Theology of Creation and Natural Science

Pannenberg, Wolfhart

Boston Theological Institute

http://hdl.handle.net/2144/3916

Boston University
Theology of Creation and Natural Science

Wolfhart Pannenberg

The author advocates for the mediating role of philosophy in the dialogues between science and theology, in particular, the dialogues to clarify that the creation of biblical faith is the same entity as the cosmos of scientific study. He points out that most current scientific concepts, such as 'field,' have a prior history of usage in philosophical discourse, before being modified for usage in scientific contexts. This example, together with associated concepts, holds special promise for developing a contemporary theology of divine presence and action.

Introduction: philosophy's role in the dialogue between theology and the natural sciences

Half a century ago, Karl Barth wrote in the preface to his treatment of creation in his Church Dogmatics that there are "absolutely no scientific questions, objections or supports concerning what scripture and the Christian church understand to be God's work of creation."¹ Such a restriction of the theology of creation to a "retelling" of what the Bible tells us about this subject has its price, and the price to be paid here was that it could no longer be made clear just how far the biblical faith in creation means the same world that the human race now inhabits and that is described by modern science. The affirmation that the God of the Bible created the world degenerates into an empty formula, and that very biblical God becomes a powerless phantom if no longer understood as the one who originates and completes the world as it is given to our experience. For this reason, one should not agree with Barth, but rather with Karl Heim, in his attempt to relate theological affirmations about the creation and final consummation of the world to the respective conceptions of contemporary science. In the context of Anglican theology, a theological appropriation of Darwin's doctrine of evolution was developed as early as 1889, in the famous volume Lux Mundi, edited by Charles Gore, where the biblical conception of a history of salvation, culminating in the event of incarnation, was combined with the modern evolutionary perspective. This view has been effective into the present day, together with related ideas issuing from the work of Teilhard de Chardin.

In spite of all the difficulties of a theological interpretation of the natural world, Christian theology must not evade the task of interpreting the same world that is described by scientists to be, in fact, the creation of God. It is not enough simply to declare the world to be God's creation; such a theological affirmation has to be made plausible. This is not to suggest that theology should enter the discussions among scientists on their level of scientific description and theory. Theological interpretation of the world of nature in terms of creation cannot be presented as competing with physics or with any other natural science. Claims like that are excluded by the fact that theological arguments move on another methodological level than the hypotheses of natural science.
ral law in the sciences do, with their examination by experiment. From a theological perspective, the reality of the world presents itself in the form of a unique and irreversible historical process which is the result and expression of divine action. Certainly, in the process of this history, there emerge uniformities and structural types of sequences of natural events that correspond to the scientific concept of natural law. In the book of Genesis, after the story on the flood, it says: “As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night, shall not cease.” Such regularities of natural processes, however, are themselves considered as products of a unique divine decision, not as evidence of a timeless order of nature. The theological focus on the historically unique and on the irreversible process of history is also related to the fact that theology does not conceive of space and time in the sense of homogeneous sequences of spatial and temporal units, sequences that can be geometrically constructed, counted and measured. The mathematical form of representing and describing natural processes and the scientific concept of law belong together. The absence of mathematical description in theology, on the other hand, speaks not merely to the inability of theologians, but also to the peculiarity of the theological subject matter and its appropriate treatment.

The question arises, whether theology exemplifies a qualitative mode of describing reality, a mode that has been reduced so often in the history of modern science to a quantitative and, consequently, mathematical way of description. The ideas of the biblical reports on creation, about the sequence in the emergence of natural forms, have been indeed replaced in modern science by conceptions based on quantitative descriptions of processes regulated by natural law. Should this tendency be generally valid concerning the relationship between theology and science? Professor Frank Tipler, mathematical physicist at Tulane University, claims in his recent book, *The Physics of Immortality*, that theology finally has to be absorbed into physics. He tries to show that the history of the universe tends towards an omega point, characterized by peculiar properties of the traditional concept of God, and which functions not only as the result but also as the creative origin of the movement of the universe. It is, therefore, occasion for an identical repetition of all forms of intelligent life in the dimension of eternity. Tipler accounts for these claims by a proposed theory of scientific cosmology. The educated layman cannot help being impressed, but he or she is also impressed by the multitude of different models of scientific cosmology produced over recent decades. Cosmology, to all appearance, is a highly speculative discipline. But how is theology to be expected to relate to the possibility of those arguments?

