CHANGING WORLDVIEWS: RESPONDING TO BETTY BIRNER AND ROBERT MASSON

by Mary Gerhart and Allan Melvin Russell

Abstract. Worldviews are changed by higher viewpoints that can develop by *metaphoric process*, the equating of two formerly disparate known concepts. The equating results in a distortion—a tectonic reformation—of the associated fields of meanings that effects a rearrangement of associated concepts leading to new cognitive relations. We comment on reviews of our books *Metaphoric Process* (1984) and *New Maps for Old* (2001) by Robert Masson and Betty Birner. Metaphoric process may further understanding of the formation of diverse worldviews and their reconciliation.

Keywords: analogy; bidisciplinary; fields of meaning; higher viewpoint; George Lakoff and Mark Johnson; linguistic metaphors; metaphoric process in science and religion; metaphors of thought and action; ontological flash; tectonic reformation; stereoscopic view; worldview.

Metaphors fascinate. They fertilize language and reconstruct mentation. Their source is as inscrutable as the Nile River's used to be. The mystery of their origins began to be unraveled in the twentieth century and continues today. At first, attention was given to their appearance in poetry, the fine art of language. Then, interest in the everyday use of English focused on the metaphors heard in coffee shops and offices. The shift to interest in the metaphors of everyday language started with scholars such as Philip Wheelwright (1954) and Max Black (1962). With *Metaphors We Live By* (1980), George Lakoff and Mark Johnson brought metaphoric analysis to casual conversation after it had long been applied primarily to poetry and literature.

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A central theoretical question remained, however, a question that had little to do with speech and writing. What was the *process* by which new understandings about the world came into existence? Lakoff and Johnson, in the first chapter of *Metaphors We Live By*, wrote, "We shall argue that . . . human *thought processes* are largely metaphorical" (1980, 6). But they never returned to those processes, choosing instead to examine verbal metaphors. Arthur Koestler in his film *Koestler on Creativity* (1971) hazarded the view that new understandings came by way of a "combinatorial act," a shaking together (*cogitari*) of ideas "previously strangers to each other"— "bisociation" he called it. This sounds a lot like making metaphors, but there is a difference. The transferant use of words carries the referent meanings to new linguistic locations and makes novel associations, but words are rather easily uprooted, and their application elsewhere does not leave much of a mark on their original associations. Something stronger is happening when worldviews are transformed.

Our search for the process by which new understandings arise led us to a combinatorial description with which Koestler, we believe, would have agreed. We call it *metaphoric process,* and we used the term as the title of our 1984 book. The book's subtitle is more informative: *The Creation of Scientific and Religious Understanding*. The words "scientific and religious understanding" directed the action toward a person's worldview (in German, *Weltanschauung*). The role of metaphoric process in changing how we think about the world has informed our understanding of how a new generation is able not only to express itself in ways different from their forebears but also to think in ways different from the ways their teachers thought.

Knowledge-in-process involves learning something new, and that process has two major methods which need to be understood as distinct. The most common process, which Koestler made use of, may be called *analogic* thinking. The far less common process involves *metaphoric* thinking. These two processes can be distinguished both by the way they occur and by what they accomplish.

Analogic thinking takes place when something *A* we don't know is found to be *like* something *B* we do know. Analogic thinking gives us new knowledge by transferring some of what we know of *B* to the unknown *A*. Most instruction and indeed most metaphors are of this form.

By contrast, metaphoric thinking takes place when something *C* we *do* know is found to be *the same* as something else *D* we *also know*. Most realization, or gestalt experience (which we sometimes call an ontological flash), is of this form.

Now, the cases of realization of greatest interest to us are not the merely cognitive accomplishments. We search for the truly revolutionary transformations—what we have called transitions to a *higher viewpoint*, a state

of understanding that transcends the discrete knowing of the two precursors (*C* and *D*). Notice that *C* and *D* remain unchanged by this process of equating: they continue to appear separately to be different. This conundrum is solved by the model of binocular vision described in chapter 3 of *New Maps for Old* (Gerhart and Russell 2001 [excerpted in this issue; see p. 16])—two different views that together create a new three-dimensional view without any change taking place in the original views. The higher viewpoint reveals a new dimension of understanding.

We appreciate this opportunity to comment on Robert Masson's and Betty Birner's readings of our work [see pp. 39–62 in this issue]. It is in conversations like these that leaps of clarification and improved understandings can occur. Masson reports finding tools to use in his research project, and Birner has responded with a description of our work as she understands it which allows us to comment in ways we think are productive.

