Article

COSMOLOGY AND THEOLOGY: THE REEMERGENCE OF PATRIARCHY

by James F. Moore

Abstract. Recent developments in cosmology have enticed several thinkers to follow leads from cosmology into new possibilities in theology and philosophy. Thus, we have seen an increasing number of books and essays offering proposals for creative relations between theology and cosmology. New constructions for theology are appearing that lead us toward a new rationality in theological thinking. This rationality seems especially familiar for anyone working in feminist thought, not so much as a repristination of Enlightenment philosophy and its strongly patriarchal overtones, but rather as a new form of postmodern patriarchy that grows out of revolutions in cosmology, mathematics, and quantum physics. This sense should be tested especially by comparing these new "theologies" with other feminist visions or alternative perspectives. This comparison will not only uncover signs of a reemergence of patriarchy within the new cosmologies, but will also suggest ways in which new cosmological views can both provide a source for new creative thinking in theology and be sensitive to the best of feminist thought.

Keywords: cosmology; Mary Gerhart; Sallie McFague; patriarchy; Rosemary Ruether; Anne Schaef; Steven Weinberg.

The thesis of this essay is that the appearance of quasi-theological ideas in the work of cosmologists, while an enticing new opportunity for dialogue between theologians and cosmologists, may also be a re-visioning of traditional forms of patriarchy. This possibility is by no means surprising, as feminists have long contended that science is especially resistant to the sort of feminist critique that might lead

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to the critical rethinking of science as a discipline. To demonstrate this thesis, we will need to clearly define what we mean by patriarchy. We also will need to understand the discipline of cosmology well enough to determine at what point a feminist critique might be pertinent. Finally, we will need to consider some of the present thinking of prominent cosmologists in order to assess whether a pattern, such as patriarchy, is produced in the "theologies" emerging from that thought. I propose to look at four cosmologists who are fairly representative of the field, comparing their views with alternative perspectives that might especially reveal the patriarchal trappings implicit in their thought.

INTRODUCING FEMINIST THEORY

Feminist thinkers have demonstrated in any number of cases both the possibility of alternatives to the dominant perspective in our culture and the deep resistance of the dominant culture to accepting the validity of the alternatives. The charge, for example, that limiting studies on the effects of drugs to male subjects was unfair met with considerable skepticism—until subsequent studies showed that certain drugs have a different effect on women than they do on men (see Konner 1983). Similarly, Carol Gilligan's work on moral reasoning challenged the assumptions of Lawrence Kohlberg's work, which also was done exclusively on male subjects (Gilligan 1982). In fact, feminist thought has touched most of the academic world, challenging the notion that the dominant perspective in our culture, what feminists have called patriarchy, is the only perspective possible on any subject matter. Despite the dominant culture's consistent resistance to feminist critique, feminist theory seems now securely established and accepted.

Science, however, remains amazingly isolated from such critique, one of the last areas of thought of which that can be said. This is not to say that science is completely isolated. For example, the biologist Ruth Hubbard has argued that research programs, specifically the interest in researching DNA, are shaped by the social organization of the sciences (see Carr 1990, 73–74). Her challenge is not merely that the discipline is dominated by men but that the research methodologies are shaped by a view of science as a detached discipline of inquiry, and of living organisms as machines to be reduced to their simplest parts. This reductive approach is not a mere accident, but rather a product of a way of seeing. Critics may respond that there is no other way to proceed, but we by now know full well that there are alternatives. Still, cosmologists perpetuate the sort of

reductionism that Hubbard critiques and with it, we might assume, the dominant patriarchal perspective of our culture.

The components of this patriarchy are well enough established that we can not only accurately identify a white, middle class, male worldview but also predict with uncanny precision what might be present in the thinking of anyone who uncritically accepts this worldview. The work of many feminists might be used to give particulars to this theory, but I find Anne Schaef's work to be particularly clear and insightful (Schaef 1985).[1] She argues that there are four great pillars of patriarchy: (1) patriarchy is the only system that exists, (2) patriarchy is innately superior, (3) patriarchy knows and understands everything, and (4) it is possible to be totally logical, rational, and objective.[2] Schaef's work is valuable to us in three ways. First, she refuses to argue that the dominant perspective is essentially false. The point is not that the alternatives are necessarily superior but rather that the assumptions on which patriarchy is built are misleading and limiting. Second, she makes a careful application of this theory to what we find in the scientific world of thought. Much of what she says can thus be used to explore various views presented by cosmologists. Third, she clearly shows a connection between the components of this white male perspective and ideas of God and religion. Thus, her work is an invaluable entrée into the quasi-theological views in the popular writing of many leading contemporary cosmologists. We may also find in her presentation of a female worldview a hint of what we might expect from alternative perspectives, such as the ones I propose to consider in this essay, in terms both of what aspects are likely to shape these views and in what ways these views are likely to be attacked and dismissed.[3]

Presuming that the theory of a dominant patriarchal worldview is valid, we must not thereby infer that science is invalid or that alternatives are innately superior, even if science, especially cosmologies, does accept and reinforce the patriarchal view. If we find remnants of patriarchy living rather well in the work of cosmologists, the issue is a matter, not of denying the views of cosmologists, but rather of relating them to possible alternatives. We will be served well by keeping alternatives together in a conversation of creative tension; but that can happen only if we are able to expose and challenge the assumptions Schaef has identified as providing justification for the truth of patriarchy by showing them to be central to various cosmologists' work.

