SIMILARITIES AND DIFFERENCES BETWEEN SCIENTIFIC AND THEOLOGICAL THOUGHT

by John W. Lansing

The modern Christian lives in a theological world and a scientific world. He also has been told frequently that these two modes of thought are utterly distinct, bearing no relation to one another. Such a sharp dichotomy, however, is intolerable to one who is not content to compartmentalize his thought, and it is my conviction that the distinction has been overdrawn. A closer examination will reveal that, while there are important differences, there are also significant similarities between the two structures of thought. We shall proceed first by looking briefly at some of the sharp distinctions which have been drawn and then by examining some of the similarities and differences between scientific and theological thought.

In what follows we are presupposing that theological language does have at least some cognitive meaning. This may be considered a dubious presupposition and certainly requires a more extensive defense than would be possible within the context of this essay. Nevertheless, we believe such a defense can be made.

Sharp Distinctions between Science and Theology

1. *Popular scientism.* Science and religion are often sharply contrasted as truth versus superstition, with science making religion outmoded. In our society, says Charles Coulson, "every schoolboy knows—or thinks he knows—that modern science has destroyed any serious claims by Christianity to provide an understanding of the world in which we live, and of the people who live in it; for many people science has taken the place of Christianity as the sure and safe ground on which to build a way of life."[1] This view is supported by a popular stereotype of science as supremely objective, immutable, and omnicompetent. Coulson describes the stereotype in these words:

Science makes claims about the nature of reality; its very success in under-

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standing and predicting the behavior of the universe buttresses these claims and gives them validity. The claims of science are different from, and superior to, the claims made by religion because, unlike religion, science makes no presuppositions in its enquiry, and is based on hard and unchallengeable facts. The laws which embody these facts, and which we call scientific laws, have shown themselves capable of almost unlimited extension, so that we may reasonably look for the time when every aspect of a man's experience is covered by them. They possess permanence and truth because they are irrevocable and unalterable. They possess universality because they are accessible to anyone with the necessary mental training. Their comprehensiveness, their vigor, their obvious power will eventually drive away all other systems of belief, which will come to be recognized as myths out of which man must grow; and though we cannot at this moment predict the nature of the changes that will come over man's ethics and his way of thinking as science grows, we can at least be sure that any old-fashioned system of thought, or vested interest, such as religion or capitalism, which impedes the progressive development of a complete science of man, must be cast out, just as, in older days, the Christian religion itself was useful for casting out the demons of uncivillized and illiterate savages.[2]

Such a scientism obviously digs an unbridgeable chasm between science and theology.

2. *Analytical philosophy.* A somewhat similar dichotomy between science and theology is made by analytical philosophy. In the case of logical positivism the weapon used to cut them asunder is the verification principle. According to this principle, any sentence which is neither a tautology nor empirically verifiable has no factual or literal meaning. It is assigned, instead, to the realm of merely "emotive" meaning. "As his [the metaphysician's] statements have no literal meaning, they are not subject to any criteria of truth or falsehood: but they may still serve to express, or arouse, emotion, and thus be subject to ethical or aesthetic standards."[3] Theological statements about the world, then, are replaced by science, not because they are false, but because they are meaningless: "It is worth mentioning that, according to the account which we have given of religious assertions, there is no logical ground for antagonism between religion and natural science. As far as the question of truth or falsehood is concerned, there is no opposition between the natural scientist and the theist who believes in a transcendent god. For since the religious utterances of the theist are not genuine propositions at all, they cannot stand in any logical relation to the propositions of science."[4] The wedge inserted between science and theology is a wedge between objectivity and subjectivity. Science is objective since it is verifiable not by personal feelings but by reference to empirical observations. Theology, on the other hand, is subjective and fac-

tually meaningless since it does not refer to sense experience but serves only to express or evoke emotion.

The same sharp distinction is also made by many linguistic analysts, although they do not usually call theological language meaningless. Rather, they point out that scientific statements and theological statements have no bearing upon one another since they perform very different functions. While scientific statements have a cognitive function by making assertions about reality which may be judged true or false, theological statements are said to be noncognitive and to function in radically different ways. They may serve to express fundamental attitudes toward oneself and the world, to express commitment to a policy of action, to evoke a discernment of depth in reality, or to evoke and express worship.

