailed occurrence can be correlated with its antecedents in a perfectly definite manner . . . must come from the medieval insistence on the rationality of God . . . My explanation is that faith in the possibility of science, generated antecedently to the development of modern scientific theory, is an unconscious derivative from medieval theology.[3]

[3] Alfred North Whitehead, *Science and the Modern World* (New York: The Free Press, 1925), 3–4, 12–13.

In other words, the governing *logical structure* of natural science is literally not of this world. It has an ontological status different from that of events. We infer its structure from the observation of phenomena—not seeing it with our eyes or hearing it with our ears, but deducing it through our intelligence by means of hypothesis and analysis. The laws of nature are not of this world because they are not located at any particular point in time or space. They are not things or events; they direct events, and one may therefore speak with confidence about their preexistence and independence of the material content of the universe. The relationship of natural laws to matter can be likened to that of blueprint to product, or software to hardware.

The reader may be surprised by such an idealistic view of science, but it is implicitly contained in every physics textbook. According to this view, space and time—together with their material content—do not govern themselves. Their behavior and fate is determined by the law, which itself is atemporal and all-encompassing. This idea lies at the foundation of modern physics and has far-reaching consequences. The laws are "out there" in the sense that they are not our invention. Neither are they social constructs, although our knowledge of them is necessarily limited and changes with time. No self-respecting scientist would say that he or she has invented some natural law. Laws are not invented but discovered, just as Christopher Columbus discovered America for Europeans, although it had been there all along. Just as Columbus mistook America for India because his theory was wrong, we may also be confused about the real meaning of our discoveries, but our understanding is improved through a continuing process of criticism, verification, and argument.

One might well ask whether we can ever be truly confident in any knowledge. Not only members of the general public but even some philosophers believe that this is impossible, that every new scientific epoch cancels the achievements of the previous one, since "paradigm shifts" in scientific thinking allegedly create impenetrable barriers in our intellectual development. If this were true, science would have no real say concerning the status of humans in this world. I think, however, that this point of view is based on a misunderstanding. New developments in science do not cancel the achievements of the past, but rather put limits on their validity and accuracy. The theory of relativity, for instance, disproved the Newtonian postulate of absolute time, but in doing so it did not invalidate all of Newton's achievements and results. Likewise, quantum mechanics disproved the absolute determinism of classical mechanics. Notwithstanding this, anybody interested in the motion of macroscopic bodies whose speed is slower than that of light can still rely on the laws of mechanics formulated by Newton more than 300 years ago. They are essential for car, airplane, and rocket engineers, and for those

who analyze weather and climatic events. The same holds for chemistry: even though we do not yet understand how to unite quantum mechanics with gravity, this is of little concern for any practicing chemist and, I dare to say, will remain so even after this unification is achieved. I believe it is safe to assume that there are areas of our experience where our knowledge is reliable. And I will try to show that even this restricted knowledge will allow us to draw far reaching metaphysical conclusions.

Let us now come back to the idea of universality. We have ample evidence that the laws of nature as we know them have remained the same throughout the history of the universe, and that they are the same in all the regions we can observe. This idea has not been accepted without challenge and doubt. Evidence in its favor comes from spectroscopic analysis of remote cosmic objects. Atoms of different chemical elements emit or absorb electromagnetic radiation (including radio waves, infrared radiation, visible light, and X-rays) at different frequencies. Each element manifests a unique pattern of emitted radiation, constituting a kind of "fingerprint." When astronomers analyze light from remote stellar objects they find the same spectral patterns as here on Earth. No matter how far these objects are—light years, thousands of light years, or even billions of light years away—we see the same patterns. This analysis gives us information about the chemical content of these remote objects, and also suggests that the laws responsible for the composition of chemical elements are the same throughout the observable universe. Moreover, since light travels at a finite speed, by looking further away we look deeper into the past. This means that by observing the same spectral patterns in objects located billions of light years away, we can ascertain that the laws of physics have remained unchanged for many years.

The concept of natural laws that is at the center of this discussion may be illustrated with a thought experiment. Imagine a very young universe, at a time shortly after the Big Bang, when stars and galaxies have not yet been formed. There are not even any complex atoms, only elementary particles. Imagine that some higher power has placed in this young universe an incorporeal spirit, and has given him our physics textbooks. Obviously the knowledge of physical laws contained in these books is rather incomplete. Even so, by reading them, our angel will be able to extract enough information to conceive a broad outline of future developments. He will be able to predict that the expanding universe will cool down, and that matter will organize itself into ever more complex forms. Elementary particles will form atoms of hydrogen and helium, which in turn will form dense clouds and eventually stars. Matter that remains outside the stars will continue to cool down, but the temperature in the stars will increase, giving rise to thermonuclear fusion. The fusion of hydrogen nuclei will create heavier elements. The clever spirit will be able to make these predictions by reading the physics books given to him well before the events take place.

This thought experiment demonstrates the thesis that physical laws are not contained in material objects, as materialists suggest, since they predict the formation of these very objects. And I hope it is clear now why I believe that the laws governing the events and the events they govern are fundamentally different entities. This

brings us to the main thesis of my narrative: idea precedes its material incarnation, and since in its unity it contains all the stages of the entire process of incarnation, from the simplest to the more complex, the complex may be said to come before the simple, not vice versa.

The material world—the world of things we can see, hear, taste, and touch—is not the only reality. There is also an aspect of it which opens itself only to our intelligence. This idea speaks against materialism, but does not necessarily speak for God. One can argue—and this argument has been put forth before—that the laws of nature constitute an impersonal force, lacking any awareness or concern for our existence. If one can call this God, it would be the indifferent god of Baruch Spinoza, not the personal God of Abraham, Isaac, and Jacob. For a religious person, the crucial question is whether the Platonic world of ideas supplants God or belongs to God.

To answer this question, it would be necessary to establish the relationship between natural laws and humans. We would have to find out whether our arrival in this world was just an accident or the result of a purposeful process. We would have to study our relationship to this world carefully, and especially our ability to extract reliable knowledge of it. I believe that modern science points toward the reality of a purposeful process. This, however, lies outside the scope of this paper.

Further Reading

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