

TRUTH, RELATIVISM, AND CROSSWORD PUZZLES

by *Nancey Murphy*

Abstract. Neither the correspondence nor the coherence theory of truth does justice to the truth claims made in science and theology. I propose a new definition that relates truth to solving puzzles. I claim that this definition is more adequate than either of the traditional theories and that it offers two additional benefits: first, it provides grounds for a theory regarding the relations between theology and science that may stand up better to philosophical scrutiny than does critical realism; and second, it blocks the move to relativism based on recognition of the plurality of perspectives and the historical and social conditioning of knowledge.

Keywords: critical realism; relativism; science and theology; truth.

Nicholas Rescher likens testing a proposition for truth to fitting a piece into a jigsaw puzzle (Rescher 1982, 40). The metaphor of truth as adequate solution to a puzzle is suggestive, but Rescher has chosen to play with the wrong puzzle. In this paper I explore analogies between finding the truth and solving a crossword puzzle.

My goal is to tackle the problem of relativism. With the abandonment of absolutist theories of knowledge in many areas of discourse, total and debilitating relativism constantly threatens. The central question to be addressed here is whether relativism is a necessary consequence of the recognition of a plurality of conceptual schemes or worldviews; the answer will require a new theory of truth.

The present issue affects the dialogue between science and theology in several ways. For example, there is the hesitancy to link theology too closely with scientific theories for fear that as science progresses the theories current today will be replaced, and theological formulations will then have to be abandoned as well. Thus theology would suffer the same relativization as that of the medievals who tied their formulations to Aristotelian cosmology.

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Critical realism is taken by its proponents to be a middle position between absolutism (naive realism) and relativism (see Barbour 1974; Peacocke 1984). I have argued that critical realism is an untenable philosophical position that creates more problems for the dialogue between theology and science than it solves (Murphy 1987; 1989). I shall argue in this paper that a middle ground between absolutism and relativism can better be found by attending to theories of truth than to metaphysical theories such as realism and its denials.

TRADITIONAL THEORIES OF TRUTH

Two rival theories have dominated discussions of truth in the modern period; neither provides a satisfactory account. The most common is the *correspondence theory*, which defines truth as correspondence between sentences (statements, propositions) and facts. This theory actually goes back to Aristotle and Plato. Thomas Aquinas preferred to speak of the "adequation" of things and the intellect, but occasionally used the word *correspondentia*. Modern proponents of the theory include G. E. Moore and Bertrand Russell (see Prior 1967).

The *coherence theory* defines the truth of a statement in terms of its consistency with other truths. This theory originated with rationalists such as Gottfried von Leibniz, G. W. F. Hegel, and F. H. Bradley (see White 1967). Rescher is a current proponent (Rescher 1982).

The coherence theory is stranger to everyday thought than is the correspondence theory, so it is no surprise that its flaws are easier to spot. From a commonsense point of view the motivation for such a theory is the simple fact that many of the statements we hold true cannot be verified by comparing them to the facts; we hold them because they are logically consistent with other beliefs. Philosophical motivation for the theory comes from the comparison of knowledge in general with specialized branches of knowledge such as mathematics and logic, where relations among statements are deductive and the truth of a candidate for the system is entirely dependent upon whether or not it can be derived from the axioms.

There are two versions of the coherence theory of truth: one claims to give the *meaning* of the word *true*; the other claims only to provide a *criterion* for truth. In the latter case, the meaning of truth may still be interpreted along correspondence lines.

A major objection to the coherence definition is simply that it violates our intuitions about what truth *is*. More serious objections, which are equally fatal to the criteriological version of the theory, are, first, that our knowledge is *not* coherent, and second, that it is possible that there be more than one comprehensive and consistent system of beliefs. The first objection exploits the fact that natural knowledge is not very much

like a formal axiomatic system. There are numerous domains of knowledge that are unrelated to other domains (a case in point being the state of affairs that existed while the “two worlds” theory of science and religion dominated the intellectual scene). There are theories within one domain that are mutually inconsistent (for example, Bohr’s research program of light emission and the Maxwell-Lorentz theory). There are also numerous discrepancies between theories and accepted facts—*anomalies*. Once we recognize that what we take to be knowledge does not form a coherent system, the theory of truth as coherence forces us to conclude that none of our knowledge is true. The criteriological version also fails because it is not possible to test each candidate for admission to the system on the basis of its consistency with the system as a whole. Since a conjunction of two contradictory statements formally implies any proposition, by this account, all propositions must be counted true.

