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THE ECOLOGICAL APPROACH TO ARCHAEOLOGY: ARE WE REALLY TRYING?

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Explicit methodological statements on the needs for and goals of an "ecological" study of man's past first appeared in the 1950's. Since this time it has become fashionable to operate archaeological projects with symbiotic teams from diverse disciplinary backgrounds. Although government agencies and private foundations have shown a measure of sympathy toward the support of "non-anthropologists" engaged in archaeological projects, there has been little reflection on how successful such ventures have been.

Have the 1960's and early 1970's seen the emergence of an effective interdisciplinary approach to the study of man's past? My own personal and preliminary assessment is that this has *not* happened. I feel, despite the best efforts and pervading good will, that:

1. The fundamental patterns of interaction between excavators and collaborating scientists remain much the same as they were in the 1950's.

2. Site reports remain only partially successful in integrating and synthesizing multidisciplinary data.

3. Theoretical statements on archaeological methodology and prehistoric research have only given lip-service to the integration and implementation of ecological concepts.

4. University curricula have shown a high moment of inertia, so that the ecological grounding of student archaeologists remains, by and large, woefully inadequate.

The purpose of the present argument is not to criticize my professional colleagues, but to attempt to point up some of our collective weaknesses and blind spots, and to plead for a critical self-appraisal. Only when we have honestly assessed where we stand today, can we hope to determine how best to achieve a more effective ecological interpretation of man's past.

EXCAVATIONS: A PERSONAL EVALUATION

The 1950's saw a number of excavation projects that included "natural scientists," with field or laboratory support provided principally by the Anthropology Program of the National Science Foundation. Although such support is still forthcoming, it remains inadequate and this inherent financial situation has played a major role in inhibiting the development of novel or more productive team interrelationships. At the same time, there is the inherent educational problem that, with few exceptions, the average excavator of today has the same narrow, disciplinary educational base that he or she had in the 1950's. As a result of these financial and educational factors, few archaeological teams have achieved interdisciplinary—as opposed to multidisciplinary—collaboration.

1. The proportion of excavation budgets devoted to "non-anthropologists" is surprisingly small—on the order of 2 to 25 percent—despite a prevailing impression to the contrary. These collaborating scientists, insofar as they are not supported by external, supplementary sources, have little logistical and salary support or released time; they commonly need to penny-pinch in all phases of laboratory analyses, and seldom can find field support for the crucial student apprentices that are a matter of

course for archaeologists. These patterns are most acute where small-scale, urgent salvage projects are involved, and collaborating scientists are commonly required to work at a pecuniary loss. The recent financial pressure on research foundations has been increasingly reflected by budgetary cuts that first and foremost affect the collaborating scientists. At the same time, other foundation programs such as earth sciences, paleontology, and biology have drastically cut their own support of any project applied even indirectly to archaeological goals. This has made the collaborating scientists increasingly dependent economically on the principal investigators of grants awarded for archaeology. In turn, this has put undue strain on the anthropology programs, promoting increased scrutiny of "non-archaeological" expenses, and discouraging applicants from requesting adequate support in such categories. Equally, if not more serious, is that most "applied" students have great difficulty in obtaining doctoral dissertation grants, also due to the persistence of very real disciplinary boundaries within most granting agencies.

2. Few excavation directors have the background or make the effort to understand what collaborating scientists could contribute if they were given the opportunity to interact, rather than be expected to serve as subordinate technicians. Thus collaborating scientists have next to no impact on excavation or survey strategy, and consequently can contribute proportionately little to the field training of archaeology students or to the intellectual atmosphere of the group.

My personal impression, based on participation in a dozen excavations or surveys during the past 15 yr, is that all parties are at fault in this arrangement. The collaborating scientists all too often do not identify with the overriding goal of such projects—the study of man's past—and either cannot or will not communicate effectively. Yet my personal feeling is that the average excavation director does not go his own half of the way in implementing real interchange, either due to his incomprehension of the contributing sciences or due to his preoccupation with the thankless but essential tasks of material organization. Last, but not least, fault must be attributed to the underlying philosophy and the practical realities that favor disciplinary limitations within our key granting agencies.

EXCAVATIONS: THE VIEWS OF A DIGGING ARCHAEOLOGIST—R. BRUCE MCMILLAN

My own perspectives on the continuing inadequacies of interdisciplinary excavation efforts are complemented by the equally critical "inside" view expressed to me by Bruce McMillan. With his permission I give his evaluation here, without further comment.

