BIOLOGICAL PERSPECTIVES ON FALL AND ORIGINAL SIN

by Philip Hefner

Abstract. The paper consists of an argument that goes as follows. Symbols and their elaboration into myths constitute *Homo sapiens's* most primitive reading of the world and the relation of humans to that world. They are, in other words, primordial units of cultural information, emerging very early in human history, representing a significant achievement in the evolution of human self-consciousness and reflection. The classic myths of Fall and Original Sin, as well as the doctrines to which they gave rise, are further interpretations of this primordial information. The doctrinal traditions of the first four centuries of Christianity are surveyed. Three sets of data as interpreted by the biological sciences are offered as resources for understanding the biogenetic grounds of the experience that the symbols, myths, and doctrines of Fall and Original Sin seek to interpret. The conclusions to be drawn are that (1) the symbolic material is indeed commensurate with the scientific understandings, and (2) the scientific interpretations deepen our understanding of the symbols, while (3) the conversation between the symbols and the science once again raises certain perennial questions about human existence.

Keywords: Augustine; defect; fall; finitude; genes and culture; Gregory of Nyssa; myth and ritual; original sin.

Paul Ricoeur's (1967, 3–18) useful methodology for understanding and interpreting symbolic and mythic materials forms the basis for my argument that these materials constitute a legacy of primordial information that originates in the earlier history of *Homo sapiens,* as a reading of the world in which earlier humans lived and their

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relation to it. Elsewhere, I have begun to elaborate a theory that attempts to place the origins, function, and significance of this primordial information within the evolutionary process and to demonstrate its implications for understanding the human phenomenon (Hefner 1991, esp. 122–30; Hefner, in press). Briefly, the theory rests on the scientific suggestions that we have already noted, that *Homo sapiens* is in a sense a two-natured creature, constituted by both genes and culture (Burhoe 1979; Klein 1989, 341–42, 356–60). Since humans are fully dependent on both of these systems of information, genetic and cultural, some sort of cooperative interaction between them has evolved—a *symbiosis*. Both systems of information are essential for the motivation, support, and guidance of human behavior. Symbol and myth may be understood as very early forms in which this system of cultural information took shape (Hefner 1991, 122–27). When one takes seriously the essential role of culture for the survival and flourishing of the species, then it is clear how significant the forms are in which early humans read their environment and their relation to it. More specifically, one recognizes how important symbol, myth, and ritual are as elements in which the cultural system of information and guidance constitutes itself.

Unfortunately, we do not have much empirical evidence concerning the emergence of symbol, myth, and ritual with which to inform our concepts and theories. The work of such scholars as Andre Leroi-Gourhan (1967), Ralph Wendell Burhoe (1976a, 1976b, 1979), Julian Jaynes (1977), Eugene d'Aquili (1978, 1983), and John Pfeiffer (1982) is perhaps the most rigorous we have at our disposal, and we recognize that their theories are as yet clearly underdetermined by empirical evidence. We know, however, that it is reasonable and even conservative to speculate that symbol and ritual were in existence fifty to sixty thousand years ago, as indicated by burial sites that show evidence of ritual performances (Klein 1989, 327; Pfeiffer 1982, 99–101). By the same reckoning, art that was a social creation, serving social purposes, goes back at least thirty-three thousand years (Klein 1989, 378–85; Pfeiffer 1982, chs. 1, 8, 12, 13). Dating from twenty thousand years ago, the number of artifacts is enormous. The number of paintings and engravings in western Europe alone is conservatively estimated at fifteen thousand (Pfeiffer 1982, 11). To this must be added the sculptures that suggest a placement within symbolic networks of meaning.

I sketch this prehistorical background simply to reinforce the suggestion that symbol, myth, and ritual are to be understood as primordial units of the cultural system of information that served the survival and flourishing of the human species and its immediate

predecessors. This sets the stage for our analysis of freedom in the context of the information borne by the mythic material associated with the doctrines of Original Sin and the Fall. My point is that these doctrines have their origin in the symbols and myths which make up that cultural information system even in its prehistoric period of development. How early the symbols pertinent to our theme occur, we do not know, but certainly they are well developed as far back as five thousand years ago. That they occur in archaic religions would suggest that they were present at the same time as the flourishing of cave art and ritual.

Why is it important to probe the origins of myth and ritual, the major components of religion? Because understanding the origins gives us a significant perspective on the purpose of religion today. To the extent that we understand when these essential elements of human being emerged, we also get a sense of the functions that they played and what they contributed to human life. To the same degree, we also may get a sense of what those elements mean in our lives today. It is true that in the dynamic processes of human history, myth and ritual might assume different functions from those they played at the beginning of the human journey. And it is also clear that the meaning of human life and its essential elements is not fully grasped except in the future, when we get a firmer grasp on what human life can become (theologians understand this as the eschatological dimension of meaning). Nevertheless, the more clearly we understand the purpose and function of religion at its emergence and in its earliest history, the more we will also understand what religion was selected for and how it served life in its early period. This knowledge gives us clues concerning the significance of religion and what its function today and in the future might also be.

The highly developed interpretations of sin and evil in myth, philosophy, and theology/doctrine, are not properly understood unless we view them as interpretations and elaborations of the more primordial sensing that occurred early on in the history of *Homo sapiens*. This placement is important, because it tells us (1) about the origin of the myths, philosophy, and theology of sin and evil, and (2) why it is important to give our attention to them. Their origin lies in the primordial human reading of the world and our place in it. Their importance lies in their being part of viable information systems that not only served human understanding, but also human survival. As with other forms of primordial information, we cherish these symbolic systems, in order to learn from them for our own understanding and survival. We know that such a learning process is not a simple one. Ricoeur himself, from a position of modern

critical reason, spoke of it as crossing the threshold from the first naivete to the second (Ricoeur 1967, 19–24, 347–57). Those who look at the learning challenge from the hermeneutical stance of postmodernism are just as aware that the premodern information and the modern critique must somehow be brought together for contemporary understanding (Shweder 1991, ch. 1; 35–39; 353–58).

