Context in Archaeology: an Alternative Perspective

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A radiation of new research modes is apparent in the field of archaeology, primarily reflecting concerns derived from cultural anthropology. At the same time, most archaeologists continue to take a static, classificatory approach to environmental variables, regarding the biophysical landscape as a spatial and temporal backdrop. The potential contributions from zoo-archaeology, archaeobotany, geo-archaeology, archaeometry, spatial geography, and ecological anthropology continue to be underexploited. There is urgent need for a multiscale and multidimensional, contextual *approach. The goal of contextual archaeology should be the study of archaeological sites as part of a human ecosystem, within which past communities interacted spatially, economically, and socially with the environmental subsystem into which they were adaptively networked.*

Archaeology is at a crossroads.

During the late 1960s and early 1970s, center stage in North American archaeology was reserved, not for competing interpretations of historical process, but for discussion of the New Archaeology. This phenomenon can be interpreted as a public debate, generated in no small part by the exponential increase of empirical data during the 30 years prior to 1960. Facts had become increasingly additive, rather than contributing to a cumulative body of real information. Syntheses tended to be descriptive, simplistic, and speculative. The New Archaeology began as an American generational conflict, as an introspective reassessment of means and purpose. But these painful beginnings, with the new castigating the old, were then followed by constructive debate among a new, international generation of archaeologists as to goals and the optimal strategies to attain them. The net impact has been healthy, with refinement in the strategies of empirical research and far more sophisticated interpretation.

Nonetheless, the Great Debate in archaeology also created its own simplifications. By polarizing old and new approaches, the impression was given that archaeologists were either empirical or theoretical. But on closer inspection the small group of active participants in the Great Debate are neither pure theorists nor pure deductivists. Archaeology is, by its nature, ultimately empirical. The Great Debate is far more than a matter of philosophical abstractions. It is a fundamental reevaluation of the conceptual framework of archaeological research, a quest for a paradigm that will rationalize both the laborious data-gathering and the frustrating, interpretive activities of the discipline.

The swelling ranks of the emerging consensus are of one mind in only one essential matter, that fresh and more productive vistas must be opened. The great diversity of possible, innovative approaches is illustrated by many papers and books, ranging from ethnoarchaeology to computer simulation, that appeared during the 1970s. They suggest that archaeologists have begun to opt for a pluralistic paradigm in their search for better insights, and that a rapid radiation of new research directions is underway. The majority of these trends reflects an intellectual confrontation with several facets of cultural anthropology. There also is a considerable debt to human geography, in particular to spatial theory. What remains poorly articulated is the equally fundamental, environmental dimension.

Ironically enough, environmental archaeology is one of the oldest interdisciplinary bridges in the field. Archaeologists have always been conscious of environmental context. And, from the earliest days, a diverse group of scientists has participated directly or indirectly in excavation. Compared with some 5000 personal members of the Society for American Archaeology, there are about 500 in the new Society for Archaeological Sciences, with little overlap in affiliations. This surprising ratio suggests a substantial empirical input from applied scientists, who nonetheless have little impact on the dominant intellectual currents within archaeology.

Perhaps the environment is taken for granted. Certainly the environment is specified as a variable in most

processual equations, but in all too many cases the equation is then resolved by treating that variable as a constant. Also, archaeologists often take a static, classificatory approach to the environment, even when the human variables happen to be considered as part of a dynamic system.

It is my belief that "environment" should not be synonomous with a body of static and descriptive background data. The environment can indeed be considered as a dynamic factor in the analysis of archaeological context. The basic ingredients of archaeology are artifacts and their context — ranging from food residues to sediment and landscape matrix. "Context" means many things to many people. But the word is derived from the Latin verb *contexere,* "to weave together" or "to connect". For archaeology, *context* implies a four-dimensional, spatial-temporal matrix that comprises both a cultural and non-cultural environment, and that can apply to a single artifact or to a constellation of sites. Context, so defined, is the primary focus of several approaches within archaeology. So, for example, spatial archaeology is concerned with horizontal patterning of aggregates within a site and interconnections between sites. Context has also long been the focus of archaeometry, which is concerned with temporal frameworks, materials analysis and technology, and raw material sources. But most importantly, context has been the traditional focus of a poorly defined but wide-ranging enterprise sometimes described as environmental archaeology, and including such specializations as archaeobotany, zoo-archaeology, and geo-archaeology.

