RALPH WENDELL BURHOE AND BEYOND: PROPOSALS FOR AN AGENDA

by Hubert Meisinger

Abstract. This paper deals with Ralph Wendell Burhoe's scientific theology and his theory of altruism. Its task is a critical examination of some of the main aspects of Burhoe's approach within the dialogue between science and theology; its goal is to enhance his vision. In the first part I argue that Burhoe's concept of God can be related to the Christian concept of a God of love through his theory of altruism. The second part deals with Burhoe's way of yoking religion and science. I apply insights of evolutionary epistemology as well as Philip Hefner's fruitful suggestion that Burhoe's enterprise is unavoidably metaphysical. In the last part, I investigate Burhoe's philosophy of science and the dominant role of Western culture, including the Judeo-Christian tradition, in Burhoe's thought. Incorporation of a more critical attitude toward science within Burhoe's positivistic approach is suggested.

Keywords: altruism; Ralph Wendell Burhoe; equivalence; evolutionary epistemology; God concept; love; scientific theology.

Ralph Wendell Burhoe is a remarkable and important figure in the dialogue between science and theology. Over the course of a lifetime, he developed an original approach to linking scientific and theological concepts—his scientific theology. His theory of altruism addresses a problem Edward O. Wilson calls "the culminating mystery of all biology" (Wilson 1975, 382): How is it possible that humans behave as altruistically to each other as they sometimes do, even to non-kin?

Of course, a detailed survey of Burhoe's thought would go far beyond the limitations of this paper.[1] My intention is to provide constructive criticism of some of the main aspects of Burhoe's work in order to enhance his vision. To begin with, I would like to show

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[*Zygon*, vol. 30, no. 4 (December 1995).]
 ISSN 0591-2385

the high degree of interconnectability between his scientific theology and his theory on altruism.[2] I will summarize Burhoe's position at the beginning of every section, so that the reader will be certain what I refer to.

Burhoe's Concept of God and the Christian God of Love

At the very heart of Burhoe's scientific theology stands his concept of God. For Burhoe, *God* is a symbol for the "ultimate and true reality which created man, shaped and shapes his destiny, and provides meaning . . . and direction for human life" (Burhoe 1975, 330). Indeed, Burhoe actually drew up a list of divine attributes. In this list, Burhoe used the term *god* (with a lowercase *g*) "to denote the total sovereign system, which in scientific language may be said to be the total cosmic ecosystem including the details of local ecosystems on earth" (Burhoe 1981, 124). This term, he suggested, is a symbol that relates both to traditional religion and to scientific concepts (Burhoe 1981, 117).

Among the main features of traditional attributes or characteristics of *god* as the ultimate reality that determines human destiny are:

1. *God* is the one and only ultimate reality surrounding and infusing man, which created man, and upon which man is utterly dependent.
2. *God* has revealed in part *god's* requirements of and *god's* disposition to men; hence, *god* is not wholly hidden, alien, or mysterious.
3. Yet *god* is in large part hidden, transcendent, beyond what man can fully understand—"supernatural"; hence, the ultimate mystery of *god*.
4. *God* is lawgiver, the reality or power that determines what is right and wrong, and has incarnated or revealed in large measure (by a grace sufficient for the day) the requirements for good and what is to be avoided as evil in the hearts and traditions of creatures.
5. But *god's* continuing program of creation of ever-new stages calls upon most evolving creatures to seek the new as well as abide by the established requirements that are still valid—or else disappear from the scene.
6. The guarantee or justification for the hope of the ultimate triumph of *god's* purpose and of all creatures who participate in them, even though any present situation may seem to be disastrously short of this triumph, is revealed by a careful reading of *god's* mighty acts in the past 6.10^3 years.
7. *God* is gracious to man; that is, without any merit on man's part, man has been raised up from the dust and perennially sustained and redeemed from his errancy and given the opportunity to be a conscious cocreator of *god's* evolving Kingdom of Life, as long as man seeks, finds, and executes *god's* requirements. (Burhoe 1981, 125)

The primary translation is God = Nature, whereby the objective side of God is nature and the operational one is natural selection.[3] Nature is defined as a "system of laws, according to which events in

the . . . evolution of the underlying reality system proceed in time, which, together with the given or 'initial conditions' and the 'hidden relations' or 'preferred configurations' of the reality system, explain . . . the varied . . . evolution of the universe and the living systems (including human minds and societies) in it" (Burhoe 1975, 361).

