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THE NATURE OF THE PHYSICAL UNIVERSE

SINCE THE BIBLE not only contains incidental remarks concerning natural phenomena, but incorporates events, dates, and places in its essential message, comparisons between theology and scientific theory have inevitably been drawn. Such comparisons, indeed such a conflict, occurred in pagan antiquity also, for Lucretius wrote out a system of science based on the first principle that "nothing is ever begotten of nothing by divine power" (*De rerum natura,* I, 150).

I. SCIENTISTS AND THEOLOGIANS

In 1896 Andrew Dickson White published *A History of the Warfare of Science with Theology,* in which, often with acrimonious phraseology, he inveighed against the stupidities of religious spokesmen.

Undoubtedly many theologians have made stupid scientific blunders. For example, White describes the theological opposition to inoculation. By White's own account, however, the opposition was at least as much medical as theological. "Foremost among the opponents was Dr. Douglas, a Scotch physician, supported by the medical profession and the newspapers" (Vol. II, p. 56). The author also generously praises Cotton Mather for favoring inoculation, but rather strangely attributes this favor to a decline of theology in Mather.

Other examples of theological blundering are the several theories invented to explain fossils. Yet the author again admits that Voltaire, hardly an orthodox theologian, explained the existence of marine fossils at high elevations as the remains of fish and shells dropped by the crusaders returning from the Holy Land (Vol. I, p. 229).

With respect to the physical sciences White also acknowledges that Cotton Mather accepted the heliocentric theory, but he seems to distort the historical situation when he attributes to theology Leibniz' rejection of the theory (Vol. I, p. 149).

And once more, White derides "the theologic [sic] phrase 'nature abhors a vacuum,'" though he fails to note that this idea was derived from the science of Aristotle.

First, then, one may acknowledge that theologians have made many scientific blunders; but possibly these are due more to what they learned from previous scientists who initiated the blunders than from what they learned in theology.

In the second place, it is most important to see how White conceives of science. If we are to compare science with the Bible, we certainly require a clear notion of what science actually is. Now, White rather obviously considers science to be, as many theologians consider theology to be, a system of propositions absolutely and immutably true. For example, he says that Galileo's "discoveries had clearly taken the Copernican theory out of the list of hypotheses, and had placed it before the world as truth" (Vol. I, p. 130). In the same vein he speaks of "the victory of astronomical science over dogmatic theology" (Vol. I, p. 158). Again, he says, "From . . . physical science we have the establishment of the great laws of the indestructibility of matter. . . . Thereby is ended . . . the theological theory of a visible universe created out of nothing" (Vol. I, p. 407).

Poor Dr. White! Physics has long ago discarded matter; and one may now question whether anything is indestructible.

And, finally, on an early page, even though the author does not say so in so many words, the tenor of his argument requires the acceptance of the nebular hypothesis as absolute truth (Vol. I, pp. 17-18).

Now, perhaps White is justified in deprecating the motives of John Henry Newman, if indeed Newman was motivated simply by a desire to defend Ptolemaic astronomy; but in contrast to White's unshakeable faith in Newtonian science it might be wise to consider Newman's more skeptical words on alternate astronomical theories: "Neither proposition is true and both are true; neither true philosophically, both true for certain practical purposes." White scorns this as "hopelessly skeptical" (Vol. I, p. 166); here we seriously propose it for further consideration.

At the same time let us set aside another famous nineteenth-century view of the relation between science and theology. The Ritschlian theory was that religion was confined to the sphere of values, while science occupied the field of truth. Therefore they could not possibly conflict. But such a sharp division, putting all value and no truth on one side and all truth and no value on the other, is an impossible bifurcation of life.

A variation of this nineteenth-century theme occurs in a recent article by Dr. Richard H. Bube ("God's Revelations in True Science and in the Scriptures," in *The Collegiate Challenge,* Dec. 1961, p. 9). The resolution of the conflict is here made to depend on the assumption that "science answers *how* and *when;* Christianity answers *who* and *why.'"* Such divisions, Ritschlian or otherwise, cannot be accepted because in reality truth and value are intertwined, scientist and worshiper are the same man, and the Bible talks also of *how* and *when*.

II. THEOLOGY AND CONTEMPORARY SCIENCE

To bring the problem up to date, the views of two important contemporary theologians will now be briefly described.

