Chapter 1 Controversy Over Method in Theoretical Archaeology

"The Loss of Innocence" by the late David Clarke was a landmark paper in the New Archaeology. Clarke stressed the need to investigate theoretical assumptions and procedures of inference in archaeology, a field in which both had often been presumed without sufficient critical reflection (Clarke 1973). Clarke's concern about theory analysis arose from a transformation in archaeology. An era in which fieldwork was the only significant focus had come to an end. Although fieldwork has continued and arguably should continue to be the centerpiece of archaeological endeavor, explaining what is revealed in the "dirt" has also taken a place at or near the center stage of archaeology.

Almost any history of archaeology will reveal that explaining the past has been part of archaeology since its inception (for example, see Sabloff and Willey 1980; Trigger 1989b). Furthermore, some contend that problems in proposed explanations and conflicts among competing explanations have provided and always do provide the impetus for intellectual work. This view of the interests of researchers and the motivation for their work has been argued for the sciences (Agassi 1964) as well as for social sciences such as anthropology (Jarvie 1964). Nevertheless, a more explicit awareness of theoretical assumptions and more conscious analysis of the methodological underpinnings of theory did sweep into archaeology. The movement began in the late 1960s and has been vigorous ever since.

Along with the rising interest in archaeological theory has come awareness that theory building and assessment should not be left to

chance. It was realized that there are benefits to understanding method, and applying it more systematically. That is why *views of knowledge*, or *epistemological theories*, have also become a focus of attention. Such views or theories include methodological guidelines for formulating and evaluating explanations. The New Archaeology has become a generic label for attempts to improve archaeological explanation by focusing explicitly on methods of generating and testing theories.

Optimism has been another important characteristic of the New Archaeology. Not surprisingly, the emergence of interest in method was associated with a rise in optimism that the prehistoric past could be understood. Archaeologists began to hope and even believe that reasonably accurate interpretations of the past could be found. That is why the belief that reliable knowledge of the past could be culled from the artifactual record also came to be identified with the New Archaeology.

Optimism is absolutely crucial to attempts to improve theory. Without it there would be no motive to make the effort. The situation is similar to that during the modern revolution in science, which occurred in the seventeenth century. Attention to method along with the vociferous, exciting debates over method during that period would have been inconceivable without the Enlightenment. The core of an enlightened outlook, during the seventeenth century or any other time for that matter, is the view that there is truth and that truth can be discovered.

Although this book is focused on method, then, it should not be forgotten that use of method only makes sense for one who is optimistic that diligent and systematic attention to method can lead to a comprehension of the archaeological past, or at least better theories about it. This seems rather obvious, but the consequences are quite significant for archaeologists who do not share the optimism. A well-known early skeptic was M. A. Smith (1955). Paul Courbin's (1988) more recent skeptical musings have also become widely known.

Method and Theory

Method, methodology, and middle-range theory

At this point it would be helpful to comment on use of the terms "method" and "methodology." The goal is not to provide an exhaustive list of the meanings, a task that may very well be impossible, nor to straighten out the myriad confusions that arise when the meanings are crossed. My goal is considerably more modest: to clarify how the terms are used in this book. The usage is not dissimilar to that of many philosophers, and is consistent with usage in some of the significant archaeological literature.

Methodology sometimes refers to the study of method, but is normally a word that is synonymous with *method*. In this book the two words and the locutions of each are used interchangeably.

In the broadest sense, method consists of the guidelines used to structure and assess theories. In terms familiar to archaeologists, method consists of the tools used to formulate and evaluate "middle-range theory." A very brief presentation of middle-range theory is in order.