Robert Masson, as a theologian, is right in the middle of the bidisciplinary conversation from which our work grows. With respect to his explication of our work, we are reminded of Schleiermacher's observation that an intelligent interpreter may discern the direction of authors' thoughts better than the authors themselves. Masson's grasp of our distinction between analogical and metaphoric process, his sorting out the various fates to which we think metaphors are subject, and his spelling out of the different ways different people can "take" the results of a metaphoric change in meaning come to mind. We are pleased that he sees the possibility of developing a research program that makes use of metaphoric process. The question he poses—"Does metaphoric process in fact explain better than other available theories key aspects of religious convictions and theological understandings?" (p. 57)—supports our own expectation that, once understood, it might help, as Masson writes, to "resolve significant theological controversies," explain "the conceptual moves of specific theologians," clarify "conceptual moves in a number of different traditions" and "facilitate more productive dialogue across confessional and convictional lines" (p. 57). We look forward to seeing the extent to which his work is able to illuminate other, more widely known, debates, beyond the example he provides. Moreover, we would like to think that metaphoric process may be as useful in philosophy of science as in theology, given the dearth of critical reflection on the productive function of metaphoric process in science. Later we give an example of metaphoric process from a recent article in *Science*.

Betty Birner assesses our work from the perspective of linguistics. We find her comments no less stimulating than Robert Masson's but of quite a different kind.

METAPHORS AND METAPHORIC PROCESS

Birner makes a useful contribution to our discussion when she writes, "there are two ways to approach metaphor: as a linguistic phenomenon and as an issue of cognitive structure" (p. 41). We would like to expand this bipolar constraint to include a third way.

Imagine a linear continuum (Figure 1) with "purely linguistic" metaphors on the left. In the center is a group characterized by Lakoff and Johnson (1980, 153) as metaphors that are "primarily a matter of thought and action and only derivatively a matter of language." On the right are metaphors that are essentially not a matter of language at all. Indeed, the evidence for the existence of these metaphors is linguistic only in the sense that something has changed in the way some people think, act, and speak. Arguing for a new worldview usually generates more resistance than conversion. The change requires an experience of insight, something akin to what we have called an ontological flash. Because the change is in thought and secondarily in action, the title of the third chapter of *New Maps* calls the effects of metaphoric process "The Tectonic Reformation of Worlds of Meaning" (see excerpt, pp. 24ff. in this issue).

The distinctions laid out in our diagram show why Birner's charge of our making "erroneous assumptions" (p. 43) is misplaced. Birner complains that in our theory the construction of metaphors is not "a basic method by which each of us comes to understand our world" as are other theories such as that of Lakoff and Johnson (p. 43). But ours is not a general theory of metaphor. And Lakoff and Johnson's theory cannot account for the examples of metaphoric process we have found in science and religion. Neither theory should be faulted for what it was not designed to do.

What Is Metaphoric Process?   When we first started working together, a central question on historical instances of radical change in either science or religion was, How does the conceptual structure that represents the understanding of a complex of ideas change when the understanding of the complex is improved (the move to a higher viewpoint)? As we worked

(art/poetry)	(everyday speech)	(sciences/humanities)
Linguistic Metaphors	**Metaphors of Thought and Action**	**Metaphoric Process**
(images/words)	(analogical conceptions)	(worldviews)

Fig. 1.   Different kinds of metaphoric activity on a continuum (left to right). Top line: Likely venues of metaphoric activity. Middle: Names given different types of metaphoric activity. Bottom: Vehicle of metaphoric expression.

on this question, Allan began drawing pictures and folding the paper (see Gerhart and Russell 1984, 112–13, Figs 6.3 and 6.4) in an effort to express the changes we were talking about. An experimental physicist, he is a strong proponent of visual thinking (see Arnheim 1964).

We needed a way to describe what we were doing with the patterns of words we had begun sketching on paper. Aware that we were forcing associations that were beyond convention, we started to call our new arrangements "metaphors." We knew that we were not making analogies: heat is not at all *like* motion, heat *is* motion (Benjamin Thompson). We realized that the associations involved rigid equivalency between concepts (the connections that required the bending and folding) that were not analogically related. We therefore shifted our emphasis to a description of the *process* of distorting these "fields of meanings" and chose the adjective "metaphoric"— hence, "metaphoric process."