Karl Barth in his first volume of *Church Dogmatics* has discussed the relation of science to theology. Of vital importance for the present purpose is his description of science. Barth virtually defines science in terms of six norms. Norms three and four, the possibility of verification by any attentive student, and regard to what is physically or biologically impossible, are the points at which the warfare between science and theology is most frequently thought to take place. Scientism rules out theology in general because revelation does not permit of laboratory experimentation and verification by all attentive students. Scientism also rules out miracles in particular on the ground that they are physically or biologically impossible.

Barth's solution of the problem is not, is emphatically not, an effort to propose other norms for science, or to alter them so that the positivistic principle of sensory verification be limited; nor does he propose to reexamine the limits of possibility and to replace the currently dominant scientism with a different philosophy of science. He is satisfied simply to say that theology is another study and is not subject to these norms (*Church Dogmatics,* Vol. I/1, Edinburgh, T. & T. Clark, 1936, pp. 315, 316).

In a Festschrift for Heinrich Barth, his brother, he wrote that philosophers and theologians seek the same thing, the one whole truth, but they seek it in different ways. Neither method excludes the other. Neither is superior to the other. The one starts with God and descends; the other starts with this world, with the concept of causality, and ascends from experience to an overarching structure.

All this sounds very much like the medieval theory of twofold truth: as theologians we believe Jesus was born of a virgin, while as philosophers we know that miracles are impossible.

It is interesting to note that in addition to the six norms Barth also mentions the concept of causality as characteristic of science. Rudolf Bultmann does the same thing. And since he competes with Barth for worldwide recognition, his view of science in its relation to theology equally deserves consideration.

For Bultmann the message of the New Testament, true in itself and highly relevant to twentieth-century civilization, is expressed in the mythological language of an ancient world- view. Modern science makes that world-view incredible, so that to preserve the message its New Testament form must be reinterpreted and demythologized. With Bultmann's existentialistic reinterpretation of Christianity we are not here concerned; the present interest lies in his view of science and of the world by which he judges to be incredible the Incarnation, the Virgin Birth, the miracles, the vicarious atonement, the Resurrection, as well as the existence of demons, angels, the Holy Spirit (and one wonders why not also God?).

Bultmann's reason for denying that God can intervene in the world is the inviolable "causal nexus" which modern science is supposed to have discovered connecting all phenomena. Not to extend documentation to weary lengths, a fair idea of Bultmann's view of science may be given by stringing together a series of phrases from the easily available *Kerygma and Myth* (H. W. Bartsch, ed., New York, Harper & Brothers, 1953). After the long dark ages of superstition, "Now [!] the forces and the laws of nature have [really] been discovered . . . ; the discoveries of Copernicus and the atomic theory" are "facts so compelling as to make [man's] previous view of the world untenable . . . ; the stars are physical bodies whose motions are controlled by the laws of the universe; we can no longer believe in spirits. . . . Sickness and the cure of disease are likewise attributable to natural causation . . . ; we are still assigning them [psychological phenomena] to causes and thus far trying to make them scientifically intelligible . . . ; all our thinking today is shaped irrevocably by modern science" (*ibid.,* pp. 3-5).

Bultmann echoes and adapts Feuerbach (cf. my *Thales to Dewey,* Boston, Houghton Mifflin Co., 1957, p. 476) when he writes, "It is impossible to use electric light and the wireless and to avail ourselves of modern medical and surgical discoveries, and at the same time to believe in the New Testament world of spirits and miracles" (*op. cit.,* p. 5).

This particular point, as distinguished from the previous items, is no more convincing now than it was when Feuerbach cited the amazing new inventions of railroads and steamships. For all his belief in spirits and miracles, the apostle Paul used ships and a physician. Improvements in the two would hardly have caused him to abandon his theology.

The crux of the matter is of course the alleged incompatibility between miracles and natural causation. To quote once more, "A miracle — i.e., an act of God — is not visible or ascertainable like worldly events. The only way to preserve the unworldly, transcendental character of the divine activity is to regard it not as an interference in worldly happenings, but something accomplished *in* them in such a way that the closed weft of history as it presents itself to objective observation is left undisturbed" (*ibid.,* p. 197).

Quotations from other works of Bultmann are unnecessary, for he has little more to say on the nature of science. The firmness of his view, however, might be indicated by a passage in *Jesus Christ and Mythology* (New York, Charles Scribner's Sons, 1958, pp. 36-38) where, borrowing from Auguste Comte, he asserts that although science may change in some details, the method of thinking will never change again; and he seems to suggest that the laws of motion are permanent whereas geocentric and heliocentric astronomy may not be.

