

*Substance or System: Different Approaches to Reality*

For various reasons, the mutual compatibility of human reason and Christian revelation collapsed at the beginning of the modern period in Western civilization and has never been fully restored to this day. If anything, the gap between the thought-worlds of those in the natural sciences and in the humanities is even more pronounced than ever. What then is to be done in order to come up with a new world view that will be at least intelligible, even if not totally convincing, to all parties concerned? My suggestion in this book is to start all over again. That is, one should look carefully at the metaphysical presuppositions taken for granted in contemporary scientific research and then ask whether some of these philosophical concepts or principles could be likewise employed in the explanation of traditional religious beliefs and practices. For, as Granville Henry argues in *Christianity and the Images of Science*, Christians normally accept good science and find a way to integrate the findings of science into their theological understanding of the God–world relationship as revealed in the Bible. Conflict between science and religion only arises when Christians unexpectedly encounter a new and different scientific approach to physical reality (e.g., heliocentrism versus geocentrism in the early 1600’s). Yet in due time this further insight into the scientific understanding of reality was incorporated into the conventional understanding of the God-World relationship based on the Bible (Henry 1998, 21-31).

Accordingly in this essay, I note that natural scientists, especially those

involved in the life-sciences, regularly employ the notion of system in their analysis of physical reality. That is, from a philosophical perspective scientists are no longer preoccupied with the relation of individual entities to one another in terms of unilateral cause-effect relations as in classical metaphysics. Instead, they tend to look at physical reality in terms of the interaction of well-organized groups of entities (systems) with one another. For, with growing awareness of the size and complexity of the cosmic process, the advantage of an overall systems-oriented approach to reality seems apparent. But how do systems grow in size and complexity with the passage of time? Here I argue that Alfred North Whitehead's understanding of the reciprocal causal relation between constituent "actual entities" and the "society" to which they belong effectively guards against the ever-present danger of regarding systems as closed or completely deterministic rather than as open-ended and self-organizing (Whitehead 1978, 90-91). Finally, in the conclusion to this article I indicate how this relatively new systems-oriented approach to reality in terms of dynamically interrelated systems makes good sense and yet is still only an hypothesis, not an established fact. Above all, it should not be exclusively linked to Christianity or any other major world religion as further proof of its superiority over all its rivals. For, this state of mind implicitly denies the infinity of God (or some other transcendent reality) that is beyond human comprehension.

#### A. Recent Scientific Research on Open-Ended Systems

In 1995 Stuart Kauffman at the Santa Fe Institute in New Mexico

published *At Home in the Universe* in which he studied the emergence of proto-cells from non-living molecules, given a sufficient amount of diversity and dynamic interrelation among themselves (Kauffman 1995, 3-30). His results were based on computer models rather than empirical observation of molecular activity, given the time-lag inevitably involved in the latter alternative. Yet it was clear that molecules under the right conditions constituted an open-ended system with a built-in principle of self-organization (vii, 47). At the same time, he did not further speculate about the philosophical presuppositions of his hypothesis, above all, its implicit challenge to Aristotelian-Thomistic metaphysics: namely, the presupposition that matter and form are linked together by an extrinsic agency (God or a human craftsman) through top-down causation. For in the case of the molecular components of prokaryotic cells, the effect they co-produce by their sustained interaction with one another is evidently something new and different from themselves as individual entities; it is, in other words, a higher-order corporate reality that is alive with its own power of self-organization. This is a case of bottom-up causality rather than the top-down causality generally found in Aristotelian-Thomistic metaphysics. In 2008, moreover, Kauffman published *Reinventing the Sacred: A New View of Science, Reason and Religion* in which he argued that growth and development within the physical universe presupposes a universal principle of self-organization which he terms creativity. So for Kauffman the realm of the sacred is part and parcel of the workings of the cosmic process; At the same time, of course, the sacred is not transcendent of the world as with traditional Christian belief in God the Creator (Kauffman 2008, 281-88).

In 2012 Terrence Deacon at the University of California, Berkeley, published *Incomplete Nature: How Mind Emerged from Matter*. Deacon likewise rejected the Aristotelian-Thomistic understanding of formal causality because it presupposes top-down causation from God or a human craftsman (Deacon 2012, 175-81). Instead, he introduces a new understanding of formal causality as simply an extrinsic effect or objective constraint on the normal operation of the constituents of the system. That is, two or more subsystems interact and thereby spontaneously co-generate a new higher-order system with even further constraints on the constituents of both subsystems (182-205). Deacon, accordingly, distinguishes between thermodynamic, morphodynamic and teleodynamic levels of existence and activity within physical reality. A thermodynamic system has little or no constraint on its conventional mode of operation and thus tends to move progressively toward a state of virtual equilibrium (complete entropy) in which nothing new ever takes place (227-34). A morphodynamic system arises when two rival systems (each with its internal structure and mode of operation) impact upon one another and thereby mechanically bring about the existence and activity of still a third system whose governing structure and mode of operation act as a further constraint on the interrelated activity of the two subsystems and their constituents (261-63). What Deacon and others call “autocatalysis” is evidently at work here (292-95). Finally, a teleonomic system involves some measure of self-awareness and conscious planning and thus at least in human beings makes possible rational

deliberation and genuine free choice (319-25). Thus, over and above the “autosynthesis” of rival subsystems in the creation of a higher-order system, there is what can be called “autogenesis,” some measure of planning for the future in terms of anticipated goals and values (264-71). In the end, one has a completely naturalistic understanding of how mind naturally emerges out of inanimate matter over an extended period of time.