The point I am particularly interested in reaching is not merely a critique of contemporary cosmologies or even a brief look at possible alternatives, but rather a close look at the dialogue between scientists

and theologians, particularly coming to terms with the basic presuppositions of our disciplines. This discussion may be one of the most important components of our dialogue for now. We might he able to test that especially by looking at ideas of God in the work of cosmologists and setting these ideas alongside alternative perspectives.

Quasi-Theological Ideas in the Work of Leading Cosmologists

Determining how quasi-theological ideas emerge from the work of cosmologists is rather tricky since the hints and brief comments that might count as theology are usually so fragmentary that we would be hard-pressed to argue that they truly reflect the writers' thinking. In that sense, the views of cosmologists appear to be no more or less revealing on the matter of patriarchy than those of any other segment of male thinkers in our society; we might conclude that the hints of patriarchy in their work have little connection to cosmology, and even less to theology. Bold claims here seem out of place. Still, the nature of the ideas about God that do emerge from cosmologists' popular and scientific work suggest that this analysis is worth the effort. In essence, we are searching for ways to judge how ideas are formed and what impact this has on the dialogue between cosmologists and theologians.

Another difficulty in dealing with ideas of God in the work of cosmologists is that, for both personal and academic reasons, the views offered by cosmologists often reflect at least a tension with traditional theism (of whatever form). Science has been more than a cultural challenge to religious claims. Indeed, some—not all—scientists have actively sought to put that challenge in words and argument, shaping their views of God, such as they are, in ways that openly oppose traditional forms of religious belief. Some features of the "natural theologies" of the cosmologists are not merely unconscious reproductions of a cultural milieu but are intentional efforts to create views quite different from traditional religions. Thus, science is itself a cultural critique of traditional ways of thinking and acting.

The Patriarchal View of God

This essay is only a beginning to what must be a larger discussion including a host of contrary views. If science is, not merely one reflection of patriarchy, but rather, as in Schaef's depiction, the great bastion of patriarchy, then the ideas of God emerging from cosmologists should reflect the general contours of a patriarchal view of God

(that is, a view of God that fits the general patriarchal view given above). This sketch of patriarchal ideas of God, which seems to be generally accepted by feminists, includes the following component aspects:

1. God is the primary holder of power, a fundamentally transcendent being necessarily separate from the created world. An all-powerful God lets humans into the scheme only so long as God can manipulate the larger picture by God's unchanging will.

2. Thus, God is one who is in control. A number of thinkers, including Carolyn Merchant and Evelyn Keller, view God as the one who dominates nature, with nature being a symbol of the feminine (Keller 1985; Merchant 1980). In a sense, this view allows us (scientists especially) to think of nature in terms both of reverence and of manipulation. Some forms of thinking about nature as that which we must take care of continue to reflect this idea of control in which the caretaker (God is often seen in this way) forces a relationship of dependence on the created order.

3. If power and its distribution are central to these ideas of God, then related matters—notions of justice and order, laws and law-governed reality—are closely connected to divine power. God is seen as reflected primarily in these parameters of power, in the laws and order of nature. Again, God's reality is demonstrated by the ability to control. This factor is so compelling that other notions secondarily related to this become central for patriarchy and for science; it becomes, for example, important to quantify and measure so as to reach a level of objective certainty. While we are seldom so bold anymore as to claim that we can reach that certainty, we say nearly the same in thinking that God's reality is primarily reflected in order and laws and shown by mathematics and measurement—that, in a favorite phrase, all these put together must reflect the very mind of God.

4. God is male. Few will boldly argue this from science since on the surface scientists rebel against such personalizations of God. Still, their rebellion tends to reflect a dissatisfaction not with patriarchy but with traditional religion. The alternatives that arise from the work of cosmologists are likely to be abstract images of rationality that can be identified with scientific notions like force. Is it accidental that *force* is the word used for a central concept of physics and that the supposed theory of everything is a projection of science's capacity to explain all aspects of the relation between the four primary forces of the universe (see Drees 1990, 51 ff.). Indeed, those who are unconvinced that quantum cosmology can produce such a theory often appeal to the mystery of God as the most satisfactory explanation of this key set of

forces. This God is the subtle and not so subtle image of what has been taken to be stereotypically male in our culture. Schaef (1985, 16–20) argues that the ultimate aim of science is mastery over nature so that we can actually become God (the "we" generally being an almost entirely male enclave of scientists).[4]

Applying This View of God to Cosmological Ideas

We face all of the difficulties mentioned above in developing ideas of God from the work of cosmologists, but given the feminist critique we have outlined we should expect to find most of the qualities of God attributed to patriarchy reflected in ideas of God developed by cosmologists. We can observe this most clearly by developing some examples of "god-talk" from the work of cosmologists such as Frank Tipler, Stephen Hawking, Paul Davies, and Steven Weinberg.

Tipler has attempted to develop his thinking more completely than most (Tipler 1988, 1994).[5] His basic contention is that all that religious language attempts to explain can be fully explained by physical laws, which physicists are nearly able to define with complete confidence. Tipler is not so bold as to claim that these explanations are finished or could ever be completely finished. He also is fully aware that much of what is taken to be true in cosmology today is speculative, built on the assumption that what holds in one place holds consistently throughout all physical space and time. That is, cosmology is and likely always will be "underdetermined by the facts," as Mary Hesse puts it (Hesse 1980).