The concept of research or theory at the "middle-range" was introduced into the archaeological literature in the early to middle 1970s by Lewis Binford. It had become clear to Binford that the strategies needed to generate and test archaeological theory were not the same as those used to assess general theory. To avoid confusion, Binford began using the labels "middle-range theory" or "middle-range research" to designate theoretic work in which empirical methodological strategies can and should be used. (Binford 1983b:18fn5). At about the same time the concept was also introduced, independently, into archaeological circles by Mark Raab and Al Goodyear (see Goodyear et al. 1978). Raab and Goodyear suggested that archaeologists adopt Robert Merton's recommendation for sociology (Merton 1968). Merton argued that high-level theory is quite abstract and not amenable to empirical assessment, so that theories with em-

pirical content—theories at the middle-level—should be the focus of theoretic activity (Binford 1983b:18–19fn5). The concepts of theory at the middle-ground developed by Binford and by Merton are similar enough that distinctions would be, for the purposes of this book, distinctions without a difference.

Middle-range theory is made up of the ideas, models, and other interpretative assumptions necessary to structure a link ("middle-range") between the low-level artifactual observations on the one hand and the high-level general theories on the other (Trigger 1989b). Low-level theories are the observations that emerge from fieldwork. Even though they are themselves interpretations—that is the reason for expressions like "observational theory," or "low-level theory"—they are normally considered the "data" or the "facts" to which explanations should be accountable. High-level theories are very general. That is why they are more an overarching framework that informs explanatory structure in the middle range rather than being part of that structure. High-level theories have been called "research strategies" by Marvin Harris and "controlling models" by David Clarke (Trigger 1989b:22). Examples include broad frameworks such as historical materialism, ecological determinism, and social individualism. The middle-level theories are or at least should be consistent with the high-level general theories, and they should explain at least some of the low-level artifactual observations.

Middle-range theory is quite different from either low- or high-level theory. Two differences are particularly noteworthy.

First, middle-range theories are explanations that are actively formulated and assessed. Unlike the low-level artifactual observations, they are not a given for generating and evaluating theory. Nor are they assumptions, as are the high-level research strategies or controlling models that inform the theory building in the middle range. In brief, both the low-level artifactual data and the high-level research strategies serve as rather inert inputs when the theoretic action is underway in the middle range.

To deflect possible misunderstanding, artifactual data and research strategies certainly do not always remain passive aspects of

theory building and assessment. There are instances in which theoretic activity leads to data being challenged. As a result, data are sometimes reformulated, changed significantly, or even thrown out completely. Research strategies themselves also can and do undergo challenge. When the explanations that flow from research strategies do not provide adequate solutions to research problems, provide less adequate solutions than those from other strategies, or fail tests against the artifactual data, then those research strategies are typically brought into question. At times they are reformulated, and some may even abandon them in favor of other strategies.

Second, guidelines are needed to structure and evaluate the explanations that constitute middle-range theory. Such guidelines are always used in the middle range, regardless of whether the guidelines are explicit or not and regardless of whether those employing them are aware of them or not. Those guidelines are *method* or *methodology*. They are the focus of this book.

Conceiving of method as guidelines for formulating and assessing middle-range theory is quite insightful. It forces one to appreciate that there is indeed a gulf between artifact and general theory. It also forces archaeologists to explore and understand what fills or should fill that gulf. In addition, it forces archaeologists to explore the methodological guidelines that can or should be used for that purpose. A serious investigation of method is essential if archaeologists are to be confident that their theories do explain the artifactual record in a productive way.

The meaning of method outlined here is quite broad. The difficulty is not that the meaning is too inclusive, however, but that it can be confused with other meanings of method.

Four meanings of method can be identified: (1) method as techniques for recovering or establishing data, such as pollen analysis and radiocarbon dating; (2) method as approaches to finding and organizing field data, such as using statistical means for predicting site location and making an analytic survey of a site; (3) method as ways to interpret data, such as use of diffusionist models, processual models, and Marxist interpretations; and (4) method as tools

for formulating and assessing theories, such as inductive method and refutationist method. This fourth meaning of method is normally called "scientific method." Nevertheless, discussion of the scientific method cannot avoid rather substantial reference to method as ways to interpret data (the third category). The intellectual and attitudinal framework within which the artifactual record is conceived has a major bearing on whether scientific method can be fruitfully utilized, much less used at all.