I think that attempted transformations of theology into physics should be observed with curiosity on the one hand, but also with a certain degree of skepticism on the other. Curiosity and openness are appropriate, since even tentative constructions of this kind work against the widespread prejudice that theological and scientific conceptions are unrelated—a prejudice the effect of which is usually that theology seems to be
irrelevant concerning our understanding of the reality of the world we inhabit. Skepticism, however, is appropriate, because of the apparent incommensurability between the scientific conception of natural law and the theological approach to reality. Could, indeed, the conception of the world in terms of a unique and irreversible history of ever new and contingent events—including the idea of God providing their origin, and of Christian eschatological hope—be dissolved, without important remnant, into a description of the world process in terms of natural law?

Even at this point, I see no basis for theological anxieties. After all, there is the historical parallel of Aristotelian physics, the objects of which included the existence of God, though not a future resurrection of the dead. A proper conception of God as creative origin of the natural universe, to be sure, had to describe the creation of the world only, and by way of their examination and revision. In a reverse argument, Christian theology seeks to conceive of God as creator of the world on the basis of the revelation in Jesus Christ. But in doing this, theology is not in a position to explain in detail the processes in the natural world.

The aim of reaching an agreement between the theology of creation, on the one hand, and the scientific knowledge about the world of nature on the other, may be indicated, then, more properly by the term *consonance* between the two perspectives than by any sort of reduction of one of them to the other. Consonance presupposes the absence of contradiction. But it requires more than that. Contradictions can be absent simply because ideas stand unrelated to each other. Consonance, however, implies the image of some harmony and, consequently, of a positive relationship. How can such a consonance be claimed with respect to affirmations that belong to quite different methodological levels? In such a case, it is necessary to look for a third level to which the two others are related. In the case of the dialogue between science and theology, such a third level has, indeed, always existed. It is the level of philosophy.

Whenever scientists talk about the relevance of their findings and theoretical formulas in view of the understanding of reality, they move in the medium of philosophical reflection on procedures and results of their science, and not, in the strict sense, on the level of scientific argument. Reflections on the relationship between natural law and the contingency of events, between causality and freedom, matter and energy, the concepts of time and space or evolution, take place inevitably in a medium that is impregnated with philosophical language and its history. Furthermore, in most cases, key con-

---

**It is not enough simply to declare the world to be God's creation, but such a theological affirmation has to be made plausible. This is not to suggest that theology should enter the discussions among scientists on their level of scientific description and theory.**

by starting from God as origin of it, rather than dealing with God as an exponent of the cosmic process. In Christian theology, such a comprehensive knowledge of creation that would comprise all the different aspects of created reality is not expected before the final consummation of the world, in connection with the eschatological vision of the glorified ones. Until then, it seems likely that human knowledge about the world will develop under conditions of human finitude and, therefore, in the form of conjectures
cepts of science have philosophical origins and underwent modifications in order to fit the requirements of their use in science. Recent investigations into the history of scientific concepts, such as space, time, mass, force and field, demonstrated connections between the philosophical meaning of these concepts and their scientific use. Therefore, together with familiarity with the philosophical discussions on these subjects, a degree of knowledge in the history of science and especially about the history of scientific terminology is a presupposition of a productive dialogue between theology and the sciences.