Evans considers environmental archaeology as "the study of the past environment of man."[1] He specifically emphasizes techniques and indicators useful in reconstructing the environment of ancient human communities, and the applications of such techniques. This definition is not only narrow but unacceptable.

To use an analogy, the difference is that between "geological archaeology" and "archaeological geology." To me, archaeological geology *is* geology, done with an archaeological bias or application. This is fundamentally distinct from geological archaeology, done by means of geological methods, techniques, or concepts, but constituting what is first and foremost an archaeological endeavor.[2] At issue are goals, rather than techniques.

I have long held the view that our ultimate goal is the interrelationship between culture and environment, emphasizing archaeological research "directed toward a fuller understanding of the human ecology of prehistoric communities."[3] But in the early 1960s such relationships proved difficult to identify, either by the archaeologist or by the applied, environmental scientist. In part the problem was a paucity of empirical data, in part the lack of an adequate conceptual framework within which to analyze complex relationships among multivariate phenomena.

In the interim much has changed. The information base has been increased by an order of magnitude and, although still far from adequate, it now at least permits intelligent hypothesis formulation. But above all, systems theory has suggested a model with which to illustrate or even analyze complex interrelationships. Systems theory has had a profound effect on conceptual formulation in environmental science since a seminal paper by Chorley in 1962,[4] in ecological anthropology since Geertz's *Agricultural Involution,*[5] and in archaeology since a 1968 paper by Kent Flannery.[6] It requires little emphasis that a cybernetics model cannot be transferred literally to another discipline, and most of us will appreciate that systems jargon can obscure an issue just as easily as it can illuminate it. Furthermore, it would be foolish to simply apply a biological systems approach in the social sciences. But the basic principles of systems theory are essential to integrate the environmental dimension within a contextual archaeology.

Odum has defined an ecosystem as a community of organisms in a given area interacting with the physical environment, so that energy flow leads to clearly defined food chains, biotic diversity, and exchange of materials between the living and non-living parts.[7] Applying this concept to human populations, the essential components of the non-cultural environment become distance or space, topography or landforms, and resources — biotic, mineral, and atmospheric. Modern

1. J. G. Evans, *An Introduction to Environmental Archaeology* (Ithaca, New York 1978), p. xiii.

2. K. W. Butzer, "Geo-archaeology in Practice," *Reviews of Anthropology* 4 (1977) 125-131.

3. K. W. Butzer, *Environment and Archeology* (Chicago 1st Ed. 1964), pp. vii, 5.

4. R. J. Chorley, "Geomorphology and General Systems Theory," *U.S. Geological Survey Professional Paper* 500-B (1962) 1-10.

5. C. Geertz, *Agricultural Involution* (Berkeley 1963).

6. K. V. Flannery, "Archaeological Systems Theory and Early Mesoamerica," *Anthropological Archeology in the Americas,* ed. B. Meggers (Anthropological Society of Washington 1968) 67-87; see also L. R. Binford, "Archaeology as Anthropology," *AmAnt* 28 (1962) 217-225.

7. E. P. Odum, *Fundamentals of Ecology* (Philadelphia 1971) 8.

geography is particularly concerned with the interrelations between human communities and their environment, and increasingly so with the spatial expression of the attendant socio-economic phenomena. This focus differs only in its spatial emphasis from ecological anthropology, which is equally concerned with intersecting social and environmental systems.

Such broad systems concepts are, however, too complex to operationalize. Yet the problem can be minimized by identifying primary research components, as distinct from ultimate systemic objectives. The primary, or lower-level objectives, would relate to the techniques and immediate goals of each method, such as spatial archaeology, archaeometry, or environmental archaeology. The secondary, or higher-level objective, is the common goal of context, shared by all the contributing methods.

So, for example, the primary goal of environmental archaeology should be the characteristics and processes of the biophysical environment that provide a matrix for, and that interact with, socio-economic systems as, for example, reflected in subsistence activities and settlement patterns. The secondary objective of this and of all the contributing methods would be the human ecosystem defined by this systemic intersection. A practicable general goal for *contextual archaeology* would be the study of archaeological sites as part of a human ecosystem. It is within this human ecosystem that communities once interacted spatially, economically, and socially, with the environmental matrix into which they were adaptively networked.