Given these reservations, however, Tipler continues with an extraordinary level of confidence, basing his thought on two points of growing consensus (so he claims) among cosmologists—the anthropic principle and the so-called theory of everything (Tipler 1988, 313–14). The anthropic principle—actually encompassing several, not equally accepted versions of this principle—arises from the Big Bang theory, which requires a certain set of events in order to explain the development of the universe as we know it. Tipler takes for granted that the Big Bang cosmology is the accepted description of how the universe originated. The anthropic principle in its simplest form states that the development of human life, intelligent life, requires that the elements, stars and planets, ingredients for life, and so on develop at basically the time we now suppose they happened. In other words, we have what we have because we have what we have. All this sounds pretty much like a tautology, but the logic implies a bit more. The assumption is that the probability of our universe arising in any other way than what now is accepted as true

is considerably less. That is, there is evidence that suggests that the presence of intelligent, human life requires the universe that we have. But this point is still a fairly weak point. We cannot from this conclude that developments had to be this way, nor can we assume that what we have is the only possible universe with intelligent beings. In fact, we might assume the opposite, that there can be other forms of intelligent life given the probabilities. This would surely be a slim foundation on which to revive an argument from design for the existence of God, and Tipler actually does not take that direction (Tipler 1988, 315).

Still, Tipler's view does suggest that physics and mathematics is all we need to explain everything in our universe, including the development of human life. According to this view, theology in its traditional form is superfluous; in fact, in his most recent book Tipler argues that the most genuine expression of theology is physical cosmology. And Tipler's confidence that a theory of everything is within reach for cosmologists is enough for him to argue that theology can make sense only if it is collapsed into physics, which is the only viable means for understanding reality.

If this is true, then we might wonder why Tipler would introduce god-language into his thinking at all. While Tipler argues that he is ontologically a reductionist, he admits that he is epistemologically a pluralist. That is to say, physics can explain all of reality but theology might provide a point of view and a language that helps give words to what physics has uncovered, most especially that the emergence of intelligent life in the universe requires a moral principle that once having emerged the universe must be designed so as to sustain intelligent life. That is, Tipler argues for a strengthening of the anthropic principle that assumes a teleology to the development of the universe: the universe is constructed not merely to allow the possibility of intelligent beings but with an increase in its capacity for intelligent life as the goal of its development.

Tipler's view is hardly accepted by the community of cosmologists, surely not by his sometimes collaborator John Barrow (Barrow and Silk 1990). Still, the basic components of Tipler's view of God are amazingly consistent with what we find across the board among cosmologists; despite their reluctance to accept his claims for the laws of physics, most might also argue that physics is capable of explaining reality fully (at least, better than any other option), that any idea of God can make sense only if it is consistent with the laws of physics, and that Big Bang cosmology is the accepted view of how the universe began and continues to develop. Tipler may find a number of his colleagues agreeing that traditional theism, because of these factors,

no longer works as an adequate view of God, that just as reality is part of an evolutionary process, so God must be part of that process.

Tipler's view is fascinating further in that he believes that the essential character of the universe is information, and that all things can be broken down to number (Tipler 1988, 317 ff.). Tipler is rather orthodox in this view; many cosmologists would agree that reality is most clearly seen not so much in physical observation, which in some cases may never be possible, but in the complex mathematics that supports and is suggested by present cosmological theories. With this turn to the primacy of mathematics, we seem to have brought together the basic components of a patriarchal view of God. The keys are that, for Tipler and others, physics is the only way reality can be properly conceived and that God is identified with the control of the process that defines all of reality.

Paul Davies shares a great deal with Tipler, except that Davies does not believe that the idea of God is merely a religious expression of physical law. For him, God is a metaphysical idea that is the best possible explanation of the amazing order of the universe, the coincidence between mathematically supported physical theory and the the way things are (Davies 1992, 140 ff.). Davies is prepared to suggest that this coincidence is a great mystery that physical theories are unable to independently demonstrate. Science can only point to the reality that gives order to the universe that physics so adeptly explains. Thus, Davies even more approximates the patriarchal view of a God that transcends reality, holding ultimate power (control) within the laws that we discover through mathematical physics. Davies can then claim that the mathematics that so beautifully explains what we observe is the mind of God, which we may penetrate through this means. Davies's view is quite underdeveloped, but again he implies that this view of God is far more likely than views coming from traditional theism. Thus, science is the best road to God.

Davies and Tipler fall into the same camp even if they differ on the issue of how God fits into the reality they essentially agree on. Above all, both tend toward claims that physics can now provide the basis for understanding morality and teleology (particularly the purpose of all things, including humanity). For them, cosmology becomes an encompassing discipline and Big Bang cosmology is more than just a cosmological model but is an encompassing theory of explanation.

Stephen Hawking's views are far more sketchy and his intent not nearly so clear as those of Davies and Tipler. Hawking is troubled by the incursion of religious ideas into cosmology as candidates for explaining cosmological events. He concludes that the Big Bang

cosmology does, indeed, suggest a singularity that makes the idea of God not only one possibility but almost a necessity. For Hawking, this God is one who creates the process (initiates the Big Bang). Such an idea would require explaining such an extraphysical, transcendent power by physical theory (Peters 1989, 54–55). Not wanting that, Hawking sets out to replace present Big Bang cosmology with a quantum cosmology that offers a grand unified theory that ultimately eliminates the necessity of assuming an original singularity (Hawking 1988). If such a theory were defensible, as Hawking believes, then all things could be explained without appealing to an idea of God. His efforts, however, do not preclude his concluding that such an encompassing theory would lead to the threshold of knowing the mind of God. That is, God is again identified with the abstract mathematical structure that governs the evolutionary process of the universe. God, basically reduced to the total interaction of all forces in a comprehensible and comprehensive theory, is again identified with the one in control.

