Anthropology without Informants

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In discussing the difficulty of interpreting prehistoric behavior from the evidence in the archeological record, Christopher Hawkes characterized the study of technology as easy, inferences about subsistence economics as operationally laborious but relatively simple and straightforward, reasoning about social-political institutions as much harder, and the study of religious institutions and spiritual life as hardest of all (1954: 161–62). It is scarcely possible to dispute his general diagnosis, which expresses a basic tenet of prehistoric research. Nevertheless, Hawkes’s statement hides a paradox; in specific cases a great deal is known about other aspects of subsistence-related technological systems, but there is very little unambiguous evidence for diet during the Paleolithic period, simple though that study theoretically ought to be. The subject is far knottier than is generally granted, and authors who undertake to produce an original synthesis of dietary data find themselves forced by the nature of the subject to speculate more than they might wish.

The deficiencies of our dietary analyses are not solely due, as is so often the case in Paleolithic research, to any absolute paucity of potentially relevant data, for data of certain kinds are abundant in many sites, although we often fail to collect them. Good prehistorians are generally aware, at a theoretical level, of the potential of the data, and appropriate data-gathering techniques are available. Several simple, readily
practicable, and often inexpensive methods for recovering information relevant to
the study of Paleolithic diet exist, such as flotation (Struve 1968). Even though no
methods can yield more than partial pictures of dietary practices, their consistent
application to Paleolithic site sediments would increase our recovery of such infor-
mation by several orders of magnitude.

Major obstacles to the study of dietary evidence stem, in my opinion, from two
factors. First of all, it is unfortunately true that the study of Paleolithic prehistory
bears at least its share of scientific inertia. Its practitioners usually profess an interest
in reconstructing prehistoric lifeways, recognizing the great potential importance
of information derived from the study of contextual evidence (including the topo-
graphic situation of the site; the nature of contained sediments; chemical, radiologi-
cal, and biological residues; and the positional and numerical relations of recovered
data). In practice, however, most of us still place overwhelming emphasis on the
analysis of artifacts in stone and bone and the chronological ordering of artifact as-
semblages, relegating to a secondary position the study of all contextual materials
except those useful in climatic reconstruction or dating. Unfortunately, stone and
bone tools studied as such provide little evidence of diet.

The collection procedures required for maximal recovery of Paleolithic dietary
information are undeniably time-consuming. For example, at the Mousterian site
of Abric Agut, in eastern Spain, for every bulk sample that yielded seeds when sub-
jected to flotation, there were 25 that yielded none; furthermore, we were overjoyed
that our recovery ratio was so high. Obviously, an intensive attempt to gather dietary
data requires a substantial shift in the mental set and excavation priorities of the
average Paleolithic prehistorian, who has been trained to dig to recover artifacts and
identifiable bones, and to invest only a minimum effort in collecting suites of sam-
pies for sediment, pollen, and chronometric analyses. Intensive sampling for dietary
study also demands additional personnel on the field and laboratory teams and thus
increases excavation costs. Perhaps it is understandable (though not excusable) that
such sampling has not been a customary part of the average Paleolithic excavation.

Even in those rare cases where materials with significance for dietary studies are
routinely collected by prehistorians, they are ordinarily gathered for other reasons,
and their potential contribution to the study of subsistence is frequently ignored or
undervalued. So, for example, faunal material lacking the diagnostic characteristics
which permit species identification is simply discarded by many investigators, often
without counting or weighing the fragments or examining them for marks of inten-
tional human activity. Only because all such specimens from the Mousterian levels
at Cueva Morín, in Cantabrian Spain, were carefully examined were we able to dis-
cover that the bones from Upper Level 17 are not primarily food remains.

A second set of considerations is at least as great an obstacle to the study of
Paleolithic diet. Excavators who have conscientiously collected samples of contex-
tual materials for analysis sometimes discover to their great frustration that special-
ists competent to identify the remains and explain their significance are impossible
to find or are not interested enough to help. This problem still plagues our work at
Cueva Morin. These two factors have interacted to produce an unsatisfactory state
of affairs in which the total amount of solid evidence available is insufficient to support broad generalizations about subsistence patterns.

THE LIMITS AND POTENTIALS OF DIETARY DATA

Although we often assume that certain categories of organic material recovered from Paleolithic sites are residues of meals eaten by prehistoric people, that assumption may be unwarranted in any specific case. Some such items may be the raw material or by-products of manufacturing processes unrelated to diet. Evidence about food, fuel, and raw material acquisition (hunting-gathering operations, butchering techniques) is commonly reported as though it were direct evidence for consumption, which, of course, it is not.