Less concerned with artifacts than with sites, contextual archaeology focuses on the multidimensional expression of human decision-making within the environment. And, without attempting to deal literally with ecological phenomena such as energy flows and food chains, it stimulates holistic research by calling attention to the multivariate, systemic interaction between cultural, biological, and physical factors or processes.

Five central themes can be singled out for specific emphasis, namely, space, scale, complexity, interaction, and stability.[8] These concepts are originally geographical or biological, but they have direct anthropological and archaeological application. Furthermore, each of these properties is measurable and therefore replicable, and so amenable to scientific study,

(1) *Space.* Phenomena are rarely distributed evenly in space. Topography, climates, biological communities, or human groups exhibit spatial patterning and are liable to spatial analysis.

(2) *Scale.* Spatial analysis must distinguish small, medium, and large-scale objects, aggregates, or patterns. Similarly the configurations of living communities or physical aggregates are established, maintained, or modified by processes that operate at several spatial and temporal scales and that may be periodic or aperiodic. Micro- and macro-scale studies are evidently complementary and both are desirable for comprehensive interpretation.

(3) *Complexity.* Environments and communities are not homogeneous. This makes both their characterization and delimitation difficult, so requiring flexible, multi-scale, spatial, and temporal approaches.

(4) *Interaction.* In complex environments with an uneven distribution of resources, human and non-human communities interact internally, with each other, and with the non-living environment; they do so at different scales, in variable degrees of proximity, and with changing and unequal rates.

(5) *Stability.* The diverse communities of any environmental complex are all affected to some extent by negative feedback as a result of internal processes or external inputs. In consequence, readjustment, whether minor or major, short-term or long-term, is the rule rather than exception. Parenthetically, in choosing the word "stability", I am emphasizing a conceptual criterion, not a condition such as homeostatic equilibrium. In fact, steady state and metastable dynamic equilibrium are far more representative conditions.[9]

My views on both university curricula and research design are on record[10] and need no development here. Instead I will attempt to show how the five perspectives outlined above can explicate a contextual approach, using a set of examples.

A false-color LANDSAT photo of central Illinois or eastern Africa provides an impressive picture of differential biotic productivity that shows how inappropriate is the basic assumption of most geometric spatial analysis: the assumption that space is homogeneous. The reds and blues show concentrated and diffuse regional patterns, some sharply demarcated, others grading across broad transitions. A census of game distributions at any one moment would show similar, complex aggregations.

8. K. W. Butzer, "Toward an Integrated, Contextual Approach in Archaeology," *Journal of Archaeological Science* 5 (1978) 191-193.

9. K. W. Butzer, "Civilizations: Organisms or Systems?" *American Scientist* 68 (1980) in press.

10. K. W. Butzer, "The 'Ecological' Approach to Prehistory: Are We Really Trying?" *AmAnt* 40 (1975) 106-111.

The importance of biotic patterning in human-resource evaluation is matched by the importance of the topographic and sedimentary matrix in designing an archaeological survey or in interpreting site locations. So, for example, in the Nile Valley of Middle Egypt the known late prehistoric sites are in no way representative of Predynastic settlement patterns, but are largely a function of selective surface preservation of only valley-margin sites.[11] Similarly, rock-engraving sites in southern Africa are predicated on the location of suitable rock outcrops, micro-topographic change, and environmental variability.[12] Spatial archaeology has contributed much of value in recent years,[13] but many of its practitioners still do not conceptualize real as opposed to abstract space.

The mosaic distribution of biophysical phenomena also serves to illustrate the synchronic attributes of scale. Arborescent foods can be perceived at the micro-scale of the individual tree or cluster of trees, at the meso-scale of individual upland or floodplain forest components, or at the macro-scale of the regional forest-prairie mosaic. As a consequence, the average pollen profile may serve to establish a palaeoclimatic sequence of some stratigraphic value — specific to a regional habitat or biome — but it more often than not contributes little to elucidating the complexity of a potential resource catchment, unless the palynologist approaches his or her problems as an archaeologist.[14]

This spatial perspective of scale is complemented by the diachronic framework: seasonality and predictability of collected or produced foods, and the significance of cyclic anomalies, major perturbations, or long-term shifts of equilibrium thresholds that define the environmental system. Temporal variability will affect, at various scales, the biomass of plant and animal foods, or even the quantitative and qualitative character of biotic communities. As a consequence, ecosystemic variability, trends, or transformations will probably also affect demography, subsistence strategies, settlement patterns, and even the social fabric in different degrees of intensity, depending on the magnitude of change, and on the information and decisions of the human communities.