3. *Existentialism.* This sharp distinction between science and religion on the basis of the distinction between objectivity and subjectivity is also made by some existentialists. There is, these existentialists say, a sharp cleavage between the realm of personal selfhood and the realm of impersonal objects. These two realms are often spoken of as "history" and "nature," respectively. This distinction is given a particularly radical expression by Carl Michalson who writes, "Nature [is] the structure of reality exterior to and silent about man," while "history is the structure of reality interior to and vocal about man."[5] Furthermore, these realms are sharply discontinuous: "Nature and history are structures in reality so fundamentally different that it ought to be said they have nothing in common. They are incommensurable. Conflict between them is impossible. Therefore, mediation between them is not only inachievable but superfluous."[6] Science is concerned with nature; theology draws its insights from history. Just as these two realms are distinct, so their methods of investigation or "rationalities" are distinct.

These three approaches—popular scientism, logical positivism, and existentialism—share a belief in the absolute discontinuity of science and religion. Science is objective, based upon detached observation; theology is subjective, based upon personal involvement. These views differ, however, in the way they evaluate subjective knowledge. Scientism and positivism see subjective knowledge as biased and unreliable or not even knowledge at all. Existentialists, on the other hand, consider objective knowledge to be satisfactory in its place, but inadequate for dealing with human existence. It is only through personal involvement, they say, that we may gain insight into human existence. From these points of view scientific and theo-

logical thought are seen as utterly separate and distinct. There can be no real dialogue or relation between them because their methods and content are so different. In the remainder of this essay we wish to correct this oversimplification by showing that, although there are significant and decisive differences, the two fields are not absolutely disjunctive. There are possibilities for fruitful dialogue and even indirect relation.

Similarities between Science and Theology

There are a number of similarities between science and theology. These similarities, largely methodological, are sufficient to indicate that the scientific and theological modes of knowing are not absolutely distinct. At a number of points they differ in degree rather than in kind. The five areas in which we find similarities are: (1) the interaction of experience and interpretation, (2) the use of models, (3) the role of the community, (4) personal involvement and objectivity, (5) and the exercise of selectivity.

1. *The interaction of experience and interpretation.* N. R. Hanson has pointed out that all "seeing" is "theory-laden." That is, every observation is also an interpretation. We come to the situation with a web of theoretical notions, information, and patterns of experiment, and it is this web which gives intelligibility to out observation or experience.[7] Thus, says Ian Barbour, "there is always an interpretive component present. A doctor sees an X-ray plate differently from someone without medical training. Galileo saw a pendulum as an object with inertia which almost repeats its oscillating motion, whereas his predecessors had seen it as a constrained falling object which slowly attains its final state of rest."[8] Stephen Toulmin also writes of "the continual interaction of theory with fact—the way in which theories are built on facts, while at the same time giving significance to them and even determining what are 'facts' for us at all."[9]

Upon careful examination of scientific investigation, it becomes obvious that the distinction between observation and theoretical terms is vague, at best. What we have is not neatly separable theories, but a network of loosely interlocking and overlapping theories with varying degrees of generality and complexity. To take a simplified example, theories *A* and *B* may both employ the observation term *X* (e.g., temperature). In turn, *X* has meaning in terms of a theory of measurement, *C*. Thus, *X* is an observation term in regard to *A* and *B*, but a theoretical term in regard to *C*. What constitutes an observation in terms of which a theory may be tested is relative to the focus of our concern in the particular experimental context. The

line between observation and interpretation is a vague one, drawn differently in different contexts. Experience and interpretation are intimately related to one another so that experience supports theory and theory shapes what we experience. Observation in science is not casual scanning, but a conceptually ordered search for evidence.

