

Wolfhart Pannenberg—A Dialogue

GOD AS SPIRIT—AND NATURAL SCIENCE

by *Wolfhart Pannenberg*

Abstract. The biblical sentence “God is Spirit” (John 4:24) occasioned the development of the Christian doctrine about God as Spirit. But since patristic times “spirit” was interpreted in the sense of *Nus*, which rather means “intellect.” The biblical concept of spirit (*pneuma*), however, has its root meaning in referring to “air in movement,” as in breath or storm. The similar concept of *pneuma* in Stoic philosophy has become the “immediate precursor” (Max Jammer) of the field concept in modern physics, so that the conclusion is suggested that God is spirit as something like a field of force rather than as intellect. This essay argues for such a conception by relating the divine eternity and immensity to the concepts of space and time, the basic requirements of any physical field. God’s eternity and immensity are interpreted in terms of undivided infinite space (and time) which is presupposed in all concepts of parts of space or time (or space-time), therefore in all mathematical and physical measurement.

Keywords: eternity; field; field of force; God as spirit; immensity; modern physics; spirit.

In the dialogue between theologians and scientists, it is important to be aware of the fact that such dialogue does not move on the level of scientific or religious discourse but rather on the level of philosophical reflection on both scientific terms and theories and religious doctrines. Usually, when scientists talk about the general meaning and significance of their equations and theories, they already move on some level of philosophical reflection. I say “some level,” because such talk does not always exhibit the same

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degree of philosophically instructed reflection. The philosophical sophistication may be rather poor; still the scientist, the authority of his or her scientific competence notwithstanding, argues on the level of philosophical reflection when addressing the public on the broader significance of his or her work in science.

In the dialogue between science and theology, the fact that both sides meet on a level of philosophical reflection is of particular importance. Such a discussion requires a rather high level of philosophical sophistication, because the traditional doctrine of God is related to many philosophical issues that imply some relation to the language of science. This is the case in the notions of causality, law, and contingency. These notions are indispensable in any discussion about God's action in the world. Similarly, the presence of the transcendent God in the world he created has to be considered in connection with the concepts of space and time. Otherwise, talk of God's omnipresence would be empty. Similarly, the clarification of the concept of divine eternity requires a discussion on how it is related to temporal events.

The contingency of events and the relationship of the concept of contingency to that of natural law was the focus of a debate in a German group of physicists, philosophers, and theologians in the 1960s. My article on "Contingency and Natural Law," written for these discussions, was first published in 1970 and appeared in English translation in 1993 in a book edited by Ted Peters (*Toward a Theology of Nature: Essays on Science and Faith*). During those conversations in Germany, the issue of contingency was considered to be fundamental in both disciplines, science and theology, though in different ways. In science, the concept of laws of nature presupposes initial conditions and boundary conditions for the application of a particular law in the description of natural processes, and these preconditions are contingent relative to the formula of law. Although these initial and boundary conditions may be explained by another law, this again presupposes contingent conditions for its application. This fact could be understood on the assumption that basically all events occur contingently, but with some degree of uniformity in their sequence, a uniformity that lends itself to a description by hypotheses of natural law.

In Christian theology, the contingency of events characterizes the logical form of God's actions in history. Contrary to its Aristotelian origin, the theological concept of contingency emerging in the Middle Ages corresponds to the freedom of God in his creative action in history. This concept of contingency requires, of course, more than the nomological contingency of initial and boundary conditions relative to a given formula of natural law. It indicates the contingent occurrence of actual events, be it in particular cases (local contingency) or in all events (global contingency). At the time of the first publication of my article, contingency of actual events seemed to be suggested primarily by the unpredictability of indi-

vidual events in quantum physics, but could be doubted with regard to macrophysical processes as well as with regard to the regularities of quantum mechanics. In 1988, Robert Russell expressed such doubts in a critical article published in *Zygon* (Russell 1988). Since that time, however, the development of chaos theory seems to have shown that “local” contingency of actual events does indeed occur even on the level of macrophysical processes, without precluding the description of such processes by natural laws. This supports, in my judgment, the assumption that basically all natural events happen contingently, notwithstanding the uniformities that ordinarily occur in their sequence, and permit a description by formulas of natural law.