Most change in meaning occurs across fields of meaning by way of analogy. Individuals acquire new knowledge by saying that something is *like* something else. In James Tate's poem "Entries" (quoted in Tracy 1981, 446), someone's experience of being unable to see similarities is described as being analogous to the experience of becoming "speechless, cold" and "turn[ing] silver." Being able to make an analogy, by contrast, makes one "happy, full of wisdom, loved by children/ and old men alike." Analogies are the stuff of everyday communication even before they are the stuff of literature and the arts.

We found metaphoric process to be a different beast. We think that Masson gets it right when he describes metaphoric process as "a key mechanism often involved in extraordinary advances in science and religion" (p. 49). Our discovery of what he calls "the explanatory scheme" (p. 49) came in the early years of teaching courses in science and religion to undergraduates. At that time several authors publishing in the then-new field of science and religion (Ian Barbour [1974] and Earl MacCormack [1981], among others) were discovering the prevalence of models and metaphors in science and religion. This development seemed to us to be helpful but inconclusive with respect to the larger issue of how science and religion shared not only linguistic structures but also cognitive strategies for creating new meanings.

What Metaphoric Process Is Not. Masson and Birner have different readings of our theory of metaphor. Masson emphasizes the distinction we make between analogy and metaphor. Birner does not pick up on analogy. Birner's reading is not the first time that our work has been misunderstood by linguistic analysts as being like that of Lakoff and Johnson.

The first time was in a conversation with George Lakoff himself, thanks to arrangements made by the Center for Theology and the Natural Sciences (CTNS, Berkeley) for our Fellows' Lecture in 1992. Lakoff at the

time was as surprised as we were at the large differences between our respective theories of metaphor.

Our most recent engagement with a group of linguistic experts on the subject of metaphor was in the birthplace of Nicholas Copernicus—Torun, Poland—where we were keynote speakers for a 1999 conference on Metaphor and Cognition. We enjoyed the opportunity of pointing to Copernicus' employment of metaphoric process in his assertion that the Sun, not the Earth, was the center of the universe. A discussion with a group of Polish graduate students who were writing dissertations from the perspective of Lakoff and Johnson began with the presumption that our theory of metaphor had much in common with that of Lakoff and Johnson. Subsequent discussion showed this not to be the case. Lakoff and Johnson's theory is basically linguistic, even though it goes beyond the conventional description of metaphor as "simile without like or as" and addresses metaphoric language use in our culture (hence, *Metaphors We Live By*) rather than its use in literary texts. Our theory also goes beyond the conventional definition. But ours is not so much linguistic as it is epistemological and cognitive. Our conversations with linguistic experts on metaphor uniformly result in the same conclusion: that although we often use the same words as linguistic philosophers, we are talking about different activities.

The decision to use "metaphoric process" in the title of our 1984 book was a considered one, made in consultation with our publisher. However, it quickly became a problem for reviewers (and probably some readers) who had difficulty with the distinction between the results of metaphoric process (results to be understood more at the level of cognition than of language) and the more conventional metaphors of speech. To clarify this problem of the use of *metaphoric* as an adjective for *process* we offer the following analogy.

The relation between *a metaphor* and *metaphoric process* is analogous to the relation between *something that is due* and *due process*. What is due is a debt, and due process is a procedure that follows a set of rules (usually in the law). Now, *due process* is also understood as the right of an accused and therefore also in a sense something owed, or due, the accused. But that sense of *due* is not identical with the concept associated with the remaining amount on a charge account when the minimum payment is made. This analogous linguistic usage may help to explain our emphasis on changing thinking processes rather than on words. And we continue to have good conversations with our friends in linguistics.

The core of our concern is knowledge-in-process, a dynamic epistemology that, along with our diverse experiences, controls the worldviews of persons. Worldviews are a very serious matter, much more serious than the fine points of academic discussion might lead us to believe. It may turn out to be the case that the more a worldview is outside the mainstream—for example, a worldview that would inspire a person to detonate

a truck full of explosives parked in front of a government office building in Oklahoma City or to fly a jet airliner fully loaded with passengers into a 110-story skyscraper—the more likely it is the result of some form of metaphoric process, a process we more and more need to understand.

Our examples of metaphoric process are drawn from the history of science and of major religions—institutions of inquiry and knowledge that play large roles in our culture. The first clarification we need to make is that metaphoric process does not create linguistic metaphor. Moreover, when a particular instance is described it rarely if ever evokes the thrall of a good linguistic metaphor. One of our favorite scientific expressions of metaphoric process in science is Isaac Newton's understanding that the laws of heaven (Johannes Kepler's laws of planetary motion) are the same as the laws of Earth (Galileo Galilei's laws of terrestrial motion). Both of these sets of laws were known. Newton devised a calculus that showed them to be equivalent. We realize that such an expression lacks the appeal of a good verbal metaphor, but our need is for an unambiguous description, and verbal metaphor does not meet this need.

