

The Emergence of Spirit¹

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Introduction

If you would like an accurate thumb-nail sketch of the history of the field of religion and science, I would encourage you to study the list of J. K. Russell Fellows who have preceded me in this, the longest running series of research conferences in the history of our field, and to peruse the topics they have addressed. From that list you can reconstruct three phases: first, scientist-theologians, such as Bob Russell himself, who first drew attention to the urgency of these questions and the possibility of addressing them in a fruitful manner; second, the “methodologists,” who worked out the epistemology of the religion-science encounter and attempted to set it on solid methodological footing; and third, the first major research programs in the field — extended meetings of scientists, theologians and philosophers, such as the CTNS/Vatican project, which have led to a growing body of sophisticated theoretical work in the field.

The last few years have, I believe, seen the advent of a new, fourth phase. The increase in the number of publications, conferences, centers, programs, faculty and doctoral students in the field has led to the first hints of something like T. S. Kuhn’s “normal science”: a body of work by younger scholars who just take it for granted that work in this field is possible and of value. It reminds me of a similar shift in the feminist movement in academics. After years of women fighting for their voices to be heard and to be accepted as equal partners in the academy, I remember encountering the first generation of women students who had not had to fight to be heard — women who just took it for granted that what they had to say deserved equal respect and recognition to anything the males in the classroom might want to say. That was a great moment in the history of the academy. I would like to believe that the non-apologetic nature of the reflection in this new, fourth phase in the history of religion and science shares a similar importance.

This paper, and the research conference to which it is a contribution, is meant to be a contribution to what we might call “type four” scholarship. I do not begin with a long apology for the title or the topic; I do not first refute logical positivism, radical empiricism, and the charge that all religious language is meaningless; and I do not pause to explain the work in epistemology and the philosophy of science that this sort of inquiry presupposes. I presuppose, rather than arguing, that science raises broader philosophical questions and, likewise, that it is vital for theologians to know and incorporate scientific results in their work.

Actually, there are two subcategories within “type four” scholarship: those that link science and theology on specific questions, such as quantum theory and freedom or neuroscience and consciousness; and those that ask about the impact of broad stretches of science on fundamental theological themes such as the nature of God or the possibility of divine action. The debate about

emergence, clearly, must lie in this latter category.

A last prefatory comment: I expect complementary uneasinesses upon reading this paper from philosophically minded scientists who are not theologians, and from theologians who are not philosophically minded scientists (PMS's). To the PMS's I say: don't worry, the theology may not be of particular interest you, but at least it is not warping the argument all the way through. The philosophical thrust of the position should still strike you as both interesting and valid, even if you part ways with me in the final pages. To the non-PMS theologians I say: don't worry, the argument may strike you as a rather long way around to where you want to be; and I don't doubt you have ways that you believe take you there much more quickly. Still, you may still find it interesting to explore this longer, more philosophical route to get to where you want to go (or at least somewhere in the neighborhood). And if you understand the route we follow here, it may help you talk more productively with philosophers, PMS's, and other strange birds.

Overall Thesis

I believe that it is possible to develop a philosophy of the emergence of spirit in which the sciences (and meta-scientific reflection) provide the major touchstones. Foes, and perhaps even friends, may see this project as a return to Hegel; and surely it is Hegelian in scope (and in some other ways that experts will recognize). But it's equally true to say that emergence theory turns Hegel on his head no less radically than Feuerbach did. Where "the rational necessity of the dialectic" once ruled, we now appeal to empirical results and an analysis of their implications. We believe we see in the natural world an open-ended process of increasing complexity, which leads to qualitatively new forms of existence. We also concur that the ladder of emergence leads eventually to the level of significance and of the meaningful use of symbolic language — a level on which ontological reference can occur and truth claims can be parsed. The emergence theorists Harold Morowitz, Terrence Deacon and I differ on how to construe these highest levels of organization metaphysically. I find the differences fascinating, since the three answers we give suggest a clear spectrum of positions along which to choose.

In the coming few minutes I would like to sketch the argument for the emergence of spirit. First, however, consistent with the *fallibilism* presupposed in all of my work in religion and science², let me admit the two chief challenges to the emergentist program. The first is top-down causation. As it turns out, all three of the emergentists who are here accept some version of top-down causation (though you'll detect differences among us on the details). But there are some frightening pitfalls here. For example, either the physical substratum (say, brain processes) for some phenomenon (say, thought) causally determines the outcome or it does not. If it does, then the higher-order description seems redundant; the causal — and hence the explanatory — work is done at the lower level. If the lower-level description does *not* determine the outcome, then we seem to have abandoned the causal closedness of the physical world; but causal closure is a fundamental presupposition of physical science. Philosophically, this is a knotty issue, and we will have to wrestle with it as the day proceeds.

The second major challenge to emergence theory comes from biology — which is why there are three biologists among the respondents to the paper! The problem is that there exists a major parting of the ways in the interpretation of biology today. The one road — I suppose we should call it the *left* fork — leads toward a basically physicalist account of both biology and mind and ultimately, I suggest, to a reductive treatment of religious phenomena and truth claims. In previous publications I have labeled this the path of *weak emergence*. The other road — the *right* fork, perhaps (on the assumption that our decision is not unlike the dispute between the Right and Left Hegelians after Hegel’s death) — points toward the possibility of a non- or post-physicalist account of reality, which I have called *strong emergence*.

All three of the biologists who are present accept the standard model of biology for their scientific work (as do virtually all scientists working in the field); none of them are members of the “Intelligent Design” or anti-evolutionist movements. We are not interested in replacing biological results with an imaginary biology of the future; we take our theorizing on emergence to be contingent on the actual empirical results. And yet, given this presupposition, each of these biologists has done significant work that, I believe, supports the program of strong emergence. As the day progresses, I believe they will be able to help us sort out whether — and if so, where — contemporary biology opens the door to an emergence position in the philosophy of biology, and perhaps to a rudimentary theology of biology.

Terry Deacon has succinctly formulated where the decision point lies that leads to what I have called the left and right forks of interpretation. He writes, “For these reasons it is essential to recognize that biology is not merely a physical science, it is a semiotic science; a science where significance and representation are essential elements.”³ Evolutionary biology is still a natural science; it is not hermeneutics proper, a pure science of interpretation. And yet, as Deacon rightly notes, it “stands at the border between physical and semiotic science” (ibid.). I believe that emergence theory supports Deacon’s interpretation, and that it is the key to an adequate understanding of the phenomena of symbolic language use, hence to an understanding of what we mean by “mind” or “spirit.” More strongly, I believe that, if we are *unsuccessful* in defending the right fork in interpreting the biological results, we will be unable to defend a non-reductive theory of mind; or, to formulate the obverse: following the left fork in the interpretation of biology entails a physicalist position in the philosophy (and theology) of mind.⁴

Because so much turns on understanding the implications of the biology, I have structured this paper in a slightly unusual manner. I will first sketch instances of emergence theory at levels of complexity prior to biology. I will then jump over the biological sciences to the “hard problem” of consciousness, outlining the theory of mental phenomena that I believe results from an emergentist perspective. With these bookends in place, we will then have a clearer sense of what challenges the emergence theorist must successfully answer in the domain of evolutionary biology.

Pre-Biological Emergence

It would take a book-length treatment to follow through the whole range of transitions in the natural world that scientists cite as instances of emergence. I am greatly indebted to Harold Morowitz for his treatment of the levels of emergence in his forthcoming book with Oxford University Press.⁵ Rather than reinventing the wheel, I presuppose the empirical details of Morowitz's treatment in what follows.

Still, it remains necessary to analyze particular instances of emergence in order to convey a sense of the type of phenomena involved; only with this list in front of us can we have any idea what the emergence of mind or spirit might entail. Let us therefore pause to consider an example of emergence in physical science.

