THE ROLE OF SCIENCE IN PANNENBERG'S THEOLOGICAL THINKING

by Philip Hefner

Abstract. Employing categories derived from the philosopher of science Imre Lakatos, this essay analyzes the theological thought of Wolfhart Pannenberg, with the aim of showing that he is engaged in a research program that takes seriously the various sciences and their understanding of the world on the one hand and the traditions of Christian faith and theology on the other. The course of the argument demonstrates that Pannenberg's thought extends comprehensively to provide a conceptuality that centers on the phenomena of contingency and field and encompasses nearly every realm of science and the breadth of biblical and theological traditions.

Keywords: contingency; field theological and scientific method; Lakatos; research program.

This essay sets forth a thesis concerning the significance of the sciences for the body of theological thinking which Wolfhart Pannenberg has given us over the past twenty-five years. The significance of his way of handling the sciences for theology generally is the subject of the concluding section.

The thesis is expressed both in a formal and in a material statement. Formally, it can be said that Pannenberg's theological thinking makes a statement about the empirical world; that is, it claims to add to our knowledge of empirical reality. Consequently, science is important as a realm within which theological issues arise, and science can either lend credence to theological statements or falsify them. In its material form, the thesis suggests that Pannenberg's theological production is focused on the phenomena of contingency and field and could indeed be viewed from this perspective as a theology of contingency and field.

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Since these phenomena are empirically discernible data, the scientific understandings of contingency and field are of importance to Pannenberg. In his final achievement, Pannenberg employs a particular conceptual grid for making sense theologically of contingency and field: the Christian theological concept of eschatology and God's relation to it, as set forth in Christ and his resurrection. The knowledge which Pannenberg's theology contributes to our scientific understandings of contingency and field is the suggestion that they are signals of the eschatological character of creation, which in turn is made clear proleptically in the resurrection of Christ. If we follow Thomas Aquinas's definition of theology as the discipline whose distinctiveness lies in its speaking of all things in terms of their relation to God, then Pannenberg's theological achievement is that he has related these phenomena as they occur in the natural world to God; further, he has suggested that when related to God they are a testimony to the knowledge which Pannenberg claims theology can add to our understanding of the empirical world.

Contributing to Knowledge as a Goal of Theology

The intention of Pannenberg's theological program to maintain theology as full partner in the community of disciplined rational discourse is well known. "Language about God no longer becomes privy to faith or imprisoned in the church and its confessional theology. For this reason he argues that theology belongs as one of the academic disciplines of a university" (Braaten 1984, 653-54). This theme runs throughout his writing. In his latest massive work, *Anthropology in Theological Perspective*, Pannenberg writes:

> If it can be shown that religion is simply a product of the human imagination and an expression of a human self-alienation, the roots of which are analyzed in a critical approach to religion, then religious faith and especially Christianity with its tradition and message will lose any claim to universal credibility in the life of the modern age. Without a sound claim to universal validity Christians cannot maintain a conviction of the truth of their faith and message. For a "truth" that would be simply my truth and would not at least claim to be universal and valid for every human being could not remain true even for me. This consideration explains why Christians cannot but try to defend the claim of their faith to be true. It also explains why in the modern age they must conduct this defense on the terrain of the interpretation of human existence and in a debate over whether religion is an indispensable component of humanness or, on the contrary, contributes to alienate human beings from themselves (Pannenberg 1985, 15; see also 1976, 316-45).

He goes on to say:

> The aim is to lay theological claim to the human phenomena described in the anthropological disciplines. To this end, the secular description is accepted as

simply a provisional version of the objective reality, a version that needs to be expanded and deepened by showing that the anthropological datum itself contains a further and theologically relevant dimension. *The assumption that such aspects can be shown to exist in the facts studied by the other disciplines is the general hypothesis that determines the procedure followed in my own study*, the hypothesis must, of course, prove its validity in the discussion of the particular themes discussed (Pannenberg 1985, 19-20; emphasis added).

The hypothesis described here is, in a sense, the hypothesis of Pannenberg's entire theological work, particularly if one includes, in addition to the significant methodological efforts, the concrete material which Pannenberg proposes in his Christology (and elsewhere) as the content of that "further and theologically relevant dimension."