Steven Weinberg is quite different from the others mentioned above in that he has done little to spell out a view of God. At the end of *The First Three Minutes,* in which he states rather loosely that the more one looks at the data available, the more one knows, the more it seems like the whole is pointless (Weinberg 1977, 122 ff.). He is quick to say that even in this early book he states his optimism by concluding that one thing that makes life worthwhile for him is scientific research. Whether we are equally ready to see science as a minimal source of worth for our lives is one thing but the assumption that scientific evidence does not give us any sense of a purpose to the whole of the universe makes Weinberg decidely different from the others we have mentioned. Science is not, for Weinberg, a road to God, not even an idea of God.

Still, Weinberg has been led to reflect further on these comments because of the extensive response to his claim (Lightman and Brawer 1990, 466). On the surface, he seems to deny that science can be that all-inclusive viewpoint through which we know all of reality. There are other tasks to be done essential to human living, which may even lead to alternative views of reality. Weinberg appears to have opened up a different way of thinking from what we have explored thus far. Still, his comments in reflecting back on his earlier book show that the scientist in Weinberg leads him not to an alternative perspective but back to the same resources that originally led to his claim about pointlessness. First, he offers no other route to establishing worth in our lives or seeing a more general purpose than the approach involved in scientific research. Whatever value is to be discovered for

Weinberg, is likely to be discovered by rethinking what he takes to be the facts of reality. The opportunity for an alternative view is not taken, at least not for him. He seems to accept the view offered by Tipler and Davies that science is the best if not the only way to come to understand reality. Any other view would surely be judged by the standards of scientific research.

Second, Weinberg argues that the issue is first establishing what point it is that we might expect to be looking for. That is, Weinberg proposes a process that resembles scientific method in order to explore whether a point might well be discovered and confirmed. We begin with a hypothesis and test that hypothesis by exploring the evidence. Indeed, if this is what Weinberg intends, then his view is not that different from Davies's. Whether Weinberg would accept Davies's claim that the idea of God is a reasonable hypothesis is not clear at all. However, we are again shown that the cosmologist's view of reality is constructed so as to discount, completely, alternative ways of thinking unless those views could satisfy criteria of scientific research, that is, unless they could be incorporated into the scientific way of thinking.[6]

A striking conclusion to this survey of Weinberg's thinking can be suggestively offered by thinking briefly on Margaret Geller's reaction to Weinberg's statement about pointlessness (Lightman and Brawer 1990, 376–77). Her surprise at Weinberg's claim is based on the fact, not so much that she sees purpose evident in her scientific research, but rather that the idea of purpose (whether there is a point) is a surprising notion to bring into the mix. This may seem like an odd and simple reaction not leading us anywhere, especially since Geller is not the only respondent who makes this point. On the other hand, this response may be quite significant. Geller argues that she does not see that the issue matters, saying further that it is not the kind of statement she would ever make. In fact, this issue of whether there is a point and why such a search is important may have to do rather centrally with the way of thinking that has dominated our Western culture—the religious and philosophical traditions that have been shaped into a unique form of patriarchy.

Exploring Alternative Perspectives

We do not offer alternatives with the assumption that the patriarchal views presented by thinkers such as Tipler, Davies, and Hawking are simply false. The point is to widen horizons to a more inclusive, more adequate perspective. Patriarchy may very well convey acceptable

perspectives, but it fails in assuming that its view is the only possible view. Thus, we will examine the residual patriarchy in cosmology by looking at the work of theoretical physicists and those who think about philosophy of science or the speculative, metaphysical edges of the discipline. Any judgments made about these ideas are themselves bound to be underdetermined by the facts, and any alternative view is likely to be just as speculative and tenuous.

Still, by offering alternatives we begin a process of challenging the assumptions of patriarchy insofar as they are resident in the sciences, not to overturn science but to open the horizons of thinking, especially as alternatives may lead to important insight or to a different level of understanding. All this assumes that a rich plurality of views contributes to the success of any discipline. The alternatives I choose come not from cosmologists but from thinkers who have reflected on cosmology either philosophically or theologically. We would be distorting the picture if we called all of these thinkers feminists, even though they may be feminists in important ways whether they think of themselves as feminists or not. Nor is our goal to impose an exclusively feminist perspective, which would serve us no better than the exclusively patriarchal view it replaced.

I wish briefly to consider three alternatives that can be found in more expanded form in the work of Sally McFague, Rosemary Ruether, and Mary Gerhart. These alternatives by no means represent the full range of possibility, nor do I wish to suggest that they are mutually exclusive. They may, in fact, have much in common. But they can be distinguished through the central metaphors that shape each vision, in the same way that Tipler's evolutionary God is different from Davies's central law-governed mystery or Hawking's mind of God. Perhaps both the differences and the common strands in the work of McFague, Ruether, and Gerhart will become apparent in these brief descriptions of their views.

The World as the Body of God. Sallie McFague's metaphor of the world as God's body is a theological metaphor. That is, she intends the image to work as an image of God and not so much as an image of the cosmos (McFague 1987, 69 ff.). Thus, the relationship between the metaphor and any specific claims about the world is on the level of analogy. The metaphor, offered as a thought exercise, is intended to expand theological horizons so as to explore how theologies can be altered to face up to the great crises of our times, the nuclear and ecological crises. McFague is fully aware that as a theological thought exercise the image is incomplete. In fact, she might grant that no image can adequately describe God, at least as

God is understood in the Christian theological tradition. Rather, she would claim that such thought exercises can show us what kinds of thinking are not adequate for our own questions.

