

ON SEEING THE UNSEEN: IMAGINATION IN SCIENCE AND RELIGION

by Garrett Green

One of the issues that have shaped most powerfully the social, cultural, and intellectual history of the West since the Enlightenment is epitomized in the phrase “science and religion.” Although both terms have ancient roots, both have achieved the meanings that we take for granted today only in the modern period. Their combination has proven to be among the most explosive mixtures in modernity; a scholar at the close of the last century could write two thick volumes entitled *A History of the Warfare of Science with Theology in Christendom*.¹ That history of course has many dimensions—including social, political, and economic—but it also has provided one of the main topics of philosophical interest in modernity.

Most of the influential figures in the religious thought of the past two centuries, however, have concluded that the conflict was a mistake. The warfare that has so often been waged by preachers and politicians seems to have been settled at the philosophical level by a truce based on a widespread consensus that religion and science belong to dimensions of human experience and thought so utterly different as to preclude any legitimate area of conflict between them. Ever since Immanuel Kant set about ‘to deny *knowledge*, in order to make room for *faith*’ and Friedrich Schleiermacher announced that “religion . . . resigns, at once, all claims on anything that belongs either to science or morality,” philosophical analysis of religion usually has been isolated from the empirical sciences by a fundamental dichotomy of one kind or another.² Most influential of all surely has been Kant’s strict distinction between theoretical reason, modeled on Newtonian natural science, and practical reason, proposed by Kant as the only legitimate ground for religious belief. Other thinkers of course have produced other dichotomies to suit their own needs, but

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most—whether friendly or hostile to religious faith—have agreed in placing science and religion on opposite sides of an unbridgeable gulf.

Since the rise of the “new science” in the seventeenth and eighteenth centuries, every aspect of Western culture has been profoundly affected by its influence. Historical and philosophical investigations of modern science are therefore of great significance not only for scientists themselves but also for other areas of society that take their cues, directly or indirectly, from science. In addition to such general considerations, however, there are special reasons for philosophers of religion to take seriously some recent developments in philosophy of science. I have in mind the contributions of such philosophers as Stephen Toulmin, Paul Feyerabend, Norwood Russell Hanson, and others, but above all the work of Thomas S. Kuhn, whose *The Structure of Scientific Revolutions* has been the focus of an ongoing discussion ever since its original publication in 1962.³ Kuhn’s historical and philosophical theses have drawn criticism as well as support, but despite continuing controversy he has plainly shown a number of traditional assumptions about the nature of science and scientific method to be untenable. At the same time he has brought to light some important features of scientific thinking and research that have long been overlooked or misunderstood. Whatever problems may remain unsolved in Kuhn’s theory, his central insight is unshakable, and its importance can hardly be overestimated.

This insight may be fairly summarized (though Kuhn himself does not put it this way) in the thesis that imagination plays a fundamental role in the origin, development, and ongoing work of the natural sciences. I put the thesis this way, at the risk of oversimplification and misunderstanding, because it brings out most sharply the necessity of radically revising long-cherished assumptions about science and because it focuses attention at the point where the new philosophy of science has important implications for the philosophy of religion. It requires, I believe, a rethinking of the relationship of science and religion and therefore—in view of the special place of science in modern thought—a rethinking of religion itself. The acknowledgment that imagination is a major ingredient in scientific thought is bound to have an unsettling effect on a philosophical tradition accustomed to seeing a sharp dichotomy between religion and science and associating imagination primarily with nonscientific enterprises—preeminently the arts and religion—or attributing to it a merely psychological function in scientific discovery. But if Kuhn’s account of science is correct, imagination is not a peripheral or incidental factor but the key to the scientific knowledge of nature and therefore of profoundly philosophical significance. It has to do not just with the subjective side of human experience but is essential to the objective and factual investigation of natural phenomena as well.

Philosophically the most important term in Kuhn's theory is the concept of paradigm, and it has been the point of greatest controversy in subsequent debate. I want to examine it in some detail not only because it is central to the discussion but also because it offers the best means of relating the discussion of scientific imagination to the issue of religious imagination. I want first to outline the role of paradigms in Kuhn's original account of science and then to examine his response to criticism of the concept. I then will argue that the concept of paradigm can be clearly defined as an essential feature of natural science and used to specify the way in which imagination functions in science. This clarification of scientific imagination will prepare the way for relating it to the religious use of imagination.