THE DOCTRINES OF THE FALL AND ORIGINAL SIN

For the purposes of this presentation, I am leaping over the testimonies of the most primitive human experience of sin and evil, as that testimony is conveyed in symbol and myth, to focus on a relatively late rendition of that testimony as it is interpreted in doctrine. Consequently, I am attending neither to biblical exegesis nor to the kind of interpretation of myths that Ricoeur's work represents. As I have said above, however, my reflection upon the doctrines rests on the awareness of the more primordial and less discursive symbolic and mythic materials and on the understanding that the doctrines are interpretations of those prior materials. I recognize, furthermore, that these doctrines and their mythic precursor texts have been interpreted in a variety of ways, especially in the first five centuries of Christianity (Pagels 1988, xxv–xxviii, chs. 5–6). This variety may be interpreted in terms of the Western church, represented by Augustine (354–430 C.E.), in contrast to the Eastern church, represented by Gregory of Nyssa (330–395 C.E.); or in terms of the first three centuries of Christian tradition contrasted to the fundamental changes wrought by Augustine in the fourth century and accepted by large segments of the church, especially in the West, in the fifth century. Even the term *original sin* bespeaks a Western treatment when contrasted to Nyssa's rejection of the term, as well as the term *natural sin,* an alternative offered by some theologians in his time, in favor of a view that roots sin in human freedom. The contrast is just as great when one considers the identification in the first three centuries of freedom with the impact of the Gospel (Pelikan 1971, 278–82; Pagels 1988, chs. 1–4). If we take this variety into account, we are struck by the Western Augustinian cast of most theological discussions of sin and evil (R. Williams 1982, 194; Gregorios 1988, ch. 7).

AUGUSTINE AND WESTERN PERSPECTIVES UNDER HIS INFLUENCE. In his argumentation with Pelagius and his disciple, Julian of Eclanum, Augustine devoted more than a decade of his life to articulating what we call the theology of the Fall and Original Sin

(Pelikan 1971, 289–92; Pagels 1988, chs. 5–6). In a decisive manner, he elaborated the concepts of Adam's fall; the transmission of Adam's sin and its consequences through conception (specifically, sin is carried by the man's semen); guilt; and the necessity of grace. Physical death as well as corruptibility and vulnerability to disease and pain are the consequences of Adam's fall. His powerful theological elaborations interweave in a complex manner his own personal experience of uncontrollable sexual desire; his polemics against the Pelagians; his interpretation of the Virgin Birth (following Ambrose, that it proves that ordinary conception is the source of sin); his interpretation of infant baptism (it is practiced because infants are born in sin and thus need forgiveness); and the church-political and cultural contexts in which he lived (Pelikan 1971, 279–331; Pagels 1988, chs. 5–6). No interpretation of what Augustine or his predecessors and contemporaries taught concerning Fall and Original Sin is adequate if it does not take this total complex of issues into account: personal experience, biblical accounts, liturgical practice, and political-social contexts.

One classic Western rendering of the doctrines of Fall and Original Sin, fully in harmony with the Augustinian heritage, is found in the Lutheran Confessions, *The Book of Concord,* article two: "Our churches also teach that since the fall of Adam all humans who are propagated according to nature are born in sin. That is to say, they are without fear of God, are without trust in God, and are concupiscent. And this disease or vice of origin (*vitium originis*) is truly sin, which even now damns and brings eternal death on those who are not born again through Baptism and the Holy Spirit" (Tappert 1959, 29; Latin version). The Epitome of the *Formula of Concord,* article one, dating from 1580, elaborates on the Fall:

> We believe, teach, and confess that there is a distinction between human nature and original sin, not only in the beginning when God created humans pure and holy and without sin, but also as we now have our nature after the Fall. Even after the fall our nature is and remains a creature of God. The distinction between our nature and original sin is as great as the difference between God's work and the devil's work. (Tappert 1959, 466)

This Lutheran version of the doctrines is distinctive in certain ways, yet, even allowing for the various ways in which the Catholics and Protestants misunderstood each other on these points of teaching, it presents in substance what much of the Western tradition held (Williams 1982, 198–205). The basic substance of the Western view holds to (1) an original righteousness stemming from the goodness of God's creation, (2) a deviation that is rooted in human rebellion

against God and which is passed on to all succeeding human beings by virtue of their conception in sexual intercourse (which entails concupiscence), and (3) the guiltiness that applies to all persons on account of this sin, thereby (4) requiring divine grace to overcome the sin. "Original" sin has been interpreted so as to refer both to the *initial* sin of Adam and Eve and to the fact that the sin applies to all individuals by virtue of their birth, that is, *the sin of their origin as individuals.* I will have more to say about this duality later. The Catholics, represented by Thomas Aquinas, use different philosophical categories, involving the formal and material aspects of the sin, referring respectively to the loss of the original righteousness and to the presence of concupiscence (Williams 1982, 204). The two extremes in thinking about this sin, which the mainstream of the tradition wishes to avoid, are a cool view of sin as defect, thus overlooking the ferocity of sinful intention, on the one hand, and a view of sin as total depravity, totally demolishing the God-given original goodness that pertains to humans. The Lutheran versions of the doctrine are cited because they seem, when taken as a whole, to represent the main tradition without the extremes—the *Augsburg Confession* articulating the inherent ferocity of the sin, the *Formula of Concord* insisting upon human created goodness.

Biblical interpretation and theology have reflected upon whether the Fall and Original Sin doctrines and their biblical textual correlates are to be taken as history. If so, then the account in Genesis, chapters 2–3, means to provide an *etiology* of human sinfulness; the *initial* misdeed of Adam and Eve provides a causal explanation for the present human sinful condition. In terms of doctrine, the question is whether the concept of original righteousness refers to an actual historical period when humans were sinless and from which they have "fallen." A different point of view is represented by those who suggest that the Genesis account is not an etiology, but rather a *description* of the present state of humans. The Old Testament scholar Claus Westermann represents this position when he writes: "The [Genesis] narrative is not really answering the question of the origin of man, but the question of man experienced as ambivalent" (Westermann 1974, 109; see 88–112).

