# Chapter 8: Summary

Today prehistory is rapidly becoming a science, a trend established nearly twenty years ago and one which has gained marked momentum in the last ten. In situations of rapid change there is a strong tendency for an old/new dichotomy to develop and such there is, at least to a moderate degree, in prehistory, represented by what has been called the “old archaeology” and the “new archaeology.” The old archaeology, concerned primarily with objects and names for the objects, is giving way. to explanatory methods and objectives of the new archaeology. The freedom permitted the workers of the old archaeology as an art is increasingly being constrained by the goals of the new, primarily by the scientific insistence that statements and constructs be testable. The greatest constraints and the greatest progress in reformulating prehistory as a science has been made in the realm of methods of explanation, much of which has been borrowed from and modified after similar procedures of the hard sciences.

The terminological confusion and conceptual imprecision of the old archaeology created few difficulties for the field as an art, for it really did not matter what the terms and concepts meant if they were not to be tested. With the insistence that statements and constructs be testable has come the requirement of knowing precisely what the units and statements mean, and the imprecision of the old archaeology has become a major and, in some respects, almost insurmountable liability. From the point of view of the student of prehistory, the old archaeology could be acquired as an art-by intuitive assimilation. Today the discipline must be treated as a body of knowledge which can be learned. Yet the terminological morass presents serious barriers to such acquisition.

In establishing scientific goals and methods to achieve them, the new archaeology has adopted rather uncritically the units devised by the old archaeology. In many cases, the old units were not specifically designed for any specific purpose, let alone the newly conceived aims of the last two decades. Unfortunately, explanations can be no better than the units they employ and the data they attempt to explain, and the. new archaeology has not seriously considered either of these. Indeed, the most serious criticisms of the new archaeology turn on its lack of formal sophistication.

In spite of the inadequacy of the old archaeology when measured by the criteria of science and in spite of the lack of any means of internal evaluation aside from a poll of majority opinion as to what is good or which prehistorian is good, explanations of limited scope and capable of independent evaluation have been made. The question is “how?” What makes the “good” prehistorian good? The old archaeology does not provide explicit answers.

It is in this milieu that we focused upon the construction of units in prehistory, units which have been largely devised by the old archaeology in an unsystematic fashion over a relatively long period of time. These units remain the formal foundation of both new and old archaeologies. Our considerations have been primarily of the old archaeology, which constitutes the bulk of the general literature and the literature on systematics, but with sympathy for the goals of the new. The purpose has been not so much to point out errors and inconsistencies (though this is an important aspect), but to isolate the good features, good, again, from a scientific perspective. Since the many problems faced by the student of prehistory, the confusing terminology, the inconsistencies of method, the lack of evaluative methods, and the lack of any kind of unity of discipline, are all interconnected, a single relatively simple solution was sought in setting forth a unitary system of unit construction including the assumptions on which it is founded and which satisfies the requirements of science. This system was employed to organize and clarify the various units and terms employed by prehistory. Inevitably, much of that currently labeled archaeology was found inadequate as science and discarded from consideration. Much of the literature, however, displays a central theme amenable to interpretation as a scientifically useful system of formal theory. This is nowhere in its entirety spelled out in the archaeological literature. Parts are explicit here, others there, some of it nowhere explicit but implicit only in the operations of the discipline. That a large part of what is done is amenable to such interpretation is a commendation for prehistory. The central theme is essentially an answer to the question of how “good prehistory” and “good prehistorians” have been identified, and why “good prehistory” works. Too, application of the general model permits a unified set of terms, ones which mean the same thing every time they are used, to be employed, and provides a way to identify any unit, given sufficient information, regardless of the name given it in a particular study. A unified terminology was not possible in the old archaeology because of its substantive preoccupation. As long as the names and units were bound to specific studies and specific problems, there was no possibility of developing overt theory. The words for its construction were lacking. In an attempt to avoid this substantive tie and the traditional confusion between concepts and their referents, examples in concrete terms have been kept to a minimum. A unified terminology, measured itself against the goal of science for its utility, can prove of immense benefit in learning prehistory, how it works, its limitations both current and potential, and aid in the selection of units for specific kinds of problems. It is fair, I think, to say that the lack of progress of the old archaeology is not so much a function of the people practicing it or intrinsic failures of the conceptual tools, but of the inconsistent terminology effectively barring much communication and admitting much misunderstanding and error. The rather uncritical borrowing of units by the new archaeology for purposes never conceived when tbe units were created can be avoided. A general model, no matter how simplified it may be, offers the possibility of distinguishing the inadequacies of theory from the misuse, abuse, and misapplication of good theory. Rational evaluation is possible.