Christian theology, on the other hand, during the entire course of its history, has

In most cases, key concepts of science have philosophical origins and underwent modifications in order to fit the requirements of their use in science... Therefore, a degree of knowledge in the history of science and especially about the history of scientific terminology is a presupposition of a productive dialogue between theology and the sciences.

developed in close connection with philosophy, though the relationship was not without its complications and strains. In contrast to this situation with the sciences, the relationship of theology to philosophy is not, in the first place, a matter of philosophical origins of a particular terminology. Rather, it is a task of integrating into theology and its explication of the relation of the God the creator and redeemer of the world and humanity, the philosophical language about God, the world and the place of human beings in it. Such integration of philosophical theses and conceptions into Christian theology always meant a more or less incisive transformation of the philosophical meaning, and occasional tensions between theology and philosophy in the course of history often arose from such attempts at appropriation of the philosophical view of the world, theology always dealt implicitly with the knowledge of nature given through science. However, the theological transformation of philosophical concepts of the world has to be evaluated just as philosophical hypotheses themselves are—namely, by their ability to do justice to scientific views and results.

Unfortunately, the task of the philosophy of nature and of its integrative reflection of scientific descriptions of nature is now neglected by most philosophers. The resulting gap is often filled by natural scientists, who, from the perspective of their respective discipline, offer generalized philosophical reflections and conjectures concerning the world at large. In this connection, however, the horizon of philosophical problems connected with the respective subject
matters and the history of those philosophical problems is often not appropriately considered. In these cases, it becomes the task of theologians to be in dialogue with natural scientists, to remind them of the philosophical problems involved in the subject matter of such dialogues, and to argue, within such a framework, for the specifically theological concerns.

The purpose of the rest of this paper is to exemplify what has been said so far in general terms concerning the dialogue between theology and science, in relation to a number of specific issues that appear to me as particularly important for such a dialogue, because they are important in the foundation of any interpretation of the world. In the first place, some reflections on the concept of law seem to be appropriate, and this in relation to the correlate of law in what is contingently given. The correlation of these two aspects in describing natural processes can be shown in the concept of natural law itself, but this also offers the opportunity for Christian theology to relate the specifically biblical understanding of reality to the description of nature by laws and formulas. A second consideration shall focus on the ideas of space and time, which are not only basic in science, but also important in theological affirmations on God’s relationship to the world. A third question will deal with the relationship of affirmations about God and divine activity to the motion of bodies, their development and decay. This is the classical theme of scientific descriptions of nature in the framework given by the ideas of space and time. A clarification of how the idea of God relates to space and time, therefore, may have consequences for an understanding of created existence and movement within space and time in their relationship to God. In this connection finally certain conclusions will arise in relation to the concept of evolution, but not only with respect to the evolution of organic life, but also to its setting in the history of the universe.

The concept of nature’s laws

In 1970, I wrote an article called “Contingency and Natural Law.” The topic had been under close discussion for a number of years in a circle of physicists and theologians in Heidelberg, Germany, and my ideas had undergone considerable modification as a result of these discussions. The subject was interesting from the theological perspective, because the Biblical reports on God’s action in history emphasize the element of the new and unexpected in divine actions, an emphasis that also characterizes the action of God in the creation of the world. The history of God’s action constitutes a unique and irreversible sequence of such contingent acts.

The concept of contingency that is used to characterize divine action in history has its philosophical origin in Aristotle. There it refers to what occurs by chance and to what is non-essential but possible, in contrast to what is necessary. In Aristotle, however, contingency was connected with the concept of matter; while medieval Christian Aristotelianism, especially since Duns Scotus, connected it with God’s freedom of will and action.

The concept of natural law, on the other hand, is logically related to conditions of its application that are contingent in relation to the formula of law as such, to initial conditions, and to marginal conditions of the processes described by a formula of law. Those initial and marginal conditions can them-

**The Boston Theological Institute**
selves result from processes that, in their turn, may be described by formulas of law. This does not change the basic fact, however, that each such description again presupposes contingent conditions of its application, with the effect that laws of nature may be conceived as descriptions of certain uniformities in natural processes that occur in what is, basically, contingently given. This implies the assumption that all events are contingent in the first place, even when the sequence of events shows similarities or uniform structures.