The role of complexity is readily illustrated by the parallel problems of classification or demarcation of artifact or climatic types. What are the most appropriate criteria? Better yet, what are the practicable criteria in view of the data base? Do these describe useful classes? Are these classes mutually exclusive? The computer helps tidy up appearances, but does not necessarily resolve the basic logical problems of defining assemblages of artifacts or sites, or of biophysical phenomena. The problem is vastly compounded when attempting to identify process and response among a chain of interlocking subsystems. The role of possible concatenations of negative inputs may be simulated by computer, but the result would be no more than a working hypothesis. It would require multiple lines of specialized, contextual investigation to identify the key components and the low- or intermediate-order processual interactions.

The matter of interaction can be illustrated by an example, that of Axum, an early civilization that flourished in northern Ethiopia during the first millennium A.C.[15] Axum owed its prosperity to international trade, yet its market resources were found in several distinct environments occupied by alien peoples in various relationships to Axum. Gold came from the semi-arid lowlands that Axum temporarily dominated but never fully controlled. Ivory and frankincense were initially abundant in local upland forests but, as both elephants and trees became scarce, ivory had increasingly to be obtained from distant parts of humid Ethiopia. In fact, the demographic base of Axum eventually was beyond the subsistence productivity of its local habitat. When international market demand faltered during the seventh century, Axum lost the means to control its critical trade resources. Lacking an adequate subsistence base in isolation, excessive demographic pressure led to severe landscape degradation and general impoverishment. Concomitantly, repeated failure of the spring rains meant one instead of two annual crops on unirrigated land. Drastic depopulation ensued. Eventually, there was a shift of power and population to new and more productive environments in central Ethiopia. Axum thus provides a good example of how spatial and temporal availability of resources, and the interactions between a society and its resource base, can be of fundamental significance in the analysis of historical process.

In the larger perspective, it is apparent that elaborate

11. K. W. Butzer, "Archeology and Geology in Ancient Egypt," *Science* 132 (1960) 1617-1624.

12. K. W. Butzer, G. J. Fock, L. Scott and R. Stuckenrath, "Dating and Context of Rock Engravings in Southern Africa," *Science* 203 (1979) 1201-1214.

13. A particularly good example is D. L. Clarke, ed. *Spatial Archaeology* (London 1977).

14. A model case in point in V. M. Bryant, "The Role of Palynology in Archaeology," *Advances in Archaeological Method and Theory* 4 (1981) in press.

15. K. W. Butzer, "Rise and Decline of Axum, Ethiopia: a Geo-archaeological Perspective," *AmAnt* 46 (1981) in press.

prehistoric and historical cultural systems appear to enjoy centuries of adaptive equilibrium, with or without sustained growth, to be followed by discontinuities. The five millennia of Egyptian[16] and Mesopotamian[17] history show a cyclic alternation between centuries when population and productivity increased in apparent response to effective hierarchical control, and other centuries marked by demographic decline and political fragmentation. Endogenic or exogenic inputs led to repeated readjustments. Whereas minor crises were overcome by temporary structural shifts, major crises required re-organization of the political and economic superstructure, with or without a transformation of identity. But the fundamental adaptive system continues to survive in Egypt and modern Iraq, as a flexible but persistent social adjustment to a floodplain environment. In the long-range view, elaborate cultural systems are dynamic rather than stable or homeostatic, since structural changes are repeatedly required to ensure viability or even survival.[18]

A unifying thread in these illustrations of the hierarchical components of a contextual paradigm is provided by *adaptation* — specifically as a strategy for survival[19] — and *adaptability* — as the capacity of a cultural system to adjust. These concepts, as defined in cultural rather than biological terms, are at the heart of the human ecosystem, and they provide criteria for analysis of historical process that I believe are more suitable than the ever-popular ontogenetic model. Archaeologists share the ultimate objective of historical interpretation with cultural anthropologists, historians, and human geographers. Many conceptual methods or models are also shared. But the analytical techniques and the scientific method of the archaeologist have less in common with those of these three fields. This point can be argued by drawing attention to the geographical literature on natural extremes and social resilience: central in all instances is the role of the individual and of the community in decision making.[20] In default of any historical records or a reasonable degree of ethnographic continuity, prehistoric archaeology can never hope to elucidate the nature of this decision-making process. We may or may not be able to identify the outcome of such a process, but we will never know why, how, or when it was initiated.