Thus the reality pictures from the sciences and from traditional theology show, according to Burhoe, that our "life and destiny may be scientifically as well as religiously hypothecated to be fully determined by the only partially understood operations . . . of that vast, omnipotent system of the *nature* that created us, shaped our societies, and even shapes what we are thinking and feeling and willing at this moment" (Burhoe 1975, 360). The only human freedom is to "adapt to what this nature requires—except to cease to be" (Burhoe 1975, 339; cf. 346). Thus survival is seen as the highest value, and the idea of God is identified with one particular concept of God which, according to Breed, derives from the pre-Christian era: "one of the God images of the early Hebrews and the image of nature characteristic of the early Greeks. The image is one of an almighty power, principle, or fate which creates and maintains order and to which one must obediently submit." Breed laments the absence of the Christian God of love, the personal God (Breed 1988, 372 f.).

This interpretation initially seems justifiable, and Breed seems to be right in saying that Burhoe's concept of God is reductionistic. In fact, Burhoe does not talk about love when he talks about *god*. And he does not give reasons for his choice of attributes for *god*. Even the criteria Breed worked out for scientific connectability and religious (theological) relevance do not really explicate Burhoe's concept of God (Breed 1992, 90). Nevertheless a look at Burhoe's theory in general will help us to understand that his concept of God—though it does not include the Christian idea of a God of love—does not exclude it either. In fact, the integration of Burhoe's theory of altruism with his concept of God leads to an insight that goes beyond Breed's interpretation and perhaps beyond what is intended by Burhoe himself, but nevertheless appears to be in harmony with his intention. It is on this field that his scientific theology has to be proved or made credible, as I would like to show in the second section of this article.

In his theory of altruism Burhoe asserts that religions are the value-transmitting cores of culture. They have been selected for because they contribute to the survival of the biocultural group. They accomplish this by enabling altruism to extend beyond genetic kin to include members of the larger group. This phenomenon, *trans-kin altruism*, can be explained neither by genetic selection (Wilson 1975)

nor by the theory of "reciprocal altruism" developed by Trivers (1971).[4] It would be interesting to compare Burhoe's approach to the problem of trans-kin altruism with those of Mary Midgley (1978), Peter Singer (1981), Charles J. Lumsden and Edward O. Wilson (1981), Donald Campbell (1975, 1991), Robert Boyd and Peter Richerson (1985), or Richard Alexander (1987). In all their theories, culture plays an important role, but in detail they emphasize different mechanisms in order to explain trans-kin altruism. According to Burhoe, "religions or some functionally equivalent cultural agencies are essential for any civilization at any stage, including ours, since, beginning with their genetically based rituals and on through myths and theologies, they are the cultural source of coadapted basic values which motivate that genetically selfish ape-man to serve his symbiotic sociocultural organism" (Burhoe 1981, 227). Thus a theory with survival at the top of the hierarchy of values and a concept of a God who weeds out what does not adapt to divine requirements brings forth a theory on the origins of altruism: altruistic behavior is necessary for the survival of a society. Indeed, it is necessary for the survival of the coming global village (Burhoe 1986, 462).

Burhoe's presupposition that religions can be the cultural agents that make possible trans-kin altruism requires more differentiated investigation in regard to Christian religion. Anders Nygren, for example, holds the view that it is disastrous for the Christian idea of love to be identified with altruism—though he sees certain surface similarities between altruism and Christian neighborly love (Nygren 1953, 95).[5] In fact, the relation of altruism to Christian love is not commonly accepted (cf. Hillerdal 1978, 349).

However, to my mind it can indeed be shown that altruism plays a central role within Christian religion and theology because it corresponds to critical aspects of the Christian love command (e.g., Mark 12:28–34) and to texts which have to do with helping other people (e.g., Luke 10:25–37). A basic motive can be found in the Johannine literature, where love is defined as giving one's life for one's friends (John 15:13). In an important statement, Hefner concludes that the "concepts of altruism as articulated by the evolutionary biocultural sciences and the love command of the Hebrew-Christian tradition focus upon the same phenomenon: beneficent human behavior toward others, even those who are not genetic kin" (Hefner 1993, 197).

Of course this preliminary definition requires more detailed investigation to support further research. As far as I can see now there are two possible ways of relating the concepts to one another.