Paul Tillich has also dealt with these issues in a representative theological fashion with his insistence that "Theology must clearly and unambiguously represent 'the Fall' as a symbol for the human situation universally, not as the story of an event that happened 'once upon a time' " (Tillich 1957, 29; see also 29–44). He continues, "Original or hereditary sin is neither original nor hereditary; it is

the universal destiny of estrangement which concerns every man" (Tillich 1957, 56). He also translates the assertion of Original Sin in his statement: "Before sin is an act, it is a state" (Tillich 1948, 155). The issue of sin being transmitted biologically, at birth, has also been translated into cultural terms, representatively by Friedrich Schleiermacher in the early nineteenth century. According to this perspective, it is culture that transmits to each new human being the tragic web of sinfulness, rather than the biology of sexual intercourse, conception, and birth (Schleiermacher 1928, 279–81, 287–91). Augustine had directly linked the passion of sexual intercourse to sin, passion being the *fomes* or tinder for sin. Hence, every human being was conceived in sin.

EASTERN PERSPECTIVES. Eastern traditions contemporary with Augustine took quite a different turn in interpreting the doctrines under consideration (Pelikan 1971, 285–86). The Pelagians themselves represented a version of the Eastern Christian traditions (Pelikan 1971, 316). Dating at least from the first quarter of the fourth century of the common era, with Aphrahat (who flourished 330s and 340s C.E.), and continuing through Theodore of Mopsuestia (who died in 428 C.E.), we find positions like that described by Arthur Vööbus with respect to Theodore:

> First, Adam was created as mortal. . . . Second, concupiscence already lived in Adam as in a mortal being, causing the fall; therefore, it cannot be a punishment. Third, death is not a punishment for Adam's trespass, but something natural. Fourth, sin has nothing to do with nature. . . . Finally, however powerful are the effects of the trespass of the progenitor, the free will and the moral ability to make decisions between evil and good are not impaired. (Vööbus 1964, 113–14)

Gregory of Nyssa stands in traditions that are consistent with those described by Vööbus (Gregorios 1988, 165–68). His views also hold that concupiscence antedates sin, but at the same time is the occasion for it. It is the constant changeableness of human nature that is the locus for sin, since in the dynamic continuum of their nature, humans make wrong choices, in favor of evil. Sin is thus rooted firmly in human freedom, and the amelioration of the human condition lies in the redirecting of the free will (Gregorios 1988, 156–80). Human nature is fundamentally good, since it originates in God's creation of humans in the image of God. For Gregory, as for Theodore of Mopsuestia, Western theology, epitomized for them by Augustine, denigrated this goodness of human nature and also misunderstood the significance of freedom. It seemed to impose a new fatalism which

denied the goodness of creation. This echoed a position of the Pelagians (Brown 1969, 387–88). Gregorios summarizes Gregory's position: "Gregory follows essentially the Semitic tradition, to which the Augustinian notion of 'original sin' is inimical. The Semitic tradition puts the stress on human freedom and responsibility, and it is this line that Gregory also adopts" (Gregorios 1988, 168). Sin is the result of Adam's free choice, and what we inherit from Adam is not sin, but rather its consequences, mortality and corruptibility. Gregory agreed with his contemporary, Severus of Antioch, that "sin is a disease of the will, and the disease is not natural" (Gregorios 1988, 161).

Sin is located in freedom, which is part of our basic created human nature. However, this is not to say that our basic nature is evil or sinful; rather, sin emerges in the course of our inadequate and wrongful use of the possibilities inherent in our nature. If the Western view of original sin is interpreted as sin of origin (rather than first sin), it may be taken to refer to the sin that arises through the activity generated by those gifts with which we were endowed at our creation. This interpretation would support a view that is rooted in both West and East, even though adherents of the latter reject the term *original sin* as they understand it to be held in the West.

THE THEOLOGICAL ESSENTIALS. For the purposes of this discussion, I will focus upon five elements that seem essential to the Western Christian doctrines of Fall and Original Sin, in such a way as to relate also to some of the Eastern Christian reflections on sin: (1) sin is an inherent factor of our self-awareness; (2) we participate in sin as a condition pertaining to our very origin as persons; (3) sin seems to be inherited in some fashion; (4) sin is associated with our freedom; (5) sin is marked by a sense of guilt and estrangement, thus requiring the gift of grace. It is these elements that will figure in our discussion of the biological materials.

EXCURSUS ON THE THEOLOGICAL MATERIALS. As we reflect upon the theological traditions concerning the Fall and Original Sin, we must keep in mind that these materials cannot simply be lifted out of their context for analysis. In their context, they were vehicles for thinking not only about their stated themes, but also about other issues. Two of these sets of other issues deserve brief commentary.

The discussion of the Fall and Original Sin were means by which the thinkers of the first five centuries of the common era expressed their understanding of the *moral dimension* of human existence,

including social and religious values. Consequently, the biblical myths and the related teachings of Jesus provided the ambience in which thinkers in this period explored such questions as the nature of sexuality, the status of marriage as opposed to celibacy, polygamy, divorce, abortion, the necessity of pain, suffering and death, the possibility of personal discipline, and the like (Pagels 1988, xix-xx; 9-16). Our discussion will not attempt to probe these issues, but it should not be overlooked that the issues we will be focusing upon are loaded heavily with implications for values and moral behavior.

The themes that we are discussing are also a chief locus for thinking about the "nature of nature." Jaroslav Pelikan points out that for major thinkers in this period, "despite all this strong language about sin, the fundamental problem of man was not his sin, but his corruptibility" (Pelikan 1971, 285). Elaine Pagels comments on Julian of Eclanum's arguments against Augustine:

> Augustine's enormous error, Julian believed, was to regard the present state of nature as punishment. . . . Augustine thus denies the existence of nature *per se*—of nature as natural scientists have taught us to perceive it—for he cannot think of the natural world except as a reflection of human desire and will. Where there is suffering, there must have been evil and guilt, for, Augustine insists, God would not allow suffering where there was no prior fault. (Pagels 1988, 132, 134-35)

In contrast, Julian holds "that we suffer and die shows only that we are, by nature (and indeed, Julian would add, by divine intent), mortal beings, simply one living species among others" (Pagels 1988, 144). Julian insisted that free will is essential to nature, at least to human nature, and, like his contemporaries in the East, he charged that Augustine's proposals deny that freedom. Julian did not deny that sin emerges in the course of our employment of our freedom, but he rejected the notion that our freedom is by its very nature sinful. That our nature becomes evil through its own free activity does not mean that it was created evil, but rather that it was created with the capacity to become what it has in fact become. Pagels goes on to suggest that despite the intellectual problems in Augustine's position, it nevertheless attempts, in a way that the more "contemporary" view does not, to make sense of the fact that then and now, human beings manifest "a peculiar preference for guilt" (Pagels 1988, 147).

