Ethology, Neurology, and Emergence: Reductionism in Biological Perspectives on Religious Ritual

Scott Halse, *McGill University*

Introduction

It is becoming increasingly clear that a topic as complex as religious ritual cannot be explained in terms of a single concept or theory. For instance, the editors to the recent volume, "Theorizing Rituals", explain that a more fruitful approach to understanding ritual will proceed in such a manner that a variety of perspectives are acknowledged as potentially offering insights.[1] Similarly, Bell notes that the meaning and function of rituals such as that of the Akitu can be illuminated more fully by recognizing the fresh insights offered by a variety of perspectives.[2] It must be acknowledged that the entire enterprise could eventually be found to be based on misleading questions,[3] though perhaps the more strident rejections of the use of "ritual" are a bit premature.[4] Nevertheless, it is prudent to be mindful of these admonitions against attempts to explain everything from a single perspective. In this vein, it is important to be as explicit as possible about the range of concerns one is addressing.[5]

The purpose of this paper is to examine the relationship between the biological and psychosocial aspects of ritual. More specifically, the purpose

---

1. Jens Kreinath, Jan Snoek and Michael Stausberg, eds., (Leiden; Boston: Brill, 2006), xxi–xxii.

2. Catherine M. Bell, *Ritual: Perspectives and Dimensions* (New York; Oxford: Oxford University Press, 1997), 20.

3. Joseph Bulbulia, "Ritual Studies and Ritual Theories: A Guide for the Perplexed," *Numen* 55 (2008): 462.

4. Don Handelman, "Conceptual Alternatives to 'Ritual,'" in *Theorizing Rituals, Volume 1: Issues, Topics, Approaches, Concepts*, ed. Jens Kreinath, Jan Snoek and Michael Stausberg (Leiden; Boston: Brill, 2006), 37–49.

5. Bulbulia, "Ritual Studies and Ritual Theories," 466.

ARC, The Journal of the Faculty of Religious Studies, McGill University
Volume 37 (2009): 91–118

is to propose how Bernard Lonergan's notion of development provides a theoretical framework according to which the emergence of the psychosocial dimension of human religious ritual from its physiological predecessor can be affirmed in a non-reductionist manner. Evidence for the existence and nature of this predecessor can be found in the observation of non-human animals as well as discoveries in the field of neurophysiology. More problematic is the proper understanding of this relationship, an understanding that adequately addresses issues of dependency, derivation and autonomy of the psychosocial level of religious ritual. There is considerable debate over what constitutes a reductionist account, and whether such reduction is essential for an explanation of religious ritual. In order to adequately address the fullness of the question, we need to make an overview of the relevant issues involved in the ongoing scholarship of the biological roots of religious ritual.

Biological Perspectives

The academic beginnings of the ethological perspective on ritual can be traced to Darwin, who "not only proposed the evolutionary development of species in terms of anatomy but also in terms of behaviour."[6] According to Huxley, by recognizing the operative importance of emotion in the behaviour of higher animals, Darwin "paved the way for a psycho-physiological approach to ethology and psychology in general."[7] The paradigmatic example of the ethological perspective on ritual can be found in Huxley's observations of the Great Crested Grebe. In his study, Huxley notes that the pre-reproductive social displays serve a triple function: to reduce fear, thereby reducing aggression; to effect the social bonding of the pair; to communicate the readiness to copulate.[8] Perhaps the most distinctive insight into the process of non-human animal (hereafter, animal) ritual afforded by the ethological perspective is that communicative behaviours, while distinct in their function, have evolved from everyday functions. This process of specialization is what Huxley and others referred

6. Richard Schechner, *Performance Theory* (London; New York: Routledge, 2003), 59.
7. Julian Huxley, "Introduction," *Philosophical Transactions of the Royal Society*, series B, 251 (1966): 250.
8. Huxley, "Introduction," 254.

to as "ritualization."[9] For example, the evolution of bird-song from simple call-notes to a form of signaling is especially distinctive when closely related species of birds live in close proximity.[10] The selective pressure on birds in such a situation is greater than one in which multiple bird-songs are absent; the absence of selective pressure in the latter situation results in less distinctive communication.

In addition to the communicative function of ritual, ethologists and those sympathetic to an ethological perspective on ritual have noted the related functions of aggression reduction and social-bond formation.[11] These functions, however, are not separate from the communicative or signaling function. Lorenz, in fact, contends that aggression reduction and social-bond formation are secondary functions of ritual that derive from the original communicative function and eventually become autonomous.[12] In his review of recent literature on the biological foundations of ritual, Bulbulia notes "the impressive and growing body of evidence that ritual practice effectively fosters cooperative commitments in groups by enabling agents to reliably signal their social intentions to each other in ways that are hard to fake."[13] To take one example of this, Alcorta and Sosis demonstrate that religious ritual has historically fostered (intra-social) cooperation and extended communication.[14] Since these perspectives are heavily informed by evolutionary theory, it should not come as a surprise that Sosis and Alcorta find that the social bonds which are effected through religious ritual

---

9. Konrad Z. Lorenz, "The Psychobiological Approach: Methods and Results," *Philosophical Transactions of the Royal Society*, series B, 251 (1966): 275, 276. See also Ellen Dissanayake, "An Ethological View of Ritual and Art in Human Evolutionary History," *Leonardo* 12 (1979): 27.

10. Huxley, "Introduction," 255.

11. Huxley, "Introduction," 250; Lorenz, "The Psychobiological Approach," 276; Erik H. Erikson, "Ontogeny of Ritualization," *Philosophical Transactions of the Royal Society*, series B, 251 (1966): 338; Erik H. Erikson, "Concluding Remarks," *Philosophical Transactions of the Royal Society*, series B, 251 (1966): 523; Eugene G. D'Aquili, "The Myth-Ritual Complex: A Biogenetic Structural Analysis," *Zygon* 18 (1983): 263; Richard Sosis and Candace S. Alcorta, "Signaling, Solidarity, and the Sacred: The Evolution of Religious Behavior" *Evolutionary Anthropology* 12 (2003): 266–7.

12. D'Aquili, "The Myth-Ritual Complex," 263.

13. Bulbulia, "Ritual Studies and Ritual Theories," 471.

14. Candace S. Alcorta and Richard Sosis, "Ritual, Emotion, and Sacred Symbols: The Evolution of Religion as an Adaptive Complex," *Human Nature* 16 (2005): 325.

are not ends in themselves, but rather serve to enhance the probability of survival through essential collective actions such as "cooperative hunting, food sharing, defense, and warfare."[15] As a result of their research, Alcorta and Sosis "expect to find the highest intensity of ritual in groups encompassing unrelated individuals who must engage in intermittent, high risk, cooperative endeavours [. . .]. In contrast, the lowest levels of religious ritual should occur among non-cooperating groups of kin."[16] An obvious test case both for the selective pressures partially responsible for ritualized behaviour and for the evolutionary continuity between animal and human ritual can be found in the ritualized bird-song described by Huxley.