A similar relation between experience and interpretation may be found in theology. It becomes particularly apparent in modern analyses of revelation. Revelation is not simply the transmission of information or an experence in which the recipient is passive. It requires the active participation and interpretation of the recipient. Until this interpretive or appreciative element is present, revelation or religious experience has not occurred. For H. R. Niebuhr the meaning of revelation is closely bound up with the use of an interpretive key. "By revelation in our history, then, we mean that special occasion which provides us with an image by means of which all the occasions of personal and common life become intelligible."[10] It is the historical events in which the earliest Christian community was confronted by Jesus, he says, which provide the concepts that the modern Christian uses in interpreting the meaning of his living experiences. Thus, if one sees in this normative revelatory experience and suffering love of God, he then interprets the meaning of all subsequent events (and thus all experience) in terms of the presence of God's suffering love. He "sees" the world and himself from a particular perspective.

Furthermore, even the experience of the original revelatory event itself also involves interpretation. Rudolf Bultmann has pointed out that "every interpreter brings with him certain conceptions, perhaps idealistic or psychological, as presuppositions of his exegesis."[11] Van Harvey, in his careful analysis of "the event of Jesus Christ," has isolated three different levels of knowledge available to us, all of which involve interpretation.[12]

We may say, then, that the Christian's mind is not simply a blank slate which passively receives the deposits of experience. Instead, he actively interprets his experience in terms of questions and concepts that point toward the meaning of his existnece. Even in the case of the root experiences or revelatory events of the Christian community, the element of interpretation is present as selection and transformation. Yet it is these root experiences which have a formative effect upon Christian doctrine. In religious knowing, as in scientific knowing, experience supports theory and theory shapes what we experience.

2. *The use of models.* A second similarity of science and theology

is their use of models and paradigms. We may begin by looking at models in science. The variety of models used in science is great, varying all the way from working scale models to mathematical formalisms. Barbour writes, "A *model* in science is a systematic analogy postulated between a phenomenon whose laws are already known and one under investigation."[13] Through this analogy the model stands in an interpretive relationship to a scientific theory. Ernest Nagel helps clarify this relationship by analyzing three components of a scientific theory: "(1) an abstract calculus that is the logical skeleton of the explanatory system, and that 'implicitly defines' the basic notions of the system; (2) a set of rules that in effect assign an empirical content to the abstract calculus by relating it to the concrete materials of observation and experiment; and (3) an interpretation or model for the abstract calculus, which supplies some flesh for the skeletal structure in terms of more or less familiar conceptual or visualizable materials."[14] The model frequently serves not only to render the theory more familiar and understandable, but also to aid further theoretical development. The nature of the analogical relationship can be analyzed into three parts: negative analogy, positive analogy, and neutral analogy.[15] Suppose, for example, that we use a collection of billiard balls as a model for interpreting the dynamical theory of gases. There are some respects in which the billiard balls are not like gas molecules, such as having color or being hard and shiny. Those features of the billiard balls which are not found in molecules we can call the negative analogy. Nevertheless, there are some properties of billiard balls, such as motion and impact, which are shared by gas molecules. This would be the positive analogy. There are generally other properties of the model about which we do not yet know whether they are positive or negative analogies. These may be called the neutral analogy. It is the neutral analogy which suggests areas for further invesigation and theoretical development. All three kinds of analogies are usually present in the relation between model and theory.

When we turn our attention to the use of models in theology, we find here a terminological difficulty, for the word "model" does not often occur in theological discourse. Much more frequently used words are "symbol" and "analogy." The word "symbol" connotes more than "model," for a religious symbol functions not only cognitively to aid understanding but also expressively to arouse or express deep-seated feelings and commitments. In theology, as in science, there is a considerable variety of types of models. Some of the more obvious biblical models are the parables of Jesus. There is, for

instance, the Parable of the Sower. Here Jesus speaks of the sower who scatters seed on different kinds of soil and compares this story with the way in which different people respond to the preaching of the gospel. There is a vividness and a structural similarity to the story which makes the varying responses to the gospel more understandable. In other parables Jesus likens the Kingdom of God to the spontaneous growth of seed, a mustard plant which grows from a tiny seed, leaven which works in a hidden way, a pearl of great value, and a dragnet which gathers together everyone for a final judgment. In each case there are positive and negative analogies plus suggestive neutral analogies and an added epistemological immediacy.