When we look at more circumscribed portions of our knowledge system (ignoring the incoherence of the whole), the problem of the possibility of alternative but equally coherent systems arises. This objection is serious enough if viewed as a mere logical possibility. It takes on extra weight for scientists, theologians, and others who are faced with the *fact* of two or more equally consistent paradigms or research programs. This has been recognized as a real problem only recently in science, where both philosophical and historical considerations point to the possibility of a (limited) plurality of equally acceptable scientific worldviews. In the 1960s Thomas Kuhn ([1962] 1970) became famous (infamous?) for his account of the difficulties involved in rational choice between competing paradigms. Historians of science such as Eugene Klaaren trace the origins of modern science in such a way as to highlight the contingencies in its development. This leads us to ask, for example, how science might be different today had it not been for the theological positions that affected Isaac Newton’s conceptions of motion (Klaaren 1977).

Theologians have struggled with similar problems for well over a century; here they take the form of questions about the relations between versions of the Christian faith expressed in concepts from different ages or subcultures. Can Hellenic and Hebraic Christianity both be *true*? How is one to choose between liberation theology and more traditional (middle-class?) expressions of the Gospel? For both communities of scholars, if truth is understood as that which fits into a single, coherent system of beliefs, then there is no truth.

The correspondence theory is closer to our commonsense view of truth. It too can be taken either as a definition of the meaning of truth or as a criterion for recognizing what is true. Despite its commonsense

appeal, this theory has proved more resistant than its rival to exact formulation. So far no one has given a fully satisfactory account of what it is that truths are to correspond *to*, or of the nature of the correspondence itself.

Moore in his final account of the matter claimed that to say a belief is true is to say that there is in the universe a fact to which it corresponds, and to say that it is false is to say that there is not in the universe any fact to which it corresponds. Furthermore, he maintained, facts exist in the same sense as do tables and chairs. They are objects, although objects of a very special sort (Moore 1962, 228-31, 319, 374-77).

Unfortunately, Moore's and other similar views run into difficulties such as that suggested by the question whether the fact that, say, a given piece of chalk is *not* red also exists. Negative facts such as this would seem to make for an unbearably cluttered universe. On the other hand, if we give up the ontologizing of facts we must recognize that "confrontation with the facts" is unworkable in a number of kinds of cases. Rescher lists five:

(1) it will not be workable for genuinely universal propositions: how can one possibly check by means of some more than fragmentary operative procedure the 'correspondence with the facts' of a universal proposition with its potential infinity of instances? ('Lions—i.e. *all* lions, past, present, and future—are carnivorous.')

(2) it will not be workable for propositions regarding the past where the 'facts of the matter' are simply not available for comparison.

(3) it will not be workable for propositions that assert probabilities. . . .

(4) it will not be workable for modalized propositions of necessity and possibility. With regard to the necessary truths of logic and mathematics we cannot say where to turn to get a view of the actual facts. And true statements of (*unactualized*) possibility are in even worse shape in this regard.

(5) it is not readily workable for hypothetical and conditional propositions—and certainly not for those with unactualized antecedents (Rescher 1982, 8).

These objections show both that it is not yet clear what it could *mean* to say that true statements correspond "to the facts," and also that correspondence to the facts will not serve as a *criterion* of truth in many instances.

More serious yet, Rescher claims, is the problem of giving an adequate account of what sort of correspondence is involved—a task, he says, that no correspondence theorist has discharged in anything like a satisfactory manner (Rescher 1982, 8; see Rorty 1982). Nelson Goodman points out that the correspondence theory encourages a natural tendency to think of truth in terms of mirroring or faithful reproduction. We have a slight shock, he says, whenever we happen to notice the obvious fact that the sentence "It is raining" is about as different as possible from the rainstorm (Goodman 1960, 53).