One is to say that Christian love goes beyond altruism since it is rooted in God's love (see, e.g., Browning 1992). This model sees altruistic behavior as one expression of Christian love and accordingly a part of it. The other possibility is to expand the concept of altruism developed in the sciences and to equate it with Christian love. Hefner tends toward this model when he says that the "theological elaboration of agape should not shy away from identifying it with altruism" and that the "meaning and status of altruism are not exhausted by . . . scientific concepts." By grounding love in God, the "way things really are," Hefner gives altruism an intrinsic, ontic character (Hefner 1993, 208 f). Both models help us to go beyond Burhoe's own concept of God and Breed's objections to it. If in fact altruistic behavior is adapted to the "central reality" (Theissen 1985), this reality may not only permit love but be characterized by love itself. Thus—from a Christian point of view and without violation of Burhoe's message—it is possible to integrate the Christian God of love with Burhoe's concept of God.

Nevertheless the problem of the personhood of God still remains (see Breed 1988, 372–75). As far as Burhoe is concerned, "such personhood may not be necessary" because in many religions the "ultimate power is not anthropomorphically conceived" (Burhoe 1981, 123). He even sees support for deanthropomorphization in the Old Testament and in the Christian tradition itself when the three persons of the Trinity are not identified as self-conscious beings. In contrast, the personhood of the three persons is in fact a necessary element within much of the Christian tradition. For example, Wolfhart Pannenberg even connects this personhood with the personhood of human beings:

> The persons are referred to the other persons. They achieve their selfhood ecstatically outside themselves. Only thus do they exist as personal selves. In this respect human personality is similar to the trinitarian persons. Historically, these features of human personality emerge only in the light of the doctrine of the Trinity as its concept of person, constituted by relations to others, is transferred to anthropology. (Pannenberg 1992, 430)

Pannenberg's model is distinguished from Burhoe's understanding by its stress upon the relational character of personhood, in contrast to Burhoe's emphasis on self-consciousness. To my mind the personhood of God is an important feature of Christian theology that cannot be dismissed as easily as Burhoe attempts to do.

In addition, there seems at first to be a contradiction in the use of altruism to integrate Burhoe's concept of God with the Christian concept of the God of love. Originally Burhoe's theory was based upon the survival criterion, and his *god* was one who selected out

what did not adapt to divine requirements. Now we have introduced the criterion of love and a God of love who especially is devoted to people at the edge of human society, the poor, the ill, and social outsiders. Such people do not seem to be adapted to the requirements for survival but need help. Where does this seeming "contradiction" come from, and how can we get rid of it?

I placed the term *contradiction* within quotation marks because I do not believe there really is one. In my view this seeming contradiction derives from reductive presuppositions on both sides. As Burhoe himself acknowledges in the text quoted on page 572, his list includes only some main features of traditional attributes of God; the list was selected based on two criteria already mentioned: scientific connectability and religious (theological) relevance. These attributes are open to amplification. On the other hand, to characterize the Christian God only as a God of love means to reduce the pluralistic picture within the Old and New Testaments to only one attribute—although it is the most important and predominant one. This is why Ulrich Lüke (1990, 119–28), who investigates the relationship between evolutionary epistemology and theology, feels a bit uncomfortable with Gerd Theissen's statement that Christian religion is "antiselectionist" because it is devoted to the poor, the ill, and social outsiders and claims to overcome death (Theissen 1985). According to Theissen, religion is at the heart of human culture and represents a rebellion against the principle of selection.

> It makes human beings open to a greater reality before which each individual has infinite value and is absolutely equal. . . . nowhere does the rebellion against the principle of selection emerge more clearly than in belief in the one and only God who brought Israel out of Egypt, and who reveals himself in Jesus of Nazareth and continues to be accessible to humanity in the experience of the spirit. If people recognize that their whole lives must correspond to the central reality which appears here, then they are obliged to rebel against the principle of selection. (Theissen 1985, 50–51)

Theissen's use of the term *selection* seems to have negative connotations and does not convey the concept's complexity (Lüke 1990, 125). Lüke observes that what Theissen calls selection is also described in the Old and the New Testaments among the diverse and often contradictory traditions to be found there; he does not specify which biblical accounts he has in mind. (Probably he is alluding to such stories as the weeding out of whole populations during the Exodus of the Israelites from Egypt.) Although Theissen claims to promote theological discussion with evolutionary epistemology, Lüke argues that in fact he does not. Instead, Theissen transfers central terms of a general evolutionary theory (e.g., mutation and selection) to the theological system, using the terms in a very vague way.