PARADIGMS IN SCIENCE

Kuhn's point of departure for his philosophy of science is the history of science, and the clearest way to gain an overview of his theory is by looking at the way it changes our picture of scientific history. He begins by characterizing what we may call for convenience the traditional view, according to which science develops piecemeal by a continuous and cumulative process, gathering facts by empirical observation, then formulating, testing, and revising theories against established facts and new observation. In contrast to this view Kuhn presents a dialectical account of scientific development, in which periods of "normal science" are interrupted and transformed by "scientific revolutions" that change the rules, the methods and instrumentation, and even the meaning of the basic concepts used in scientific thinking. The philosophic key to this historical process is the role of paradigms, which account for both the unity of normal science and the discontinuities of scientific revolutions.

Paradigms, says Kuhn, are "accepted examples of actual scientific practice . . . which . . . provide models from which spring particular coherent traditions of scientific research" (p. 10). On the basis of such accepted paradigms, normal science is largely a matter of what Kuhn calls puzzle solving, "achieving the anticipated in a new way" by working out the implications of the paradigm in concrete research programs (p. 36). The paradigm limits scientific attention to a particular narrow range of phenomena and implies the rules under which research is to proceed. This limitation is not a disadvantage but precisely the main advantage of the paradigm since science otherwise would have no basis for attaching more significance to some facts than others and no criteria for choosing among possible research projects. Radical novelty is excluded from the normal work of science, allowing it to get on with its business. "Normal science," says Kuhn, "does not aim at novelties of fact or theory and, when successful, finds none" (p. 52).

The significant characteristics of paradigms, which remain largely invisible in normal science, come to light most clearly in scientific revolutions—that is, at those points in the history of science where accepted paradigms break down, novelty does occur, and new paradigms appear as the basis for a new kind of normal science. The midwife of change is a growing awareness of anomaly, brought on by an increasing number of problems that cannot be solved by normal scientific means and therefore place the scientific community and its paradigms under mounting pressure. Without such a crisis discoveries will often go unnoticed even if they are made by individual scientists, as Kuhn demonstrates from the histories of several sciences. Particularly significant at this stage is Kuhn's contention that scientists do not simply reject the old paradigm that led to the crisis; rather "the decision to reject one paradigm is always simultaneously the decision to accept another . . ." (p. 77). Ptolemaic astronomers, for example, were able to cope with observed anomalies for centuries by ad-hoc amendments to their theory; only after Copernicus offered a new paradigm were scientists able and willing to see the anomalies as counterinstances, grounds for falsification of the old paradigm. In a similar way physicists continued to see anomalies as puzzles to be solved on the basis of Newtonian physics until Albert Einstein's new paradigm enabled them to see the anomalies as counterinstances.

The period of revolutionary science ends only when the scientific community has accepted a new paradigm, which then forms the basis for a new tradition of normal science. But the nature of the change is perhaps the most noteworthy aspect of Kuhn's theory and highlights the logical peculiarity of paradigms. The transformation is not gradual and cumulative but logically (and psychologically) discontinuous, like a visual gestalt shift in which the elements of perception suddenly come together in a new and unanticipated configuration. Kuhn's very language at this point should arouse the attention of philosophers of religion, for he speaks of "conversion to the new paradigm" (p. 19). His appeal to religious metaphor is occasionally quite undisguised. He writes, for example: "The man who embraces a new paradigm at an early stage must often do so in defiance of the evidence provided by problem-solving. He must, that is, have faith that the new paradigm will succeed with the many large problems that confront it, knowing only that the older paradigm has failed with a few. A decision of that kind can only be made on faith" (p. 158). Although scientists committed to a new paradigm may present arguments in an effort to persuade their skeptical colleagues, they cannot have recourse to step-by-step proofs to compel assent since the very rules and concepts previously employed are called radically into question by the new paradigm. For this reason Kuhn speaks of competing paradigms as

‘incommensurable’ (p. 112). Once a new paradigm is established it can be applied and further articulated but not proven or corrected, for “paradigms are not corrigible by normal science at all” (p. 122). Only a new crisis followed by a new revolution occasioned by another paradigm can bring about such a change—which again will involve a discontinuous shift of vision.