Now, to all appearances Barth and Bultmann agree with White that science is infallible and obtains fixed and absolute truth. Unless, therefore, one is satisfied with the irrational theory of a twofold truth, one must, when the findings of science disagree with the statements of the Bible, reject the latter and accept science. Religion must be demythologized. But, we ask, is this the view of science that must be taken; or is there something to be said for Newman's more skeptical outlook?

To be a little blunt, the most noticeable characteristic in these theologians' views of science is their extensive ignorance. They simply do not have the remotest idea of what science actually is. If now we are willing to consider a few specific points, and not be satisfied with vague, popular generalities, the warfare of science with theology, though perhaps not eliminated, will appear in a very different light. First, something will

be said about classical Newtonian physics, for example, the laws of motion which Bultmann said were permanent; second, some developments of the early twentieth century will be noted; and finally the implications of the most recent philosophy of science will be studied.

Before this, however, it may be well to give a little evidence that theologians are not the only ones to handle science carelessly. Sometimes scientists themselves make doubtful claims. During the centennial celebrations for Charles Darwin a certain college arranged for a lecture by a zoologist. A discussion session was to follow, which I, perhaps as devil's advocate, was asked to conduct. In his lecture the professor of zoology waxed eloquent. He described an evolutionary process starting with inanimate particles and proceeding without a break through plant life, animals, and mankind. This, he assured the audience, was incontrovertible fact. Not a hint of hesitation marred his superb dogmatism.

When it came my turn, I pointed out that there existed not one only, but several quite different theories of evolution. These differ both with respect to method and with respect to extent. Then I related a conversation with a professor of botany. The botanist told me that he had been raised academically on the theory of evolution. When fossil gaps in the geological evidence were noted, the answer had been that further geological discoveries would close the gaps. But, my botanist professor continued, during the last fifty years advancing geology has not closed these gaps, and the examination of strata is now so extensive that it seems unlikely that future discoveries can radically alter the picture. Therefore, he concluded, I cannot accept a continuous evolution of plant life.

After hearing my story, the zoologist lecturer made a most amazing remark. Yes, he said, the botanical evidence for evolution is virtually nil. And this, after his flawless dogmatism!

III. CHRISTIANITY AND THE CLAIMS OF PHYSICS

Interesting though evolution may be, the warfare of science with theology, or, better, the relation between science and Christianity will be determined on the field of physics, for physics is the purest and most developed form of science. We shall begin with Newton's *Principia* of 1687. By his general theory of gravitation Newton unified Galileo's laws of freely falling bodies with Kepler's laws of planetary motion, laid the basis of all the particularities of the science of mechanics, and did it so well that his construction stood uncontested until the opening of the twentieth century. A man whose thought can dominate science for a full three centuries must have been a genius. No wonder the rhymester Pope exclaimed,

Nature and Nature's laws lay hid in night;
God said, Let Newton bel And all was light.

Because the following argument aims to lay bare certain fatal flaws in the Newtonian system, it is not only polite but even necessary to stress the genius of the man. If the materialists of the nineteenth century used his mechanics as an argument against miracles and God, such at least was not Newton's intention. Newton was a more cautious scientist than the later materialists; he was also a devout believer in God, and his sentiments are rather those of Addison's hymn:

The spacious firmament on high
With all the blue ethereal sky
And spangled heavens a shining frame
Their great Original proclaim.
.....

What though in solemn silence all
Move round this dark terrestrial ball?
What though no real voice nor sound
Amidst their radiant orbs be found?

In reason's ear they all rejoice
And utter forth a glorious voice;
Forever singing as they shine,
"The Hand that made us is divine."

Nevertheless, despite Newton's personal beliefs and intentions, it was the general law of gravitation, that is, the inviolability of the mathematical laws of mechanics, that was used to undermine Christianity. Gravitation and miracles, mechanism and prayer, mathematics and morality, are incompatible. To this, does a Christian have any reply? He has indeed a very lengthy reply, a sample of which the following purports to be.

Less than a century after Newton's *Principia,* Bishop Berkeley and David Hume exscinded the concept of cause from science so well that Kant never succeeded in restoring it. From that time to the present causality has not been a scientific concept. In 1893 C. S. Peirce wrote, "We still talk about 'cause and effect,' although, in the mechanical world, the opinion that phrase was meant to express has been shelved long ago" (*Philosophical Writings,* p. 17). On this point Bultmann himself must be demythologized: his seventeenth-century world-view is incredible today. Unfortunately, and contrary to Bishop Berkeley's hopes, the excision of cause was of no particular help to Christianity. The inviolability of mathematical law remained. Of course, it remained only on the assumption that the laws discovered now have always operated in the past. Logically and philosophically this assumption is exceedingly difficult to prove; but it is so in accord with common sense that materialism and mechanism easily survived.