Laughlin's analysis of the symbolic function of ritual makes the link between the communicative and cooperative functions of ritual. The communicative function of religious ritual, he claims, is crucial to adaptation. "The adaptive importance of sign systems is most evident in natural language."[17] Language allows humans to know more about the world than simply that which is directly perceived. This uniquely human capacity raises the problem of divergence of experience to such an extent that "group consensus and social action become impossible." Ritual behaviour and the symbols involved in ritual help overcome these differences by providing the means by which the experience of individuals can overlap significantly even though they do not share the exact same history or direct experiences. Thus, ritualization is adaptive insofar as it overcomes potential obstacles to social cooperation.

It is important to note that these and other evolutionary perspectives on ritual are proposed in the midst of opposition to both the specific conclusions of ethology as well as the very notion of applying an ethological perspective to religious ritual. For example, Sosis and Alcorta's research into the cooperative function of ritual is in direct response to the hypothesis that religious ritual evolved in order to reinforce existing social inequalities.[18] While religion has served this function at various points in history, the hypothesis overlooks the fact that the emergence of religious ritual

---

15. Sosis and Alcorta, "Signaling, Solidarity, and the Sacred," 267.

16. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 349.

17. Charles D. Laughlin, "Ritual and the Symbolic Function: A Summary of Biogenetic Structural Theory," *Journal of Ritual Studies* 4 (1989): 23.

18. Sosis and Alcorta, "Signaling, Solidarity, and the Sacred," 266.

probably preceded the kinds of complex social organizations required for the development of hierarchy and its attendant inequalities. In his response to the theories of Dawkins, Kreb, and Cronk, Roy Rappaport notes that religion is probably "as old as humanity, which is to say as old as language, and as such, it is further plausible to argue, it appeared millennia, probably many millennia, before anything that could properly be called an 'elite' developed."[19] Other criticisms of the evolutionary perspective on ritual described above tend to emphasize the pathological or maladaptive aspects of religious ritual. Perhaps the most obvious example is Freud's critique of ritual as a by-product of human neuroses. From a neurological perspective, Saver and Rabin suggest that the neurological basis of the religious experiences associated with ritual can best be discovered through attention to brain disorders. "The cross-cultural ubiquity," they write, "of numinous experiences and the heritability of religious dispositions argue strongly for a biological basis, but fail to indicate the specific neural mechanisms involved. Clues to neural substrate must be gleaned from the sites of brain disorders that provoke qualitatively similar experiences."[20]

Pathological instances of human ritual, however, seem to be the exception rather than the rule,[21] a contention which finds support from the ethological perspective on pathological animal ritualization. For example, Huxley notes that captivity and cage environments may lead to pathological rituals. "When crowding is added, the resultant stress may result in anti-adaptive deritualization and disorganization of behaviour. Obvious analogies occur in man."[22] One of these analogies could be schizophrenic behaviour, which "increases ambiguity and impedes communication."[23] Erikson notes that a focus on ritual as pathological does not elucidate the meaning of ritual, since the ethological approach to ritual "reveals the bond created by a reciprocal message of supreme importance."[24] Sosis and Alcorta respond to the notion that religious ritual is maladaptive by pointing out that the

---

19. Roy A. Rappaport, "On the Evolution of Morality and Religion: A Response to Lee Cronk," *Zygon* 29 (1994): 338.

20. Jeffrey L. Saver and John Rabin, "The Neural Substrates of Religious Experience," *The Journal of Neuropsychiatry and Clinical Neurosciences* 9 (1997): 499.

21. See, for example, Erikson, "Ontogeny of Ritualization," 344.

22. Huxley, "Introduction," 257.

23. Huxley, "Introduction," 263.

24. Erikson, "Ontogeny of Ritualization," 337.

costliness of a ritual practice may actually enhance its adaptive advantage. Preliminary empirical evidence for this hypothesis includes statistics which not only demonstrate that secular communes have a shorter duration than religious ones, but more importantly that the duration for which a commune survives is in proportion to the number of costly requirements placed upon a commune's inhabitants.[25] Finally, Erikson points out that it is the *absence* of the common infant-parent ritual that often results in psychopathology.[26]

In addition to the objections to specific conclusions reached by ethologists regarding ritual, there is the broader concern that the very project of ethology should not be applied to a cultural phenomenon such as religious ritual. For example, Leach stridently objected to an ethological approach to ritual: "[An ethological] definition [of ritual] can have no relevance for the work of social anthropologists. [. . .] It cannot be too strongly emphasized that ritual, in the anthropologist's sense, is in no way whatsoever a genetic endowment of the species."[27] Leach's objection was perhaps in large part due to a perceived epistemological divide between nature and culture. There is, after all, very little about the methodology of ethology as articulated by Huxley that contradicts the aims of a social-scientific understanding of religion: "Ethological methodology includes (a) careful observation and description of ritualized behaviour, followed by comparative study; and (b) its analysis, aimed at discovering the psychosocial mechanisms of its operation, and its relation to environmental and historical change."[28] The disciplinary divide between, for example, Leach and Lorenz was perhaps exacerbated by Lorenz's contention that the haphazard procedures undertaken by some branches of the human sciences may fail to produce "results before the present interglacial period comes to an end."[29] While Lorenz noted the importance of distinguishing between cultural adaptation and genetic adaptation,[30] he acknowledged the possibility that our understanding of the latter could improve our understanding of the former. Similarly, Huxley, while obviously sympathetic to the project of furthering

25. Sosis and Alcorta, "Signaling, Solidarity, and the Sacred," 269–70.
26. Erikson, "Ontogeny of Ritualization," 339.
27. Edmund R. Leach, "Ritualization in Man," *Philosophical Transactions of the Royal Society*, series B, 251 (1966): 403.
28. Huxley, "Introduction," 263.
29. Lorenz, "The Psychobiological Approach," 274.
30. Lorenz, "The Psychobiological Approach," 279.

our understanding of religious ritual through comparison to animal ritual, was careful to distinguish between "genetic" and "cultural" transmission, as well as "genetic" and "non-genetic" ritual.[31]