The first edition of Kuhn’s book provoked a wide range of response, including criticisms of various kinds and degrees, and of course it would be impossible here to summarize or respond to all of them. To the most extreme of the hostile critiques—those seeking to show that Kuhn makes science “irrational” or “relativistic”—I can only record my conviction that they are unfounded and that Kuhn and his defenders have already presented sound reasons for rejecting them. Criticism of this kind can best be understood on the basis of Kuhn’s theory itself: Such arguments are based on other, incommensurable paradigms—in this case of science itself—and cannot therefore be countered directly and conclusively but only indirectly, by further articulation of Kuhn’s basic insights in the hope of inducing conversions among the opponents.

One area of criticism, however, does require attention here because it is directly pertinent to the nature of imagination in science and religion and because it has provoked Kuhn to qualify his original theory. The notion of paradigm in Kuhn’s book, according to this critique, is vague, confused, contradictory—or all three at once. One critic listed twenty-one different ways in which Kuhn used the term paradigm.⁴ Kuhn responds to this criticism in the second edition of the book by appending a “Postscript” dealing with the concept of paradigm (pp. 174-210). Acknowledging considerable ambiguity in his use of the term, he tries to clarify the situation by distinguishing the principal uses of the word and assigning them new designations. The more general, sociological meaning of paradigm, referring to what is shared by a community of scientists, he proposes to call a “disciplinary matrix,” which includes such components as “symbolic generalizations,” models, and values. The more specific use of paradigm to refer to concrete examples of scientific research—also a component of the disciplinary matrix—he now wants to call “exemplars.” He recognizes exemplars to be the most philosophically important component and the most controversial aspect of his theory. They are shared examples through which scientists learn to see certain problems as *like* one another. They signal “the gestalt in which the situation is to be seen” and are therefore the means of bringing about “a time-tested and group-licensed way of seeing” (p. 189).

Although Kuhn’s “Postscript” does help clarify some of the confusion surrounding paradigms, it also runs the risk of weakening his

view of science by a kind of scholastic fragmentation of the concept of paradigm. I want to argue that the term can be retained to identify the heart of the family of "paradigm phenomena" and that these other elements can all be shown to be dependent on it. Kuhn is surely right that the shared example is the central element, but the reason for its centrality must be made clear. At the root of each of the great exemplars in the history of science is a concrete image that functions as an analogy or metaphor. The Copernican revolution in astronomy, to cite the best-known example, was occasioned by Copernicus's picture of the solar system—a relatively simple, easy-to-grasp image of the relationship of sun and planets. This concrete image is the heart of Copernicus's exemplary research, and his theory is simply the detailed explication of it. The other, sociological components of the "disciplinary matrix" of Copernican astronomy are built on this base; without the original image—the suggestion that the heavens are *like* a system of planets circling around a central sun—none of the other paradigmatic elements would have been possible. It is this image that I propose to identify as the paradigm itself. In a comparable way it is the image of an evolutionary history of organisms that enabled Charles Darwin's *Origin of Species* to attain its paradigmatic role for modern biology. In each case it is a particular image, picture, or model that provides the clue to a larger pattern or gestalt in nature that was not previously noticed. The key factor is the relationship between a concrete image—the paradigm—and a general pattern or configuration in nature.

This concept of the paradigm as an enabling image brings out the specific force of the earlier claim that Kuhn's philosophy of science demonstrates the centrality of imagination in the natural sciences. Imagination, in this sense of the word, can be defined as the paradigmatic function, the ability to see concrete visual or conceptual images as exemplars of the organization of hidden, larger, or more complex aspects of reality.⁵ The apprehension of pattern or configuration is the definitive element of imagination. Since there are other senses in which philosophers have used the term imagination—for example, as a transcendental function of pure reason or as an unconscious element of perception—I will distinguish the present use of the term by calling it the paradigmatic imagination. In this sense, imagination denotes a necessary element in interpretation rather than an a priori structure of experience or an involuntary aspect of sense perception. The essential role of paradigmatic imagination in science, brought to light by the work of Kuhn and other philosophers of science, offers an opportunity to see the relationship of science to religion in a new and fruitful way.