My misgivings with Deacon’s argument is that it runs the risk of complete determinism and thus tends to eliminate any real spontaneity within the cosmic process. Accordingly, I side with Alfred North Whitehead that the ultimate constituents of all these systems are what Alfred North Whitehead calls actual entities, that is, momentary self-constituting subjects of experience that in historical succession transmit an ever-changing mode of operation or governing structure. Deacon rejects Whitehead’s hypothesis as a modern form of animism (77-79). That is, absolutely everything is alive. Not only self-conscious human beings and other animal species but even water particles such as are found in mountains and streams sense one another’s existence and activity and respond to it. Yet in Whitehead’s scheme there are different grades or levels of complexity among actual entities. Some are more self-aware than others (e.g., successive moments in the mind of a human being versus successive moments in the “life-history” of a mountain or stream). But even fleeting moments of subjective experience likewise undergo subtle changes with the passage of time. Mountains grow or diminish in size over the years; streams alter their rate of flow

and overall direction, depending upon contingent environmental factors.

Animism may not be as primitive as Deacon believes, if one takes into account a wholistic approach to reality, i.e., the interdependence of every event on every other event within the cosmic process.

Jesper Hoffmeyer, Professor Emeritus at the Biological Institute of the University of Copenhagen, wrote a ground-breaking book *Biosemiotics: An Investigation into the Signs of Life and the Life of Signs*. Published in Danish in 1991, this book has resulted in Hoffmeyer's becoming a central figure in the new field of biosemiotics. As he sees it, information is traded between entities by way of signs that have to be interpreted in order to be understood (Hoffmeyer 2008, 3-5). Yet the trading of information exists not only among human beings and higher-order animal species but according to Hoffmeyer is present even at the level of molecules which find themselves aggregated into natural configurations/systems that are "informed" by what Whitehead would call a governing principle or common element of form. To be alive is to exchange signs and their interpretation with other entities of the same level of existence and activity within nature (Hoffmeyer, 31-37; 195-97). Hoffmeyer, however, is reluctant to endorse Whitehead's notion of actual entities as momentary self-constituting subjects of experience in dynamic interrelation with one another from moment to moment. Presumably the fear of animism likewise controls Hoffmeyer's thinking on this matter.

At the same time, Evelyn Fox Keller in her book *The Century of the Gene* indicates how human understanding of the nature and function of genes as biochemical vehicles for the sharing of genetic information from one organism to another has evolved over the years (Keller 2000, 66-72; 147-48). Initially it was thought that genes were inert entities that never varied in their self-constitution from one organism to another. By the end of the twentieth century, however, it was clear that genes varied considerably in the role that they played in different organisms; much depended upon how the organism in which they resided itself responded to varying environmental factors. So not just the organism as a whole but also its genetic components are in some sense “alive,” i.e., responsive to contingent circumstances. Furthermore, the notion of biological niches which organisms create to protect themselves from extinction in an ever-changing environment has gained universal acceptance within the life-sciences. Biological niches, of course, closely resemble cultural niches that human beings fashion in order to survive and prosper (Deane-Drummond 2014, 219-22). Finally, Simon Conway Morris has set forth the provocative hypothesis that basically the same principles of self-organization are present in the evolutionary growth and development of widely different plant and animal species. It is as though the cosmic process operative on this earth has an inbuilt “tool-kit” with which to achieve specific goals and values in its evolutionary orientation and further growth (Morris 2015. 3-8). How it came to possess such a “tool-kit” from its beginning billions of years ago remains a mystery. But Morris proposes in the penultimate chapter of his book *The Runes of Evolution* that it might quite

possibly portray the invisible presence and activity of a Creator God (297-300).

#### B. Reciprocal Causality within a Systems-Oriented Approach to Reality.

In the first chapter of *Process and Reality*, Whitehead claims that “the final real things of which the world is made up are actual entities/actual occasions”, momentary self-constituting subjects of experience, that in various combinations are the ultimate constituents of all the entities, individual and social, making up this world (Whitehead 1978, 19). Each such actual entity is unique in its self-constitution but at the same time is heavily influenced by all the other actual entities in its past history, above all, its predecessors in the society/societies to which it belongs. Here Whitehead is partly agreeing with his predecessor in the history of Western philosophy, Gottfried Leibniz. In his book *Monadology* Leibniz claims that the world is made up of monads, individual mini-substances, each of which was programmed to operate in a singular way but was coordinated with other such monads through a pre-established harmony determined by the Creator God of Biblical revelation (Leibniz 2001, nn. 53-59). Whitehead for his part rejected the notion of “windowless” monads with his insistence that these monads (or for him, “actual entities”) had windows, openings to the full panoply of the world of past actual entities. But he retained Leibniz’s proposal that monads/actual entities are still unique in their individual mode of operation. In this way, Whitehead likewise endorsed a more moderate form of philosophical atomism in his own philosophy. But he thereby failed to see the importance of his own category of “society” as a corporate entity in its own