Thus, the idea works both as a critique of standard Christian theism and as a constructive idea of God. In that way, McFague's intent is similar to that of Davies and Tipler. On the other hand, McFague is not a cosmologist, and her views about the world as God's body, while something like the use of metaphor in cosmology, do not emerge from cosmological study but from theological and ethical concern. In that way, her views are unlike those of Tipler and Davies, even though she surely is not writing in response to either of those men or to other cosmologists for that matter.

Perhaps this vantage point affords McFague a perspective that allows for both a critical and an appreciative view of the work of cosmology. This is what seems to be the case as she talks about new cosmologies and Christianity in a recent essay. She argues that theologians need to be "eavesdroppers," listening in on the scientists and taking seriously what they are saying about the world (McFague 1991, 24). She argues that this will allow theologians to enter a new era of theology, escaping the unfortunate break between theology and nature that emerged from the Reformation. Thus, despite her different starting point and goals, McFague views her metaphors of God as relating to science. She argues, "Theologians cannot interpret the God/world relationship in credible, holistic, persuasive ways unless they take the scientific picture of the world seriously" (McFague 1991, 24–25).

It is important to remember that in McFague's view, the science being done today is not classical Baconian science but what she calls postmodern science. She and others who use this term (e.g., Rosemary Ruether) make this claim for two main reasons: (1) The view of the world (universe) that science now holds is not the same as the view introduced by Bacon, Newton, and their contemporaries. There are, for example, no eternal laws to be discovered in nature. The current picture of the universe is instead dominated by flux and chance, concepts reinforced by the dramatic impact of quantum theory, chaos theory, and evolutionary theory. Having replaced the predominant view of the modern era, then, present science is postmodern. (2) The model for scientific method introduced by Bacon and others is no longer the model for science that dominates the views of contemporary philosophy of science. There is no longer a sense that we can locate pure empirical facts or that there is a direct correspondence between fact and theory. The change from

a positivistic/empiricist view of science is so complete for these thinkers, despite the widespread disagreement on other issues of method, that present science can be called postmodern. My use of this term in the following pages assumes this twofold understanding of present science. Our argument from the outset has been that modern cosmology has functioned so as to maintain classical views of science, which are seen most clearly in the ideas of God that emerge from the work of cosmologists. McFague is fully aware of this issue and the feminist critique of science that we have described briefly above. Nevertheless, she believes that we can separate the pragmatic and technical applications of science from this new postmodern scientific view. If she is successful, then she will be producing a picture different from what we have seen from many cosmologists, even as they incorporate the features of cosmology that McFague also wants to use; that is to say, though the science can legitimately be called postmodern, the views of scientists might still reflect the classical modern picture of science. The difference is the larger framework from which one sees reality.

McFague regards postmodern science as holistic and not reductionistic, which means that she rejects a notion within science that there can be one absolute picture of reality (McFague 1991, 25). Even this new cosmology must, for McFague, be open to a plurality of views and possible dramatic change. They function for us as stories that make sense of reality for us more than other views, namely orthodox theism, do. While such an open-ended acceptance of pluralism does indeed seem characteristic of cosmology (remember Hesse's claim that all cosmology is underdetermined by the facts), the general picture of reality that seems most widely accepted among cosmologists, even an antireductionist like John Polkinghorne, is that certain ways of seeing are firmly established and unlikely to change. The reason for this claim is that the essential principles, the laws of physics, now show us how reality in its simplest form works; we cannot determine such parameters exactly but we can know with fair certainty that the laws are true. That is, that the reductionist claims of standard classical science still hold.

This latter point makes all the more remarkable McFague's claim about the obviously hierarchical structure of modern cosmology (from simple to complex, from early to late) that moves us from the objective to the subjective. It is precisely the emergence of self-aware intelligent beings that makes for Tipler's extravagant claims about the anthropic principle, but Tipler views this emergence of intelligent life as a sign of the omega point, not that humans are the center of the universe but that they point to the center, the supreme

determining factor. This argument from Tipler seems to be just the opposite of that which McFague wishes to make. Moving from what appear to be the same data, McFague argues that postmodern science takes humanity away from the center, makes us rather cousins of the stars and planets. Hers is an organic picture and not the teleology that we find in Frank Tipler or even in Paul Davies.

We might be suspicious that McFague has not accurately read the character of postmodern cosmology. Still, her claim that she is moving toward an idea of God in a fashion similar to the way both Tipler and Davies develop their views makes her work an interesting and especially striking alternative perspective. At least we might ask why McFague sees an organic image while Tipler and Davies see the teleological. Perhaps our point about Geller's reaction to Weinberg is not so incidental after all. She asks why the question of whether all the data have a point is an important question. The answer may lie in something other than the data of the sciences but rather in the perspective of the scientist, about what it is that makes sense of things.

McFague's notion of the body of God is thus an interpretation of the data of the new cosmology that is nearly the opposite of Tipler's notion of the ever-advancing accumulation of information bits toward an intelligent omega point. This argument is by no means conclusive; I have not made my point by this one illustration. Nevertheless, I am at least suspicious that the difference between McFague and Tipler, Davies, and others is one of differing views of reality, a patriarchal and a feminist perspective. McFague does not deny—she even affirms—that hers is a feminist perspective. The question remains whether the views of cosmologists are uniformly and necessarily patriarchal.