Data potentially relevant to dietary studies often have ambiguities that can only be resolved after thorough and thoughtful study. Some of the reasons for these ambiguities are outlined below.

The prehistorian reads the records of the past in its relics and the situations in which they are discovered. For the most part, only the relatively imperishable relics remain, but the recovered items may provide no evidence at all about diet, or the picture they present may be biased, owing to its incompleteness. True residues of human activities in an archeological site are never a fair sample of all the imperishables resulting from those activities, because a single site is not an entire prehistoric settlement system. Furthermore, prehistorians never recover a fair sample of all imperishables in a single level; some always go unrecognized, and imperishability in the archeological sense is a relative condition anyway. In addition, the materials recognized as important at any stage of our discipline’s development are almost never distributed uniformly over the surface of an undisturbed archeological level, and because we very seldom excavate a level completely, we always miss some of them. This injects another element of bias into our interpretation. Even if we could recover an unbiased sample of all diet-related imperishables produced by an extinct human society, it would not give a complete idea of the diet of the times, since a large proportion of any past meal may have consisted of foodstuffs that do not leave anything we now recognize as a durable material trace (beverages, boned meat, greens, ground meal, and so on).

For present purposes, we may distinguish two kinds of prehistoric evidence. When a substance in which we are interested is itself recovered, the evidence for its presence is unequivocal and may be called primary. Sometimes the substance itself no longer exists in recognizable form, but other indications of its presence, such as traces of chemical decay products, may be detectable with appropriate procedures. This evidence is, of course, secondary, but in rare cases it may be virtually as unequivocal as primary evidence. Crosscutting this distinction is another, which can only be made when the purpose of the investigation is known. That is the dichotomy, familiar from legal usage, between direct and circumstantial evidence. In dietary studies, we try to determine what was actually consumed by past human groups; any direct evidence depends on proving that the material in question really found its way
to the human gut. As a result, there are just two kinds of direct evidence for food consumption. When a body is as well preserved as those of the Tollund, Grauballe, or Borre Fen corpses, an actual analysis of stomach contents may be possible (Glob 1969: 56–57; Helbaek 1969: 207–8); no such miracle of preservation is known for the Paleolithic period. The only other direct evidence for food consumption is the presence of food remains in hominid fecal material (coprolites). A few possible hominid coprolites have in fact survived from very remote periods (R. Leakey 1971: 67; de Lumley 1966), but they are very rare and none is identified with certainty from the study area discussed here. Even where it does occur, such direct evidence can never provide a complete picture of past diet; it only gives us partial information about the represented meals, which are in turn an infinitesimally small proportion of all the meals eaten by the individuals in question.

In the overwhelming majority of cases where primary evidence of potential food materials is recovered, we still have no more than circumstantial evidence of their consumption. The strongest kind of circumstantial evidence would be the discovery of hominid tooth marks on the material, but I know of no unequivocal case of such data from a Paleolithic site. I am sure that among the masses of unidentifiable bone fragments from Paleolithic sites some will eventually be found with convincing tooth impressions, but finding them will require much closer attention than is ordinarily extended to bone debris.

The primary materials with dietary potential that one may ordinarily hope to recover, with care and luck, from at least some sites are the range of durable animal, plant, and edible mineral remains. For animals these include bones, teeth, antlers, mollusk shells, otoliths, scutes, carapace and plastron fragments, and (rarely) hair, horn, scales, and bits of beetle elytra. For plants, carbonized plant material and opal phytoliths (microscopic remains of the siliceous skeletons of plants) are our primary evidence. Unfortunately, species identification from some of these materials (phytoliths, for example) is still so difficult and our knowledge about them so rudimentary that their analysis has not yet made the contribution we hoped for a few years ago. Pollen is ordinarily no more than secondary evidence for the presence of plants in a site and is very unreliable, circumstantial evidence at that, since it is ordinarily transported to the site by currents of air or water, or on the bodies of animals or people, or on clothing, or enters in other ways beyond conscious human control. However, when pollen from a plant species occurs in sediments in large clumps, the deliberate transportation of flowers to the site may be indicated, as has been claimed for a Mousterian level at Shanidar (Leroi-Gourhan 1975). Edible mineral salts, easily leached from archeological levels, may perhaps be recovered from dry sites someday.