Altruistic, "antiselectionist" actions such as Theissen describes may characterize Christian religion. Nevertheless, on a cultural level, the Christian religion is itself not exempted from selectionist pressures. It must survive a kind of natural selection if it is to prevail.

However, my argument should make it clear that simply combining the God concept of Burhoe and the Christian concept of a God will not yield an adequate description of the term *God*. Both concepts have to be differentiated more precisely and completed within their own framework before they can really be related to each other. Thus my attempt to amplify Burhoe's concept of God by integrating it with the Christian concept of God via altruism can be only a preliminary and incomplete one. This is a field for future research.

Burhoe's Yoking of Science and Religion

So far we have presupposed that Burhoe equates God and nature, though I have shown that his attributes of *god* have to be amplified. In this section I will investigate the nature of this equation itself.

According to Breed, Burhoe methodologically tries to build an analogy between two kinds of dialectics: that of theology with theories and models of science, and that of scientific theories with data of experience and observation (Breed 1992, 93). Thus, theology is in principle connected to empirical experience, and God is identified with and translated into nature. Thereby Burhoe does not simply replace religious or theological terms with scientific terms. He tries to identify equivalent religious and scientific concepts on the basis of two criteria: scientific connectability and religious (theological) relevance. The concepts themselves stay within their specific frames of reference.

Burhoe is convinced that religion is important for the survival of humankind today because of its "well-winnowed" wisdom. In addition, he holds the view that the sciences are new revelations of reality. From these convictions he works to construct a scientific theology that could be seen as a "Rosetta stone" for theology and science. Apparently, the resulting concepts may not only replace older theological ones but—as I interpret Burhoe—should inherently have the power to replace scientific concepts as well. His primary intention is to enhance the credibility of theology by relating its concepts to those of science. Secondarily, he hopes to broaden the framework of the sciences by integrating religious and theological concepts into their inquiry, which now can be related to the "central reality." In contrast, such a mutual relationship is not intended by E.O. Wilson when he speaks of science as the Rosetta stone for theology (Wilson 1978, 172). Wilson's idea of the relationship

between science and theology in general seems to be a hierarchical one with science at the top. This does not correspond to Burhoe's way of relating science and theology, in which each should be able to enrich the other. I feel uncomfortable, however, with what Breed calls an analogy between two processes: building theology out of the theoretical material of the sciences, and generating scientific theories from empirical data. To my mind he does not make sufficiently clear to what extent it is possible to talk of an analogy in this case.[6] Burhoe himself very often uses the term *equivalent* to indicate his understanding of the relation between various concepts of science and theology (e.g., Burhoe 1977, 350).[7]

The most elaborate use of the term *equivalence* has been developed by Niklas Luhmann (1977).[8] Of course Burhoe's use of this term cannot be measured by this concept because the two thinkers probably do not know of each other. Nevertheless, I would like to summarize Luhmann's approach in order to show the differences and some similarities between the two concepts. According to Luhmann, our current society is functionally differentiated, with each segment having a special "functional primacy"—a term coined by Talcott Parsons—that must be fulfilled in order to maintain the society as a whole. From society's perspective, every function is one among many and cannot claim priority. The function of religion is the transformation of indefiniteness into definiteness—for example, through rites of passage.[9] Generally there do not exist functional equivalents outside religion. If there is a change within society, religion, like all other subsystems, has to adapt to the new situation while still having to fulfill its function. Such adaptation requires that the subsystems desire new concepts and procedures. To my mind Burhoe's construction of a scientific theology can be seen as such a self-substitution within the religious subsystem: meaning systems are recast in light of input from the sciences so as to orient humans in a world radically informed by science. But Luhmann would probably reject Burhoe's mode of relating concepts within different subsystems, even though he does consider how different functional segments can be integrated. In particular, Luhmann would not allow that a scientific concept and a theological one could be equivalent. If they were, one could be replaced by the other—in Burhoe's context, a theological concept could simply be replaced by a scientific one, with no need to construct a scientific theology. But science cannot fulfill the function of religion, according to Luhmann. The two constitute different segments within society, each with its own functional primacy.