The study of emergence in chemistry embraces at least two distinct sets of phenomena. The one concerns the formation of equilibrium structures, such as the structure of a crystal, which could continue to exist in a thermodynamically closed environment. The other involves dissipative structures, those that are involved in a continuous energy exchange with their environment. Terry Deacon has written on the first area and may well choose to present it at this conference, so let me concentrate for a moment on the latter. Dissipative structures have attracted particular interest because they exhibit the property of self-organization. Chemists such as Joseph Earley are now studying examples of self-organization, or the spontaneous generation of complicated dissipative structures from less highly organized antecedents.⁶

It is important to note that emergence through self-organization is a bottom-up phenomenon. Nothing in the study of dissipative systems requires us to introduce the notion that the crystals or boiling water are acting intentionally or seeking to carry out purposes, however rudimentary. No teleological language whatsoever, however physicalist and minimal, is necessary to understand their process of development. (Here is a crucial break between emergence metaphysics and process metaphysics, which the comments by Joseph Bracken that follow should help us to sort out.) The reason is that the chemical phenomena are less complex than those we encounter in studying the evolution of living systems; in the latter case the behaviors of organisms incline biologists (sometimes against their will!) to utilize various forms of purposive language and to appeal (sometimes unconsciously) to the theoretical framework of information theory.

Yet the phenomena of self-organization also clearly move us beyond the theoretical resources of traditional reductionist and atomistic accounts. It is meaningless to say that the complex patterns that emerge in self-organization are contained in the individual atoms or molecules themselves. Instead, it's the inherent laws of highly complex physical systems that are responsible for emergent properties. Mathematical complexity theory reveals some of these patterns,⁷ and fractals offer a dramatic and often beautiful expression of them.

Paul Cilliers describes self-organizing systems: "The structure of the system is not the result of an a priori design, nor is it determined directly by external conditions. It is a result of interaction between the system and its environment."⁸ Niels Gregersen adds that the patterns "are informed by an *internal generative program* which is neither the result of an *a priori* design nor

an *ad hoc*-construct triggered by environmental factors.”⁹ In the case of self-organized complexity, large systems contain what he calls an “internal autonomous program which constrains the array of possibilities and itself controls the system-world interactions.”¹⁰

Emergence at the Boundaries of Biology

Niels Gregersen has given a convincing analysis of the type of emergence that lies at the boundaries of biology using the concept of autopoietic (“self-making”) complexity. This next level of complexity adds to the previous definition the requirement that the internal program also produce new internal components, thus leading to new system-world interactions.¹¹ Among the examples he analyzes are RNA reproduction, the immune system, neural networks, language systems, and historically self-reflexive agents.

Such systems quickly become non-computational, that is, future states could not be computed even if one had an exhaustive knowledge of their present state and the fastest computer that is physically possible. Note that this non-computability is the *negative* formulation of what turns out to be a basic, and highly significant, feature of biological organisms in their interactions with their environment: the definitive failure of reductionism in biology. Given that organisms have developed new internal programs or informational states that affect their dispositions to respond to their environment, and given that the evolution of these internal states is not a direct traceable (computable) response to inputs from their external environment, it follows that a reductive account of their interactions with their environment will no longer be possible even in principle. Instead, the explanations must be given in a theoretical framework that looks a lot more like ecosystems theory: the altered behavior of the organism brings about changes in its environment that affect other organisms; their complex responses, based upon their own internal changes, in turn alter the shared environment, and hence its impact on each individual organism, in unpredictable ways. Here we have a “network of interdependency” (Gregersen’s term): interactions between part and whole — or, we may now need to say, between individual and group — that is only partly analogous to what occurs in the chemical world.

Now Niels Gregersen has sought to show that chemical self-organization is compatible with a theistic notion of the purposes of God in creation.¹² I have no doubt that a theological account can be written that incorporates the principles of self-organization within its fold and shows that no inconsistency with Christianity need arise. The emergence hypothesis, however, pursues a rather different path. The goal of this research hypothesis — and of this research conference — is to see what happens when one follows the line of emergence *all the way through*, asking both about the “highest” levels of which we are aware and about the nature of a world that displays emergent levels of this sort along the way. The question is not only how the traditional God of theism can be reconciled with the thermodynamics of dissipative systems or with the phenomena of self-organization — such reconciliations are, I fear, all too easy and thus represent too low a standard. Rather, the question is what kind of doctrine of creation — and for that matter, doctrine of God — one might write in response to the fact of the ladder of emergence taken as a whole.

Emergence from Biology to Psychology

I suggested earlier that understanding emergence in biology is the most difficult task facing emergence theory. In order to see more clearly what is at stake in biology, and perhaps also for a sense of what form the answer might take, I suggest that we turn next to the question of emergence as it is being raised in debates about the relationship between neurobiology and consciousness.

In order to get quickly to the difficult issues, allow me to summarize very briefly the assumptions that underlie this treatment:

* On the one hand, strongly dualist theories of human nature, and in particular substantial theories of the soul, have become problematic in an age of science. The metaphysics of soul does not fit comfortably either with modern metaphysics¹³, modern science, or the epistemologies that are able to incorporate them.

* On the other hand, many aspects of our ordinary experience as actors in the world conflict with physicalist accounts of personhood.¹⁴ Reductive physicalist accounts are not able to do justice to the first person/third person distinction, to what it is like to see red or experience other qualia, or to symbolic language use. Making sense of representational or truth-seeking language, of intentionality, and of “raw feels” requires a richer semantics than the physicalist framework can provide.

* Recent criticisms of non-reductive physicalism, particularly those advanced by Jaegwon Kim¹⁵, raise serious doubts whether *any* version of philosophical physicalism can serve as the basis for an adequate philosophy of mind.

Even these brief comments already throw us right into the middle of the debate currently raging on the nature of consciousness. In the past I have argued that *supervenience theory* is particularly effective at formulating what is needed from a theory of mind today and at drawing attention to where the as yet unanswered questions lie (although a fully adequate presentation of the literature would take much more space than we have). Let me merely summarize in three points what I have previously argued is the main contribution of supervenience theory.

(1) In the most general terms, supervenience means that one level of phenomena or type of property (in this case, the mental) is dependent upon another level (in this case, the biological or neuro-physiological), while at the same time not being reducible to it. I have used the term *weak supervenience*, adapted from Kim, as a way of expressing this minimal position. *Strong supervenience* positions, by contrast, generally argue for a *determination* of higher-order phenomena by the subvenient level (e.g., for the determination of mental phenomena by the neural substrate), such that the subvenient level provides the “real” explanation for the phenomena in question.

(2) If supervenience is understood to be a *token-token* relationship — an individual instance of a mental property directly supervenes on an individual brain state — then, according to most standard presentations of supervenience, there is no real place for mental causation. For in each case the mental event will be dependent upon its corresponding physical event, making unclear why the explanatory story couldn't be told in terms of physical events alone. One can *say* (as I have in earlier publications) that a mental input should be added to the chain of brain states causing other brain states, as in the following diagram:

Diagram 1

But it is not clear why the mental cause would not be redundant in this case, turning the resulting position into a de facto epiphenomenalism.

(3) Jaegwon Kim has relied on a version of the multiple realizability argument, which I believe strengthens the case for a *type-type* understanding of the relationship between the mental and the physical. Compared to many authors in the philosophy of mind, Kim shows a deeper appreciation for natural history and the evolutionary origins of mind. I would express a variant of his position as follows. In order to allow adequate place for mental causation, we must reject token-token identity theory. Instead, we understand mental properties to be a type of property, which bear a dependence relation to another type of property, the physical (or neuro-physiological) states of the organism.

In this new and more sophisticated form, the dependence relation of supervenience has both a synchronic and a diachronic dimension: mental properties depend upon the entire natural history that led to the evolution of an increasingly complex brain and central nervous system, as well as on the physical state of the organism at a particular time. (To the best of our knowledge, corpses don't have qualia.) This mutual dependency is neither logical nor metaphysical — two requirements that have become the hobgoblin of analytic thinkers in the philosophy of mind. Rather, the assertion of both a diachronic and a synchronic dependence of mental properties is our best reconstruction of the highly contingent natural history that led to organisms like us. Of course, understanding the dependency relation in terms of natural history represents a firm break with all dualist theories of mind, thereby distinguishing the emergence approach as a separate ontological option in the debate.