PARADIGMATIC IMAGINATION

Near the end of his 1969 "Postscript" to *The Structure of Scientific Revolutions* Kuhn notes with some puzzlement the eagerness of so many of his readers to apply his theory to other fields (p. 208). Since he knowingly borrowed some of his central theses from other disciplines, he does not find the wider applicability of his own theory surprising. But the phenomenon is more significant than he realizes, I think, and can best be interpreted in his own categories. The special role of science in modernity, noted at the beginning of this paper, can be formulated in Kuhnian terms by saying that the modern natural sciences have functioned paradigmatically in the modern history of the West. The work of the heroes (the term is appropriate) of modern science has functioned in the wider culture as paradigms in precisely Kuhn's sense: concrete achievements (Isaac Newton's *Principia*, Darwin's *Origin of Species*, Einstein's general theory of relativity) that serve as exemplars not in this case of particular sciences but of science, of what it means to discover the facts and acquire objective knowledge. Indeed "modernity" itself can be usefully defined as the historical period dominated by the paradigm of modern science.

Religion of course has had a particularly embattled existence in this age of science. Excluded from modernity altogether by its "cultured despisers," it has found philosophical support primarily from apologists who have tried to define it in explicit contrast to the prevailing paradigm of scientific truth, with the result that it has appeared to be peripheral or secondary. The discovery of the role of paradigmatic imagination in the natural sciences offers the hope of delivering religion from the hand of friend and foe alike. I want to indicate, as a first step toward a more adequate analysis of religion, some significant continuities between scientific and religious imagination. Then in the final section I will apply the results of the comparison to two particular problems in the philosophy of religion.

The concept of paradigm can be articulated further by examining some specific functions of paradigms with the aid of examples taken from both science and religion. Let me cite again as an example from the natural sciences the model of the solar system that served as the paradigm for the Copernican Revolution and the beginnings of modern astronomy. Let me take as an example of a religious paradigm the apostolic kerygma (proclamation) of Jesus as the Christ from the early history of Christianity, that is, the capsule narrative that forms the core of the apostles' preaching of the gospel as seen, for example, in Peter's sermon at Pentecost as recorded in Acts 2:14-36. The most familiar form of this kerygma in Western Christianity is the second article of the Apostles' Creed, which summarizes the belief in God the Son in a compact narrative sequence extending from his conception

by the Holy Spirit, through his birth, passion, resurrection, ascension, and heavenly reign, to his future return in glory. Both of these examples are paradigms in the specific sense articulated above: concrete images that are simple enough to be readily sketched on paper or in words and yet are the means of grasping a pattern or gestalt constitutive of a larger reality. How the paradigm induces this "new way of seeing" can be seen in the several related functions that it performs:

1. The paradigm directs attention to a narrow range of significant phenomena. It thus enables us to distinguish what is important from the complex mass of unimportant detail. The simple picture of a heliocentric system of planets allowed astronomers to reduce the complexity of the Ptolemaic cycles and epicycles by taking into account the motion of the earth in relation to the sun. A similar focusing of attention and consequent reduction of complexity followed for the early Christians from the proclamation of Jesus as the Christ. By attending to this particular story they were able to see in the complexity of human history and the vicissitudes of individual experience a meaningful pattern. The history of Israel was not just the history of one people among many, and Jesus was not simply one more religious teacher; rather served the special function of illuminating the whole human enterprise in its essential relation to God.

2. The attention-focusing nature of paradigms is closely related to a second function, whereby the paradigm presents in concentrated form the pattern or configuration constitutive of a larger reality to which it is the key. This function may seem self-evident in the case of the solar system, but it contains a feature that might easily be overlooked: the crudeness of the paradigm. The actual motion of the planets does not in fact conform to Copernicus's model, which assumed circular orbits. Not until Johannes Kepler worked out the mathematics of elliptical orbits was a satisfactory theory of planetary motion possible. Nevertheless it was Copernicus's crude model that occasioned the revolution in astronomy, and Kepler's discovery could not have occurred without it. The religious paradigm functions in a similar way, bringing to light the whole divine economy of salvation in history by means of the pattern encapsulated in the kerygma of Jesus. Here too the concrete paradigm is crude, for its earliest and simplest versions lack the precision and sophistication of later theological formulations, omitting major features and employing language that later dogmatics would find misleading. Yet it is the kerygma, for all its crudeness, that makes possible the dogma.

3. A third function of paradigms is to enable a retrospective reordering of anomaly and confusion. Copernican astronomy can account for the complex disorder of Ptolemaic explanations of the movements of the heavenly bodies. An unconverted Ptolemaic astronomer, how-

ever, can see in the Copernican view only error and apostasy. Likewise a Christian convert (consider Saint Augustine in the *Confessions*) can look back, with the aid of the kerygmatic paradigm, on his early life and see a consequential history of sin and hidden Divine Providence leading to his conversion. But the same man before his conversion, even if told he would later become a Christian, would be unable to find any meaning or relevance in the narrative of Jesus. It is simply incommensurable with his present self-understanding.