The general model for unit construction in prehistory and the assumptions it is founded upon have been detailed in the several chapters of Part II in piecemeal fashion in an attempt both to show their rationale in the general scheme presented in Part I and to tie them generally to practice in prehistory. The focus upon the original formulations of classificatory concepts in the discipline rather than more modem renamed and elaborated versions points up the basic lack of change in prehistoric systematics. The remainder of this final chapter attempts to present in brief form this general model, the formal theory of prehistory.

Part I presents the basic notions used throughout, the core of which is the distinction between ideational and phenomenological realms and the correlative distinctions between definition and “description, classes and groups, and classification and grouping. The import of the distinctions is two-fold: ( 1 ) the means of evaluating ideational constructs and phenomena differ-logical proof in the former case and probability or plausibility in the latter; and (2) the characteristics of ideational constructs and phenomenological units differ in respects that affect their utility in scientific endeavor. Ideational constructs are ahistorical and capable of intensional definition, whereas phenomenological units are contingency-bound and capable of extensional definition at best. The ideational and phenomenological realms are articulated in the framework of science, in that science employs ideational constructs to explain phenomena. The distinction between ideational and phenomenological is entirely analytic, in the nature of the logic of justification. If only because men necessarily use language, the two are fused in reality. The utility of such distinctions lies in their ability to clarify what has been done, for both evaluation and communication, but it is not a program of operational procedures.

Explanation is taken to mean prediction and control. Differences in value are capable of explanation but differences in kind (a function of unit construction) are not. The role of formal theory in science is to provide the means of organizing phenomena so that their explanation is possible. The prime requisite for such organizations is that the units permit recurrence and it is recurrence that enables one to link the known (observed fact) with the unknown (prediction).

Means for unit construction were examined in terms of the ideational/ phenomenological distinction which results in the identification of two fundamentally different devices for creating arrangements-classification, which produces ahistorical, intensionally-defined, ideational units, termed classes; and grouping, which produces contingency-bound, extensionally-defined sets of phenomena called groups. Classes are articulated with phenomena by means of identification, isolating at given points in time and space those phenomena which display the necessary and sufficient conditions for membership as stipulated by the intensional definition. Identified phenomena constitute special groups called the *denotata* of the class. The only groups, aggregates of phenomena, which are capable of explanation in a scientific sense are the *denotata* of classes. Identification is absent with grouping devices since the units and the phenomena are coterminous.

An additional dimension, that of ranking or mutual relationship of units within a system of arrangement, was added to the first distinctions, and two kinds of classification and two kinds of grouping so distinguished: unranked classes all at the same level produced by paradigmatic classification, and hierarchically ranked classes at several levels produced by taxonomic classification; unranked groups all at the same level produced by statistical clustering, and potentially hierarchically ranked groups at several levels produced by numerical taxonomy. Ranking is deemed relevant because it affects the parsimony of the various devices, hierarchic arrangements being the least parsimonious, but most elegant.

A comparison of the four possible means of arrangement with the requirements of unit construction for science identifies classificatory devices as appropriate to this general aim and grouping as inappropriate. Classification produces units which have a defined meaning and the possibility of recurrence, whereas grouping produces units which have no specifiable meaning beyond their existence and which are localized at a given point in time and space. Classification provides a means of measuring changes in value and a basis for comparison. Grouping is not reconcilable to measuring change, and cannot provide the framework for comparison. Within classification, the differences between paradigmatic classification and taxonomic classification affect their utility, or rather their roles in scientific endeavor. Paradigmatic classification, by reason of its relative parsimony, can function as the main tool for unit construction when the purpose is heuristic. Taxonomic classification, because of its lack of parsimony, is useful only in didactive situations in which elegant presentation of already established paradigmatic classifications is required. The characteristic lack of parsimony of taxonomies vitiates their use unless the organization can be shown to be appropriate beforehand.

Another aspect of classification emphasized is the role of problem in its use and evaluation. To construct a classification requires a series of decisions or choices. The field or root of the classification (determined by the discipline), the scale at which features are to be distinguished (determined by the field), and the sets of features to be employed as criteria (determined by the problem) all must be selected and defined. The selection of a feature as definitive represents a hypothesis about the nature of the feature and its relevance for a specific problem. If the hypothesis is assumed to be correct, then the manner in which its use will organize phenomena is predictable. The utility of the hypothesis is tested by comparing the expected distribution with the actual distribution of *denotata*. A given classification either will organize a corpus so that the problem is soluble, or it will not. If alternative classifications are available, the criteria of elegance, parsimony, and sufficiency provide a means of selecting the most appropriate one. Without a specified problem, however, there is no means of justifying the selection of definitive features or evaluating the utility of the classification. Unfortunately, far too often classifications are not accompanied by explicit statements of problem, and this is currently the single greatest operational deficiency in prehistoric systematics.