The models for the kingdom, however, lead not to an abstract theory but to another, more comprehensive model. They serve to interpret the more general model of a king and his subjects. The kingdom model, in turn, is similar to a number of others which interpret the relation between God and his people or God and the world. There are the models of a judge, a father and his children, a shepherd and his sheep, a potter and his clay, a maker and his creation. These all revolve around the central biblical model of God as a person. In this personal model God is attributed such personal characteristics as wisdom, will, purpose, love, anger, anguish, patience, hatred, jealousy, joy, etc. In all of these cases the model functions cognitively as an aid to understanding. It adds vividness and immediacy and enables one to coordinate his experience in understandable patterns.

3. *Role of the community.* In both scientific and theological thinking the community plays a significant role in setting standards by which beliefs are tested. In fact, neither enterprise can be carried on in complete abstraction from its respective community. Harold Schilling, a prominent physicist, points out that there is no such thing as "one-man physics." Instead, every scientist is a part of a "science community" with characteristics like other human communities.[16] The aspect of this "science community" which is particularly relevant for our present discussion is its role in accrediting scientific knowledge. Michael Polanyi writes that no single person can know the entire body of scientific knowledge. For the most part, he must rely upon the authority of a community of people accredited as scientists. "But this accrediting depends in its turn on a complex organization. For each member of the community can judge at first hand only a small number of his fellow members, and yet eventually each is accredited by all."[17] Indirectly, through interlocking accredi-

tation, there is achieved a group consensus as to who properly belongs in the scientific community. This accreditation extends not only to contemporary scientists, but also to those in the past. Thus, "its members recognize the same set of persons as their masters and derive from this allegiance a common tradition, of which each carries on a particular strand."[18]

The role of community in accrediting scientific knowledge is shown even more clearly in recent studies by Toulmin and Kuhn.[19] They point out that community consensus exercises considerable influence upon what may be accepted as legitimate problems and solutions in science. This influence is exercised in part by communal commitment to various normative patterns of explanation, intelligibility, and rationality.

As we turn to the role of the community in theology, we see a similar functioning. Just as Schilling insisted that there is no such thing as "one-man physics," so we must also insist that there can be no "one-man theology." The Christian theological enterprise cannot be carried on in complete separation from the Christian community, since the very subject matter of theology can be understood only through the faith of the community. That is, the community commits itself to particular paradigmatic events as criteria of intelligibility. In the language of Paul Tillich we would say that the Christian community is that community of persons which have committed themselves to the event of Jesus as the Christ as the normative manifestation of that which concerns us ultimately. The theologian, because of his participation in the community, finds that his understanding is shaped and judged by the paradigms, images, models, or patterns of intelligibility held by the community. He is particularly commited to the historical events of Jesus' life, death, and ministry as the fundamental paradigm or interpretive key for understanding God and the meaning of his own life. His theology will be judged as orthodox or heterodox in accordance with this communally held paradigm. In fact, insofar as he is committed to faith in Jesus as the Logos, the revealing self-expression of God, he will *see* God and the world in terms of this model.

4. *Personal involvement and objectivity.* Insofar as science and theology have cognitive meaning they are concerned with the discovery of truth. Their modes of searching for truth, however, are often contrasted: it is said that science is objective while theology is subjective, that science employs the attitude of impersonal detachment while theology requires personal involvement. It is not appropriate that they be contrasted in this absolute manner, however, since they

both make use of objecivity *and* personal involvement. In fact, personal involvement is required for the proper functioning of objectivity. We wish to clarify this by describing objectivity as intersubjective testability.

The purpose of employing objectivity in the search for truth is to avoid distortions and bias due to the indiosyncracies of individual scientists and theologians. This is attempted by the requirement of intersubjective testability. That is, any statement which an investigator claims to be factual must be testable by other members of the community of investigators. Thus, there is an emphasis upon both the social character of knowledge and the need for having claims to truth borne out by experience. The social character follows from what we saw in dealing with the role of the community. Objectivity on the part of a scientist or a theologian requires that he personally involve himself in a community which accredits various persons as its members, which uses a common language and common standards of intelligibility. Only in this way is communication and agreement upon truth possible. Only by this means can an individual be assured that what he has experienced is not merely private, but is the experience of other men as well.