Birner describes metaphoric process well when she notes that "the resulting topography [of the field of meanings] favors neither of them [the concepts being equated]" (p. 42). However, she disagrees with the accuracy of our theory, contrasting this conceptual equivalence with Lakoff and Johnson's view, in which, she says, "metaphor is directional" (p. 42). We would agree if Lakoff and Johnson's examples were identified as analogies rather than metaphors. For us this directionality is a matter of being instructional: analogies tells us that something we don't know (very well) is like something we know (better). Even though Lakoff and Johnson's examples conform to the conventional definition of metaphor as a simile without *like* or *as*, in our analysis they are analogical (directional) rather than metaphoric (equivalent).

Moreover, the "directionality" of analogies in everyday language may be more ambiguous than the examples that Birner cites ("Mary's a peach," "happy is up" [p. 41]). To make the point, Birner contrasts *happy is up* with other everyday expressions—*I'm feeling down, I'm down in the dumps*. But "happy" also can be down, and "up" can be unhappy; for example, *screwed up, I'm upset, run up a bill, lock 'em up! tear it up, that was made up, give up, it went belly up*, and *it's all up in the air* do not draw on the happy-up conceptual complex, while *down home, down to earth, got it down pat*, and *calm down* all seem rather upbeat.

For Lakoff and Johnson, one of the prizes was "Argument is war"—basically a category that houses dozens of examples (see pp. 64, 79–86, 105, 115, 117, 156, 171). It fits Birner's description of being one-way, the more abstract *argument* being metaphorized or understood in terms of the of the less abstract *war*. Unlike metaphoric process, this metaphor is not bidirectional or symmetric. Would anyone want to claim that "War is argument"?

Further Notes on Examples of Metaphoric Process

For us who work in the bidisciplinary field of science and religion, the important issue is whether metaphoric process can be understood as a route to higher viewpoints—especially those leading to new worldviews. The severe problems that exist between different groups of human beings in the world may, at least in part, be expected to yield to higher viewpoints from which ideas that had seemed irreconcilable may be seen to be related or even the same.

Consider two groups of people. One group wants a piece of land preserved as holy ground; the other wants to farm it. Their concerns, one for worship and the other for food, seem utterly disjunct. Then someone asks, "What do you think God would want us to grow on God's land?" This question, containing a new concept, sacred space = farm land, may cause the conversation to change and new ideas to emerge. Although such an outcome may seem impossible, the example does wrestle with the situation of needing, and a strategy for possibly achieving, a higher viewpoint—a name that carries the implication of an integrated, more complete, better worldview.

Within a Discipline.   Persons not working in science and religion are inclined to think that metaphors, while important in religion, play a minor role, if any, in science. That such is not the case is illustrated in *Science*, the dominant weekly science journal published in the United States. A recent issue featured an essay titled "Natural Enemies—Metaphor or Misconception?" by M. K. Chew and M. D. Laubichler. The subtitle is particularly interesting: "Interpreting phenomena in human terms is a two-edged sword, generating knowledge as well as opening the door to troubling misunderstandings" (Chew and Laubichler 2003, 52). The article drew letters from people in various disciplines. As we read the article and the letters, we found most of the things called metaphors to be analogic (where an unknown becomes known better or known for the first time) rather than metaphoric (where one known is shown to be the same as another known thought to have been different). However, there was one exception—the etymology of *ecology* referred to in the essay itself: "Ernst Haeckel self-consciously exploited the metaphorical currency of its Greek roots, '*oikos* and *logos*,' in defining ecology as the science of the 'household of nature'" (2003, 52). Even though it was not discussed further in the article, this conception seemed to us to signal a higher viewpoint. This higher viewpoint, in turn, is the effect of metaphoric process, which brings together the fields of meanings (in this case, the fields of *household* and of *nature*) in which the known elements in question are embedded, thereby changing the relations among a host of neighboring concepts (in this case, living arrangements, environment, available resources, and populations of living things) and ultimately our worldview.

In an interesting coincidence, Birner and Masson offer different understandings of the same claim, namely, *Jesus is the Messiah*. Masson addresses this claim as a paradigmatic example of metaphoric process, together with the possible meanings that come about through the frame of metaphoric process. Birner affirms our view that theory generally plays a role in many forms of knowledge-in-process, but she does not address the metaphoric possibilities of the statement.