To my mind this discussion of Luhmann's views seems fruitful in

understanding Burhoe. Burhoe's method of relating science and theology obviously presupposes a wider understanding of the term *equivalent* and accordingly another picture of society than Luhmann presents. Furthermore, we see that striking problems are raised with regard to Burhoe's method in general, which require serious research. Such work would be only part of an investigation into the character of Burhoe's work as a whole. Of course I cannot give final answers to either specific or general research problems. My intention here is to discuss approaches that can be related to these problems or that deal with them directly.

Problems of Methodology. Breed (1992) accepts Burhoe's methodology with little critical reflection. Even less critical is Roger Sperry; in his foreword to Breed's book, he explicitly agrees with Burhoe's strategy of staying clear of embroilment in underlying philosophical issues. He asserts that Burhoe's approach corresponds with current mainstream opinion. Unfortunately Sperry does not provide much basis for this statement.

While Burhoe's method of bridging science and religion has its roots in positivism, evolutionary epistemology may enhance our understanding of it. Lüke (1990), in his detailed discussion of the relation between evolutionary epistemology and theology, concludes that, in a perspective based upon evolutionary epistemology, both rationality and religiousness are adaptations to the one reality that Theissen calls "central reality." Note that Lüke explicitly speaks of *religiousness*, not *religion*. According to Lüke's argument, which is based on a short article by Oskar Jacobi (1986), an evolutionary point of view can explain and pragmatically justify the existence of our innate religious disposition. Furthermore, he argues that both science and theology deal with problems that go far beyond our innate cognitive capacities, which are adapted to the so-called mesocosmos (intermediate between microcosmos and macrocosmos) (Vollmer 1990, 161). In order to deal cognitively with these phenomena, we must "transfer" them into the mesocosmos. Thus, he claims, there is a structural correspondence between science and theology. They may be parallel phenomena because both have to cope with a relative abstractness on a cognitive level, which has to be transferred to partial concreteness at a discursive level. However, Lüke does not claim an ontological correspondence of scientific and theological concepts, a feature that distinguishes his approach from Theissen's.

Seeing both science and religion as adaptations to the central reality, Theissen follows Burhoe's method in presenting theological

concepts in scientific terminology. Burhoe goes a step farther. His roots in positivism and its high appreciation of scientific language are responsible for his move to equate God and nature even ontologically. Lüke implicitly does not share this view. For him Jesus as God incarnate is the most important reference for a theological conceptualization of God in the realm of human experience.

I would like to point out two insights that can be gathered from this discussion. In the first place it should have become clear that, from an evolutionary viewpoint, religiousness as well as rationality can be seen as adaptations to the same reality. This view suggests a structural correspondence between science and theology. While this insight is necessary in order to make Burhoe's method credible, it is not sufficient. The second insight to be gained from Lüke is the distinction between religion and religiousness: *religiousness*, not religion, is an adaptation to reality. It is the basis for and is expressed in various religions all over the world. To my mind Burhoe's approach in general could have gained credibility if he had explicitly considered this difference between religion and religiousness. The distinction would have provided a more subtle tool to analyze the relation of his scientific theology to other theologies and religions. Religiousness is the phenomenon underlying both the religions of the world and the particular religion expressed in Burhoe's scientific theology.

Evaluating Burhoe's Contribution. The second set of problems has to do with the characterization of Burhoe's approach as a whole. Is his scientific theology based upon a scientific picture of nature? According to Hefner, the answer to that question is no (Hefner 1977; cf. Barbour 1990, 199 f). Hefner very convincingly concludes that Burhoe's work is a metaphysical attempt. He refers especially to a definition of metaphysics by W. H. Walsh:

> [Metaphysics is a] set of principles . . . [that] would tell us how to organize the data of our experience in such a way that we could give a unitary account of them; it would thus help us to make sense of the scheme of things entire. . . . We should then be masters of an over-all point of view enabling us to see things synoptically or have a set of ideas which would allow us to differentiate the real nature of the universe from its merely superficial aspects. We should, in short, be in possession of a metaphysics. . . . The deviser of a metaphysical theory thus becomes a man with a vision of the scheme of things entire. It is important to add, however, that he is not merely a man with a vision, in which case he would be indistinguishable from a philosophical poet. He needs to work his vision out in a theory; he needs to argue his case both by adducing those facts which immediately support it and explaining those which on the face of things do not." (Walsh 1967, 303)

According to Hefner, Burhoe is the metaphysician par excellence in terms of Walsh's description. He is a man with a vision of the scheme of things entire, and his work forms a grand attempt to work out that vision in a theory substantiated by a massive range of significant and cogent facts. Hence, Burhoe is calling for an interpretation of religious truth within a certain metaphysics, not within a scientific picture of reality. "God = Nature" is, like all metaphysical visions, an assumption, not a conclusion, an a priori, not an a posteriori. According to Hefner, Burhoe's conjunction of theology with scientific inquiry can be seen as an effort to garner credibility. Thus Hefner sees "translation" as the effort to bring the religious vision into conjunction with scientific inquiry so as to show how the vision organizes that inquiry and points to its ultimate significance. This process, in turn, renders the vision credible.