Edward O. Wilson was critical of a blanket application of ethology to the understanding of religious ritual, noting that "the principles of behavioural evolution drawn from existing population biology and experimental studies on lower animals are unlikely to apply in any *direct* fashion to religion."[32] It is true, as Wilson points out, that rituals do not simply serve the function of communication.[33] However, Wilson's emphasis that rituals "reaffirm and rejuvenate the moral values of the community" is akin to the ethological insight that rituals help form essential social bonds, an insight which emerged from observation and comparison of animal rituals. Drawing on the work of Roy Rappaport, Wilson points out that religious rituals have demonstrated a biological advantage. The lesson, then, seems to be that one should be wary of equating the behaviour of animals with that of humans. Ethology can provide one perspective by which some core components of both animal and human ritual can be identified, though such an approach does not exhaust the function or meaning of religious ritual. Indeed, Wilson himself acknowledges that ethology, in combination with sociobiology and neurology, may eventually bridge the gap between natural and human sciences.[34] He provides a helpful note of precision regarding the difference between nature and culture by distinguishing between two kinds of adaptation. "Human social evolution," Wilson writes, proceeds along a dual track of inheritance: cultural and biological. Cultural evolution is Lamarckian and very fast, whereas biological evolution is Darwinian and usually very slow."[35] That is, while biological evolution proceeds as a result of variation of genetic composition within a population, thus excluding human agency as a means by which the evolutionary process can be quickened, cultural evolution proceeds according to "the inheritance of acquired characteristics, the transmission to offspring of traits acquired

---

31. Huxley, "Introduction," 258, 264.

32. Edward O. Wilson, *On Human Nature* (Cambridge, MA: Harvard University Press, 1978), 175, emphasis added.

33. Wilson, *On Human Nature*, 179.

34. Wilson, *On Human Nature*, 195.

35. Wilson, *On Human Nature*, 78; cf. Lorenz, "The Psychobiological Approach," 279.

during the lifetime of the parent."[36] Furthermore, despite the gradual nature of phylogenetic development, the rituals that are part of the ontogenetic development of individuals in a given society can be "snuffed out like candles," as Lorenz notes in his description of the effects of cultural deprivation.[37] This distinction between biological and cultural evolution requires that we take note of the ways in which interpreters have understood both the phylogenetic and ontogenetic correlates of animal and human ritual.

The very idea of comparing the phylogenetic development of rituals among animals with the development of human ritual strikes Leach as "more or less absurd."[38] This reluctance to acknowledge the potential utility of such a comparison is due to the "enormous complexity of ritual sequences" which makes the question of origins virtually unanswerable. However, the comparison remains potentially fruitful insofar as one is seeking to unravel the biological basis of ritual, as opposed to the question of historical origins. Furthermore, the comparison seems rather vital to an investigation which recognizes the significance of selective pressures on the development of both animal and human ritual. Ritualization in animals is of particular significance for a comparative phylogenetics. As noted above, behaviours that fulfill everyday functions, such as foraging techniques, can be distinguished from ritualized signaling techniques that perform communicative functions. While similarities among the former may simply have arrived from similar habitats and the consequent similarity of selective pressures, significant similarities in ritualized communicative techniques are more likely to have resulted from contact and imitation.[39] Therefore, we might say that while behaviours that fulfill "everyday" functions of animals are functionally analogous, the ritualized behaviours of animals that perform a signaling function are phylogenetically homologous.[40] There is, of course, no simple distinction that can be made between ritualized and non-ritualized behaviour, especially given the gradual nature of phylogenetic development. As Alcorta and Sosis note, "the continuum of simple to

36. Wilson, *On Human Nature*, 78.
37. Lorenz, "The Psychobiological Approach," 281.
38. Leach, "Ritualization in Man," 405.
39. Lorenz, "The Psychobiological Approach," 275–6.
40. Compare Huxley, "Introduction," 279.

complex ritual signals clearly encompasses a broad range of 'fixed' and 'learned' elements."[41]

Ritualized behaviours among humans are adapted to various stages of psychosocial development. Hence, much human ritualization occurs on an ontogenetic basis, which "is directed mainly by psychosocial selection, not by the genetic mechanism of natural selection."[42] Erikson describes some of the ontogenetic aspects of ritualization among humans, including the point that pseudo-speciation is a "basic fact in the ontogeny of *familiarization by ritualization*, as well as the fact that ritualized activities tend to sanction a selected group of adults as authoritative "ritualizers."[43] Erikson's notion of pseudo-speciation is a helpful means by which one can detect the development of strong group identity and the formation of social bonds as the result of ritualization, Leach's objections notwithstanding.[44] The study of human ritual must also take account of important phylogenetic factors, just as interpreters of animal behaviour must recognize the ontogenetic malleability of ritualized behaviour among animals.[45] Attention to neurological structures highlights the interplay between the phylogenetic development of a species and the ontogenetic development of an individual member of that species. For example, d'Aquili points out that while the gradual evolution of the inferior parietal lobule and the anterior convexity of the frontal lobes was required in order for humans to become "culture makers," myelinization (a process that allows interconnections throughout different parts of the brain) is an ontogenetic process that roughly corresponds with Jean Piaget's stages of cognitive and linguistic development.[46] Furthermore, the cognitive-verbal-motor connections that are central to myth-ritual complexes are possible because of the evolutionary development of inter-hemispheric neural communication.[47] Once again, there is a related ontogenetic aspect, since such communication requires the development of the corpus callosum, a structure in the brain which undergoes development over the lifetime of

41. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 331.
42. Huxley, "Introduction," 258.
43. Erikson, "Ontogeny of Ritualization," 340, 347.
44. Leach, "Ritualization in Man," 403.
45. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 330.
46. D'Aquili, "The Myth-Ritual Complex," 253.
47. D'Aquili, "The Myth-Ritual Complex," 260, 264–5; cf. Laughlin, "Ritual and the Symbolic Function," 29–30.

an individual. Victor Turner similarly suggests that religious ritual effects a dialect of the archaic and developed structures of the brain.[48] By stimulating the right and left hemispheres of the brain, Tuner claims that religious ritual sets up the necessary conditions for a "mystical" experience.[49] Even if critics are correct in suggesting that theories of ritual based on hemispheric specialization are merely metaphorical, it remains true that other contenders for the neural basis of religious experience also undergo development within the lifetime of the individual. For example, Saver and Rabin cite evidence that the hippocampus and the amygdala generate feelings of "unreality about the self or external reality."[50] This would not change the fact that the neurological mechanisms underlying religious experience, in this case the limbic system, undergo ontogenetic development and distortion.[51]

One of the primary differences between animal and human ritual is that "the process of human ritualization in psychosocial evolution has a primarily ontogenetic, not a phylogenetic basis."[52] One of the most significant consequences of the very different bases of animal and human ritualization relates to the human capacity for symbolic language. Lorenz's admittedly speculative contention that religious ritual does not owe much to human insight seems to be the exception among interpreters of ritual.[53] Huxley, for example, notes that the learning capacity of humans is what makes symbolic language possible.[54] Alcorta and Sosis put the points succinctly: "In contrast to nonhuman ritual, however, iconic, indexical, and ontogenetic signals are not the primary encoded elements of human religious ritual. The fundamental elements of human religious ritual are, instead, abstract symbols devoid of *inherent* emotional or cognitive meaning."[55] In phylogenetic terms, one could say, along with Huxley, that the "autesthetic" or privatized component of human ritual has replaced the "allaesthetic" or signalling component of ritualized behaviour among animals.[56] Whether or not there is such a