The first and second meanings of method fall more clearly onto the empirical rather than the theoretical side of archaeology. Empirical matters have an important bearing on archaeological theory. A number of arguments and examples in this book drive that point home; however, the empirical side of archaeology is largely beyond the scope of this book and hence is discussed only tangentially.

Theory

The word "theory" can be used in numerous ways. Misunderstanding can come about because of different meanings, and because writers switch between meanings.

Broadly speaking, in this book theory is interchangeable with explanation. The reason is that a theory is simply an attempt to explain. Such usage is quite common and is not in itself prone to misunderstanding. Confusion can arise, however, for other reasons, such as the different levels of theorizing or the number and variety of components that constitute an explanation.

The division of theories into three levels has already proven helpful. Recall that method is an active tool in the middle range, and the explanations with which an archaeologist is normally involved are in that range. In theoretic practice the low and high levels do function quite differently than the middle level: Low-level or observational theories are normally a given and high-level or controlling theories are usually assumed. Labeling the ideas at all three levels as "theories," however, can camouflage these rather substantial differences. For the sake of clarity, then, the word "theory" in this book

will simply mean an explanation at the middle range. An explicit verbal flag will be waved whenever the discussion turns to low-level or high-level theories.

Incidentally, another convention is to distinguish between expressions such as "hypothesis," "theory," and "law." From this conventional perspective "hypotheses" are quite speculative and tentative, normally suggested before substantial research is undertaken to assess them. "Theories," on the other hand, are hypotheses that have been confirmed to the point where they can be held with reasonable confidence. "Laws" are theories that are so highly confirmed that they can be held without further question. These distinctions will not be used in this book for two reasons. First and foremost, all explanations are conjectural. Even though some may be more highly corroborated (by passing tests) than others, they are all prone to error. There are no "laws," then, and making a distinction between "hypothesis" and "theory" can mask a more important shared characteristic: vulnerability to error. Explanations had better be vulnerable, by the way, if they are to provide a route to further theory development. Second, the distinctions between "hypothesis," "theory," and "law" seem to reflect a subjective degree of confidence rather than an objective measure of corroboration. There is no workable measure of objective corroboration, to be sure, but making a subjective judgment of confidence is even more tenuous. The history of science is strewn with explanations that were held with great confidence but were overthrown, and explanations that inspired little confidence but eventually flourished.

The number and variety of components in an explanation can also lead to confusion in the use of the word "theory." Even in uncomplicated form, a theory is a conjunction of statements rather than just one statement. Consider the following example: Agricultural workers were redeployed to produce religious icons because of the declining prestige of priests, causing a further decrease in agricultural production. This explanation can be analyzed into three component statements: (1) Agricultural workers were redeployed to produce religious icons; (2) the prestige of priests was on the decline; and (3) whenever agricultural workers are redeployed to alter-

native types of production, all other factors remaining unchanged, there will be a decrease in agricultural production. Not only are there three statements, but there are different types of statements. Statements (1) and (2) are low-level assertions that summarize "facts," whereas (3) is a middle-level statement that is universalized. The word "theory" could apply to the original explanation, which contains all three statements, or it could refer to (1) or (2) or both (1) and (2), or it could refer to (3). Matters can become considerably more complicated than outlined here because the original explanation would typically be associated with numerous other explanatory statements. That would definitely be the case when a theory is only one part of a systemic explanation, for example. Is there a way around such potential problems of reference when using the word "theory?" I believe so, and it is not complicated.

Normally, there is no need to be overly specific about the precise referent of the word "theory." The context most often is clear enough that a general reference is sufficient. For example, in many contexts one can simply and appropriately refer to "the theory of relativity," or the "hydraulic theory of the origin of state structure." Each of those theories, needless to say, is made up of a web of different statements at different levels. Unless the context requires further specificity, however, there normally will be no confusion, and hence no need to be more precise. When more precision is required, then it can be provided. For example, when testing an explanation it is usually crucial to designate its theoretic components so that test(s) can be directed at the appropriate part(s) of a theory. In that way one can have a better chance of discovering which components are sound and which are questionable. But it is not necessary to go into such detail if ones task at the moment does not require it.