A more forceful objection to this type of anti-theological science is suggested in a question that was asked later. For two centuries it had been supposed that science really discovered the laws of nature, and that these laws really described how nature goes on. But eventually the possibility of scientific discovery and scientific description were both questioned. If now it can be shown that the laws of physics do not describe the workings of nature, the question of miracles will be placed in a new light. Obviously there is no point in denying the occurrence of miracles on the ground that miracles violate the processes of nature, if these processes are unknown.

To show that scientific law, specifically the laws of Newtonian mechanism, do not describe how phenomena occur, the example of the pendulum will be used. The law of the pendulum, roughly expressed, states that the period of the swing is directly proportional to the square root of the length. But the scientific methods by which the equation is obtained are based on three remarkable assumptions. First, the mass of the bob is assumed to be concentrated at a point; that is, the body is homogeneous.

This condition is never met in actuality. Second, the string must be tensionless. There is no such string. And third, the pendulum is supposed to swing on an axis without friction. This is impossible. The necessary conclusion therefore is that the scientific law describes only non- existent pendulums, and that real pendulums do not move in accordance with the laws of physics. Accordingly, when it is argued that miracles can never have happened because they violate the laws of nature, the reply is that no laws of nature are known and that even ordinary pendulums violate the laws of physics.

In the next place, science as little discovers as it describes. For one thing, there is a considerable amount of *a priori* mathematical construction, such as the simple use of arithmetic means, the theory of least squares, the constant extrapolation of values both beyond the limits of experiment and between the individual readings. But aside from the effect of particular mathematical choices on the form of the laws of physics, there is a more easily understood consideration that quite dearly shows the impossibility of discovery by science.

In keeping with the general theory of mechanism, Lord Kelvin claimed that if he could construct a mechanical model of a natural phenomenon, he had explained it. The success which the nineteenth century had in constructing mechanical models was stupendous. Such models were therefore assumed to explain. Then

Poincaré pointed out that it was always possible to construct many mechanical models of any natural phenomenon. Theoretically it is possible to construct an infinite number. But if this is so, why should a scientist select one particular model and assert that this one explains the phenomenon?

A crude example may enforce the point. Suppose we see an auto moving down the street. Let this be a new phenomenon which we want to explain. We must therefore construct a mechanical model; that is, we must contrive some machinery that could duplicate the car's motion. After some thought you with your brilliance dream up an internal combustion engine, whether of two, six, or eight cylinders is immaterial. But I with less or maybe more imagination suggest a trained squirrel in a revolving cage.

How could we tell which of these mechanical models explained the auto? Of course, the easy answer is to open the hood and look in. If we then see a squirrel, I win.

But unfortunately we cannot open the hood of nature and look in. We see, as it were, just the outside of nature. To be sure, we use microscopes and see within grosser bodies the motions of smaller particles. But no one has ever seen an atom move, much less looked inside an atom. Galileo simply assumed that the motion of an atom was similar to that of the marbles he rolled down his inclined plane. The marble was in fact a mechanical model. There are today other and more complex models of "atoms." But with all our nuclear science, we can never lift the hood and see whether our model is the one true picture of nature. Science cannot discover the workings of nature. To be sure, it can discover or invent jet planes and destructive bombs. And it succeeds in formulating the laws of physics. But it cannot discover the laws of nature.

To this point the discussion has been carried on within Newtonian limits. These limits were broken at the beginning of the twentieth century, and how thoroughly they were broken can be seen in the case of Newton's first law of motion. The law states that a body in motion continues to move in a straight line until acted upon by an external force. Thus a single atom in an infinite non-gravitational space would continue in the same direction forever. With this law as a basis the elliptic deviation of the planets from a straight line is explained by the gravitational pull of the sun.

