

THEOLOGY'S TRUTH AND SCIENTIFIC FORMULATION

by *Philip Hefner*

Abstract. One of the basic intentions of theology is to extend the explanatory function of the community's faith beyond the community to the realm of wider human experience. In this sense, theology may be called "scientific," and it will benefit from conforming as much as possible to the characteristics of scientific theory formation. Using the work of Karl Popper and Imre Lakatos as a guide, the following theological theory is proposed: Homo sapiens is God's created co-creator, whose purpose is the stretching/enabling of the systems of nature so that they can participate in God's purposes in the mode of freedom. It is argued that this research program produces new knowledge in relating the Christian faith to scientific views of human being as comprised of both genes and cultures to a theory of technological civilization; to freedom, determinism, and natural selection; and to credible notions of human purpose. Traditional Christian doctrines are related to this research program.

Keywords: anthropology; created co-creator; falsification; methodology; technological civilization; theory-formation.

The purpose of this essay is to present an experiment in thought. It will set forth a hypothesis concerning certain kinds of Christian theological statements. The hypothesis will be illustrated through an example taken from the author's own work.

THE THOUGHT-EXPERIMENT

The argument that I am setting forth here takes the following train of thought:

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OBSERVATION 1. Christian theological statements may be viewed in their function of articulating the experience of the community of faith in which they originate. Their primary concern is to articulate that experience from the perspective of its affirmation that it has been transfigured by the encounter with God.

OBSERVATION 2. Theological statements may also be viewed in their function of conjoining the articulation of the faith-community's experience with certain configurations of empirical data that pertain to human beings in general so as to illuminate those data and thus provide explanation and interpretation of the data. In this function theological statements extend their significance from the community to general human experience.

OBSERVATION 3. At any moment, when theological statements attempt to articulate the community's experience internally, for the community's own private understanding, they base themselves on the community's tradition. When, however, they attempt to provide explanation and interpretation of general human experience, they extend themselves to incorporate materials that originate outside the community.

OBSERVATION 4. It is in respect to the wider explanatory function of theological statements that scientific formulation becomes particularly relevant to theology.

OBSERVATION 5. It is in this wider explanatory function that theological statements must attempt to frame themselves as theory in a manner that is commensurate with (not identical to) scientific theories. In particular, they must observe the canons of dealing with a wide range of data, falsifiability, and fruitfulness.

OBSERVATION 6. The hypothesis proposed is that theology's claim to convey truth and/or genuine knowledge is directly related to its success in accomplishing the wider explanatory function.

BRIEF COMMENTARY ON THE THOUGHT-EXPERIMENT

COMMENTARY TO OBSERVATION 1. Some would want to designate this type of theological statement as *dogmatic theology*. This sort of theological statement is of relevance and concern chiefly for the inner life of the community of faith itself. A considerable amount of the discussion that relates current developments in philosophy of science to theology focuses on this aspect. For example, discussions of referentiality seem often to concern themselves with questions of how the way in which the faith community articulates its experience to itself can be considered to meet the canons of scientific thinking. The answer given by several leading thinkers is that the community's language can indeed be said to "refer," inasmuch it is resident within a long-term

community of discourse that can relate itself to the statements in question and finds those statements meaningful. Examples of such statements might be the biblically-based affirmations about God, for example, that God is love. Also to be included in this group of statements are those which relate to interior experience, such as, "The just shall live by faith," which comforts the person who is tormented by the inadequacy of his or her efforts to satisfy divine commands of perfection. The dogmas of the Trinity or of the Two-Natures of Christ may also be referred to here, since these were (in one of their aspects, at least) meant as ways of helping Christians to understand their experiences of the Holy and of Jesus, respectively.

COMMENTARY TO OBSERVATION 2. If the theological statements described in Commentary 1 qualify as dogmatic theology, perhaps the type of statement referred to here constitutes *apologetic theology*. Neither of these labels should be applied in a definitive sense, but they may be useful as heuristic entrees to the issues I am raising. Similarly, the distinctions between the inner life of the community of faith and general human experience may also be of chiefly heuristic value. On the one hand, the interior life of faith is never insulated from the wider culture in which it occurs, while, on the other hand, the most intimate and parochial expressions of a community's faith may take on startling pertinence for the wider culture.

