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# CTNS Bulletin

# Commentaries by Schimke, Hearn, Tabler, Peters, McLean

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Christians, Creation, and Environmental Ethics*  
Holmes Rolston, III

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## Reflections from a Molecular Biologist

**Robert T. Schimke**

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Each person will bring to the reading of a provocative thesis such as Professor Holmes Rolston's "Genes, Genesis and God" certain knowledge, prejudices and assumptions, and will look for those items that agree and disagree with them. Simply as a molecular biologist, my interest is with genes, but my specific research is about the very sorts of processes that lead to changes in organisms. We may call that "genesis." As with all human beings, I too reflect on and continually seek answers to the question: "What does it all mean?" I am a religious person.

What follows are some reflections on my reading of "Genes, Genesis, and God." Some of these are directed to Professor Holmes Rolston to assist him in refining his thesis. Others are directed at a broader community wrestling with the interaction of science and theology. Still others are some questions for my future work that were provoked by Rolston's paper.

The first question I ask when examining a writing is this: For whom is it written? In this case, has Rolston written for scientists, for theologians, for students, or for a broader public? Rolston's lack of definitions to his terms, and his use of the same word in contexts where its meaning is vastly different, make for difficult understanding. In a "poetic" context such ambiguity is useful in evoking an apparent understanding; however, in an "expository" or "analytical" context ambiguity produces confusion and a misguided belief that the reader understands what is written. Thus, as a scientist reading this paper, I look for a kind of clarity and precision that is missing here.

Rolston strongly affirms, as do I, the variety of life forms,<sup>1</sup> rejoicing in what can be concluded from "natural history" to be a progressive increase in "complexity," here defined as the increase in complicated structures, forms of life, and interactions between like forms (same species) and other forms (different species), i.e., behavior. Equally striking is the variety of solutions (call it diversity) of differing life forms to the problems of sustenance and reproduction such that virtually all imaginable ecological niches on earth are filled. He rightfully puts *homo sapiens* into this world of living forms. He says far less than I would like about the fundamental issue of whether humankind is, or is not, more than a part of this mix of life forms.

In extolling the progressive "complexity/diversity" of life forms, Rolston concludes that there must exist

*We asked five scholars from various disciplines to offer responses to Rolston's paper. The first two look at Rolston's paper from a more scientific perspective. Robert Schimke is a noted molecular biologist from Stanford University who assessed Rolston's use of current biology. Schimke also remarks on the nature of the science-theology dialogue in general. Walter Hearn is a biologist by training, and currently a writer and editor. Hearn offers what he calls a "minimalist" view of biology.*

a "Divine Creativity" at work in the process, i.e., the process has "purpose." Here, I believe, we come to a central and critically important issue: We are taught from the laws of thermodynamics that there is progressive disarray (randomness) in the world, i.e., entropy. Rolston concludes, as have many writers, that surely only a "creator" can provide the counterbalance (negentropy) to explain the progressive existence of more complicated life forms. He mentions in passing the entropy issue but fails to indicate that there are formulations of this issue that can resolve the apparent paradox. Such formulations start with the realization that classical thermodynamics is based on the concept of reversibility, whereas starting with an assumption of irreversibility, one can come to quite different conclusions, an "Order Out of Chaos."<sup>2</sup> Interestingly, such formulations deal with an organism as a single "bit" of the disarrayed state, and an increasing state of disarray can "drive" such "bits" into more complicated states, i.e., the forces (whatever one wishes to call them) at work actually lead to more "complex" life forms. To pass off lightly the "entropy issue" in a paper that seemingly deals with issues of biological sciences does a serious disservice to those concerned with the interactions of science and theology.

Rolston begins the body of his paper centering on the word "selfish" and debunks its use to describe genes. He strongly rejects the anthropomorphizing of the behavior of various life forms. I fully agree and applaud him for this debunking. As a scientist and an editor, I have always been opposed to the use of various ill-defined terms with ambiguous and "value-laden" meaning from one arena of life into another. No matter how well authors may define their particular usage (they usually don't), such terms still carry with them a subliminal residual meaning. Such terms are often used to "name" a process or entity, as if in naming it one somehow understands it. This is rarely the case. Other sciences are not immune to this as indicated by the use of "charm" and "machoism" by the physicists.

I would have preferred for Rolston to begin his paper with a definition of "biology." For instance, "biology" is used to denote variously (1) the scientific discipline which attempts to describe and understand life processes,

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(2) the description of life forms *per se*, (3) the process of evolution, and (4) an evolutionary solution process applicable to solution-solving by humans. It should be stated clearly that biology is that scientific discipline that attempts to gain understanding and knowledge of life processes. The operative term is "life" and this term is used to distinguish between animate and inanimate forms (for instance rocks and the like). Life is generally defined in the context of self-replicating entities, and the definition (as do all definitions if pushed to the extreme) breaks down at the level of a growing inorganic crystal. If we start with the concept of reproducing, i.e., replicating, then we immediately shift our focus from a gene as the unit of life. The unit is not simply the individual but becomes the reproductive "unit." That unit (in higher organisms) is not the single organism, but is both male and female. The behavior of many (social) animals tells us that the reproductive unit is even more complex. Hopefully, we realize this in our own species. If one acknowledges competition, symbiosis, and parasitism across species, we eventually come to the entire world ecosystem as one interacting unit which, to varying degrees, is the replicating unit. I would presume that Rolston has developed such a progression as the basis of his environmental ethic. He could have used it in this paper as well.

Rolston devotes a considerable amount of his paper to issues related to the processes (call them mechanisms) of genetic change involved in evolution. We are told by some authors that such changes are "random events," that they involve "blind tinkering," or that biology is not "elegant." Rolston appears to have rejected anthropomorphisms when describing genes and animal behavior, but also appears to have accepted their use in this more global form. He does well in explaining the fact that organisms, during evolution, can change "only at the edges" (since the genetic structure cannot be completely dismantled and put back together), and he contrasts this with an engineer making a new machine. Although he mentions or alludes to various genetic processes that occur in the remarkable changes in genomes associated with increased complexity /diversity in life forms, he fails to provide an informative exposition of such processes. Perhaps I am disappointed because this is basically my field of scientific expertise, and as an interested and educated reader, I wanted more exposition of this subject.

Regarding his comments related to his assertion of a "Divine Creativity," he says that there are no "laws" in science that allow for the "deduction of primates" and that "no logic demands it." Of course, he is correct in this. However, Rolston confuses differences between "laws" and what I shall call "rules" in the context of science and engineering. A "law" states that if there is A, then B follows directly. To Rolston, A is a simple organism (trilobites, and extinct species) and B is primates? How can you get from A to B? He does not include the vastly different ecologies that existed between A and B, i.e. the selection pressures and the like, or the progressive and irreversible biological "solu-

tions" in the intervening millions of years. A better example might be a single step, for instance, an organism that is sensitive evolving into one that is resistant to an antibiotic or an insecticide. An organism may acquire resistance by (at least) two different routes (different genetic mechanisms). Perhaps this is a bifurcation that would eventually lead to different species. Such changes follow "rules" and such rules (my dictionary first defines rules as "guides") do exist that can explain genetic differences and genetic complexity that can account for progressive derivation of more complex and diverse life forms.