48. Victor Turner, "Body, Brain, and Culture," *Zygon* 18 (1983): 225, 243.
49. Turner, "Body, Brain, and Culture," 230.
50. Saver and Rabin, "The Neural Substrates of Religious Experience," 500.
51. Saver and Rabin, "The Neural Substrates of Religious Experience," 507–8.
52. Huxley, "Introduction," 258.
53. Lorenz, "The Psychobiological Approach," 279.
54. Huxley, "Introduction," 258.
55. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 331, emphasis added.
56. Huxley, "Introduction," 259.

thing as a private language, rituals clearly carry symbolic meaning which becomes privatized. Such meaning is a human creation, whether individual or collective.[57] Not only do human rituals carry symbolic meaning which is largely absent in animal ritualization,[58] but they also perform a function unparalleled in animal behaviour. As Alcorta and Sosis explain, the "critical distinction" between animal and human ritual is that "while nonhuman ritual encodes signals as neurophysiological primes for behavior, religious ritual encodes symbols created through the ritual process itself."[59] They point to further evidence that suggests that the emergence of symbol systems was in part dependent upon the performance of human ritual.[60]

Human and animal ritual can also be distinguished by noting that while the communicative function of ritualized behaviour among animals requires that the intention of signals are clearly received by the recipient, human rituals do not necessarily have the same surface clarity. The need for interpretation is especially apparent when one attends to the occasional ambiguity of the symbolism of religious ritual. So, Erikson writes, "while the ethologists will tell us that ritualizations in the animal world must, above all, be *un-ambiguous* as sets of signals, we suspect that in man the *overcoming of ambivalence* as well as ambiguity is one of the prime functions of ritualization."[61] Even Leach, who claims that the "condensed language" of ritual symbolism does not lead to ambiguity, acknowledges that "in ritual sequences the ambiguity latent in the symbolic condensation tends to be eliminated again by the device of thematic repetition and variation."[62] Attention to symbolism as the main factor which distinguishes human ritual from animal ritual should not overshadow the continuity between animal and human ritualization. This is true both in terms of the communicative function of ritual, as well as the way in which rituals facilitate the formation of social bonds. The role of symbols in human ritualization is associated with both of these functions. For example, d'Aquili finds that "there is a great body of evidence that many of these rhythmic stimuli [associated with

57. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 332.
58. See, for example, Lorenz, "The Psychobiological Approach," 276.
59. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 345.
60. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 346.
61. Erikson, "Ontogeny of Ritualization," 339.
62. Leach, "Ritualization in Man," 408.

ritualized behaviour] serve as communications, and the position of most ethologists is that rhythmicity evolved in lower animal species in the service of communication."[63] Furthermore, the affective state produced in humans by such rhythmic rituals "may vary in intensity, but it always has the effect at least of unifying the social group." Similarly, Alcorta and Sosis conclude that the religious symbols associated with human ritual have "provided tools for creating cooperative coalitions across time. In doing so, they introduced a new level of cognition and social organization in human evolution."[64]

The notion that the meaning carried by the symbols of religious ritual effects "new levels" of cooperation and cognitive capacities brings us closer to the question of reductionism in the biological perspective on religious ritual. Specifically, the suggestion that religious ritual acts as a catalyst in human evolution and development implies that rituals are a sort of bridge between the biological and psychosocial levels of human development. For instance, religion is, according to Burkert a "model case for the 'coevolution of genes and culture'" insofar as it constitutes a hybrid of biology and culture.[65] Turner similarly proposes "that creative processes, those which generate new cultural knowledge, might result from a coadaptation, perhaps in the ritual process itself, of genetic and cultural information."[66] Thus, a fuller understanding of the nature of the integration effected by ritual might also shed light on the nature of the relationship between the biological and psychosocial levels of human development. Rituals perform crucial integrative functions on the psycho-neurological level as well as the social level. For instance, d'Aquili writes that some of the main characteristics of ritual behaviour is that it acts to "synchronize affective, perceptual-cognitive, and motor processes within the central nervous system of individual participants" as well as "synchronize these processes among the various individual participants."[67] There are, of course, different ways of conceiving of the pertinent processes on the individual level. For example, the psychoanalytic perspective on ritual points to the fact that ritualization

63. D'Aquili, "The Myth-Ritual Complex," 263.

64. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 348.

65. Walter Burkert, *Creation of the Sacred: Tracks of Biology in Early Religions* (Cambridge, MA: Harvard University Press, 1996), 20.

66. Turner, "Body, Brain, and Culture," 228.

67. D'Aquili, "The Myth-Ritual Complex," 261.

helps provide a "psychosocial foundation for that inner equilibrium which in psychoanalysis is attributed to the 'strong ego.'"[68] The integration effected in this instance is that the "wishes and images [from childhood] which have become undesirable or evil" are subordinated.

In our overview of some of the insights offered by the biological perspective on ritual, we have discussed similarities and differences between animal and human ritual, touched on neurological hypotheses regarding religious ritual, and surveyed the evidence that ritual is an adaptive phenomenon arising, in part, as a result of the selective pressures favouring behaviours that extend communication and promote social cooperation. We have also noted significant differences between human and animal ritual related to phylogenetic and ontogenetic development and the role of meaning and interpretation of ritual symbolism. Despite these significant insights, the biological perspective on ritual has largely passed over significant theoretical considerations regarding the nature of the emergence of higher levels of complexity in human development. For example, Wilson claims that religious ritual is *merely* an adaptive mechanism that has improved the probabilities of both individual and group fitness. "If this interpretation is correct, the final decisive edge enjoyed by scientific naturalism will come from its capacity to explain traditional religion, its chief competitor, as a wholly material phenomenon."[69] This gloss has resulted in a reductionism that constitutes a barrier to ongoing and fruitful dialogue between the natural and human sciences. More to the point, it is liable to obscure important aspects of religious ritual.

In order the rescue the valuable insights of the biological perspective on ritual from the reductionist tendencies that accompany them, we must now investigate more precisely the nature of the relationship between the biological and psychosocial levels of human development. We undertake this task in three steps: first, a consideration of the epistemological problems which impede our understanding of the neurological foundations of religious ritual in light of Lonergan's critical realist epistemology; second, a consideration of the reductionist physicalism which impedes our evolutionary understanding of the biological foundations of religious ritual, including the relationship between animal and human ritual; third,

68. Erikson, "Ontogeny of Ritualization," 341.
69. Wilson, *On Human Nature*, 192.

a consideration of Lonergan's notion of development as a means of understanding the emergence of human ritual from its neurophysiological foundations.