In what follows, the discussion will have deep implications for how we perceive the "nature of nature." Even though I will not probe the matter in depth, I will argue that scientific understandings throw light on the "peculiar preference for guilt."

AN EXCURSUS ON DUALISM

It is important to emphasize that our talk in the following pages about the two-natured character of the human being is in no sense intended to suggest a dualistic understanding. On the contrary, our image of *Homo sapiens* is antithetical to dualistic modes of thought. One natural process has given rise to all that exists in the universe, including the human being. Whether one posits a divine source to nature or not, the instrumentality for the creation of human beings is the one process of nature. Within the evolution of this nature, the human is an emergent.

Our experience and understanding of this natural creature, the human being, however, is that of a being whose character is variegated and marked by very profound tensions. Western thinkers from Plato, through Martin Luther, Hegel, Søren Kierkegaard, Sigmund Freud, and Paul Tillich have marked these tensions, often using the images of animals to symbolize the different facets of human nature, generally animals that are hostile to one another. For example, they have often spoken of humans as horses being ridden by different and opposing riders. One can acknowledge the authenticity of these perceptions without necessarily subscribing to Platonic metaphysics, Hegelian or Kierkegaardian dialectic, or Freudian psychology. The reader should keep this antidualistic intention in mind as we discuss the distinctions between genes and cultures and the ways in which those distinctions define the field of what we consider to be the fundamental challenges facing the human species today. The discussion of sin may appear to rest on a dualism of genes versus culture, nature versus nurture, but such a dualism is more apparent than real. There are tensions, to be sure, between the two streams of evolving information, and this tension is so real that it can result in death to the symbionts.

Nevertheless, both streams of information have emerged within the one constellation of natural processes. Both have emerged within the realm of biological evolution. Furthermore, within the human being, the health of both genes and culture is necessary for the survival of the individual, as well as the group. No matter how vividly we experience the tension, we remember that the fundamental symbiotic belonging of the two streams is as deeply rooted in the way things really are as the tension. To apply a hermeneutic of dualism to explain the breadth and complexities of the human phenomenon is too easy a strategy. Though it is far more difficult to probe how the variegated realm of nature—and human beings within that nature—has emerged from one evolutionary process, at the hand of

one God, what we gain from that probing is also far more adequate for understanding what we experience and what we believe.

INSIGHTS FROM BIOLOGY: THE AWARENESS OF THE FALL AND ORIGINAL SIN GROUNDED IN *HOMO SAPIENS* AS A SYMBIOSIS OF GENES AND CULTURE

The first set of ideas provided by biology to which I shall turn for insights on the Christian assertions of human sinfulness emerges from the understanding of *Homo sapiens* as a creature that is dependent upon and formed by two kinds of information—genetic and cultural.

THE DISSONANCE BETWEEN GENES AND CULTURE. This dissonance within the individual is a ground of our awareness that sin is associated with our origins in prehistory, represented as Fall, and thus also a ground for the sense of guilt. The two streams of information—genetic and cultural—have evolved to their present state through processes of coadaptation that are centered in the human central nervous system. The genetic component has come to possess the characteristics of plasticity that allow for the emergence of culture and also allow it to operate according to its own dynamic processes in ways that make for its success in the face of selective forces. On the other hand, culture has had to adapt to the constraints of genetic evolution, since the death of the genetic host spells the end of the culture-bearing creature. This symbiosis has formed what geneticist Alfred Emerson (1943) and Ralph Burhoe (1981, 18-20, 173-79) have called a supraorganism, which flourishes because the two strands of information have coadapted—to each other and to the environments in which the supraorganism exists. When we properly understand the emergence of the human central nervous system and the concept of coadaptation of genes and culture within that central nervous system, we recognize that speaking of dissonance between the two systems of information does not mean positing a fundamental dualism between them. On the contrary, the various dimensions of our biocultural nature constitute a wholeness. Talk of dissonance and tension is a heuristic device that aids—so long as we remember that it is heuristic—in the attempt to understand the richness of our natural character—in this case, the sense of sin and guilt.

Paul MacLean's celebrated concept of the triune character of the human central nervous system—reptilian, paleo-mammalian, and neocortical—provides an additional perspective on the symbiotic character of *Homo sapiens* (1973). Since it is the neocortex that is

primary for the formation of culture, MacLean's theories can be included in the discussion of the genes-culture phenomenon. His work, as well as Emerson's and Burhoe's, underscores the importance of the harmonious or coadaptive interaction within each person of the various strands of evolutionary history that comprise human beings. To speak figuratively, within each human being, a serious conversation and mutual instruction has to take place between the reptilian, paleo-mammalian, and neocortical dimensions of the brain. In a sense, the neocortex has to teach the other two dimensions how to function in a "human" way; on the other hand, the neocortex also has to accommodate itself to the constraints of the earlier dimensions. The prehuman components are active within us, and as Anthony Stevens has told us, they are still engaged in the ongoing process of accommodation to the neurobiological ambience in which they must interact and function; they must function in ways that are appropriate to their human context. The evolutionary selection processes are operative in this realm also (Stevens 1983, 267–71). MacLean's suggestions are to be understood primarily for their heuristic usefulness (Deacon 1990b, 660–65), but they do give us a sense of the dynamic that accompanies the genes-culture symbiosis and its emergence and development in evolutionary history.