> Too few principal investigators systematically think through all of the contingencies for employing several disciplines to investigate a defined set of questions. Even when there are specific research objectives framed by problem definition, too often there is no attempt to define the mutual areas of feedback expected between the different man-environmental subsystems proposed for study. If there is one salient point that needs to be clear in every investigator's mind before the first shovel is uncased, it is how he or she predicts his data will articulate with every other area programmed for potential study—that is, if there is more than lip service given to the interdisciplinary approach.
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> Since the focus of an interdisciplinary team is on the points of articulation between the different subsystems, then at every intersection two or more investigators share equal payoff within their respective fields of investigation. The sum of these (the synthesis) is greater than the parts and is necessarily shared in by the entire team of investigators.
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> Allocation of time, money, and personnel to the various types of data collection should be governed by the research strategies set forth to investigate a problem. Research strategies should be established prior to fieldwork through compromised concensus among the research team. The allocations of funds to each part of the research program should be in concert with the contingencies set up to investigate the stated problem. It should not be based on the gut instinct of what a principal investigator wants to spend on areas other than "pure" archaeology. Since it is impossible for a team of investigators to predict *a priori* the potential for all lines of investigation from their initial deductive model, it is necessary to make adjustments in the allocation of time, money and personnel to different parts of a project.

SITE REPORTS

The impact of multidisciplinary teamwork on publications has been an exponential growth of articles by collaborating scientists in media that normally accept archaeological papers. The same applies to a number of polymorphic compendia or symposia. This has unquestionably had a highly salutory effect in broadening the scope of the literature, and in exposing

students to the relevance of non-artifactual data in archaeology.

Less satisfactory, however, are the comprehensive site reports in which there are increasingly many contributions on non-artifactual data. In these it is apparent that collaborating scientists are not always given access to digested site data and emerging problems, nor do they always have incentive or opportunity to apply their own particular experiences to the resolution of issues that require interdisciplinary talents. As often as not, those report chapters by contributing scientists stand in isolation. These writers frequently have not been stimulated to optimal problem-orientation, their working methods show correspondingly little innovation, and the potential input of their writing is seldom realized. At the same time, the excavation director may be unable or unwilling to incorporate the results of his associates into his own interpretation, so that the reader of many site reports must integrate the published data himself. Another possibility is that the excavation director assumes the responsibility or right to carry out all higher levels of integration or interpretation by himself; as a corollary, it needs no emphasis that as often as not he is unsuccessful and sometimes tactless in such a gargantuan task.

My own experience has been that few excavation directors have objections to their associates evaluating their own data in a much broader context. Nor is access to other classes of information deliberately denied, but in practice this is the effect, probably for the reason that everyone is overloaded with responsibility. If the collaborating scientists are to remain severely disadvantaged in terms of independent funding sources, then within the team framework there should at least be more delegation of authority, not only in the establishing of research strategies in the field, but also in planning and executing publications. Although he has economic control, the excavation director has more authority than he really needs, and his own qualifications as an excavator and possibly as an artifact typologist are no grounds to elevate him above a position of *primus inter pares* among his colleagues. There would seem, then, to be much room for improvement in integrating and synthesizing multidisciplinary data at the very low cost of a change in attitudes and general awareness.

THEORETICAL WRITINGS

Although there are recent signs of increasing interest in the formulation of ecological problems and research strategies, theoretical writings by and large have been disappointing on this score. Part of the blame lies with the ecologically-oriented collaborators themselves, who generally seem reluctant to leave the comfortable realm of empirical data. Perhaps by default, most of the theoretical writings either display an appalling ignorance of ecological problems, or give them little more than lip-service. Just as many an excavator may list "his" collaborating scientists with a certain relish, and then proceed to deliver a paper largely oblivious of the implications of their work, almost all of our better theoreticians do no more than recite their ecological ideals, without confronting real ecological issues or searching for a meaningful synthesis between empiricism and epistemology.

So, for example, those theoretical writings that have devoted explicit attention to ecology have tended to stress broad organizational devices or overly-sophisticated biological models. Yet the complex interactive relationships between culture and environment have not even been explicitly formulated, let alone explored. In practice this is particularly apparent in the assertions regarding cultural adaptations to new or changing environments, even as offered by some of the most incisive theoreticians. Under these circumstances it is not surprising that there has been so little successful exploration of the ecological problems actually discernible in the archaeological record and potentially amenable to archaeological methods.