There are many examples of how Christian theology has turned the interior statements of faith to the task of interpreting general human experience. One of the most illuminating case studies that illustrates this process is Charles Norris Cochrane's classic interpretation of the dogma of Trinity in *Christianity and Classical Culture*. Sallie McFague's *Models of God* constitutes the same sort of attempt that Cochrane traces among the early Christian theologians. Those ancient thinkers were extending the interior statements of Christian faith to the task of clarifying the general human experience of seeking to relate human historical existence to whatever is considered to be Ultimate. In doing so, the Christian theologians and philosophers offered to the Hellenistic world an alternative interpretation of human existence to those set forth by Stoicism and the political philosophy of the Caesars. Similarly, McFague is extending Christian God-talk to interpret experience that is generally felt today to be pertinent to how humans live their lives. In both the ancient and the contemporary examples the work of the theologian presents to Christians a reformulation of their traditional faith statements. Reformation Christians have often employed the concept of "law" and wrath (as they appear in formulations concerning "law and gospel") to interpret general human experience. *Law* had personal existential significance for Martin Luther, but it was extended to provide an interpretation of secular history. What Christians like

Luther experienced as the wrath of God driving them to despair or to the arms of a gracious God was extended to explain why it was that society at large was suffering dislocations, wars, and other ills.

What is accomplished by this extension of the Christian concepts? It relates the experience and knowledge of God to wider human experience, outside the community of faith. Most often, the community of faith has not intended for these extensions of interpretation to be simply esoteric or obscurantist, but rather to be the basis for credible interpretations of that wider experience. To the person outside the community faith, these extensions had the intention of saying: "If you entertain the reality of the Ultimate (or of ultimacy), that is, God, the theological statements in question present a coherent explanation or interpretation of your experience, which in turn can be entertained as candidates for being designated as growth in, or addition to, knowledge or truth."

The complexities and problematics of this sort of claim (i.e., the "If you entertain the reality . . ." claim in the previous sentence) will be discussed below. It is important, however, to recognize the claim as inherent in this second type of theological statement.

COMMENTARY TO OBSERVATION 3. Here the interrelationships between what are often called *revealed knowledge* and *natural knowledge* come directly into play. When theology mines from the community's tradition the materials that set forth the understandings stored there and sets them forth, it is considered to be using "revealed," sources, because it appears to be doing nothing more than elaborating (or "explicitating," to use an older term) the deposit of the tradition. When the traditional statements are conjoined with general human experience, certain things happen which give the impression to some observers that theology has based itself upon natural knowledge, thus forsaking the realm of the revealed. What happens is twofold. First, the theological statements thus conjoined purport, not to articulate the tradition as such, but to illuminate experience that seems foreign to the tradition. This means that the theological statements are cast in a form that is elicited by the general human experience which they seek to illumine, and it is this recasting that appears to be crossing over from revelation to the realm of natural knowledge. Second, precisely in order to function as illumination of the wider experience, theology must come to terms with criteria of meaningfulness that pertain to that experience. These criteria will be discussed later in some detail. To the extent that these criteria are strange to the interior life of the community of faith, that community may judge theological statements that conform to these criteria to be more beholden to natural knowledge than to revelation.

If we focus upon the examples mentioned in the Commentary to Observation 2, we recognize that the theologians of the Trinity are accused of succumbing to the hegemony of classical philosophy; McFague may be accused of taking her cues from secular concerns and modes of thought; and the transposition of the Reformation categories of law and wrath into social critique is said to be a substitution of politics for Gospel.

These criticisms of theological statements that illumine general human experience miss the mark to the extent that they fail to recognize that the tradition is not so much being diluted by natural knowledge as it is being extended in its relevance and meaningfulness. Furthermore, the criticisms draw sharp distinctions between natural and revealed knowledge that are artificial and unuseful. Indeed such criticisms fail to understand that it is most often sensitivity to revelation that directs the theologian to see how the tradition can be extended to inform general human experience.