The point to be made here very emphatically is that this approach, which stands right at the heart of his theological effort, places Pannenberg's work squarely on the interface of theology with the sciences. If the "secular descriptions" derived from the sciences are to be considered by the theologian "simply" as provisional versions of reality, and if this considered opinion must "prove its validity," then the theologian must be expecting not only to be informed about those secular descriptions but also to be able to engage in meaningful and persuasive argumentation with them. Even though these descriptions are, in the *Anthropology*, more or less restricted to the sciences that are related to anthropological studies (in itself no mean feat!), the principle enunciated here amounts, in fact, to an elaboration of what Pannenberg has intended throughout his career.

The thrust that is so strikingly set forth in the opening pages of the *Anthropology* is already explicit in the concept of revelation that was argued in the early programmatic work *Revelation as History* in 1961. Thesis 3, as formulated by Pannenberg, states: "In distinction from special manifestations of the deity, the historical revelation is open to anyone who has eyes to see. It has a universal character." Revelation dare not be considered "an occurrence that man cannot perceive with natural eyes and that is made known only through a secret mediation." Any concept of revelation that "puts revelation into contrast to, or even conflict with, natural knowledge is in danger of distorting the historical revelation into a gnostic knowledge of secrets." In a somewhat perplexing argument that has often been misunderstood and contested, he asserts that revealed truth "lies right before the eyes, and . . . its appropriation is a natural consequence of the fact." It is true that many persons do not see the truth; however, that is not because they lack faith but rather because their reason is inexplicably blinded. In any case, "Theology has no reason or excuse to cheapen the character and value of a truth that is open to general reasonableness" (Pannenberg 1968a, 135-37).

The concept of revelation at work here is a subtle one. Pannenberg is not arguing that certain historical facts can be isolated and used as the foundation of revelation, simply on the basis of their facticity. The argument, rather, is that when the events of nature and history are properly understood, in and of themselves, knowledge of their being rooted in God and God's will is conveyed. This knowledge is not complete in any single event or series of events, but only in the totality of all events; that is, it is not complete until history is completed. The proper understanding of nature and history is enabled by interpreting the "natural consequence of the facts" through the event of Jesus Christ and his resurrection. When one is in relationship with Christ, one is also in touch with the movement of history toward the meaning and fulfillment that will come to pass when God's work is completed. This meaning and fulfillment that center in Christ's revelation form the focus which also encompasses the reality that concerns the "secular descriptions" of nature and history found in the sciences. The reality of which science provides knowledge is part of the history that is on the trajectory of God's will and fulfillment which is revealed proleptically in Christ and his resurrection (Pannenberg 1968b, 53-114).

The foregoing discussion gives the content to our thesis that Pannenberg conceives of theology as claiming to add to our knowledge of empirical reality. If theology is to lay claim to the phenomena described by the sciences, and if it views the secular scientific descriptions of reality as "provisional versions" (as versions that are accurate as far as they go, but which are incomplete until enhanced by additional relevant interpretations) which await the expanding and deepening that theology can provide, then it is very clear that theology contributes to our knowledge of the phenomena described by the sciences. This is precisely what revelation, as conceptualized in *Revelation as History*, is supposed to accomplish. What we observe here provides both a breathtaking program and also the criteria by which to assess whether Pannenberg has succeeded in accomplishing what the program intends.

Some explanation of my approach in this essay is in order. I devote more attention to analyzing the program and Pannenberg's execution of it than to assessing the adequacy of his performance. The grounds for this imbalance are my judgment that this aspect of his program generally has not been recognized for the breathtaking venture that it truly is. Further, since the sources I rely on are not everywhere so well known, I will include generous long quotations from them. Finally, although the complete range of the sciences, natural and social, falls within Pannenberg's purview (and ours, as well), I will put more emphasis on the natural sciences, partly because of limitations of space and also because his treatment of the social sciences is more widely discussed in other places.

The Phenomena of Contingency and Field

In the foregoing comments, we have said that Pannenberg's theological thought puts a premium on coming to terms with the events of nature and history as described by the various sciences. His breadth of understanding in this regard is impressive, even staggering; his scope of vision aims to cover the entire range of human knowledge. The outcome of this broad-gauged survey, however, is a consistent focus upon the various phenomena that can be placed first of all under the rubric of *contingency*, and secondly under the rubric of *field*. He is not interested, apparently, in all of the data which the sciences churn up but rather is selective in concentrating upon those which are most useful for theological construction. The most useful factors in the data seem to be contingency and field theory.