The second aspect of intersubjective testability, the need for confirmation by experience, also includes an element of personal involvement. As we noted earlier, experience and interpretation are inseparable in both science and theology. Experience is not a purely passive reception of signals but a conceptually oriented search for intelligibility. The element of interpretation is present to various degrees in various kinds of experience, but it seems to be always present in at least a minimal degree, whether it is the experience of a meter reading which must be *interpreted* as such or the experience of being loved. Thus, in checking their beliefs against experience, both the scientist and the theologian become personally involved by committing themselves to tacit or explicit modes of interpretation.

Both scientific and theological knowing, then, are carried on by commitment to tacit standards of rationality and order. This personal act escapes being mere subjectivity in that it is responsible commitment. As Michael Polanyi points out, it "submits to requirements acknowledged by itself as independent of itself."[20] It is the responsible investment of oneself in criteria whose implications have not yet been fully explored but whose bearing upon reality is trusted.

5. *Selectivity.* The last similarity between scientific and theological method which we plan to mention is the fact that both are selective in their approach to reality. This becomes quite apparent as

we view the various sciences. None of them attempts to deal with *every* aspect of the phenomenon under investigation. In physics, states may be described in terms of a limited number of kinds of relevant variables such as position and momentum or electric and magnetic field vectors. Thus, in dealing with behavior of freely falling bodies, the physicist may normally ignore such characteristics as color, age, or social value. In sociology, abstraction cannot be quite so highly developed, and the relevant variables are often more numerous and less sharply defined. Nevertheless, even the sociologist is quite selective. If he is investigating political behavior, he would not usually be concerned with the subject's eye color, choice of necktie, horoscope, or body temperature. Each field of science, then, has its own selective interest, although they frequently overlap at the edges. But even all the sciences put together do not deal with every aspect of reality. Natural science is fundamentally concerned with predicting and explaining phenomena in terms of generalizations that deal with those aspects of events which are regularly repeated. The focus, then, is upon repeatable events. N. R. Campbell has pointed out: "It must always be remembered that science does not attempt to order all our experience; some parts of it, and the part perhaps that is of most importance to us as active and moral human beings, is omitted altogether from that order."[21]

Theology is also selective in its particular way. It is sometimes said that theology is all-inclusive because, in developing a total world view, it will admit no occurrence to be outside its purview. God is the Lord of *all* life and *all* the world and thus is related to everything that happens. Nevertheless, it does not follow that theology is not selective. Although theology may be legitimately concerned with every human action and all occurrences in the world, it is not concerned with every aspect of these actions and occurrences. Like science, theology is oriented by particular concerns or questions. It is concerned primarily with existential questions about man's orientation in a framework of meaning and about the fundamental character of God, man, and the world which gives meaning to human existence. This focus upon those aspects of events which give meaning and purpose to life, this concern with ultimate meaning, is what gives theology its principle of selectivity.

Differences between Science and Theology

We have reviewed thus far some of the similarities between science and theology. They are alike in the interaction between experience and interpretation, the extensive use of models to aid under-

standing, the role of the community in accrediting norms of rationality, the personal element inherent in objectivity, and the exercise of selectivity. It is this last similarity, however, which leads to significant differences between science and theology. In their selectivity, they focus upon different aspects of reality which in turn lead to other differences. Some of these significant differences are in (1) focus, (2) degree and kind of personal involvement, and (3) kind of norm or paradigm.

1. *Focus.* Differences in focus have already been discussed as we dealt with the selectivity of science and theology. We pointed out that science is primarily concerned with predicting and explaining phenomena in terms of generalizations or laws. Attention is focused upon the measurable and repeatable aspects of events and the individual phenomenon is seen as an instance which conforms to the generalization. The fundamental data are close to pure sense perception. We recognized, of course, that there are no really "pure" data without some element of interpretation. The distinction between theoretical terms and data or observation terms is essentially a pragmatic one, with the line being drawn at different points in different contexts. "Pure" sense-data without any interpretation would be nothing more than chemical processes in the human body. Even the perception of an object in front of me would involve the interpretation of a variety of signals received by my brain. Nevertheless, the most fundamental data of science are close to pure sense-data and entail relatively little interpretation in comparison with the data of theology.