COMMENTARY TO OBSERVATION 4. As theology steps into the realm of providing interpretation and explanation of wider human experience, it must take into account the ways of perceiving that are appropriate to that experience. These ways of perceiving are manifold. In some respects it is aesthetic ways that theology must recognize, the poetic expression or the way of art, for example. In other respects it is the ways of scientific perceiving that must be acknowledged. It is the scientific mode that concerns us particularly here. However, it is useful to recognize the circumstances which motivate theology to come to terms with science, namely, the innate thrust to interpret reaches of experience that extend outside the events experienced within the community of faith from which theology takes its origins.

COMMENTARY TO OBSERVATION 5. This commentary consists of three sections:

1. The train of thought at this point touches directly upon the theme of this Consultation. In connection with the Commentary to Observation 3, I referred to the criteria of meaningfulness that obtain in the realms of the general human experience for which theology may attempt to provide an explanatory function. Within the realms of experience in which the sciences and scientific ways of perceiving are significant, there are very definite criteria of meaningfulness to which statements must conform. Statements that pertain to this realm at their most useful present themselves as *theory*. We may accept Karl Popper's suggestive comments about theories: "Scientific theories are universal statements. . . . Theories are nets cast to catch what we call 'the world': to rationalize, to explain, and to master it" (Popper 1972, 59). I would paraphrase these comments with the suggestion that *theory is a set of*

concepts that is capable of interpreting a range of phenomena. This set of concepts must meet satisfactorily two further criteria: first, *it must be falsifiable and*, second, *it must be fruitful for stimulating further thinking and interpreting new data.*

My suggestions are very much within the Popper/Lakatos field of thinking. For Popper on falsification, I follow this passage in his *Logic of Scientific Discovery*:

A theory is to be called “empirical” or “falsifiable” if it divides the class of all possible statements unambiguously into the following two non-empty subclasses. First the class of all those basic statements with which it is inconsistent (or which it rules out, or prohibits): we call this the class of the *potential falsifiers* of the theory; and secondly, the class of those basic statements which it does not contradict (or which it “permits”). We can put this more briefly by saying: a theory is falsifiable if the class of its potential falsifiers is not empty (Popper 1972, 86). In reading this passage, we recall that “basic statement” is a technical term for Popper: “What I call a ‘basic statement’ or a ‘basic proposition’ is a statement which can serve as a premise in an empirical falsification” (Popper 1972, 43).

We recall, of course, that for Popper the process of attempted falsification is at the heart of what science is all about.

Imre Lakatos refines the Popperian position in the direction of what he calls the “sophisticated falsificationist” position. He holds that a theory is falsified only if a new theory explains that which is improbable or forbidden by its predecessor. That is, falsification happens if the successor theory accounts for novel facts or if it possesses “corroborated excess content” over and above that content which the predecessor theory possesses (Lakatos 1978, 31-33). Successful theories, for Lakatos, produce “research programmes,” that is, series of theories that result in growth of knowledge. Such a program “consists of methodological rules: some tell us what paths of research to avoid (*negative heuristic*), and others what paths to pursue (*positive heuristic*)” (Lakatos 1978, 47).

In brief, then, I suggest that if theology is to be faithful to its innate thrust to extend the significance of its originating revelation by playing an explanatory function for general human experience, then insofar as that wider experience leads into the realm of the sciences, theological statements will be used in theory-construction that conforms to the criteria of falsifiability and fruitfulness. Theology, in extending out from the community of faith, will want to lay the basis for successful research programs in interpreting general human experience under the impact of the Ultimate (God).

2. Observation 5 speaks of theological statements being “commensurate” with scientific theories, not “identical” to them. The categories of Popper and Lakatos referred to above pertain to empirical knowl-

edge that can be tested by the conventional scientific means. Obviously, theological statements do not aim at empirical content with the same degree of precision that scientific statements do, nor do they prize prediction in the way that scientific discourse does. Popper himself, however, recognizes that there are “levels of testability.” His axiom is: “The *empirical content* of a statement increases with its degree of falsifiability: the more a statement forbids, the more it says about the world of experience” (Popper 1972, 119-20). My suggestion holds that theological statements in the circumstances that I have outlined above, must be falsifiable, that is, they must have a class of potential falsifiers that is not empty. How full that class is, is subject to variation, case by case. Theology’s success in extending its explanatory field is directly correlated to how full or empty its class of potential falsifiers is. What this means will become clearer when we move into the next section of illustrations.