Between Disciplines—Bidisciplinary Dialogue.   We do not claim that science and religion together constitute a metaphor, even though we do affirm that science and religion share commensurate epistemological processes. Nor do we think of science and religion as genres, as Birner writes. We see them instead as fields of meaning each composed of several genres (see Gerhart and Russell 2001, 82, Table 1). In *Metaphoric Process* (1984) we do ask the question whether seeing the world through "binocular vision"—that is, from the perspective of science and religion together—yields a higher viewpoint. We think that such seeing does result in a significantly more complex understanding of the world. What we hope to have provided is a theoretical structure in which higher viewpoints in both scientific and religious understanding are better understood.

We may not have clearly expressed our understanding of the relationship between science and religion in our first book, but in chapter 8 of *New Maps for Old* (2001), "Mathematics, Empirical Science and Theology," we propose a more developed view of religion and science by making explicit the role of mathematics in science (see excerpt, pp. 31–37 in this issue). We describe the three disciplines as being relatively autonomous with respect to their questions and their choice of methods and topics. The relationship of science to religion is illuminated by the relationship of science to mathematics. Empirical science, with its own questions, methods and topics, prospects in old and new mathematics for whatever is useful to it. So, too, theology, with its own questions, methods and topics, prospects in old and new science for whatever is useful to it. Notice further that when it comes to mathematics, discovery is particularly problematic. Because modern mathematics is not an experimental science—not a part of (modern) natural philosophy, and rather more of a game—it leans toward inventiveness. For Einstein, Riemannian geometry was a means of "doing" general relativity. The mathematics was new for Einstein, but it was a mathematical achievement that existed before he did. For Einstein, Riemann's work was a discovery—of a means to an end; for Riemann, the geometry was probably more of an invention. Both science and theology are more likely to speak of discoveries (or revelations) than of inventions.

THE GOAL OF METAPHORIC PROCESS: A HIGHER VIEWPOINT

We say that at its best metaphoric process leads to a higher viewpoint. We think our best analogy is that of stereoscopic vision in which two two-dimensional images can merge to create a three-dimensional representation of what is being viewed. To say that we have a new understanding satisfies the efficaciousness criterion discussed by Masson but not, by itself, the criterion of truthfulness.

One might ask why we have been engaged in this inquiry into the processes by which human beings change the way they think. At first we were responding to our own curiosity about the roots of change in our respective disciplines, religion and science. Then we came to see that the mental activities engaged in knowledge-in-process were not different in our two disciplines.

We have seen the results of what we believe are great divergences in the worldviews of human beings. Possibly these differences were there previously, and the requirements of living in what is increasingly becoming one world served as a kind of photographic developer of latent images and understandings that have always been there. Whatever the reasons behind the destructive concatenation of these diverse human viewpoints, we think metaphoric process will contribute to the fostering of worldviews that can coexist in a peaceful world, a world in which dissent, disagreement, and divergent interests are resolved by processes that yield higher viewpoints.

This hope is the framework for the following statements about truthfulness made in the introduction to *Metaphoric Process*. It is also the framework within which we take up Birner's and Masson's comments on evaluation in relation to metaphoric process.

In the nineteenth century, when broad achievements in science led enlightened intellectuals to challenge religious dogma, it was thought that religion would have to undergo radical change if it was to exist in collaboration with science. Religion would have to become more "scientific" if you will, for, after all, was not science the only road to true knowledge?
The battle was to be waged on the classic philosophical field of the true and the false. But that field was found to be a quicksand bog in which no discipline could get a footing. (p. 8)

. . . We think that issues of the true and the false have prematurely been allowed to becloud issues of process, that an understanding of what is true must presuppose an understanding of the process of understanding itself. (p. 10)

Whatever the question, whatever the claim, the response must be that justification is to be found in and through an examination of human experience. Without experience there can be no theory and no understanding. And without experience there can be no verification and justification. (p. 11)

In one sense we have defined the product of metaphoric process to be necessarily a higher viewpoint. Like a classic, a higher viewpoint, by definition, withstands the test of time. Nevertheless, this definition does not

mean that a higher viewpoint resulting from a metaphoric process at a specific time is permanent. Just as a classic can later be demoted to being a period piece, a higher viewpoint can lose its wide affirmation and become just one of the examples of historical metaphors that for a significant time shaped prevailing views. Like classics, higher viewpoints comprise statements judged to be true and false, right and wrong, but they are affirmed to be classics and higher viewpoints for more complex reasons. It might be fair to say that the goal of metaphoric process, the higher viewpoint, is not judged only on the basis of logical tests for true or false assertions, because it seeks a comprehension of reality. On the issue of evaluation, then, we are less confident than Birner that metaphors *in general* are evaluated "by the extent to which they result in new insights and improved understandings." We think that this claim (which also applies to but does not exhaust the grounds for metaphoric process) applies to metaphors, not in general, rather rarely, and not to the ones she offers. Examples of evaluation provide, at best, a slippery basis for generalizations.