In his theological writings, he speaks of the phenomena of contingency and field in several domains: physics, biology, anthropology, psychology, and history. In terms of quantity, the bulk of his attention has been given (in descending order) to history, anthropology/psychology, physics, and biology. I will survey Pannenberg's treatment of the data in each of these fields. Even though it is most important to Pannenberg, history will receive less attention here, since several other essays have dealt with it.

Physics. In his 1970 book *Erwaegungen zu einer Theologie der Natur* (which also features an essay written by the co-author, physicist A. M. Klaus Müller), Pannenberg writes: "A common field should be sought on which the natural sciences and theology can relate themselves without losing sight of the specific differences between the two ways of thinking. In what follows, an attempt will be made, provisionally, to lay out such a field. *The field will be characterized through the relationship of contingency and lawfulness*" (emphasis added). Pannenberg believes that contingency is a basic consideration for the Christian outlook, because the understanding of God which was bequeathed to the Christian church from Israel was one in which "the experience of reality was primarily through contingency, and particularly through the contingency of historical happenings. Always, there came the new and unforeseen, which were experienced as the workings of the almighty God (Pannenberg 1970a, 37). Lawful regularities were recognized, as well, but they are also contingent upon the action of God. The reality of the future also arose in this context, because the Israelites were aware that they were part of a continuum that was not yet complete.

Two recent essays raise similar considerations: "Theological Questions to Scientists" (1981) and "The Doctrine of Creation and Modern Science" (1988). In these essays, too, the concern is whether the physical sciences can be reconciled with the biblical understanding of reality

as historical, the historical being the work of God as creator and sustainer (*creatio ex nihilo* and *creatio continua*). The question of inertia arises, since that physical principle seems to suggest that events are fully caused by the nexus of physical reality, leaving no possibility for divine causality.

These concerns take on deep significance when one thinks back to the early, formative essays that Pannenberg wrote, particularly the 1959 piece, "Redemptive Event and History." In that essay the point is also made that Christians, like the Israelites, experienced reality as historical: "History is the most comprehensive horizon of Christian theology" (Pannenberg 1970b, 15). There, too, history is made up of the contingent and the continuous. Both have their origins in God: "The God who by the transcendence of his freedom, is the origin of contingency in the world, is also the ground of the unity which comprises the contingencies as history. This history does not exclude the contingency of the events bound together in it. It seems that only the origin of the contingency of events can, by virtue of its unity, also be the origin of its continuity without injuring its contingency" (Pannenberg 1970b, 74-75).

Why would the theologian be so concerned to discuss contingency and lawfulness with the physicist? Because the Christian view of God and the world puts contingency and the lawfulness that is also contingent at the center. We note, however, that the aim is not simply to gain reinforcement for Christian theological belief or scriptural affirmation from the sciences. Such a simplistic motivation founders on the rocks of philosophical analysis without any question! On the contrary, harking back to the understanding of revelation that also emerged in these years, the point is that theology has something to contribute to the provisional descriptions of the physicist, and this "something" is knowledge. As we shall have ample occasion to note, the contingency of events is a fundamental clue to events being rooted in a source of that contingency, namely, the action of God. The descriptions of the cosmologists are only provisional until they are conjoined with the theological commentary.

The discussion of field theory and inertia has the same concern (see Pannenberg 1981, 7-10; 1988, 7-11). Field theory (which will receive greater attention in the next section) suggests that causes do not originate in entities nor do they operate only on individuals; rather, factors in the field which is the ambience of the entity can be causes, and they work on the entire ambience. This, too, is a clue that the biblical imagery of all things being rooted God—the source of nature and history—not only has a point of contact with scientific understandings of reality but also has something to contribute to those under-

standings: the insight that the largest field of all, which embraces all of reality and all of the relevant causative factors, is God.

In the discussion of contingency and field, the final theological point to be made seems to be that both concepts point toward a ground upon which both are dependent, namely, God. The contribution of theology in both cases is to call attention to and say something about this ground in God. In his most recent work, Pannenberg begins to relate this concern to the very important and complex set of issues that pertain to the unity of space and time. Drawing upon a wide range of authors—stretching from Plotinus through Augustine, Duns Scotus, and Ockham, up to contemporary physics and philosophy—he juxtaposes the attempts of physics to speak about the cosmic field of space and time with the Christian theological concepts of God, the divine Spirit, and the eschatological future (Pannenberg 1958b, 11-19). He suggests for discussion two sets of questions in particular: ". . . the question of how the different parts of the cosmic field are related to that field itself and . . . [the question] of the role of contingency and time in the understanding of a cosmic field" (Pannenberg 1988, 15).

