FAITH IN GOD THE CREATOR AND SCIENTIFIC COSMOLOGY

• **Wolfhart Pannenberg** •

"If the Christian belief that God created the world could no longer be related to the world of our experience . . . the one God of the Biblical faith himself would become an unreal entity."

Like the biblical account of creation in the first chapter of Genesis, the medieval Christian doctrine of creation assumed a temporal beginning of the world. Indeed it was a not uncommon belief that the world was no more than 6,000 years old. Already in late antiquity the Christian doctrine of a temporal beginning of the world found itself in opposition to philosophical conceptions such as those of Aristotle, who believed the cosmos to be limited in space, but without beginning or end in time. Given the authority of Aristotle in medieval Christian theology from the 13th century on, many Christian theologians, such as Thomas Aquinas, considered the assertion of a temporal beginning of the world to be a proposition that was to be held on faith but that was not susceptible of rational demonstration.

With modernity, the idea that the world was unlimited in space gradually gained an increasing number of followers. Giordano

Communio 28 (Fall 2001).

Bruno's affirmation of the infinity of the cosmos seemed to find increasing confirmation in the discoveries of astronomy and the consequent revisions of earlier conceptions of the spatial extension of the universe. In the 18th century, Kant's thesis that our planetary system was formed as a result of mechanical processes seemingly rendered belief in a temporal beginning of the universe even more unlikely. Not only did it become clear that the history of our own planetary system had begun much earlier than the 6,000 years that the older assumption believed had passed since the creation of the world, but the stars and the Milky Way turned out to be much older than our planetary system itself. The question of a beginning of the universe dissolved into a nebulous, uncertain expanse of indefinite time. A paradigm for the change of attitudes is the development of the thought of Immanuel Kant. In his *Critique of Pure Reason* (1781), Kant declared the impossibility of answering the question concerning a temporal beginning of the universe, even though he himself only a few years earlier had affirmed such a temporal beginning. Considering this change in attitude, it is understandable that in the 19th century Christian belief in creation became hard to defend in an intellectual climate increasingly shaped by natural science.

Even today it is important to remember the dominance of the seemingly self-evident idea of an infinite extension of the universe in space and time well into the early 20th century. Only when we remember this situation can we appreciate the profound change in the conception of the universe occasioned by the theories of Alexander Friedman (1922) and by Edwin Powell Hubble's research (1923) on the spectrum analysis of light emitted from more or less distant stars. The resulting change led to the now standard model of an expanding universe, whose star systems continuously spread farther and father apart. Tracing this movement of expansion back to its earlier phases, we arrive at a starting point of the process of cosmic expansion around 18 to 20 billion years ago. The consequence is that the universe as we know it once again appears to be limited in space and time. It is not surprising that Pope Pius XII, in a declaration of November 1951, referred to this revolution in scientific cosmology as a confirmation of Christian doctrine concerning the creation of the world. Since that time the Roman Catholic Church has become more cautious in drawing such conclusions. Thus Pope John Paul II, on the occasion of the tricentennial of Newton's *Principia*, explicitly cautioned against the uncritical and prematurely apologetic use of the standard model of

contemporary scientific cosmology with its assumption of a starting point of cosmic expansion, a "Big Bang" that supposedly occurred at a given time. Writing in 1981, Catholic philosopher Ernan McMullin warned that the "Big Bang" is not necessarily to be conceived as the beginning of time and of the universe as such. On the other hand, some have observed a convergence of Big Bang cosmology with the Christian doctrine of creation. The Benedictine S.L. Jaki relates how certain scientists desperately sought alternative accounts of cosmic development because they felt it to be impossible that scientific cosmology should converge with the teaching of the Church. One example of such a quest for alternatives was the idea that the history of the universe oscillated between phases of contraction and phases of expansion. In this account, the movement of expansion in which we find ourselves would be just one phase of this infinite, oscillating movement. But such hypotheses are sheer speculative fancy. All that is known empirically is that there has occurred a single expansion of the universe, which has disturbed some physicists precisely because of its proximity to the Christian conception of creation. Although the hypothesis of a "Big Bang" as the starting point of the expansion of the universe should not be considered a scientific proof that God created the world, nevertheless there now is a remarkable correspondence, a "consonance," to use Ernan McMullin's term. If the universe and cosmic time had their origin in the creative action of a creator God, then this universe would present itself to physics more or less in the form in which contemporary scientific cosmology in fact regards it when it posits a "Big Bang" as the starting point of the universe. In this respect, there is a "consonance" between the standard model of contemporary scientific cosmology and the doctrine of creation in Christian theology. McMullin's claim depends, however, on a number of presuppositions regarding the more precise definition of the concept of creation and of its relationship to the scientific description of the universe. These presuppositions will be dealt with in what follows.