Prehistorians do a much better job of collecting most kinds of primary evidence of plant and animal remains in the levels they excavate than they do with the trickier collection of secondary evidence. However, secondary evidence is extremely important to sound interpretation, since a number of materials would be undetectable otherwise. Among the most important kinds of secondary evidence for dietary studies are chemical traces and microbial spores and particles (Burrows 1968; Graczyk
For years, it has been recognized that the decay of organic materials (bone, kitchen wastes, fecal material, etc.) in an occupation horizon results at least temporarily in detectably higher phosphate levels than those characterizing adjacent layers that had lesser organic content. Under appropriate conditions the higher phosphate values may persist for millennia, and a stratigraphic profile will show the relative intensity of organic detritus accumulation in each level. Such information is quite crude compared to the results of chemical studies made possible by modern technology. Spectroscopy (Britton and Richards 1969), X-ray diffraction studies (Brothwell et al. 1969), and neutron activation analysis (Jervis et al. 1963) can detect and measure tiny quantities of trace elements, permitting the recognition of such characteristic and complex molecules as amino acids in archeological horizons.

Spores of certain microbes (some bacilli, yeasts, molds, and fungi) persist in recognizable form in Paleolithic horizons, and it is theoretically possible that some prehistoric spores can be identified and perhaps even cultured. Since some microbes (obligate parasites and obligate saprophytes) are only associated with one or a very few specific host media, concentrated patches of these forms would suggest the former presence of long-vanished animal or plant tissues. Even virus particles may someday be identified in Paleolithic horizons. The major obstacle to the search for Paleolithic microbes is the great difficulty of securing uncontaminated samples, but the prospect of recovering evolutionarily antecedent forms of “antibiotic” microbes has enough potential to interest large pharmaceutical companies, and with their help we may hope to see important advances in “prehistoric microbiology.”

Food consumption is the last stage in a variable sequence of subsistence-related events, some of which may provide other kinds of circumstantial evidence relevant to dietary reconstructions. Food acquisition is the first step in the sequence. Food may of course be eaten immediately where it is acquired. Unless such foraged meals are detected as coprolites or stomach contents, they leave no durable trace in the archeological record. Among some societies today, much of the total dietary intake is consumed on the spot; this is especially true for small, perishable items such as berries or shellfish. In some groups where there is a pronounced division of food-acquisition activities by age and sex, during certain seasons children and women may regularly satisfy their major dietary requirements for days at a time in this way. Prehistorians must always be aware of the possibility that they are recovering remains of the meals of just one segment of the population, and so their observations may have only partial validity for the society as a whole. At present there is no apparent way out of this dilemma.

When food items are not consumed as they are being collected, they may be brought to what will later become a recognizable archeological site. This may be anything from an ephemeral resting place used while certain activities are undertaken at some distance from the group’s headquarters, to its temporary or permanent “living area” or base camp. In this case, durable remains of diet-related activities may perhaps accumulate at the site. Where a temporary surplus of foodstuffs is available, a society may develop special techniques for storage over shorter or longer
periods. Storage pits, “silos,” cairns, or tanks may be constructed to contain these materials and protect them from competitors, large and small. Careful study of such features may provide evidence that they were indeed used for foodstuffs instead of serving some other purpose, but the proof is not easy. Nor are all the possible food-storage devices represented in the archeological record, since food may be kept in perishable containers such as boxes or skin bags, or may be protected by suspending it high in the air, or placing it on a platform atop a post or in a tree. Nevertheless, the features that do survive may provide significant evidence of subsistence practices.

Perishable foodstuffs also need to be preserved if they are to be stored beyond the normal period of their “palatability.” Opinions about palatability vary widely from group to group, of course, and prehistorians must keep their own ethnocentric biases from influencing their interpretations in this context. There eventually comes a time, however, when most biotic materials in most environments become so rotten that they are toxic to humans. Many societies have discovered techniques that effectively delay this decay process for appreciable periods.

Where there are cold seasons, foods may be preserved by chilling, because near-freezing temperatures slow down the metabolism of food-spoilage microorganisms. Roots and tubers may be kept in dark, humid containers at 6°C for several months. At temperatures of 0°C, fresh meats will keep for a week or more, and at −18°C most meats other than organs may be kept up to two years and on thawing will have virtually the same palatability as when they were first frozen (J. Jay 1970; Paul and Palmer 1972).

