EVOLUTION, HUMAN VALUES AND RELIGIOUS EXPERIENCE: A PROCESS PERSPECTIVE

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Abstract. This essay sketches an interpretation of human experience utilizing the perspective of process philosophy. Beauty is a key notion, and emergent evolution is a central theme. The following topics are addressed: the emergence of modern evolutionary thinking and alternative responses to it; the nature of human nature in a process perspective; the place of humans in nature; the immanence of laws; emergent evolution on this planet; some implications of the hierarchy of nature for the interpretation of human life, human morality, and human values; and human religious experience.

The place of humans in nature has long been problematic, and the foundational issues pertaining to humankind's relation to nature emerged in the West long before the development of modern science. Nonetheless, the impact of science upon the world and popular culture in the past three or four centuries has dramatically affected the loci of discussions and has led to the accentuation of themes and foundational modes of interpretation which were minor motifs during the medieval and early modern epochs. Today western scholars and scientists emphasize inordinately efficient causes and minimize final causes; just the opposite situation prevailed in the Middle Ages.

The problem of interpretation is complicated by the intertwining of propositions and theories informed by particular researches in specialized fields of scientific investigation with propositions embodying more general notions not being considered directly in the more specialized studies. For example, many studies in the biological and human sciences refer to the "passage of time." This conception, informed by a Newtonian understanding of time, usually is not discussed in detail in more specialized monographs. The different notion that time is measured by motion, embodying an alternative cos-

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mology associated with Plato's *Timaeus* and advanced by the twentieth-century philosopher and cosmologist Alfred North Whitehead, is rarely discussed in specialized monographs in biology, sociology, psychology, economics, or political science.

When one seeks to discern the place of humans in nature, broad general presuppositions giving shape to one's interpretation of scientific data are unavoidably intertwined with more specialized notions pertaining to data in a particular field of investigation. One may seek to generalize the findings and the interpretative framework drawn from the study of one subject matter to other subject matters, but two dangers are inherent in such analogical efforts. First, the characteristics of the primary subject matter and the secondary subject matter may be significantly different, so that findings informing the first subject matter may be unfitting for the second. Second, the implicit, generic notions inherent in the interpretative framework informing one area of investigation may be applied in an unexamined manner to another area. When this happens, an implicit interpretation of experience rooted in a particular philosophic tradition may be imposed uncritically on the secondary subject matter. Some propositions may seem to be relatively adequate for the purpose of studying a particular subject matter but may be unfitting for other subject matters without substantial qualifications and revisions.

The principle that our understanding of nature may enhance our understanding of human beings is a sound one, but the principle is double-edged. What we know of human beings may also enhance our understanding of nature. If theories developed primarily in the context of the physical and biological sciences are used to interpret human nature and human action, serious distortions and misinterpretations of the human situation may result. The widespread use of a Freudian world view in the interpretation of human nature is a case in point, for both the gratification-deprivation interpretation of human motivation and also the rewards-punishment scheme of human social control stemming from that tradition are inordinately mechanistic and reductionistic.

This paper elaborates an interpretation of the evolutionary process informed by process philosophy. Process philosophy was initiated by Whitehead through a series of writings in the 1920s and 1930s during the time he was professor of philosophy at Harvard.[1] Deeply informed by the broad contours of modern science, Whitehead appropriated the Platonic heritage to develop a cosmology incorporating a complex and rich doctrine of emergent evolution.

Before addressing this constructive task, it is fitting to describe briefly the context from which the "evolutionary epoch" emerged and to note some theological responses to it.

The Evolutionary Epoch

The Emergence of Modern Evolutionary Thinking. The epoch-making work of Charles Darwin initiated a movement in theory and research that has brought the topic of evolution to a central place in both scientific and popular culture in the contemporary world. Darwin himself emphasized both the conflictful and also the adaptive dimension of nature through his ideas about the struggle for survival and the survival of the fittest.

Social theorists in the late nineteenth and early twentieth centuries sought to apply evolutionary ideas to the changes being manifest in human society. Lloyd Morgan, Herbert Spencer, and Emile Durkheim are illustrative of those who sought to develop interpretations focused on the evolution of human forms of social organization. Most social theorists informed by evolutionary notions undertook either phenomenological or reductionistic interpretations of experience. They saw no reason to appeal to a Divine reality that was at least in some senses *sui generis* to interpret the evolutionary process. In addition to the intellectual issues involved in their interpretations of the evolutionary process, two sociocultural factors affected their approaches. First, the general climate of opinion prevailing in European scientific circles disparaged "metaphysics" and ontic interpretations of experience. Second, in the early modern period most independent thinkers and scientists in Europe had to struggle with university establishments which had been dominated for centuries by the church and the clergy. The scars of these struggles have run deep, and they undoubtedly affected the intellectual interests and the emotional tone of persons working in both the natural and the human sciences.[2]

Some biblical scholars became interested in evolutionary theories in the latter part of the nineteenth century and applied evolutionary notions to the analysis of biblical documents and to the interpretation of ethical and theological ideas. Also, in addition to the detailed studies undertaken by biologists, historians, psychologists, and sociologists, persons concerned with cosmological and ontological matters began to incorporate evolutionary thinking in their work. Henri Bergson, Charles Sanders Peirce, Nikolai Berdyaev, and Samuel Alexander all elaborated dynamic ontologies embodying evolutionary understandings.

Today evolutionary thinking is overwhelmingly predominant in the scientific community. To be sure, differences exist among scientists regarding both the details of the evolutionary processes and also the most fitting interpretations of the processes, but very, very few challenge the basic vision of the emergence of increasingly complex creatures on this planet.[3] In this sense, the present epoch may be termed "the evolutionary epoch."

Theological Responses. The primal vision embodied in evolutionary thinking did clash with cosmological interpretations advanced by classical Christian thinkers, and evolutionary theories have evoked varied theological responses.

St. Augustine (354-430) most fully formulated the cosmology which became dominant in the Christian movement for the next fourteen-hundred years. Although he insisted that knowledge of the theories and details of the workings of nature were not critical to matters of faith and theological belief, he himself did develop a theory of the origin of things that stands at variance with evolutionary perspectives. Augustine posited a world with a beginning, a middle, and an end. In his view God created *ex nihilo* a perfectly harmonious world—a literal Garden of Eden and a literal Adam and Eve, created with their wills in perfect accord with the Divine will. Consequently, their minds were in perfect harmony with their wills, and their bodies were also in perfect harmony with their minds and wills. When they turned away from the Divine will and centered themselves around their own wills, thereby committing the sin of pride, they disrupted the perfect harmony of their bodies, minds, and wills. Their actions along with the actions of fallen angels, who were creatures with minds and spirits but no bodies, introduced disharmony in nature and death to humans.[4] God, knowing that they would sin inevitably but not necessarily, had initiated efforts to redeem some of the fallen people and to condemn others to eternal separation from It. Redemption was carried out through the life, death, and resurrection of Jesus Christ and through the salvational mediation of the church.