But the contingent type-type relationship between the mental and the physical also allows one to give a more robust account of the nonreducibility of the mental than the competing accounts provide. Wherein, then, does the nonreducibility of the mental lie? How is it to be characterized? Much turns on this question. The only way to give an adequate answer, I have argued, is to draw

on the resources of emergence theory — a position I have called *emergentist supervenience*.

In discussing pre-biological emergence we already saw that each emergent level of complexity helps to set the stage for introducing and understanding the next. This is true of all instances of emergence of which I am aware; it holds, for example, for the relationships between each of the 28 emergence levels in Morowitz's recent book. Thus it seems to be a general feature of emergence theory that one's understanding of later stages will be strongly influenced (though not determined) by one's understanding of the earlier stages. Or — to put it more colloquially — understanding where you are depends in large measure on understanding how you got there.

In defending the irreducibility of mind, many philosophers and theologians have been misled into *beginning* with concepts from their own disciplines. By contrast, I suggest, we should remain committed to a bottom-up theology that tallies longer with the data from the natural and social sciences that study these fields. Thus a full analysis would have to include a detailed treatment of the phenomenology of mental experience. Numerous studies have been devoted to the study of the mental in irreducibly mental terms, going back at least to William James' *Lectures in Psychology*.¹⁶ James places great emphasis on the flow of consciousness, which is the particular form in which *attention* is manifested at the human level. In individual chapters he also considers the effects of will, habit, and thought, among other phenomena.

Following a number of thinkers in the field, I summarize the various phenomenological features of reflective self-awareness under the heading of *agent causation*. That is, there is a type of emergent causation associated with the reflectively self-aware agent that is not identical to other forms of physical or biological causation.¹⁷ Unfortunately, discussion of agent causation is often carried out in a rather top-down manner. Either the agent is construed as a particular substance with certain essential properties, as in William Hasker's presentation; or the debate quickly reduces to attempts to prove the metaphysical free will of the agent in opposition to compatibilism. I say "unfortunately" because the analytic demands of the free will debate on the one hand, and the metaphysical presuppositions of substance-based approaches on the other, inevitably draw attention away from the empirical considerations on which a science-based theory of emergence must rest.

And in what direction does an emergentist theory of agent causation point? The study of the human person involves not only all the knowledge we can glean about the brain and its workings, but also study of the emergent level of thought, *described and explained not only in terms of its physical inputs and nature, but also in terms intrinsic to itself*. I am arguing here for the explanatory significance of both levels, based on an understanding of the way in which the mental emerges out of the physical. The resultant anthropology begins with the notion of the human person as *psycho-somatic unity*. Humans are both *body and mind*, and both in an interconnected manner. Yet at the same time that this view accepts the dependence of the mental on the physical, analogous to other dependency relations in the ladder of emergence, it also understands mental properties to be different in kind from the properties that one observes at lower levels and to exercise a type of causal influence appropriate to this new emergent level.

Note that this debate concerns not only explanatory adequacy; it is also about ontology — about (at least) what sorts of properties we are willing to countenance in our description of the world. The debate between physicalist and nonphysicalist views of the person, after all, is not only about science; it is also about what actually or really or finally exists. We must ask: are the properties measured by natural scientists (physicalism, after all, must mean “of or pertaining to the methods of physics”) the only sorts of properties that humans have? In debating the issue it is important to distinguish the ontology of the phenomena (i.e., of the world as we experience it) from the ontology of the *best explanation* of the phenomena. A cultural anthropologist, for example, might note that the subjects of her study report discussions with the spirits of animals and give explanations of her arrival in their village that conflict with the world as she experiences it (e.g., they take her to be the embodied spirit of one of their ancestors). In *describing* their beliefs, she suspends judgement on their truth, attempting to be as accurate as possible in representing the world as they see it. In her explanations, however, she will feel free — indeed, it is required of her — to offer explanations which use an ontology (an account of what really exists in the world) that may diverge widely from their own.

The key question under debate, then, is the question of how much of subjective experience or “folk psychology” is to be retained in our account of the actual world, that is, how much of it actually belongs in a correct explanation of human experience. Some theorists defend an explanatory ontology that consists of brains and other physical organs and their states alone. At the opposite end, others argue that both minds and bodies represent primitive substances, defined as radically different sorts of things (*res cogitans* and *res extensa*). Still other thinkers (e.g., social behaviorists) hold that both brains and their social contexts exist, that is, both brains and whatever things we are committed to by an account of social contexts. The emergentist view I have defended here holds that brains, social context, and mental properties exist; hence the correct explanatory ontology has to introduce at least three types of “really existing properties.”

Returning Again to the Realm of Biology¹⁸

If this account of what we mean by “person” is correct, at least in broad outline, then the one natural world exhibits different kinds of properties at different levels, and different kinds of causation are at work at the various levels. There may be a very large number of such levels, with subtle gradations between them, or there may be a smaller number of basic levels. Note that we must be able to distinguish three or more levels of emergence for my thesis to be correct. For if we could distinguish only two, then the suspicion would be raised that emergence is only a variety of dualism: the world contains only mental and physical properties, only mental and physical causes. But in that case the difference between them (the critic would point out) would represent exactly that “great divide” that so stymied classical dualists such as Descartes. To make sure that the position is not crypto-dualist, we must therefore turn back to biology, to see whether we can discern in the biological sciences any kind of analog to the robust emergence that we have traced in the theory of mind.

As mentioned earlier, the biosphere represents a fantastic increase in complexity. Life forms

absorb physical energy and use it to build complicated structures such as eyes, organs and DNA strands; they also reflect it back in the form of complicated behaviors in the environment. Although the second law of thermodynamics always wins in the end — the net result is an increase of entropy in the universe — the principles of life function in the opposite direction; they make short-term inroads in the overall march toward thermodynamic equilibrium.

This fact is significant to our project because an anentropic process is one that accomplishes an *increase in order*, whereas the (thermodynamically) typical process results in greater disorder. And a process that brings about an increase in order, that leads to more complex and more highly ordered systems, is one that appears purposive. The appearance of purposiveness is increased when the purpose-like behavior is manifested in the actions of organisms. This appearance of purposiveness is increased still further when it is the *internal* changes in the biological agents involved that cause further increases in complexity, as is the case in the autopoietic processes that Gregersen has studied.

Now remember that biological evolution does not require or directly assume purpose as an explanatory category. One can say that there is a God (a supernatural intentional agent) who brings about purposes *through* natural history, but one cannot say that *nature itself* possesses such purposes — at least not without negating the basic principles of the biological sciences. So what are we to assert? I propose a theory of *purposiveness without purpose* in the emergence and behavior of organisms, a middle instance between the non-purposiveness of chemical emergence and the clearly purposive behavior of intentional (self-conscious) agents. The parts of an organism (or organ or cell or ecosystem) work together for its survival. The organism (cell, organ, ecosystem) does not consciously carry out purposes in the way an intentional agent does. Yet growth, nurturance and reproduction function so that the chances of the organism's survival, and thus the survival of the gene pool from which it stems, are maximized.¹⁹

Biology cannot explicitly introduce conscious purpose into the evolutionary process, since its ontology does not include any entities (short of the higher primates, as we've seen) of which it makes biological sense to postulate conscious intentional actions. But this does not prevent the ascription of *quasi-purposiveness* to biological agents. Eventually, there emerged a level at which entities within the created universe became capable of acting according to explicit conscious purposes. At that point there emerged conscious persons who could be affected by and affect other conscious beings, in a manner fully consistent with, though also going beyond, the laws of physics. Yet, we have discovered, this evolutionary achievement rests on the shoulders of innumerable gradual developments, much as the eye with its exact presentation of a field of vision is built on the countless varieties of heat and light sensors that preceded it. Thus there is some evidence, for example, that other higher primates possess a rudimentary theory of mind (call it proto-mentality).²⁰ The same holds true for virtually every other human capacity: each one was rehearsed, if you will, tried out in draft form and honed through environmental feedback.²¹ As the primates developed more and more complex central nervous systems in response to their environments, they also gradually developed capacities unmatched elsewhere in the biosphere.