Grouping, since it produces extensionally defined units, is not amenable to testing. Because groups are applicable as units only to the material from which they are derived, they cannot be tested against new data. Only the mechanics of grouping are testable, not the groups themselves. Groups are thus usually proclaimed as natural or non-arbitrary in lieu of some specified meaning, and the problem for which they serve is that of “description.” It was noted that any set of words will suffice the purpose of “description,” and thus the means by which the words are invented is irrelevant.

To construct a model of prehistory's formal theory utilizing these notions requires that the discipline be defined as a science in such terms as to delineate empirically the subject matter and to specify the general character of its potential explanations. Prehistory is thus the science of artifacts conducted in terms of the concept culture. Artifact, the concept delineating the subject matter of prehistory, is understood to mean anything which owes any of its attributes to human activity, and culture, the concept controlling the nature of its explanations, is defined as shared ideas. Prehistory is the science which isolates human products and seeks to explain them in human terms. The specification of the kind of study (science), the subject matter (artifact), and the kind of explanation (culture) provides the basic elements for the statement of prehistory's formal theory.

The definitions of both artifact and culture are theoretical and thus do not evidence any particular problem or any particular body of data. They are intended to subsume all of the tactical definitions found in the literature, treating these definitions as special cases of the theoretical definitions and derived by restricting the range of application for a particular problem or body of data. Use of the definitions in the archaeological literature is impossible in the present context because they either evidence some specific content or embody nonessential inferences.

Once the discipline has been defined and the notions of artifact and culture theoretically defined, the development of a model of prehistory's formal operations is relatively straightforward. The aim of the inquiry can be specified. The role of formal theory must be that of creating cultural classifications for artifacts. Making use of the general considerations in Part I, the goal is limited to showing how prehistory converts classification in general into cultural classifications of artifacts. This entailed the identification of the kinds of classification employed and the manner in which they are used. A necessary adjunct is the identification of grouping devices frequently encountered assuming classificatory functions in “descriptive” and “cultural reconstruction” approaches.

The identification of the devices used (classification or grouping) and the forms they take (paradigmatic or taxonomic classification and statistical clustering or numerical taxonomy) is not an easy matter, since the means by which they have been created is rarely explicit, the units customarily taken for granted, and, more often than not, unsystematically named. The account provided for the formal operations of prehistory is thus sufficient only to account for what is done. Its parsimony cannot be assessed directly from the literary sources. The examination suggests that only two kinds of classification are employed: paradigmatic classification, which is by far the most common, and a special form of taxonomic classification which makes use of the dimensional features of paradigmatic classification. True taxonomy is not important; the few cases which are conformable to interpretation as true taxonomy are probably poorly explicated examples of the special-case taxonomy. Both statistical clustering and numerical taxonomy are restricted to the “descriptive” approach with the exception of the general use of numerical taxonomy to provide a rationale for the implicit paradigmatic procedures which lead to the construction of phases. Paradigmatic classes are commonly formed for three scales of phenomena: (1) attributes of discrete objects, with the classes termed “modes”; (2) discrete objects, with the classes termed “types”; and (3) occupations (aggregates of discrete objects), with the classes termed “phases.” The special-case taxonomies link alternative paradigmatic classifications which differ from each other in level at all three scales. The number of paradigmatic classifications at any scale is infinitely large, not only by varying the level, but also by changing the criteria used-common means of creating classes to serve specific problems (e.g., functional types, historical types at the scale of discrete object; phases, foci, traditions, horizons, stages, and so forth, at the scale of occupation).

Prehistory has traditionally conceived phenomena in such a manner as to be amenable to scientific explanation. Prehistory further imposes the requirement that the units be cultural. The identities represented by classes and the “behavior” of these classes with respect to other classes and in other dimensions (time/space) must be viewed as the products of ideas held in common by the men who made, used, and deposited the artifacts concerned. How the cultural requirement is met can be treated separately.