It is obvious that evolutionary theory, rejecting the idea of a perfectly created world which was subsequently distorted and suggesting the increasing complexification of life forms on this planet, constituted a major challenge to this style of thinking.[5]

Biblical fundamentalists, insisting on the literal interpretation of the Adam and Eve account in Genesis incorporated in the thinking of Augustine, have persistently and consistently challenged evolutionary thinking. The current "creationist" controversies in North America are a contemporary manifestation of this conflict.

Christian theologians wanting both to sustain facets of the theological tradition and also to respond sympathetically to evolutionary thinking made two types of responses. Some made very sharp distinctions between the inner experiential warrants for theological formulations and external scientific and cosmological formulations; others incorporated the broad contours of evolutionary thinking in their theological formulations. In different ways Paul Tillich and Karl Barth, two of the most distinguished Protestant theologians of the twentieth century, took the former route; Pierre Teilhard de Chardin and process theologians took the latter route.

Arguing that the movement from essence to existence was irrational, Tillich insisted that the impingement of the Divine Spirit into the human spirit is a consequence of the Divine initiative.[6] With one exception, theologians *qua* theologians have no business dealing with the issues embodied in the specialized sciences. These sciences have developed fitting methodologies and accepted methods of investigation about which the theologian has nothing to say *qua* theologian. The one exception is the sciences dealing with human beings. If scientists studying human beings deny that humans are deliberating free subjects, their objectification and thingification of human beings has to be challenged. (Tillich's personal experiences with the Nazis and their treatment of Jews accentuated his views on this matter, but the general notion was, of course, not dependent on this particular occurrence.) Any research or experimentation on human beings violating their freedom and subjectivity must be challenged.

Because Tillich thought theology could provide the answers to the questions philosophy raised about human existence, he was willing to use the cultural forms of the modern epoch to raise the questions to which he felt theology could provide answers. In this manner, he was able to relate to evolutionary thinking in his work.

Barth insists as vigorously as Tillich that the Divine reality is utterly transcendent and only through Its self-revelation to humankind could humans become aware of It. He insists on the ultimacy of God's revelation in Jesus Christ and in the primacy of biblical forms to convey God's revelation to humankind. Although Barth was a most learned person thoroughly conversant with the major thought forms shaping the modern world, in his theological work he refused to engage in speculation about evolutionary theory. He viewed his task as a theologian to seek to illumine the meaning of God's revelation in Jesus Christ to which witness was borne through Scripture primarily and in the tradition secondarily in relation to one's personal experience. The radical contrast between human works and God's grace led him to insist that human thinking about God apart from human awareness of God's revelation to humankind would either be idolatrous or secular. For Barth, Scripture is the form through which God's relevation is manifest.[7].

Due to a rather static ontology and the qualified appropriation of the Augustinian view of creation, nineteenth-century Catholic theologians were very wary of evolutionary theories, but in more recent times some have sought to relate to evolutionary thinking, for example, Karl Rahner and Bernard Lonergan.

In contrast to thinkers like Barth and Tillich who sharply distinguished theology and science, some theologians responded to evolutionary theories by incorporating evolutionary theory in their theological work. Teilhard de Chardin is the most widely recognized

Roman Catholic to do this. His presentation of the emergence of the *nous sphere* in the evolutionary process accentuates the emergent side of evolution, but his view of the culmination of history in an Omega point accentuates the notion of a single mode in perfection to be attained at the end of history, a motif which is predominant in the Christian movement.[8] Catholic theologians Bernard Lee and Davis Tracy have utilized the process perspective informing the constructive portions of this essay in their work.[9]

The contemporary line of theistic thinking most fully appropriating evolutionary views is the movement of thought broadly characterizied as process philosophy and its corollary, process theology. As noted earlier, the distinguised mathematician and philosopher Alfred North Whitehead initiated this line of thinking in the 1920s. Numerous Protestant theologians and a few Catholic theologians have appropriated this approach.[10]

The body of this essay is devoted to the formulation of a perspective informed by process philosophy. It seeks to discern the place of humans in nature, to affirm one type of evolutionary theory, to describe the processes by which an emerging creature becomes and is objectified for other creatures in its causal future and in the Divine life, and to delineate the nature of human nature, the nature of religious experience, and the status of human values.

Even though the framework of interpretation developed here is informed by evolutionary theory, it contains two elements absent from most contemporary scientific accounts. First, forms of definiteness termed eternal objects are an integral part of this interpretation; analogous to the Platonic forms, they constitute the potential which may be actualized by emerging creatures. An indefinite number of creatures may participate in the same eternal object. Second, a Divine reality that is in some senses *sui generis* is an integral part of this interpretative framework. God functions in the universe as the locus of potentiality, the mediator of experience from one creature to another, the lure for feeling, and the ultimate receptor of all that has become.

These two components and the interpretative framework in which they are set are not fashionable today among most workers in either the natural or social sciences. Some form of metaphysical skepticism, involving a rejection of a faith in rationalism beyond the confines of one's specialized discipline, some form of reductionism, involving an explanation of the higher aspects of experience on the basis of more fundamental or elemental components, and/or some form of causal determinism, involving an explanation of current occasions on the basis of events in the causal past of an emerging creature, are currently more widespread.[11]

The Human Organizing Center. A detailed consideration of the human organism, the biological and biochemical processes transpiring in the human body, and the mechanisms of sense reception and perception lie in the special provinces of the biologist, the biochemist, and the physiological psychologist. These analyses are beyond the scope of this essay and are not directly pertinent to the salient aspects of human activity considered here, for the peculiarly human aspects of human life are embodied in the human organizing center.

This organizing center is a sequence of occasions arranged in serial order and embodied in a form so protean it can only be characterized by the occasions which it receives. This organizing center is here termed a "soul," and each event constituting its life is termed a "regnant ultimate percipient occasion."[12] This regnant ultimate percipient occasion receives data from the body, from the Divine life, and from preceding ultimate percipient occasions. (The way in which these entities contribute to the emerging regnant ultimate percipient occasion will be discussed subsequently.)

In process thinking the reasons for things are always to be found in actual occasions. One's primary data for developing an interpretation of experience are one's conscious experiences; there is no place else to begin. Our own foundational experience illumines the centrality of deliberations and decisions in human life. Human beings are meaning-seeking, meaning-positing creatures with substantial capacities for deliberation and self-determination. These factors shape the entire tone of human life; they are too central and too widespread among humankind to be set aside as mere illusion.

These aspects of human nature are central for *human* social theory. They are integral to interpretations of *human* history and *human* group life, for with the emergence of humans life has taken on new dimensions of novelty and intensity. Because all creatures possess some capacities to respond to the data they appropriate in the process of their becoming, the differences between human and subhuman entities on this planet are a matter of degree; but the differences in degree are so substantial they are almost differences in kind.

In spite of this emphasis upon the importance of the human organizing center in human life, the regnant ultimate percipient occasions constituting our conscious "selves" are intimately related to our bodies. Conscious human experience begins with a flood of feelings coming from the occasions constituting our bodies. In this initial physical phase of the becoming of a regnant ultimate percipient occasion, feeling is primary. The body functions as a giant amplifier, sensing and transforming data having their origins both within and beyond the body. In the supplemental or mental phase of the occasion's be-

coming, the emerging occasion supplements and synthesizes the feelings and forms received from the physical phase of the occasion's becoming.