If this account is carried through consistently, it allows us to speak of human thoughts and intentions, human symbolic interactions, as a genuinely new level of experience and behavior. And yet, like every other form of activity within the created universe, human thought is *also* conditioned by the regularities of physical law and by the quasi-intentional level of biological drives. Human thoughts are removed from any simple identity with “pure spirit” by their location within an organism which is determined by the various and sundry forms of organismic striving. Traces of these various drives and urges remain in our involuntary reflexes, our immune and limbic systems, in the body’s regulation of hormones, and in the release and uptake of neurotransmitters and inhibitors in every synapse of our brains. Much of this complex history of origination is reflected in our DNA, which serves both as a historical overview of how we got here and as a constant reminder that each capacity is built on the foundations of the less advanced capacities of our ancestors.

What natural history teaches us, then, is that philosophers from Plato to Descartes (and many of the religious traditions!) were wrong: there is no absolute dividing line between mind and matter. Human cognitive behaviors, purposes and goals are anticipated in the quasi-purposive behavior of organisms. Dualism is a flatlands philosophy, one that disregards the depth of understanding provided by natural history. But, it turns out, the physicalists are no better off. Their error is the mirror-image of the dualists’ blindness to natural history. If the one group overemphasizes the distinctiveness of human cognition, the other fails to recognize it in the first place.

Emergence represents a *tertium quid*. It suggests the following picture: as entities evolved within the biosphere they progressively exhibited new ways of functioning that could not have been predicted from the point of view of “lower” stages of development. The lesson here is *gradualism*: anentropic living systems display purposive behavior not found in more simple systems, then gradually manifest higher degrees of self-monitoring until the internalized world of symbols and representations that is consciousness emerges. Of course, one may wish to speak of human thought in terms of a more robust account of human freedom. But emergence suggests that, if such freedom exists, it must be understood in terms of a developmental story that includes the role of physical laws, biological drives, and the increasing latitude of behavior in more complex organisms — features both shared with other animals and distinguishing us from them. Let me put the point differently: organisms have a latitude of “choice” that increasingly differentiates them from non-living systems as they grow more complex, to the degree that one must, perhaps, finally acknowledge a qualitative difference. In human decision making this range and quality of choice is manifested in a manner both continuous *and* discontinuous with the stages of development out of which it evolved. In this respect, as in many others, human “mind” can be seen as an isolated peak in the evolutionary landscape²² — both resting on the foothills below it and yet higher in elevation (performance) than anything around.

Emergence Summarized: The Three Basic Levels

We have briefly surveyed the importance of emergent phenomena as a recurring pattern across a

number of physical sciences. But the (to my mind) overwhelming evidence for emergence may at the same time be its greatest flaw, as the over two dozen different levels of emergence in Morowitz's text might cause one to worry. What reason do we have for thinking that any interesting continuity runs through the immensely variegated examples of emergence that one finds in the literature today? Is there any way to bring order into this chaos?

It depends on what principle one uses in comparing the instances. The principle most often used in the literature — correlating emergence with increasing complexity (of structure, of behavior, of language usage) — is indispensable, since it brings a quantitative measure, a metric, to the process (e.g., we can measure linguistic complexity in terms of syntactic richness, vocabulary, etc.). At the same time, quantitative measures fail to explain the “breaks” in the process at which qualitatively new behaviors or experiences arise. The very success in establishing quantitative comparisons might seem to rule out *a fortiori* any qualitative characterization of the results (as is presupposed by the phrase “the emergence of spirit”). Or, to put it differently, one thereby acknowledges many instances of emergence, but each is *sui generis*.

Beyond summarizing individual examples of emergence, then, one must also look for broad patterns of behavior that link together multiple instances of emergence within the natural world. In pursuing this strategy, one loses the more rigorous criterion of a quantitative measure; nonetheless, the move to a more qualitative analysis is necessary if one is to recognize broader similarities in the natural world. Let us therefore take one step further back from the ladder of emergences in order to see whether the individual instances can be grouped together into any larger patterns. I suggest that two such patterns stand out in particular.

The emergence of life used to be treated as a single distinct ontological change: at one point there were only inorganic materials, and at the next (distinct) moment, there were life forms. This construal of the living/nonliving distinction has not stood up to recent results. Biochemists such as Gerald Joyce and Jeffrey Bada, both at the Scripps Institution of Oceanography in San Diego, are arguing that, given the structure of the heavy elements, the arising of life, at least on earth, was not improbable. Bada argues that life began as a “boundary-less soup of replicating molecules”; only later did the first membranes arise by chance. Joyce defines life as “a self-sustain[ing] chemical system capable of undergoing Darwinian evolution.” If these biochemists are right, the boundary between living and nonliving things is much more porous than we thought in the past; the line between them is a hazy one, and motion across it can occur in a much more gradual fashion than we once thought.²³

But even if the line of distinction is not completely clear — some characteristics of viruses link them more closely to the nonliving, other characteristics to the living world — there are still broad characteristics shared by organisms throughout the biosphere and throughout evolutionary history. Growth and development, homeostasis, reproduction, and controlled energy exchange with the environment are shared features of living organisms; equally fundamental is the fact that change over time is controlled by a process of evolutionary adaptation. These features are so basic that there is some temptation to call them *meta-emergent properties*. (However, since no

firm conceptual or empirical distinctions can be drawn between emergent and meta-emergent properties, this locution should be used cautiously.) Empirically, following the lead of Morowitz, it may be more accurate to analyze life not in terms of a single moment of emergence, but rather as a sort of family resemblance that ties together a large number of individual emergent steps.

Another broad area of family resemblance has to do with self-awareness. Self-awareness in the biological sense involves not just the monitoring of the external environment (which is too easily confused with perception), but also the monitoring of the organism's own internal states and the modification of its behaviors as a result. The self-reflexivity of this feedback loop has been fruitfully explored by Terence Deacon.²⁴ Some also distinguish reflective self-awareness from generic self-awareness as a separate area of family resemblance. As the name implies, reflective self-awareness requires the ability to monitor one's own self-monitoring. If the feedback loop of self-awareness is a second-order phenomenon, then, as several writers in the field have pointed out, reflective self-awareness becomes a third-order phenomenon: being aware of *how* you are aware. Using more strongly mental predicates, we could describe it as knowing that you are thinking, or knowing one's own thoughts, or knowing that one is experiencing certain qualia.

First Steps toward Metaphysics: Rethinking Form and Cause

I have argued for an “in-between” status for evolutionary biology. It is concerned with information (semiotics) and with function in a way that physics and chemistry are not; in this limited sense it is teleological in nature. I must now show that what separates biology from more radically hermeneutical (interpretation-centered) disciplines is the connection of biological information with form or structure. We can then ask: What are the first metaphysical implications of this “more than” status of biology vis-à-vis physics and chemistry? And how can we do them justice without projecting onto the biosphere more than we actually observe to be there?

I follow Deacon, Jeff Schloss, and numerous other biologists in looking to the purposiveness of life forms — in their structure, functioning, and behaviors — without claiming that the evolution of life proves cosmic purpose. Contemporary biology allows us to speak of *purposive behavior* but not of *Purpose*.

It is an almost irresistible temptation to parse “purposiveness” using the categories of personal action in the world. You form an intention in your head; you reflect on the best steps for carrying it out; you resolve to act on your intention; and then you carry out the action. Since it does not seem likely that fruit flies and cockroaches go through these steps — they don't have the central nervous system to support such cognitive activity — pre-Darwinian biology ascribed the apparent order in biological development to an “unseen hand” underlying all natural change. This hidden Orderer brought emergence about as we might, were we puppeteers guiding the movements of evolution with invisible strings. But this temptation must be resisted: it involves an unjustified reading-back of human intentions into the biosphere. However frustrating it may be

for the natural theologian, the so-called miracles of nature are largely explained by the Darwinian principles of random variation and selective retention.

Yet to say this is not simply to hand victory to a classical Darwinian metaphysics of the sort espoused by Richard Dawkins. The reductionism and atomism that undergirds the Dawkinsian metaphysic is unnecessary and, increasingly, counter-indicated by the evidence. As we have seen, Dawkins' mistake does not lie in excluding an anthropocentric account of biological development as brought about by the hand of God. Rather, his mistake lies in focusing exclusively on the *material* of evolution, without adequately considering its form or structure. Focusing on material inclines one to an atomistic materialism, the reduction of all things to patterns of atoms. On such an account, all biological structures are merely accretions of parts; they have no intrinsic interest beyond the survival value that a particular (random) structure offers to the parts that constitute it.