In my judgment, the basic contingency of each and every event in the world of creation, including the occurrence of order and uniform pattern in the sequence of events, is much more fundamental concerning the task of a theological interpretation of the natural world in terms of creation than the idea of purpose is. In connection with the discussion of an “anthropic principle” guiding the development of the universe from the beginning to the emergence of life and of intelligent life, the old idea of a teleological determination of physical processes (a determination aiming at the end of the process) has acquired new plausibility in the eyes of many. The belief in a teleological orientation of the development of the universe, as founded in its beginnings, seems to lend itself more easily to the assumption of a divine purpose governing that development. But for two reasons I hesitate to follow these suggestions, one of these reasons being scientific and one theological. The assumption of an intrinsically teleological direction of the development of the universe requires acceptance of not only the “weak” anthropic principle, according to which the later emergence of life depends in fact upon the fine tuning of the natural constants in the early phases of the universe, but also of the “strong” anthropic principle, which claims that the early condition of the universe renders the later emergence of life and of intelligence inevitable. This strong anthropic principle does not seem exactly empirically warranted, and it is in conflict with the role of contingencies in the history of the universe.¹ On the theological side, it is certainly possible to speak of a “purpose” of God in creating the universe with reference to the creation of human beings and to their final redemption in the eschatological future. It is possible, in theology, to talk that way, because God’s act of creation relates to the universe as a whole, including its later developments. Thus the beginnings and intermediate stages can be contemplated in the light of the outcome toward which they lead. But still, the language of “purpose” easily suggests a false anthropomorphism in our language about God, because it suggests a position of the creator in the beginning of the universe as if looking ahead to a distant future and selecting means for achieving some purpose. Such a picture ignores the eternal presence of God, to whom the future is not

distant and who, indeed, precisely in his capacity as the final future of everything is the source of ever-new contingent events. The language of a divine “purpose” realized in the development of the universe is legitimate only with regard to the fact that the divine act of creation relates to the universe as a whole and therefore includes its final future as well as its beginning. Indeed, the character of the universe as a whole is “determined” by that final future, and the power of the future completing the history of the universe can also be understood as the source of contingent events that spring from that future during the entire course of the universe’s history.

But how is the creator to be understood as active in the particularities of his creation? This question is not yet answered by the assertion of the contingency of all events and of all more or less enduring forms of created existence. How can the creator be understood with the apostle Paul as *dynamis*, force, that is at work in his creation (Romans 1:20)? And how is God’s divine power related to the natural “forces” that are effective in the movements of his creatures? As these movements are taking place in space and time, God’s relationship to space and time has to be clarified in such a way that his powerful presence with his creatures and their movements in space and time becomes intelligible.

In Isaac Newton’s doctrine of space, absolute space was conceived as a medium of God’s presence at the place of the finite existence of his creatures. God was understood as mind, who by his will is present and active in the material universe like our soul is present in all the parts of our body. The biblical basis of this conception was John 4:24: “God is spirit.” For many centuries, since the work of Origen in the third century, this sentence had been interpreted in the sense that God is mind, *Nus*, and Newton presupposed that tradition. But in the Bible spirit does not mean “mind.” The Greek word *pneuma* as well as the corresponding Hebrew word *ruah* rather mean wind, storm, or breath. Thus, in the biblical creation story, when it is said that in the beginning God’s “spirit” was “moving” over the primeval waters, the image is that of a storm agitating those waters. This spirit is the source of all movement. It is also the source of life in the animals and in human beings. In Genesis 2:7 it is said that God breathes his spirit into the nostrils of the figure of Adam that he had formed from clay, and in Ecclesiastes 12:7 we learn that in the moment of death “the spirit returns to God who gave it.” In Psalm 31:5 we read: “Into thy hands [God] I commit my spirit,” and according to Luke 23:46 Jesus used these words on his cross immediately before he died: “Father, into thy hands I commit my spirit.” Thus, the life we received from the breath of God is within us until our last breath. The spirit as divine wind or breath is very important in the biblical understanding of life and movement. But it seems a world apart from modern science and from its ways of accounting for the movements of bodies and especially for life.