Throughout his years of dialogue with scientists, Pannenberg also has called attention to an insight that he derived from his conversations in the interdisciplinary group that met in Heidelberg in the early 1960s. This insight deals with the character of scientific statements. He writes:

> There was a resulting agreement to the effect that each scientific hypothesis of law describes uniformities in the behavior of the object of such affirmations. The object itself, however, is contingently given in relation to its hypothetical description as a case where the affirmed law obtains. This element of contingency in the givenness of the object, however, is usually not explicitly focussed upon in scientific statements. The focus is rather on the uniformities that can be expressed in equations. *It goes as a matter of fact that those uniformities occur in a substratum that is not exhausted by them* [there follows a description of examples which make his point]. . . . *This means that the descriptions of nature by hypothetical statements of natural law presuppose their material is contingently given.* They do not focus, however, on this contingency, because their intention is the formulation of uniformities that occur in the natural phenomena, their contingency notwithstanding (Pannenberg 1988, 9; emphasis added).

This argument is important for the function that it serves; namely, to make credible the notion that theology, particularly a theology that speaks of contingency, has something legitimate to contribute to the enhancement of scientific knowledge. In this connection we note the manner in which Pannenberg relates science and theology. It is not one that employs a "God of the gaps" strategy, nor that of perceiving science and theology as "two worlds." Rather, it immerses itself fully in the contributions that science makes to our understanding of the world, and it seeks to bring theology to bear in a constructive and

cooperative manner upon the descriptions which science provides. It does so in the conviction that theology has something to contribute which will otherwise be wanting. Such a style of approach, upon which I will comment more fully later, is thoroughly consistent with the program which Pannenberg has set for himself.

Biology. Although he has devoted the least attention to the biological realm in his published works, some of Pannenberg's most insightful and persuasive arguments emerge from this area. The chief sources for this aspect of his thought are the 1962 book *What Is Man?*, the 1985 *Anthropology*, the 1970 essay "The Working of the Spirit in the Creation and in the People of God," and the generally overlooked but nevertheless useful essay "The Doctrine of the Spirit and the Task of a Theology of Nature," which appeared for the first time in 1972.

The issues of contingency and field are dominant for Pannenberg as he approaches the biological sciences. Biology, governed as it is by evolutionary modes of interpretation and overlapping at important points with anthropology, provides Pannenberg a rich and complex set of ideas within which to pursue his concerns for contingency and field. He has obviously learned greatly from this realm of reality, just as he has chosen to express some of his formative ideas in its context.

In the context of biology and anthropology, the concepts of *openness* and *ecstatic ecological self-transcendence* receive brilliant articulation. These articulations take on even deeper meaning if we keep in mind the larger reaches of Pannenberg's theological system—the concepts of revelation, eschatology, and God as the all-determining reality (and hence the ground of the unity of all reality). Evolutionary modes of thinking lend themselves to the articulation of these concepts for three reasons: first, the processes of nature so perceived are intrinsically contingent, both in the sense that the new and unforeseen is (as in history itself) always occurring, and also in the sense that all evolutionary events take place in a larger environment upon which they depend for their origin and sustenance; second, the notion of this larger environment leads directly to the concept of field; and third, the dynamics of evolution lay the groundwork for the empirical actuality of openness.

The evolutionary pathway is one in which the organism interfaces with its physical world through its own physical shape (phenotype), and in this situation it is continuously being drawn outward. The environment elicits responses from the organism as the process of adaptation directs the interactions between organism and environment. This drawing out or eliciting is the biological basis for and correlate of openness, and in the process of being drawn out the organism has no recourse but to transcend itself.

All human life is carried out in the tension between self-centeredness and openness to the world. In order to understand man's unique situation correctly, one must note that man shares this tension in its main features with all organic life. On the one hand, every living organism is a body, which, as such, is closed to the rest of the world. On the other hand, every organism is also open to the outside world. It incorporates its environment, upon which it is dependent for food and growth, into the cycle of its biological functions. Thus every organic body, whether it is animal or plant, simultaneously lives within itself and outside itself. To live simultaneously within itself and outside itself certainly involves a contradiction. But it is a contradiction that really exists in life. All life, even human life, as we have seen, is carried out within this tension (Pannenberg 1970d, 56-57).

Ultimately, Pannenberg finds the ground of this tension and its meaning in the concept of God.