The problem of the multiplicity of competing research programs, paradigms, conceptual schemes, raises additional difficulties for the correspondence theory as well. Philosophers of science and many philosophers of religion now recognize that theoretical statements can never be tested for truth in isolation. Tests always involve networks of theories. In fact, all empirical theses involve theoretical claims. As W. V. O. Quine ([1951] 1953, 41) puts it, it is our whole network of belief that faces the tribunal of experience. Furthermore, competing networks of belief can (and often do) correspond equally well to experience. Thus neither of the traditional theories of truth turns out to be adequate when we look beyond the proponents' over-simplified test cases, and the correspondence theory may be incoherent as well.

A FRESH LOOK AT TRUTH

As a heuristic device, a vehicle for exploring the issues of truth, relativism, and the relations between theology and science, I shall employ a metaphor: seeking truth as solving a crossword puzzle. This metaphor will provide hints about how to reconcile the viable claims of the old coherence and correspondence theories of truth as well.

In solving a crossword puzzle one works within three kinds of constraints. First there are the clues. The clues provide an external stimulus—they suggest possible answers—and at the same time they place constraints on what the answers might be. They constrain but do not uniquely determine answers. If we compare the *theories* (in science, theology, other disciplines) to the *words* in the solution to the puzzle we see a number of analogies. Experiences of various sorts provide clues that both stimulate and constrain the development of theories. Apples and other falling objects cry out for explanation; Aristotle, Newton, and Albert Einstein read the clues and suggested theories to solve the puzzle.

In attending to the clues—the stimuli and constraints provided by experience—we are acknowledging what is of value in the correspondence theory. That is, we recognize that knowledge relates to and is partially determined by something outside itself. However, the metaphor of clues frees us from the unhappy illusion that knowledge must somehow copy or mirror what is out there. The relations between clues and answers in a crossword puzzle are many and varied; so too are the relations between experience (or reality) and knowledge.

The analogue for coherence in solving a crossword puzzle is, of course, the requirement that the words proposed to solve the problem all fit together. Again we find that the requirement (fitting with other words) is both a *stimulus* in thinking of solutions and a *constraint* as well. Here again the metaphor reproduces rather closely our experience in

seeking truth. When we cannot get a word simply by reading the clue, we fill in the region near it until the words that cross the spaces in question provide enough information to guess the missing word. Likewise, the demand for consistency among theories in a given region of our knowledge often leads to the development of new theories that would never have been proposed simply on the basis of experience. Scientists and theologians develop networks of theories, proposing new auxiliary hypotheses on the basis of the need to maintain consistency within the program. But again, consistency or coherence alone is not enough. The new word is filled in (the new hypothesis is proposed), but then one has to go back to the clues and see if, once proposed, it fits that external constraint as well (see whether it can be corroborated by observation or experience).

So two kinds of constraints in puzzle-solving (truth-seeking) are the clues (experience) and consistency with other words (theories). A third constraint, which we may not notice at first in the case of puzzle-solving, is language. In English-language newspapers the puzzle answers are all to be in English unless otherwise specified. It is this variable and its analogue in truth-seeking that makes the crossword-puzzle model particularly useful for the discussion of truth in an era that recognizes the historical conditioning of knowledge. I suggest that we take the *language* used in solving the puzzle as a metaphor for the *conceptual scheme* with which the scholars in a given era have to work. Just as we are ordinarily oblivious to the fact that we are *restricted* to English, scholars are generally unaware that they are restricted to a particular conceptual scheme—until it changes.