So I thought when I happened to read an article by a renowned historian of scientific terminology, Max Jammer (1972), on the concept of *field*. Jammer, who has published important books on the concepts of space, of mass, and of force, characterizes in his article the modern scientific concept of field as a further development of the ancient Stoic doctrine of *pneuma*. Jammer even called the Stoic *pneuma* the “direct precursor” of the modern field theories. Now the Stoic concept of *pneuma* was in many ways similar to the meaning of the biblical word *pneuma* or, in Hebrew, *ruah*. The basic intuition was in both cases that of air in movement, full of force, which, according to the Stoics, is a result of the “tension” the air contains. The important difference, of course, is that in Stoic philosophy the *pneuma* was a cosmic principle, pervading the cosmos and keeping all its parts together by its tension (*tonos*), while in the biblical conception the divine *pneuma* was conceived as transcending the world of creatures though working in it creatively. Otherwise, however, the biblical and the Stoic conceptions were similar. This similarity, together with the observation that the Stoic concept of *pneuma* was the “direct precursor,” as Jammer put it, of the modern scientific field concept, suggested the conclusion that the meaning of the statement in John 4:24 that “God is spirit” is considerably closer to the field concept of modern physics than to the Platonic idea of a divine mind or *Nus*, which Origen identified with the biblical concept of God as *pneuma*, because he abhorred the materialistic interpretation of *pneuma* by the Stoic philosophers. Origen made fun of the bodily nature of the Stoic *pneuma* by saying that bodies can be divided and put together again, which contradicts the basic requirements of any concept of God as first principle, because all division and composition is in need of a further cause doing the job of the dividing and composing. This argument secured the acceptance of Origen’s identification of the divine spirit with *Nus* for many centuries, though that identification was not correct as a translation of the biblical word *pneuma*. But precisely at this point modern field theories offer the theologian a conceptual help, because the spreading of field effects is no longer considered to be dependent on a material medium like ether but requires only space or, in the General Theory of Relativity, space-time. Thus, the biblical conception of God as *pneuma* can be defended against the suspicion of involving some bodily conception of God without identifying *spirit* with *Nus* or mind.

Against this, John Polkinghorne recently argued that “this notion of a field’s immateriality is not correct,” since notions like energy and momentum “function in the same way for the field as they do for particles of matter.”² Now the concept of matter is not—like “mass” is—a strictly physical concept, but a philosophical one, and there seem to be different opinions among physicists as to the impact of modern physics on the formerly “materialistic” character of physics. The German theoretical physicist Georg Süßmann (1980, 18–21), for example, argued that there has

been a change in that respect so that modern physics should no longer be called materialistic. Albert Einstein ([1913] 1958, 108f.) himself distinguished the “field of gravitation” from “matter.” My own point was that the fields of modern physics are not bodies in the way the Stoic doctrine of *pneuma* considered *pneuma* a bodily reality, occasioning thereby Origen’s objection to its application in the doctrine of God. Like the ideas of dynamism in modern philosophies of nature since Leibniz and Boscovich (see Jammer 1957, 158–87), the introduction of field concepts into modern physics since Faraday involved the idea of a priority of the field with regard to bodily particles. Thus Max Jammer said: “For a consistent field theory the concept of a ‘particle’ is extraneous. It seemed therefore very tempting to interpret mass points as singularities of the potentials of the field equations.”³

Another objection to my application of the field concept in the interpretation of the biblical language about God as spirit has been that it does not use the word *field* with the precise meaning it has in physics (Polkinghorne 1999, 154; Wicken 1988, 48). That is certainly correct. I do not contend that the divine spirit is sending forth waves that can be counted and measured. But neither is the word *field* as applied to God, who is spirit, just a vague analogy or a poetic expression. It is certainly a metaphor, like the field concept of physics itself is, because the primary meaning of *field* is the field of the farmer, where wheat or corn is raised. The origin of field language in the sciences, then, is certainly metaphorical.⁴ But it is not a vague analogy, either in science or in theology. It has a clear conceptual meaning in its connection with the concepts of space and time. If that were not the case, the use of the field concept would indeed become vague. It is because of its connection with the concepts of space and time that a sufficiently precise theological use of the field concept is possible that is clearly distinct from its use in physics and yet related to it. The reason is that space is the minimal requirement for any notion of field, while it may dispense with the idea of force as in General Relativity. Since in physics the notion of field is connected with that of energy, in addition to space the dimension of time is needed, or space-time in the case of General Relativity. In theological use, talk of God the spirit in terms of field also implies a connection with the concepts of space and time, though different from their use in physics. This affirmation, of course, needs some explanatory remarks, and so I offer some considerations on space and time before returning to the field concept.