But this law, the law of inertia, on which for three centuries all physics was based, turns out to be scientifically meaningless. There is no experimental method of determining rectilinear motion. Newton had assumed that the stars are fixed in space, and that therefore a particle moving constantly toward a star is moving in a straight line. But now that stars are seen to move, rectilinear motion loses all meaning.
The first law of motion underlies the entire Newtonian system, and naturally a flaw here will automatically vitiate all that follows. There are ramifications that go beyond the simple difficulties of rectilinear motion. Newton's formulations presuppose the possibility of determining the position and velocity of a particle apart from its relation to any other particle. At the same time the law of gravitation asserts the continuous interaction of all particles. The incompatibility of these two presuppositions was for many years dismissed by scientists as the ethereal speculations of mere philosophers. But when in the more recent past the phenomena of light became more frequent factors in experimentation, the latent contradiction soon resulted in the complete overthrow of Newtonian science.

The amazing scientific ingenuity by which this overthrow was accomplished in detail is a long and interesting story. Part of it has to do with the breakdown of the atomic theory. Instead of the atom's being indestructible and fixed in quality, uranium broken down into lead and nitrogen can be turned into carbon. Interest now came to center in electrons. But electrons are so small that even the light necessary for experimentation affects them. If light of low energy is used, their velocity is hardly changed, but the picture is so fuzzy that the position cannot be determined. On the other hand, if light of shorter wave length is used, the position becomes clear, but the motion is unpredictable.

The literature on the history and the philosophy of science, more and less technical, is extensive and abounds in most interesting details. But for the present purpose two conclusions must be drawn. First, science does not discover the laws of nature. Above it was shown that science cannot discover nature because of *a priori*

mathematical construction and because there is no way to "lift the hood" and look in. Now we see that science has not discovered nature because science is constantly changing. If it had ever *discovered* a law of nature, the law ought never to be discarded. But two thousand years of history, or four hundred years if you like, give us no confidence in any hope of a law that will not be changed.

In the second place, we may conclude from the recent developments in physics that the present state of science is one of utter confusion. No one understands this better than the scientists themselves. One of the most frequently mentioned illustrations of this confusion is the simultaneous acceptance of two mutually incompatible theories of light. For certain purposes scientists use the long accepted wave theory. Light is supposed to travel through the ether like waves through the sea. Of course, there is no longer any ether to wave, but light is still regarded as a wave motion. At the same time light is not a wave motion, but is composed of very tiny corpuscles. These illuminating bodies shoot through space like buckshot and so produce the phenomena under investigation.

Other examples of the chaotic implications of the quantum theory, relativity, nuclear physics — that is, twentieth-century science as a whole — can be found in profusion in the voluminous literature. Much, and in a sense all, of this chaos stems from the absence of unambiguous definitions. The older concepts of mass, energy, and inertia have lost their old Newtonian meanings and have not acquired fixed new meanings. Socratic dialogue with the best scientists soon reduces the more confident to inextricable contradictions and the more competent to honest confession of ignorance.

Newton himself, it must be insisted, was not altogether free from this difficulty. On a very early page of the *Principia* Newton wrote, "I do not define time, space, place, and motion, as being well known to all." Only a very great genius could afford to make such a stupendous blunder. Of all unknowns, space, time, and especially motion are the most obscure and enigmatic. No doubt Einstein and other twentieth-century giants have made determined assaults on the defenses of space and time — only to find that they still remain impenetrable. And as for motion! Achilles and the tortoise still show that it is safer to ignore Zeno than to answer him.

Now, in view of the absence of basic definitions, in view of the chaos of our time, and in view of the constant replacement of one scientific theory by another, it should be quite evident that science can provide no firm ground for denying the possibility of miracles or for making any confident declaration regarding spiritual realities. If science cannot answer the question, What is light? it surely cannot answer the question, What is God?

IV. THE DESCRIPTION OF NATURE

The question, What is light? introduces us to the third and final section of this discussion on science. Newton tried to answer the question, What is light? and in general aimed to describe nature. By and large this was also the conscious aim of the early twentieth-century scientists. They agreed that Newton had not succeeded in describing the innermost workings of the universe; they may have modestly admitted their own limitations; but they thought they could at least do better, and at any rate they aimed to describe.

However, Percy Bridgman, more philosophic than most, in *The Logic of Modern Physics* (New York, The Macmillan Company, 1927), came to the conclusion that the purpose of science is not the description of nature. He notes that in the infinitesimal world of electrons direct experience is impossible. And further, "The experimental facts are so utterly different from those of our ordinary experience that not only do we apparently have to give up generalizations from past experience as broad as the field equations of electrodynamics, for instance, but it is even being questioned whether our ordinary forms of thought are applicable in the new domain; it is often suggested, for example, that the concepts of space and time break down" (Preface, p. ix).

One of his earliest and easiest illustrations of the effect of operations on concepts is that of length.