Gaia and God. Rosemary Ruether's idea of the cosmos as Gaia is more self-consciously proposed as a feminist perspective than the other two images I am presenting here. It also is more dependent on ecology and sociobiology than on cosmology to provide substance. Nevertheless, Ruether does take up the growing sense that the new cosmology is intricately linked to biology particularly on the level of the interdependence within a large ecosystem. This interdependence is visible to us because twentieth-century physics has striven to link the physics of the very small with the physics of the very large so that we can see that the presence and the sustaining of life forms is, itself, dependent on the precise interaction of physical events. Without the subatomic reactions and interactions within stars the heavier elements necessary for the formation of proteins and DNA—for the

development, that is, of life in the form that we know it—would not have been possible (Ruether 1992, 40 ff.).

This argument seems like a version of the anthropic principle in that its logic requires considerable speculation about events that we think we understand but with regard to which we have few means of producing supporting evidence. The notion of ecosystem seems to have an easier home in biology, where at least we can talk about evolutionary processes guided by laws of chance and genetic development. There is an information link that ties living organisms together in particular larger systems. It is more difficult to make a case for the cosmos as organism along the lines of James Lovelock (1979).[7]

Even so, Ruether wants to make the case on the cosmological level with the hope of reestablishing a basis for cosmological theology, and she believes that she can do this with an appeal to cosmology. Of course, this is not an attempt to say that science will be altered in the process. She does not offer a challenge to the character of science as such, although she is quick to fault classical science in the same manner that she faults orthodox theologies; the dualism that became the byword of the modern era infected both pursuits. She feels, however, that cosmology has come of age, at least potentially, somewhat like McFague views of postmodern science. The ingredients are there at least for a new emergence of cosmological theology (examples of which she examines).

But, we might ask, how do we avoid reductionism in the form of a proposal like that of Tipler if we make an argument that proposes the cosmos as organism, as Gaia? Indeed, it seems that we need something like a basic foundation of all reality, something like Tipler's notion of information, to tie things together. With this also comes some form of hierarchy, a view that Ruether hopes to avoid. The only answer seems to be that views that are proposed to give models of the universe arise from more basic perspectives. Ruether avoids the potential reductionism because her feminist perspective leads her to see the link of information as a relational, unifying link that eliminates hierarchy rather than creating it. Even though she somewhat nostalgically remembers the Platonism of the medieval synthesis, she surely does not hope for the hierarchy of the chain of being. But she does see in the new cosmology an opportunity for a new vision of wholeness, of Gaia.

What this means is that Ruether can envision God in ways similar to Tipler, as something of an evolutionary God who is part of the whole but actually becomes more of a complex of possibilities that is found throughout the whole. God is not merely the composite of information or the final omega point, but is the linking complexity

that makes Gaia possible. In Ruether's terms, God becomes the idea that holds all together, even opposites. This complementarity is an idea present in cosmology, although cosmologists are reluctant to accept the terms that Ruether suggests. Ruether proposes such a view so as to multiply the possibility of diversity; cosmologists work with the hope of finally eliminating the apparent paradox.

Why does Ruether reach the conclusion she does and not something like Tipler's view, despite the fact that they are in many ways similar? I cannot think of many possible answers better than that Ruether works with a self-consciously feminist perspective and Tipler, despite his status as nearly over the edge of what cosmology can demonstrate, remains firmly within the patriarchal world of modern cosmology. This is not a conclusive argument, to be sure. But as we add more cases, the evidence seems to mount that cosmology remains firmly patriarchal and feminist approaches offer real alternatives.

Metaphoric Process. Mary Gerhart does not present her thought as a feminist perspective, and actually one would be hard-pressed to read her argument in *Metaphoric Process* (Gerhart and Russell 1984) as a feminist view. In fact, because she wrote the book as coauthor with a scientist colleague, precisely what her view is may be difficult to sort out. On the other hand, she has written about feminist thinking in other places (Gerhart 1991), and she certainly is aware of the kind of critique that feminism has brought to science. All of these qualifiers aside, the image presented in her book with Allan Russell provides an interesting alternative that adds to our discussion of the basic pattern of scientific thinking and the relation between scientific epistemology and religious ideas.

Gerhart believes that critical thinking develops in both religion and science through a process that involves both the self-critical mode that leads to the realization that basic assumptions must be brought to analysis, and a second level of critique that requires an analysis of the questions being asked. This constant open-endedness of a discipline of thought stands in direct contrast to what she wishes to define as first and second naïveté. Second naïveté seems especially appropriate for our discussion since this idea describes, for Gerhart, the pedestrian status of any discipline of thought. In order to break from a static view of thinking, one that assumes that the questions we are asking are always the correct questions, there must be a self-transcendent mode that allows for envisioning quite a different pattern of thinking.

On the theoretical level, both science and theology, according to

Gerhart, constantly are involved in a dual-level process that both questions basic assumptions and seeks to transcend any present critique with new vision. This process requires not merely questions and data but vision, ways of seeing or configuring the realities we experience. It is this demand for vision and visionaries that leads Gerhart to argue that both theology and science require metaphors, because through metaphor a new vision can emerge in which not only our basic beliefs but even the questions we are asking are challenged. Thus, the discipline of thought that characterizes both science and religion is a metaphoric process.