The ecological approach has long provoked schizophrenic reactions among anthropologists. Whereas the nineteenth century biological definition considered ecology as the interactions of communities of organisms with their environment, the twentieth century sociological definition restricted this concept to the interactions of monogeneric organisms among themselves. Fortunately, whatever the inherent roots of cultural ecology, few anthropologists and no archaeologists have espoused such an extreme view. However, cultural ecology has been increasingly abandoned by anthropologists and it has now lost most of its theoretical impetus in regard to the study of contemporary cultures.

Thus those ecological models implicit in archaeological writings are drawn from increasingly defunct notions of synchronic cultural ecology.

Another fundamental problem is that the environmental concept of most anthropologists and archaeologists has traditionally been two-dimensional and physical: it is seldom properly appreciated that human communities interact with a myriad of other biological communities, all of which respond differently to the essential elements of the inorganic environment. So, for example, cultural activity inevitably interferes with the ecological balance of the local environment. Consequently a viable concept of cultural ecology must include the reciprocity between a human society and all facets of its environment, including not only discrete biological or physical resources and neighboring human groups, but all other, interacting biological systems.

It would seem to me that one of the most urgent needs to implement such a broader concept of cultural ecology is within the programmatic writings on settlement archaeology. Recent statements in this subfield suggest a potential research strategy to establish regional patterns of prehistoric subsistence and interactions, but, as of now, a lack of concern for the fundamental reciprocity of nature and culture.

UNIVERSITY CURRICULA

When I entered graduate school in 1954 I was interested in the interrelationships of nature and culture, in an historical context. I learned the tools of the trade as a physical geographer in order to pursue this goal with competence, but soon found the goals of the earth sciences lacking in intellectual stimulus. In 1961 I taught my first advanced class with a substantial contingent of archaeology students present and, also in that year, worked with my first group of properly-motivated archaeologists on excavation. But the step from thinking as a geomorphologist, with archaeological interests, to a prehistorian, with a geomorphological craft-speciality, was only possible after I received a joint-appointment in an anthropology department in 1966. Even there my coursework remained at a technical and analytical level for 3 yr, when I concluded that this was having no tangible effect on our archaeology students. At that point I began a program of synthetic courses aimed at an ecological understanding of man's past, including technical experience in geomorphology and environmental reconstruction, but with an overriding concern in what is variously labelled as paleo-anthropology, prehistory, or culture history. It was then that I realized that my students responded best to the intellectual excitement and mental templates of the social sciences.

In view of my own experiences and information from other institutions I would suggest that:

1. An interdisciplinary approach is only possible with an adequate grounding in the relevant cognate fields. For prehistoric ecology this means a spectrum of meticulous coursework selected from among the better and more pertinent offerings locally available in subjects such as geomorphology, stratigraphy, botany, meteorology, or theoretical geography. If the goal is an archaeologist who knows his business, an appropriate course selection of this type should rank a full equal with exposure to cultural anthropology, and even for the archaeology of literate societies should partly replace the preoccupation with ancient languages that is commonly emphasized. Student advisors must insist on such course exposure and see to it that professional competence is achieved. All too often, despite their protestations, these student advisors ultimately give top priority to "in-house" coursework or they succumb to student pressure to release them from obligations to a more far-sighted goal.

2. Despite the lack of genuine interest in interdisciplinary curricula or appointments by most university administrations and departments, the optimum solution from all perspectives is a maximum by way of courtesy, titular, or joint-appointments. Such appointments do not dilute departmental orthodoxy, although the individual involved may have to bear the somewhat painful introspection common at the "core" of most disciplines, sometimes to the detriment of his or her students on such formal occasions as dissertation proposal hearings. Such appointments also need not strain budgets in a time of limited money since, if any new financial arrangements are indeed required, they can more often than not be handled by nominal reallocations within a single divisional budget. Departments stand everything to gain under such arrangements, and the only potential loser is the individual who must meet two sets of responsibilities and persuade two

groups of peers that he indeed qualifies for salary increments.

3. Whether or not a joint-appointment or cross-listed courses can be realized despite the stasis of a particular institutional setting, it is essential that relevant, external staff members be apprised of student needs and interests, be drawn into discussions of student programs, and be represented on all exam committees for archaeologists in training. Only in this way can supporting staff from other disciplines custom-tailor their courses to serve a broader constituency from two or more departments. Similarly, the interest and commitment of such supporting staff can only be maintained if there is interchange and measurable response.