"What do we mean by the *length* of an object? We evidently know what we mean by length if we can tell what the length of any and every object is, and for the physicist nothing more is required. To find the length of

an object, we have to perform certain physical operations. The concept of length is therefore fixed when the operations by which length is measured are fixed: that is, the concept of length involves as much as and nothing more than the set of operations by which length is determined. In general, we mean by any concept nothing more than a set of operations; *the concept is synonymous with the corresponding set of operations"* (ital. his; *ibid.,* p. 5).

And further on: "What is the possible meaning of the statement that the diameter of an electron is 10^{-13} cm.? Again, the only answer is found by examining the operations by which the number 10^{-13} was obtained. This number came by solving certain equations derived from the field equations of electrodynamics, into which certain numerical data obtained by experiment had been substituted. The concept of length has therefore now been so modified as to include that theory of electricity embodied in the field equations, and, most important, assumes the correctness of extending these equations from the dimensions in which they may be verified experimentally into a region in which their correctness is one of the most important and problematical of present-day questions in physics. . . . As a matter of fact, the concept of length disappears as an independent thing and fuses in a complicated way with other concepts, all of which are themselves altered thereby . . ." (*ibid*., p. 21).

In the past the argument against miracles depended on the assumption that nature has always worked as it does now. To deny this uniformity was unthinkable in the Newtonian age. But, surprising as it may be, yet not so surprising on the operational view, Bridgman has harsh words for uniformitarianism. "It is difficult to conceive anything more scientifically bigoted than to postulate that all possible experience conforms to the same type as that with which we are already familiar" (*ibid.,* p. 46).

Of course, it must not be supposed that Bridgman is an apologete for miracles. Nor are operationalists generally motivated by a desire to advance Christianity. But the implications of their theory are ruinous for the old-fashioned "scientific" warfare against theology. Operationalism asserts philosophically what scientific experimentation has been enforcing practically; to wit, that science provides no knowledge of nature itself. It is not the case merely that science has not yet found the truth but may later discover some. Scientific skepticism goes far deeper than this. What twentieth-century science has come to is the view that science will never, can never describe how nature works. Science does not aim at truth; it aims at invention.

John Dewey, neither a scientist nor a Christian, has popularized the idea that the purpose of science is to control nature for practical, i.e. non-cognitive experience. Scientific concepts are not pieces of information about independent antecedent being; they are plans of action. Mass is not a quantity of matter, but a set of operations. Now, it is always possible, at least theoretically, to invent some gadget in two ways — indeed in an indefinite number of ways. Such is the extended significance of the previous remarks on mechanical models. The two models, i.e. the two scientific theories, may be, must be, mutually incompatible. But both are "true" insofar as they work; that is, they are true in the pragmatic or instrumentalistic sense of true. This is not to say that the instrumentalistic theory of truth is a good epistemology. In fact, it is a very bad one (cf. my monograph, *Dewey,* Philadelphia, Presbyterian and Reformed Publishing Co., 1960). The point is simply that two incompatible theories can easily produce the same result. Refrigerators and telephones can be manufactured in many different ways. Two incompatible theories, however, cannot both be true, if they are taken as descriptions of nature. But science now has nothing to do with describing or explaining nature.

Its aim is invention, that is, control of nature. And in this setting the phenomena of light, for example, can be utilized by formally contrary equations.

As Christians we are not called upon to give creedal subscription to the philosophy of operationalism. As science itself has been constantly changing throughout its history, so too the philosophy of science has changed and will change. Operationalism is very popular today. It is also very plausible. Indeed, it seems to be the best explanation of science yet given. But, who knows? In another fifty years some great thinker may invent a different philosophy of science. And so the change of opinion will continue.

What a Christian should say in reply to a future philosophy cannot in any detailed way be predicted now. But now the present chaos in science itself, and the operational philosophy, enforcing the double lesson that science is not stable and is not a transcript of nature, form a propitious situation in which to show the futility of scientific objections to Christianity. If science has not discovered any law of nature, and if it is bigotry to postulate that past events must conform to present experience, and if we are well assured that the future laws of science (not laws of nature) will differ from those now in use, there is no knowledge in science that can oppose the history of the Virgin Birth or the Resurrection of Christ. Many scientists will of course continue to reject these miracles and Christianity with them; but their rejection will not be based on any scientific grounds; it will be entirely religious. And in matters of religion, where a knowledge of God is desired, experimentation cannot hold a dim candle to the sunburst of special revelation.