Though Burhoe does reject being called a metaphysician (Burhoe 1977), Hefner does in fact go beyond Burhoe's thoughts. In his critical remarks on the problem of evil, Hefner shows both weaknesses and possibilities in Burhoe's discussion of evil. The difficulty with Burhoe's attempt is that he does not approach the obvious phenomenon of evil with enough gravity. It simply is not adequate to the existential trauma of evil to write, as Burhoe does, "Since God is omnipotent and since man's true soul or being is one with God and since God's program of evolution is indeed the ultimate reality, then all is well" (Burhoe 1975, 364; cf. Hefner 1977, 102). Yet, in contrast to Barbour, who does not believe that Burhoe can adequately deal with this problem (Barbour 1990, 199f.), Hefner expands Burhoe's concept to deal with the problem of evil more credibly. Hefner understands Burhoe's approach in light of Hegel's dialectic of negation. In this view, the evil that accompanies the selecting-out process is part and parcel of the process by which nature and history are brought into being, proceed in time, and move toward the goals that the Lord of History sets. Evil, then, is not only intrinsic but plays a significant role, since selection is the primary characteristic of the unfolding of the process of reality.[10] Thus Hefner convincingly shows that Burhoe's approach is open even to constructive critique that goes beyond Burhoe himself.

I would like to point out another aspect of Burhoe's thought that can be better understood when viewed as metaphysical. Within a metaphysical framework, Burhoe's theory of altruism can be seen as a kind of applied scientific theology. Not only is it an effort toward credibility but, according to Hefner's interpretation, it is a kind of translation that organizes the scientific inquiry and even completes it, forming an important piece to the scientific puzzle concerning the

phenomenon of altruism. By using the term *applied scientific theology* I not only refer to Burhoe's argument that theology should be seen as applied science (Burhoe 1981, 37) but also transfer it into a metaphysical framework. If his theory of altruism, wherein religion plays an important role, really contributes to the scientific investigation into the problem of trans-kin altruism, then his vision yields credibility. Again we see the centrality and importance of the theory of altruism within Burhoe's approach in general (see Burhoe 1977, 383).

Burhoe's Philosophy of Science and the Role of Western Culture

According to Burhoe, the sciences are new revelations of human nature and the world; they go far beyond the former revelations of religion. In his view, the revelations of science are credible and compelling for most people today (Burhoe 1975, 328). Though he is aware that the scientific community "does not and cannot have *ultimate* explanation" (Burhoe 1975, 360; cf. 1981, 128), he nevertheless strongly believes in the scientific "myth" (Burhoe 1975, 317) that, in principle, there is no limit to scientific investigation of the phenomena of our experience, including religious experience. Thus, in Burhoe's epistemology, "science says" is the "synonym for 'truth'" (Burhoe 1975, 353). In a slightly moderated form, he claims that "what sciences say is our best avenue to new truth" (Burhoe 1977, 370). In addition, Burhoe appreciates the sciences as that "element of human cultural evolution that has learned most deeply to understand that the evolution of valid knowledge is not to be entrusted to any individual human wish, prejudice, or person" (Burhoe 1975, 328).

As Breed (1992, 16–19) has shown, Burhoe's positive attitude toward science was highly influenced by Philipp Frank and the Institute for the Unity of Science, which grew out of the work of the Vienna Circle. Their task was to unify the sciences through formation of a universal language of science. Burhoe expanded this model to include traditional religious concepts. Thus his vision was that the universal language of the sciences should be the medium for the reformulation of religious doctrine. I need not repeat all the discussion of the Vienna Circle and positivism here (see Pannenberg 1976). In the section that follows, I criticize Burhoe's point of view from three different perspectives and thus show that a more critical attitude toward science should be incorporated within his approach in order to gain credibility.