Theology, on the other hand, is primarily concerned with that which gives ultimate meaning, value, and purpose to human existence. "The object of faith," says Paul Tillich, "is what concerns us ultimately. Only those propositions are of theological significance which deal with their object insofar as it can become a matter of ultimate concern for us."[22] Theology, then, concentrates upon the ultimate meaningfulness of existence and upon the character of God, man, and the world which makes this meaning possible.

Since theology has a different focus, its data will also be different. Theology focuses upon those "depth-experiences" which raise questions or offer clues as to the meaning of existence and the fundamental nature of God and man. These experiences will necessarily involve a greater degree of interpretation and will not simply be reducible to relatively uninterpreted sense-data; they have meaning only within a context of thought.

2. *Kind and degree of personal involvement.* We pointed out earlier that science and theology, in their search for truth, both make use of objectivity and personal involvement. The kind and degree of personal involvement, however, is not the same in the two enterprises. The difference in degree is due largely to the way interpretation enters into the formation of the basic data of natural science and theology. The amount of interpretation entailed in "the needle points at such a number" is not as great as that entailed in "this unconditional moral demand is a command from God." The second statement involves personal commitment to tacit criteria of far greater complexity.

Differences in personal involvement are also a matter of kind as well as degree. We can probably best see this difference by examining a distinction made by Donald Evans. He points out that scientific assertions are "logically neutral" while theological assertions are "self-involving." "A self-involving assertion is one which commits the person who asserts it or accepts it to further action, or which implies that he has an attitude for or against whatever the assertion is about, or which expresses such an attitude."[23] A logically neutral assertion would be one which does not commit the person to some further action or imply some attitude toward the subject of the assertion.

The assertions of a scientist do not commit him to any particular attitude toward what he is studying. For instance, if the Kinsey Report says, "such-and-such sexual behavior is normal," it means normal in the sense of "average" or "usual" rather than "normative." The scientist attempts to report his findings in a neutral manner without expressing either approval or disapproval. Of course, he may have strong feelings about his subject, but the expression of these feelings is not his function *as a scientist.* Theological assertions, on the other hand, are self-involving. This is true precisely because the religious question is about the objects of one's devotion and loyalty. Theological assertions, in dealing with that which is of ultimate concern to persons and which gives meaning and purpose to human existence, necessarily express attitudes of the theologian toward his subject.

This claim that scientific assertions are logically neutral does not contradict what we said earlier about objectivity entailing personal involvement. Both science and theology require personal commitment to tacit criteria for understanding and evaluating their assertions. They do not, however, both require personal involvement

with the *subject* of their assertions. They are alike, then, in their personal involvement with criteria of rationality, but different in regard to personal involvement with their subject.

3. *Kind of norm or paradigm.* We have seen that both science and theology require communally held norms, paradigms, or patterns of intelligibility. In science the central paradigms tend to be generalizations or idealized situations; in Christian theology they are historical events.

The idealized situations or patterns which serve as paradigms in science are not drawn from any particular historical events. For example, the paradigm of motion used in Newtonian dynamics is that of uniform velocity in a straight line. Deviations from this state may be explained in terms of impressed forces. What we have here is not a particular event, but an abstract pattern of intelligibility to which all explanation of motions must conform. Another example may be found in a now discarded paradigm of material change. In the 1690s, Isaac Newton wrote in an essay on chemistry: "And if Gold could be brought once to ferment and putrify, it might be turn'd into any other Body whatsoever. And so of Tin, or any other bodies; as common Nourishment is turn'd into the Bodies of Animals and Vegetables."[24] Here the idea of organic metabolism and change is used as a paradigm for understanding chemical changes. It was not until later that a new paradigm was adopted, an idea involving absolutely "inert" or "inanimate" matter.[25] In either case, the important point to note is that the fundamental paradigms or patterns of intelligibility in science are abstract generalizations.