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Rolston, in his affirmation of life forms, gives them a *positive* value. As a biologist and as a human being, I find it strange that one needs to assert this at all. His assertion of "value" opens a Pandora's box of issues (and meanings) that are not dealt with sufficiently. For example, one could develop a value system which derives solely from the concept of "reproductive fitness," the central concept (and a complicated one) of current versions of Darwinism. We would then have to trace the relation of this value to Rolston's next concept—morality—which belongs strictly to human agents. In summary, my view is that this is a fascinating connection, but Rolston does not cover it with sufficient depth to disclose the complexity of it, so many of the difficulties on the path from "value" to "morality" are left unresolved.

At the very beginning of his paper Rolston asserts that theology and physics have been modified over the years (centuries, I suspect) to come to an accommodation. Biology and theology are further apart, he states. He seeks an accommodation in a "reformed" biology. For some of the reasons I state above, I think most biologists think of their discipline as being far more in tune with that of Rolston than those who tout the "life of a selfish or altruistic gene." His assertion, however, raises certain issues for me. Modern physics (theoretical and high energy) is concerned with the most basic states of energy/matter in a time-space-energy continuum. It seeks "first causes" in the form of an instant in time, the "Big Bang" of the astrophysicists. It seems to me that a plausible thesis is that such scientific questions have their counterpart in first cause arguments of theology, with mysticism, and with hierarchical constructs in theology. For a reflective individual, a practical outcome would

be seeking a "becoming one" with such a "first cause," the search for Nirvana. Physics, in one form or another, is a science with thousands of years of development and there is every reason to suggest the "co-evolution" of theology and physics. Modern biology dates from the early 1800s with Louis Pasteur and the discovery that "life begets life": it is a very young science. Biology deals with interacting members in an ecology where "success" is defined by capacity to produce generation after generation of individuals. A theology based on biology deals in the world here and now and where value structure relates to a past-present-future-generation continuum.

Thus, I wonder if a theology based on an accommodation with physics may not differ significantly from a theology based on an accommodation with biology. Perhaps Catholicism has accounted for both directions in the dual worship of God and Mary. Can this paradigm be used to understand the conflict between the hierarchical theology of the Vatican and that of the liberation theologians, or the varying degrees of "high" and "low" Christology that abound in various Protestant churches? Can the paradigm be used for defining differences between Eastern and Western religions? Have I misrepresented Rolston, or is this really what he is attempting to address?

#### NOTES

<sup>1</sup> I use throughout this paper "life forms" to denote the vast continuum of replicating units (organisms) past-present-future living in the world (perhaps elsewhere as well).

<sup>2</sup> See, for instance, *Order Out of Chaos*, by I. Prigogine and I. Stengers. New York: Bantam Books, 1984.

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## Science, Selves, and Stories

Walter R. Hearn

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Professor Holmes Rolston's "Genes, Genesis, and God in Natural History" is full of fresh thinking and forceful writing. I'm afraid I'm ill equipped to follow his example beyond giving my response a similarly alliterative title.

### I SCIENCE (AND ITS RELATION TO THEOLOGY AND RELIGION)

"Biology and theology can be troublesome to join." In his first sentence, Professor Holmes Rolston jolts me into alertness with that word *join*. As he defines his program of reinterpretation, I see a reprise of the "genes" of his title in the word "congenial." I want to *stay* alert to savor his paper.

My training and research experience were in biochemistry, in its "golden age" following WWII. As we ourselves were being transformed into molecular biologists, biochemists were doing our best to transform biology into a branch of chemistry, which, the physicists assured us, was a branch of physics.

Rolston's comparison of physics and biology with regard to their degree of congeniality with theology reminded me that I had thought about that, too, before the anthropic principle was elaborated or at least before it was celebrated. About a quarter-century ago I described how biology was being unified and thus strengthened by the chemical approach, for a book on *The Encounter Between Christianity and Science*. Then I said:

Theologians would perhaps welcome more genuinely the strengthening of biological science if they had been more aware of some of the philosophical problems posed by the physical sciences. In a sense the positivistic philosophy arising from physics has been bearable to scientists, partly because of a certain residue of mysticism inherent in the scientist himself [or herself] as a human being.<sup>1</sup>

In other words, I thought mechanistic biology might make a religious view of life more appealing. Indeed, mechanistic biology has since led positivistic or reduction-

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istic biologists like E.O. Wilson and Richard Dawkins to the kinds of excesses challenged by Rolston. Back then the reverse process, a biological approach to machinery, illustrated in Rolston's section on the "genetic algorithms" of computer science, had scarcely begun.

Many of my conversations about science and Christian faith hinge on the proper boundaries of science. I tend to take a narrow view, preferring a science as devoid as possible of philosophical trappings. It is appropriate for a philosopher to deal with metaphysics, but I think of myself as a "metaphysical minimalist."

Consequently, I'm unlikely to contribute much to Rolston's program beyond cheering him on as he unravels some uncalled-for metaphysics, or in this case, "metabiology." The scientisms of Wilson, Dawkins, Crick, Gould, and Monod dissected in his paper have never rung true to me. I find Rolston's reinterpretation of biology penetrating and fascinating, but I would settle for far less. Rather than replacing those mischievous adjectives in phrases like "selfish genes" or "blind chance," I would simply flush them. I take my science "neat" or "straight," thank you, undiluted with metascience.

I tend to take my theology that way, too, despite many analogies between science and Christian faith. Theology is to me more or less analogous to the theoretical component of scientific work, but both as a biochemist and as a Christian I have been primarily an experimentalist. I want to "get on with it" even with a lot of competing theories and theologies rolling around in my head. A sort of pragmatic incongeniality at the experiential level forms the basis of my own concept of integrating science and religion.

My thinking has been influenced by the insight of Michael Polanyi and others that all knowledge is personal, including scientific knowledge. I know it is false to call scientific knowledge objective and religious knowledge subjective. Yet it seems fair to say that an objective mode predominates in scientific activities and a subjective mode in religious activities. I like the way one student summed it up: "In science you take yourself out of the picture as much as possible and in religion you put yourself into the picture as much as possible." My problem is that I'm not sure I can do both at the same time.