There are difficulties in saying exactly what a conceptual scheme is and in making explicit what we mean in talking about changing conceptual schemes.¹ We can say that conceptual schemes are very much like languages: they are our resources for naming things, for organizing experience, for communication. They provide the categories into which we classify experience and are therefore very much like the vocabulary of a language. They also provide implicit rules about what can and cannot be said using those words, and are therefore very much like grammars (see Körner 1970). For example, *material object* names an important category in practically all schemes. One of the rules for use of this category is that we may not say that there is more than one material object in a given place at a given time. Christians add the category *God* to their scheme, but grammatical rules do not prohibit speaking of God sharing the same space with a material object.

Despite the fact that philosophers may have difficulty saying what a conceptual scheme is, both scientists and theologians know that there must be such things because they have struggled with the very real

problems that arise when they change. In science—for example, in the change from Newtonian to Einsteinian theories—most of the vocabulary stayed the same (*mass, acceleration, velocity*, and so on) but the grammar changed. Before, one could speak, for instance, of mass *tout court*; now one can only speak of mass relative to a spatio-temporal framework.

Theologians have struggled for years with questions such as how to reconcile Greek and Hebraic concepts of God and salvation. Many see their task as the translation of the Gospel into categories appropriate to our own age.

Such changes in categories and grammar (from Newton to Einstein; from Hebrew to Greek) produce changes throughout a system of knowledge somewhat like that required if one were to change from one language to another while solving a crossword puzzle. Imagine struggling with a section of the puzzle, unsuccessfully seeking English words that fit the clues and spaces, then suddenly recognizing that it all works out if you change to French. Previously completed sections would then have to be re-done, of course.

To sum up thus far, the crossword-puzzle metaphor causes us to look at three kinds of constraints in the search for truth: the clues from experience, the demands for consistency among elements of theoretical knowledge, and the requirement of a consistent and adequate conceptual system (language) for the formulation of truth.

DISANALOGIES

It is important in our investigation of truth to look at disanalogies as well as analogies between the search for truth and the solution of puzzles. The first and most important disanalogy is this: in solving a puzzle there is such a thing as *the* right solution. It always appears in the next edition of the paper and one can check one's work against it. Thus a word that fits may still be the wrong word because it is not the one intended by the puzzle's designer. That there be *a* solution, *a* correct answer to the puzzle is a necessity based on the fact that someone had to have designed the puzzle in the first place, and one can only do so by working backwards from the solution to the clues.

In ages past, humankind's search for knowledge has been similarly conceived. Perfect knowledge was that in the mind of God. Our job was to try to approximate to that perfect knowledge. But here (as with the two traditional theories of truth) the plurality of conceptual schemes makes this an unsuitable way of thinking. Just as we have had to realize that God's own language is neither Hebrew nor Greek, so too, we must realize that God's thoughts are not our thoughts; God's conceptual scheme is not the same as one of ours.

So here we must imagine the search for truth as like the task of solving a puzzle where there is no pre-determined right answer. Conceivably more than one solution can be found, especially when we consider the possibility of switching languages (changing conceptual schemes). It is an open-ended task dependent in great measure on human ingenuity.

A second important difference between solving puzzles and the search for truth is due to the limited or bounded character of the crossword puzzle. The search for truth has no such limits. We are far from explaining the world as it is now known (we have not filled in all the blanks), and the growth of knowledge itself creates more experience to be explained (new clues). As new theories are put in place we find new questions arising and our capacity to explore reality increases. Think how technology based on scientific theory allows for collection of new data in astronomy and physics; or in archeology and therefore in history and biblical interpretation as well. Not only do familiar regions grow at the edges as we fill in theories at the center, but entirely new regions are added to the puzzle as new sciences develop.

We must recognize, too, the limitations of the metaphor of changing languages as changing conceptual systems. We never in fact switch languages in the midst of solving a puzzle. But in the search for truth scholars specializing in one region often find that neighbors in other disciplines have changed categories. It is exactly the changes in contemporary thought brought about by developments in science that attract theologians to journals such as this one. How do we re-work our section now that science has changed the categories, the conceptual scheme, with which we have to work? How can we solve our problems with the new linguistic resources? Do we have to change some of the old solutions?

SCIENCE AND THEOLOGY

I have already implied that theology and science may be compared to different regions or sections in the puzzle. What sorts of relations between the two sets of disciplines does this image entail?