Heat will also slow or halt the microbial spoilage of food, since high temperatures can destroy all or most of the decay organisms present. One advantage of the “perpetual stewpot,” where fresh food is added to the pot each time a portion is eaten, is that the food is regularly reheated. Unfortunately, direct evidence of food preservation by these techniques would be unrecognizable in most Paleolithic sites.

Since the metabolic processes of microorganisms require water, food may be preserved by drying. If food is dried by the sun or the heat of a fire, direct archeological evidence of the process is unlikely to result. However, drying may be done by plasmolysis, which occurs when the food is surrounded by high (hypertonic) concentrations of salt or sugar. In some cases, residues of those substances might survive but by themselves would be no more than circumstantial evidence of food preservation. Residues of other chemical substances used to kill microbes or retard their growth might eventually be recoverable. Wood smoke, for example, contains antimicrobial chemicals (aldehydes, alcohol, phenol, cresol, and others) that add their action to the preservative effects of drying and heat (J. Jay 1970: 117).

Undesirable microbial action can also be slowed in certain cases by subjecting foods to the intensive growth of specific microorganisms that the human gut tolerates. This encouraged growth results in a controllable fermentation, which produces an unfavorable environment for the undesirable decay-producers. Sour cream, pickles, yogurt, cheese, and alcoholic beverages are familiar fermented foods on our tables, but the process is not restricted to modern industrial society. Some food-gathering peoples, especially in northern latitudes, use controlled fermenta-
tion to preserve meat, fish, and berries. Traces of the microorganisms responsible for fermentation, or the lactic and acetic acid resulting from their metabolism, may someday be recovered from Paleolithic sites.

Most human foods may be consumed raw, without special preparation. Infrequently, hunter-gatherers use foodstuffs that must be treated in special ways before they become edible. In California, several genera of highly nutritious acorns are so rich in tannic acid that this substance had to be removed before the acorns could be eaten. Sometimes the nuts were hulled and buried for long periods. Alternatively they could be dried and ground into meal with mortar and pestle; the meal was placed in baskets or shallow basin-shaped depressions and then repeatedly soaked with water. As the water passed through the meal, it leached out the bitter tannins. The cyanic acid in wild plum pits and buckeyes was removed in the same way (Kroeber 1953).

Cooking is the most widely used technique of food preparation. Primary evidence that potential foodstuffs have been subjected to the action of fire is widespread, in the form of charred animal remains. Carbonized plant remains are more rare but have been found in Paleolithic contexts. These materials may have been burned for other reasons, either accidentally, or as part of the food-preservation process, or because they were used as fuel. But, where such material is abundant, we should be able to rule out one or more of the possible explanations on the basis of the nature of the materials, the pattern of charring, and the contexts in which the items were recovered.

Fireplaces are ordinarily no more than circumstantial evidence of cooking, since fires may also have been used to provide warmth and illumination. In addition, from at least Solutrean times, fires were used to make flint more workable in the toolmaking process, especially when pressure-flaking was involved. Thus, caution should be exercised in interpreting the remains of fireplaces as indicating that food was cooked. Paleolithic hearths are often not informative—although they exist in considerable variety, most seem to be variants of the open fireplace, with or without draft trench or reflector. Possible exceptions are the hearths at two Upper Paleolithic sites in the Corrèze (Coumba del Boitoü and le Pré-Neuf), which contained slab-walled chambers that may be ovens, and the pits that may be ovens on the peripheries of a large hearth at Dolní Věstonice (see Breuil and Lantier 1959: 104; Klíma 1963: 125; Perlès 1976: 680–81). Occasionally, large patches of partially carbonized vegetation have been found, and these might be the remains of smoldering fires built to smoke meats, although other interpretations are possible.

These lengthy introductory remarks illustrate both the wide range of data about diet which can be recovered (at least theoretically) from Paleolithic sites, and the many interpretive problems the prehistorian faces. We must always be wary of conclusions based on isolated finds. Reliable information can be obtained only where a number of lines of evidence converge.

Paleoenvironmental reconstructions provide us with the data needed to assess the past potential of a region for hominid subsistence. They afford much background information about resource availability that may clarify the hard evidence
of actual behavior. Naturally, even the most reasonable attempts at assessing the
potential offerings of the area accessible from a site will not tell us what actually
happened in history; at best they show us what might have been. There has recently
been a resurgence of interest in studying the environment as a key to understanding
past behavior (see, for example, Higgs 1975; Higgs and Vita-Finzi 1972). The ap-
proach taken by the “site catchment analysts” (who seem to assume that whenever
a resource is available, it will be exploited) glosses over both the known complexities
of hominid behavior and the great difficulties involved in reconstructing prehistoric
environments in useful detail. Nevertheless, it is self-evident that we cannot properly
evaluate the finds from an occupation level unless we see them in the context of their
relationship to the prehistoric environmental setting.