For me, integrating science and my Christian faith is more an existential exercise than a strictly intellectual one. It requires learning to move from a logical mode to a fiducial mode, reversibly, with a certain amount of grace. I associate scientific knowledge with Martin Bubcr's "I-it" relationships, my religious knowledge with an "I-Thou" based on mutual trust and mutual disclosure. In both modes, the "I" indicates a personal, individual, knowing process.

What I meant about physics and biology in 1968 was that biochemistry would begin to make people uncomfortable as it turned their "I" into an "it." We are accustomed to being the "I" who accounts for the world as "it," unaccustomed to being at the objective (rather than ocular)

end of the microscope, to being dissected, counted, accounted for, explained, or explained away as molecular interactions. I have seen scientists show symptoms of extreme discomfort when scientific behavior came under scrutiny by relatively harmless sociologists of science or even science historians. In their pain, "hard scientists" may assert that such fields are not "real science."

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When science is elevated to the status of the only reliable kind of knowledge, its definition becomes fought-over turf. In a current flap on the U.C. Berkeley campus, we have scientists *in the same field* openly challenging one another along these lines. In *Science*, U.C. anthropologist Nancy Scheper-Hughes is quoted as saying of her colleague Vincent Sarich's position on some issue: "It's not good science, it's not bad science, it's not science at all."<sup>2</sup> That is, it can't be worth much.

From *Zygon*, here is physicist David Bohm, in an interview, accounting for what he regards as an erroneous pattern of philosophical thought:

This tendency [to confuse partiality and wholeness] is very much tied up with the emotional side of the brain, in particular with the need of some sense of security. If a person becomes disturbed, the brain can produce endorphins—which is like naturally occurring morphine—to quiet the nerves. So if certain thoughts can liberate the endorphins, then the thought that you have a solid whole becomes very appealing. The removal of that thought removes the endorphins, and it's like somebody hooked on morphine who experiences withdrawal symptoms. In order to get the endorphins back, you hold the thought that produces them.<sup>3</sup>

To my students who felt inferior to physicists because "everything is basically physics," I used to joke that physics is basically a hypothalamic secretion, which biochemists would be the first to account for. (I was working on hypothalamic "super-hormones" at the time.) But I don't think David Bohm is joking when he "explains" a philosophical stance on a molecular basis; the joke is that *his* explanation could be accounted for in exactly the same way.

For most of us, for me at least, an ethical sense arising from outside of science, from our "I-Thou" relationships, issues a warning against overdoing a mechanistic approach. But even without that sense, any approach that turns people into "its" carries its own warning. We have a right to be uncomfortable, knowing how "its" are treated, even when they are living things, even when they are human beings.

To Rolston the casting of any living "it" in the role of a mechanism is inappropriate, whether the "it" is a living organism or an ecosystem. Indeed, reminding us that everything living *is* a system, he steers us away from the concept of organisms as "things," at least of "made" things. He says, "The watchmaker-design approach to the concept of a Creator, if appropriate in physics, may not be the model for biology." And, "An organism is not a machine, not a clock."

The form my warning takes is not a categorical denial. I say that organisms are not *merely* machines. Organisms contain a lot of biochemical machinery. They seem to function, at least in part, as mechanisms. Speaking as an organism myself, I want to assert that even the most thorough mechanical description of me will miss a lot, without rejecting a metaphor so evocative of purposeful invention, of intention. It is characteristic of machines that they are designed and built to carry out a specific purpose. Speaking as a Christian, I acknowledge that I am a creature in a world I did not create, and I am grateful for my existence. How do I express my gratitude? Did the creativity that produced me originate in a cycle of genetic information passed on by my forebears?

Well, I can credit my parents for my procreation, though I may have been a surprise to them. They knew nothing of genes but passed on what they had received. It is hard to picture myself thanking their genes for altruistically sharing their information. Actually, I find myself thanking God for having "had me in mind," for thinking me up—yes, for designing and making me—however the Creator went about it or however long the process has taken.

Rolston can be a theological minimalist when appropriate. "Well," he says, "at least there is genesis, whether or not there is a Genitor." Yet I sense that his reasoning is profoundly Christian and if we disagree it is probably over something so mild as our preference in metaphors. I think we agree that what we learn from God's relationship to nature must shape our own, though God's relationship is unique. Rolston prefers a generative metaphor, a picture of kinship rather than mechanical invention. God has begotten nature and loves it as his creation, a procreation. God values every "it" enough to give it birth, to bring it into existence. "God must have loved life," Rolston says. "God animated such a prolific Earth."

Whether biology and Christian theology will be brought closer together through such reasoning is not entirely clear to me. In my view, science should be "lean and

mean," but not mean in the nasty sense one gets from "selfish genes" or "nature red in tooth and claw." From an Indo-European root for "common," the *mean* I mean means "low in quality, value, or importance." Science is of limited importance; it is not of utmost value to us. That word *value*, in itself, brings me to the second section of my response.

## II. SELVES (AND OTHER TERMS WITH SLIPPERY DEFINITIONS)

*Self* and *value* are two words used repeatedly by Holmes Rolston. His focus on such words and their meanings is a stimulating aspect of his paper. Words that mean one thing in a scientific setting and something else in common parlance deserve close attention. The word *law*, descriptive in science, prescriptive in ordinary experience, is a frequent source of misunderstanding in science/religion dialogue. Here Rolston puts a novel twist on the term *value*. He brackets its biological use ("survival value") on one side with its mathematical use (the value of *x* in an equation) and on the other with its everyday meaning of qualitative goodness (something valuable).

Does saying that genetic information is a "value" conserved by sharing it in reproduction mean more than that it is an entity that continues to exist? We move to a higher level: "Every organism has a *good-of-its-kind* \ it defends its own kind as a *good kind*" Finally, "We want to pass judgment on the value of nature for what it is in itself, with criteria appropriate to nature, not with anthropocentric criteria. Let nature be what it is; do not fault it morally. Value it biologically; do not disvalue it ethically." The paragraph following that argument sums up the range of word usage:

This is value vocabulary, but the point here is that, in the genetic world, value vocabulary is more accurate descriptively than is moral vocabulary, for genes essentially are information, and information is of value. A gene is an information fragment, a puzzle picture of how to make a way through the world; and such a fragmentary piece is of value to survival. That is not a selfish thing; that is a valuable thing. We are first describing what is the case when we model the phenomena so, and, after that, we may also value such value, often prescribing that such value not only is, but ought to be conserved in the world (pp. 14-15).

The word *self* extends over an equally broad range. Like a numerical "value," any *Ding* can be *ein Sich*. Rolston speaks of an organism as self-actualizing or self-defensive but also of "nature itself." We can speak of an atomic particle itself, or of the word *self* itself. Most proximate to our own home on that range, we know ourselves as selves by direct experience. Words with the prefix *auto-* stir up the same questions. We do not *automatically* know what we have in common with atoms, machines, chimpanzees, or with nature or God. We do not know how correct it is to confer autonomy on a cell, a human being, or nature itself.