First, the metaphorical picture of knowledge presented here *suggests* that even if theology and science inhabit opposite corners of the whole, there must be connections, either direct or indirect, between those two corners. Now to take this picture as a proof that theology and science must be related would be a fallacious argument from analogy. Readers of this journal, one may presume, are already convinced that there is such a relationship. Thus we can use the puzzle as a model for *representing* relations between theology and science that we already presume to

exist on other grounds. Additionally, we can use the model to express different opinions about *how* theology and science are related. For example, does the Christian doctrine of creation connect directly with Big Bang theory, or must there be an indirect relation, via metaphysics or history? Do the regions of science and theology overlap, or are they separated by the region belonging to some other discipline?

The metaphor also serves to remind us of the very real interdependencies, mentioned above, that come from sharing a common conceptual scheme. Expressed figuratively, a change in the language in which the puzzle is to be solved may be occasioned by the exigencies of one region but will have drastic repercussions in all regions. An important contribution to understanding indirect (conceptual-scheme) connections between theology and science has been made by Nicholas Wolterstorff ([1976] 1984) in *Reason within the Bounds of Religion*. Here he develops the notion of *control beliefs*—beliefs that concern the very nature of knowledge and reality. Control beliefs determine what counts as a proper *sort* of theory. Wolterstorff points out that control beliefs may derive from philosophy or theology and will have important effects on the development of science. We might point out that the influence can go the other way as well.

A popular view of the Middle Ages as enjoying a coherent worldview, with places for both science and theology, is probably a myth. Their puzzle solutions were certainly as incomplete, and probably as incoherent, as ours. However, one real difference between that era and our own is in the dominance of one discipline over another. In the Middle Ages one started with theology (it occupied the upper left-hand corner) and one worked out the rest in consistency with those first moves. Today we have to admit, I think, that the natural sciences have taken over that formative position. Theologians more often try to accommodate their theories to the requirements of consistency with science than the other way round. However, a picture of science and theology as different regions of the same puzzle should remind us that theology cannot be governed exclusively by the demands for consistency with science (and other areas of knowledge), but is also to be constrained by its own clues—that is, by its own proper sorts of data, including the practices and experiences of the religious life. Ideally, therefore, religious experience and its explanations by means of theological theories should impinge upon, should constrain, science. This should not be seen as a hindrance to science, but rather as a help—as a further source of clues in solving the puzzle of understanding reality in its entirety.

DEFINITION OF TRUTH

So far I have provided a metaphorical characterization of truth-seeking. Is it possible to proceed from this somewhat fanciful account to a *definition* of truth? I suggest that: *A true statement (theory) is one that provides (one of) the best solution(s) to an empirico-conceptual puzzle.* Several phrases here call for comment:

1. “empirico-conceptual puzzle”: The hyphenated term *empirico-conceptual* makes reference to the three kinds of constraints that affect truth-seeking. There is *fit with experience* (which, remember, does not mean a match or copy of experience but rather that the answer is ‘fitting’ in light of the clues provided by experience). There are two kinds of conceptual constraints: the simpler one of *logical consistency* with related theories and the more nebulous one—the requirement of *conceptual coherence* with the rest of the knowledge system. We express this latter requirement as consistent use of *categories* throughout the system and as obeying the implicit *grammatical rules* governing the use of those categories.

Use of the word *puzzle* is intended not only to remind the reader of the (humble) origin of this theory in the back pages of the daily newspaper, but also to suggest that truth-seeking is related to human motivation—to curiosity, to life interests, to pressing needs. There are an infinite number of things we could set out to discover (for example, how many peanuts could be laid end-to-end between Chicago and Berkeley) but we tend to think of *truth* as somehow loftier than that. The correct number of peanuts partakes of truth, we might say, but it is not the sort of thing we have in mind when we speak of *the* truth. Here we tip our hat to the not-so-popular but still significant *pragmatic* theory of truth. The value of the pragmatic theory is the reminder that truth matters.