Foci of the controversy over method

The turn toward more intensive and critical discussion of theory formation and assessment, along with use of method for that purpose, constitutes a major revolution in archaeology. Like all revolutions, it

has created storms of controversy. The controversy swirls around three foci.

First, there are numerous ways of attempting to improve archaeological theory. It is helpful to distinguish *internal* types of analysis—those that focus on the methodological approaches actually employed in archaeological theory building and testing—from *external* types of analysis—those that attempt to import methodology from other disciplines such as the physical sciences, biological sciences, social sciences, and the philosophy of science.

Those who put their faith in the internal approaches understandably tend to view archaeology as a unique discipline and have confidence that methodological insight lies within its resources. Those who search for external criteria tend, just as understandably, to conceive of archaeology as a subdiscipline of other fields—such as the physical, biological, or social sciences—and assume that wisdom on matters of method can best be obtained from those fields.

Second, it has been recognized that there are numerous views about how to build and test explanations. Faced with different and contradictory methodological positions, it is difficult to know which are preferable and why, much less how to apply method judiciously.

The controversies over internal and external approaches, and over the multiplicity of methods, are further complicated by a third type of disagreement: disagreement over the purposes of archaeological work. Theory building and assessment are endorsed by many. Yet there is also a backlash against theoretical concerns and a call to return to fieldwork (Smith 1955; Courbin 1988). Controversies over theory are a wasteful distraction to those less than enamored with the rising star of theoretical archaeology. To them, lack of consensus on theory and method only confirms the futility of theoretical speculation. They would prefer that time and energy expended on theoretical and methodological debate be spent in the field (for a humorous parable, see Flannery 1982).

The contentions concerning theory building and assessment in archaeology are somewhat caricatured here. They will, nevertheless, be recognized by nearly any contemporary archaeologist. In order to clarify and discuss the multiple issues underlying these contentions, in the following sections I review the rise of theoretical archaeology

and its relationship to science, and outline the connection between theoretical archaeology and the New Archaeology.

Views of Science and the Revolution in Theoretical Archaeology

The revolution in theoretical archaeology is rooted in rejecting the tendency to write prehistory as a myth, or fairy tale, or some other type of fiction. It has not been denied, however, that there may be some truth in early accounts of prehistory. Recall, for example, how stories of Troy and the Trojan War were considered by many to be purely myth. Nevertheless, the supposedly mythical tales of Homer led to a spectacular discovery: Bronze-Age Hisarlik. Heinrich Schliemann's work in the summer of 1868 was pivotal. His faith that Homer's geographical commentary was accurate enabled him to find where Troy had stood. Another example occurred in 1880 when A. H. Sayce boldly postulated that there had existed in Anatolia an important but undiscovered empire, that of the Hittites. Few took Sayce's view seriously until excavations in the 1890s by Flinders Petrie in Egypt revealed clay tablets that proved Sayce correct (Renfrew 1989a:47–50).

To be more precise, then, the thrust of the revolution is not and should not be to reject uncritical accounts of ancient events out of hand. It is, instead, to make the procedures of theory building explicit, to improve upon them, and to use them repeatedly. The goal is to produce theories that can be criticized and evaluated, and hence modified or even replaced by other theories. Even if none among a set of competing theories seem satisfactory, at least the stage is open for consideration of alternative explanations rather than being closed to all but entrenched theories.

The revolution in archaeology introduced methods of science into theoretical discussion. The reason is plausible: Methods of science are designed to produce theories that can be criticized and evaluated, and thus modified or replaced. Fruitful use of scientific method also necessitates avoiding abusive use.

Many abuses follow from the attempt to use definitions of scien-

tific rather than to deal with methods that help theory building and assessment. One difficulty is that labeling a theory "scientific" because it follows some definition does not in itself render the theory any more deserving of confidence. A related difficulty is that the term "scientific" has many meanings, none of which are likely to be entirely satisfactory from all perspectives. For these reasons it is helpful to think of scientific as simply meaning "arrived at by means of scientific method." Attention can then turn to different methodological proposals, and the advantages as well as disadvantages of using them in the formulation and assessment of theories. Whether or not the label "scientific" is also used would then be quite immaterial. Perhaps it would be less confusing if it were abandoned.