The question of how the eternal God is related to space and time has a long history. The idea of God’s omnipresence always required some such connection. Although in his eternity God transcends time, still he is present and becomes present in the temporal reality of his creatures. In the early eighteenth century the function of space in God’s omnipresence with his creatures became the object of a famous controversy between Leibniz and

Samuel Clarke, who, on behalf of his friend Newton, defended Newton's occasional reference to space as *sensorium Dei* (sensory) against the suspicion of pantheistic implications. Leibniz had used the argument of Origen against the Stoics that if space were an attribute of God, God had to be composed of parts and would be divisible into parts. Clarke's rejoinder was that geometrical space that consists of parts presupposes some undivided and infinite space, because every act of composition or division already presupposes space within which the dividing or composing takes place. This infinite and undivided space is, according to Clarke, identical with the divine immensity. It is presupposed in our conceiving of parts of space and in any composition or division, hence, that undivided infinite space is also prior to measurement, which presupposes and applies standard units that are already parts of space. All geometrical conceptions of space, then, because they operate with units of measurement, already presuppose the infinite whole of undivided space. According to Clarke, that infinite and undivided space is the divine immensity, the field of God's omnipresence, in distinction from the geometrical space, where we have parts, composition, and division and which is also the space of the physicist and of his measurements. If one identifies the space of geometrical measurement with the divine immensity, as Spinoza did, one ends up with pantheism, but Clarke (and Newton himself, as Clarke believed) clearly observed the distinction between God and the infinite and undivided space of his immensity, on the one hand, and the geometrical space of the physicist's descriptions of the world of nature on the other.

At the end of the eighteenth century, Immanuel Kant, in his *Critique of Pure Reason* (1781), repeated the argument of Clarke that every conception of partial spaces or space units presupposes the intuition of one infinite and undivided space, within which we may conceive of circumscribed space units. The same with time: the perception of any section of time presupposes an awareness of time as an infinite whole. In the traditional philosophy of time such simultaneous presence of the whole of time was called eternity. Plotinus said (Enn III, 7) that the perception of the present moment and of temporal continuity in proceeding to the next moment is possible only on the basis of some awareness of eternity, which is to say the simultaneous presence of the whole of life. Kant, in his later period, no longer paid attention to the theological implications of our awareness of space and time, because he was concerned with avoiding pantheistic affinities,⁵ but he kept insisting that in both cases awareness of the infinite whole of space and time is presupposed in the perception of any part of time or space.

If all measurement in space and time presupposes the undivided, infinite space of God's immensity and the infinite whole of his eternity, then the definition of the concepts of space and time cannot be the exclusive prerogative of the physicist and the mathematician. Their special competence

is the measurement of space and time, but in exercising that competence the scientists move within an intuitively present conception of space and time that is neither constituted nor exhausted by their measurements. The question of the nature of space and time, therefore, transcends physics and geometry. This is also the reason why changes in the scientific description of time and space like the space-time concept of the General Theory of Relativity contribute less than one might think to the philosophical question of the nature of space and time.⁶ The contribution of physicists concerns the measurement of movements in space and time, which is important enough, but contrary to Spinoza and Einstein the nature of space and time transcends any geometrical model of their description, because the infinite and undivided whole of space and time—or of space-time, for that matter—precedes all measurement. God's immensity and eternity are prior to the finite reality of the world of creation that is the object of geometrical construction and of physical measurement. The infinite space of God's immensity, however, and the infinite whole of simultaneous presence that is God's eternity are implicated and presupposed in our human conceptions and in our measurements of space and time. Thus God's eternity is different from the time of his creatures, but constitutive of it, and his immensity is constitutive of the space of his creatures. This comes to expression in that the infinite whole of space and time precedes any conception of temporal and spatial sections or units and all geometrical description.