The coexistence between the varied evolutionary strands that comprise human being is not fully harmonious, however. The creatures who precede *Homo sapiens,* and who live almost entirely on the basis of preprogrammed genetic information, relate to the basic rhythms and requirements of their nature with an immediacy which humans, being the decisively cultural animals that they are, cannot match. Since the evolutionary past is integral to our central nervous system, we can in a sense remember the times of immediacy, and this in turn gives rise to a sense of discrepancy. To a very considerable extent, an element of reflection and enculturation is required in order for humans to bring their prehuman information systems to bear within their existence as creatures of culture. There is also, of course, a significant range of behaviors in which such an element is most often not required—the body's autonomic systems is one such instance. (Although, for example, where medication is applied to these systems, it constitutes a cultural intervention.) Where the supplementations of culture are necessary, it is often because the deliverances of the evolutionary past are deemed unacceptable, or because human agents sense their finitude and recognize that they need to augment the prehuman information inputs. The unacceptableness of the prehuman inputs may be felt, for example, in our sense of territoriality, in our predisposition to reinforce the kin group, in certain

eating patterns, or in interactions between male and female. Awareness of our finitude and lack of capability becomes clear to us when we respond to motivators for achievement, only to realize that we lack the basic capacity, experience, or education necessary to satisfy those motivators.

George Pugh reinforces this understanding of the basic sense of discrepancy in his analysis of human values. For example, the desire to excel or the desire to contribute to the group are values bequeathed to us from our evolutionary history—specifically, from the higher primates. However, neither excelling nor contributing can take place until culturally suitable supplements come into play that enable group members to make contributions in a satisfactory manner (Pugh 1977, 284–88).

My conclusion from the foregoing is that concepts of the Fall and Original Sin may well be considered to be mythic renditions of this biologically grounded sense of discrepancy. Our awareness of the discrepancy is that it is deeply rooted in our being, that it is primordial to our self-consciousness. This primordial character is what the term *original* conveys—not in the sense of there being a "first" or causative sin, but in the sense that the discrepancy is as primordial as our very origination. Obviously, this is to favor the Eastern theological traditions over the Western, as the more satisfactory thematization of our biologically conditioned experience. The Fall articulates symbolically our awareness that our human identity is constructed very significantly on foundations bequeathed to us from a prehuman evolutionary history where immediacy governed as both necessity and possibility in ways that are not available to us as humans. We cannot retreat to our prehuman past; even to desire that is a pathology, since it is a rejection of our human selfhood (Tillich 1957; Burhoe 1972). Nevertheless, we can and do yearn for a state in which our culture would respond as immediately to the requirements of the way things really are (or God's evolution) as did the prehuman motivators, whose messages now flood our central nervous system, when they drove their host organisms in prehuman environments.

This discrepancy may also be the biogenetic ground of our sense of guilt. The motivators that derive from our prehuman past operate in part on the pleasure principle. To be in the position of having to deny those motivators is unpleasant to us. To override those motivators with motivators that derive from the neocortex sets up a dissonance that itself may cause us to feel unpleasantness or even pain. Vis-à-vis the more primitive motivators, we may thus feel lacking and guilty. In the light of these factors, we may gain insights into

Augustine's insistence that guilt comes with the human territory—the peculiar preference for guilt. Contrary to his explanations, however, the guilt does not flow as a consequence of an initial sin but rather is grounded in the evolutionary history and nature of *Homo sapiens*.

HUMAN CULTURE CONTRA SELFISH HUMAN NATURE—A SECOND GROUND FOR OUR AWARENESS OF ORIGINAL SIN. Donald T. Campbell has related the religious symbol of original sin to the experiential and behavioral consequences of the fact that not only has sociocultural evolution emerged as a concomitant to biological evolution, but it is the basis for contemporary urban civilization. His thesis is stated in two celebrated maxims:

1. Human urban social complexity has been made possible by social evolution rather than by biological evolution,
2. This social evolution has had to counter individual selfish tendencies which biological evolution has continued to select as a result of the genetic competition among the cooperators. (Campbell 1976, 189)

Campbell's argument recognizes the necessity of sociocultural evolution for human life as we now know it, but also calls attention to the fact that, unlike the social insects, who also possess a highly complex social life, the cultured cooperators in the human community are genetically competitors. This results in the state of affairs that Campbell characterizes as "human culture contra selfish human nature" (Campbell 1976, 187). He elaborates this comment as follows:

> Not only must complex human social interdependence be a product of social evolution; the evolved socially induced dispositions must have directly opposed the selfish dispositional tendencies continually selected for by the concurrent biological evolution. It is this opposition between the dispositional products of biological and social evolution that explains Freud's observations on human ambivalence toward social roles and his contrast with the unambivalent insects. But Freud was wrong in believing that length of time in evolutionary history is the problem; it is, rather, the more fundamental fact of the evolutionary route toward social complexity. (Campbell 1975, 242–43)

This argumentation is rooted in Campbell's reading of developments during the last quarter-century in the genetics of altruism. He associates himself with the position of George C. Williams, who holds that altruistic tendencies that put the individual at risk will be selected for less frequently in a population's evolution than those that make for selfish gain (Campbell 1975, 239). Campbell favors this strict view of the limits of genetic evolution, precisely because it sets up the tension with sociocultural evolution that runs through the center of human social existence. This tension, in turn,

> makes evolutionary sense out of the otherwise anomalous or incomprehensible preoccupation with sin and temptation in the folk morality that our religious traditions provide. The commandments, the proverbs, the religious "law" represent social-evolutionary products directed at inculcating tendencies that are in direct opposition to the "temptations" which for the most part represent dispositional tendencies produced by biological evolution. For every commandment we may reasonably hypothesize a biological tendency running counter to some social-systematic optimum. (Campbell 1975, 243)

In relation to my previous argument, Campbell's reflections are significant because (1) they underscore that the interface characterized by discrepancy is itself the ground of an important feature of human life—its complex social form; (2) they specify the nature of this discrepancy as the pressure from cultural evolution for genetically predisposed competitors to function as cooperators; and (3) they introduce the tension between social and individual systems into the discussion of the discrepancy based on genes and culture on which we have focused. Campbell recognizes that being competitors shakes out as selfishness, greed, and "skin-surface hedonism," whereas being cooperators suggests "counterhedonic" self-discipline, denial, and altruism. He explicitly correlates the state of affairs along this interface with the classical notions of Original Sin. In terms of what I have already argued, we could say that Original Sin and Fall are mythic renditions of the circumstances that Campbell clarifies in his complex genetic/sociocultural analysis. His proposals bear strong witness to the fact that the themes we are discussing carry implications for values and moral behavior. They also throw light on the possible matrix out of which our feeling of guilt arises.