Artifacts are identified by the criterion of human involvement and their identification serves to isolate those phenomena amenable to the interests of prehistory. The ease with which artifacts may be identified varies with scale and circumstance; a certain number of human products may be excluded because of an inability to reasonably assume their artificial origin. This loss of data is a necessary sacrifice to accuracy. It is essential for the purposes of the discipline that no natural objects be included by its systematics, but it is not equally important that all artificial objects are included. The creation of categories of artifacts requires the stipulation of scale and the three scales enumerated above are nearly universal though not exhaustive in prehistory. Implicit in classification at the lowest scale is a fourth and still lower scale, attributes of attributes of discrete objects. Higher scales make use of classes formed at lower scales in analysis.

Using the concept artifact to segregate phenomena for which cultural classes can be constructed does not mean ipso facto that classes of artifacts are cultural. While this possibility is not generally recognized, non-cultural classes are in practice generally avoided, intuitively. To insure structurally that artifact classes are cultural, additional operations are involved.

First, the potential features themselves must be identified as products of human activity, a parallel procedure to the identification of artifacts and making use of a dichotomous index (artificial attribute/natural attribute). As with artifact, the identification of artificial attributes varies with circumstance, and a certain number of artificial attributes will be lost, since conditions may not reasonably permit the assumption of human involvement. Restricting the source of criteria to artificial attributes insures that artifacts will be treated as human products, eliminating the possibility of natural classes of artifacts.

Secondly, prehistory makes an assumption to convert classes defined on the basis of artificial attributes into cultural classes. This single, simple assumption is the pivotal operation in formal theory, the one upon which the discipline is based--:creating features, usually modes, from artificial attributes and completing the articulation of the notion of artifact and that of culture. It is assumed that if a set of objects share the same feature, and that if that feature is artificial, then the objects share that feature because the people responsible shared the same idea. A simple equation is made between recurrent feature and shared idea. As was argued in Part II, this is the only plausible account for shared artificial features. While never explicitly stated in the literature, this is the most universal operation in prehistory, the one which provides such coherence as the discipline has. A certain amount of confusion is possible, and does indeed occur, with regard to this equation: a concern with “intent,” contact, and genetic relationships (analogs/ homologs). These post hoc queries are irrelevant so far as formal theory is concerned. The equation stipulates only formal sharing, that the artifacts concerned may be treated (for a specified purpose) as products of the same mental template. The equation does not say how or why the sharing takes place. This latter concern is entirely inferential; it is an explanation of the distribution of class *denotata*, and it plays no role in their definition.

The testability of classifications is a requirement of science, but a requirement neglected by prehistory even though many of its classifications are testable. The terminological confusion, the vagueness of labeling, and the lack of explicit problems combine to deprive prehistoric classification of much of its potential. Perhaps it is too much to ask for testing and explicit statement of problem when all the preceding operations are implicit, haphazard, and ad hoc constructions in common practice. Nonetheless, when the operations are explicit the investigator is forced to make explicit statements of problem and thus creates potentially testable classifications. To construct classes, specific dimensions of features, again usually modes, must be selected as criteria, other dimensions being discarded from a definitive role in the context of a given classification. This decision, or set of decisions, must be justified on the basis of the relevance of the set of dimensions chosen to the problem for which the classes are being constructed. The justification should always have the form of an hypothesis about the nature and relevance of the dimension of modes to the problem. The testing of these devices follows the basic pattern for hypothesis evaluation: the decision, once made, either will create classes which have the necessary distribution characteristics or it will not. An affirmative result (e.g., a particular set of classes will function in seriation) shows that the classes are sufficient. Comparison with alternative classifications makes it possible to ascertain if the classification is the best available.

An important consequence, not as widely recognized and practiced as could be hoped for, is that there are-indeed there must be-as many classifications as there are problems and methods for their solution. Different classifications are created by changing levels (e.g., “ware-type-variety”) and by changing criteria (e.g., functional types, ethnological types, historical types). Monolithic “right” classifications have no place in prehistory or any other science which lacks a singularity of inquiry. A single rock will have many names, a single occupation belong to many phases. Our common sense desire for a perfect class/object equation has no utility for phenomena beyond common experience and common interest. Figure 23 presents in summary fashion the basic elements of formal theory as employed in prehistory. The diagram illustrates only the most usual program, that is, one which begins with modes as the analytic step for the classification of discrete objects. The figure represents the path taken to convert classification into cultural classification of artifacts. The end product classes, (mode, type, and phase) denote the scale of phenomena for which they are constructed, their paradigmatic nature, and the cultural quality of their defining criteria. These are the only characteristics which can be included for the discipline as a whole in a problem-free context. The number of defining criteria and the particular criteria chosen are a function of the requirements of particular kinds of problems, and variations in these aspects produce the large number of modes, types, and phases, sometimes recognized under special labels such as tradition, horizon, ware, or functional type, and some.

times terminologically undifferentiated. However, prehistory's formal theory, in spite of the presentation afforded it in the literature, is rather simple-there being but three kinds of units employed and their formulation as cultural units of scientific utility being founded upon a small set of simple discriminations and a single, important, but simple assumption.