1.

The theological affirmation that the world is the creation of the God of the Bible always took account of the reality of the world as it is given in human experience. This was the case already in the

Biblical narrative of the creation of the world. The priestly narrative of the first chapter of Genesis, for example, integrated elements of the Babylonian conception of the order of the world and of the process by which it took shape. An instance would be the idea of a heavenly ocean above the clouds, which explains the experience of rain, but whose waters are normally prevented by a vault or firmament from pouring down *en masse* upon the earth as happened in the great flood. Theological exposition of Christian belief in the creation of the world must make analogous use of our contemporary knowledge of the world. It is precisely in this way that theology follows the authority of the Bible. Obedience to this authority does not mean insisting on particular biblical assertions that have their origin in the appropriation of a conception of the world that is no longer valid. Let us offer just one example. The conception that God formed a firmament, a hemispherical solid vault, in order to keep the water of the heavenly ocean above the clouds from raining down upon the earth and thus to enable the water on earth to be gathered together so that the dry land might appear (Gen1:6 ff), makes perfect sense in its own way. It is also paradigmatic of how the scientific knowledge of a given time can be used by the theologian to express faith in God's creative activity. But it does not determine how we should conceive God's creative action today. Rather, theology should use the science of its own day, as did the Biblical account itself, in order to explain with its help the affirmation that the universe was created by the God of the Bible. Faith's claim that God created the world belongs, of course, to another level of thought and reflection than does the scientific description of the universe. But if the Christian belief that God created the world could no longer be related to the world of our experience or be expressed in the medium of our experiential knowledge of the world, then the affirmation of the creation of this world would become an empty formula. Consequently, the one God of the Biblical faith himself would become an unreal entity. Talk about God is tested by its relationship to the world. This is why Martin Luther, for example, in his explication of the first article of faith in the *Great Catechism* of 1529 argued for our faith in God the Father by affirming that "no other could have created heaven and earth." This is a rather strong claim. It asserts that there is no better explanation of the existence of the world as a whole and for all the creatures in it than the God of the Bible. But how is such an affirmation to be justified?

2.

Since the second century, Christian theology has justified its affirmation of the creation of the universe by the God of the Bible in critical discussion with philosophy. It could do this because the Greek philosophers, like the Jewish religion, maintained that the unity of the cosmos is founded upon the unity of its divine origin. The existence of this correspondence between the God of the Old Testament and the God of the philosophers was of fundamental importance for the spread of the Christian faith in the world of ancient culture. Concerning the more concrete conception, however, of how the one God is the origin of the cosmos and of its unity, there arose a dispute that could be faced only through argument. The Christian doctrine of creation is the specifically Christian way of conceiving how the existence of the cosmos and of its unity results from the activity of the one God. In this Christian conception, the *divine will* provides the final reason for the existence and unity of the world. This is expressed in the formula that the world is created out of nothing, *creatio ex nihilo*: God did not produce the world by forming it out of already existing material; rather, he called it into existence by the word of command that expressed his almighty will.

It was in dialogue with philosophy, then, that theologians developed their doctrine of creation. Scientific knowledge entered this discussion only indirectly, that is, only insofar as philosophical doctrines concerning the cosmos themselves resulted from a reflective recapitulation of contemporary knowledge of the facts and processes of nature. Appeal to particular scientific data based upon experience can become an argument in favor of one or the other conception of the world, but this dispute takes place on another level of reflection than that of experimental science and of the development of its methods and results. The concept of the world as such transcends empirical knowledge. One can see the pertinence of this when one considers the contemporary debate on the question of whether the expanding universe of the standard model of scientific cosmology is identical with the world at large, with the whole of the universe, or whether it relates a phase of history. Nevertheless, in this debate the fact that we have evidence only of a single process of expansion in the universe can be used as an argument for a creation of the world at some distant time in the past.

Immanuel Kant was of the opinion that the world as a whole cannot be an object of empirical knowledge. He considered the concept of the world as merely a guiding idea serving the continuous integration of our empirical knowledge. Were he alive today, Kant would have been surprised to see to what extent scientific cosmology has turned the world as a whole, the universe, into an object of empirical science. Nevertheless, the concept of world, and especially the question of the first origin of the world and of its unity, transcends what even contemporary science is able to ascertain. On the other hand, the concept of the world and the concept of the one God explain the unity of the world. By the same token, the gradual waning of philosophical theology in modernity explains philosophy's difficulties with the concept of the world and of its unity, difficulties evident in the development of Kant's thought. Modern scientific cosmology certainly turned the universe, as far as it is accessible to our human observation, into an object of theoretical description for science. But the question remains whether there might not exist other dimensions that are no more accessible to our observation at present than were distant clusters of stars in former times. It is only the unity of God the creator that renders the unity of the world he created inescapable.