1. An important insight of evolutionary epistemology is the hypothetic-realistic character of all knowledge. Vollmer characterizes this hypothetical realism as follows: "We assume that there is a real world, that this world has certain structures, and that these structures are in part knowable. We then test how far these hypotheses can take us" (Vollmer 1990, 35). That is to say, a complete scientific description of reality seems to be impossible—especially because our cognitive system itself is part of that reality. Perhaps we would need to have a position outside ourselves to conceive reality completely.[11] This, of course, is impossible. In fact, Burhoe's insight that the scientific community cannot provide ultimate explanations should even be strengthened. Otherwise he can be accused of having a restricted understanding of "truth" and an epistemology that is correspondingly limited.

2. In addition, Kuhn has convincingly shown that the scientific enterprise is not free of values, personal commitments, schools of thought, and prejudices (Kuhn 1962). This conclusion counts against Burhoe's trust in the objectivity of science. Though Burhoe refers to Kuhn several times in his writings, he obviously does not take into consideration this aspect of Kuhn's work. Burhoe's concept of truth can be criticized out of a Kuhnian perspective. In fact, Burhoe's scientific theology can be seen as a new paradigm to interpret religious experience. According to Burhoe, this means that scientific theology has gone further on the avenue to truth than any model before. Thus Burhoe's understanding of truth orients itself toward a final telos. This assertion does not square with Kuhn's conviction that we cannot talk of a process *toward* anything but only of a process *away from* something. This disagreement of course leads us to the problem of progress in science (and theology) in general, which cannot be discussed here.

3. Burhoe can also be criticized from an ecological perspective. The insights of science and related technological progress have improved life in some respects, but they also have led to such serious ecological problems as environmental pollution, unsafe generation of atomic power, and problems of radioactive waste disposal, not to mention the atomic bomb and other kinds of weapons that can easily destroy life on earth several times over. Many have lost confidence in progress through science and technology. Increasingly, people realize the ambiguity of the process. Indeed, in some parts of society a negative attitude toward science and technology is becoming extremely strong (see Altner 1991), although many remain uncritically in favor of the scientific enterprise. (Arnold Toynbee, to whom Burhoe frequently refers and upon whose insights on the

dynamics of religion in human history he builds, hypothesized in the 1950s that a feeling of revulsion against science and technology might develop in the late decades of the twentieth century [Toynbee 1956, 235; cf. Breed 1992, 82]). Thus a reformulation of traditional religious doctrines in the universal language of the sciences is likely to become problematic, even if one acknowledges that Burhoe's theology was developed primarily within a scientific community and was therefore addressed to scientists. If it were possible to incorporate a critical attitude toward science within Burhoe's positivistic approach, its credibility would increase.

Such criticisms suggest the need to go beyond Burhoe constructively. It is not easy to do so without changing his approach in principle.[12] A possible starting point may be found within the tradition that seeks to widen our understanding of reason. Tillich, for example, points out a distinction between an ontological concept of reason and a technical concept of reason that is a part of the ontological one (Tillich 1951, 72). Perhaps it could be a field of future research to integrate the technical reason of the sciences with a wider ontological reason which would also apply to Burhoe's approach in general. What has to be avoided is a hierarchical model of the sciences with theology at the top—as extreme a concept as a hierarchical model with science at the top. It is interesting to note that Burhoe integrates both extreme models. By identifying science as the new revelation of truth he attempts to restore theology as queen of the sciences (Burhoe 1981, 34). The results lead me to conclude that both extreme models in their one-sidedness must be avoided in order to go fruitfully beyond Burhoe's approach.

Burhoe's program can be understood only in light of the dominant positivistic position of Western culture in his thought. For example, he writes that "the various cultures of the world are buying or adopting the scientific-technological culture of the West because of its advantages to them compared with their previous cultural tradition" (Burhoe 1981, 102). Even his translation of scientific and theological concepts into a scientific theology is possible only because he interprets the "physicalistic, scientific conceptual system" as the "crowning epistemological tool achieved in the West for providing coherent and 'objective' views or 'truth' in theology as well as in the sciences in general" (Burhoe 1981, 212). Unfortunately, Burhoe does not critically discuss this presupposition and the problems that arise because of cultural imperialism, though he seems to be conscious of them (Burhoe 1981, 102).

