

In the Periodicals

In order to integrate the wisdom of religious humanistic traditions, on the one hand, with new scientific information, on the other, we need to be familiar with elements of the literature in both domains. Clearly, a problem is that the sources to which we should go to find the various elements we need for constructing an integrated picture of human destiny are widely scattered and not always recognizable or evaluated by specialists in others of the various disciplines relevant to the task. To meet this need, the editor and his associates will seek to point out materials published in the periodicals of various disciplines that in our opinion may be especially significant for *Zygon* readers who may be concerned with working on human values, religious understanding, and theology in the light of the sciences. Any readers who wish to volunteer citations and evaluations of especially significant items of such literature are invited to send a copy to the editor for possible use in *Zygon*. To the extent that it is possible, such items (together with the contributor's name) will be published. I present below three items that I have found especially significant recently.

STENT/End of Materialism versus Idealism

The possible union of human values with the sciences—union of the representations of the “subjective,” internal feelings, values, emotions, and ultimate concerns of man (commonly represented in the fine arts and religion) with the “objective,” external facts of man and his world—is rather uniquely and clearly shown in a paper by Gunther S. Stent, a molecular geneticist at the University of California at Berkeley. This paper, curiously enough, has the title, “Prematurity and Uniqueness in Scientific Discovery,” and is published in *Scientific American* (227 [December 1972]: 84–93). The possibility of this union of the humanistic arts with the sciences apparently came to Stent in part as he contemplated the problem of the prematurity of certain new ideas—or the incapacity of the scientific community to make sense of or even accept the reality of a new discovery until it can be connected by a series of simple logical steps to canonical or generally accepted knowledge in the field. This phenomenon in the history of scientific ideas is akin to that which Thomas Kuhn published in his book *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), in which he advances a thesis that a whole conceptual frame of reference or “paradigm” must change before a new theory will be accepted.

From this, Stent is led—through considerations of the actual history of the prematurity of certain discoveries related to the role of DNA molecules in heredity and through some related elements in the history and philosophy of science—to show that scientific innovation is quite like artistic innovation, that “both the arts and the sciences are activities that endeavor to discover and communicate truths,” and that both discover and integrate new truth with old truth by means of a common method. The new method of gaining

knowledge, or the new philosophical epistemology, is called "structuralism" and replaces the earlier philosophical traditions called "materialism" (tied to the sciences) and "idealism" (tied to the humanities, arts, and religion). The older philosophies created insuperable antitheses. The new structuralist view, itself a product of several areas of the sciences, provides a common perspective for both the arts and the sciences. I consider the views contained in this kind of paper very significant for those who wish seriously to be creative in synthesizing religious and scientific truths.

PRIGOGINE ET AL./Thermodynamics of Evolution

To understand man's place in the scheme of things requires today a new understanding of how life is related to cosmic trends. For most of the past century, the knowledge coming out of the physics of thermodynamics has suggested a high probability of life's ultimate doom. This news has tended to make the world's keenest minds despair of the meaningfulness of man in the physical cosmos. For philosophers as well as theologians it made a bleak picture of the human future and made physics a stumbling block even for those theologians who, like Teilhard, had found evolutionary theory a potential resource. He fumbled over the implications of the second law and invented his "centripetal energy" to take care of the seeming difference between physical mechanics and the evolution of life.

Zygon has published several papers to show the newer and more humanly meaningful understandings of the relation of the second law of thermodynamics to life. Included among these have been "New Concepts in the Evolution of Complexity" by J. Bronowski in the March 1970 issue and papers in the June 1971 issue from the Symposium on Science and Human Values, especially "Thermodynamics of Flow and Biological Organization" by Aharon Katchalsky. For those who wish to pursue this question of thermodynamics and life, in order to understand and to help develop a sound theology of hope for man's life as not in fact alienated from the cosmos that produced him, I suggest the great significance of "Thermodynamics of Evolution" by Ilya Prigogine, Gregoire Nicolis, and Agnes Babloyantz, in two issues of *Physics Today* ([November 1972], pp. 23-28; [December 1972], pp. 38-44). This paper, by people whose work is related to that of Katchalsky, gives more details on Katchalsky's notions of biological systems as open systems of dissipative flow in physical chemistry, and on his and Bronowski's views of how there is developed a hierarchy of successive stages of increase in the complexity of order in living systems as they evolve, while the world around them experiences a decrease in orderliness.