At this point, I return to the field concept and to the significance of its application to the doctrine of God as spirit. I said before that space and time, or rather space-time, are the only basic requirements of the field concept in the General Theory of Relativity. Here, the universe is described as a single field, while in principle the states of bodily matter (or particles) are considered as singularities of the cosmic field. If all geometrical descriptions of time and space, however, are dependent on the prior conception of space and time as an infinite and undivided whole, the immensity and eternity of God, then this infinite and undivided whole may also be described as infinite field, the field of God's spirit that constitutes and penetrates all finite fields that are investigated and described by physicists, even the space-time of General Relativity. This relationship makes intelligible how the divine Spirit works in creation through the created reality of natural fields and forces. The interpretation of the concept of God as spirit in terms of the field concept, then, functions as a key to obtaining some understanding of God's fundamental relationship to the world of nature.

Such a theological use of the field concept does not and need not rely on any specific field theory the physicists have produced.⁷ Nevertheless, it is related to the field language of physics, because it claims to deal with the preconditions of any physical field that occurs in the spatial and temporal setting of the universe. John Polkinghorne, in his criticism of my theo-

logical use of field language, did not pay any attention to my argument concerning the connection of the field concept with the concepts of space and time. Otherwise he would have seen that the field concept is used not in a vague way but with some “precise meaning,” as he demands (Polkinghorne 1999, 154), though different from the field theories of the physicists. When I referred to Faraday, it was more the metaphysical vision behind his scientific work, the priority of his field of force regarding bodily entities,⁸ that I was concerned with, though I am aware that the concept of force tended to be eliminated later on, especially in the field theories of Einstein.⁹ When I called upon Einstein’s field concept, I was primarily interested in its reduction to space-time, but I did not adopt the idea that the nature of space and time is determined by measurement and expressed in the geometrical scheme of space-time. I rather suspect this position is related to Einstein’s professed Spinozism, and I think that theology has to insist on the transcendent reality of God even with regard to his immensity and omnipresence. My theological considerations on the divine spirit as field aim precisely at the distinction as well as interconnection between the reality of God and the world of nature concerning its constitution in time and space. The space and time of the creatures are composed of parts and are divisible into parts, which God is not, and they are objects of geometrical description and physical measurement, which God isn’t either. It seems that the transition from God’s immensity and eternity to the space and time of the creatures occurs when finite events and entities are granted an existence of their own within the undivided space of God’s omnipresence and in the presence of his eternity. The finite existence of creatures entails relationships that are described in schemes of measurable space and time. The space-time concept of General Relativity is of philosophical significance here in expressing the dependence of the metrical structure of space and time on the presence of finite reality, of “masses” or clusters of energy. It is possible to conceive of this dependence reversely by reducing the occurrence of masses completely to the concept of space-time (Jammer 1961, final chapter). But the relevance of these attempts seems to be limited by the irreducibility of events in quantum physics. This is related to the emphasis on contingency discussed earlier in this presentation.

In his critique of my theological use of the field concept, John Polkinghorne (1999, 155) denied “that fields as such have any intrinsic relationship to contingency.” That depends on how the concept of field is formed. Polkinghorne’s judgment is certainly correct with regard to classical field theories in physics, but he himself allows for an exception in the case of quantum fields. The field concept in general should make room for contingency, however, if time is to be taken seriously as a source of novelty that characterizes each new event because of the irreversibility of time. Whether such an accommodation of the field concept in order to describe the openness of natural processes is possible in physics along the lines, for

example, suggested by Ilya Prigogine (Prigogine and Stengers 1980) is not for the theologian to decide. But it is certainly appropriate with regard to the work of the divine spirit who is the creative origin of life in all its forms. Life is characterized by self-transcending openness in the case of the individual organism as well as in the case of the evolution of living forms. The ecstatic openness of life to its environment and to its future corresponds to the creative activity of the divine spirit, and if the divine spirit works as a dynamic field, then here we have a field concept that is connected with contingency regarding the efficacy of the field.¹⁰ It also produces the phenomena described by chaos theory and is related to “the spontaneous generation of large-scale orderly structures in complex systems” as well as to the “effects of wholes over parts” (Polkinghorne 1999, 154; cf. Gregersen 2000) that Polkinghorne and Arthur Peacocke call top-down causality. When we want to describe the emergence of these phenomena in the language of a Christian theology of creation, we have to speak of the activity of the creative spirit of God in cooperation with the divine Logos.