APPENDIX

We are all inclined to accept the affirmations of other archeologists without hesita-
tion. Sometimes, we should be less uncritical, especially when those affirmations
concern prehistoric food practices. I have given some of the reasons that we should
only accept such affirmations after careful scrutiny in this chapter. The impact of
those considerations on archeological dietary interpretation can best be seen if a few
examples are given.

Plant Remains and Diet

A large mass of carbonized vegetation found in one level at Torralba might have been
thought of as a cooking fire or an area where plant food was prepared. However, it
is just as likely to have been a large smudge, unrelated to cooking or the preparation
of plant food. In the Mousterian levels at Abric Agut, on the other hand, I have in-
terpreted the remains of charred seeds including that of a sea-beet that were found
close together in one Mousterian level as food remains. I came to that conclusion
based on the limited area of the distribution and the fact that the seeds were charred
(Freeman 1981).

Incidentally, I now know from our experience with flotation at the Magdalenian
site of el Juyo that seeds can be preserved without charring. There, the distribution
of the plant remains recovered by flotation suggests that what we found was the
result of periodic house cleaning: the seeds were found in the area where structure
walls met floors, rather than in the centers of rooms, whatever the original reason
for their presence. Seeds such as “stick-tights” (Bidens) could have been introduced to
the site on animal skins or clothing. Others, for example blackberry seeds, might be
the remains of human food, but might also have been introduced by rodents.

At Shanidar, Arlette Leroi-Gourhan has identified clumps of pollen from flower-
ing plants, indicating the former presence of whole flower heads in one Mousterian
grave. The flowers may have been placed in the grave to heal the dead person, since
several of the species have medicinal value (Leroi-Gourhan 1975). But the reasons
for challenging this interpretation are given in Chapter 9.
**Remains of Invertebrates**

Both at Devil’s Tower and the better excavated Gorham’s Cave nearby, the Mousterian levels contain shellfish that could come from storm beaches. That is especially worth considering at Devil’s Tower, where the shellfish list includes *Tritonium*, *Lucina*, and *Pecten*, deep-living or free-swimming species that would probably not have been caught alive by Mousterian food collectors. Their shells might of course have been picked up as oddities and brought to the site. The species list is also much more extensive than it is when the shells are more likely to represent food residues. This is not to deny that some of the shellfish (and the represented land snails) could be the remains of meals; some marine mollusks even show signs of burning (Garrod et al. 1928; Waechter 1964).

On the contrary, I find little reason to doubt that most of the thousands of mollusk shells in Magdalenian Level 8 at el Juyo were food remains. The species represented are overwhelmingly of two genera: limpets (*Patella*) and winkles (*Littorina*). Both are easily collected from the area between the tides and from the splash zone; they were distributed in lots about the size of a human head, as though they had been discarded as garbage after meals; a few were charred; some contained small-backed bladelets that may have been used to sever meat from the shells. Where there is little or no evidence that the shells served a technological function or were deliberately perforated as decorations, quantities of shellfish remains do seem best explained as dietary items.

**Birds and Small Fauna**

It is obviously not the case that every animal bone recovered from an archeological horizon need be an immediate reflection of prehistoric diet. As an example, the Acheulean Aridos quarry site JR-AR-01 yielded a series of small faunal remains that closely resembles the list of prey hunted by the raptorial black kite, that could have perched at the meander edge where the site was located (Santonja et al. 1980). This suggestion has been rejected by Mourier-Chauviré (1980), the avifaunal expert, but for reasons that I do not find convincing. I am also inclined to think that the skeletal parts of aquatic birds recovered at Torralba and the birds, anurids, and rodents from Ambrona died natural deaths unrelated to their potential dietary use by early people.

Dorothy Garrod found over 30 species of birds in the bones from Mousterian levels at Devil’s Tower, Gibraltar (Garrod et al. 1928). That list may have little or nothing to do with past human dietary preferences, however, since although some of these creatures could have been taken while nesting in the cliffs above the site, many are raptors or carrion-eaters (eagles, hawks, and buzzards) that would have been large and ferocious enough to have been formidable prey. They survive by hunting just such creatures, the other sorts of migrating birds in the faunal assemblage, as they nest or rest on the overlying cliffs.