Now, what has this to do with the way ideas of God might emerge in cosmological reflection? At first, we might assume that each discipline would be a source of metaphor, of new visions that would lead to new thinking in the other discipline. In fact, it might well be the case that ideas of God emerging among cosmologists could give rise to new visions in theology, even if the metaphors were not directly applicable. The difficulty arises in the different ways metaphors function in theology and in the sciences. We cannot merely dismiss the distinction between disciplines because, besides providing some vision, these metaphors carry with them the basic questions characteristic of each discipline at any given stage. We cannot reproduce Gerhart's discussion of this issue here, but we can say, at least, that her focus upon second naïveté and the issue of the fittingness of questions gives us another insight about the relation between theology and science, which may be especially valuable in assessing the role of a feminist critique in this discussion. Let me return to the Steven Weinberg quotation that has been so controversial as an example.

Recall that Weinberg argued that the more the cosmologist surveyed the evidence and gathered data the more the universe seemed pointless. I believe that Weinberg's main point is that whatever point might be made about the universe such ideas are not self-evident in the facts gathered by cosmologists. On the surface that appears to be a critique of the many cosmologists—for example, Tipler and Davies—who do believe that the data reveal, at the very least, the implication of purpose in the universe. Weinberg uses science as a means for raising questions about the basic assumptions of the arguments presented by such scientists as Tipler and Davies. Still, though Weinberg reopens the process of thinking by challenging easy assumptions about purpose and teleology, his vision of a pointless universe is not yet a functioning metaphor, although someone like Jacques Monod does develop such a vision (Monod 1972). Indeed, Weinberg believes he is making a minimal assumption, not

that there is no point, but that science and the data science gathers do not seem to provide that point.

Even so, in later reflections Weinberg has argued that the issue is pushed forward by asking what point we would expect to find. He is fully aware that problem is more complex than merely searching for self-evident purpose in the universe but has to do with the way that we think about such issues, that is, the questions we ask. Weinberg seems to have primed the discussion in precisely the way that Gerhart suggests critical thinking must develop. The problem is that Weinberg does not yet present a new vision but believes that even this issue can be settled by approaching matters in a scientific way, though I would admit that Weinberg does apply much of what we have called postmodern science in his way of understanding science (see Hefner 1993). There is an assumption that the questions science asks are the right questions, and if an answer is to be found then science is the direction that we should take. Weinberg stands on the brink of falling into a second naïveté on Gerhart's terms. Though Gerhart uses Paul Ricoeur's work and this language that Ricoeur introduces, she understands the second naïveté differently than Ricoeur in that Ricoeur views this level of understanding as a stage that incorporates the critical moment of questioning into a new way of looking at things, a new set of fundamental beliefs that have been shaped dramatically by the critical questions we are now able to ask and give answers to. Instead of a developing metaphoric process, we are left with a naïve trust in an empirical research program that will lead us toward whatever answers might be available. Gerhart believes that this means that our understanding is limited by or even to the questions we ask, while Ricoeur tends to argue that our questions open up vistas that allow something new to emerge. That explanation moves us beyond previous limits to a second naïveté.

It is this assumption that science is the way, perhaps the only way, to understand reality that is especially the target of feminist critique. I return to Margaret Geller's response to Weinberg, which I recounted above. She is, perhaps, close to Weinberg in her idea of science, but we might miss the subtle challenge that makes her vision different from that of Weinberg. She wonders not only whether there is a self-evident point to the universe but also why the question is of any importance. That is to say, she is seeking, even if only in the briefest response, a critique of the questions we raise and not merely of the state of scientific thinking as such. Her point is not so much to move away from science to some other discipline of thought but to ask what are the questions that should concern the scientist. I do not wish to make more of such a brief comment than is reasonable,

but her thinking does seem to match closely the arguments presented by Gerhart.

In fact, I wonder if the whole notion of metaphoric process is an idea that would not develop out of the mindset of science as such. The ingredients are present for such a way of thinking about knowledge in contemporary cosmology. As Gerhart argues, cosmology especially has been able to incorporate the sense of dialectical opposites as a necessary component of advance in understanding cosmological theory. Even so, cosmologists seem ill prepared to make use of this breakthrough vision, that of Niels Bohr, at the level of epistemology. Is it because the whole system of thought that is modern science aims at a reductionism that finally seeks answers, some point of it all? Indeed, the empirical process is geared toward providing this kind of pragmatic application. To challenge this aspect of the process is to challenge science at its core. And perhaps, this challenge is the most significant feature of the feminist critique of science.

Some Conclusions

One might wonder if we have done nothing more than produce the obvious in this survey, although what is obvious to those familiar with feminist thought is hardly obvious to those either unfamiliar with such thinking or contemptuous of it. This exercise is not entirely fruitless on that level. At least, we have explored ways to further the conversation. Still, we might want to say more than that science is at its core patriarchal and that feminist thought often has been highly critical, especially of scientific thought and method. We have already argued that patriarchy is not wrong as such even if the assumptions that have supported the dominance of patriarchy are false. And we do not assume, as a matter of course, that feminist vision is preferable to the dominant vision of patriarchy, even though we often find a refreshing newness in feminist thinking. There are too many variables to make so simplistic an argument. The fact that both McFague and Ruether see modern cosmology as a source for new vision suggests that a simple conflict model of the relation between science and feminism is untenable.