4. Especially obvious in the sciences is the ability of the paradigm to open the way to further discoveries. On the basis of the Copernican paradigm, for example, a number of new planets were discovered and some previous sightings were understood for the first time. This kind of occurrence is the surest refutation of subjectivist and psychological reductions of paradigms. In religion too commitment to the paradigm opens the way to new insights into the meaning of individual and historical experience. The Christian believer discovers again and again that the story of Jesus sheds new light on his own experience. The basic function of the Christian sermon is the proclamation of the historical kerygma in such a way that the hearers may discover the pattern of God's activity in the present. In both science and religion the metaphorical quality of the paradigm emerges in this way. Like a literary metaphor, but unlike allegory, the paradigm can have no limit set in advance to its possible applications: It is open ended.

5. Finally paradigms in science and religion make possible communities of those who have learned to "see in a new way." The new appreciation of the sociological implications of paradigms by philosophers of science has brought to light an unexpected similarity between science and religion. The community of modern astronomers who have learned to see the planets on the analogy of the Copernican solar system shares some formal characteristics with the community of Christians who have learned to see the world on the analogy of the story of Jesus. Scientific community and church both owe their communication and unity to an underlying commitment to a paradigm.

The dependence of both scientific and religious thought on paradigmatic imagination calls into question many of the familiar science-religion dichotomies, popular as well as philosophical, whether the terms used are theoretical and practical, objective and subjective, reason and faith, fact and value, *Begriff* and *Vorstellung*, or *Erklären* and *Verstehen*. All too often such dualities depend, explicitly or implicitly, on an inadequate picture of natural science as the distinterested gathering of neutral "facts" leading to the discovery of the "laws" of nature through a continuous and cumulative progress. Philosophy of science, by showing this view to be untenable, has

forced philosophers of religion to reexamine corresponding assumptions about the nature of religion. One aspect of the traditional view of science that is especially relevant to religion is the assumption that the natural scientist enjoys direct or immediate access to nature, a relatively unproblematic relation to his object of study. This view was especially predominant in the eighteenth and nineteenth centuries, when Newtonian mechanics was the main paradigm of science and when the foundations of modern philosophy of religion were laid. Scientific developments in the twentieth century, however, especially in physics, have led to a new understanding of scientific concepts, which need briefly to be considered in relation to religious thought.

Scientists and philosophers of science now speak routinely of the "unpicturability" of theories, especially in microphysics. The situation they describe has suggestive formal affinities to theological attempts to describe the nature of God—affinities which I believe bring out with particular clarity the operation of imagination in both science and religion. Hanson draws attention to the confusion that has resulted from the insistence that theories must be picturable in order to explain the phenomena of atomic particles. He argues that "atomic particles *must* lack certain properties," that they "could not be other than unpicturable."⁶ Progress in nuclear physics became possible only when scientists abandoned the assumption that the atomic world must be a miniature version of the Newtonian, Euclidean space hitherto assumed by modern physics—the assumption, that is, that the world of the atom is picturable. Such an assumption, says Hanson, "no longer serves the imagination."⁷ A striking example is the postulation of the existence of the neutrino to explain the apparent violation of the conservation of energy in beta disintegrations, for the neutrino combines a set of properties incapable of being visualized together in terms of classical physics. "The neutrino idea," Hanson says, ". . . is a retroductive conceptual construction out of what we observe in the large. . . ."⁸ But such a description is admirably suited to theological theories as well—for example, the Nicene definition of the divine Trinity. The church fathers of the fourth century also found it necessary to combine a set of properties not capable of being pictured in terms of the created world in order to provide a satisfactory description of the Creator revealed in scripture and confessed by the church. In order to give adequate theoretical articulation to their data, to the "facts" that they recognized on the basis of the constitutive paradigmatic commitment of their community, they had recourse to "a retroductive conceptual construction" of unpicturable reality: the triune God uniting in one *ousia* the distinct but inseparable *hypostases* called Father, Son, and Spirit.