3.

The affirmation that God is the creator of the world applies to the world as a whole in its entire spatial and temporal extension. It does not relate only to the beginning of the world. This is also true of the biblical creation account, despite the fact that it describes how "in the beginning" God created heaven and earth. In reality, this narrative intends to deal with the constitution of the universe signified by the phrase "heaven and earth." But the authors of this account shared with their age the mythical conception that the whole of the world and of its order was founded once and for all at the beginning. This conception admits of no fundamental changes later on. From a contemporary perspective, on the other hand, the universe appears as a process within which new forms of reality continually emerge. The evolution of life is merely the most obvious example. Consequently, the entire process of the universe (and not just its beginnings) must be the object of the affirmation of the creation of the world. In traditional theological terms: God's creative

action is to be understood in terms of *creatio continua*, a continuous creative activity.

In the language of the theological tradition, the term *creatio continua* meant originally the conservation of what God had created once and for all in the beginning. The conservation of what was once created is the continuation of the act of creation itself. There was thus a recognition of the close connection between creation and conservation, but not of the fact that in the course of the universe's history new forms continually emerge. The one-sided dependence of theologians upon the account of creation "in the beginning" in the first chapter of the Bible was responsible for their undervaluation of other biblical affirmations, especially the prophetic words about God's action in history that produces and indeed "creates" something quite new (Is 45:7f., 48:6f.). The continuous creative activity of God involves more than the conservation of what was created in the beginning. Each individual life is the immediate object of the creative action of God, and not only a case of conserving the species. The old distinction between creation and conservation considered all forms of created reality as having been constituted once for all "in the beginning," which, in the case of organisms, applied to the different species. The species were not considered to be open to change in the course of time, though new individuals of the same species were expected to come into existence again and again. This practically ensured that the theory of evolution would conflict with a conception of creation exclusively focused on creation in the beginning and therefore upon the invariable identity of the original order of nature. The controversies surrounding the theory of evolution, however, became the occasion for theology to reconsider the diversity of biblical affirmations concerning the creative activity of God and to overcome the limitation of its conception of the creation of the world to the beginnings. The idea of creation came to be connected instead with the historical activity of God that creatively produces novelty on a continuous basis from the beginning of the world on through its final completion.

4.

The idea of novelty that emerges in every new form of created reality, and, in principle, in every new event, is fundamental to our new conception of the creation of the world in terms of a process of continuous creation. Creative novelty, in philosophical terms the

contingency of each single event, is closely related to the openness of the future with regard to each present situation. It is from the openness of the future that new events occur in each situation.

It is in the indeterminism of quantum physics that we currently recognize this contingency of events. The contingency of individual events, however, does not exclude the applicability of law in the description of natural processes, but is actually presupposed in every description of natural processes in terms of laws. The laws of nature express uniformities in the sequence of events, uniformities that occur in the sequence of what is contingently given. The occurrence of uniformities presupposes that something new happens in the first place; such uniformities do not exclude the occurrence of novelty. Novelty, however, must not be described in terms of an infraction of the law of nature, because such an infraction would do away with the very concept of natural law. A law of nature that suffers exceptions is no law at all. On the other hand no description of natural processes in terms of law can claim to explain exhaustively the course of events.

Without the order of law there would be no enduring forms of created reality. This is not a completely new insight. The regular sequence of "seed time and harvest, cold and heat, summer and winter, day and night" and its importance for human life was already perceived in the Bible (Gen 8:22). This statement expresses an early form of knowledge of the laws of nature. The creation account in the first chapter of the Bible, however, describes the order of the created world in a different way, i.e., in terms of an order in the sequence of created forms, not in terms of the order of successive events. We now know that order in the succession of events, which is the object of scientific description in terms of the laws of nature, is the more fundamental form of order in creation. The order of law in the sequence of events determines the emergence and the disappearance of enduring forms of created reality; it also enables new forms of created reality to emerge. The order of repetitive patterns in the sequence of events is more comprehensive than the order governing the succession of enduring forms of created reality. It is also the more elastic form of order, because it is open to the future emergence of novelty. It enables the emergence of enduring forms—according to the contemporary understanding of the history of the universe: the emergence of atoms, of molecules, of stars and systems of stars at their particular time in the history of the universe, and, finally, of the special conditions required for the emergence of

organic life on earth and for the evolution of ever new organisms including even human beings.