Two questions may be raised concerning Campbell's analysis: Does his rhetoric of cooperators and competitors bespeak a fundamental dualism? Is such rhetoric too much the product of importing metaphors from other sectors of our culture—perhaps from the ideology of free-market capitalism—under the subliminal pressure to invest that ideology at the most fundamental levels with the authority that derives from being clothed with "scientific fact"? Since Campbell is fully aware that the locus of his cooperators and competitors is the evolutionary process in which intense coadaptation is the norm, the charge of dualism is misguided. Tension and contradiction may indeed occur as behavioral manifestations, but in the context in which Campbell works, that cannot imply an ontological dualism. As to the second question, there may indeed be a transfer of metaphors, particularly among North American thinkers, from the competitive rhetoric of capitalism to the realm of the scientists. However, Campbell and his peers also speak of cooperation, coadaptation,

coevolution, which certainly counterbalance the competitive images. In the final analysis, the rhetoric must be judged by what actual empirical investigation within a broad community of researchers favors.

Insights from Biology: The Fact of Original Sin Grounded in *Homo sapiens* as Intrinsically Imperfect and Finite

The preceding section dealt with the ground of the feeling or awareness among humans that they have somehow "fallen" into sin. This mythic symbol of the Fall was correlated to the awareness of the discrepancies and tensions that attend the interaction of two systems of information that are basic to the human individual and group—the genetic and the cultural. The discussion turns in this section to the perceived fact that sinfulness is intrinsic to the human condition. This is a perception which Tillich articulated in his statement "Before sin is an act, it is a state" (Tillich 1948, 155), and to which the tradition refers when it speaks of a defect or disease of our origin, or which pertains to our very origin (*vitium* or *morbus originis*) (e.g., Tappert 1959, 29).

This theme is illumined by an understanding of human culture to which this essay referred earlier and which the following chapters explore in detail. Culture is a system of information, guidance, and support that is symbiotic with our genetic information systems and which supplements the genotype and its elaboration in the phenotype. Neither the genotypic nor the cultural systems are perfect in their ability to guide and sustain human behavior. Ralph Wendell Burhoe has described this imperfection:

> Living systems simply are not fully preadapted to all future contingencies. It would seem that we can epitomize the program of life as the unending search for the right code without our ever fully reaching it. . . . If the failures and inadequacies of the codes of right behavior of any time and place are always with us, to that extent we are always wrong, bad, and evil. And since in evolutionary pictures of life this is the case, we may say that humans in this sense are inherently wrong, bad, and evil. One finds this parallel to religious doctrines of original sin. (Burhoe 1981, 65)

The cultural system of information intensifies this propensity to imperfection, however, in that it relies for its development not only on what Burhoe calls "this unending program of trial and error" that constitutes the process of natural selection, but also in that it includes within that unending program the element of human self-awareness, decision, and the accompanying self-aware feedback mechanisms.

Moreover, all of these elements occurring in the system of cultural evolution proceed in their work at a rate of speed much more rapid than the mechanisms of genetic evolution. Finally, we recognize the truism that the cultural system (like all other systems) is finite. The human cultural information and guidance system must respond not only to the environment in which it is set, but also to its conscious perceptions of that setting. It must determine on its own which of alternative perceptions is to be given greatest weight, just as it must determine and authenticate in itself that which is to be authoritative for its processes of selection and action. At every moment, the system is itself aware that it knows too little, that its projections are based on inadequate data, that its stamina is less than it desires and needs. This is inherent in the central nervous system processes. Jerrison (1976), Deacon (1990a, 1990b), and Calvin (1991) describe the neurophysiological correlates to this probing character of *Homo sapiens*.

For some, this emphasis on fallibility and finitude may seem too bland to describe sin as the Western religious traditions understand it. We must remind ourselves, however, that the aspects of human nature that we have described as fallible are not at all bland but, rather, are themselves the underlying ground of sin in its most virulent expressions.

The foregoing illuminates the biogenetic context in which human freedom emerges and is required. Freedom is here defined as the capacity to launch into, and to persist in, the trial-and-error program that evolution sets for us, the probing that Jerrison, Deacon, and Calvin insist is intrinsic to the human central nervous system. Against this background we recall the emphasis upon free will that much of the theological tradition has associated with the human condition and the source both of sin and of its overcoming. Contrary to Julian of Eclanum, however, this free will appears to emerge within the context of the discrepancy that we focused upon earlier. The sense of discrepancy (and guilt?) does not militate against the freedom, but rather may be its concomitant. Although we found the Western, Augustinian concepts of Original Sin to be unpersuasive, this set of probes, dealing with finitude and fallibility, gives weight to Pagels's judgment that Augustine does deal more seriously with certain aspects of the human condition, namely, the interrelatedness of freedom with a sense of inadequacy and guilt.

Fallibility and the awareness of fallibility are thus built into the human system in a way that is not the case with systems that are not cultural and highly self-aware. Since all of the factors described above are intrinsic to the human creature and its self-awareness, and furthermore, since they are the occasion for regret and painful or evil

consequences, they truly appear as *defect* or *disease of origin.*

But in addition, these factors of trial and error and fallibility stand also as the very source of life and goodness. Burhoe continued, in the essay just cited, as follows:

> However, it should be noted that this same process in another perspective is good. If life is the supreme value, it is clear that in this universe it can be obtained only by this unending program of trial and error, which continues to build up higher and higher systems of order or life. In this wider perspective evil becomes the agent of the good, wrong or error the means to the right, and death the source of greater life. (Burhoe 1981, 65)

Consequently, the poignancy is heightened. Just as Campbell noted that the tension that produces the awareness of original sinfulness is central for making possible that social form of existence that is distinctive to humans, so Burhoe reminds us that the fallibility that engenders error and evil is not only intrinsic to human being, but even more basic to the processes that originate life and allow it to develop in enriching ways. This intrinsic poignancy and complexity, deep down in the character of human nature, grounds the Christian insistence, both West and East, that in its created origins, human being is not bad, but good, even though the traditions also insist upon the inescapability of grave sin. Defect of origin and goodness are not contradictory but, rather, constitutive of human being in its primordial nature.