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**[Rolston says,] "An organism is not a machine, not a clock." I say that organisms are not merely machines. Organisms contain a lot of biochemical machinery. They seem to function, at least in part, as mechanisms. Speaking as an organism myself, I want to assert that even the most thorough mechanical description of me will miss a lot, without rejecting a metaphor so evocative of purposeful invention, of intention.**

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*Self* and *value* are not the only words whose elastic connotations clutter science/philosophy/religion conversations. Rolston explores the term *creation*, of which some biologists decline to speak, he says, "because they fear a Creator lurking in the concept of creation." Rolston himself seems to worry that an engineer or designer might be lurking there. I know people who fear that an atheistic naturalism lurks in the concept of evolution. Rolston uses creation and evolution freely but when push comes to shove, recognizes the problem of autonomy or ultimacy:

Ultimately, there is a kind of creativity in nature demanding either that we spell nature with a capital N, or pass beyond nature to nature's God. Biologists today are not inclined, nor should they be as biologists, to look for explanations in supernature, but biologists nevertheless find a nature that is super! Superb! (p.22).

I salute such skillful word play, convinced that play is the essence of creativity. Rolston continues, "No biologist can doubt genesis" (with a small "g"). Here's another bit of word play: the words *nature*, *creation*, and *genesis* were all born and grew from ancient roots for birth or growth. The Indo-European base *kre* ("to grow") passed into the Latin *creare* and thus to "creation." The Indo-European base *gen* ("to beget") passed via the Greek *gigncsthai* ("to be born") more or less directly into "genesis"; with loss of the initial

g it became the Latin *nascor* ("to be born") and *naturae*, "nature."

Despite fears of "naturalism" lurking in evolution, I've seen almost no discussion of what may lurk in *nature*. That word might easily be taken as a patently nontheistic substitute for *creation*. It raises all kinds of labeling questions because of ambiguity over what it excludes. God, yes, in a sense. Spirit, yes, to some. What about humanity, or society? Are manufactured vitamins "natural"? What kinds of science are excluded from the Center for Theology and the Natural Sciences? If *homo sapiens* is a classifiable animal species, why isn't human history considered part of natural history? At one point, for clarity, Rolston has to add a qualifying adjective: "wild nature." So much for the "value of nature itself and other hardly perspicuous texts.

### III. STORIES (AND THE SIGNIFICANCE OF CREATIVITY)

The theme in Holmes Rolston's paper that best catches my own wave of enthusiasm is that of "story." Here's another etymological relationship to play with: the difference between *story* and *history* is not a prefix added to "story," but something dropped from "history"; the Indo-European base *weid* is at the root of it, from which comes the *veda* of Sanskrit, *wisdom* via old German, *vision* via Latin, and *history* via Greek. I recall a lecture by the Hungarian biochemist and Nobelist, Albert Szent-Gyorgyi, who said that "History is the only subject." Perhaps he was right.

Holmes Rolston's paper is about "natural history," the nineteenth-century term for biology. He sees biological reproduction as a kind of spreading out of information, along with the incorporation of new information (publishing is an obvious metaphor), making biology "historical" in ways impossible in physics or geophysics.

I am more concerned with the telling (or publishing) of human stories, including scientific stories. On the PBS TV program "Bookmark" I once heard novelist Robert Stone summarize memorably all that we can experience as humans: "self, stuff, and story." We know ourselves in a different way than we know other stuff; we discover other selves by their stories. Scientific accounts are our "stories about stuff." Amid much discussion of science education and scientific illiteracy, I have been pondering the nature of scientific story-telling, as compared, say, to ordinary story-telling. Among my conclusions is that it does no discredit to biblical creation stories to say that they are "just stories"; all scientific accounts of how we got here are also "just stories."

But are they *good* stories? Good in what way? Good for what? For the ordinary reader, or listener, not merely for the illiterate or innumerate, most scientific papers hold no interest. They tend to have no visible characters or plot. Things happen, but the action gets lost in

detail and in the passive voice (not "I analyzed the DNA" but "the DNA was analyzed"). The "it" is there but the "I" is kept out of it. No wonder, absent subjects and active verbs, that biologists who want to catch our eye with "the story of life" turn to adjectives like "selfish," "random," and "blind" to "put some life back into it." In Holmes Rolston they run into both a lover of life and a sharp literary critic.

The fall 1990 *CTNS Bulletin* reprinted an Isaac Asimov fable about Moses getting advice on how to tell the creation story: if he stretches it out over fifteen billion years the story will be too long and "won't sell," so he settles for six days.<sup>4</sup> The usual scientific story is marketable to those who already know the plot or the characters from some kind of personal experience. Peter Degen of CTNS told me that Niels Bohr once said something to the effect that "science has all the details; poetry has everything else." Details are actually exciting to those who want to add still more details, hoping to arrive at some grand, impersonal generalization.

But knowledge is personal, and the transmission of knowledge is doubly personal. Stories are told by persons, to persons, for some purpose. The purpose controls where the story begins, how it ends, and the way it is told. There are many ways to tell any story. Since every story is only partial, told from a particular viewpoint, I believe we are richer for having many stories to choose from. We are richer for *having* to choose. Scientists constantly make choices of what data to gather, what information to receive. We also make choices of the kinds of stories we tell. Any story is judged on how well it fulfills the narrator's purpose.

We can tell a story without a plot, but there must *be* a plot, a purpose, for telling it. We can leave ourselves out of the action, but we are still there as author or narrator, leaving our marks on the way the story is crafted. It is that quality of agency, of participation in contingency, of purposeful creativity, I believe, that marks human persons as "made in the image of God."

References to story abound in Rolston's paper. "All we can do is tell the epic story [of biological evolution] ... and the drama may prove enough to justify it." "We want a genetic account in the deeper sense, one that tells the full story of the historical genesis of value." "... there is no particular cause to assume that the grim accounts of [the history of biological struggle] are the adult, biologically correct ones, and the gracious, creative, charismatic ones are childish, naive, or romantic." "The molecular self-assembling is a sort of self-actualizing, but it is also a response to the brooding winds of the Spirit moving over the face of these earthen waters."

In response to a "morally rotten" sociobiological description of animal behavior, Rolston writes, "We are viewing wild nature through a human prism; and though this is said to be objective hard science, it really is just a subjective way of framing the problem, and other frames are equally as plausible." And, "Theories are like suits of clothes; they do have to fit the data more or less, but a great deal depends on how you want to dress things up."

My favorite passage compares the creative work of scientists and engineers with their own creation or generation "in real time," where we deal not with tinkering but "with development along a story line":

Lives have to be narrated, not engineered. Scientists may engineer their artifacts, but the lives of scientists (and all human persons) have to be biographies. Life has its revolutions and conversions, its dramatic crises; still it has to be lived incrementally and vitally day by day. Robots can be assembled and switched on; but persons have to be assembled while they are living. That may be the nature of all self-generation (p. 16).