This consequence appeared to the natural scientists participating in the above-mentioned discussions at Heidelberg in the 1960s as rather problematic, although such an assumption is also suggested by the irreversibility of time. In the meantime, the contingency of events, in distinction from contingency in a merely logical sense, seems to be generally accepted, in view of the fact that many natural processes take place in chaotic forms. The contingency of events can be affirmed especially with relation to the indeterminacy of elementary events in quantum physics, provided that account is taken of the fact that the same events, on account of the uniformities in their sequence, also become objects of descriptions in terms of natural law. The possibility of such description, on the other hand, does not eliminate the fundamental contingency of events; rather, the regularities that can be observed in contingent sequences of events and that can be described by hypotheses are themselves contingent facts. But, while theological affirmations concerning the reality of created existence and the action of God in creation are primarily related to this aspect of contingency in natural processes, a scientific description of these natural processes is primarily concerned with the demonstration of regularities in those processes. However, the dependence on something contingently given is a precondition in the applicability of the concept of law itself.

To those involved in the Heidelberg discussions, a common basis for the dialogue between theology and nature seemed to emerge from the clarification of the correlation between natural law and contingency, a common basis beyond vague analogies and metaphors transferred from one discipline to the other. Nevertheless, the agreement on the correlation of natural law and contingency did not open access to a more concrete understanding of nature in theological perspective. In order to find the key to that access, a theological approach had to be developed to fundamental concepts of physics, such as energy or force or movement, as well as to their presupposition in ideas about space and time.

The concepts of space and time

In the early eighteenth century, a philosophical dispute concerning the concept of space took place in which theological implications played a decisive role. Even today, the correspondence between Leibniz and Samuel Clarke on Newton’s description of space as sensuum Dei in his Opticks holds more than merely historical interest. Certainly, Newton’s concept of absolute space has become obsolete since Einstein’s theory of relativity, but Newton’s thought about space and about God’s relation to space was very complex. It is worthwhile to take a closer look, in order to find out just how many of these ideas have become obsolete and how many have not. The conceptions of absolute direction in space and of absolute dimensions of objects in space are certainly no longer valid. But Newton’s and Clarke’s ideas about God’s relation to space contain another insight that is still important. Clarke defended Newton’s attribution of the concept of space to the idea of God against Leibniz’ objection that God, in such a case, would be divisible and composed of parts. Clarke’s main argument was that all division in space already presupposes space, because division can only take place within space. The space that is presupposed in all spatial division is infinite and undi-
vided; and it is this infinite space, not geometrical space, composed of parts, that is said to be identical with the divine immensity that enables God to be present to every creature at its own place. This argument was reproduced by Kant in his *Critique of Pure Reason* in 1781. According to Kant, the intuition of space as an infinite whole is presupposed in any conception of determinate spaces. Kant stopped exploring the theological implications of this idea, because he conceived of space as a merely subjective form of human intuition. As soon as one wonders about this subjectivism, however, as did Samuel Alexander in this century, then the theological implications of the priority of infinite and undivided space in relation to every determinate concept of spaces reemerges before one’s eyes. The point of this argument is that the infinite space that is presupposed in each division of space is necessarily undivided, in contrast to all geometrical conceptions of space.

Geometrical concepts of space are constructed on the basis of units of measurement: each geometrical unit of measurement is itself a unit of space, the concept of which presupposes the undivided whole of infinite space. That, however, is an infinity that is not to be conceived the same way as in geometry—by indefinitely repeated addition of units of measurement—but an infinity that is prior to all division and, therefore, also prior to all forms of measurement. The mistake that Spinoza made in his conception of space as an attribute of divine substance consists in the fact that he did not distinguish infinite geometrical space from the infinite undivided space of the divine immensity—which is presupposed in every geometry. If this distinction is considered, then no pantheistic consequences result from such a close connection between God and space, consequences that Leibniz seems to have suspected in Newton’s thought. The transition from the undivided space of divine immensity to the space of our experience that knows of parts and places can be considered, then, a consequence of the occurrence of finite objects and their relations to each other. In such a way one can also do justice to the relativity of spatial relations, with regard to the masses moving in space. Each type of space that consists of parts presupposes, as Kant emphasized, some undivided whole of space, because divisions and parts are only possible within some space that is already there and, therefore, prior to geometrical conceptions of space. The ideas about divine immensity and God’s omnipresence with every creature can be referred to this presupposition of undivided space, as Newton and Clarke did, without violating the divine transcendence over the world. This contrasts with Spinoza’s conceptualization, which Einstein felt sympathetic with, by the way, but which did not distinguish between the undivided infinite space of divine omnipresence and the space of geometry.