In contrast to this view, I suggest placing renewed emphasis on the ontological significance of form. In classical philosophy, form meant *meaningful structure*. For Plato, for example, it meant ideational content (the idea of a thing); for Aristotle, the comprehensible nature or essence of a thing. If I am right, an adequate construal of biology requires understanding both what the evolutionary process builds upon and what it eventually yields. To put it differently, comprehending biological processes requires moving upward from the underlying physical laws and particles, *and* moving downward from the pervasively semantic or meaning-oriented, symbol-producing nature of human existence in the world. The same information that structures our lives and makes us who we are is present, albeit in nascent form, in the biosphere and in all living things.

On this view, form or structure cannot be read from the bottom up only, but must also be understood from the top down. It is not only a complex aggregate of parts; it is also an informational structure. Biological forms record information and pass it on to the organism and its environment. The difference is that the individual organism is not aware of the information, as you may become aware of the content of your thoughts. Yet these structures are responsible for much of what happens to organisms in their environments. We think of the DNA code as information, since it structures, via messenger RNA, the cell and is decisive in the formation of new cells. But *nature* does not know a distinction between DNA and the rest of the cell structure. The DNA is a potential for structure; cell walls and cell differentiation and proto-organs are structure actualized. To put the point differently: just as the DNA is encoded information, the cell structure is expressed information — as are also the structures of a single-celled organism, a simple plant or animal, or a complicated central nervous system. Ontologically, there is no difference between structure and information; there are only varying degrees of informational complexity. At some point, when the recursive loops become complex enough, the organism begins to monitor its own behavior; and the most complex form of modeling we are aware of is the self-awareness or self-consciousness we experience as human animals.

The recognition of the top-down nature of structure means a decisive break from the reductionism of Dawkins and his friends. When Steven J. Gould broke from the reductionist

model in the late 1970s, it was because of the nature of structure and environmental impact on structure. He writes, “Minor adjustment within populations may be sequential and adaptive. ... Evolutionary trends may represent a kind of higher-level selection upon essentially static species themselves, not the slow and steady alteration of a single large population through untold ages.”²⁵ The building blocks of the cell do not alone account for the cell’s development and functioning; environmental factors and chemical changes at the level of the cell as a whole act as mechanisms to promote the expression of genetic potentials in a sort of “top-down” causation. What’s right about the modern synthesis — its ability to account for major changes through a sequence of smaller genetic changes — has been retained; yet it has been *supplemented* by top-down theories that account for the role of form. Irreducible complexity has brought with it this expanded notion of emergent form, which alone can account for broader, more sudden, and nonsequential change.

Earlier I distinguished between a kind of purpose that requires self-conscious intentional choices (call it *purpose proper*) and another kind of purpose that lacks such self-conscious decisions, which I called *purposiveness without purpose*. Similarly, we must distinguish between different sorts of causal forces in natural history. As John Polkinghorne has argued, human beings “act both energetically and informationally.”²⁶ In the physical world we encounter only efficient causes; in cases of conscious intentional behavior, we encounter final causes. The point of transition, the point at which both are active without being fully differentiated, occurs in the biological sciences.

But, the critic may complain, even if form connotes different things at different levels, why introduce any notion of emergent causative novelty? “Perhaps,” he continues²⁷, “the argument as you have sketched it involves an evolutionary progression from mechanical regularity to ‘purposiveness without purpose’ to conscious purposes in human action, but I do not at this point see how this progression requires or even suggests genuine *causal* novelty at any of these stages.”

But natural history and the theory of emergence suggest that all causation is *not* identical. Under some conditions causation operates in a highly regular fashion, without distinction among the objects on which it operates; under other conditions it acquires a recursive structure that produces quasi-purposive patterns of behavior; and under still other conditions it operates on specific objects for specific ends. Using the family resemblance approach outlined above, we can now characterize these families of causal activity for the first time. We might well speak of them as physical causality, biological or organismic causality, and mental causality. Indeed, if one takes the framework developed to this point, while beginning to give it a philosophical or theological reading, one can take a further step. Natural history begins with the world of physics and traces two broad areas of emergence: in the case of biological causality, the emergence of life; and in mental causality, the emergence of spirit.

Danger: Theological Terrain Ahead; Shifting Gears Required

I believe the argument as developed so far does not depend in any clear sense on faith assumptions. It does depend on the assumption that one can reflect in a cognitively meaningful

manner on scientific conclusions in a way that goes beyond those conclusions themselves. That is, I presuppose the possibility of a philosophy of physics, philosophy of biology, and philosophy of psychology (philosophy of mind), just as I presuppose that there can be a *theory* of emergence above and beyond the particular *examples* of emergence that are being detailed in articles in scientific journals. Still, these are all plausible assumptions; and none of them turns, as far as I can see, on any religious faith assumptions.

But one cannot introduce the term “emergence of spirit” without opening a religious Pandora’s box. At first this might seem surprising: have not issues of spirit been debated by metaphysicians, many of them not particularly religious, for millennia? But as children of the Enlightenment, and as thinkers living “after the fall” of the Kantian critique of metaphysics and after Kant’s recognition of the pervasive role of conceptual schemes, we can no longer draw the metaphysics/theology distinction quite so firmly. (Or at least not from the outside: once one has accepted the rational viability of metaphysical reflection, the distinction between theological and non-theological metaphysics is not difficult to recognize.)

What then are we to do? For, it now seems, the so-far non-theological treatment of emergence has led us to the doorstep of theological questions. There appear to be only two courses of action. First, those without interest in metaphysical or theological questions could simply stand and leave at this time. Various retorts can be given on your way out. “I am uninterested in the following discussion” is incontestable, though perhaps of only psychological interest. The answer, “I do not think that anything meaningful can be said using terms such as *spirit*,” will require you to defend the principle of demarcation between scientific and non-scientific or metaphysical discourse. The history of the philosophy of science in the 20th century shows, I believe, that your task of defending your exit on epistemological grounds alone may be more difficult than you think. Finally, you may respond, “No metaphysic other than a physicalist metaphysic is rationally credible.” Here, I believe, you face the stiffest challenge: we have already found that biology stands in some tension with a strictly physicalist ontology, and mental phenomena do so for different reasons. To my mind, some new doors have been cracked open by the emergence framework we have traced. These doors open to metaphysical questions; once opened, they are not easily shut again. A second, and perhaps more productive, option, then, is to put one’s initial hand of metaphysical cards on the table and begin the process of trying to give the most coherent expression of one’s metaphysical commitments (whatever they be) as one can.

This has not been a very postmodern treatment up to this point. But in one sense this last observation, and the discussion that follows, break with the “modern” pattern of most philosophical theology. It does not seem, that is, that “purely philosophical” and “not merely philosophical but also theological” considerations can be so sharply differentiated in discussing the topic of spirit. Discussions of spirit inevitably have a, well, *spiritual* dimension. The only honest way to respond to this fact is to lay out one’s theological (or anti-theological!) cards in the open right at the outset. One can say (among other things), “I wish to avoid any notion of a transcendent God,” as Ursula Goodenough does so clearly in her work; or one can say, “I would consider it acceptable, or even desirable, to interpret emergence within the natural world in light

of some form of personal theism.”

In what follows I take the latter route, and do so unapologetically. Others will take the former route. Those with diverging metaphysical commitments may be less interested in some of what I now have to say — though, I believe, sufficient common ground remains between us on other points that we are unlikely to be plagued with either boredom or silence.

Acknowledging the role of one’s theological or anti-theological biases does, however, change the nature of the task to follow. No longer can one draw a direct line of inference from empirical data to metaphysical conclusions. Now two poles are involved: the pole of argument, and the pole of metaphysical or theological starting assumptions. These two poles are not independent, since they can have some influence on one another; yet they are distinct. This means that both need to be formulated before one can engage in a disciplined inquiry concerning their interrelationship. On my view this is precisely what is meant by the distinction — widely used in Bob Russell’s work, and before him by Ian Barbour — between natural theology and the theology of nature.