Nothing in the present argument of course compels belief in either the neutrino or the Trinity. The point is rather that both depend, in

philosophically significant ways, on imaginative constructs rooted in paradigmatic commitments. At most one might draw the negative apologetic conclusion that disbelief in God is no more reasonable on the grounds of his invisibility than disbelief in atomic particles because of their unpicturability. One of the most debilitating consequences of the bondage of the modern imagination to the traditional paradigm of science has been the narrowing of attention to those aspects of reality that can be visualized in terms of Newtonian space and time and the corresponding illusion that anything requiring imagination must be imaginary. By demythologizing this restrictive view of science, philosophers of science have brought to light the essential role of imagination in the scientific understanding of nature and thereby enabled us to see important similarities between religious and scientific thought. What this new insight implies for the philosophy of religion is the question to which I now turn.

RELIGIOUS USE OF IMAGINATION

If philosophers of science have cleared the way by removing a picture of science that has been as influential as it is inadequate, it remains to be seen what philosophers of religion might do with the new possibilities suggested by parallels with the natural sciences and especially by the concept of paradigmatic imagination. I want to show briefly, by way of example, how these insights can be used to clarify two persistent and vexing issues in the modern philosophy of religion.

The first problem is best defined by the concept of positivity, although the term itself has not been widely employed since the early nineteenth century. G. W. F. Hegel used it in his early essay, "The Positivity of the Christian Religion," and it has been revived periodically, most recently by Wolfhart Pannenberg in his *Theology and the Philosophy of Science*.⁹ Positivity can be defined as "what is factually given in contrast to what is derived from general concepts or principles . . . ; thus *positive religions* are the actual, historical religions appealing to divine revelation in contrast to 'natural religion.' . . ."¹⁰ Adapting a traditional distinction in legal theory between natural law and positive law (i.e., legislation laid down or "posited" by divine or human authority), thinkers of the European Enlightenment developed their well-known theory of natural, or rational, religion as the alternative to the "positive" religions that appeal to historical revelation and arbitrary authority. The desire to "depositivize" religion—which usually has meant historical Christianity—survived the demise of eighteenth-century rationalism and has remained one of the strongest underlying motives in religious thought from Kant to the present.

With the aid of the new developments in the history and philosophy of science, we can now see that this long-standing modern prejudice

against religious positivity is rooted in the traditional view of science as the paradigm of rationality. Once this prejudice is removed, the positivity of religious belief can be seen as its paradigmatic character, for all paradigms appear "positive" to those who consider them from the standpoint of a competing paradigm commitment. What Kuhn refers to as the "incommensurability" of paradigms in science corresponds to the positivity of religious traditions; this relationship in fact is implicit in Kuhn's use of the religious term "conversion" to describe the movement from one scientific paradigm commitment to another. Recognition of the positivity of religion by philosophers could throw a fresh light on the perennial problem of defining religion. Any general definition that tries to harmonize the positive differences of various religious traditions by blurring the contours of their basic paradigms will do violence to its subject matter. Religious disputes are so difficult to resolve precisely because they involve clashes between incommensurable, positive images, each taken by its adherents to be the key to a pattern of ultimate significance. The notion that a neutral philosophy of religion could adjudicate such differences is as futile as the proposal that a neutral language of empirical observation independent of theory could serve as a court of appeal for paradigm disputes in science. On the other hand, in acknowledging the priority of paradigms in religious traditions, philosophers could better analyze religious truth claims by recognizing the necessary positivity of their foundations and seeking to articulate conceptually the paradigms that shape religious traditions.

In this way the problem of positivity is related to a second fundamental issue for philosophy of religion, the evaluation of theological propositions. Here too the new philosophy of science has important implications. Although few philosophers of religion would argue today that religious statements must be verifiable, the thesis that their falsifiability in principle is essential to their meaningfulness has been widely influential since the famous debate sparked by Antony Flew.¹¹ This thesis, however, now appears to have been borrowed from an untenable view of science, for paradigmatic commitments are in fact highly resistant to falsification. Anomalous experiences do not become falsifying ones without a shift to a new paradigm.¹² Acknowledgment of a similar role of paradigms in religious belief can help clarify the resistance of religious commitment to falsification by negative experience. A great deal of philosophical ink has been spilled, for example, on the rationality of belief in a beneficent God in the face of experienced evil. If this belief is understood as part of a paradigmatic "way of seeing" the world, it is possible to understand how a "rational" human being might persist in his commitment in spite of strongly anomalous experience. On the other hand the logic of paradigm

changes can also account for the radical religious change that may occur in another individual when the old paradigmatic commitment suddenly yields to a new one and the experience of evil does—in retrospect—count against the old belief. The role of paradigmatic imagination makes both positions philosophically comprehensible and clarifies the nature and significance of religious commitment and conversion.