One of the most renowned historians of science in our century, Max Jammer, who investigated the history of a number of key concepts of physics, considers the pneuma concepts of classical antiquity as predecessors of the field concepts of modern physics.

The relationship between God’s eternity and time is largely analogous to that between God’s immensity and space. Kant’s treatment of time in his transcendental aesthetics corresponded closely to his treatment of the idea of space. In both cases, an infinite and undivided whole is considered the precondition of all division and of all concep-
tions of parts. With reference to time this means, "Different times are but parts of one and the same time." The undivided whole of time, or, rather, the whole of life that appears divided in the sequence of time, has been termed 'eternity' in the philosophical and theological tradition, ever since the treatise on time by Plotinus (3rd century C.E.) in his *Enneads*. Eternity, Plotinus says, is ultimate completion without parts or division of what occurs in divided form in the sequence of time. Boethius (d. 524 C.E.), who transmitted this definition to later generations, called eternity the simultaneous and complete presence of unlimited life. Eternity, then, is not atemporal or timeless in the sense that eternity and time were completely foreign to each other. Rather, according to Plotinus, time is constituted by eternity, because the transition from one temporal moment to the next is understandable only if we presuppose some presence of the whole that is separated in the sequence of temporal moments even within that separation—in other words, a presence of eternity in the course of time itself. The same idea is expressed in Kant's sentence: different times are just parts of one and the same time. However, Kant did not view time as constituted by the presence of eternity; but, in analogy to his conception of space, he thought time to be constituted on the subject of experience—more precisely, on the "standing and persisting" human ego, which, as persisting through time, according to Kant, forms the basis of the unity of all human experience. In view of the temporality of the ego itself, however, which we are aware of in our self-consciousness, Kant's attempt of accounting for the unity of time on the basis of the unity of the subject may seem to be considerably more problematic than Plotinus' foundation of time on the concept of eternity.

From a theological perspective of nature, then, God's eternity is present in time, more specifically, as origin and completion of time and of all temporal reality: origin in the sense of conditioning the continuity of what occurs separately in the sequence of time; completion, however, because all temporal reality, according to Plotinus, tends toward the future, in order to realize the wholeness of its being. It is through the future that eternity enters into time.

With respect to time as well as to space, the result is that these ideas cannot be successively defined on the basis of measurement by clocks or by spatial units of measurement. This may be a very important point in the dialogue between theology and science, because the scientific interest in time, as well as in spatial dimensions, is so closely connected with the possibility of measurement. The ideas of space and time, however, claim priority over those regarding measurement techniques. If this priority is neglected, contradictions will be the inevitable consequence. This is so, because all units of measurement are themselves already parts of time and space that have to be delimited within time and space from other such parts and, therefore, already presuppose time and space as such.

**Motion, force, and field**

Much more difficult than the question of the relationship of space and time to God's immensity and eternity is a clarification of God's relation to the forces working in the motions of nature. And yet, this is a decisive question for every biblically based doctrine of creation. Because at this point the possibility of God's action in creation is at stake, action not only in the beginning, but also in the entire process of the history of creation. It was at this point that, in the seventeenth and eighteenth century, the alienation between Christian theology and the scientific description of nature began. The starting point of this alienation was the mechanistic interpretation of natural processes. Descartes inaugurated it and it triumphed against Newton's intentions in the eighteenth century, when all natural force was reduced to bodies and to
their effects upon each other. This conception necessarily excluded God from the understanding of natural processes. If there was a point on which modern philosophical theology was in unanimous agreement with the earlier scholastic teaching about God, it was the affirmation that God cannot be a body. If all natural force resides in bodies, then any idea of an exercise of power on God’s part and, resultantly, any assumption of divine action in the course of nature were a priori excluded. Thus, God was respectfully urged out of the natural world.