Another source of abuse is the ring of authority and respect conveyed by the word "scientific." Labeling a theory as "scientific" can give a stamp of legitimacy without aiding theory development, the consequences of which can actually be harmful. Unwarranted authenticity can discourage criticism. It can also encourage dogmatism on the part of those who claim scientific status for their theories.

Yet another abuse derives from the ill-guided attempts to establish whether theories meet some precast meaning of scientific. These attempts can easily lead to interminable and barren disputes. The disillusionment that follows can fuel the relativistic (but unwarranted) conclusion that there are no reliable guidelines for improving theories, nor criteria for judging some preferable to others. It is only a small step to the view that nonintellectual factors such as power or propaganda are the key to establishing theories, especially in archaeology and other disciplines with potential social and political consequences.

The New Archaeology: First and Second Meanings

There may be no label more confusing in the lexicon of archaeologists than that of the New Archaeology. It is assumed to have clear reference when it actually has multiple and incompatible meanings. It was pointed out earlier in this chapter that the New Archaeology

is a generic label for explicit use of method to improve archaeological explanation, and for the associated optimism that reliable knowledge of the unwritten past can be culled from the artifactual record. In addition to these general references, four quite particular meanings of the New Archaeology can be distinguished. Each is related explicitly or implicitly to science or views of science. The first and second meanings are discussed here, and the third and fourth meanings are addressed later in the chapter.

The first meaning of the New Archaeology arose shortly after the advent of radiocarbon dating the early 1950s. It became established when radiocarbon dating was improved with calibrated dates from tree-ring analysis of the bristlecone pine. It is an old story now, but recall that the radiocarbon dating of many significant artifacts throughout Europe and the Mediterranean basin eventually overturned the accepted explanation of cultural development in those regions. The received view was that cultural progress had advanced in Mesopotamia and Egypt at an early date, diffusing from those regions into Europe. Radiocarbon dating showed that such could not have been the case: Many artifacts in Europe predated those from which they supposedly diffused. A prime example of *diffusionist theory* became highly suspect. Diffusionist theory is the view that culture spreads from more "advanced" centers to more "primitive" ones via contact among peoples.

The tidal wave from the downfall of the diffusionist explanation of the origins of European culture went much deeper than the reordering of the chronological record. Diffusionist theories in general came under siege, and diffusionist theories had dominated explanations of cultural development. It was recognized that cultural influences certainly do, at times, spread by diffusion. No longer, however, could it be uncritically assumed that diffusion was the explanation. Thenceforth it had to be argued, both empirically and in competition with other explanations (Renfrew 1973a). Of particular importance here is that the New Archaeology became a label for the emerging nondiffusionist perspectives.

The first meaning of the New Archaeology, then, designates any nondiffusionist theory. *Processual* explanations, which assume that social and cultural change are primarily a function of internal dy-

namics ("processes"), became the predominate nondiffusionist theories. That is why the New Archaeology is frequently used as a stand-in for processual archaeology. It is a more restricted version of the first meaning.

A second meaning of the New Archaeology also stems from the early 1950s. There were major shock waves in archaeological theory due to the advent of radiocarbon dating, but many other types of scientific techniques were also being developed for generating and analyzing field data. Examples are pollen analysis, archaeomagnetic dating, and osteoarchaeology. Such techniques are also called "scientific methods," although the meaning is clearly different from meaning of that expression in this book. In any case, these and other scientific techniques, including radiocarbon dating, are sometimes referred to as the New Archaeology. Most of the techniques became widely adopted and have remained relatively noncontroversial instruments for archaeological fieldwork. Use of the New Archaeology to refer to scientific techniques of data collection and analysis was made more popular when David Wilson's book on scientific techniques of data collection and analysis, *Atoms of Time Past* (Wilson 1975a) was published in an American edition under the title *The New Archaeology* (Wilson 1975b).