right, equivalently a system in dynamic interaction with other systems so as to co-produce a still higher-order system within a common field of activity. I turn now to an inspection of what I regard as a key passage in *Process and Reality* that sets forth Whitehead's understanding of the reciprocal relation between societies and their constituent actual entities from moment to moment: "The causal laws which dominate a social environment are the product of the defining characteristic of that society. But the society is only efficient through its individual members. Thus in a society, the members can only exist by reason of the laws which dominate the society, and the laws only come into being by reason of the analogous characters [individual patterns of self-organization] of the members (PR, 90-91). There is then no unilateral cause-effect relation between the actual entities constitutive of the society and the society itself with its "common element of form" or governing structure. Rather, through a process of what could be called simultaneous reciprocal causation, the society and its constituent actual entities sustain one another in existence from one moment to moment. A Whiteheadian society then is both an entity existing in its own right together with its energy-source or principle of activity at the same time.

For example, a Whiteheadian society with its governing structure needs as its constituents dynamically interrelated actual entities from moment to moment so as to continue to exist, and the constituent actual entities need the "constraint" of the governing structure of the society at that moment for their own individual self-constitution. For Deacon, however, these constituents of the system are

strictly inanimate and function mechanically. In Whitehead's scheme the constituents of a society are momentary subjects of experience that function spontaneously. At lower levels of existence and activity within nature, of course, the degree of spontaneity thus involved is minimal so that the results seem to be purely mechanical (as Deacon presupposes). But at higher levels of existence and activity where consciousness or self-consciousness is involved, the difference between past and present moments of experience is much greater. Hence, creativity and spontaneity are clearly needed to bridge that gap. But, if that be the case, then actual entities as the ultimate constituents of a Whiteheadian society must be alive, not dead, and responsive to one another. Admittedly, within classical metaphysics lower-order entities serve the needs of higher-order entities (e.g., non-living entities serving the needs of living entities, plants providing food for animals, lower-order animals ordered to the needs of higher-order animals, above all, human beings). But the real difference between these different metaphysical schemes is that the Aristotelian-Thomistic scheme works top-down and the Neo-Whiteheadian evolutionary scheme works bottom-up. A Whiteheadian society is then not just an aggregate (*nexus*) of actual entities here and now but an enduring corporate entity which exercises agency toward other societies in and through the interaction of the constituent actual entities proper to each society within a given field of activity. All of physical reality is in this way corporately organized with hierarchically ordered levels of existence and activity.

### C. Application to Christianity and the Other World Religions

Christianity is not simply composed of individual parishioners who gather periodically for worship services. Instead, most of them consciously belong to a religious body with a long history involving differences in doctrine and practice both among their own members and with the members of other religious institutions. Yet within most forms of Christianity salvation seems to exist primarily for the individual believer, not for the group as a whole, even though they all aspire to the same doctrinal goals and values. Admittedly, in the early centuries of the Church persecution raged and Christians rallied to support one another. But, when Christianity became one of the official religions of the Roman Empire, persecution ceased and Christians became just as competitive as their pagan neighbors in their day-to-day lives. But this unhappy situation can be at least in some measure remedied if one changes world views. That is, if one gently sets aside the classical focus on individual entities (*substances*) in Aristotelian metaphysics and begins thinking in terms of organized groups of entities (*systems*) in aggressive competition with one another, one can summon the courage to set self-interest aside and work with others for the sake of the common good. In effect, as Pope Francis noted in his recent encyclical on the environmental crisis (Pope Francis, *Laudato Si'*, 120-121), one already has in hand the remarkable doctrine of social justice preached by Jesus in the Gospel narratives and reflected in various ways by church documents over the centuries.

At the same time, one should likewise remember that a systems-oriented metaphysical scheme is at best an imperfect model or symbolic representation of what is in fact the case. As Whitehead notably commented in the opening chapter of his metaphysical scheme *Process and Reality*: “Philosophers can never hope finally to formulate these metaphysical first principles. Weakness of insight and deficiencies of language stand in the way inexorably. Words and phrases must be stretched towards a generality foreign to their ordinary usage; and however such elements of language be stabilized as technicalities, they remain metaphors mutely appealing for an imaginative leap (Whitehead, PR, 4). There is always more to learn than what we already know or can even imagine at the present time. Furthermore, it would be in my judgment foolish to claim that a given philosophical scheme privileges a single world religion over all its contemporaries. For, in retrospect, all of these world religions provide valuable insights into what is strictly transcendent and thus beyond human comprehension. Furthermore, respect of individuals for one another and for the spiritual values they all share in principle should be the goal of authentic interreligious dialogue.

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