This view is, of course, not the only one possible. Given the terminological difficulties of prehistory's literature, many accounts are undoubtedly possible. The account presented does offer the advantages of consistency coupled with utility for the purpose of explanation. Also, this is an account of what has been done, not what might be done or could be done. Simply examining Figure 23 suggests that redundancy is involved in the repetition of the artificial/natural discrimination for both artifacts and attributes. This, however, appears to be the way It is done. The prehistorian recovers artifacts and then dis.criminates their attributes rather than recovering artificial attributes and then noting the objects in which they occur.

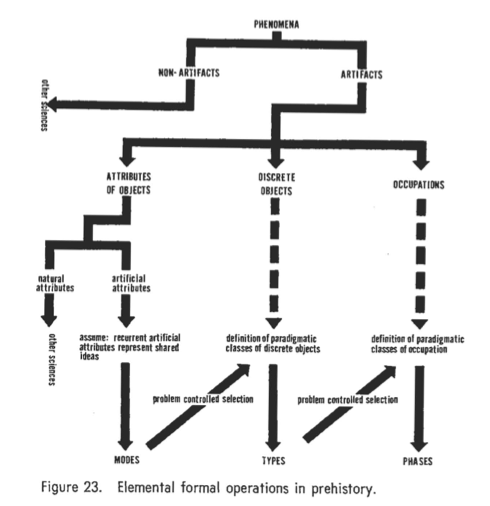


Figure 23. Elemental formal operations in prehistory.

## Larger Issues

Lest the approach taken be misunderstood, it should be clear that the qualitative program adhered to throughout is not a rejection of statistical-oriented approaches. It rather tries to show why grouping and counts are inappropriate to unit construction. The particular view espoused here is perfectly consistent with the goals and most of the methods of the new archaeology, save those attempts to employ groups in the stead of classes. This latter procedure I have tried to show is both counter-productive and deceptive-counter-productive because, it does not convey meaning precisely and is not capable of expansion; deceptive because, while it cannot predict, it does provide lucid and elegant accounts of what one already knows.

Statistical techniques have their appropriate role in the manipulation of data, not in its creation. These techniques are necessary to construct distributions and compare and correlate data in their variable aspects, and they will be all the more powerful if they constitute tests of hypotheses embedded in the systematics rather than a shuffling of data. This is possible only when units are properly and explicitly formulated, and it is in this that the “old archaeology” can make an important contribution to the new.

The abuse and inconsistency in the use of classification and its consequent failure in many circumstances certainly points to the need for improvement; however, improvement is not forthcoming from grouping devices. Bad practice has been confused with bad theory and method. The method-classification-is sound, indeed the only device possible, but its practice in prehistory has thwarted its potential. Certainly there are further ramifications. To a formalist, much of the concern with elaborate statistical devices appears as an attempt to correct with a calculus arithmetic errors which have been obscured by multitudinous manipulations. Many of the problems for which factor analysis is proposed, for example, would simply not exist if the formal units had been precisely constructed in the first place with a full knowledge of the wide range of units that can be and in fact have been employed. There may well be a role for factor analysis but it does not appear to be the imperfect correction of errors in systematics; if it has a role to play, this can be reasonably determined only after a reasonable systematic is in use. The qualitative and quantitative are not alternatives; they are necessary complements. The manipulation of the phenomenological world must always be, overtly or covertly, statistical in at least some minimal sense. What correlations mean, not their utility, is questioned. Statistical manipulation is not a means of discovery (this always has been and always will be “guessing”), but a means of testing the efficacy of qualitatively derived units. Regarding the units as givens rather than hypotheses is the principal sin of the old archaeology; currently, disregarding the role of qualitative operations is the sin of the new.

The old archaeology and the new archaeology are not competing approaches, for each has a distinctive and dependent relationship with the other. The old archaeology, basically qualitative, provides the units which the new archaeology can use for explanation. Both are necessary components of a science. The terminological and conceptual ambiguity of the old archaeology resulting in both misapplication of classification and lack of explanation is a function of the state of development of the discipline. There is no model for a science of man, though there are models for parts of it such as have been used here. Errors have been made, perhaps the principal one being the use of sociocultural anthropology as a model. The new archaeology has corrected some of these errors. It has provided the stimulation to correct others. It has incorporated others. The clarification of the old archaeology is a requirement for the success of the new.