2. “(one of) the best solution(s)”: This definition recognizes that in some cases there is one statement (theory) that stands out as the obvious solution to the puzzle at hand. For example, if someone asks what the weather is like, and I step outside and find water falling, the one obvious answer is “It’s raining.” At other times there may be several alternatives among which we are unable to choose. In such a case we may say that both are true. It is then important to realize that each account is *a* truth, not *the* truth. It is a truth about light that under certain circumstances it is particle-like. It is also truly wave-like. For the ethicist it is true that human beings are free agents; for the social scientist it is true that human behavior is causally determined.

3. “statement (theory)”: This definition is intended to apply equally well to simple observational statements (“It’s raining,” “The cat is on the mat”) and to theoretical statements (“Christ is both truly

human and truly divine,” “Matter tells space how to curve; space tells matter how to move”). The distinction between observation statements and theories is not absolute. Philosophers of science have argued cogently that all observation is theory-laden.

The virtue of the correspondence theory of truth is that it seems to apply so well to simple observational statements; but it encounters (perhaps insurmountable) difficulties when one attempts to apply it to abstract or theoretical propositions. On the other hand, the coherence theory does well in accounting for the latter but breaks down when applied to the former.

To see whether the puzzle definition applies equally well to both sorts of statements, let us first consider two of an observational sort. The obviousness of the response “It’s raining” when one steps out into a rainstorm usually conceals the fact, mentioned above, that there is no resemblance between the sentence and the storm. Now look at it another way: given the meteorologic conditions, and given the language (English and our conceptual system), “It’s raining” is just the obvious answer to the question “What is the weather like?” It is analogous to a response to the clue: a four-letter word, beginning with *r* and ending with *n* that means precipitation.

Consider a second example: Suppose my husband asks “Where is Tabby?” I reply, “The cat is on the mat.” What makes my answer true? The correspondence theory says it is true because *the cat* refers to the cat, *the mat* refers to the mat, and *is on* designates the spatial relation between the cat and the mat. My theory interprets it this way: “The cat is on the mat” is the sentence that best solves the puzzle (answers the question) posed by my husband’s inquiry. The constraints on that solution are empirical (it must fit with my most recent sighting of Tabby) and conceptual-linguistic (it must be a grammatical sentence in a language we both understand and of the conventional form for answering such inquiries; it must not contradict other true and relevant sentences such as “I just put her outside”).

In this case the empirical constraints are dominant, but the conceptual constraints are not non-existent and are covered here by my reference to “conventional form.” We can become sensitive to the conceptual constraints by considering some unconventional alternatives that, on a correspondence theory, are equally ‘true.’ For instance, why do we not say “The mat is under the cat” whereas we would say “The cat is under the bed”? We have a convention, of course, of making the object about which a question was asked the grammatical subject of the sentence that gives the answer. However, apart from any knowledge of questions asked about the cat, we still would not ordinarily say that the mat is under the cat. I suggest that we have another convention of giving preference to animate objects as subjects of our sentences.

Thus “the cat is on the mat” is consistent with the *deep grammar* of our language. It depends on distinguishing *categories* of animate and inanimate and on recognition of *grammatical rules* that apply to each.

So we can see that the puzzle-solution theory of truth is preferable in this case to the correspondence theory since it not only tells us wherein the truth of our test sentence lies but and also explains why one grammatical form is appropriate whereas another form, equally true from a correspondence point of view, is not acceptable.

Now let us look at theoretical sentences. It is significant that recent philosophers of science tend to avoid speaking of the truth of theories, focusing instead on their “acceptability.” (I believe this says more about their loss of confidence in theories of truth than about their confidence in science.) I believe that Imre Lakatos provides the best account of what makes for acceptability of scientific theories (Lakatos 1970). Therefore let us see whether we can make a case for identifying “acceptable” theories in Lakatos’s sense with true theories as defined above.