A related issue is the centrality of the Judeo-Christian religion and Christian theology in Burhoe's approach. Though he asserts that his

way of relating science and theology could work for other religious traditions as well, the written account of his approach is deeply rooted in his own tradition. He does not transfer his approach to other religious traditions, and I am not sure that he could, because his concept of a scientific theology depends so deeply on Judeo-Christian assumptions. For example, Burhoe characterized the inception of Christian theology as a "high step toward converting primitive or 'mythical' explanations of religious ritual into the sophisticated, rational, scholastic, or theological 'myths' of Greek philosophy" (Burhoe 1975, 321). Burhoe regards that process of rationalizing religious myth as a model for his own efforts to overcome the current religious crisis by creating a scientific theology. Thus he rather clearly shows that his concept of a scientific theology can hardly be based upon a religious tradition other than the Christian one (although, as we have seen, he reduces certain Judeo-Christian beliefs, such as the concept of God, to selected features within that tradition).

One could argue that Burhoe had to stick to Western culture, including its scientific enterprise and Christian religion, because the crisis he wanted to overcome had its roots within Western culture itself. In my view this argument is shortsighted. It does not take into account Burhoe's assertion that his scientific theology is to be the theology of a coming global village that will have to adapt itself to each local culture (Burhoe 1975, 328). Clearly, such a theology cannot be based upon only one religious tradition. Probably Burhoe had this issue in mind when he talked about "scientific theologies" in plural (Burhoe 1975, 328), but I am not sure about that. If we measure Burhoe's approach by his intentions and assertions, we can conclude that he has gone far toward the goal he envisioned. Nevertheless, several aspects of his thought need further development.

Concluding Comments

Aside from all these critical remarks on Burhoe's approach, the straightforwardness with which he developed his ideas over a lifetime and the immense amount of scientific and theological information he marshaled are admirable. To my mind he belongs among those theologians in our century who have been able to shape their vision into a coherent form. Burhoe's approach also may be distinguished from most others in that the dynamic structure of his thought is a part of his system itself, which requires continual development in accord with the newest information from the sciences. In fact, it is questionable whether one can talk about a system at all, because

Burhoe has always developed his ideas without having written a final account. Nevertheless his theology is highly coherent—and provocative for both theologians and scientists. Burhoe's scientific theology and his founding of *Zygon* as a forum for interdisciplinary dialogue have engaged both theologians and scientists, encouraging them to think about their mutual relation more intensively and to relate the concepts of each field to the other. Thus, Burhoe has made a central contribution to the highly developed current dialogue between science and theology.

NOTES

The author would like to thank Professor Gerd Theissen and Professor Jürgen Hübner of the University of Heidelberg and Professor Philip Hefner of the Lutheran School of Theology at Chicago for their critical comments. He is especially grateful to Ralph Wendell Burhoe and his late wife Calla for their hospitality during several visits at their home.

1. I assume that the reader of *Zygon* has become acquainted with Burhoe in general. If not, I recommend the book by David Breed, *Yoking Science and Religion: The Life and Thought of Ralph Wendell Burhoe* (1992), which is a first and fruitful attempt to cope with the ideas Burhoe developed.
2. This aspect is not really mentioned by David Breed in his book on Burhoe (Breed 1992).
3. Cf. Breed (1988, 334), who holds the same distinction.
4. Unfortunately, there is no discussion of an opposite phenomenon—hostility and aggression—and its relation to trans-kin altruism. However, both obviously belong to our common human experience.
5. Of course the background of Nygren was not that of sociobiology, to which Hefner (1993) refers. Nevertheless, his position indicates the difficulties theologians sometimes have with this term.
6. Cf. Track (1978).
7. In his 1975 article he also speaks of a logical isomorphism (Burhoe 1975, 361).
8. For the background of the term *equivalence*, cf. Menne (1971).
9. In Burhoe's approach the function of religion is not to transform indefiniteness into definiteness but to contribute to the survival of humankind. Because of this fundamental difference, a comparison between Luhmann and Burhoe is difficult.
10. Hefner summarizes as follows: "If Burhoe is to deal adequately with evil, and if he is to render his vision credible within the context of the existential force of evil, then he must lift up the implications of the fact that evil is a necessary ingredient in the selection process and focus on those implications with the same forcefulness that a Hegel does" (Hefner 1977, 103).
11. Of course, this statement can be applied to itself because it is a statement on the reality of our cognitive system, which ultimately cannot be left out of account.
12. Of course the possibility of changing Burhoe's approach in general cannot be dismissed. Nevertheless my intention here is to enhance his vision by critically discussing it, as I have already said.

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