Notice that the second meaning of the New Archaeology is quite distinct from the first. The first refers to a change in archaeological explanation, whereas the latter refers to scientific techniques used to generate data and analyze data. They can easily be confused, however, because the downfall of uncritical diffusionist theory (associated with the first meaning) was closely associated with radiocarbon dating (an example of the second meaning).

Views of Science, Views of Knowledge, and Method

The third and fourth meanings of the New Archaeology emerge from approaches to structuring and evaluating theories. In short, they both have emerged from concerns over method.

Method—the guidelines for building and assessing theories—is

implied by any view of science. It is often called scientific method for that reason. Not surprisingly, effective use of a method requires a solid understanding of the view of science with which it is associated. But there are different views of science.

It is best not to think of science as a monolithic entity, but as an enterprise composed of numerous and different goals and tasks. That is why the expression "scientific enterprise," rather than just "science," is often employed in this book. Alternative tools are often needed for the contrasting goals and tasks, however, and that is why there are different methods.

When it is realized that the scientific enterprise is comprised of a variety of goals and tasks, it comes as no surprise that there are multiple views of science and hence different formulas for generating knowledge and incompatible criteria for judging knowledge "scientific." Far from being a disadvantage, understanding contrasting views of science and method is absolutely crucial for effective use of methodological tools. The reason is not mysterious: Views of science, and the method implied by them, are addressed to different facets of science. Archaeologists are themselves faced by numerous and contrasting tasks when developing theory. When searching for method appropriate for a particular theoretical task, then, familiarity with different views of science enables the selection to be more judicious.

Four Views of Science and Method

The four views of science are the inductive, paradigmatic, refutationist, and anarchic.

According to the classical *inductive view,* knowledge grows by gathering facts and then generalizing—inducing—explanations from them. Knowledge is legitimate if it is reducible to the facts. The goal of method is to establish the truth of theories. Variations on induction have dominated the English-speaking world ever since the idea was formulated by Francis Bacon in the seventeenth century.

Contemporary versions of the inductive view relegate the genera-

tion of theories to the background, focusing on the legitimation of theories relative to available data. Contemporary induction is probabilistic, with a modified goal of establishing the probable truth of theories. Many are also *positivistic;* that is, they are hostile to speculation about causes, minds, and other entities underlying data. Positivists have even developed terminology that implies there are no assumptions about what underlies data; for example, they prefer the expression "correlation of data" to "induction from facts."

The most salient contribution of induction is its emphasis on the empirical side of theory. That is why induction is superior to the more subjective method of the Aristotelian view it replaced. The principal weakness is its goal of establishing truth, or probable truth. The goal cannot be realized, and attempts to reach it yield inadequate and even unworkable guidelines for making decisions about theories.

The inductive view of knowledge still dominates the English-speaking world. Very entrenched, inductive method tends to become ritualistic. That is why it is often imposed ideologically. Furthermore, its influence has been so pervasive that two other views—the paradigmatic and refutationist views—have emerged from criticism of the inductive view.

According to the *paradigmatic view,* science develops from a set of assumptions called a "paradigm." Tracing the implications of a paradigm by research is called "normal science." Although criticism of a paradigm is discouraged, normal science does uncover anomalies. Overlooked or downplayed during the course of normal science, anomalies eventually provide the impetus to launch "revolutionary science:" the questioning of an established paradigm along with an earnest search for a new paradigm. Revolutionary science ends with acceptance of a new paradigm. The establishment of a new paradigm ushers in another period of normal science and hence the beginning of another paradigmatic cycle.

The paradigmatic view, systematized in its contemporary form by Thomas Kuhn in the early 1960s, incorporates sociological forces and dogmatic elements into its account of the scientific enterprise. The principal weakness is that it underestimates the role of rational pro-

cedures in scientific change, providing only a rudimentary account of how reason can function in theory assessment and selection.