3. The fundamental distinctiveness of theological statements is their reference to God. In the Commentary to Observation 2 this was asserted clearly. Obviously the reference to God cannot be object of the falsification process. Furthermore, since theological statements lose their entire *raison d’être* if the reference to God is omitted, it would seem that the Popperian scheme is not applicable to theology at all. I suggest that Lakatos’s elaboration of Popper is pertinent in dealing with this problem. Lakatos, in his discussion of the methodology of scientific research programs, argues that every research program has a “hard core,” which, by means of what he calls the “negative heuristic,” is never permitted to feel directly the abrasion of the falsification process. The hard core is vigorously surrounded by a “protective belt” of auxiliary hypotheses, which take the brunt of falsification. Whether or not the auxiliaries are appropriate or not depends on whether they contribute to the program’s success in producing growth in knowledge (through the positive heuristic). He writes, concerning the Newtonian program, “This hard core is tenaciously protected from refutation by a vast ‘protective belt’ of auxiliary hypotheses. And even more importantly, the research programme also has a ‘heuristic,’ that is, a powerful problem-solving machinery, which, with the help of sophisticated mathematical techniques, digests anomalies and even turns them into positive evidence” (Lakatos 1978, 4). He goes on to assert that even bodies of thought like Marxism and Freudianism “are all research programmes, each with a characteristic hard core stubbornly defended, each with its more flexible protective belt and each with its elaborate problem-solving machinery” (Lakatos 1978, 5). Not all of these research programs are equally good. What distinguishes the superior programs is their ability to make “dramatic, unexpected,

stunning" interpretations of the world of experience. These interpretations must be empirically credible. Where the program consists mainly of theories without concrete credible interpretations of the world (i.e., what scientists call "facts"), "we are dealing with miserable degenerating research programmes" (Lakatos 1978, 6).

We may summarize the Popper-Lakatos discussion of falsifiability and fruitfulness in the following terms. The process of falsification is applied to the auxiliary hypotheses of a research program, hypotheses whose function is to protect the hard core of the program. Whether a research program is successful or not depends on its fruitfulness (in Lakatos's term, "progressive"), that is, whether it is productive of new knowledge through its dramatic, stunning, and unexpected interpretations, which qualify as the production of "new facts." A theory, or hard core, is considered to be falsified by another theory at the point where that new theory provides the interpretations which the earlier theory either could not or which it prohibited. One might suggest that the hard core corresponds to that set of insights which form Thomas Kuhn's celebrated concept of "paradigm" (Kuhn 1970). Similarly, that which enables the stunning, dramatic new interpretation is akin to Michael Polanyi's discussion of the place and role of tacit knowledge (Polanyi 1966).

I suggest transposing this Lakatosian argument into the realm of theological methodology (as that has been set forth in Observations 1 through 4) by asserting that the reference to God is at the hard core of any theological program. What is at stake in the falsification of theological theories is not whether they can prove the existence of God, but rather whether, with the help of auxiliary hypotheses, they lead to interpretations of the world and of our experience in the world that are empirically credible. If they can do this, then they have indeed succeeded in extending the explanatory function of the community's faith into the realm of wider human experience. If theology is in any sense to be called "scientific" then it is in this sense.

THE ILLUSTRATION: THE CREATED CO-CREATOR

The Hard Core. The illustration is the theological theory in which the author has interpreted the human being theologically as God's created co-creator (Hefner 1984a, 323-28; 1984b, 209-15; 1973, 395-411). The theory can be stated more fully, but still succinctly, in the following form: *Homo sapiens is God's created co-creator, whose purpose is the stretching/enabling of the systems of nature so that they can participate in God's purposes in the mode of freedom.* This statement constitutes the hard core of a research program.