When one duly considers the far-reaching consequences that the reduction of forces and motion to conceptions of bodies and masses had upon an atheistic picture of nature, one can also imagine the potential significance that Faraday’s introduction of field concepts into the description of natural processes would have for a theological interpretation. This statement does not mean that

Just as God’s omnipresence is co-present to all things without falling prey to the relativistic paradoxes of simultaneity—since God’s omnipresence is not dependent on the velocity of light—in a similar way, the field effects of divine omnipresence are not in need of being transmitted by waves.

the demonstration of the efficacy of electric and magnetic fields could immediately be used as a model to conceive of God’s efficacy in nature. But although field effects usually have their correlate in masses, Faraday had already entertained a vision of finally interpreting all bodily phenomena as manifestations of fields. A vision like that was close to Newton’s own vision that the forces of natural movement are, in the end, not material, as they do not issue from bodies. Rather, Newton conceived of God’s efficacy in the universe in analogy to how the human spirit moves the parts of the body.

An introduction of the field concept into theology is not, however, suggested primarily by the question of how to understand God’s activity in nature; but it is suggested first by internal problems in the doctrine of God. The designation of the divine being as “spirit” in the Gospel of John has been interpreted since Origen in the sense that God is nous, a bodiless spiritual intellect. But this Platonizing interpretation does not correspond to the original meaning of the biblical word pneuma, nor to the corresponding Hebrew word ruah. In both cases, the root meaning is moved air, breath, even wind. In Greek thought, the word pneuma, which is usually translated by “spirit,” was used in the sense of air in motion, as in breath or wind. This applies to the pre-Socratic philosophers, especially to Anaximenes, but also and particularly to the Stoics. According to Stoic doctrine, air, as the most subtle element, penetrates everything and holds the entire cosmos together through its particular “tension” (tònos). Early Christian theologians before the third century understood the New Testament identification of God as pneuma in similar ways. Now, one of the most renowned historians of science in our century, Max Jammer, who investigated the history of a number of key concepts of physics, considers the pneuma concepts of classical antiquity as predecessors of the field concepts of modern physics. Indeed, the intuitive idea of a field of power comes to paradigmatic expression in “a state of tension in the air.”

Modern field concepts, however, differ in an important aspect from the conceptions of pneuma in classical antiquity: field effects do not require a material medium like air or “ether”—though in the nineteenth cen-
tury, an ether was still assumed. Field effects can pervade space without such a medium. The materialism of the Stoic doctrine of pneuma as air, however, in the sense of a most subtle element that penetrates everything else, formed the main reason for Origen’s rejection of this conception in interpreting the Johannine characterization of God as spirit. The absurdities of a conception of God as body—as divisible and composed of parts—formed the negative reason for interpreting pneuma in terms of nous, and thus for conceiving of God in the image of a bodiless intellect. It is now evident that this conception does not correspond to the root meaning of pneuma. At this point, the field concept that replaces the pneuma doctrines of classical antiquity can become helpful in theology, because it allows the root meaning of pneuma to be distinguished from the concept of a material basis, ether, or medium. If the divine reality is conceived in terms of a field that manifests itself in the three "persons" of Father, Son, and Holy Spirit, then justice is done to Origen’s objections against any conception of God as body, while preserving the genuine meaning of pneuma.