Epistemological Problems

We begin our consideration of epistemological problems in the literature on religious ritual by stating our own position, based on the philosophy of Bernard Lonergan. Lonergan approaches epistemological questions by starting with the problematic of the ideal of knowledge. The problem, briefly put, is that the ideal which exists in the process of coming to know something is conceptually implicit. While philosophers often start with a definition of ideal knowledge, Lonergan's starting assumption is that no such definition is immediately forthcoming. There is no naturally existing definition of ideal knowledge which arises spontaneously for our inspection. However, the fact that such an ideal is implicit throughout human time and space does not at all require that the ideal does not exist. Lonergan's solution for unearthing a normative definition of knowledge is a turn to the self, which he calls self-appropriation.

The act of self-appropriation leads Lonergan to the discovery of a normative structure of cognition. He begins his magnum opus, *Insight: A Study of Human Understanding*, with a detailed description of the activity of enquiry in the natural sciences and mathematics. His task is to explain the stages of knowing which occur throughout all of these disciplines. Put briefly, cognitional activity is structured by a tripartite pattern consisting of experience, understanding and judgment. Lonergan describes the formal system in terms of operators and operations. The former are questions of (i) intelligence, (ii) reflection, and (iii) deliberation; the latter consist of (i) sense experience, (ii) insights and formulation, (iii) reflective understanding and judgment, and (iv) evaluation and decision. Self-appropriation involves making these operators and operations themselves objects of intentionality. By doing so, we become conscious of the normative structure of cognition operative in the process of coming to know.

One can contrast this self-attentive approach to understanding cognitional process with the biostructuralist understanding of cognition in its relation to religious ritual. For example, explaining that certain myth themes associated with religious ritual constitute cognitive structures,

d'Aquili suggests that the human brain is akin to a computer.[70] The operators referred to by d'Aquili (i.e. holistic, causal, abstractive, binary, formal quantitative, and value operators) are various ends which are served by the core intentional operators effected by the operations of questioning. Following a brief description of each of these operators, d'Aquili describes how he will use this understanding of cognitive operators to explain the development of religious ritual. "We shall now present an anatomical model for each of these six operators, based on recent neurophysiological research. In terms of each model we shall attempt to *localize* these operators in terms of specific neuroanatomical structures."[71] This localization of operators, or identification of cognitive operations with human neurophysiology, simply amounts to ostensive definition. More to the point, this emphasis on location as explanation tends to lead to a reductionist perspective on knowing, which consequently results in a reductionist perspective on religious ritual. So d'Aquili writes, "these operators allow us to propose that the most sophisticated mathematical, logical, or grammatical operation can ultimately be reduced to the simplest spatial and spatio-temporal analysis, which itself can be understood as an evolutionary elaboration of the more gestalt operation of the nondominant hemisphere of the brain."[72] This kind of "understanding," however, is simply a matter of pointing and naming. While ritual can be helpful in understanding the phylogenetic development of human neurology, neurology itself cannot explain ritual solely in its own terms.

D'Aquili and Newberg's neurological perspective on religious ritual correctly begins by asserting that "one can never get at what is 'really out there' without its being processed, one way or another, through the brain."[73] It is, however, possible to achieve knowledge of the truth of verification because it is possible to determine a coherence between a conditioned statement and the fulfillment of its conditions through the operations of cognitional activity. This is what Lonergan considers the *fully human* type of knowing, since it involves both rational reflection and reflective

70. D'Aquili, "The Myth-Ritual Complex," 248, 253.

71. D'Aquili, "The Myth-Ritual Complex," 249, emphasis added.

72. D'Aquili, "The Myth-Ritual Complex," 253.

73. Eugene G. D'Aquili and Andrew B. Newberg, "Liminality, Trance, and Unitary States in Ritual and Meditation," *Studia Liturgica* 23 (1993): 32.

understanding.[74] The failure to recognize this type of knowing leads to the mistaken understanding of ideal knowledge in terms of knowing the truth of the "really out there." This mistake itself stems from assuming that the *object* of ideal knowledge must be the "already out there now real."[75] "Already" refers to a biological consciousness which finds its environment instead of creating it. "Out" refers to the extroversion of a consciousness that is aware of objects distinct from itself and unaware of its own ground. "There" and "now" refer to the spatial and temporal qualities of an extroverted consciousness. Finally, "real" refers to a subdivision within the "already out there" which is distinct from mere appearance. All of these terms stand for concepts which are grasped, not by an intelligent process of coming to know, but by a non-intelligent response to stimuli. Although this sort of knowing does in fact occur (Lonergan uses the example of a kitten), confusion arises from the claim that this sort of knowing is the only existent or valid form. As Lonergan points out, such a claim would be inconsistent: "Any attempt to dispute the validity of full human knowing involves the use of that knowing and so, if the attempt is not to be frustrated by its own assumptions, it must presuppose that validity.[76]

D'Aquili and Newberg continue to argue for the irreducibility of experiences related to religious ritual, arguing that "it is a foolish reductionism indeed that states that because hyperlucid unitary consciousness can be understood in terms of neuropsychological processes, it is therefore derivative from baseline reality. Indeed, the reverse argument could be made just as well. [. . .] We are reduced to saying that each is real in its own way and for its own adaptive ends."[77] The confusion inherent in this position is due primarily to a failure to conceive of the real as that which is verified as true "as a consequence of intelligent inquiry and critical reflection, and not as a property of vital anticipation, extroversion, and satisfaction."[78] It seems, then, that when d'Aquili and Newberg concede that one cannot get at the "really out there," they nevertheless consider the world that is "really

74. Bernard J.F. Lonergan, *Insight: A Study of Human Understanding* (Toronto, ON: University of Toronto Press, [1957] 1992), 278.

75. Lonergan, *Insight*, 277.

76. Lonergan, *Insight*, 278.

77. D'Aquili and Newberg, "Liminality, Trance, and Unitary States," 33.

78. Lonergan, *Insight*, 413.

out there" as the "real" world. This position can be discerned elsewhere, for instance when they claim that "whatever is anterior to the experience of God and the multiple contingent reality of everyday life is in principle unknowable, since that which is in any way known must be a transformation wrought by the brain."[79]

The work of a fellow biostructuralist, Charles Laughlin, is hindered by the same problematic view of what constitutes reality. Laughlin first contrasts that which is known by an individual (the "cognized environment") "with an individual's operational environment which is the *real* nature of that individual as an organism and that individual's world as an ecosystem."[80] Laughlin is not just claiming that the real universe of being transcends the known universe of an individual; he is establishing an insurmountable barrier between the two. He continues, "because the true nature of the operational environment is transcendental, and because all forms of knowledge—all theories, models, conceptions, images and points of view—are partial, incomplete, and (however useful and adaptive) distortions of the *true nature of things*, biogenetic structuralism has embraced a methodological discipline it has called the 'rule of minimal inclusion.'"[81] We are once again faced with the problematic notion that the known (or cognized) world is different from the real (or operational) world. The result of this epistemological position is that instead of elucidating religious ritual through attention to its relevant neural foundations, this biological perspective reduces the constituent complexity of ritual to that which can be identified through ostensive definition. For our purposes, however, the main problem with this flawed epistemological position is that it results in a reductionist perspective on religion that impedes a fuller understanding of religious ritual.