In other words, life (even to a biologist) is far more than biology. I came to see the creativity of evolutionary processes most clearly not in my biochemical studies but by noting the way I went about writing poetry.<sup>5</sup> A poem must also be assembled incrementally, without losing its vitality or unity. One scans freely, randomly, for elements that might fit a pattern already established, then selects the one that fits best. A poem, a *poesis*, is a "made" thing with a life of its own, so I can accept the idea of God as "maker." To me the "making" of a building can be attributed to an architect as readily as to a bricklayer. As poet, author, or director, God seems immediately accessible to me. A number of Christian writers, including C. S. Lewis and Donald MacKay, have elaborated that kind of metaphor,<sup>6</sup> honed to perfection, perhaps, when God is seen as playwright, creating living characters and, in Christ's Incarnation, stepping on stage to show the actors how to get it right.

The richness of Holmes Rolston's paper reminds me of a passage in 1 Kings 4 about the breadth of Solomon's interests: "He would speak of the trees, from the cedar that grows in Lebanon to the hyssop that grows in the wall; he would speak of animals, and birds, and reptiles, and fish" (v. 33, NRSV). Besides all that natural history, the passage says, Solomon wrote over a thousand poems (v. 32).

I began writing poetry while I was still practicing biochemistry. I was such a rank amateur that I didn't realize sonnets had gone out of style. What attracted me was that, unlike free verse, in a sonnet when you've crafted fourteen lines, you're "outa there." Now I end with a love poem, appropriate, I hope, because of Holmes Rolston's evident love for nature and for "nature's God." This sonnet is actually about someone I love, but it's also about my relationship to my Creator. I wrote it after watching a physical chemist I knew at the lab perform, in his braces, in a university play. A crippling bout with polio had kept him from a career as a Shakespearean actor. That was why, my chemist friend told me, that he couldn't believe in God.

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The Actor Who Finally Learned His Part

I am at peace loving you, content  
 With miracle, unwilling to ask more  
 Of you, or God. I could, of course, invent  
 Alternatives, as I often did before  
 We met—thinking of ways for love to be,  
 Of how we'd meet, and when, and how you'd look,  
 And would there be a moon? But when I see  
 What unexpected paths love really took,  
 How far reality outstrips romantic dreams,  
 I play it straight, conceding I was not  
 Imaginative enough—a fault, it seems,  
 Of many amateurs: weak sense of plot  
 The Author, I guess, threw back his head and laughed  
 To see an actor try the Playwright's craft.<sup>7</sup>

—Walter Hearn

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## An Axiological Perspective on Nature

Carol Tabler, Margaret McLean and Ted Peters

### Value Vocabulary in Biology and Theology

Carol J. Tabler

I consider Professor Holmes Rolston's groundbreaking approach to the discussion of environmental ethics highly important for those of us attempting to reflect theologically from within the environmental context.

I will offer an examination of the philosophical framework operative in Rolston's argument for the relation of biology and theology. My goal is not to dispute the need for, nor possible success of, such a relation. Rather, from my generally favorable outlook on Rolston's philosophical understanding, I want to critically examine the "value" category that dominates this essay, and offer suggestions for clearing up the problems associated with it.

First, a look at the philosophical framework of this paper. Rolston uses a phenomenological method that recognizes all inquiry as essentially *interpretative*. Therefore, he begins with a commitment to allowing the phenomenon under investigation to "present itself." Rolston is attentive at every point to genetic and biological phenomena as they appear in themselves, without pre-emptively imposing an epistemological framework. That is, rather than seeking confirmation of his theory in the interpretation of the data, Rolston examines phenomena, and attempts to draw conclusions from that investigation. I believe this is a welcome change, not only from the socio-biological approach he criticizes, but from what I would call an "onto-biologicai" approach as well (i.e., an approach which begins with the adoption of an ontological theory with which to interpret the phenomena).

Rolston proposes what he calls a "positive axiological paradigm," an interpretive schema which recognizes the phenomena as it appears in itself. This positive axiological paradigm starts with the recognition that "every organism must project itself in the world" (see Rolston, p. 13). This tips the hat to the sociobiologist's observations, but without adding the burden of negative moral language that

*The language of "Values" holds a prominent place in Holmes Rolston's research proposal. Thus, it is no surprise that three of our respondents focus on this concept in their examination and critique. The following excerpts present a number of issues raised by Rolston's axiological approach to nature. Carol Tabler, a GTU graduate student, asserts that Rolston's use of "value" is ambiguous, and that he needs to relate his various uses of the term more carefully. Ted Peters, Professor of Theology at PLTS, focuses on theological implications of the paper—how we are to connect nature's so-called "intrinsic value" and nature's creativity, to God's creativity and goodness. Finally, Margaret McLain, Medical Pathologist and doctoral student in medical ethics at GTU, asks what we are to do when the preeminent value of survival throws us headlong into ethical conflicts between the survival of competing life forms. In each case these respondents ask Rolston to offer a clearer exposition of "value" in his philosophy of nature.*

typifies sociobiology. Thus, Rolston continues, "... we will substitute the equally descriptive but nonpejorative acting "for its own sake," and even substitute the positive "to protect its intrinsic value." This use of phenomenological method, and in particular the use of an axiological paradigm, represents a significant advance toward a mutually constructive relation between biology and theology.<sup>1</sup>

But it is precisely at this point of introducing an axiological paradigm that a problem emerges, and not just a fruitful pathway. The problem is that Rolston employs the word "value" ambiguously in his effort to bridge the biological and theological worlds of discourse. I find at least four definitions of value:

1) As "pre-moral": "These genes, transmitted are not so much slivers of a self, selfishly protected as are they elements of value conserved by giving them away. . . . Genes do generate; they reproduce or communicate what they possess; they share their information, literally, although precociously and pre-morally" (See Rolston, p. 14).

2) As "morally neutral": "... in the genetic world value vocabulary is more accurate descriptively than is

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moral vocabulary" (Rolston, p. 14). This contrasting of the two vocabularies seems to imply that value vocabulary is a distinct and morally neutral kind. While the above-mentioned "pre-moral" definition of value implies a developmental schema (i.e. from pre-moral toward morality) operating in the natural world, the "morally neutral" definition suggests the absence of moral categories in the natural world.

3) As "intrinsic": ". . . perhaps what we have in biological nature is better described as intrinsic values actualized, defended, and shared" (Rolston, p. 15).