According to the *refutationist* view, science consists of theories about the empirical world. The goal of science is to develop better theories. Progress is made by finding mistakes in received theories and overcoming mistakes by proposing alternative theories. Theories are best regarded as stepping-stones toward better theories, and so it is crucial that theories be *refutable*, or vulnerable to error. If theories are refutable, they are vulnerable to empirical demonstration of error. The refutationist view was developed in the early 1930s by Karl Popper.

The principal strengths of the refutationist view are its goal—to make progress—and its workable means of moving toward the goal—finding and overcoming error in theories. Its major lacunae are an inadequate account of sociological and other less than rational factors operating in the scientific enterprise, and an insufficient account of the role of competing theories.

As discussed in greater detail in the final part of this book, theories can be developed that include distinctly individualistic elements such as cognition and decision making. In these theories individuals are interpreted as active agents, not passive automatons. Because active agents can change ideas and decisions, some transformations in human institutions are unpredictable. It is argued that the best approach to developing such theories is with *methodological individualism*. Methodological individualism can be understood from a variety of perspectives, but its methodological core is closely associated with refutationist method. A background in refutationist method is important for understanding methodological individualism thoroughly, and using it effectively.

According to the fourth view of science, the *anarchic* view, the goal of science is to increase understanding through theoretical development. That goal is similar to the goal in the refutationist view. Unlike in the refutationist view, however, the most efficient route is theoretical anarchy: proposing theories of any type, which necessitates there be *no* methodological constraints. Theories should be supported by any means possible, including deliberately propagandistic argumentation and accentuation of difficulties in competing theories.

Developed by Paul Feyerabend in the 1970s, the anarchic view provides excellent medicine for scientism and other ideological uses of method. The anarchic view also highlights the importance of creativity, argumentative skill, and sheer luck, factors that can never be captured by appeal to scientific method. Finally, it gives a detailed account of the role of multiple, competing explanations in theory development. Like the paradigmatic view, a serious weakness is its disregard for the role of rational criteria in making decisions about theories.

A Multiple Approach to Method

The variety of theoretical tasks in a field such as archaeology are best approached with numerous methodological tools. When searching for theory, for example, exploring correlative relations among data will sometimes suggest an explanation. Careful attention to correlative relations among data is a mandate of inductive method. When testing an explanation, however, focusing on points vulnerable to error is normally most fruitful. That focus is a mandate of refutationist method. Inductive testing is aimed at establishing the truth or probable truth of the explanation. It will later be argued that attempting to establish truth or probable truth is fruitless except in trivial cases, and that it is often detrimental as well. Generalizing from the examples already given, the method implied by one view of science can be fruitful for some theoretical tasks, but not for others. That is why it is argued that archaeologists should use a *multiple* approach to method; that is, archaeologists should pick and choose method that is appropriate for a specific theoretical task.

As pointed out in the Introduction, a common tendency in the methodological literature has been to adopt a monolithic view of science. Not only does that approach encourage scientism and its unfortunate consequences, but the use of one and only one methodological framework is simply not workable. It is one reason that methodological literature is not always very helpful. In contrast, use of the multiple approach to scientific method allows creation of tools more useful to archaeologists for making decisions about theories.

Incidentally, it is common for methodological purists to feel that "pollution" from other methods would open the door to relativism. Purists fear that methodological pollution would leave no reliable standards by which to criticize theories, much less to choose rationally among them or make productive decisions about them. The upshot would be a muddle that permits nearly any theory to gain scientific status. It comes as no surprise, then, that methodological purists are attracted to scientism. Unswerving application of the (supposedly) one and only one method—read "pure method"—is thought to be a defense against relativism.

The multiple approach does draw upon different sets of methodological tools rather than just one set. That step need not, however, put one on a slippery slope to relativism. For one thing, the choice of method is far from arbitrary. Building theory is like building a house: Different tasks require different tools, but one *must* pick an appropriate tool for a given task. Familiarity with an array of methodological tools along with the advantages and disadvantages of each enhances rather than decreases the ability to choose an appropriate tool. For relativists the choice of method is not intellectually judicious but arbitrary, usually functioning to reinforce ones own favored theories at the expense of others.