A dynamic and reciprocal relation exists between the body and the regnant ultimate percipient occasion. Sometimes the regnant ultimate percipient occasion is preoccupied with the body, as in cases of great pain, intense hunger, or sexual excitement. Sometimes it exercises substantial directive influence on the body, as in the cases of intense intellectual activity, appropriation of a rich aesthetic experience, or participation in facets of the Divine life.

The Structure of the Becoming of Actual Occasions (Creatures). The description of the emergence and becoming of actual occasions is central to a process perspective on emergent evolution. In process modes of thought, actual occasions are the basic units constituting the components of the cosmos. They differ in complexity and importance, but they all exhibit the same basic structure.

All creatures are dipolar. Except for God, they begin their process of becoming by appropriating data embodied in the creatures of the emerging occasion's causal past.[13] This physical appropriation is termed the "physical pole." It is "followed" by a conceptual appropriation of forms of definiteness embodied in the primordial facet of the Divine life. This appropriation is termed the "conceptual" pole, and the forms of definiteness are termed "eternal objects." Eternal objects are not necessarily embodied in the occasions in the causal past of an emerging creature, but they are necessarily embodied in the primordial facet of the Divine nature. Novelty and the emergence of new forms and novel propositions in the evolutionary process are due to the "abrupt" appropriation by an emerging creature of forms of definiteness either not previously embodied in the world or else not previously embodied in the same patterning in the world.

The verb "followed" in the preceding paragraph is placed in quotes, for the process of the coming together of the several forms and feelings comprising an emerging actual occasion cannot be divided into temporally earlier and later phases. The temporal thickness of an emerging experience is termed a duration. Physical time itself is measured by the sequence of events which become, and change is the "movement" of eternal objects from one creature to another.

In process thinking, the potentiality represented by eternal objects must be located somewhere. That somewhere is the primordial facet of the Divine nature. Not only does God provide a locus for potentiality; It also orders the forms of definiteness. Through Its ordering God assures that an emerging creature can integrate the data it ap-

propriates into a novel unity. Without God's functioning any situation would be riddled with ambiguity. God's envisagement of all potentiality provides a locus for potentiality and the lure for feeling. It permits a rational explanation for the emergence of novel entities in the evolution of the cosmos.

In the supplemental phase of the becoming of an actual occasion, the emerging creature effects syntheses and contrasts between the data appropriated from occasions in the emerging creature's causal past and the eternal objects appropriated from the primordial facet of the Divine nature. In higher-grade organisms the supplemental phase is enhanced and prolonged, so the contrasts between the initial data and the supplemental data are richer and more complex. In lower-grade organisms the past is appropriated in the present with a modicum of novelty; the laws of nature hold sway, for zest, novelty, and innovation are at a minimum.

In its becoming a creature seeks aesthetic satisfaction and intensity of feeling. As it synthesizes and integrates the data it has received, it is guided by its subjective aim. This aim is informed by God's subjective aim, for God's overarching rationality, Its harmonization of all forms of definiteness, and Its grading of seasonal relevance of the forms of definiteness for emerging occasions give shape to the subjective aims of emerging creatures. God is immanent in the creatures of the world whether or not they are aware of it. The process of the becoming of an actual entity just described is illustrated in figure 1.

Individual creatures may share complex eternal objects with other creatures and may derive satisfaction from their common participation in the same defining characteristics. Creatures sharing the same defining characteristics may constitute a society. In the case of creatures in the physical and biological spheres, these defining characteristics contribute to the apparent substantiability of what is in fact a myriad sequence of emerging actual entities.

Human beings participate in some of the forms of definiteness embodied in entities in both the physical and biological spheres, but they also share many complex conceptual forms and feelings grounded in the rich and complex supplemental phase of the regnant ultimate percipient occasion.[14] Humans may participate in multiple social worlds, each with varying defining characteristics. The realm of human culture is a complex realm of propositions and precipitates of meaning and feeling created by humans and shared by persons in specified societies of human beings.

As noted earlier, the prolongation and enhancement of the supplemental phase of the serial sequence of regnant ultimate percipient occasions constituting the human organizing center provides the basis for the richer elaboration and the greater complexification of human

The many of the cosmos disjunctively are in the process of becoming the one of the cosmos conjunctively.

Physical Phase
The initial phase of the becoming of the emerging creature involves the objectification of creatures in the causal past in the emerging creature. The emerging creature grasps or "prehends" these data. These appropriations are termed "physical prehensions."

Mental or Conceptual Phase
The supplemental phase of the becoming of the emerging creature involves the objectification of eternal objects from the primordial facet of God's nature in the emerging creature. The emerging creature grasps or "prehends" the eternal objects. These appropriations are termed "conceptual prehensions."

God's subjective aim envisages all the eternal objects. Eternal objects are embodied in the primordial facet of God's nature.

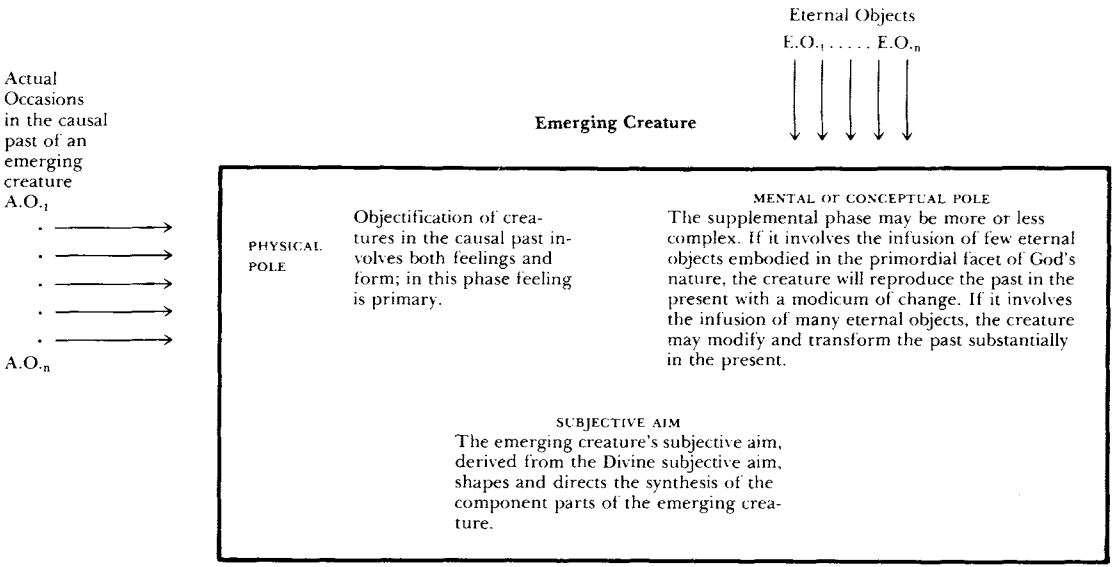

FIG. 1.—The becoming of an Actual Entity

life than is the case for other living organisms on this planet. Human societies are much more variegated and innovative than subhuman societies. This prolongation also greatly increases a creature's capacity for depth and breadth of aesthetic satisfaction, providing the bases for human values and human religious experiences. These human-defining characteristics give human history a qualitatively different character than subhuman history.