4) As "moral": With the addition of "intrinsic" to the word "value" it seems to me we have indeed entered a moral world of discourse, especially if this definition of intrinsic value (that is an intrinsic value actualized from within nature itself) is compared with a second definition of "intrinsic value" implied at the end of the paper. Rolston comments "I doubt whether you can be a biologist without a respect for life, and the line between respect for life and reverence for life is one that I doubt that you can always recognize" (Rolston, p. 22). With the addition of the words "respect" and "reverence" we find a definition of intrinsic value that involves a human decision and moral stance toward nature.

I do not dispute that the word "value" can and does have a variety of meanings depending upon the context. My concern is two-fold. First, if Rolston varies the meaning in his use he ought to be more explicit about the relation between these various meanings. The word "value" seems to make sense *relationally*, so my first question for Rolston is: Are we to understand the relationship between these four different uses of "value" as continuous, aggregate, developmental or in some other way? Appeal to "value" vocabulary alone will not help us here.

Second, with regard to the two definitions of "intrinsic value" in this paper (one being that intrinsic value arises from within nature and natural processes and the other being that intrinsic value is a human decision motivated by reverence and respect for life), I would urge Rolston to include a more explicit account of the two uses he employs and the ways in which he would argue for their relation. This kind of discussion would be *crucial* not only to increasing the effectiveness of this particular paper, but for any discussion of how values which are exhibited in and arise from nature are related to what one might call "Gospel" or theological values. Here I have in mind values of justice, forgiveness, self-sacrifice, to mention a few, which Christians regard as important components of their theological framework. If the intent is to produce a fruitful relation between biology and *theology*, then "values" in the sense of arising from nature must be adequately related both to intrinsic value as a human decision *and* to specifically Christian values such as those I have mentioned.

Consider, for example, the Christian value expressed by Jesus' death on the cross. My question for

Rolston would be: how do we understand the relation of the value of altruism expressed in the cross to the value of altruism apparently exhibited in nature?<sup>2</sup> If the argument is that these "values" of altruism are somehow continuous or developmental in their relation—if Jesus' act was simply an expression of his own genetic pre-disposition toward value expression—what becomes of the Christian claim that in his death, Jesus was revealing something new (a new value if you will), the value of self-sacrifice? If value arises within nature, what are we to say about the role or necessity of revelation?

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**. . . an axiological paradigm represents a significant advance toward a mutually constructive relation between biology and theology. But it is precisely at this point of introducing an axiological paradigm that a problem emerges, and not just a fruitful pathway. The problem is that Rolston employs the word "value" ambiguously.**

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On the other hand, if the relation is not continuous or developmental, if the altruism of the cross somehow *transcends* the altruism exhibited in nature, then how are we, as theologians, to express this notion of transcendence so that it makes some kind of biological sense, and fits with the natural history behind and around us?

If our goal is the fruitful relation of biology and theology through the use of value vocabulary, these questions must be addressed. However, Rolston does not take up this issue in this paper. I think this diminishes the effect of a research project that seeks to examine the role of genes, genesis *and God* in natural history, a paper which otherwise holds a lot of promise.

## NOTES

<sup>1</sup> Of course I do not mean to suggest a naive realism with these observations about Rolston's commitment to the phenomenological method. Neither he nor I would advocate that either an objective observer or a pure phenomenon "in itself" is a possibility. Phenomenology recognizes the interpretative character of all inquiry. I only mean to suggest that phenomenology's focus upon "phenomenon" and "world" as central to inquiry represents an important contribution to the dialogue between biology and theology.

<sup>2</sup> Here I am thinking of the mother bird, who will feign being wounded in order to draw the predator toward herself and away from the offspring.

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## Beyond the Genes: Epigenesis and God

Ted Peters

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I undertook this response to Professor Holmes Rolston's research proposal, "Genes, Genesis, and God in Natural History," with gratitude for his broad approach and insightful contributions in the field of theology and science. He brings a sensitivity of perception that permits him to see issues that others have missed, and a seriousness of thought that allows him to escape the clutches of simplistic ideologies.

In this spirit of appreciation I raise the following two concerns with his paper. First, I would like to identify a link in his chain of argumentation that I find puzzling, even confusing: the move from *morality* to *value* in extrahuman nature. Second, I would like to offer some observations regarding the relationship between creativity within the world and God's creativity, looking especially at the role of human creativity and its possible link to the *imago dei*.

First the puzzle. In my view, Rolston first demoralizes nature, then immediately re-moralizes it. But he fails to identify just what he is doing and why. Let us look at this problem more specifically. He first demoralizes nature by asserting that genes are not moral agents: "Since genes are not moral agents, they cannot be selfish, and, equally, they cannot be altruistic. But they can transmit information..." (p. 14). However, he then continues on the same page to say, "... [nature] is a wonderland of adaptive fit, a community of intrinsic values woven instrumentally into a systematic web."

So, on the one hand he says "there are no moral agents in wild nature"; on the other hand he says that nature includes a "community of intrinsic values." How can he hold these antinomies without contradiction?

He offers a curious remark: "... value vocabulary is more accurate descriptively than is moral vocabulary" (p. 14). Here, values and morality are two different things. But ordinarily, one thinks of axiology as one ethical scheme among others, such as deontology. I think it would help if Rolston would try to clear this up by identifying and defining more precisely the relevant assumptions at work here.

It seems to me that if Rolston can successfully demonstrate that values are intrinsic to nature, we would have the foundation for a natural morality, not its elimination. It would also call into question his assertion that moral agency is limited to human beings.

His success in demonstrating *intrinsic* values in nature is jeopardized because he has not established for us which comes first, value or the genesis of value. One might initially conclude from Rolston's argument that if values are intrinsic to nature, then genetic development would be guided by these values. However, it appears that these values are the result—the "achievement"—of the previous course of genetic development.

This brings us to the second concern of my response. What about God? Rolston wants to lead us down this path: from selfishness to intrinsic value to creativity to God. I believe the following statement maps his direction.

... the critical category is value (not selfishness), commonly termed "survival value," better interpreted as valuable information, coded genetically, that is apt for "living on and on" (survival), for coping, for life's persisting in the midst of its perpetual perishing. Such fecundity is better interpreted still as divine creativity, (p. 21).

While he wants to arrive at the house of God, Rolston does not want to follow the path blazed by the *physico* theologians of classical dynamics who argued from design. Even though we may observe that biological evolution involves creativity, he says this is insufficient reason to posit a creator. Even though there is genesis, there may or may not be a Gcnitor (p. 22). Would it not follow to say that even though we may observe that there is valuing in nature, this is insufficient evidence to posit a divine valuer? It seems that Rolston points us toward a divine destination, but once on the trip we discover the bridge is out.

Along with the design argument for the existence of God there are other issues. For instance, Rolston forces us to consider the relationship between divine creativity and nature's creativity. He forces this issue upon us by implying that, whereas religious people in the past had assigned genesis to God, we now find that genesis is intrinsic to nature. The creature is now the creator. The obvious implication of this is that divine creativity is not fixed and final. The evolutionary development of living species is testimony that there was no original creative act that is now over and done with. Creation continues. We can only ask whether this *creatio continua* is merely intrinsic to earth or is also in some sense divine.