The concept of openness that is intrinsic to the evolutionary-biological process is the direct descendant of the concept of contingency that was central to the discussion of physics. There, the concept of contingency primarily correlated with God's working as origin of the new and unforeseen. Here a nuance is added: the concept of being drawn out and thereby constituted is correlated with the "Spirit of God as the creative origin of all life" (Pannenberg 1972, 17 passim). Here the concepts of ecstatic and ecological self-transcendence should be considered. Ecstasy is intrinsic to life, particularly to human life, and it is manifested in the phenomenon of living beyond oneself: ". . . every living organism lives beyond itself, for every organism needs an appropriate environment for the activity of its life. When kept in isolation, no organism is fit for life. Hence every organism lives beyond itself. A particular aspect of this ecstatic character of life is to be found in its relation to time: every organism relates itself to a future that will change its present conditions. This is evident in the drives and urgencies of life, but also in negative anticipations such as fear and horror" (Pannenberg 1970c, 18). Ecstasy is a mark of the spirit. Pannenberg elaborates this further:

The element of transcendence in spirit suggests that after all it might be neither necessary nor wise to admit a fundamental distinction between a human spirit and a divine spirit. The ecstatic, self-transcendent character of all spiritual experience brings sufficiently to bear the transcendence of God over against all created beings. *The spirit never belongs in a strict sense to the creature in his immanent nature, but the creature participates in the spirit—and I venture to say: in the divine spirit—by transcending itself, i.e., by being elevated beyond itself in the ecstatic experience that illustrates the working of the spirit.* . . . Thus the idea of spirit allows us to do justice to the transcendence of God and at the same time to explain his immanence in his creation (Pannenberg 1970c, 21; emphasis added).

What we have here, when put in the context of Pannenberg's other writings, is a theological interpretation—in the concept of spirit—of

one very important component of the evolutionary process that is observed empirically by the sciences. The train of thought is carried further in the essay "The Doctrine of the Spirit and the Task of a Theology of Nature":

> Modern biology does not exclude everything that transcends the living cell from the analysis of life. Although life is taken as the activity of the living cell or of a higher organism, that activity itself is conditioned. It is conditioned particularly by the requirement of an appropriate environment. When kept in isolation, no organism is fit for life. In this sense, every organism depends on specific conditions for its life, and these conditions do not remain extrinsic to its own reality, but contribute to the character of its life: an organism lives "in" its environment. It not only needs and actively occupies a territory, but it turns it into a means for its self-realization, it nourishes itself on its environment. *In this sense, every organism lives beyond itself. Again it becomes evident that life is essentially ecstatic: it takes place in the environment of the organism much more than in itself.*
>
> *But is there any relation of this ecological self-transcendence of life to the biblical idea of a spiritual origin of life? I think there is* (Pannenberg 1972, 17; emphasis added).

In these reflections the phenomenon of field is given even greater significance for theology, fully as importannt as the phenomenon of contingency. It is clear that the significance of both phenomena is rooted in their relevance to the reality of God. Pannenberg then introduces the phenomenon of the future into the biological scheme: "By turning its environment into the place and means of its life, the organism relates itself at the same time to its own future and, more precisely, to a future of its own transformation. . . . By his drives an animal is related to although not necessarily aware of his individual future and to the future of his species" (Pannenberg 1972, 18). This insight lays the foundation for relating eschatology to the biological realm. Pannenberg continues: "Hence, the element of truth in the old image of breath [which he has elsewhere related to the biblical concept of spirit and the scientific concept of field] as being the creative origin of life is not exhausted by the dependence of the organism on its environment, but contains a deeper mystery closely connected with the ecological self-transcendence of life: the temporal self-transcendence of every living being is a specific phenomenon of organic life that separates it from inorganic structures" (Pannenberg 1972, 18).

What should be clear at this point is that in his rather extensive discussions of physics, cosmology, and biology, Pannenberg has laid—to his own satisfaction, at least—the basis for correlating the empirical phenomena *as described by the sciences* with the realities that are spoken of in theological discourse in the concept of God, spirit, creation (both *creatio ex nihilo* and *creatio continua*), transcendence, and eschatology.

Anthropology, Psychology, Social Theory, History. Our analysis must be satisfied with an even more summary discussion of anthropology, psychology, social theory, and history as they fit into the vast Pannen-

bergian scheme. There is some overlapping of the interpretations taken from anthropology with what we have already considered, since the trends in anthropological thinking he appropriates employ the phenomena of openness, world-relatedness, and self-transcendence, for which the evolutionary biological descriptions lay a sort of foundation. In the context of anthropology and psychology, he elaborates the concept of relatedness to and openness to the world—with great learning and subtlety—in a way that provokes further insights.