History, Facts, and Values. The dynamic and emergent character of human societies is rooted in the nature of human nature indicated above by the human-defining characteristics. Human *history* involves heightened intentionality and directionality. Purposiveness and meanings embodied in human social groups loom large in human life. In addition, theoretical understanding developed in one human generation and/or society can be transmitted to another, increasing the human cultural storehouse.

The infusion of feelings and forms constituting perception in the mode of causal efficacy is primary in human experience. This physical phase of becoming is more primitive than the complex conceptual development constituting the supplemental phase.[15] The objectification of creatures in an emerging occasion's causal past integrates fact and value, for *what* something is and *how* that thing functions are interrelated. The "facts," that is, entities in their causal pasts which humans appropriate in their emerging presents, are laden with meanings and feelings.

Science is concerned with percepta rather than the humans' feelings about the percepta—at least not human feelings in their immediacy. Religion is concerned with human responses to the data it receives—both from creatures in the world and from the Divine entity. Philosophy seeks to discern the relation between science and religion and to develop a framework of interpretation which incorporates both spheres of human experience in an integral whole. Humans seek intellectual justifications for both science and religion. This issue will be considered subsequently in the discussion of human religious experience. But before this is done, humans must more clearly be set in the context of nature by examining the organization of the human organism and its place in the order of nature.

The Place of Humans in Nature

The Organization of the Human Organism. The human organism is an exceedingly complex society including a vast number of subordinate societies and myriad living occasions. It incorporates in serial order a sequence of regnant ultimate percipient occasions of very high grade in what earlier was termed the organizing center or the

soul. As noted earlier, an emerging regnant ultimate percipient occasion receives a complex array of data from the subsocieties and occasions constituting the body and from preceding regnant ultimate percipient occasions. It synthesizes them with conceptual forms and with subjective feelings in its process of becoming. As observed previously, these regnant ultimate percipient occasions are embodied in the organizing center or soul, a "formless" form so protean it can "contain" the occasions which occur in serial order "within" it.

The living occasions constituting the human being's organizing center are bound together by hybrid prehensions, which in this instance are the "physical" prehensions of earlier regnant occasions. Hybrid prehensions, by which an emerging occasion may feel the conceptual feelings of other occasions physically and *vice versa*, are required to explain memory. Through memory the living occasions lying in the causal past of the emerging occasion are objectified in that occasion.[16]

Humans are organized hierarchically, for the human organizing center coordinates and directs the human organism. Lower grade organisms such as rose bushes and oak trees are more democratically organized; they do not have a dominant organizing center.

In spite of the importance of the human organizing center, many parts of the human organism exist quite independent of it. Overall, the organizing center and the rest of the human organism maintain symbiotic and mutually reciprocal relations.[17] Due to this intimate relation between the "soul" and the body, the body has a substantial impact on human behavior. Some psychic disorders have their roots in bodily disorders. Research in biochemistry has discovered the physiological bases for some psychic disorders and will undoubtedly discover physiological bases for other psychic maladies.

Nonetheless, the exceedingly complex and reciprocal relations between the soul and the body, the abruptness of the forms of definiteness appropriated in the conceptual phase of the becoming of a regnant ultimate percipient occasion, the capacity of present occasions to surpass past occasions, and the significance of human relations in human life suggest the multifaceted sources of human pathological behavior. Human psychic pathology cannot be reduced unequivocally to physiological phenomena.

No advances in biochemistry or in related areas can eliminate all disharmony in human experience, for finitude, ignorance, sloth, lethargy, and inordinate self-interest are persistent bases of disharmony. Furthermore, the emergence of new, novel, and more creative human relations, grounded in the Divine evocation for harmony and intensity of feeling and in the capacity of emerging occasions to respond novelly to their pasts, is always a potential source of dishar-

mony; for the quest for richer and more complex harmonies always involves the risk of greater disharmony and attenuation of feeling.

The Hierarchy of Nature. Humans are at the apex of a hierarchy of nature on this planet, but they are integrally involved in the order of nature. This order needs to be sketched to illumine the direction of emergent evolution on this planet. The most general defining characteristics, shared by all creatures in our cosmic epoch and also by creatures in other cosmic epochs, are the properties of extensive connection. Creatures are bound together by their common participation in an extensive continuum. The properties of the extensive continuum include extensive connection, whole-part relations, and various geometrical elements derivable from these properties.[18]

Those most general geometric properties do not include measurement, for measurement presupposes the embodiment of more specialized geometric forms permitting straight lines to be defined. Consequently, more specialized defining characteristics are also embodied in the creatures in our cosmic epoch. These more specialized defining characteristics make measurement possible.

A multiplicity of competing families of straight lines is possible, giving rise to different systems of measurement. In our cosmic epoch, this ambiguity is resolved in favor of one family of straight lines and a system of metric measurement.

In our cosmic epoch more specialized societies with additional defining characteristics have evolved. These societies include numerous subatomic entities, atoms, molecules, societies of molecules organized as inorganic bodies, living cells closely related to inorganic molecules and societies, and societies of living cells. On this planet vegetable and animal bodies illustrate complex societies composed of both inorganic societies and living cells.

The human organism is set in the context of this broad order of nature. The human organism itself consists of a hierarchy of societies more or less integrated into a complex whole. However, as noted earlier, humans possess a soul, a serial sequence of regnant ultimate percipient occasions, constituting the conscious self.

The Immanence of Laws

According to this view of the character of geometric forms and other defining characteristics and their relations to the "facts" of emergent evolution, the laws of nature are immanental. They pass into existence with the emergence of creatures possessing particular defining characteristics, and they pass out of existence with the emergence of new creatures embodying different defining characteristics. Plato

made this point poetically in the *Timaeus* when he observed that nature could only tell a likely tale.

The view of law as immanental must be qualified, for according to process thought the Divine reality is seeking to evoke creatures capable of experiencing more intense feelings and richer harmonies. Both the forms of definiteness embodied in the order of nature, from which a creature begins to become, and the Divine evocation for harmony and intensity of feeling contribute to the shape and feeling of an emerging new creature. In its becoming, a creature not only appropriates but also surpasses the "laws" embodied in the creatures constituting its causal past.

The aim of existence is aesthetic satisfaction and intensity of feeling. The Divine persuasion seeks to evoke creatures capable of greater aesthetic satisfaction. In this evocation, one can discern the teleology of the universe. This point of view provides a framework to interpret the process of emergent evolution on this planet.

Emergent Evolution on this Planet

In evolution on earth, two salient trends are discernible. First, some societies and some societies of societies have become increasingly complex. Second, the mental or conceptual pole of some occasions has been enhanced. Life, constituting a bid for freedom from the bonds of the causal past, has emerged.

In ways that permit some of their members to attain greater breadth and depth of experience, complex structured societies have evolved. The creatures of these societies participate in common forms, and these societies are able to survive in the midst of a shifting and changing environment. The enhancement of an occasion's mental pole facilitates the emergence of these structured societies, which are enduring objects with substantial survival capabilities.