This, then, brings us back to the central issue, namely, God's relationship to the ongoing creative activity of the world. We assume that God is creative. Now we find that nonhuman nature is creative. More than that, with words such as "fertility" and "fecundity" Rolston believes that creativity is a value intrinsic to nature. This would mean then that creativity in itself has the potential of sacredness. And, still more, this implies that sacred creativeness.

ity escapes the limitations of human province. Creativity belongs to nature as a whole, not merely to the human role within nature. In short, we human beings no longer have a patent on bearing sacredness in our world.

This adds a factor to arguments raised earlier by theologians such as Teilhard de Chardin or Philip Hefner for whom the *imago dei* consists primarily in human creativity. Hefner's precise designation is that we humans are "created co-creators" with God. Although Rolston does not address the issue of the *imago dei* directly, it would be useful to know whether he believes the *imago dei* as creativity belongs to nature as a whole and not merely to human nature.

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**In the event that we wish to locate a connecting point between God's creativity and the world's creativity, is there warrant for a genesis that takes us beyond the genes?**

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If Rolston's answer includes non-human nature, then we must ask about the relation between genetics and culture: Is there a moral obligation to conform human culture to the values already intrinsic to nonhuman nature? Is there warrant for us to pursue values at the level of culture that go beyond or perhaps even contradict the values intrinsic to genetic activity? Or, to draw this question out theologically, does creativity at the level of culture sufficiently distinguish human from nonhuman nature to justify only human identification with the *imago dei* to the exclusion of, say, genes that partly constitute human beings?

My motive for posing these questions comes from the nontheological conclusion to Richard Dawkins's book, *The Selfish Gene* (New York: Oxford University, 1976). Dawkins writes,

We have the power to defy the selfish genes of our birth, and, if necessary, the selfish memes of our indoctrination. We can even discuss ways of deliberately cultivating and nurturing pure, disinterested altruism—something that has no place in nature, something that has never existed before in the whole history of the world.

Dawkins appears to be positing a level of creative potential for human culture that extends well beyond the fertility and fecundity of nonhuman nature, a capacity for producing new values hitherto unforeseen in prehuman history. It is instructive that the value on which Dawkins focuses is altruism, a value which Christians hold to be divine. "No one has greater love than this," says Jesus, "to

lay down one's life for one's friends" (John 15:13). Jesus even goes further. He asks us to love our enemies. And he goes yet further when he himself lays down his life as a ransom for many. As truly human and truly divine, the New Testament dubs Jesus Christ the true *imago dei*. Self-sacrificial love belongs to the divine nature itself and calls us humans to transcend our past and to embrace God's future by embodying such a love in our day to day lives.

With this in mind, I ask Professor Rolston if we can distinguish between value in general and specific values, such as altruism. Or, in parallel fashion, can we distinguish between creativity in general and the creation of certain things, such as altruism. If we can make such distinctions, then would it be enough to identify divine sacredness with value in general or creativity in general? In the event that we wish to locate a connecting point between God's creativity and the world's creativity, is there warrant for a genesis that takes us beyond the genes?

## A Moral World "Red in Tooth and Claw"

Margaret R. McLean

Earth's crammed with heaven, and every  
common bush afire with God:  
But only he who sees, takes off his shoes,  
The rest sit round it and pluck blackberries.

—Elizabeth Barrett Browning, *Aurora Leigh*

This response to Professor Holmes Rolston's expansive and challenging paper is, in many ways, interdisciplinary because I am interdisciplinary. I am a scientist by training, a theologian by conviction, and an ethicist by sheer strength of will. My response to *Genes, Genesis, and God in Natural History* is to Rolston, but also it is a conversation with myself.

The conversation partners, biology and theology, are both firmly established as basic components of human activity. Theology and biology are neither exclusive realms nor reducible one to the other. Both involve assertions about reality—theology speaks from above, biology from below. Indeed, biology and theology are "troublesome to join" but the conversation must indeed be joined, troublesome or not. Ethics lives and breathes precisely at the heart of this conversation. Ethics is an attempt to converse in a reasonable fashion about morality.

The danger is that conversations with an ethical component often fall victim to wordy sword play because of the lack of a common language.<sup>1</sup> In his weighty volume *Whose Justice? Which Rationality?*, Alasdair MacIntyre asserts that the words "justice" and "rationality" are necessarily vacuous unless they are carefully and clearly defined, because the terms themselves carry a spectrum of historical and contemporary meanings.<sup>2</sup> We do not have ethical conversations; we have ethical confusion. When biology and theology are added to the mix, this Tower of Babel looms large indeed. Those of us involved in the conversation need to acknowledge and remember this.

I have pursued many paths through this manuscript. In the end the trail that has become the most attractive to me pushes the biological and philosophical boundaries to ask how we are to make our way in this world. In a moral world "red in tooth and claw," if you will (p. 11), how are we to live? If all of creation is pregnant with value, we humans must make valuable choices. We can no longer

take a sterile walk through nature, but must really see and feel the ground we cover. This is not a value-free world, but one dripping with choice. How does *Genes, Genesis, and God in Natural History* help us here?

All aspects of our lives have a moral dimension. This is not to say, as Rolston observes, that atoms, molecules and cells choose the true or the good. Genetic "selfishness" implies that "the stuff of life" could, and should, be other than it is. Humans choose and molecules do not; humans are moral beings and genes never can be. As Christians, we assert that the whole moral truth is never coextensive with any humanly constructed moral system; the Creator can know in a way that creation cannot. Moral systems tailored by and for humanity circumscribe our finitude and when truth and falsehood, good and evil, take center stage in the moral drama we are left to ask: "Whose truth? Which falsehood?"

In *Genes, Genesis, and God in Natural History*, the moral spotlight falls on the intrinsic value of wild nature—"perhaps there is no selfishness in nature, rather there are values shared" (p. 18). The central value is *survival*, or reproduction and fertility.

We want a genetic account in a deeper sense, one that tells the full story of the historical genesis of value. The history of Earth, we are claiming, is a story of achievement, conservation, and sharing of values. Earth is a fertile planet, and in one sense, fertility is the deepest value category of all, one classically reached by the category of creation. (p. 21)

Resting as we are in the shadow of Babel's tower, we must question the use of and the presuppositions underlying "value" terminology; but, for the sake of this discussion, let us take Rolston's assumption that value is an intrinsic part of whatever it is that has value and that "value" implies "objective, nonanthropocentric values in nature... that are defended and distributed by wild creatures in their pursuit of life" (p. 14). This is the "axiological paradigm" which Rolston claims is "objective and natural" (in contrast to the "subjective and humanistic" ethical one). Rolston describes a world of "self-actualizing, value conserving genes" in which values are shared, a world in which "[t]he fauna and flora do not so much love propagating themselves, as propagating their know-how," a world of "epistemic biology" (p. 14). The adjective here is significant. "Survival" (and, by implication, reproduction and fertility) has taken on an epistemological function; it has become the "lens" through which all other values are defined.