This way of speaking is reminiscent of Paul Tillich's description of the demonic:

> The demonic contains destruction of form, which does not come from without, does not depend on deficiency or powerlessness, but originates from the basis of the form itself, the vital as well as the intellectual. To understand this connection is to grasp what is meant by the concept demonic, in its truth and inevitability, that is, in its metaphysical essence. . . . the depth of things, their basis of existence, is at the same time their abyss; or in other words, that the depth of things is inexhaustible. . . . The impulse for formation inherent in everything and filling it and the horror of decay of form is founded on the form-quality of existence. To come into being means to come to form. To lose form means to lose existence. At the same time, however, there dwells in everything the inner inexhaustibility of being, the will to realize in itself as an individual the active infinity of being, the impulse toward breaking through its own limited form. . . . Demonry is the form-destroying eruption of the creative basis of things. (Tillich 1936, 82–85)

We might also refer to Nicholas Berdyaev's interpretation of chaos and freedom as reinforcement of the imagery that Tillich sets before us (Hefner 1984).

In this case, as with the other two sets of data that we surveyed, the conclusion can be drawn that the symbols pertaining to the

doctrine of Original Sin render the primal experience of being intrinsically inadequate, while that inadequacy is key to the process that makes life possible and enriches it—the *vitium originis*.

CONCLUSIONS: THE MUTUAL ENRICHING OF BIOLOGY AND THEOLOGY

COMMENSURABILITY OF RELIGIOUS SYMBOLS AND BIOLOGICAL ANALYSIS. Earlier, I suggested that five elements from the historical traditions are essential to the doctrines of Fall and Original Sin: (1) sin is an inherent factor of our self-awareness; (2) we participate in sin as a condition pertaining to our very origin as persons; (3) sin seems to be inherited in some fashion; (4) sin is associated with our freedom; (5) sin is marked by a sense of guilt and estrangement. It is these elements that will figure in our discussion of the biological materials.

Our discussion of the biological materials leads to the first conclusion that these five elements are borne out by the biological theories. Following Ricoeur, this means that the symbols that underlie the doctrines can be understood as ways of reading the human condition, conceptualized biologically. The first two elements, sin as (1) inherent in our self-awareness and (2) pertaining to our very origin as persons, have been reiterated several times. The third element, the inheritance of sin, is clear when it is defined as we have discussed, since it is the evolutionary process itself that bequeaths to each individual and each generation the constitutive elements of life that bear the conditions of what we have called sin of origin. This self-awareness does not, however, gainsay our conviction that humans are created good. The poignancy and complexity that underlie the simultaneous acknowledgment of goodness and sinfulness are intrinsic to being human. With respect to our elaboration of the concept of created cocreator, this complexity underscores both the possibilities and excitement of being human and also the sober awareness of our finitude and vulnerability to the defects that ground the most demonic expressions of evil.

The fourth element, freedom, figures centrally in all three sets of biological data that we have surveyed, inasmuch as those sets of data focused upon the evolutionary emergence and the functioning of culture. The emergence of culture is dependent upon the precultural evolutionary processes that are capable of sustaining the presence of culture, in something like a symbiotic relationship. The functioning of culture is dependent upon the activities of freedom that make possible such phenomena as cultural selection, discernment, and decision.

The element of tension between genes and culture that figured in the first two sets of data, as well as the factor of fallibility in discernment and decision that come to expression in the third set, is rooted in the activity of freedom as it interacts with the biological symbiont of human being and also with the physical environment in which humans live.

The fifth element, estrangement and guilt, also correlates with the biological discussions of the three sets of data, since the tension between genes and culture, human fallibility, and the reflection of fallibility in human self-awareness are leading causes of the sense of alienation at very fundamental levels of human consciousness.

BIOLOGICAL INTERPRETATIONS DEEPEN OUR UNDERSTANDING OF THE RELIGIOUS-THEOLOGICAL SYMBOLS. The first element, the symbolic message of sin as inherent in human nature (the defect of origin) is deepened by biological understandings in that they make more complex our sense of how this defect comes to be inherent. What we have called sin is inherent in human being because it is a constituent of the processes that make life possible in the first place and that contribute to life's development. Thus, even though we are aware of sin and feel its pain, with guilt, sin is not present because of a prior evil action that was committed. Guilt is better understood as a response to our inherent inability to satisfy all of the messages that are delivered to our central nervous system, rather than as a response to an evil act committed in the primordial past of the race. Two of Schleiermacher's theses concerning sin are strikingly contemporary for this discussion:

> [Number] 69. We are conscious of sin partly as having its source in ourselves, partly as having its source outside our own being. . . . [Number] 72. While the idea that we have thus developed cannot be applied in precisely the same way to the first human pair, we have no reason for explaining universal sinfulness as due to an alteration in human nature brought about in their person by the first sin. . . . In fact, Adam must have been sundered from God before his first sin; for, when Eve handed him the fruit he ate it without even recalling the divine interdict; and this presupposes a like corruption of his nature. . . . If, however, human nature in the first pair was the same before the first sin as it appears subsequently alike in them and in their posterity, we cannot say that human nature was changed as a result of the first sin. (Schleiermacher 1928, 279, 291, 296–97)

Leaving aside the fact that Schleiermacher's "first pair" belief is impossible for us, except in a symbolic rendering, we note that he believed that he was forced to depart from the Lutheran and Calvinist confessions to which his church held fast. In light of our earlier analysis, we recognize that he embodies the critique of the Eastern

Church against the West (see pages 83-84, above). We understand the Eastern rejection of the term *original sin,* since they thought of it as the "first" sin. However, we need not reject the term *original* as Schleiermacher and the Reformation traditions understood it; that is, as "sin of, or pertaining to our origin." Indeed, we recognize that Augustine, in part, and the subsequent traditions of the West, understood the term *original* in this deeper sense. The inadequate notion of "first" sin constitutes only a part of their understanding. We have only to think of book 2 of Augustine's *Confessions* (1955, 50-61) in contrast to chapter 13 of his *Enchiridion* (1955, 365-68), where the "first" sin hypothesis is accepted. The Eastern view that human nature is created good but falls into sin through freedom is credible when viewed from the perspective of biological knowledge, but neither their view nor that of the West during the early centuries does justice to the intricate interweaving of goodness, freedom, and the basis of sin and evil in that interweaving.