4. Although a more expansive era of foundation spending saw the underwriting of radiocarbon or applied geological laboratories within some archaeology programs, there is no obvious correlation between expensive physical plants and real student opportunities. This is not to say that the physical resources presently available in most departments for the training of students in useful cognate techniques are adequate. However, it is my contention that available human and physical resources are seldom fully utilized, and that most archaeology programs could be substantially improved by a concerted effort to mobilize available resources. I specifically mean that successful programs depend more on human relationships than on money. Assembling an informal group of faculty to provide better interdisciplinary opportunities for graduate students requires an intellectual spark, a large measure of good will, and a minimum of manipulation. Once mobilized, such an effort will fizzle rapidly unless there is adequate give-and-take between archaeologists and collaborating staff. Whether a joint-seminar or a major program be at stake, collaboration is possible only on a *quid pro quo* basis, not as an extension of a single individual's ego.

5. Last but not least, more attractive opportunities must be provided for interdisciplinary scientists-in-the-making. Few departments show much tolerance for individual study programs that are unduly cross-disciplinary. Anthropology-based archaeologists have the most to gain from such students and therefore should have the greatest interest in providing them an unrestrictive intellectual home. There are, however, few anthropology departments that look kindly on dissertation proposals focusing on the study of prehistoric faunas or alluvial history. "But is it anthropology?" How discouraging such rhetoric is when the student involved is an archaeologist by conviction! Often obliged to work in a more hospitable neighboring department, the student may then be penalized by low priorities for participation in excavation projects, and lack of access to funds to support his or her dissertation research. Ultimately the student may not fit the bill for a first teaching appointment in an anthropology department. The crowning blow may come at the end when the young interdisciplinary professional discovers that many excavation directors prefer a "prestige" scientist as a drawing card for grant applications, while exhibiting little patience for the fact that all experts have learned their trades by trial and error.

CONCLUSIONS

In overview, the past 15 yr have seen considerable technical advances essential to a more effective ecological approach to archaeology and prehistory. Yet progress in this direction has not been as substantial as it might have been, primarily as a result of attitudes—attitudes of archaeologists, of collaborating scientists, of students, of university departments and administrations, and of granting agencies.

All lip-service to the contrary, interdisciplinary research encounters much academic and administrative opposition. Despite any such obstacles, a surprisingly large contingent of collaborating scientists continues to work indefatiguably on problems directly relevant to the study of man's past, no less so than the artifactual studies of archaeologists *sensu strictu*. By proper intellectual integration into the mental ferment and decision-making process of field or curriculum projects, such sympathetic individuals could contribute so much more for students in particular and for archaeology in general. Although formal appointments and adequate means are highly desirable, the basic issue is one of more productive working relationships rather than of more money. Many opportunities for recruiting new professionals or apprenticing students with

interdisciplinary qualifications are simply overlooked or even thwarted.

I am not advocating a radical change in the existing structures but rather a reassessment of priorities—new priorities in the best interests of educating our students in the field, laboratory, and classroom, and so furthering the study of man's past. This is as much in the interest of strict archaeologists as in the interest of the collaborating scientists and their students. At the highest level of rationalization it is essential for progress in the study of prehistoric man. After all, excavating technique, artifact typology, and anatomy are not the only vital skills in interpreting human prehistory. The ecological arts are equally essential, and it is a moot point whether the digging archaeologist should have a monopoly in prehistoric synthesis.

Perhaps, therefore, we should ask ourselves that final question: How do we decide who is or is not an archaeologist? For the sake of clarity and convenience, this paper has referred to collaborating scientists and excavators, deemphasizing the polarization of "outsiders" and "insiders," but sidestepping the issue of what was central to the core of archaeology. Excavation unquestionably is, but an artifact typologist may be no more anthropologically oriented than someone who interprets the sedimentary contexts or vegetation communities once associated with prehistoric man. I continue to be disturbed by the concept of "applied" sciences, feeling that such a classification tends to create an unfortunate and unnecessary dichotomy of core practitioners and vassal technicians. This same dichotomy underlies many of the unsatisfactory interrelationships experienced by collaborating scientists with excavation directors, students, universities, and funding agencies. The only solution would seem to be a more explicit identification with the broader field of archaeology and its goals, by directly applying labels such as bio-archaeology and geo-archaeology.

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