> The concept of human self-transcendence—like the concept of openness to the world which is to a great extent its equivalent—summarizes a broad consensus among contemporary anthropologists in their effort to define the special character of the human.
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> It was this transcending of every particular object—a transcending that is already a condition for the perception of the individual object in its determinacy (and thus in its otherness and distinctness)—that I had in mind when I wrote in 1962 that the so-called openness of the human being to the world signifies ultimately an openness to what is beyond the world, so that the real meaning of this openness to the world might be better described as an openness to God which alone makes possible a gaze embracing the world as a whole. (Pannenberg 1985, 63, 69).

Contingency and field still figure as foundational concerns. In the important realms to which psychological and anthropological descriptions are relevant, the challenge to discover and actualize the unity that binds together the contingencies is at the center of human existence and reflection. The field, as the environment or ambience which is causative and sustaining, is even more intensely the focus of Pannenberg's reflection and argumentation. Some of the most important examples of this trend of his thought can be highlighted:

First, the phenomenon of openness to the world and the attempt to unify the disparateness of the world through human dominion are linked to the biblical affirmation that humans are created in the image of God (Pannenberg 1985, 76-77). That is to say, the trajectory of openness to the world which Pannenberg traces through the evolutionary order—of which the human capacity for dominion is a moment—belongs to the dimension of human being which he identifies with the image of God (see also the italicized citation in the next paragraph).

Second, in the formation of identity the individuals must differentiate themselves from the world and gain independence "while not destroying that symbiotic connection" with their world which makes life possible. Trust is definitely a matter of relatedness to the field in which the individual lives—physical and cultural. The religious dimension is visible here because "trust is, by reason of its lack of limits, *implicitly* directed beyond mother and parents to an agency that can justify the unlimited character of trust." This argument concerning

trust is not meant as a proof for the existence of God, but rather it shows "that the theme of 'God' is inseparable from the living of human life. . . . *There is an original and at least implicit reference of human beings to God that is connected with the structural openness of their life form to the world and that is concretized in the limitlessness of basic trust*" (Pannenberg 1985, 233; emphasis added).

Third, the primary challenge facing human cultural life is the establishment of the unity of culture; that is, of articulating the field or unity which sustains culture and gives it meaning. This is where religion becomes meaningful for culture. Religion is the factor that can give legitimacy to the culture. To understand this, the function of religion within the cultural system must be understood: "This function is to be seen, first, in the fact that religion has for its object the unity of the world as such in relation to its divine source and its possible fulfillment from that same source. . . . Because religions are concerned with the unity of all reality, it is possible and necessary to seek and find in religion the ultimate frame of reference for the order of human life in society" (Pannenberg 1985, 473-74). As with the issue of the trust which makes individual identity possible, this unifying within the cultural system is basically the challenge of making clear the field in which life's origin and sustenance is to be found and describing the field in ways that are persuasive and add the knowledge of it to what the sciences can describe of it.

Fourth, history becomes at a higher, more complex, and (in the epoch in which humanity is the dominant species) more critical level what the physical and biological processes were for preceding levels. History is a realm of self-transcendence, ecstasy, openness, subject formation, contingency, and the operation of the field (see Pannenberg 1985, 485-532). This is not surprising, since (as we have seen) Pannenberg uses the historical order as the analogy for understanding contingency and field in the physical realm. It is because he uses the historical process as his base category and sees the spirit at work in those processes that he is able, through analogy, to analyze physical and biological processes as he does, and thus also to see the unity of all the processes.

The Totality of Meaning

Pannenberg himself uses the term that is the title of this section to refer to God; we are using it to refer to a summary of the total system of meaning which he presents to us, bits and pieces of which I have discussed in this essay thus far. If there were space, I would argue that what Pannenberg has provided is what the philosopher of science Imre Lakatos has termed a *research programme* (Lakatos 1978; Murphy 1987).