Auxiliary Hypotheses. The hard core is surrounded by a number of protective auxiliary hypotheses:

HYPOTHESIS 1. The theory is built on the premise that *Homo sapiens* is actually constituted by two natures genetic and cultural. The genetic component has its locus in the processes of biological evolution in which it has emerged and developed. The cultural dimension has its roots in the highly developed human central nervous system. The evolution of these two systems has made the human being what it is today. These two components, genetic and cultural, might be understood as co-adapted symbionts, existing together in a symbiosis (Burhoe 1976). This human creature has evolved within the system of nature within which all other terrestrial reality has evolved.

HYPOTHESIS 2. The theory rests upon an understanding of the character of technological civilization. This civilization is understood as a vast system of cultural artifacts, correlated with the cultural dimension of *Homo sapiens*, as described in Hypothesis 1. Technological civilization represents the phase of evolved existence in which all of life on planet earth, including that of *Homo sapiens*, is shaped by and inescapably dependent upon the cultural artifacts that are the products of human decision and action.

“FACTS”—1: With respect to Hypotheses 1 and 2, the hard core claims to be an interpretation of human being and technological civilization. Human being (a) is the evolved co-creator, genetic and cultural; and (b) technological civilization is both (i) the product of human culture and (ii) the instrumentality of the co-creator upon which all terrestrial existence is now decisively dependent.

HYPOTHESIS 3. The theory interprets the cosmic, terrestrial, biological processes of evolution prior to the appearance of *Homo sapiens* as the instrumentality for the fashioning of freedom and the created co-creator.

HYPOTHESIS 4. The theory emphasizes that freedom has evolved from within the world-system. Since on the one hand, the processes of evolution have worked by means of natural selection, while on the other hand, freedom exists with purposes that pertain to the conditioning evolutionary processes that have preceded its appearance in *Homo sapiens*, freedom is to be interpreted as nature's way of stretching itself toward newness (see Hefner 1987a). Hypotheses concerning evil and theodicy must be related to the theory at this point. John Hick's hypothesis of evil as the agent of evolutionary passage over the epistemic distance that is required for the emergence of freedom holds the status of auxiliary hypothesis (Hick 1981; Hefner, 1980 [see p. 276 below for discussion]).

"FACTS"—2: With respect to Hypotheses 3 and 4, the theory claims to provide an interpretation of freedom and determinism. (a) Determinism (i) refers to the conditioning processes of evolution (operating within the dynamics of natural selection) that have preceded the appearance of the creature of freedom, *Homo sapiens*. (ii) These conditioning factors are interpreted as the means by which the creature of freedom was produced. (b) The purpose of freedom is (i) spoken of as pertaining to this conditioning matrix. (ii) This purpose is the stretching of that matrix. This purpose also becomes the purpose of human being.

HYPOTHESIS 5. The theory also rests upon certain classical Christian doctrines, which comprise classical Christian theological anthropology. These doctrines include: Creation, Original Sin, Actual Sin, Christology, Justification, and Forgiveness. (See pp. 273-76 for examples of this integration within classical Christian doctrine.)

"FACTS"—3: With respect to Hypothesis 5, the theory claims to incorporate the interpretations of human being, technological civilization, freedom, and determinism within the Christian theological tradition, thereby extending the significance of that body of doctrine so as to provide genuine knowledge and growth in knowledge.

"STUNNING" NEW INTERPRETATIONS OF THE WORLD AND OF CHRISTIAN FAITH—THE POSITIVE HEURISTIC

We recall that the phrase "stunning, dramatic, and unexpected" originates with Lakatos, and it is the sort of technical phrase that he applies to the interpretations, predictions, or "facts" which are contributed by the progressive research program. These comprise the "corroborated excess content" which a progressive research program claims to possess with respect to predecessor programs or theories. This positive heuristic is finally the most powerful aspect of any research program. If it does not set forth a strong, innovative, striking vision that can deal with data which other programs find difficult, then it has no chance to survive. We shall discuss these "new" interpretations in two classes: with respect to general human experience and also with respect to the Christian faith.

NEW "FACTS" CONCERNING GENERAL HUMAN EXPERIENCE. First, the theory incorporates the "new facts" that are gained by Ralph Burhoe's theory (Burhoe 1976) of the co-adaptation of genes and culture in the symbiosis that makes human being what it is. These facts have a very broad range in and of themselves, interpreting: the commonality of the genetic and cultural components of human being, as well as the utter

dependence of the cultural component upon the continued existence of the genetic; the unique possibilities of the cultural symbiont within the human equation, particularly in the realm of religion as a transmitting agency that is comparable to the genes, as well as the possibilities of culture to promote altruism beyond the kin group and to enable cooperation and peace to replace hostility and war (Burhoe 1986).