The enhancement of the mental pole may occur in one of two ways. In the first instance, the enrichment of the conceptual pole permits an emerging creature to consider the many members of a society as one. The unity of the society is accentuated in the experience of each emerging member, and the individuality of the many actual occasions comprising the society is minimized. The fitting uniformity of structure pervading the society is enhanced, and the diversity of its individual members is minimized.

This mode of conceptual enhancement is typical of the occasions of societies termed physical bodies, for both organic and inorganic physical bodies are closely associated with presented loci definable by straight lines. The creatures sharing these forms are prone to reproduce them, for the commonly shared forms are imposed upon them. These societies are stable and endure many changes in their surrounding environment.

This type of mentality is rather low grade, a step above the level of the mere reproduction of the past in the present. There is evidence of conceptual integration, but minimal evidence of conceptual originality. This mentality is characteristic of societies termed "inorganic."

In the second instance, the emerging occasion's mental pole is further enriched to produce conceptual originality. In this way a creature may both appropriate more elements of the environment into its own becoming and entertain novel eternal objects that may not have been embodied in the occasions in the emerging entity's causal past. The complexity of this conceptual originality varies from the merest aesthetic adjustment lured by an ideal of harmony in the case of low-grade living organisms to thought about a range of experiences and the exercise of negative judgments in the case of high-grade living occasions.

In both of these instances, an impulse original to the emerging occasion qualifies the data received by the physical pole of the occasion. The emerging occasion initiates a response aimed to preserve and enrich the society of which the emerging creature is a member.

The transition from nonliving to living societies is not clear cut, so the members of a society may be more or less living. For example, "viruses" represent transitional societies that are neither organic nor inorganic. Further, as noted earlier, on this planet living societies are intimately associated with inorganic ones. In complex living organisms, living and nonliving occasions interact with and relate to each other.

The abruptness of the embodiment of eternal objects, or new forms of definiteness, in the conceptual phase of the becoming of a creature and the discreteness of some geometrical forms provide the basis for a rational interpretation of the emergence of new forms of life on this planet. New life evolves as an emerging creature appropriates forms of definiteness that are not identical with the forms embodied in its causal past but that may be integrated with them to produce a novel proposition. What begins as a novel conceptual form may then be embodied in an emerging creature and subsequently become a physical datum for the entities which succeed it. In this manner a mutation may take place. The fecundity of nature is vast; some of the mutations may enhance the capacity of subsequent occasions to survive and live better, and others may not. Thus, one may speak of the survival of the fittest, but this notion should not be emphasized inordinately, for nature manifests cooperative as well as the conflictful aspects.

The discreteness of geometric forms enables one to interpret the rather clear-cut species in nature, for there is not a continuum of organic life grouped around an amorphous central type. Instead, species of organic life are reasonably distinct. The same situation

holds in the realm of inorganic entities. In these instances, creatures of the same species seem to share common geometric forms.

Although the abruptness of the embodiment of eternal objects in the conceptual phase of the becoming of a creature need not necessarily result in the rapid emergence of a new species, it certainly would lead one to suspect such phenomena have occurred. The current biological discussions about the possible rapid development of human beings cohere with one of the likely possibilities suggested by this theory. Human beings, for example, may have emerged as a result of an abrupt mutation. If so, the quest for intermediate species between humans and other primates may well be a futile one. In one sense, these abrupt mutations, if they in fact occurred, could be interpreted as a form of "new creation."

In the case of humans, the most significant factor in their mentality is the prolongation of the supplemental phase of the regnant ultimate percipient occasions constituting the human organizing center.

The peak of consciousness is the negative judgment. In a negative judgment one can imagine the absence of that which is present or the presence of that which is absent. These experiences involve a new level of contrasts in the conscious entity. This capacity appears to differentiate humans rather sharply from other earthly creatures, but some analogous judgments seem to be manifest in some subhuman animals.

Because the evolutionary process is unending, it is conceivable that new and novel creatures with capacities for contrasts and intensities of feelings surpassing those of humans will emerge on this planet. Considering the vastness of the cosmos, alternative life forms superior to human forms may well have evolved in some environments or will do so in the future.

However, possessing enhanced capacities for thought, aesthetic satisfaction, and depth of feeling, humans can qualify, modify, and shape that which they receive in ways which greatly exceed the capabilities of other creatures on this planet. Both intentionally and unintentionally humans impinge on the processes of natural evolution in ways that greatly exceed the abilities of subhuman entities.

Human moral values, cultural works, and religious experiences also are grounded in these enhanced capacities for aesthetic satisfaction and creative formulation. These aspects of human experience will be considered in the concluding sections of this essay. Before turning to them, however, the implications of the hierarchy of nature for human social theory and social ethics need to be further considered.

Some Implications of the Hierarchy of Nature for the Interpretation of Human Life

The enhanced conceptual phase of the becoming of the regnant ultimate percipient occasion of a human being has important consequences for the interpretation of human life. The recognition of this reality permits one to delineate the relative importance of the physical and biological spheres in human social theory and social ethics and to illumine the nature of consciousness and the self.

The Relative Importance of the Physical, Biological and Human Spheres in Human Social Theory and Social Ethics. The increasing complexification of some societies on this planet and the increasing capacities of some organisms to respond novelly to the data they appropriate permits one to assess the relative importance of facts and theories in the physical and biological sciences for human life.

For purposes of human social theory and social ethics, many of the persistent patterns manifest in the physical world are relatively insignificant. The "laws" shaping the behavior of many nonliving creatures which are of special interest to mathematicians and physical scientists are not directly pertinent to the human scientist and social ethicist.[19]

Due to the intimate relation between the soul and the body noted earlier, findings in the biological sciences are more directly relevant for human studies than findings in the physical sciences. However, due to the innovative character of the regnant ultimate percipient occasions constituting the human soul, biological components are modified, qualified, and transformed in human life. Human behavior is *not* reducible to its biological dimension, for, as noted earlier, purposiveness, meaning, and intentionality loom too large in human life to be put aside as epiphenomenal.

The actions of human beings and the feelings and meanings informing these actions are at the center of human life, for the conscious experience of a regnant ultimate percipient occasion is the primary datum for all human reflections and interpretations. In assessing the validity of any formulation, the ultimate court of appeal is the individual thinker's experience. An individual's feelings, meanings and interpretations are primary in understanding *human* behavior.

This existentialist bias of process thought is qualified by a principle of relativity and a principle of rationality. According to the principle of relativity, every being is a potential for every becoming. Consequently there is a *necessary* relation between an emerging creature and other creatures, for all other creatures in the universe lying in the causal past of an emerging creature contribute positively to the emerging creature. Conscious creatures are able to understand some

aspects of the order of nature because patterned forms of definiteness embodied in other creatures are also embodied in the emergent conscious subject.