According to Lakatos, the primary unit of appraisal in science is not an individual theory but rather a research program: a complex network of theories whose central idea (*hard core*) remains unchanged over time, while a *protective belt* of auxiliary hypotheses is modified to account for problematic data. The acceptable research program is the one that is the most *progressive*. A progressive research program is one wherein changes in the auxiliary hypotheses not only serve to account for known anomalies, but also (occasionally at least) allow for the prediction and corroboration of novel facts.

Before attempting to apply the formal definition of truth, let us see how well Lakatos’s theory of acceptability in science fits the metaphor of puzzle solution. A research program is a densely woven section of the puzzle, somewhat isolated from other parts of the science region (allowing for the change of research programs without greatly disturbing all the rest of science). One word (theory) forms the ‘core’ of the section in question. It is resistant to change because its interconnectedness with all other words (auxiliary hypotheses) would mean that to abandon it would be to abandon everything in that section. (One anomalous feature here is that the hard core usually has no ‘clues’ of its own—it is usually too abstract to be directly related to any sort of experience. Its connections with experience are indirect, via the auxiliary hypotheses.)

The choice between competing research programs is comparable to the choice between two different solutions worked out by different teams of researchers for the same section. Neither will ever be entirely complete or consistent, due to the unbounded nature of knowledge. The two research teams will take many of the clues differently, since

the clues are usually ambiguous. Their meaning only becomes definite in light of the language used in the puzzle (conceptual system) and of the demand for consistency within the puzzle itself. Here we have an analogue for the theory-ladenness of data in science.

Lakatos's theory of choice between competing research programs can now be expressed as follows: choose the solution (to this section of the puzzle) wherein changes and additions of words (auxiliary hypotheses) have been made not only to correct for inconsistencies within the section, but also to anticipate clues that have not yet been taken into account (novel facts). The rationale for this is as follows: if the words already in place are suitable, then the new words that can be inferred from them should be expected to fit their own clues as well. Thus there should be some cases where the clues themselves can be predicted on the basis of the new entries.

Recalling the three kinds of constraints listed above in solution of crossword puzzles, we can see that work within a given research program conforms to analogues of the first two: the empirical criterion of fit with the clues (facts) and the conceptual criterion of internal consistency. It is in the rejection of one research program for another that we find an analogue for changing the language in which the puzzle is to be solved.

For someone who does not work crossword puzzles, the foregoing is surely a case of explaining the obscure through the more obscure. Therefore let us look as well at the formal definition. The empirico-conceptual puzzle in the case of a research program is the complex task of increasing consistency within the research program—among auxiliary hypotheses and with known facts—in a progressive manner. The value of increased consistency and coherence is obvious. The demand for progress insures that the empirical side of science is not slighted in favor of conceptual coherence.

Since no research program ever accounts for all data in a wholly consistent manner, choice of a research program is always a matter of comparison of available options and selection of the best among those possible solutions.

I conclude that the puzzle-solution definition of truth provides a more adequate account of the truth of scientific theories than does either the coherence or the correspondence theory. On my account, a theory is true if it is part of a progressive research program since, as I have shown above, a progressive research program can be identified as the one that provides the best available solution to the empirico-conceptual problems involved in the development of science.

The coherence theory implies that a scientific theory is true only if it is consistent with all other knowledge, but most scientific theories are not consistent with all other knowledge—as Kuhn and others point out,

scientific theories are born in a sea of anomalies. Furthermore, attention only to the removal of inconsistencies among a given body of theory and data neglects the empirical side of scientific development.²

The correspondence theory implies that a scientific theory is true only if it corresponds to the way the world is. The problem here is that theories are by definition about unobservable entities and processes—otherwise they would be observation statements. On this account there is never any way to know whether a theory is true or not.

I have argued elsewhere that theological rationality can be understood as clearly as that of science by using Lakatos's model of theory choice (Murphy 1990; see Hefner 1988). Abstract theological theories form hard cores of theological research programs, which are connected to appropriate kinds of data by means of auxiliary hypotheses. For example, Wolfhart Pannenberg's system includes as a hard core the assertion that the God of Jesus Christ is the all-determining reality. Important auxiliary hypotheses include principles of historical methodology (equivalent to Lakatos's theories of instrumentation in science), conclusions about the life and teaching of Jesus, about the apocalyptic worldview of the time, and pre-eminently, the thesis of the historicity of Jesus' resurrection. Data include the texts, other historical data, anthropological data, and perhaps other kinds as well. If my argument there is sound, then all that has been said above regarding the truth of scientific theories applies equally to theology.