A research program is constituted by a *hard core* of assertions and a set of auxiliary hypotheses which surround the core. The hard core rises to the top of the heap of theories in its field, surpassing others because it is able to provide "dramatic, stunning, and unexpected" interpretations of the world, which do as a result provide "new facts" that had not been known before (the *positive heuristic*). This hard core is never subjected to the process of scientific falsification; its activity is rather to provide the stunning and unexpected interpretations. The auxiliary hypotheses carry the brunt of the falsification process and thereby lend credibility to the hard core and to the research program as such (the *negative heuristic*). If the hard core proves to be degenerative, then the center of the program is no longer really viable. In such a case the hard core is not falsified; rather, it simply falls away, to be replaced by an alternative program with its own hard core. This replacement may well be akin to what is often called *paradigm shift* in the history of science. I will attempt to summarize Pannenberg's proposals for global meaning in the form of a Lakatosian research program. I will not always use Pannenberg's own terminology to summarize his contribution.

THE HARD CORE[1]

1. God is the all-determining reality which constitutes the field in which everything that exists derives its being and in which all the contingencies of nature and history have their origin.
2. The medium in which God's all-determining work (both as *creatio ex nihilo* and *creatio continua*) has been cast is that of an eschatological historical continuum, wherein the meaning is in the as-yet-uncompleted totality of reality. Within this continuum, the resurrection of Jesus Christ is a revelation of that meaning.[2]
3. Included in God's all-determining work is the fulfillment of the eschatological continuum.

AUXILIARY HYPOTHESES[3]

Hypotheses Drawn from the Biblical-Theological Tradition.

1. The biblical picture of God as the Lord of history and creator supports the concept of God that is contained in the hard core.
2. The biblical picture of the divine spirit as the creative source of all life supports the hard core.
3. In Jesus Christ and his resurrection we encounter a proleptic embodiment of the totality of reality and of God's will for it and fulfillment of it, when interpreted in the light of the apocalyptic framework in which it was originally experienced. Therefore, Christ

and his resurrection qualify as God's revelation, that is, as God's own indirect self-revelation.

4. The biblical concept of the Kingdom of God is a symbolic representation of God's eschatological work and of God's relation to it.

Hypotheses Drawn from Scientific Descriptions of Reality.

1. In their character as contingent and field-dependent, physical processes leave open the conjecture that they manifest the effects of God's all-determining totality.

2. In their character as contingent and field-dependent, biological evolutionary processes leave open the conjecture that they manifest the effects of God's all-determining totality. Ecological self-transcendence is an important aspect of this manifestation.

3. In their character of openness to the world, to others, and to the future, the processes of society and history leave open the conjecture as described in (1) and (2) above.

4. In its dependence upon the reality of trust, the process of identity formation in the individual human person leaves open the conjecture as described in (1) and (2).

5. In their dependence upon a perception of unity, the processes of human culture leave open the same conjecture.

6. A comparable hypothesis may be made about history, except that it would be more complex.

The magnitude of this program is stunning in its own right. As the Lakatosian elaboration reveals, Pannenberg's central core of contributed insight does attempt to throw light on the nature of all things, and it demonstrates its seriousness by suggesting hypotheses that cover broad ranges of biblical-theological and scientific materials. I suggest that this way of representing Pannenberg's theological thought is not simply a perspective that grows out of consideration of his use of the sciences; rather, it does more justice than many other perspectives to the genuine intent of his theological work and its genuine significance. This elaboration shows the justification of his claim that theology deserves a place in the university because of its contribution to knowledge, that is, because of its cognitive claims.

Assessing Pannenberg's Handling of Science

In a brief sketch, we may suggest several ways in which Pannenberg's handling of science can be assessed.

First, we must recognize that in contrast to the vast majority of mainline Christian theologians of his generation, Pannenberg genuinely opens his theological work to the impact of science by inviting falsification on the basis of science. He has not retreated behind the

prevalent "two worlds" approach to the sciences, which builds an insuperable wall between science and theology by making some version of the claim that the two kinds of discourse are so utterly different that they cannot exist on the same interface. Furthermore, while he has opened himself to falsification from the side of the sciences, he has also assimilated himself so fully to the theological tradition that he courts falsification from that sector, as well. When we compare his work to the other prevailing schools of theology today, I suggest that there is no other school of theological thought that opens itself so fully to this dual falsification—from the side of the sciences and also from the side of the biblical-theological tradition. If one believes, as this writer does, that the primary challenge to theology in our era is to open itself to the greatest extent possible to both the contemporary world and to the Christian tradition, then Pannenberg's position vis-a-vis dual falsification suggests that he has produced a research program in theology that surpasses any other current program.