On the same issue, we would resist Masson's interpreting the ontological flash—that special experience that engenders confidence in what is known—as a criterion for validating metaphoric process. Although we characterize the ontological flash as an experience that cannot be gainsaid, we perhaps were not clear in emphasizing that for us it remains on the level of experience. We think that the confidence that accompanies the ontological flash is an affect of the experience rather than a criterion for validity.

Metaphoric process is perhaps the most distinctively cognitive way by which our understanding of the world can reach a higher viewpoint. Higher viewpoints also can originate in certain experiences: a shocking betrayal that has made a large part of one's world unreliable, a rhetorically powerful communication (Lincoln's Address at Gettysburg, for example, or one of Winston Churchill's speeches during World War II), hearing about an extraordinary event in history (such as the destruction of the World Trade Center on 11 September 2001), a visit to a country with a culture different from one's own, or a personal experience of mortality (relative, friend, or stranger). While claims about these experiences can be argued for their logical truth or falsity, it makes little sense to think of the resulting change in worldview as logically true or false.

In *Metaphoric Process*, we treat such experiences generically under the rubric of ontological flash, which we define as "a surprising experience that creates conviction." These experiences and the conviction that accompanies them are experiences on the level of immediacy. For this reason, the worldview resulting from metaphoric process or an ontological flash is subsequently subject to the same tests of validation and verification as is a world understood by any other means.

On the whole, our work emphasizes what Gerald Holton (1973) called "S_1" or "private science" as distinct from "S_2" or "public science." We

choose to emphasize S_1 and what analogously we call R_1 because, with Holton, we think that experience in both science and religion has been neglected. A good part of the field of science and religion has had to do with comparison and contrast of the means by which public meanings in each discipline are validated and come to be verified. But treatments of both validation and verification presume that some kind of experience has been understood. We do address issues of validation and verification (see especially Gerhart and Russell 1984, chap. 9, "Truth and Theory," and 2001, chap. 11, "Myth and Public Science"), but we are more interested in how experience in the sciences and experience in the religions comes to be understood. However important and necessary in both science and religion, validation and verification are not our main foci of investigation. Masson is correct, we think, in his belief that "the criteria for making such judgments [regarding truth] involve fragile and tentative interpretive implications" (p. 54). And so we affirm—with both Birner and Masson— that the worldview created by metaphoric process must subsequently be subject to the tests of further experience and outcomes.

Here the feminist practice of asking, For whom is something true, advantageous, or good? is useful. Birner is correct in pointing out that we do not belabor the dangers of metaphoric process (although we do not ignore them). Asking the further question, For whom is it good? is not an explicit part of our theory of metaphoric process, although one must ask if in fact a particular higher viewpoint makes the world more intelligible for oneself. To evaluate a worldview more generally—to ask, For whom is a particular result of metaphoric process a better understanding?—is to enter into a different frame of analysis, more likely a field of social critique, a field whose formal focus is the reexamination of the meanings and values of any cognitively stable environment.

Does metaphoric process always and everywhere produce higher viewpoints? No, the process is no guarantee of the ultimate success of any particular cognitive reformation. How do we recognize the higher viewpoint that an example of metaphorical process may yield? We must rely on our own faith and insight and the affirmation of fellow human beings, among them scientists and theologians. Affirmation, like faith, is itself a complex phenomenon.

From a religious perspective, affirmation has been called "solidarity-in-hope." T. S. Eliot's thought, as appropriated by David Tracy, enables us to glimpse some of the components of affirmation: "There is no release for any of us from the conflict of interpretations. . . . Whoever fights for hope, fights on behalf of us all. . . . The rest is prayer, observance, discipline, conversation, and actions of solidarity-in-hope. Or the rest is silence" (Tracy 1987, 114).

It is not difficult to see scientific affirmation as including many of the components of religious affirmation: discipline, bidisciplinary research, con-

versation, and perhaps even a relationship between observation and observance. Such affirmations are the true test of higher viewpoints arrived at through metaphoric or any other process.

NOTE

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