Although the structures emerge in individual experiences, they have a public character. Rational analysis can illumine aspects of these structures. This interplay between the public and private aspects of experience can be illustrated in human social relations. The principles of justice and the forms of human social organization contributing to the conduct of human life are inherent in every human experience. Even though all humans participate in these structures, not all humans are self-conscious about them. Some humans, being more self-consciously aware of these principles of justice and alternative forms of social organization, may illumine them through rational analysis. In this manner, those persons raise the consciousness of their fellows. This enhanced consciousness may lead to more general understandings to guide human life and to enhance its quality.

In this way, the primacy of individual preferences and tastes in human experience is acknowledged, but a critique of particular human tastes, preferences, and actions based on the development of a more public mode of interpretation is possible. Tastes, preferences, and particular social institutions are not equal in excellence; by using more public principles of evaluation, a critique of individual values and modes of conduct is possible.[20]

The Nature of Consciousness and the Self. Earlier in this essay the dipolar character of occasions was noted. In the discussion of emergent evolution, the prolongation and complexification of the supplemental phase of the becoming of a creature were outlined to interpret the foundational bases for the movement toward more complex structured societies and toward organisms with enhanced capacities for manifesting novelty and intensity of feeling in their becoming. This movement reaches its apex on this planet with the emergences of organisms with human-defining characteristics. As noted earlier, humans embody a series of sometimes conscious regnant actual occasions of a very high grade.

Humans apparently share consciousness with some other animals on this planet, but only a very small proportion of actual occasions on this planet are conscious. So far as we can discern, this low proportion of conscious creatures extends throughout the cosmos.

Mentality is more general than consciousness; the two cannot be equated. Mentality at a very low level is manifest in every entity due to the dipolar nature of becoming. In low-grade occasions the supplemental mental phase is minimal, and the past is reproduced in the present with minimal contrasts and changes. Low-grade occasions

must entertain some contrasts between the eternal objects objectified in the physical phase of their becoming and those ingressing in the conceptual phase, but in most occasions this contrast is merely a senseless aesthetic one. Most occasions do not appear to exhibit even an embryonic consciousness.

Consciousness is the identifying mark of high-grade occasions. In conscious occasions the supplemental phase of their becoming is prolonged and enhanced. In conscious occasions contrasts develop between the objectified creatures in the occasion's causal past that are embodied in the emerging creature through its physical pole and the complex eternal objects derived from the primordial facet of the Divine nature that are embodied in the emerging creature through its mental pole. This contrast may be incorporated with additional eternal objects to produce another contrast. This second contrast may be incorporated with still additional eternal objects to produce yet another contrast, and so on. This enrichment gives rise to a hierarchy of contrasts, having a relation but not a correspondence with the objectified entities lying in the emerging subject's causal past.

The peak of consciousness is the negative judgment. In the negative judgment, the judging subject imaginatively contrasts that which is with that which might be but is not. For example, more creatures can experience blackness than can contrast their experience of blackness with their experience of not-blackness. In the latter instance, the individual experient must imagine the proposition "B is not black" and contrast it with the proposition "A is black." This contrast heightens one's consciousness of blackness and deepens the feeling of blackness in the emerging creature.

Life is a claim for freedom from the bonds of the past. In its simpler forms there seems to be little evidence to suggest that living occasions transmit their experience from one living occasion to another. But higher forms of living occasions are bound together in serial order; life has been canalized and turned in on itself. In this way both memory and novelty of response to circumstances can be combined to enhance the experience of the conscious regnant actual occasion. In these instances antecedent living occasions are felt physically in the initial phase of the becoming of a subsequent living occasion. The subsequent occasions can sustain complex values and discern formal principles which may inform their behavior and shape their social institutions. These occasions are salient in human life and give rise to morality, values, and religious experience.

Human Morality and Human Values

According to the point of view being developed here, the aim of existence is beauty. Human moral principles and human values that

enhance harmony and intensity of feeling are "good"; those that diminish them are "evil."

The primacy of creativity means that morality is ultimately contextual. As contexts change, fitting creaturely responses also change. Moral values fitting for one historical epoch or culture may be inappropriate for a different epoch or a different culture.

At the same time forms are embodied in every emerging creature, and some pervasive forms may generally increase harmony and intensity of feeling for creatures with particular defining characteristics. In this manner, the formal side of morality may assume importance.

Thus, both contexts and forms need to be considered in a social ethic. Some persons may accentuate the contextual side leading to a dynamic and emergent morality. Others may accentuate the formalistic side leading to a more formalistic and conservative morality. Some process thinkers look for general principles of justice and seek normative forms of human social organization to inform human morality; others emphasize more forcefully the relational, dynamic emergent facets of experience and do not focus on principles of justice and normative forms of social organization.[21]

From the point of view shaping this essay, both formal and contextual facets of morality need to be considered in a process social ethic. Equality appropriate to form, self-determination informed by excellence, and order constitute the formal principles of justice which must be embodied in the judicial rules and regulations of a particular living community in a given historical epoch. Normative forms of social organization include monogamy, a fitting ethnic and racial pluralism, a fitting separation of economic and political institutions, a federated form of democracy, and fitting cultural religious pluralism.[22]

The inevitable contrasts between liberty, equality, and order and the multiple situations to which they have to relate underscore the contextual side of morality. Similarly, the wide variety of forms of social organization manifest on this planet and the lack of seasonal relevance of normative forms in many human societies also accentuate the contextual side of morality.

The significance of the contextual side of morality should not lead one to denigrate the formal side of morality. Principles of justice and a vision of desirable forms of social organization can help people seek the relative "better" rather than the relative "worse" in the familial, social, ethnic, economic, political, cultural and religious spheres.

Human Religious Experience

Human religious experience is intimately related to rather exceptional experiences of the conscious regnant occasions constituting the human organizing center. Only creatures with enhanced capacities

for harmony, contrasts, and intensity of feeling can be religious. On this planet some lower animals may have some aesthetic experiences which may be termed "religious," but adequate data are lacking. In any event, both historical and contemporary human beings have participated in religious rituals, developed religious beliefs, and elaborated rational theologies.[23]

As noted earlier, an important distinction should be made between the loci of scientific inquiry and religious experience: science is concerned with the objects an experiencing subject perceives while religion is concerned with the sensitive response of the experiencing subject to the percepta it is receiving. Because the two dimensions of experience are intertwined, one will likely experience aesthetic disharmony and tedium unless one effects a supreme fusion between these two dimensions of experience.

Religious experience involves an intuition of an ultimate harmony of harmonies, a consummate peace of peaces. Religious experience may be evoked by and may evoke a sense of moral fitness, a sense of the rightness of specialized truths, and a feeling of aesthetic satisfaction. However, because the aesthetic dimension of experience embodied in an emerging creature's subjective aim surpasses the formal aspects of experience embodied in propositions and eternal objects, the feeling of aesthetic satisfaction is more foundational than moral fitness or the rightness of specialized truths. Without aesthetic satisfaction and religious experience, morality deteriorates into moralisms and truth into narrow dogmatisms. Because truth and goodness may contribute to beauty, they are important. In addition, as truth, beauty, and goodness are three-in-relation, an experience centered on any one may evoke the others and shade off into religious experience.