The analogy from science also implies that a paradigmatic analysis of theological statements cannot be used as an “immunizing” device to render religion invulnerable to criticism, for—as Kuhn makes clear in the natural sciences—the difficulty of falsifying paradigms is not an impossibility. The fact that paradigm disputes cannot be settled by proofs does not imply that there are no good reasons for adopting and rejecting paradigms; rather it shows the kind of reasoning appropriate to them. A philosophy of religion that recognizes the decisive role played by paradigmatic imagination in religious belief and theological argument is therefore not vulnerable to the criticism that has been brought against “Wittgensteinian fideism,” the thesis that religious traditions are based on language games that cannot be evaluated by external standards.¹³ An important aspect of the conceptual grammar of the paradigm is its claim to elucidate a wider reality, its essential relation to something beyond itself. A paradigm is not a self-enclosed language game but rather an analogical image for understanding something else. However difficult it may be in practice to evaluate religious arguments, they remain open in principle to testing and refutation.

The centrality of imagination in religious belief and theological argument neither settles nor bypasses the issue of rationality. As the parallel with the natural sciences makes clear, the necessary role of imagination in the discovery of truth, although it makes direct comparison of theory with fact impossible, does not relieve theory of the responsibility to be true to the facts. Imagination is the medium of error as well as of truth. The same paradigmatic commitment of imagination that makes normal science possible may blind the scientist to truth in more revolutionary times. The faithful imagination of the religious believer can open his eyes to the revelation of God or hold him captive in blind obedience to an idol. The choice, in the words of H. Richard Niebuhr, is never “between reason and imagination but only between reasoning on the basis of adequate images and thinking with the aid of evil imaginations.”¹⁴ Neither scientist nor theologian is spared that choice.

NOTES

1. Andrew Dickson White, *A History of the Warfare of Science with Theology in Christendom*, 2 vols. (New York: D. Appleton, 1896).

2. Immanuel Kant, "Preface to Second Edition," in *Critique of Pure Reason*, trans. Norman Kemp Smith (New York: St. Martin's Press, 1965), B xxx; Friedrich Schleiermacher, *On Religion: Speeches to Its Cultured Despisers*, trans. John Oman (New York: Harper & Row, 1958), p. 35.

3. Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2d ed. (Chicago: University of Chicago Press, 1970). Page references given parenthetically in the text refer to this edition.

4. Margaret Masterman, "The Nature of a Paradigm," in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (New York: Cambridge University Press, 1970), pp. 59-89.

5. Images, as the term is employed here, are not necessarily picturable. In addition to visual images, there are, e.g., conceptual and mathematical images. Picturability is thus a narrower concept than imaginability. See the discussion of picturability in science and religion below.

6. Norwood Russell Hanson, *Patterns of Discovery: An Inquiry into the Conceptual Foundations of Science* (Cambridge: Cambridge University Press, 1958), p. 119.

7. *Ibid.*, p. 122.

8. *Ibid.*, p. 124.

9. Wolfhart Pannenberg, *Theology and the Philosophy of Science*, trans. Francis McDonagh (Philadelphia: Westminster Press, 1976), pp. 276-96, 299. The translation sometimes erroneously has "positivism" instead of "positivity."

10. *Die Religion in Geschichte und Gegenwart*, 1st ed. (Tübingen: J. C. B. Mohr [Paul Siebeck], 1913), s.v. "Positiv."

11. Antony Flew et al., "Theology and Falsification," in *New Essays in Philosophical Theology*, ed. Antony Flew and Alasdair MacIntyre (London: S. C. M. Press, 1955), pp. 96-130.

12. Cf. Kuhn, pp. 146-48.

13. Cf. Kai Nielsen, "Wittgensteinian Fideism," *Philosophy* 42 (1967): 191-209, and the reply by D. Z. Phillips, "Religious Beliefs and Language-Games," in *The Philosophy of Religion*, ed. Basil Mitchell (London: Oxford University Press, 1971), pp. 121-42.

14. H. Richard Niebuhr, *The Meaning of Revelation* (New York: Macmillan Co., 1941), p. 108.