Is the production of enduring forms, including those of organic and, finally, of human, life, to be understood as the *purpose* of the nomological order of the universe? This is the claim of the advocates of an "anthropic principle" at work in the history of the universe. The idea of purpose is especially connected with the stronger form of this claim, which asserts not only that important constants of the cosmic process are structured in such a way that in their totality they in fact enable organic life—and, finally, intelligent life—to emerge, but also that the fine tuning of these constants actually makes the later emergence of life necessary, so that the universe seems to be designed from its beginnings to produce this life. From its beginnings, then, the order of the universe aims at the production of organic life. Such a judgement recommends itself because of the coincidence of many factors that, while individually contingent, converge so as to bring about together the complex conditions needed for the emergence of life. This convergence suggests itself, however, only when we look back upon the history of the universe after the actual emergence of organic life. If seen from the point of view of the previous phases of the history of the universe, the emergence of life appears to be as contingent and unpredictable as is the convergence of the many factors whose concurrence is the precondition for this emergence in the first place. But how is this state of affairs to be evaluated from the perspective of theology?

5.

We noted above that the affirmation of the creation of the universe applies to the whole spatial and temporal extension of the universe. From the point of view of philosophical and theological reflection, then, the creation of organic life and, among organisms, of the human being, can certainly appear as the purpose of the entire history of the universe. However, this affirmation, from a theological point of view, raises two problems: first, there is the danger of an excessively anthropomorphic conception of the relationship of the creator to his creation; secondly, a conception that is exclusively

focused on the creation of the human being as the purpose of the universe overlooks all too easily that each particular creature is a product of the creative love of God and, therefore, exists primarily for itself, and not for the sake of other entities, though it is also true that it secondarily serves the existence of others.

The danger of excessive anthropomorphism in the description of the relationship between creator and creature in terms of a development of the universe that aims at the emergence of human beings is rooted in the fact that the purpose to be achieved by an action is always in the future, a future that is different from the present of the acting subject and is to be brought about by the selection and use of appropriate means. If God's action with regard to his creation is imagined in such a way, God is conceived as if standing at the beginning of the process of the universe and looking ahead to its future while choosing aims and means to execute through his creative action. Such a conception, however, is not consonant with the eternity of God. From the point of view of eternity, the past, the present, and the future that in our experience are separate are not separate at all, but simultaneous. The conception of a God who stands at the beginning of time and who looks ahead to a future different from his present situation supposes a human situation of action that is not appropriate to the eternity of God. Therefore, such a conception must be considered excessively anthropomorphic.

This critical consideration does not exclude the possibility that the different factors in the process of the universe may be connected in such a way that from the point of view of the final result they seem to aim at that result. Indeed, all the parts are conditioned by the whole. At this point, however, the second consideration that was mentioned before becomes important. Every creaturely reality possesses its own dignity in being itself a purpose of God's creative action and not merely a means for something else. It does not follow that creatures cannot also serve as means for the existence of others. Conversely, the immediacy of God's creative action to individual creatures is not impeded by the fact that each particular creature emerges through the mediation of others. This is already the case in the biblical creation account. Gen 1:11 says that God called upon the earth to bring forth vegetation. According to Gen 1:24, even the animals are produced by the earth in compliance with the creator's command. Obviously, the authors of this account did not posit an either/or between God's doing something through

his creative action and his achieving the same result by using the service of other creatures. If theologians had always paid due attention to this fact, much of the alarm over the doctrine of evolution, as well as over the possibility of the emergence of organic life from inorganic matter, would have been unnecessary. It is quite possible to conceive of the existence of a creature as coming about by the mediating service of other created factors and yet to insist upon its immediate origin from God's creative action. This corresponds to the interaction between contingency and law that we discussed earlier.

6.

In connection with the category of purpose, we already touched upon the relationship of the creator to his creation. The early Greek philosophers, in their criticism of the mythical conceptions of the gods and their relationship to the cosmos, insisted on the necessity of understanding the divinity in such a way as to explain plausibly the origin of the world as we know it and to express the peculiar nature of the divinity rather than, for example, contradictory opinions about the gods. Thus, for instance, the unity of God is to be considered the precondition for the unity of the cosmos.