In the Bible, references to the divine *pneuma* occur in different ways. One way is the identification of the essence of God as *pneuma*, as it occurs in John 4:24. More often, the *pneuma* is seen as the power through which God is active. Furthermore, the *pneuma* is mentioned as a gift of God in the hearts of believers or finally as a hypostatic reality of its own, glorifying the Son and the Father. When it is said that “God is *pneuma*,” however, it must be added that God is not only *pneuma*. He is also a personal reality, more precisely a threefold personal reality. The divine spirit exists in personal centers, in the Father, the Son, and the hypostasis of the Holy Spirit. Perhaps we may say that the field of the divine spirit has three singularities, Father, Son, and Holy Spirit, and it exists only in these three singularities, though radiating through all the world of nature, their creation. In all of his creation, God the Father is working through his Word and through his lifegiving Spirit.¹¹ Both can be related to the scientific description of the world of nature, the divine Logos as creative origin of the forms of creatures and of their order, the Spirit with regard to the dynamics of the natural processes. The recognition of the nature of spirit as field, in connection with a theological appraisal of space and time, contributes to elucidating this affirmation.

NOTES

1. This does not exclude all forms of teleology from the description of physical process. My own way of speaking of God as power of the future and of drawing the entire process of the universe (and especially human history) toward himself involves some form of teleology. But here, the *telos* is transcendent, while the teleology criticized in the text is concerned with some implanted *telos*, like an intrinsic force directing a process toward its goal.

2. Polkinghorne 1999, 154. See also his shorter remarks in Polkinghorne 1998, 82.

3. Jammer 1957, 201. See also his article on the field concept (Jammer 1972).

4. This is not to deny the analogical use of language in physics as elsewhere. Mark Worthing (1996, 118f.) is correct in pointing to “the analogical character of the field concept, especially within quantum physics.” The application of the field concept to physics involves metaphor, and so does its adaptation for theological use. But there is a difference between a vague analogy and a linguistic transfer that by definition and argument constitutes a new conceptual use.

5. With regard to Kant’s concept of time cf. Manzke 1992, 151ff. Originally Kant shared the theological interpretation for the givenness of time as infinite in our intuition (pp. 82ff.), but later he replaced this idea with an anthropocentric interpretation. This remains implausible, however, since the human subject and self-consciousness, which is finite, can hardly guarantee the objective validity of an infinite totality of time and space (p. 153).

6. For the impact of relativity on the philosophy of time see Craig 2001, chap. 2, II.

7. That is to be emphasized in view of the concern expressed by some that my interpretation is “overly bound to physical science” (Wicken 1988, 48, 51f.). I fully agree with the excellent discussion of the issue by Mark W. Worthing and with his judgment that “it would be a mistake . . . to build any part of our theology on a specific physical theory” (1996, 124). When I observed biblical references to cosmic forces as angels and argued for a possible appropriation of this view in theology (Pannenberg 1994, 102ff.), I did not mean to confuse science and theology but intended to express the old Christian confidence that the transcendent God is present and active in his creation, like his eternity is present and active in temporal events and the undivided infinite space of God’s immensity is present in the parts of geometrical space. His presence does not exclude the activity of his creatures but rather works through their special forms of activity.

8. See Berkson 1974, 50f. See also the observations on the relationship of Maxwell to Faraday in Torrance 1982, Preface, 7f.

9. Jammer 1957, 200ff., esp. 211ff., 257f. That could mean that the concept of force is returned to theology, which will continue with the apostle Paul to speak of God as forceful *dynamis* (Romans 1:20). However, short of the unified field theory Einstein wanted to establish, scientists continue to speak of four basic natural forces—gravitation, electromagnetism, and strong and weak reciprocal forces.

10. For further details see the excellent description given in Hefner 1988, 275ff., and also Pannenberg 1994, 126ff.

11. For details see Pannenberg 1994, 76–115, esp. “The Cooperation of Son and Spirit in the Work of Creation,” 109ff.

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