It has been said that archaeology is anthropology or it is nothing.[21] I beg to differ with this view. Archaeology and cultural anthropology do, or at least should, enjoy a close, symbiotic relationship, and archaeology is indeed critically dependent on stimuli and models grounded in social, ecological, and evolutionary anthropology. But archaeology has been equally dependent on geology, biology, and geography at some time during its development. Archaeology is a complex social science in its own right.[22] But, just as geography, archaeology is heavily dependent on both the empirical methods and models of the natural sciences, qualifying as a social science mainly by virtue of its objectives. The specific methodologies of other disciplines, including cultural anthropology and biology, cannot simply be transferred. They must be transformed, according to a new, rather than a secondary paradigm, if they are to have salutary inputs. For this reason I feel as uncomfortable with an unadapted cultural anthropological paradigm as I do with a biological one. Context represents a traditional concern of archaeology[23] and, as more comprehensively defined here, is developed with the conceptual inputs of cultural anthropology, human geography, and biological ecology.

By way of conclusion, I am arguing for a contextual rather than an anthropological archaeology. My plea is for the conscious exploration and development of an approach that transcends the traditional preoccupation with artifacts or with sites in isolation, to arrive at a realistic appreciation of the environmental matrix and of its potential spatial, economic, and social interac-

16. K. W. Butzer, "Long-term Nile Flood Variation and Political Discontinuities in Pharaonic Egypt," *The Causes and Consequences of Food Production in Africa,* J. D. Clark and S. Brandt, eds., (Berkeley 1981) in press.

17. R. M. Adams, "Strategies of Maximization, Stability and Resilience in Mesopotamian Society, Settlement, and Agriculture," *ProcPhilSoc* 122 (1978) 329-335.

18. Butzer op. cit. (in note 9).

19. P. V. Kirch, "The Archaeological Study of Adaptation: Theoretical and Methodological Issues," *Advances in Archaeological Method and Theory* 3 (1980) in press.

20. I. Burton, R. W. Kates and G. F. White, *The Environment as Hazard* (New York 1978).

21. The statement is from G. R. Willey and P. Phillips, *Method and Theory in American Archaeology* (Chicago 1958) 2, but the philosophical explication is in W. W. Taylor, *A Study of Archeology* (Menasha, Wisconsin, American Anthropological Association Memoir 69, 1948).

22. For similar views, see G. J. Gumerman and D. A. Phillips, "Archaeology beyond Anthropology," *AmAnt* 43 (1978) 184-191; James Wiseman, "Archaeology in the Future: an Evolving Discipline," *AJA* 84 (1980) 279-285.

23. Differing concepts of context are applied in: W. W. Taylor, "Old Wine and New Skins: a Contemporary Parable," *Contemporary Archaeology,* edited by M. P. Leone (Carbondale, Illinois 1972) 28-33; J. Helm, "The Ecological Approach to Anthropology," *American Journal of Sociology* 67 (1962) 630-639; and M. B. Schiffer, "Archaeological Context and Systemic Context," *AmAnt* 37 (1972) 156-165.

tions with the subsistence-settlement system. The human ecosystem so defined opens truly ecological vistas that continue to remain largely neglected. This contextual approach, heavily dependent on archaeobotany, zoo-archaeology, and geo-archaeology, is new not in terms of its components but by virtue of its integrated, general goal of the human ecosystem. The key to this systemic approach is the set of perspectives — space, scale, complexity, interaction, and stability — that I have discussed. It is not an exclusive but a complementary approach, in that it is inoperative without socio-economic interpretation of artifactual assemblages, intrasite patterning, and cultural transformations on the one hand, and modelling or computer simulation on the other. But it is a dynamic perspective that must be developed with great urgency if an entire research component is not to be lost in present and future field projects, a component that is indispensible for comprehension of human ecosystems.

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