So let me state my two poles clearly. On the one hand, I accept the conclusions of emergence theory as sketched and defended in this paper. On the other hand, I am willing to countenance a metaphysic of a purposive power that underlies the process of emergence. For those who share with me the second assumption and have become convinced by emergence arguments also to take the first one seriously, a clear and rationally discussable challenge arises: how are we to integrate theism and emergence? I thus label my comments from here to the conclusion of this paper, “Toward a Theology of Emergence.”

On Divine Causality

Where were we before that short digression? I had just suggested that it makes sense to speak of the emergent levels of consciousness — intentionality, self-awareness, rational reflection, artistic creativity, and the like — as “the emergence of spirit.” Given the multiple levels of causality defended earlier, this would mean that we are justified in speaking of the causal activity of spirit in connection with the phenomena of consciousness. Perhaps we can locate this type of causal activity as a further stage in natural history, subsequent to the causal activity of organisms and more more rudimentary forms of mental causation. The question immediately arises whether such causal activity helps in any way to give an account of the causal activity of God.

Several decades of work on the divine action question have resulted in some very clear constraints. Doctrines of creation have always held that, if God exists, God must be viewed in some way as the ultimate source of the natural world. Yet a world that is to provide a stable context for intentional action will need to possess its own integrity and order. On the one hand, if the doctrine of providence is to be retained, God must be able to guide the course of affairs within the world in some way. On the other hand, if we suppose that there is no obstacle at all to God’s manipulation of physical events and human decisions, the problem of evil will become

insurmountable; for there are innumerable events in the world that a benevolent God would presumably prevent if free to do so. Furthermore, if we imagine that God can suspend natural law at will, both the integrity of the natural order and the significance of human action are called into question.

In *God and Contemporary Science*²⁸ I accepted the presumption of naturalism (much to the consternation of many of my more theologically conservative friends). But (to the consternation of my more liberal friends) I also argued that an emergentist account of mental phenomena such as the one developed here leaves open the possibility that God can influence the thoughts of conscious beings. In the J. K. Russell lecture that set the stage for today's research conference, "Can Liberals Still Believe that God (Literally) Does Anything?"²⁹ I provided further arguments on behalf of this thesis. What are the basic outlines of the position on divine action that results?

It is one thing to suggest that God "lures" humans (or: nature as a whole) toward the good, quite another to construct an account of God's action that does justice to all the desiderata just mentioned. Moreover, in addition to these demands, an account of divine action must also do justice to what we have come to know about the structure and evolution of the cosmos and of ourselves within it. How exactly should we conceive divine action within the cosmos given the lawlikeness of the physical world, the increasing complexity of the biological world, and the conscious agency that we have found to be indispensable in the world of human actors? Just as important, if the history of the cosmos does reveal a gradual "becoming conscious" of the spiritual nature of the universe and its Creator, in what sense was that spiritual dimension present and efficacious from the start? Does God only emerge gradually along with the creation (but then the creation can't be attributed to God!); or is there some sense in which the same God is present and active in the world in different ways during the different periods and at the different levels of cosmic evolution?

It is easy to formulate several *unsatisfactory* ways of interpreting the suggestion that God affects the physical world. On the one side, there are problems with supposing that God is constantly performing physical miracles by communicating divine purposes to rocks and plants and animals, thereby directly causing them to behave in ways they otherwise wouldn't. On the other, if theism is viable, then talk of divine action cannot be purely otiose, merely adding a religious rhetoric to what is better explained in natural terms. Recent work in the religion-science discussion — I think especially of the Vatican/CTNS volumes edited by Bob Russell — suggests a more adequate approach: specific features of the physical world are compatible with, and even best explained by, the creation of that world by God. For example, lawlikeness and regularity reflect the enduring character of God. Big Bang cosmology is fully consistent with the creation of the universe by a conscious intelligence. And the Anthropic Principle, which shows that many variables are "fine-tuned" for the production of intelligent life in a way that would be a priori extremely unlikely, suggests a structuring of the universe for the evolution of consciousness. Note that none of these features depends on an intervention of God into the physical order; yet each does reflect the sort of universe one would expect if the theological picture sketched above were true.

The missing link in discussions of divine action over the last 40 years or so is biology. Standard Christian accounts of God’s causal activity in pre-human life either clash with evolution (e.g., creationism) or fail to specify a conceptual framework that would make sense of this alleged divine activity. A notable exception are process thinkers such as John Cobb, David Griffin, Lewis Ford, Charles Birch, and Joseph Bracken, among others, who have given the most convincing and robust account of divine agency in the biosphere. The trouble with these accounts, I have argued, is that they do not respond adequately to what we have learned about the emergent structure of the natural world.

By contrast, consider the response developed above.³⁰ Fundamental physics does not offer any openings for divine influence (with the possible exception of quantum indeterminacy — a debate that I will not reopen today³¹). If one asks about matter, i.e. about causation prior to the emergence of life, the answer must be that whatever divine input or organization there might have been must have been built in from the beginning. Nothing in our understanding of physics suggests the possibility of subsequent direct divine influence over rocks. If panentheism is false — a topic to which we’ll come in a moment — one would have to grant that deism is true at least up to the emergence of life.

Yet in biology we found reason to break with a purely materialist view: there is an informational element in biology, involving the role played by form, structure and function, that is crucially different from physics. Moreover, there is some anticipation within the biological order of the kinds of purposes we see fully expressed in mental phenomena. To avoid anthropomorphism, I used the Kantian phrase *purposiveness without purpose*. If one grants my position on God’s causal role in influencing thought, *and* grants proto-mentality in the biological sphere, then one would expect to see divine causal agency, appropriately limited, at levels in the natural history of life prior to the emergence of conscious beings. But how is such causal agency to be conceived — especially if, like most theologians in this field, one is committed to avoiding an account that is either interventionist or occasionalist? Theologians today are correct, I believe, in eschewing answers that imagine God introducing a new form of energy into the physical universe or directly causing deviations in the motions of created entities. But if one accepts this limitation, in what sense can God be said to exert a causal influence on or within creation?

The Contribution of Panentheism

Panentheism is frequently defined as the theological view that the world is in some sense contained within God, although God is also more than the world.³² This is not the place to repeat the fundamental exegetical and theological arguments on behalf of panentheism. Instead, let us see what merits this particular theology may have for dealing with questions of divine action across the span of cosmic evolution.

Negatively, to say that complex phenomena like life or mind lend themselves to theological explanation is to say that they cannot be given a reductive explanation in terms of lower levels of “natural” functioning, which is exactly what emergence says. But it isn’t as if God gets into the

picture for the very first time when one particular level (say, thought) emerges from the levels that preceded it. The beauty of panentheism is that, if it is right, the energies at work at the physical level are *already* divine energies, and physical regularities are already expressions of the fundamental constancy of the divine character. Thus panentheism changes the framework: if the world remains within and is permeated by the divine, then it is possible to speak of divine purposes and goals being expressed even at the stage at which there are no other actually conscious agents. Even the lawful behavior of the natural world can now be an expression or manifestation of the divine character or intentionality.

Because physical phenomena do not function with anything we can identify as “focal” or direct purpose, we may speak of them as manifesting only God’s “autonomic agency,” just as the actions of our own bodies are divided between autonomic processes and focal intentions. For the panentheist, the regularities of natural law represent the autonomic or, as it were, habitual operation of divine action apart from God’s specific or focal intentions. By contrast, should God sometimes consciously influence conscious thought processes in humans or other animals, we would speak of these as focal divine actions.

As organisms evolve and begin to behave in more complex ways, panentheism allows one to speak of a category of divine action that is not merely autonomic — that is, not completely explicable as a mechanical result of God’s autonomic agency — but that nevertheless stops short of focal purpose. We can speak of the central features of the biological realm as reflecting the divine character and influence without claiming that kidneys or amoebas themselves possess the goals of functioning as they do. After all, actual purposes can be predicated only of purposive beings; a colony of bacteria functions in a purposive manner without possessing actual purposes. The colony behaves *as if* it really desired to nourish itself and grow, but it does not desire growth in the conscious way that you now desire a glass of orange juice.