Second, we should examine Pannenberg's rather full discussion of how his theological statements can be subjected to scientific methods of validation, to see if they are adequate. This discussion is set forth in *Theology and the Philosophy of Science* (1976, 326-45). Although I cannot go into this question here, the four basic tests that he outlines in this work (1976, 344-45) conform to the Lakatosian structure I have utilized in my analysis: conformity to the tradition, connection with present experience (which I interpret to include scientific experience), integration with the appropriate area of experience, and comparison with other existing research programs. The third criterion is the only one to which this essay has not given attention.

Third, granted that Pannenberg's design for his theology proposes a brilliant engagement with science, the major test is whether he actually brings off what he has attempted. I suggest a number of concrete assessments.

To begin, even though the range of the auxiliary hypotheses in Pannenberg's program is very impressive, he will surely need to develop more. The emerging field of thermodynamic thinking bids fair to become the foundation of a unified science; that is, a unified view of the entire cosmic order. This new field is of such great pertinence to Pannenberg's program that he can scarcely overlook it (Wicken 1987). One might also suggest he will want to probe more fully the relationship between culture and the biogenetic background of the human central nervous system. His reflection upon biological evolution (1972) does recognize that the concepts of openness and self-transcendence, which are so central to his interpretation of society and history, have significant roots in the biogenetic evolution and structure of human life. The anthropologist Victor Turner (1983) recognized

this shortly before his death. He was greatly influenced by the work of Ralph Burhoe (1976) and Eugene d'Aquili (1978; 1983). It would be a natural step for Pannenberg to take this interrelationship of culture and biogenetic backgrounds more seriously.

Next, Pannenberg tends to give the impression that the biblical-theological tradition is a given in the quest for knowledge which at the formal level changes little even though in material expressions he suggests dramatic reformulations of the tradition. Is it not a contradiction of the standards he applies to his own theological program, to protect the tradition, even the biblical traditions, from validation and falsification procedures that are in use today?

Furthermore, one might question Pannenberg's reliance on analyses which conclude that in relation to non-human life forms the human reveals a defective level of instincts. Is he not touching here the important interface between genes and cultures in human existence? In genes/cultures terms the interface could be interpreted more provocatively, released from the inhibiting notion that culture lacks instinct.

Finally, physicists have raised a number of questions about Pannenberg's discussion of contingency and inertia. Robert Russell (1988) has suggested that Pannenberg's discussions (1981; 1985), while provocative, would benefit from a fuller and more complex attention to what physicists today are saying about inertia and contingency. Jeffrey Wicken also finds Pannenberg's questions fruitful, but he believes that on the one hand Pannenberg is not careful enough in his use of the concept of field, while on the other, more attention should be given to the "ontological room" that science necessarily leaves for theology in probing the "sensitive dimension of nature that is the source of feeling, perception, and consciousness" (Wicken 1988). David Breed (1985) has argued that current cosmological thinking suggests that contingency includes limitations upon the action of God which would qualify the claim that God is all-determining. These examples are cited in order to suggest that Pannenberg's dialogue with the scientists is by no means at an end. Further developments in the process of give-and-take are eagerly awaited.

The magnitude of Wolfhart Pannenberg's theological enterprise is clearly revealed when we view it from the perspective of his stance toward the sciences. His program merits the most serious attention and dialogue. Let the conversation continue.

NOTES

1. The hard core, in Lakatos's terms, is the source of stunning, dramatic interpretations.

2. Any discussion of Pannenberg's use of science must take note of his remarkable discussion of the resurrection of Jesus Christ. This discussion demonstrates how his Christology is the nodal point, where his concern for secular knowledge and Christian

tradition intersect most intensely. Consequently, one can say that he has been consistent in following out the concept of revelation that he set forth in his earliest work. His interpretation of the New Testament texts, utilizing his version of the apocalyptic framework of the early first century, brings to bear the quintessence of what we have elucidated above concerning contingency and field. What Pannenberg thus gives us is a neatly dovetailed tapestry of meaning: contemporary scientific understandings (as Pannenberg interprets them) are subtly employed to interpret the texts, and the texts (interpreted in the light of Pannenberg's understanding of the apocalyptic) result in a message of the resurrection that reveals the meaning of the eschatological reality in terms that make sense also to contemporary secular knowledge. This means that the Christ-resurrection-revelation is the point where the two sets of auxiliary hypotheses meet; it also explains why Christ appears both in the hard core and in the first set of auxiliary hypotheses (Pannenberg 1968a, 53-114).

3. These may be falsified in appropriate ways. The following list is by no means complete.

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