By contrast, the fundamental paradigm of Christian theology is a historical event. It is the birth, life, death, and teachings of Jesus which form the basic paradigm for Christian "explanation." Any subsequent revelatory event or theological explanation of the meaning of an event must be evaluated in terms of its conformity to the original events of Jesus Christ. Any statement about what God is doing in a particular event is judged in terms of what we understand God to have done in Jesus Christ.

This difference between scientific and theological paradigms points to a different attitude toward historical events. For the scientist no one historical event is more significant than any other of the same class. All events which exemplify the same law are on the same level. In fact, one of the requirements of a scientific law is that, all other things being equal, it is true for all times and in all places. The theologian, on the other hand, sees particular events as being uniquely significant. From these he develops generalizations which

he holds to be true for all events, but he does not leave the particular behind when he has arrived at the generalization. It is still retained as the norm of intelligibility.

SUMMARY

We have seen that science and theology are alike in a number of respects. In both of them there is an interaction between experience and interpretation or between two poles: the "given," or datum, and the active human intellect. In no act of knowing is the element of interpretation totally absent. They also make use of a great variety of models as aids to understanding. In both science and theology the communities play similar roles by accrediting scientists and theologians and by adopting the paradigms or norms by which the intelligibility of an explanation may be evaluated. In both disciplines there is an attempt at objectivity, an inescapable element of personal commitment, and the exercise of selectivity.

Nevertheless, there are also significant differences between science and theology. Science focuses its attention upon the measurable and regularly repeated aspects of events; theology focuses upon depth experiences which raise questions and offer clues as to the meaning of existence. The degree of personal involvement is much greater in theology than in science and extends to the subjects under investigation as well as to the criteria of rationality. Finally, the paradigms of science are generalizations or idealized situations; in theology they are historical events.

NOTES

1. Charles A. Coulson, "The Similarity of Science and Religion," in *Science and Religion*, ed. Ian Barbour (New York: Harper & Row, 1968), p. 57.
2. Ibid., pp. 58-59.
3. A. J. Ayer, *Language, Truth and Logic* (New York: Dover Publications, 1952), p. 44.
4. Ibid., p. 117.
5. Carl Michalson, *The Rationality of Faith* (New York: Charles Scribner's Sons, 1963), pp. 26, 27.
6. Ibid., p. 24.
7. N. R. Hanson, *Patterns of Discovery* (Cambridge: Cambridge University Press, 1958), pp. 19, 26.
8. Ian Barbour, *Issues in Science and Religion* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1966), p. 139.
9. Stephen Toulmin, *Foresight and Understanding* (New York: Harper & Row, 1963), p. 95.
10. H.R. Niebuhr, *The Meaning of Revelation* (New York: Macmillan Co., 1941), p. 109.

11. Rudolf Bultmann, *Jesus Christ and Mythology* (New York: Charles Scribner's Sons, 1958), p. 48.
12. Van A. Harvey, *The Historian and the Believer* (New York: Macmillan Co., 1966), pp. 266–81.
13. Barbour, p. 158.
14. Ernest Nagel, *The Structure of Science* (New York: Harcourt, Brace & World, 1961), p. 90.
15. Mary B. Hesse, *Models and Analogies in Science* (London: Sheed & Ward, 1963), pp. 9–10.
16. Harold Schilling, *Science and Religion* (New York: Charles Scribner's Sons, 1962), pp. 54–55.
17. Michael Polanyi, *Personal Knowledge* (New York: Harper & Row, 1964), p. 163.
18. Ibid.
19. Toulmin (n. 9 above); and Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).
20. Polanyi, p. 300.
21. N. R. Campbell, *What Is Science?* (New York: Dover Publications, 1952), p. 71.
22. Paul Tillich, *Systematic Theology* (Chicago: University of Chicago Press, 1951), 1:12.
23. Donald D. Evans, "Differences between Scientific and Religious Assertions," in *Science and Religion,* ed. Ian Barbour (New York: Harper & Row, 1968), p. 112.
24. As quoted in Toulmin (n. 9 above), p. 63.
25. Ibid., p. 67.