Herein lies the theological significance of biology. Like physical regularities, biological regularities reflect the divine character; yet here, because organisms also behave in a purposive manner, there is a place in principle for speaking of divine influence. The influence in question must be intermediate between the conscious influence that is possible in relation to conscious beings and the apparent impossibility of influence (outside of natural law) in physics. If biological organisms are indeed more than machines, and if it is correct to ascribe drives, strivings and non-conscious goals to them, then there is room for influence on these goals.

The idea here is to try to understand what are the distinctive forms of influence or causation that one finds in biology but not in physics or chemistry, and then to ask whether they offer room, in principle, for divine influence. If biological explanations are ultimately nomological (law-based) in the strong way that physical explanations are, then there will be no room for divine influence; if they exhibit causal influences analogous to the way that one thought can (non-nomologically) influence another, then there will be room in principle. (To demonstrate the actuality of divine influence is another matter.)

The trouble is that we are only beginning to break free from the dominance of biology by physics (or, rather, the illusory dream of such dominance). Until distinctively biological causation is better understood, theology cannot proceed. Consider the possibilities: biological information seems to exercise a causal role that is emergent (not reducible to physics). Could there be a non-physical input of information into the biological world as a form of divine influence? Second, the behavior of all biological systems, from genes to complex organisms, is influenced by broader environmental factors; could this provide an opening for a broader sort of “top-down” influence? Third, form or structure is key to biological explanations; could a neo-Aristotelian version of “formal causality” be developed that might be of both biological and theological interest?

Finally, individuality does not play the same role in biology as it does in, say, psychology. Where psychologists attempt to explain individual experience and behavior (what Windelband called “ideographic science”), biologists explain broad patterns and tendencies. Nonetheless, individual variance plays a far greater role here than in physics: no two phenotypes of a species are identical; even so-called identical twins diverge from strict identity long before the moment of birth. By definition, however, laws cannot account for such variances. If biological variance indeed stands beyond the reach of law-based explanation, then it remains open to forms of individual influence, not unlike the way in which a person who knew you in infinite detail could influence your actions in ways that no laws could predict or explain. The theological significance of this fact, should biology confirm it, is obvious.

When the panentheist account is developed in a manner consistent with the logic of emergence, human thoughts and intentions appears as (at least) a three-level phenomenon, with a distinct type of divine influence corresponding to each level. (1) Since thought is built upon the enduring regularities within the one physical cosmos, it (like everything else) reflects the constant character of the all-pervading God. Given the framework of panentheism, we may view these regularities as an expression of autonomic divine agency. (2) Like other forms of activity in the biosphere, the human neurological system is not *only* conditioned by the autonomic or natural-law level, but also by the quasi-intentional level of biological drives and goals. It is thus open to the sort of biological influence or constraint described above. (3) Finally, if human consciousness is indeed an emergent property of our complex neurophysiological structure, then humans (and perhaps some other animals) also exercise a distinctive form of causation: conscious agency. This would in principle allow God to influence our thoughts and motives at the same mental level that other persons influence them, even though the means may be rather different.

Human thought in this three-fold sense is thus not simply a direct, unmediated expression of God’s own focal thoughts and purposes. We might say that human thoughts are divine thoughts that are removed from any simple identity with the divine will by their location in a context determined by the various “lower” expressions of divine agency, i.e. by the whole course of natural history.³³ One may or may not wish to add on to this account a richer notion of human freedom. If one does, free individual agency would become another factor (alongside the influence of physical laws and biological drives) that blocks any simple identity between human thoughts and intentions on the one hand and focal divine thoughts and intentions on the other.

In summary, in this version of emergentist panentheism human minds appear as partially isolated or partially independent pockets of divine thought and purpose, receiving their separate identity thanks to the constraining conditions of natural law, material composition, and biological drive — and perhaps also through their own free agency. A fuller theological account could then describe the manner in which God as it were reconnects with these isolated pockets of intentionality by addressing them via the sphere of human/divine interaction we call the realm of spirit, including personal religious experience, culture, art, philosophy, and theology itself.

Outline of a Theology of Emergence

In the concluding paragraphs I turn in a more speculative direction and attempt a constructive theological account of the evolutionary process of emergence. We might start with the theological desiderata. Most philosophical theologians in the monotheistic tradition have sought to retain a sense in which God is present and active *ab initio*. There may be change and development in God, but there must *be* God from the beginning. This means that some aspect of the divine is ontologically prior to the world, and hence that the world is finite, contingent, dependent for its existence on its Ground. (Our knowledge, by contrast, generally moves, as evolution has moved, chronologically from the physical through the biological and psychological toward an explicit understanding of the cultural and spiritual.) This desideratum places a dual constraint on the philosophical theologian. On the one hand, she must find a way to talk about a divine Ground that precedes the natural order; on the other she must do so not in a Platonizing form that negates the natural order but by preserving a connection with the structures and function of natural entities. Although present from the beginning, the spiritual emerges out of, rather than being superimposed upon, the one natural order.

Many theologians in the 20th century found that the only way to meet this dual constraint was to take *process* much more seriously than the tradition had done. Time will not be extrinsic to the God-world relation; rather, the process of divine self-revelation and influence will develop as the universe, to which God relates, itself develops. At the earlier stages little or nothing of the self-conscious, personal character of the divine may be visible; in the middle stages some anticipations of that character should be observable; and in the later stages parts of the natural order have taken a form that reflects the personal agency that created and sustains it (cf. the *imago dei* doctrine).

What would such a theology look like, at least in outline?³⁴ I would conceive it in process-trinitarian form. Philosophical theologians might wish to speak of the first “pole” or nature of God as the *infinite creative Ground* of all that exists.³⁵ The second pole conveys the personal or responsive or “consequent” aspect of the divine. That there is some tension between God as ultimate principle and God as *a* personal being is not surprising; the history of Western thought seems to represent (as Ivor Leclerc has argued) a profound and long-lasting vacillation between these two approaches to the term “God.”³⁶ Thus the two moments require a third, a mediating moment. There are resources in classical trinitarian theology, in the philosophy of German Idealism, and in process thought for making sense of how this mediation works.

Scientifically, panentheism arises out of emergence theory; theologically, it arises out of the dialectic between the infinity and the finiteness of God. A relationship of difference-in-sameness characterizes God's relation to the world, which is construed neither as external to God (for what could be external to infinity?) nor as identical to God (since the predicates of the absolute certainly cannot be predicated of us as individuals). If an ultimate principle is to be (adequately) thought at all, it must be thought out of the unity of the finite and infinite: "Until our doctrine acknowledges such a power in God, or until it grasps the absolute identity of the infinite and finite," wrote Schelling, there is no place to speak of the personality of God.³⁷ The enduring value of the classical Christian doctrine of creation lies in its recognition that *freedom* provides the best means for thinking through the relationship of infinite and finite. No law drives the creation of a finite world and the transformation of its nature until it can be fully enfolded back within the divine; only theological terms such as freedom, love and grace can adequately express this movement.

Much more could be said about panentheism as a framework position for construing the God-world relation.³⁸ At this point, it seems to represent the metaphysical interpretation that best allows for an inclusion of individuals within God in a way that their own subjective immediacy does not disappear. Marjorie Suchocki has beautifully described the God-world relationship that results, and I close with her words. According to Suchocki, the key idea is that "the occasion can become itself and more than itself in God. The occasion is linked into the concrescence of God, even while remaining itself. Thus the peculiarity obtains that the occasion is *both* itself *and* God: it is apotheosized. As a participant in the divine concrescence, it will feel its own immediacy, and God's feeling of its immediacy as well."³⁹

Endnotes

1. The influence of several thinkers on the following position is pervasive enough to require separate mention. Arthur Peacocke's work is so formative for this position that it rises above the level of individual footnotes. I owe my basic understanding of theological method to four years of tutelage under Wolfhart Pannenberg and to a lifetime of working through his theology. Finally, many years of conversation and correspondence with Steven Knapp have left their marks on the resulting position, and even on some of the formulations.