THE PROBLEM OF RELATIVISM

Two sources of relativism in recent thought are the observable plurality of viewpoints, competing theories, worldviews, and recognition of the historical and social conditioning of knowledge. I believe that the understanding of truth developed here allows for recognition of both of these facts without jumping to the pernicious conclusion of relativism.

The definition of truth suggested above makes it clear that while sometimes there may be competing claimants for the honorific title of truth, no hopeless, skeptical relativism follows from this fact. The true statement or theory is either the best solution to a set of empirico-conceptual problems, or else it is one among a set whose merits are indistinguishable. The number of such indistinguishably meritorious solutions will be small. If we are not convinced of this by the difficulty of imagining more than one equally successful solution to a crossword puzzle, we should be so convinced by the comparable constraints placed on theoretical development, as described in Lakatos's philosophy of science. The history of science shows few able contenders (few equally progressive research programs) in competition at a given time.

If theology seems to provide a plethora of competing theories the problem is perhaps only that we have not yet applied stringent enough criteria (such as Lakatos's) to weed out unacceptable variants.

While the fact of historical and social conditioning of knowledge has been widely accepted in theology for years, it has been resisted in science. Recently, however, the "strong program" in the sociology of scientific knowledge has gained wide attention. Proponents such as Barry Barnes and David Bloor at Edinburgh argue cogently that the content of scientific theories is affected by historical and social factors (Barnes 1977; Bloor 1976). The cultural milieu in which scientists work provides the linguistic and conceptual resources for the development of scientific theories. It provides as well a measure of the motivation that directs scientific inquiry along some lines rather than others. Barnes and Bloor do not draw any skeptical conclusions from these positions, and neither should we if we hold to the puzzle-solution theory of truth. Let us employ our crossword model again. I stated above that changes in thought in one discipline often occasion conceptual changes that affect other areas, somewhat like a change in the language available for solution of the puzzle. The conceptual system provides the linguistic resources from which apt choices can be made to solve problems in a given domain. So when the sociologists say that scientists' cultural milieu provides the conceptual resources, the metaphors, for developing scientific theories we should not be at all taken aback.

I also noted above that human knowledge, unlike a crossword puzzle, is unbounded. In discussing my definition of truth I suggested that human needs and interests affect what will be seen as a puzzle, as something *worth* solving. So again, we should not be surprised to hear the sociologists telling us that extra-scientific motivations have contributed to development of certain areas of knowledge rather than others.

CONCLUSION

I have claimed that neither the correspondence nor the coherence theory of truth does justice to the truth claims made in science and theology. I have proposed a new definition that relates truth to solving puzzle, is unbounded. In discussing my definition of truth I suggested that human needs and interests affect what will be seen as a puzzle, as vides grounds for a theory regarding the relations between theology and science that may stand up better to philosophical scrutiny than does critical realism; and it blocks the move to relativism based on recognition of the plurality of perspectives and the historical and social conditioning of knowledge.

NOTES

1. Donald Davidson entitled his presidential address to the American Philosophical Association "On the Very Idea of a Conceptual Scheme" (Davidson 1973/74). He defined a different conceptual scheme as a language that is largely true but untranslatable and then concluded that if there were such a thing as a conceptual scheme different from our own we could never know that there was: in order to know that its view of the world was largely true we would first have to be able to translate it. I believe Davidson's argument is flawed, first, because he identifies a conceptual scheme with a language and, second, because he assumes translation is the only access we have to another form of life. For an example that refutes Davidson's position, see Paul Feyerabend (1975, ch. 17).

2. This is a major problem with Larry Laudan's methodology of science (see Laudan 1977). For criticism see my forthcoming book (Murphy 1990, ch. 3).

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