Second, the theory interprets technological civilization within the context of the entire evolutionary process prior to the appearance of that civilization, and it links the rise of technological civilization to the cultural component of human being. This results in an interpretation of technological civilization whose nub is its function within the larger evolutionary processes, namely *to stretch them in distinctive new directions*. The theory does this by correlating the prior process to determinism and the stretching phenomenon to freedom as it operates within the processes of cultural evolution.

Third, subsidiary new interpretations of freedom are provided, therefore, which relate it to its originating context which is constituted by the evolutionary processes of nature.

Fourth, an understanding of the purpose of natural selection is suggested, as the instrumentality for producing the creature of freedom and culture, building upon the theory of Hick (Hick 1981).

Fifth, a suggestion is made concerning the way in which we should understand the purpose of human being. This purpose is spoken of as the created (evolved) co-creator, whose activity of co-creating is related to the process prior to the appearance of *Homo sapiens*, as well to its future, in the concept of "stretching" that process.

NEW "FACTS" CONCERNING CHRISTIAN FAITH. First, the claim of the Christian faith that human existence takes place within the ambience of God's will is now extended, so that the evolutionary process is itself seen in terms of ultimacy and the realm of technology and its purposes are also brought within that ambience of ultimacy. Second, a number of central Christian doctrines take on new interpretations when they are elaborated within the theory of the created co-creator.

Christological Doctrines. The human being, therefore, represents, through the action of its culture a proposal for the further evolution of the created world. Humans have the potential to actualize a radically new phase of evolution. For Christians, this may be stated in the traditional terms that humans have been created in the image of God, with the possibilities of carrying out God's will in the world. Just what that will is has not been clear to humans, but in the person and meaning of Jesus of Nazareth, clarity is given and participation in God's purposes is enabled. To call attention to the clarity which Jesus provides, the language of exemplar and Logos has been used, while the

language of atonement and redemption has carried the message that in Jesus there is also the enabling power for us to participate in the purposes of God. This is the import of the symbolism of First and Second Adam. Jesus is the Second Adam in that he embodies, not the destruction of the First Adam, but rather the image and accomplishment of what that First Adam can become, that for which the First Adam was intended. Whereas the First Adam is a symbol of the essential humanity that belongs to every member of the species, the Second Adam speaks of what that humanity is created to become.

When the Christological symbols are placed in the context that forms the basis of this discussion, Jesus Christ becomes the central event for understanding what it means for humans to be God's proposal for the future of the evolutionary process. Now in freedom, the option is opened up for the race to enact what has been set forth by Jesus as God's purposes. A brilliant first step for understanding Jesus in this perspective has been provided by Gerd Theissen. In Theissen's view, we encounter "the central reality," God, on all levels of evolution and of our own life as "opportunity and pressure originating from outside, as resonance and absurdity, as success and failure to adapt" (Theissen 1985, 114). Jesus offers in his life, death, and teaching the possibilities for raising human living to a higher plane, one which will reveal new ways of adapting to the reality system (God) that determines our lives. Jesus' proposal is a new way of life, but it stretches and bends the requirements of adaptation in novel ways that will adapt even more successfully than older ways. This proposal is scandalous to many of Jesus' contemporaries, because they are not insightful enough; for them his proposal appears to be a formula for maladaptation and extinction. Theissen's thesis holds that the innovation and the element of superiority in Jesus' proposal for cultural evolution have to do with his presentation of the love-principle: universal love across all kinds of boundaries. He builds this thesis about love on the work of Burhoe and Donald Campbell, and others, which emphasizes trans-kin altruism as the key to understanding what stage of evolution *Homo sapiens* offers beyond that of the other higher primates (see Burhoe 1979; Campbell 1975). The Cross and Resurrection are understood as intensifying the real power and desirability of love, as a prime new direction for the future of human cultural evolution.