2. See Clayton, *Explanation from Physics to Philosophy: An Essay in Rationality and Religion* (New Haven: Yale University Press, 1989), esp. chapter 2.

3. Terrence Deacon, "Evolution and the Emergence of Spirit," unpublished paper, p. 6.

4. For a version of a physicalist philosophy and theology of mind, which the author calls "non-reductive physicalism," see Nancey Murphy's contributions to Russell et al., eds., *The*

Neurosciences of the Person (Notre Dame Univ. Press, 2000); and to Warren S. Brown, Nancey Murphy, and H. Newton Malony, eds., *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998). Jaegwon Kim of Brown University was for many years the leading advocate of non-reductive physicalism, though in his more recent work he has now become one of its chief critics. See Kim, *Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation* (Cambridge, MA: MIT Press, 2000).

5. See Harold Morowitz, *Emergences* (Oxford and New York: Oxford University Press, 2002).

6. Among the variety of Earley's publications on this topic, see "Far-From-Equilibrium Thermodynamics and Process Thought," in David R. Griffin, ed., *Physics and the Ultimate Significance of Time* (Albany: State University of New York Press, 1985), pp. 251-55; "The Nature of Chemical Existence," in Paul Bogaard and Gordon Treash, eds., *Metaphysics as Foundation* (Albany: State University of New York Press, 1992); "Self-Organization and Agency: In Chemistry and in Process Philosophy," *Process Studies* 11 (1981): 242-58; "Towards a Reapprehension of Causal Efficacy," *Process Studies* 24 (1995): 34-38; "Collingwood's Third Transition: Replacement of Renaissance Cosmology by an Ontology of Evolutionary Self-Organization," in Luigi Zanzi, ed., *With Darwin Beyond Descartes — The Historical Concept of Nature and Overcoming "the Two Cultures"* (forthcoming).

7. See for further examples Robert Russell, Nancey Murphy and Arthur Peacocke, eds., *Chaos and Complexity: Scientific Perspectives on Divine Action* (Vatican City State: Vatican Observatory, 1995).

8. Paul Cilliers, *Complexity and Postmodernism: Understanding Complex Systems* (London: Routledge, 1998), p. 91.

9. Neils H. Gregersen, "Levels of Complexity: From Complicatedness to Autopoiesis," unpublished paper, p. 7.

10. Gregersen, p. 9.

11. Gregersen, p. 10.

12. See Gregersen, "From Anthropic Design to Self-Organized Complexity," in Niels Henrik Gregersen, ed., *From Complexity to Life: On the Emergence of Life and Meaning* (New York: Oxford University Press, 2002), pp. 204-234.

13. Clayton, *The Problem of God in Modern Thought* (Grand Rapids: Eerdmans, 2000).

14. Clayton, "Neuroscience, the Person and God: An Emergentist Account," *Zygon* 35/3 (Sept. 2000): 613-652.

15. See Kim, *Mind in a Physical World* (note 4 above).

16. But the history goes back to Bergson, to Dilthey and Windelband, to Schleiermacher — even to Augustine!
17. See William Hasker, *The Emergent Self* (Ithaca: Cornell Univ. Press, 1999), and Timothy O'Connor, ed., *Agents, Causes, and Events: Essays on Indeterminism and Free Will* (New York: Oxford University Press, 1995), esp. O'Connor's own essay in this collection, "Agent Causation."
18. Parts of the following paragraphs were co-written with Steven Knapp, to whom I am indebted for numerous discussions and some of the formulations that follow.
19. In the fuller argument, I explore the origins of the phrase "purposiveness without purpose" in Kant's account of natural beauty. An equally important antecedent lies in Spinoza's concept of *conatus*, whereby each organism strives "naturally" to keep itself in existence. See *The Emergence of Spirit* (forthcoming).
20. For a summary see John Cartwright, *Evolution and Human Behavior* (Cambridge: MIT Press, 2000).
21. To continue the metaphor, one might think of the environment as similar to the applause, or boo's, of the audience — except that the process is not quite so gentle: in this case the acting failures are shot outright. More exactly, this "audience" rewards the hit show with babies that make babies, whereas the failures either die or are left without offspring.
22. Human mental and affective experience is isolated by the conditions of natural law and biological drive, and perhaps also by human free agency.
23. Research reported in *New Scientist*, July 13, 1998.
24. See, among other works, B. Weber and T. Deacon, "Thermodynamic Cycles, Developmental Systems, and Emergence," *Cybernetics and Human Knowing* 7/1 (2000): 21-43.
25. Stephen J. Gould, *The Panda's Thumb: More Reflections in Natural History* (New York: W. W. Norton, 1980), p. 15.
26. John Polkinghorne, *Belief in God in an Age of Science* (New Haven: Yale Univ. Press, 1998), p. 63.
27. I am indebted to Steven Knapp for this formulation of the objection.
28. See *God and Contemporary Science*, esp. chapters 7-9.
29. Clayton, "Can Liberals Still Believe that God (Literally) Does Anything?" *CTNS Bulletin* [[add reference]].
30. I am grateful to Steven Knapp for some of the following formulations.

31. See Robert J. Russell, et al., *Chaos and Complexity* (note 7 above), esp. the articles by Bob Russell, Nancey Murphy and Tom Tracy. More recently, see Robert Russell, John Polkinghorne, Philip Clayton and Kurt Wegter-McNelly, eds., *Quantum Mechanics: Scientific Perspectives on Divine Action* (Vatican City State: Vatican Observatory, 2002). See also my *God and Contemporary Science*, chapter 6.
32. I have traced the philosophical foundations of panentheism in *The Problem of God in Modern Thought* and have applied it to the question of divine action in *God and Contemporary Science*. In three articles in *Dialog* over the last few years I have begun to work out a Christian panentheistic theology: “The Case for Christian Panentheism,” *Dialog* 37 (Summer 1998): 201-208; “A Response to My Critics,” Symposium on Clayton's Panentheism, *Dialog* 38 (Summer 1999); and “Panentheist Internalism: Living within the Presence of the Trinitarian God,” *Dialog* 40 (2001): 208-15. Most recently see Arthur Peacocke and Philip Clayton, eds., *In Whom We Live and Move and Have Our Being: Reflections on Panentheism for a Scientific Age* (Grand Rapids: Eerdmans, forthcoming 2003).
33. Cf. the famous equation in Spinoza, *deus siva natura*.
34. See my “Pluralism, Idealism, Romanticism: Untapped Resources for a Trinity in Process,” in Joseph Bracken and Marjorie Suchocki, eds., *Trinity in Process: A Relational Theology of God* (New York: Continuum, 1997); cf *The Problem of God in Modern Thought*, chapter 9.
35. Thus Frederich Schelling writes, “As there is nothing before or outside of God he must contain within himself the ground of his existence. All philosophies say this, but they speak of this ground as a mere concept without making it something real and actual. This ground of his existence, which God contains [within himself], is not God viewed as absolute, that is insofar as he exists. For it is only the basis of his existence, it is *nature* — in God, inseparable from him, to be sure, but nevertheless distinguishable from him” (*Sämmtliche Werke* [Stuttgart and Augsburg: J. G. Cotta'scher Verlag, 1856-1861], 7:358f.).
36. This tension has been brilliantly worked out in the thought of Werner Beierwaltes. See inter alia *Denken des Einen. Studien zur neuplatonischen Philosophie und ihrer Wirkungsgeschichte* (Frankfurt: Klostermann, 1985), and *Platonismus und Idealismus* (Frankfurt: Vittorio Klostermann, 1972).
37. See Schelling, *ibid.*, 8:74.
38. For sophisticated defenses of panentheism, see the various publications by Joseph Bracken, e.g. *Society and Spirit: A Trinitarian Cosmology* (London and Toronto: Associated University Presses, 1991), and *The One in the Many* (Grand Rapids: Eerdmans, 2001).
39. See Majorie H. Suchocki, *The End of Evil: Process Eschatology in Historical Context* (Albany: SUNY Press, 1988), p. 102. See also her *The Fall to Violence: Original Sin in Relational Theology* (New York: Continuum, 1994).