Is such a theological use of the field concept a mere metaphor? At first glance, it may look like that. But one should not overlook that the fundamental requirement has been met for the application of the concept of field to theology, namely, the relationship to time and space—though in the sense of what has been said about the undivided infinite space of divine immensity, presupposed in all geometrical description of space, and about the undivided unity of time in God’s eternity as the condition of all temporal sequence. The interpretation of the pneumatic particularity of God’s being as field can be accounted for by relating it to the undivided wholeness of time and space prior to all geometrical description. By the same reason, it is distinguished from the field concepts of physics, but would function as a condition of those by analogy to what had to be said concerning space and time. The field of divine omnipotence, then, does not compete with concrete physical fields, but its activity works through all the natural forces without being exhausted by them. Just as God’s omnipresence is co-present to all things without falling prey to the relativistic paradoxes of simultaneity—since God’s omnipresence is not dependent on the velocity of light—in a similar way, the field effects of divine omnipresence are not in need of being transmitted by waves. The concept of waves, though important in the field notions of classical physics and especially as a basis for quantitative descriptions of field effects, may not be constitutive of the field concept as such, even though that concept would be empty without being related to time and space. If the concept of field in the strict sense can be conceived of without the idea of expanding through waves, then types of non-local, instantaneous communication between physical phenomena can also be conceived of in terms of field effects.

In the framework of this paper, it is not possible to apply what has been said thus far to a theological interpretation of the world of creatures, according to the sequence of their emergence in the history of the universe. A sketch of such an interpretation has been published in the context of my treatment of the doctrine of creation in the second volume of my Systematic Theology. In the dialogue between theology and science, however, it is even more important to reach agreement about the foundations of interpretations of such a type. This much may be said here: the key for perceiving the interconnection of eternity and time lies with the relevance of the future in understanding everything existing in time. It is through the future that eternity enters into time. Ever new contingent events proceed from the future, and, on the other hand, everything existing in time can expect from the future only the possible wholeness of its life. All things proceed towards the kingdom of God, whose sovereignty is already at work by entering from God’s future into the presence of all
creatures. From the point of view of the creatures, this relationship gets reversed: the future becomes the direction of extrapolations from the present and from whatever is known from the past. That is also true in the history of the universe. Mythical interpretation of the world looks at the order of the universe as founded in its beginning. Even the biblical report of creation, though no longer a myth in its literal form, exemplifies this way of looking at the world. The image of the foundation of all creaturely forms in a first week of seven days is in a certain tension, however, to the perspective otherwise characteristic for the biblical understanding of reality, the perspective of ever new actions of God in history toward the future completion of creation. The idea of an order of creation, complete in the beginning and not significantly changed in subsequent time, made agreement between theologians and scientists difficult for a long period, especially during the struggle about the doctrine of evolution. Much more important, however, in view of a possible consonance between a theology of creation and natural science, is that the evolution of life occurs within an irreversible process, where again and again contingencies occur.

It is similar with the history of the universe. With regard to the origin and evolution of life, as well as in the field of cosmology, the ideological barriers between the scientific description of the world and the interpretation of the same world in Christian theology broke down. One would be asking too much if scientific cosmology were expected to produce a demonstration of the existence of God right away, as Pope Pius XII believed at the time of the first enthusiasm about the present standard model of the expanding universe. It is sufficient that theological interpretation of the history of the universe in terms of creation can be developed in consonance with scientific data and procedures. To this end, it is necessary that the theological doctrine of creation remain able to learn, not in the sense of adapting itself apologetically to every change of the scientific description of nature, but in the sense that theology remains vigorous enough to keep developing, from its own resources, new interpretations that try to do justice to a changing state of experiential knowledge of our world, in order to integrate it into the Christian understanding of the cosmos as being created by the God of the Bible.

Works cited:


---

**Endnotes:**

1. Barth, III/1.
2. Gen. 8:22.
3. Clarke.
5. Ibid., A 31.
6. Plotinus, III.7.11.
8. Kant, A123.

Wolfhart Pannenberg is Professor of Systematic Theology on the Protestant Theological Faculty at the University of Munich, and one of the foremost theologians of the twentieth century. In addition to his three-volume Systematic Theology (Eerdmans, 1991-98), his other recent books include *Toward a Theology of Nature: Essays on Science and Faith* (Westminster/John Knox, 1993), *Metaphysics and the Idea of God* (Eerdmans, 1990), and *Christianity in a Secularized World* (Crossroads, 1989).

This talk was presented at the Massachusetts Institute of Technology in May 1994, as part of the Lecture Series of the Center for Faith and Science Exchange.