Doctrines of Original and Actual Sin. The human predicament of sin is illuminated in this context of interpretation, if we understand that sin is located in the phenomenon of the co-creator's activity within God's purposes for the creation and its future fulfillment. We are aware that the creatures who precede *Homo sapiens*, and who live almost entirely on the basis of preprogrammed genetic information, relate to the basic

rhythms and requirements of their nature with an immediacy which humans, being the decisively cultural animals that they are, cannot match. The concept of original sin testifies that the awareness is still with us of that earlier immediacy, before there was a discrepancy between what we did by genetic programming and what we learn to do through culture (Burhoe 1972). Since the evolutionary past is integral to our central nervous system, we can, in a sense, remember the times of immediacy. Paul Tillich understands this when he writes that the Fall into original sin is a fall into personhood. We not only cannot retreat back to our prehuman past, but to even desire that is a pathology, since it is a rejection of our human selfhood (see Tillich 1957, 29-44). Nevertheless, we can and do wish for the condition in which our culture would respond as immediately to the requirements of God's evolution as our prehuman nervous system did.

This concept of original sin is illuminated still further when we ponder the fact that although it is our freedom to be co-creators through our culture which constitutes our destiny under God, the very eschatological character of the evolutionary process in which we are to be decisive actors renders it intrinsically impossible for us to be certain about what direction our co-creatorhood should take and what will constitute appropriate artifacts of that co-creatorhood. This intrinsic uncertainty is also a defect of our origin, a "sinfulness" that is bone of our bone and flesh of our flesh. To cite Tillich again, this sin is a state before it is an act (see Tillich 1948).

The Christian tradition holds also to the concept of actual sin. In a sense, actual sin proceeds from original sin as actuality emerges from potentiality. So, too, the discrepancy between the instinct and the act and the unrelieved uncertainty which characterize the co-creator taint all that issues from human culture. The co-creating process thus becomes demonic on all too many occasions. That is to say, that which is essentially good, mandated by God, turns against itself and wreaks death where it ought to be the pathway of life (see Tillich 1936, 77-122).

Doctrines of Forgiveness, Justification, and Redemption. What constitute forgiveness, justification, and redemption in this situation? Certainly redemption does not consist of the kind of word of forgiveness which implies that the works of the co-creator are unimportant, unnecessary, or expendable. Such a word of forgiveness or image of redemption would be a denial of the co-creator's essential nature and destiny, not its fulfillment. Rather, the reality of redemption is the fact that the artifacts of our co-creating are acceptable and are in fact accepted. The God of the evolutionary process is also faithful and loving; nothing is useless or unimportant for the work of God's evolutionary creation. The mutation and adaptation which appear to be "failures" are essen-

tial for the process that creates those few that appear to be highly "successful." The failures are no farther removed from the heart and soul of the evolutionary process than are the successes. All are equally a part of the process and its movement across the epistemic distance from present to future. Only a theological perspective, one that grows out of the conviction that the process transpires within the being and love of God, sees in the maladaptations of evolution anything except carnage, "red in tooth and claw." In language of the cultus, this is expressed in the thought that our sacrifices are acceptable to the Lord, and they are united mystically with the sacrifice of Jesus Christ, whose sacrifice was the action of God for the world—united in the action that God makes into Eucharist.

Doctrines Concerning Evil, Theodicy, and Consummation. Space permits only a reference to the doctrines. The created co-creator theory, building upon Hick, does provide a new insight into evil as a constructive factor in the process of evolution, in the context of natural selection. Briefly put, evil is the outcome that often results in a system that seems to have been put together as God's created order has been constructed. Apparently, in order for freedom to emerge, creation must be such that a certain epistemic distance must be traversed by all individuals and groups. In our world, that traversing is according to the design of natural selection.

Two fundamental considerations must be kept in mind always: first, that the question of evil is finally an unsolvable mystery to all modes human thought, and second, that reflection upon evil underscores how central the question of freedom is. The created co-creator theory finally will become the basis for a theology of freedom.

This set of issues are particularly neuralgic, since they pertain to the theory's point of greatest vulnerability. They must be handled with great concern for the Christian doctrines of God's final Providence and Consummation, as well Justification, as that has been discussed above (see Theissen 1985, 171-74).