The Problem of Reductionism

The result of these epistemological problems is a reductionism which impedes the human dynamism for further understanding. For instance, under the heading of "Neuroepistemological Concerns," d'Aquili and Newberg state that the religious experiences often associated with ritual "might be

79. D'Aquili and Newberg, "Liminality, Trance, and Unitary States," 34.
80. Laughlin, "Ritual and the Symbolic Function," 16, emphasis added.
81. Laughlin, "Ritual and the Symbolic Function," 17, emphasis added.

reducible to issues of neural tuning or even to specific patterns of neural blips on an oscilloscope." According to the authors, reductionism should nevertheless not be a problem for those who put special value on religious experience because *all* experiences of reality can be reduced to "neural blips and fluxes of brain chemistry." We have already seen how the epistemology underlying this understanding of what is real is flawed insofar as it does not sufficiently account for the conscious operations of attention, intelligence, and reflective judgment. D'Aquili is closer to the mark when he tries to temper his reductionist analysis of the myth-ritual complex by noting that "humans are not simply the sum of neural mechanisms, independently evolved under various selective pressures. Rather, each of us functions as an integrated whole."[82]

Other interpreters have also suggested that fears regarding reductionism within the biological perspective on ritual are unwarranted or perhaps even represent an unscientific attitude. In his discussion of the variety of models of religious ritual, Bulbulia writes that "it is worth emphasizing that because models are useful for what they leave out, we can safely conclude that all models will be, in an important sense of the word, reductive. There will always be something omitted."[83] Quoting William James, Bulbulia really seems to be indicating (1) that not all experiences can be verbalized, and (2) that academics need to be *selective* in regard to the data they consider relevant for explanation. He writes, "the standard complaint that scientific theories of human behaviour are reductive applies to any approach, including phenomenological approaches. [. . .] Again, without omission there is nothing to say, just as there are no maps without scales."[84] Bulbulia seems to be confusing the problem of reductionism with the need to be judicious in the selection of relevant data to be interpreted. Lonergan's discussion of the canons of empirical method shed some light on this issue. "The necessity of some canon of selection is obvious. Possible correlations, hypotheses, laws, probability expectations, theories, and systems form an indefinitely large group. [. . .] There is no reason why the empirical inquirer should investigate all the trees in this endless forest of possible thoughts, and so

82. D'Aquili, "The Myth-Ritual Complex," 266–7.
83. Bulbulia, "Ritual Studies and Ritual Theories," 466.
84. Bulbulia, "Ritual Studies and Ritual Theories," 467.

he needs some canon of selection."[85] Bulbulia is correct that interpreters need to leave some data out, but this is not what is at issue in reductionist accounts of religious ritual.

The question, then, is what *do* we mean by reductionism? A first approximation is provided by Philip Clayton, who describes the "project of explanatory reduction" as a philosophical position which claims that phenomena in the natural world can be explained "in terms of the objects and laws of physics."[86] In this understanding of reductionism, phenomena on all levels of development, whether chemical, biological, or psychological, are reducible to the laws of physics. However, as Frank Budenholzer points out, "most talk of reductionism is limited to two levels. Psychology is just biology, biology is just chemistry, chemistry is just physics. . . . With the developments in genetic engineering, the big question is whether we are determined by our genes. To take reductionism seriously, we cannot stop at the next lower level."[87] Reductionism can mean either reducing one level of complexity to a simpler level, or it could mean reducing everything in nature, including religious ritual, to genetic programs or physical laws. The fundamental point is that reductionism does not recognize that higher levels of complexity have an *intelligibility* which is absent in lower levels of complexity.

Before exploring how Lonergan's notion of development can help remedy some of these problems, it is helpful to consider a representative example of a reductionist account of religious ritual. Wilson asserts that "the cardinal mystery of neurobiology is not self-love or dreams of immortality but intentionality. What is the prime mover, the weaver who guides the flashing shuttles?"[88] One the hand, Wilson is wary of trying to understand ritual solely in terms of a level of complexity simpler than that of human behaviour. So he writes, "too simple a neurological approach can lead to an image of the brain as a Russian doll: in the same way that we open one figure after another to reveal a smaller figure until nothing remains, our research resolves one system of neuron circuits after another into subcircuits until

85. Lonergan, *Insight*, 94.
86. Philip Clayton, *Mind and Emergence: From Quantum to Consciousness* (Oxford: Oxford University Press, 2004), 2–3.
87. Frank E. Budenholzer, Emergence, Probability, and Reductionism," *Zygon* 39 (2004): 354.
88. Wilson, *On Human Nature*, 75.

only isolated cells remain."[89] However, the most telling aspect of Wilson's program appears when he warns that "at the opposite extreme too complex a neurological model can lead back to a vitalistic metaphysics, in which properties are postulated that *cannot be translated into neurons, circuits, or any other physical units.*"[90] Similarly, Wilson writes that "the paradox of determinism and free will appears not only resolvable in theory, it might even be reduced in status to an empirical problem in physics and biology."[91] Despite Wilson's contention that one should avoid explaining religious ritual in terms of its components, his view is, nevertheless, reductionist insofar as his notion of emergence does not adequately recognize the intelligibility of higher levels of complexity. These levels of complexity cannot be explained solely in terms of the otherwise coincidental manifold from which these practices have emerged. While Wilson gives a nod to the high level of complexity of religion in relation to, for example, kin classifications, he maintains that these complexities merely "hide" the Pleistocene origins of religious ritual.[92] While he is correct to suppose that the cultural phylogeny of religious ritual is traceable, he fails to recognize the crucial point that religious ritual has an intelligibility that is independent of the biological material from which such ritual has emerged. Hence he assumes that religion can be shown to be "wholly material,"[93] as we saw above.

The biological perspective on ritual is important insofar as it offers insights regarding the similarity between animal and human ritual, the phylogenetic development of ritual, and the neurological foundations of ritual. However, the reductionist philosophy underlying much of this work —a methodology which, as we have seen, is largely a result of a flawed epistemology—constitutes an impediment to a fuller understanding of religious ritual. We now consider how by drawing attention to the process of emergence Lonergan's notion of development overcomes the obstacles erected by explanatory reduction.

---

89. Wilson, *On Human Nature*, 75.
90. Wilson, *On Human Nature*, 75, emphasis added.
91. Wilson, *On Human Nature*, 77.
92. Wilson, *On Human Nature*, 95–7.
93. Wilson, *On Human Nature*, 192.