While the "Thermodynamics of Evolution" is not easy reading for the nonspecialist, its ideas are in my opinion essential for theologians who wish to interpret man's place in the scheme of things in ways that fit with contemporary pictures of the realities about man and of the transcendent system of reality that is the source and sustenance of his being.

The first of the articles points out that "the functional order maintained within living systems seems to defy the Second Law" but that "nonequilibrium thermodynamics describes how such systems come to terms with entropy." Then it goes on to show how. The second article points out that "the ideas of nonequilibrium order and of the search for stability extend Darwin's concept back to the prebiotic stage by redefining his "survival of the fittest" in terms of "search for optimal stability." It is an important paper for evolution-

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ary theorists as well as theologians. It is another important contribution to bridging the gulf between physics and biology, and I suggest these new insights are almost essential for going beyond Teilhard, Whitehead, and others towards a new natural theology. For developing the hermeneutic values of this complex and difficult field for Judaic or Christian theology, I suggest the need for joint teams of theologians with several kinds of scientists. There need to be more interpretations of man's at-oneness with the source of his being from his molecular basis to his soul's farthest vision.

GLOCK/Images of "God" and Man

Important for relating religion and science is the fruit of the social scientific study of religion. A critically important paper for *Zygon* readers is the 1969 presidential address to the Society for the Scientific Study of Religion by Charles Y. Glock, on "Images of 'God,' Images of Man, and the Organization of Social Life" (*Journal for the Scientific Study of Religion* 11 [March 1972]: 1-15). Here one will find a good summary of the role of religion in the structure and dynamics of social life, especially in terms of beliefs or ideology concerning the nature of "god" and of man. Glock reviews the medieval, Reformation, Marxist, and scientific views of "god" and of man. He notes how closely human behavior follows the patterns engendered by the beliefs or images of "god" and man, and suggests that "what can be expected with increased diffusion and internalization of scientific perspectives is the erosion of old imageries and the social structures they support accompanied by an extended period of social disintegration." As a leading student of religion in American society, he points to specific problems of our society in consequence of contemporary trends.

I find his sociological analysis of the role of religion and the impact of images of "god" and man upon social patterns and stability to be one of the clearest and most credible accounts I have seen, and it is a similar view to that which has motivated my concern for revitalizing and reforming religion in the light of the sciences. In comparison with the adequacy of his picture of the sociological function of religion, the paper of a sociologist should not, of course, be expected to give an equally adequate coverage to the role of religious beliefs or images in their psychological function of adapting man internally to the inequities, difficulties, or evils brought upon him by his nonsociological environment and by the inadequacies of his own inner nature as specified by his genotype. The theologian needs to find equivalently good accounts of these problems as well, for a full understanding of the role of religious beliefs. A further needed supplement to Glock's analysis is the progress some of the writers in *Zygon* have been making in showing new ways of understanding "god" and man from a broader evolutionary and systems analysis that may be translated more directly into more traditional religious imagery and wisdom. Here, new scientific beliefs tend to support and clarify religious belief, and help remove some of the ancient paradoxes—thus reforming and revitalizing it.

But an understanding of what is in Glock's paper is a "must" for those who wish to understand the role of religion in society and to be aware of some of the contemporary social problems as the product of contemporary religious imagery. After showing how the dynamic forms of societies derive from ideologies, and are maintained by sanctions and compensations, Glock states that "the central proposition which I wish to advance is that the organi-

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zation of social life is importantly related to the prevailing imagery about 'god' and imagery about man. Such imagery contributes to shaping the form of social organization and to rationalizing it, and it becomes crucial to the maintenance of social solidarity and stability. Moreover, when prevailing ideas about 'god' and the nature of man change, the form of social organization can also be expected to change, sometimes profoundly so. Indeed a subsidiary theme and claim of the paper is that a change of profound proportions is currently in progress."

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