Two implications of these relations should be noted, for they invert the priorities espoused by those who place preeminence on the quest for truth and/or those who equate religion and morality. First, an intuition into the rightness of things and a faith that there is a relational essence to things which reason may penetrate—at least in part—is transrational. Second, rational proofs for the existence of God are of secondary importance and will be unconvincing to one who with intentionality wills to exercise negative judgments about any human efforts to delineate the Divine nature.

Nonetheless formulations characterizing the Divine nature can be developed. Theological propositions *about* the Divine nature may increase human religious experience *of* the Divine nature, but they cannot unequivocally evoke human religious experience. Religious experience entails an especially intense awareness of the Divine subjective aim—an aim which harmonizes all the eternal objects and evokes harmony and intensity of feeling in the creatures of the world.

In human experience, these occasions are rather infrequent and may be misinterpreted or explained away.

The phases of becoming provide a basis for interpreting the various dimensions of religious expression discerned among humans. The rhythms embodied in the physical side of experience give rise to the ritual and emotional dimensions of religious expression. Rituals are the external data appropriated by emerging subjects to evoke feelings and emotions eliciting religious experience. Because of the significance of the supplemental phases in the becoming or regnant ultimate percipient occasions constituting the human organizing center, feelings demand interpretations. Consequently religious beliefs emerge among humankind to explain the religious practices in which humans engage. At the folk level religious beliefs are often inchoate and contain inconsistent and incongruous propositions.

Humans also quest for some coherence and logicality in their beliefs, and they want them to fit the facts. Consequently, even though theological developments are uneven and are more fully elaborated in some cultures than in others, rational theologies have emerged to provide a more coherent and logical account of religious beliefs and practices. Characterizations of a Divine reality that is at least in some senses *sui generis* are an integral part of rational theologies.

According to the interpretation advanced here, religious experiences, beliefs, and interpretations are evoked by the Divine presence in human life. Because the persons initiating the evolutionary epoch were informed by phenomenological or reductionistic interpretations of human values and religious experiences, they frequently interpreted them by appealing either to what they held were underlying or more fundamental phenomena or by resorting to descriptive or subjective interpretations.[24] Process thinking can both honor the "facts" about evolution and also interpret them in a manner which may enhance human religious experience. It also permits us to understand our deepest aesthetic and religious intuitions in ways which enable one to affirm the *sui generis* and authentic character of these experiences. It remains to be seen how and to what extent this mode of thinking is incorporated in the future work of scientists and theologians and is appropriated in human life.

NOTES

1. Alfred North Whitehead's major writings in this period include *Science and the Modern World* (1925; reprint ed., New York: New American Library, Mentor Books, 1964); *Religion in the Making* (1926; reprint ed., Cleveland, Ohio: World Publishing, Meridian Books, 1965); *Symbolism: Its Meaning and Effect* (1927; reprint ed., New York: G. P. Putnam's Sons, Capricorn Books, 1959); *The Function of Reason* (1929; reprint ed., Boston, Mass.: Beacon Press, 1958); *Process and Reality*, corrected ed., ed. David Ray Griffin and Donald W. Sherburne (1929; corr. ed., New York: Free Press, 1978); *Adventures of Ideas* (1933; reprint ed., New York: New American Library, Mentor Books,

1967); and *Modes of Thought* (1938; reprint ed., New York: G. P. Putnam's Sons, Capricorn Books, 1958).

2. In the context of the American experience the conflicts have taken a different shape. Scientists working in most universities did not have to deal with a clergy establishment, for most of the major universities were public in the nineteenth century. The major private universities made the transition from substantial church relatedness to negligible or nonexistent church relatedness with relative felicity. Indeed, in the context of the American experience many church groups themselves appropriated many of the interpretations and findings of modern science.

Political bodies, secondary schools, and some church related colleges bore the brunt of the controversy. The Scopes trial was the high water mark of the political impingement upon science in America, but some "creationist" advocates in the current epoch seem intent to raise similar issues. Some scientists and some church people entertain, in different ways, rather unbending viewpoints on creationist issues.

3. See, for example, Ernst Mayr and William B. Provine, eds., *The Evolutionary Synthesis: Perspectives on the Unification of Biology* (Cambridge, Mass.; Harvard University Press, 1980). For a most interesting analysis of the evolutionary process emphasizing periods of rapid change associated with major evolutional transitions, see Steven M. Stanley, *Macroevolution: Pattern and Process* (San Francisco: W. H. Freeman, 1979). Although Stanley does not use the categories of process philosophy to interpret his data, the abruptness of the emergence of eternal objects in the conceptual phase of an actual occasion's becoming provides a basic explanation for the mutations and rapid emergence of novel creatures sometimes observed in nature. This issue is discussed subsequently in the section entitled "Emergent Evolution on this Planet."

Many biologists and social anthropologists reject the notion that nature has a purpose. See, for example, G. G. Simpson, *The Meaning of Evolution*, rev. ed. (New York: Bantam Books, 1971). In his *Chance and Necessity* (New York: Vintage Books, 1972) Jacques Monod holds that chance alone accounts for every creation in the biosphere. For him, chance is absolutely free but it is blind.

On the other hand, Ralph W. Burhoe in his "The Human Prospect and the 'Lord of History,'" (*Zygon* 10 [September 1975]: 299-375) discerns a deterministic pattern in the evolutionary process.

For a most interesting interpretation of the evolutionary process having much in common with the constructive facets of this paper, see John F. Haught, *Nature and Purpose* (Lanham, Md.: University Press of America, 1980). He develops the notion that nature exhibits a "loose teleology," somewhere between the randomness of Monod and the determinism of Burhoe.

4. It is beyond the scope of this essay to elaborate the richness and complexity of the Augustinian formulations. The person reading this summary statement who has not read the Augustinian texts should be alerted to the breadth and the scope of his thought. It would be interesting to see what Augustine would have written if he had been living in an evolutionary epoch, for he ranks among the major intellects produced on this planet.

5. One cannot fault the logicality and coherence of Augustine's formulations. His thinking cannot be challenged on the rational side. It must be challenged on the empirical side, for it does not seem to fit the facts. The evidence for the emergence of creatures on this planet with increasingly complex structures and with increasingly enhanced capacities for intensity of feeling and thinking and for greater capacities to respond to circumstances seems very persuasive indeed.

6. Tillich affirms confessionally the revelatory power of Jesus as the Christ. It is beyond the scope of this essay to pursue this matter, but it is a central aspect of his theological system.

7. For this reason an uninitiated person might think Barth was a biblical fundamentalist. There is a tantalizing relation between Barth and biblical fundamentalists, but he is definitely not a fundamentalist.

8. See Pierre Teilhard de Chardin, *The Phenomenon of Man* (New York: Harper & Row, 1959).

9. See, for example, Bernard Lee, *The Becoming of the Church* (New York: Paulist Press, 1974) and David Tracy, *Blessed Rage for Order* (New York: Seabury Press, 1975).