Rolston makes clear that sociobiology is "wearing its morally colored eyeglasses," but axiology is also a shaded lens through which the world is viewed. Although he acknowledges that environmental axiology is itself an "interpretative scheme" (p. 14), he has neglected to examine

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the underlying presuppositions and implications of this value-based paradigm. Like sociobiology, "epistemic biology" has its own pair of interpretative lenses. No facts remain uninterpreted; no unfiltered light reaches our corneas.

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**Rolston has urged us to walk barefoot through wild nature, to be dazzled by creation, to see a world created and creating, to witness "an earth crammed with heaven" and to ask how it is that we should value this Earth. Once the value question is properly acknowledged, I place a second question along our path: How then are we to live and survive within this value-laden Earth, filled as it is with moral conflict and with choices?**

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This being said, let us put on Rolston's axiological eyeglasses which render a world of a shared value in which "every living thing defends its intrinsic value" (p. 15). This defense of one's intrinsic value is commonly termed "survival value," better interpreted as valuable information, coded genetically, that is "apt for 'living on and on' (*survival*)" (p. 21). If every living thing has intrinsic value and survival is the absolute value, then how are we to make our way when *all* cannot survive? What is the logic involved in mediating one survival or another? May I not sacrifice my survival for a higher good? Clearly, "there are no moral agents in wild nature even at the organismic level, much less the genetic one" (p. 14) and "only humans are moral agents" (p. 14), but, as moral agents, we must ask: How do we 'value' nature? We live in a world of competing values and mutually exclusive claims which cannot all be met, a moral world "red in tooth and claw." How do we finally decide *who we are* and *what we must do* within such a world?

An example which is often cited by Rolston himself may help us focus on the logic of competing values and the implications for the Earth and for morality if we conceive of "survival" as the ultimate value, the *norma normans*. The lines for the battle for survival remain etched in the rocky crags of San Clemente Island off the coast of Southern California where "imported" goats vied with dwindling "native" vegetation on this isle which could not support both acrobat and food source. The vegetation lived on the verge of extinction as it was trampled and consumed by the goats. Goats and plants both could not survive this ecological confrontation—a choice "for" one implied a choice "against" the other. If nature was allowed to "take its course," the vegetation would have been decimated and lost forever; if the rooted things were to survive, the predatory goats were to suffer destruction at the hands of the humans

who brought them to their island home years ago. To absolutize "survival" seems of little help for rooted and hoofed creatures could not both survive on San Clemente Island.<sup>3</sup> How do we as moral agents choose which species shall live when not all can survive?

As we stumble barefoot along Earth's paths, we are showered with many such deeply troubling moral conflicts. A duty not to kill may come into conflict with a duty to protect innocent life from aggression—a dilemma which has overshadowed us during this crisis in the Persian Gulf. In the case of goats and plants, this conflict of duties could be recast in terms of a duty not to kill animals (except perhaps for food and warmth) and a duty to protect vanishing species from extinction. How is it that we are to decide who will survive?

Tom Beauchamp and James Childress in the third edition of their classic work, *Principles of Biomedical Ethics*, offer a useful approach to such a decision-making crisis.<sup>4</sup> They defend the thesis that rules and principles are binding but not absolutely binding, and they construct a "composite theory" which allows each basic principle to carry ethical weight without assigning a priority weighting.<sup>5</sup> No principle is absolute. Which principle trumps in the case of conflict depends on the particular context. Basing their composite theory on the *prima facie* duty theory of W.D. Ross, Beauchamp and Childress offer four requirements for justified infringements of a *prima facie* principle or, for this discussion, a "*prima facie* value":

- 1) the moral objective justifying the infringement must have a realistic prospect of achievement;
- 2) infringement of a *prima facie* principle must be necessary in the circumstances, in the sense that there are no morally preferable alternative actions that could be substituted;
- 3) the form of infringement selected must constitute the least infringement possible, commensurate with achieving the primary goal of the action; and
- 4) the agent must seek to minimize the effects of the infringement.<sup>6</sup>

The second condition seems the most troublesome—it asks us to weigh the survival of green species against the death of the goats. Is the value of species diversity enough to trump the value of life itself, the value of fertility and survival?

Solving this moral conflict is beyond the scope of my remarks, but a critical point is to be made. Insofar as an act involves that which is wrong-making, such as killing, there is always good reason to avoid it. But a wrong-making act such as killing may be the only path leading to the fulfillment of other "*prima facie* values" such as survival of endangered species. Was such the case on San Clemente Island? Was the loss of goat lives necessary for the protection and survival of the ecological whole? Must we always act on the basis of "survival" (which, in this case, renders us paralyzed), or can we perhaps act on "love"—loving and respecting the Earth for its own sake? The composite theory

of Beauchamp and Childress helps us to make our way by giving us terms and criteria for making choices. Nature is neither random nor blind—neither is morality and the decision-making it requires. In wild nature, intrinsic values conflict and we need to decide how it is that we are to "oversee this panorama of natural history ..., rejoice in it, and conserve such created wildness" (p. 15).

Value-oriented theories, such as environmental axiology, can allow room for discretionary judgment, for discretionary moral agency, if such values are conceived as prima facie binding rather than absolute. In the case of a conflict of values, in a moral world "red in tooth and claw," we finally must decide and absolute values seem of little help. Rolston has urged us to walk barefoot through wild nature, to be dazzled by creation, to see a world created and creating, to witness "an earth crammed with heaven" and to ask how it is that we should value this Earth. Once the value question is properly acknowledged, I place a second question along our path: How then are we to live and survive within this value-laden Earth, filled as it is with moral conflict and with choices?

#### NOTES

<sup>1</sup> See Jeffrey Stout, *Ethics After Babel* (Boston: Beacon Press, 1988).

<sup>2</sup> Alasdair MacIntyre, *Whose Justice? Which Rationality?* (Notre Dame: University of Notre Dame Press, 1988).

<sup>3</sup> The Fund for Animals was able to live-trap many of the 2000 feral goats on San Clemente Island, thereby rescuing them from the Navy's guns.

<sup>4</sup> Tom L. Beauchamp and James F. Childress, *Principles of Biomedical Ethics*, 3rd ed. (New York: Oxford University Press, 1989), pp. 47-55.

<sup>5</sup> *Ibid.*, pp. 51-55.

<sup>6</sup> *Ibid.*, p. 53.