Patristic and medieval Christian theology conceived of the one God in terms of the most perfect reason or intellect, in correspondence with the philosophical schools of the Platonists and Aristotelians. This concept of God continued to be influential in modern philosophical theology, and Isaac Newton still believed that it is finally the divine intellect that moves the entire process of the world in the same way that our rational soul moves the organs of our body. In our day, the conception of a bodiless reason or intellect is not easy to entertain plausibly. At the same time, the traditional idea of God conceived along such lines appears to be anthropomorphic, especially in connection with representations of an interaction of intellect and will in a God who conceives purposes and realizes them. This conception of a personal God became the main target of atheist criticism, which described this image of God as mirroring the human condition. If contemporary theology intends to maintain the conception of a personal God, or even of three trinitarian persons, then it must find quite different ways of explaining the concept of the person.

It is clear today that the idea of God as the highest reason or intellect guiding the cosmic process does not correspond to the biblical conception of God as spirit. The biblical word for "spirit," in its root meaning, denotes "air in movement," breath, or also wind. Therefore, the Gospel of John says of the spirit that it "blows where it wills, and you hear the sound of it, but you do not know whence it comes or whither it goes" (Jn 3:8). This is not just an image to illustrate the activity of the spirit. It is less metaphorical than the conception of the divine spirit as a rational will deciding and pursuing purposes. In the Bible, the root meaning of spirit is "breath" or "wind." This biblical conception of spirit has its closest classical parallel, not in the Platonic idea of divine intellect, but in the Stoic doctrine of spirit (*pneuma*) as a movement of air that permeates everything and by its tension contains the entire cosmos. Since this Stoic idea of spirit was (as Max Jammer has shown) historically the predecessor of the notion of field in modern physics, we may conclude that the biblical conception of God as spirit is closer to this concept than to the conception of a bodiless highest intellect or reason.

This does not mean, of course, that the divine spirit, through whom God is present in his creatures and invigorates them, should be identified with one of the fields known to contemporary physicists. The effects of the divine spirit do not spread like waves through space-time. Does this mean, then, that the description of the divine spirit in terms of field is a mere metaphor? I do not think so; the description of spirit in terms of field can be shown to be closely related to the conceptions of space and time.

Newton already conceived of space as the medium of the presence of the divine intellect in the place of his creatures. Because of this assertion, Newton was accused of pantheism by Leibniz, but Newton's friend Samuel Clarke, countering Leibniz, showed that the space of divine immensity is not identical with the geometrical space that consists of parts, but with the infinite and undivided space that necessarily precedes all spatial partition and composition. Decades later, this argument was repeated by Kant, in his *Critique of Pure Reason*, where he called the intuition of the infinite and undivided whole of space the presupposition of all conceptions of partial spaces, a presupposition also underlying all conceptions of geometrical spaces that consist of parts. A similar argument applies to time. The undivided whole of time is presupposed in every idea of partial times and their sequence. This undivided whole of time, however, is

nothing other than eternity, an eternity that is not a-temporal, but simultaneous with all parts of time.

If divine immensity and eternity, then, are considered as conditions of every conception of geometrical space consisting of parts and of the succession of events in time, hence, as the origin and basis of our created space-time, then the description of the divine spirit as a field my be more than a mere metaphor. The concepts of space and time are sufficient for defining the concept of field. In any case, this corresponds to Einstein's idea that space-time is a field that comprises all phenomena in the universe. Einstein, however, envisioned a geometrical construction of space-time, though in the sense of a non-Euclidian geometry of curved spaces. He did not distinguish the infinite, undivided space and infinite, undivided time of divine eternity from the geometrical conception of space-time. This may be due to the fact that Einstein was an avowed follower of the philosophy of Spinoza, who also identified geometrical space with space as such, and considered this geometrical space to be an attribute of God. If, however, the undivided, infinite space of divine immensity and God's eternity must be understood as the origin of our cosmic space-time, which has its concrete form in the expanding movement of the universe, then we may ask how we are to conceive the production of this created reality by the divine immensity and eternity. This is a huge question that obviously cannot be answered in a single sentence. I must therefore limit myself to a mere hint by way of conclusion: it may be the creation of finite entities that first occasions succession in time and division in space. Conversely, succession in time and coordinated simultaneity in space are the fundamental conditions for the independent existence of any finite reality. The connection with eternity seems to be provided for temporal existents through the future, which continually gives rise to new events, but also holds out to every temporal existent the promise of a possible wholeness, as the greatest ancient theorist of time, Plotinus, tells us. □

WOLFHART PANNENBERG *is professor of systematic theology at the University of Munich.*