The prevailing Western view of the transmission of sin genetically, through sexual intercourse and conception (the second element) is often scorned in modern discussions. We are more amenable to suggestions that sin's transmission is through cultural instruments. The biological understandings, with their focus also on the genes-culture symbiosis, lead us to insist that both genetic and cultural means leave a legacy of sin in each generation, for reasons that should be obvious from the discussion above of each of the three sets of data. Passion or concupiscence is not the key to this transmission, however, as much of the tradition insists, since it is not the "bad" or uncontrollable dimension of human sexuality and culture that conveys the elements that make for sin, but rather the human constitution as such, including those elements that make for human distinctiveness and goodness.

These reflections suggest that the interpretation of Fall and Original Sin as universally applicable myth is more commensurate with the biological understandings than is the etiologic interpretation that views earlier sins as causative of later sin. However, the causative view is not ruled out. The sins of the parents can be conveyed biologically to the children—we think of "crack babies," as well as fetal alcohol syndrome, and other defects caused by improper prenatal care. Similarly, all of the attributes of finitude are conveyed genetically, at conception. Finally, cultural events may also be causative in force.

The introduction of biological understandings into the discussion of sin as described by the third element (the inheritance of sin) favors neither a so-called male analysis nor a feminist view, but rather could

include both. Judith Plaskow associates feminist views with the protest against "male" views that sin is pride and arrogance, as if passivity and absence of aggressive self-development were more virtuous. Such interpretations tend to be of disadvantage to women—so the argument goes (Plaskow 1980). Our historical survey suggests that the feminist proposals are particularly relevant as critique of the Augustinian position, since the Eastern understandings, with their emphasis upon free will, would tend to support the position that Plaskow urges. The interpretations that have been advanced in this discussion, utilizing biological understandings, can affirm Plaskow's argument. Certainly the inherited biocultural constitution of the human being is equally applicable to both her "male" and "female" experience of sin. The tension between genes and culture, between the social system and the individual system, and also the intrinsic fallibility may take different forms when applied to the stereotypical male or female experience, but the biologically informed interpretations throw light on the experience of sin in both men and women.

FINAL REFLECTIONS. *Gains.* Juxtaposing the biological interpretations to the religious-theological materials illumines several important dimensions of the traditional reflection upon sin. Our discussion has indicated how biology enriches (1) our understanding of the inherent character of sin; (2) our understanding of sin's interrelationship with what makes life possible and with what is good for life; (3) the significance of freedom in our thinking about sin. Finally, our understanding of the character and causes of sin, guilt, and estrangement are deepened by biological concepts.

Obsolete Views. Furthermore, certain traditional understandings are seriously challenged, including the necessity for simply rejecting some historically popular insights. Notions of (1) the "first pair," (2) concepts of the Fall that insist upon some primordial act by early humans that altered subsequent human nature, and (3) certain forms of aetiological interpretation are among the elements that must be looked upon with great skepticism.

Ambiguities Calling for Further Reflection. The clash of ideas that is exemplified by Augustine's insistence upon guilt as a primordial condition, due to a primordial sin, versus Julian of Eclanum's equally insistent argument that freedom is essential to human nature, thus disproving the primordial sin, calls for deeper reflection. The primordiality of guilt, as a reading of the discrepancy that is intrinsic to *Homo sapiens,* seems to be a reasonable and discussable notion, even

though the suggestion that guilt is proof of an original sin seems untenable. On the other hand, the essential place of freedom in the human equation seems equally viable as a proposal for discussion, alongside the presence of guilt and its underlying grounds. The guilt/free will complex of concepts begs for more adequate conceptual treatment.

These comments concerning "gains" and "obsolete views" are not made simply on the assumption that science determines what may or may not be believed religiously. Rather, the point is that of Ricoeur: The symbols of the religious tradition are primordial readings of human experience and the human position within the natural and social world. Whether a traditional element is enhanced or rendered obsolete when juxtaposed with science is here dependent upon whether that symbol seems to render adequately what counts as significant human experience, inclusive of science.

Perennial Questions. Some perennial questions about sin remain, however, among which are the following. (1) Why is human life so intricately and intrinsically implicated with the factors that make for sin and evil? Is Burhoe's explanation (which in one form underlies John Hick's reflections upon theodicy [Hick 1981]) persuasive—that the very aspects of the process of life that make human culture possible are intrinsically the bearers for the possibility for sin and evil? This amounts to the recognition that theodicy is rendered neither more nor less a problem by the interpretations of biology.

(2) Our discussion throws new light on the issues of free will versus determinism and guilt but by no means pretends to resolve these thorny questions. Their discussion is modulated into a new key but does not disappear.

(3) If sin is what our biologically informed discussion indicates, what does this imply for grace and redemption? Whether viewed in Christian terms or not, does redemption alter the reality of nature so that sin can be overcome? This would imply a rigorous atonement-centered Christology. Or does redemption model for us how sinful human nature can be empowered for life and its enrichment, fulfilling the human destiny? This would seem to imply a Christology of exemplification.

The rudimentary probes that have formed the substance of this essay have not touched in any depth the constructive challenge that awaits the theologian and philosopher in fulfilling the task that Ricoeur set before us—to transport the traditional symbols, where they are important vessels of information for us, into the realm of contemporary, second-naivete experience, and enable them to

coalesce with our experience to provide genuine knowledge of reality, for the sake of our wholesome living. That task remains and is intensified by the considerations we have surveyed.

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