FALSIFIABILITY—THE NEGATIVE HEURISTIC

Whereas it is the positive heuristic that gives power to a research program, it is the negative heuristic that provides concrete credibility to the theory by testing its protective belt of auxiliary hypotheses. We shall discuss the falsifiability of the theory under three rubrics: first, those hypotheses for which there are clearly potential falsifiers; second, those positions which the theory forbids; third, the place of evil and theodicy as falsifiers.

HYPOTHESES FOR WHICH THERE ARE CLEARLY POTENTIAL FALSIFIERS. First, a considerable number of the hypotheses which support the

hard core of the created co-creator program are constituted by empirical components for which potential falsifiers may clearly be formulated. These falsifiable hypotheses include: the hypotheses that pertain to the concept of *Homo sapiens* as a conjunction of genes and culture in the vein that Burhoe has pursued. The hypotheses pertaining to cultural evolution, its dynamics, and the role it has in shaping our lives (e.g., Csikszentmihalyi 1985). The concepts of evolution, natural selection, freedom, and technological civilization contain empirical components which may be subjected to the conventional rules of testability.

Second, the components of the theory that deal with classical Christian doctrines can be subjected to testability according to the conventional theological tradition of analysis, to ascertain in what ways they are in continuity with the tradition and in what ways they are innovative to the point of discontinuity.

POSITIONS WHICH THE THEORY FORBIDS. Popper's dictum is well taken: "The more a statement forbids, the more it says about the world of experience" (Popper 1972, 120). The created co-creator theory makes a number of clear demarcations that indicate what it might forbid. These include: theories of human being that separate the human from the evolutionary processes that have preceded its appearance on planet earth; theories of human being that separate human being from technology; theories that separate technology from nature and the total evolutionary process; conceptions of God that separate God's purposes and will from the evolutionary processes, including technology; conceptions of forgiveness, justification, and redemption which suggest that nature or the works of the human co-creator are unimportant, unnecessary, or expendable; and concepts of the human co-creator that do not emphasize adequately the co-creator as dependent upon God, created by God, or likewise that do emphasize, in an inappropriate manner, autonomy for *Homo sapiens*; concepts that suggest that the human being can create originatively, *ex nihilo*, as God does create.

THE PLACE AND FUNCTION OF EVIL AND THEODICY AS POTENTIAL FALSIFIERS. The greatest potential falsifier of the created co-creator theory—and of all other theories that speak of God—is the reality of evil. This is true, because evil challenges all that the theory asserts about meaning, purpose, and goodness as the rationale of the created world, and in particular about the meaningfulness and goodness of the evolutionary processes.

The theory can deal with evil only by placing the theodicy problem in the hard core of the program which is never subjected to the abrasion of falsification. What results is that the program must rely on two basic strategies: first, demonstration of the cogency of the other aspects of

the theory, particularly the auxiliary hypotheses, and second, emphasis on the insight of philosophy that answers to the final ontological questions (e.g., Is there a God? Will evil be overcome and compensated for finally?) are not susceptible to demonstration. At the end of the day, one must simply acquiesce to the fact that it is equally reasonable to believe or to disbelieve in God and the triumph of goodness.

As far as the questions of evil and theodicy are concerned, however, the created co-creator theory will accept as a starting-point the theodicy of Hick, as he has revised it in 1981. Hick's hypothesis will thus stand as an auxiliary hypothesis.

CONCLUDING COMMENTS

Two final comments are intended to remind the reader of the focus of the foregoing. First, the theory (or research program) set forth here is intended as a theological theory, and therefore God stands at its center, as that to which all of the terrestrial and cosmic data that the paper discusses is related. The question and reality of God, however, are placed in the hard core of the program, so that they never enter into the realm of possible falsification. Such considerations do figure strongly in the positive heuristic of the program, however. Second, the created co-creator theory is intended to enable an extension of the explanatory power of Christian faith so as to provide genuine knowledge of wider human experience. Whether the theory will stand or fall, whether its program will finally be judged to be progressive or degenerative or simply misbegotten, will largely depend on whether it satisfies this basic intention.

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