Development, Emergence, and Integration

While there is little difficulty in summoning an intuitive account of development, outlining the general principles of development is a complex and difficult matter. Our account here does not claim to be exhaustive, though we do intend to highlight some key aspects of the general notion of development. We shall illustrate Lonergan's notion of development through reference to organic, psychic, intellectual and human development. We begin by citing Lonergan definition of development:

> Development may be defined as a flexible, linked sequence of dynamic and increasingly differentiated higher integrations that meet the tension of successively transformed underlying manifolds through successive applications of the principles of correspondence and emergence.[94]

The point of fundamental importance is that development entails the emergence of a higher integration of an otherwise coincidental manifold of lower conjugate acts effected by a higher conjugate form. The emergence of such a higher integration gives a particular direction to development, moving from generic indeterminacy towards specific determination. The differences, Lonergan explains, can be discerned in early and late stages of life. For instance, while both an acorn and an oak tree are alive, the difference between the two phases of life consists in the transition from a generic potency to a specific determination.[95] The same holds true for infants and adults, insofar as both perceive and respond, yet the perceiving and responding differs as the potential becomes increasingly specialized over time.

To this formulation of development and its direction, Lonergan adds the principles of correspondence, differentiation, and flexibility. The principle of correspondence stipulates that there is a limit to the diversity within an underlying manifold that can be systematized by the same integrator.[96] For example, two single-celled organisms of the same kind can differ in size as a result of differences in the underlying chemical manifold. However, these differences have a limit such that past a certain point variations in the

94. Lonergan, *Insight*, 479.
95. Lonergan, *Insight*, 486–7.
96. Lonergan, *Insight*, 477.

underlying chemical manifold entail a different kind of organism. Therefore, development is the emergence of a higher integration of an underlying manifold according to the rules of correspondence which are determined by the actual conjugate level under investigation.

The principle of differentiation is related to the general direction in which developments emerge. As an organism evolves from generic indeterminacy to specific determinations, there is a concomitant capacity for the organism to undergo integrations subsequent to the initial integration of the initial manifold.[97] Furthermore, to note the differentiated nature of development is to grasp that higher integrations are intelligible. More to the point, the intelligibility to be grasped pertains not only to what actually is, but also to what potentially may be. Thus, human intelligence has realized the actual further integrations resulting in differentiations such as mathematics, philosophy, and natural science, and foresees further differentiations as potential in light of ongoing discovery in each of these integrations.

Finally, the course of development accommodates both minor and major flexibility. The principle of minor flexibility is partially entailed by the principle of correspondence, insofar as the underlying manifold of conjugate acts constitutes a capacity which becomes intelligible through higher integration. As we saw with the principle of correspondence, this capacity sets limits to the nature of the higher integration. The limits imposed by the underlying manifold allow for a minor flexibility in the course of development, such that the same objectives can be reached by a set of alternative sequences leading from generality to specificity.[98] The principle of major flexibility is partially entailed by the principle of emergence, insofar as the course of development admits further integrations which are increasingly specialized and differentiated from the initial integration. In this case, new integrations present new schemes of recurrence, which themselves enable further and higher integrations. While these two aspects of flexibility may appear to conflict, upon further investigation their complementarity becomes evident. For the capacity that limits flexibility and calls forth the principle of correspondence is also the ground of emergence which systematizes the underlying manifold. Furthermore, this

97. Lonergan, *Insight*, 478.
98. Lonergan, *Insight*, 478–9.

systematization occurs within a larger environment that includes conjugate forms outside of its own integration.[99]

Such are some of the core components in the notion of development. Of course, the above explanation has been thoroughly abstract. Therefore, we offer some illustrations of this notion of development in order to demonstrate the way in which these principles and their relations to one another function on the organic, psychic, and intellectual levels.

Organic development is made possible due to the existence of unstable chemical elements, which in turn allow for the formation of compounds. An aggregate of compounds then provides the necessary underlying manifold of coincidental chemical processes.[100] The cell is a systematization of this manifold, consisting in a dynamic integration of the aggregate of compounds. The integration is dynamic insofar as it intussuscepts fresh materials and excludes materials that are no longer needed for survival or further development. The direction of integration is towards duplication of the pattern and division, potentially resulting in either reproduction or growth. The former case entails different instances of life, while the latter case entails development. Furthermore, growth entails an increased differentiation according to both the principles of correspondence and emergence. Through the principle of correspondence, a limit is placed on what a higher system can integrate; through emergence, the integration eventually reaches a differentiation that consists in a new intelligibility. In organic development, the principle of major flexibility is evident when this organic development takes place in an environment consisting of a diversity of initial manifolds.

Thus arises the phylogenetic counterpart to the ontogenetic sequence. Such a study enquires into both the survival of an earlier member of an organic constituency (i.e. species) in a less developed and differentiated environment, as well as the contribution of a later member of the same species to an increasingly developed and differentiated environment. Through attention to this phylogenetic process, one finds that the notions of selection and adaptation are accounted for within the notion of development with its principles of emergence, correspondence, differentiation, and flexibility. Finally, the development of an organism is directed from generic

---

99. Lonergan, *Insight*, 480.

100. Lonergan, *Insight*, 480.

indeterminacy to specific determination. The direction can, for example, involve a movement from the shelter of the womb or egg, to the care of a parent, to the freedom of movement, to a certain level of self-determination by means of selection and adaptation.[101]

As organs provide the materials which are integrated by the increasingly specialized and differentiated organic functions, neural development provides the basis or underlying manifold which finds a higher integrator in the complexity of sensitive consciousness.[102] Such, in brief, is the principle of emergence at work. Numerous examples of psychic development could be brought forth as demonstrations of some of the major components of development we have highlighted. One could demonstrate that the direction of psychic development is towards increased specialization of determinate sensitive functions. For example, the bilateral eye of the barnacle constitutes a rather unspecialized determination of photoreceptivity relative to the vertebrate eye. Barnacle eyes do not carry out vision, but merely perceive changes in light intensity, which allows the nervous system to respond appropriately. The vertebrate eye, on the other hand, forms optical images from which the central nervous system may abstract a neural counterpart giving rise to the experience of vision.[103] Our brief example is meant to illustrate that by attending to the differentiated psychic development of various species, one can discern the concrete workings of some key components in the general notion of development. The important thing to note with this or any other example of higher psychic integration is that the neural materials supply the essential and yet basic underlying materials of the psychic development itself.