Second, despite the benefits of familiarity with numerous views of science and method, the contributions of each to theory development are not all equal. For example, testability is absolutely crucial for effective theory development, a point that will be argued and illustrated extensively. Testability is the heart and soul of the refutationist view of science. Testability is also fatal to relativism; it provides a rational way of discovering where theories are mistaken and an effective route to improving theories and developing new ones. Induction, on the other hand, is not so significant. I argue that much theory development could proceed without major inductive influences.

Although induction does not provide the central methodological framework for archaeology, it is still crucial to theory development for a number of reasons. One reason is its emphasis on the importance of a sound empirical basis for theorizing. A related reason is its encouragement of judicious fieldwork to yield an accurate artifactual record. Induction also provides useful guidelines for generating

theories about prehistoric thinking when such theories cannot confidently be generalized beyond the data base from which they arise. Familiarity with induction is important for another reason as well. Disappointment with inductive approaches to theory building have amplified the relativistic tendencies among some archaeologists (see Bell 1987a). Separating the strengths of induction from its drawbacks can help one exploit the former while dampening the relativistic reaction to the latter. In short, then, the multiple approach provides weapons against relativism rather than leading to it.

The New Archaeology: Internal and External Meanings

The groundwork has now been laid to discuss the third and fourth meanings of the New Archaeology: the internal and the external. Although different, these two meanings are often confused. For that reason, and the fact that those embracing either meaning are trying to use method to improve theory, it will be important to offer a thorough discussion of each.

The *internal* meaning of the New Archaeology is aimed at improving theory by explicitly analyzing and improving methods already implicit in theoretical archaeology. It assumes that there has been productive theoretical work in archaeology, and that the method implicit ("internal") in that work has contributed to its success.

In philosophical circles, the search for and evaluation of method as actually employed are tasks within *naturalized* epistemology. A naturalized approach to the philosophy of science, for example, includes a study of what actually transpires in the scientific enterprise and among scientists rather than focusing exclusively on the formal properties of rational procedures (for example, see Giere 1988 and Hull 1988). The paradigmatic view of science is the product of a naturalized approach. It incorporates sociological forces and psychological factors. Furthermore, the intellectual procedures identified in the paradigmatic view emerge from attempted descriptions of scientific practice rather than prescriptions for it.

Naturalized approaches do not dominate professional philosophy

even though they are being given more consideration. The trend toward naturalized approaches is an especially healthy one, in my view, especially when used in conjunction with prescriptive work. Naturalized approaches to understanding method can enhance the effectiveness of methodological recommendations. A naturalized study can reveal the context in which methodological decisions are actually faced by practitioners, and can expose recommendations that are irrelevant, or at least inapplicable.

In my view, most of the valuable methodological insights generated in the New Archaeology derive from the internal approach. Generating "scientific" theories is not a goal of the internal approach. Whether archaeological explanations can be labeled "scientific" or not, or should be labeled "scientific" or not, is not considered crucial. Salient examples of desirable methodology might be labeled "scientific" in a derivative sense, but the use of that label would add nothing to the rationale for a particular method. Also noticeable is the *lack* of highly generalized and formal guidelines. Methodological suggestions, as outgrowths of theoretical work in archaeology, tend to be embraced cautiously rather than universalized compulsively.

In addition, method has historically developed in the context of use. Progress was made in the physical sciences, for example, long before any of the contemporary methodological views were systematized. Furthermore, methodological suggestions and contributions by practicing scientists have been significant. For example, Isaac Newton was concerned with what would now be called methodological issues. Most notable was his concern about the empirical status of his gravitational theory, which seemed suspiciously akin to the astrological "emanations" he so deplored. Yet another reason is that methodological suggestions that emerge from actual theoretical work can be more readily grasped by those who would employ them. For all of these reasons methodological insights from the internal approach have the best chance of being relevant and effective in theoretical archaeology.

A noteworthy example of the internal approach to the New Archaeology is Jean-Claude Gardin's *Archaeological Constructs: An As-*