10. See, for example, John B. Cobb, Jr. and David Ray Griffin, *Process Theology: An Introductory Exposition* (Philadelphia: Westminster Press, 1976). This volume contains an excellent annotated bibliography of works by persons informed by process thought. Those wanting bibliographical references for work done prior to 1976 are referred to this text. (For an exhaustive bibliography of writings relating to Whitehead prior to 1976, see Barry Woodbridge, *Alfred North Whitehead: A Primary-Secondary Bibliography* [Bowling Green, Ohio: Philosophy Documentation Center, Bowling Green State University, 1977].)

Cobb and Griffin also edited *Mind in Nature: Essays on the Interface of Science and Philosophy* (Lanham, Md.: University Press of America, 1977). This volume contains several essays of direct relevance to the topic of emergent evolution.

For a rich and complex critique of process views of God, see Robert Neville, *God and Creativity* (New York: Seabury Press, 1980).

For a collection of essays dealing with the implications of process thought for the human sciences, social ethics, and liberation theology, see John B. Cobb, Jr. and W. Widick Schroeder, *Process Philosophy and Social Thought* (Chicago: Center for the Scientific Study of Religion, 1981).

Lewis Ford has incorporated evolutionary thinking in his work, *The Lure of God* (Philadelphia: Fortress Press, 1978).

11. As noted in the opening paragraphs of this essay, the specialized scientist will inevitably incorporate some presuppositions in his analysis not directly derived from work in his specialized field of endeavor. These more general notions will effect the shape and tone of his interpretation. If the scientist is informed by reductionist views, he is apt to seek to "explain" the activity of the human organism on the basis of some underlying elements internal and/or external to the organism. Some evolutionary theory is of this type. E. O. Wilson's *Sociobiology* (Cambridge, Mass.: Harvard University Press, 1975) is informed by such views.

In this essay, the informing evolutionary theory is "emergent evolution." In this view the causal past conditions the present, but it does not determine the present. The more complex and high grade the organism, the greater its capacity for novelty in response to circumstances. Life is fittingly interpreted as a claim for freedom from the bonds of the causal past.

12. The unity of the self constitutes a major problem in process modes of thought. Process philosophy entertains an atomic view of reality, for the ultimately real are drops of experience. Varying in richness and complexity, the occasions constituting the world are, nonetheless, all on the same level of actuality.

This view does justice to the experience of diversity, but it does not adequately deal with the *unity* of human experience. The notion of a formless form is advanced here to account for the *unity* of the human person. God contributes to the experience of the unity of the self, for there is a peculiar mutual immanence between God and the soul, due to the significance of the mental phase in occasions constituting the soul and the richness of the human subjective aim.

13. In the case of the Divine entity, the mental pole of Its becoming is prior to Its physical pole. This exception has far-reaching consequences for an interpretation of the Divine life. The implications of this exception are not explored systematically in this essay, but some of the consequences are considered in the latter part of the essay.

14. Some subhuman animal societies have some transphysical feelings and meanings. Dolphins and primates probably have the richest subhuman cultures. In the future humans may devise better ways to communicate with such creatures and may be able to empathize more sensitively with their symbolic worlds.

15. The order of nature manifest in our cosmic epoch is partially objectified in the regnant ultimate percipient occasion through sense *reception* in the mode of casual efficacy. This version of philosophic realism is central to process modes of thought.

16. Telepathy and other psychic phenomena—insofar as they are authentic—also involve the hybrid prehension of the mental pole of another creature or creatures.

17. The interrelatedness of nature and the intimate relations existing between the organizing center and the rest of the body underscore the importance of a congenial sustaining environment to support human life. The ecological concerns emerging in our time are grounded on this interrelatedness. For a discussion of ecology by a process

theologian see John B. Cobb, Jr., *Is It Too Late? A Theology of Ecology* (Beverly Hills, Cal.: Bruce, 1972).

18. For a rich discussion and elaboration of the order of nature and the properties of the extensive continuum, see Whitehead, *Process and Reality*, corrected ed. (n. 1 above), pp. 61-129, 283-333. An extended discussion of the extensive continuum and the geometrical implications of it are beyond the scope of this essay. The discussion here is designed to set the human organism within its broader environment and to illumine the form of emergent evolution which is envisaged in the framework of process philosophy.

For helpful discussions of these issues, see Elizabeth Kraus, *The Metaphysics of Experience* (New York: Fordham University Press, 1979) and Robert M. Palter, *Whitehead's Philosophy of Science* (Chicago: University of Chicago Press, 1960).

19. Of course, the *human* consequences of developments in scientific theory and application are important for human life. High technology has helped transform many human societies, and the scientific mind set has greatly influenced modern culture. Because such work is inevitably informed by some implicit or explicit metaphysical assumptions, the human impact of such work may be substantial.

These factors need to be considered in the human sciences, but it is not necessary to understand the most recent specialized work in the natural or biological sciences to elaborate a human social theory or social ethic. Because so many scientists formally eschew metaphysics, the communication problems between scientists and others are increased.

20. In this way a double understanding of human freedom emerges. In one sense, freedom is doing what one wants to do. In a second sense, authentic human freedom consists in doing what one ought to do.

The "is/ought" contrast deeply embedded in human experience is ultimately grounded in the intense human awareness of the Divine subjective aim. Its once-and-for-all envisagement and harmonization of the forms of definiteness provide the basis for the "ought" aspect of human experience. Finitude, ignorance, sloth, lethargy and inordinate self-interest provide the basis for the "is" aspect of human experience.

21. For an illustration of alternative approaches to a process social ethic, see Cobb and Schroeder (n. 10 above).

22. It is beyond the scope of this essay to elaborate these notions in detail. For extended discussion, see W. Widick Schroeder, "Religious Institutions and Human Societies: A Normative Inquiry into the Appropriate Contribution of Religious Institutions to Human Life and to the Divine Life" in *Belonging and Alienation: Religious Foundations for the Human Future*, ed. Philip Hefner and W. Widick Schroeder (Chicago: Center for the Scientific Study of Religion, 1976), pp. 181-218 and W. Widick Schroeder, "Toward Belief: A Process Perspective on the Social Sciences and Social Ethics" in *Belief and Ethics: Essays in Ethics, the Human Sciences, and Ministry in Honor of W. Alvin Pitcher*, ed. W. Widick Schroeder and Gibson Winter (Chicago: Center for the Scientific Study of Religion, 1978), pp. 237-54.

23. It is beyond the scope of this essay to examine alternative interpretations of religious phenomena. For a typological discussion of alternative perspectives, see W. Widick Schroeder, *Cognitive Structures and Religious Research* (East Lansing: Michigan State University Press, 1970), pp. 145-80.

24. Because so few contemporary workers in the sciences—natural or human—are informed by views rooted in the Platonic or Aristotelian traditions, most scientists entertain either skeptical, phenomenological, or reductionistic views of a Divine reality. Because most Western theologians entertain "one-way" God-world relations, their views of the Divine reality contrast substantially with process views. Process theists suggest that a "two-way" God-world relation exists. God is immanent in and transcends the world, and the world is immanent in and transcends God.

From the point of view of most contemporary scientists, many process thinkers are willing to say more about a Divine reality that is, in some senses, *sui generis* than they are. From the point of view of most Western theologians, process thinkers limit the Divine in ways they do not.