Of course, our approach has aimed at providing alternative views of reality, at challenging the notion that there is one and only one true view of reality. It is not surprising to us from a feminist perspective that Tipler's view of reality is little more than a reproduction of patriarchy, and we are not surprised that Tipler argues that this is the only view of reality that is true. But, by challenging this claim we are not merely setting Tipler in his place (his thinking still has value)

or exposing the necessary limits of science, but even more exploding a fantasy that has enormous appeal in our society. Even with the increased distrust of science as the sole source of salvation, the belief that science is the best road to answers still has powerful effect in our society. What is most problematic about this powerful social myth is that the scientific view, if it arises merely from science (like that of Freeman Dyson or Tipler), is so narrow that we have no adequate means for respecting and understanding the full dimensions of human and cosmological being—the moral, aesthetic, and spiritual dimensions of reality.

What we need is not merely for theology or philosophy to leap into the breach, as those disciplines also have regularly reproduced patriarchy as the framework of their perspectives. We need, rather, theologies and philosophies sensitive to feminist critique. Of those, we have many available to choose from. Mary Gerhart is correct, we are inclined to say. Indeed, the insight that the process of understanding is a continuously open one containing an endless array of dialectical oppositions (the metaphor, identity in difference, is a particularly fruitful way of describing this process) is vital to any successful dialogue between science and theology. There can never be a significant dialogue if this creative tension is reduced to mutual admiration or if theology is reduced to a second cousin of science. Cosmology, for one, would be poorer for this loss, suffering from its natural tendency toward reductionism. Surely, feminist thought has been a valuable tool leading us back to this vital point. The dialectic between feminist thought and patriarchy is not the same as the dialectic between cosmology and theology, but both creative interplays might well be enriched immensely by allowing the two dialectics to feed into one another.

NOTES

1. Schaef's designation of the dominant worldview as "The White Male System" is pointed and potentially misleading. She is, however, consistent with other feminists in arguing that what has persisted as the dominant view in our culture is restrictive not only to women but to a number of minority groups, such as persons of color. She would need more corroborating evidence to establish such claims but the notion is at least in principle testable. I use her designation to be consistent with her presentation even though I cannot take on the additional question of the participation of persons of color in our culture, or in science for that matter.

2. Schaef uses the word *myth* for these cornerstones of patriarchy. Her use of the word is not naive but is open to distortion. She does not argue that myths are utterly false; indeed, the system of myths points to reality—but only to a *part* of reality. As partial views of reality, myths become false when assumed to represent the only view possible or the whole of reality. But the word *myth* is fraught with problems, both in terms of contemporary studies of myth and in the popular presumption that myths are by definition false. The model presented here assumes that we can test these views and assumptions

and, thus, is not benefited by using language that may imply that they are false.

3. Schaef's language about male and female worldviews is problematic to be sure. For one thing, she admits that no one actually holds either of these exclusively since both structures have been present in our culture throughout. The issue is not one of absence but one of dominance. Second, it is quite clear that patriarchy relates to a structured viewpoint that assumes a hierarchy of power that clearly places a number of men under oppressive situations as well. Thus, the terms are not gender-exclusive.

4. We should note that this patriarchal view of God is not simply rejected on the basis of a feminist hermeneutic. The point is not that such views are invalid but that they have led to a mindset that holds (1) that no other view is possible and (2) that views held by women are necessarily inferior. It is possible that only a minority within a given culture actually holds to such views, but those who have held power have sustained such views over time, leading to both a dismissal of other possibilities and the exclusion of particular groups, such as women, from full participation. The critique is feminist in the sense that the aim is to uncover a sexist bias in such views. It is, however, broader than feminism in that a rejection of the exclusive hold of patriarchy certainly has implications for more than the specific fate of women within a society. Critiques of this view have likely appeared often within history; alternative worldviews have not, however, achieved dominance in our culture and thus have not had influence that the dominating patriarchy has. I choose Schaef's view because she offers her critique as a theory, that is, as a set of hypotheses that imply specific kinds of predictions that can be tested and supported by evidence. This sort of theory is what I am particularly interested in applying to the new cosmologies, since if Schaef is correct, then we should find its specific features prominent even there.

5. Tipler has written about his views in any number of places, with ever increasing detail. I have drawn much of this discussion from sources earlier in his writing career, but his most recent book, *The Physics of Immortality* (1994), appears to take his thinking into theology much more explicitly than any previous effort. The book is fascinating in its detailed discussions of traditional religion and of religious views of death, goodness, life after death, evil, and God. All of these discussions continue to show that he is a remarkably innovative and open thinker, a breath of fresh air for dialogue even if his views are openly criticized by a number of his colleagues in physics. Even so, his perspective remains essentially patriarchal, by our accounting. We see this rather strikingly as he talks about why he is not a Christian, and further through his view of the omega point and its focus on information. It would be absurd to say that he is a standard model of patriarchy or that he simply reproduces previous thought, but he operates with an overall perspective that is still rooted in the very assumptions about the world and God that Schaef has identified as patriarchy.

6. Weinberg attempts another stab at this question in his new book, *Dreams of a Final Theory* (1992), and he muses about the fact that his colleagues in physics are so skeptical any time he wishes to speak of God or religion. He sees himself as a scientist genuinely interested in religion. Even so, his efforts in that work show that he still places his faith in the solid arena of scientific explanations, even though he clearly allows that meaning is finally imposed by humans on what they experience in reality. He is surely not closed to alternatives, given that view, but remains skeptical of ways of imposing meaning that do not fit the rigorous methods that science employs.

7. It is clear that Lovelock produces a hierarchy in his view of Gaia but it is precisely Ruether's intent to borrow this idea without presuming the hierarchical structure with it. That is my point here.

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