The presence of barn owls at el Juyo when the cave was not occupied by humans is apparently attested indirectly by our discovery in the Magdalenian levels of
the remains of the very small animals (rodents, etc.) that make up their diet. We do not believe that these small creatures were sought as food by humans. The small mammal remains from some sites may be represented because their pelts were used to make clothing.

**Larger (Mammal) Bone**

The faunal makeup of the bone assemblage recovered during the excavation of most sites is not a fair representation of all the animals hunted or eaten by prehistoric humans. In the first place, smaller animals are usually overrepresented, because it is simply harder to drag the large body parts of a bison or elk from the kill site to a camp than it is to bring home a whole rabbit. Then again, larger bones may be saved or moved about as raw material for tool manufacture. At Cueva Morín, some bones were apparently weathered for several seasons to free them from their periosteum, and even if they were originally food-related, the lapse of time between the relevant meals and toolmaking complicates their dietary interpretation (González Echegaray and Freeman 1998). At el Juyo, too, elk shoulder blades were decorated and burnt, indicating that they are something more than simple food remains. That is the case as well for some other bones. Elk ribs were also used as shovels and elk acetabula as lamps at that site, and in one case a cervid metapodial was turned into three “dice.”

There is a single case of an elk rib bearing human tooth marks at el Juyo. Judging from the impressions, the dental arcade that produced them belonged to a young, perhaps pre-adolescent, individual. The rib must have been soft (perhaps boiled?) or the bite very intense to leave the marks we found. But the impressions could have resulted from biting to relieve the intense pain of a surgical operation.

A famous prehistorian and student of Paleolithic art has speculated at length about the meaning of the “fact” that the species shown in cave paintings are not the same, or present in the same proportions, as the ones represented by the bones in archeological levels. While the calculation may perhaps be true (for specific caves it may not be), his observation is essentially meaningless. It certainly does not imply that the painted animals were the ones the artists could not get enough of, or were trying to attract magically, or beheld in visions.

**Cooking Pits at Altamira**

We excavated in the vestibule of the famous painted cave of Altamira in 1980–1981. In Level 2 (Magdalenian) we recovered two pits filled with mammal, bird, fish, and (very abundant) mollusk shells (Freeman 1988). Most of the thousands of shellfish remains recovered were the shells of limpets (genus *Patella*). These were part of the fill dumped into the pits once they had been emptied. The presence of ash in the pits, the presence of charred bones, the abundance of mollusks, and the limited number of mollusk species found all seem to indicate that the pits had been used for cooking.
Conclusions

In my experience, there usually are so many complications in the interpretation of possible dietary-related items that most conclusions about Paleolithic food practices, while they may be plausible conjectures, remain no more than conjectures nonetheless. In virtually all cases, implications of excavated remains for dietary interpretation are dubious at best. Only the abundance of shellfish remains seems to provide some direct dietary information, but as Devil’s Tower shows, one must approach their analysis with caution.

Nevertheless, I still continue to believe that the occupation residues found in well-excavated sites can provide evidence for Paleolithic diet, if studied with sufficient care. Virtually all the large mammal bones recovered are likely the remains of past meals, but there is no guarantee that the animals documented were consumed together at the same time, or that their proportional representation mirrors their relative abundance in past diets, or even that they were the only animals consumed by the inhabitants of a site. Plant foods can be especially difficult to identify: even where they are recovered, plant parts cannot be assumed to be remains of meals or attempts to cure disease or stanch wounds simply because modern examples are thought to be good as food or medicine; virtually all plants have such uses. Mollusks seem to be easier to interpret (cautiously) but one must always be aware that their food value may have been very much less than was the case for other potential diet-related items. The remains of birds and the smaller mammals, amphibians, and reptiles can be very hard to interpret. In some cases, storage devices or cooking pits may be identified and provide (usually) indirect evidence for dietary practices. The identification of chemical or bacteriological residues of vanished foods is another route to dietary interpretation that has scarcely been explored.

The difficulties inherent in dietary interpretation from archeological residues, while not insurmountable, are far greater than Christopher Hawkes realized. In fact, paradoxical though it may seem, in many cases I think that it would be far easier to reconstruct a past socio-political system or some of a society’s religious beliefs than to reconstruct ancient subsistence economics from archeological evidence.

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