The basic difference between psychic and intellectual development is related to the principle of integration, insofar as psychic development supervenes upon organic development, while intellectual development is a higher integration of psychic development itself.[104] Instances of differentiation are abundant on this further level of development. The principle of correspondence is evident in the intellectual capacity to grasp

---

101. Lonergan, *Insight*, 481.

102. Lonergan, *Insight*, 482.

103. Roger Eckert, *Animal Physiology: Mechanisms and Adaptations* (New York: W.H. Freeman & Co., 1988, 3rd ed.), 177.

104. Lonergan, *Insight*, 492.

insights which unify a sensible flow of related elements.[105] The specialization of the human brain also provides grounds for a distinction between psychic development and the further intellectual integration. For example, insofar as current research on human memory recognizes an imperative to go beyond the analysis of synaptic change, further questions arise which may pertain exclusively to human intellectual experience.[106]

The direction of development is especially evident on the intellectual level of development. For instance, recognition of the need for higher viewpoints is peculiar to intellectual development. Lonergan illustrates this point though reference to the successive stages of mathematical learning.[107] The elementary insight to be grasped here is that each stage has its own set of operations, rules, and symbolic language. While the symbols provide the necessary image, human intelligence provides the capacity to grasp a higher set of rules governing operations that will elicit the symbols of the next stage. Thus, in mathematical understanding the human demonstrates her intellectual capacity to move from the more generic operations of arithmetic to the highly specialized operations of calculus by means of sensation, imagination, insight, formulation, and reflection. Finally, we may note the vast flexibility that is evident on the intellectual level: while the chemical and physical manifolds underlying the integrator of psychic development are material, the intellectual integrator systematizes "a psychic representation of material manifolds."[108] Such a state of affairs suggests that intellectual development is a higher integration of the psychically represented universe, as opposed to an integration of the individual human being. Hence, intellectual development enjoys considerable freedom from the limits imposed by the underlying manifold in accord with the principles of correspondence and minor flexibility.

When discussing the heuristic notion of human development, one is necessarily concerned with the three-fold process of movement involving the three levels, organic, psychic, and intellectual. This three-fold aspect of human development is not unlike the three-fold aspect of human knowing outlined above. There we noted that human knowing is not a matter of

---

105. Lonergan, *Insight*, 493; cf. Budenholzer, Emergence, Probability, and Reductionism," 353.
106. See, for example, Larry R. Squire, *Memory and Brain* (Oxford: OUP, 1987) 8–9.
107. Lonergan, *Insight*, 37–43.
108. Lonergan, *Insight*, 494.

experiencing, understanding, or judging, nor is it a matter or any two of these levels of activity; rather, it is the three-fold operation of these primary activities. Only through an experience of data, a grasp of intelligibility, and a reflective insight expressed through judgment does one arrive at knowledge of the object of enquiry. In a somewhat analogous fashion, human development involves the subject operating on three different levels. Thus, three separate but related developments can be occurring simultaneously. For example, while the growing child undergoes significant organic development, she also experiences and assimilates images, feelings, and memories that cause a psychic tension leading to changes in her affective living. These organic and psychic developments are accompanied by cognitional and linguistic learning that constitute intellectual development.[109]

Integration, therefore, is necessary for cooperation in the individual with respect to all three levels of development. Furthermore, the emergence of new forms on one level affect the type of development occurring on a higher level. So, glandular changes which emerge on the organic level find higher psychic integrations that lead to affective changes, which in turn provide senses and images that provide the material from which the intellectual operator can grasp new forms. The tension just mentioned on the psychic level is related to the principles of correspondence and flexibility. For as long as the emergence of, for example, new feelings can be integrated by the same intellectual form, the limitation on diversity within the underlying manifold has not been transgressed. When the same intellectual integrator cannot account for new psychic data, either new insights emerge or the images required for such insights are suppressed. Once again, all three levels are operative in the development of the human being; each level is crucial to development and is studied independently according to the methods of the relevant science.

Conclusion: Ritual and Development

By attempting to explain religious ritual simply in terms of organic or neurological development, the biological perspective fails to recognize the irreducible nature of higher levels of complexity in human development

---

109. Joseph Flanagan, *Quest for Self-Knowledge: An Essay in Lonergan's Philosophy*, (Toronto, ON: University of Toronto Press, 1997), 173.

effected by the processes of emergence and integration. While we have been critical of the epistemology and the reductionist tendencies of biostructuralist interpretations of ritual, d'Aquili, Laughlin and McManus do acknowledge that greater complexities have emerged as a result of animal and human phylogenetic development. For instance, in *The Spectrum of Ritual* they write, "one may trace the evolutionary progression of ritual behavior from the emergence of formalization through the coordination of formalized communicative behavior and sequences of ritual behavior to the conceptualization of such sequences and the assignment of symbols to them by man."[110]

An alternative neurological perspective of Alcorta and Sosis similarly acknowledges the emergence of the complexity of human ritual from earlier phylogenetic origins. Noting the specific variability of religious beliefs and practices, they claim that "the belief systems and communal rituals of all religions share common structural elements that maximize retention, transmission, and affective engagement. The roots of these structural elements can be found in nonhuman ritual where they serve to neurophysiologically prime participants and ensure reliable communication."[111] The question, however, is what do they mean by "roots"? Do they mean to say that religious ritual is possible because of these physiological traits which we can trace phylogenetically through ethological and neurological techniques? Or do they mean to say that religious ritual is nothing but an adaptive trait which has enabled the survival and fitness of the species? An answer lurks in the same paragraph: "Human use of ritual to conditionally associate emotion and abstractions *creates the sacred.*"[112]

The ethological perspective, though often reluctant to reduce human behaviour to the functions of animal ritual, is likewise in need of a non-reductionist account of the emergence of religious ritual. Erikson celebrates the opportunity "to give full consideration to man's complexity, and to dispense with the attempt to *derive* the human kind of ritualization from what has come to be called ritualization in animals."[113] His cautious approach appears again when he discusses the ontogenetic development

110. In Schechner, *Performance Theory*, 60.

111. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 348–9.

112. Alcorta and Sosis, "Ritual, Emotion, and Sacred Symbols," 349, emphasis added.

113. Erikson, "Ontogeny of Ritualization," 337.

of ritual: "I am not suggesting a simple casual relationship between the infantile stage and the adult institution, in the sense that adult rituals above all serve persisting infantile needs in disguise."[114]

Concern regarding the attempt to derive human ritual from animal ritual, or reducing human ritual to animal ritual, is liable to make people cautious about talking of selective pressure, unless there is an accompanying acknowledgement of human intentionality that is absent among animals. The possible exception to this would be pathological ritual, which one could argue is phylogenetically homologous to the ritualized behaviour of caged animals. These precautions set Erikson's approach apart from that of Wilson, whose suggests that complex human rituals hide the Pleistocene origins of religion. Nevertheless, problems still persist. Leach's criticism of Erikson's "analogy" of pseudo-speciation as a means of bridging the gap between ethologists and anthropologists (or between nature and culture) is ostensibly due to the fact that it "provides the basis for racial prejudice."[115] However, the epistemological problem underlying the use of pseudo-speciation as a bridge between biology and psychology is the very fact that it is an analogy. An analogy will always fail to fulfill the requirements of explanation, because metaphors are no substitute for explanation. Lonergan's notion of development, on the other hand, provides the principles according to which the emergence of interdependent levels of human development can be understood in a non-reductive manner. By applying these principles to the biological study of ritual, we can continue to glean insights from ethology and neurology while better understanding the autonomous intelligibility and irreducibility of religious ritual.

---

114. Erikson, "Ontogeny of Ritualization," 344.

115. Leach, "Ritualization in Man," 403.