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Subsistence-settlement systems of the Pastoral Neolithic in East Africa

Introduction

Knowledge of the Pastoral Neolithic in East Africa, the region's first set of cultural adaptations to a food-producing way of life, has accumulated rapidly during recent years (Bower *et al.*, 1977; Bower and Nelson, 1979; Onyango-Abuje, 1977). Unfortunately, as is frequently, the case during the "boom" phase of research on a new topic, the effort has often been rather haphazard, and our understanding of the data has lagged substantially behind its accumulation. Other participants in the conference will deal with Pastoral Neolithic (PN) culture history and subsistence patterns; this paper is aimed at understanding PN settlement practises. Specifically, my objectives are:

1. to list and evaluate data that may shed light on PN subsistence-settlement systems and
2. to generate a series of models for such systems which are compatible with existing archaeological and ethnographic data and can be tested archaeologically.

Before proceeding toward these objectives, I must interject a few words of caution. The task at hand is fraught with difficulties, some of which are essentially empirical and will probably be eased in due course as a result of more and better field studies, but some are conceptual and may ultimately prove more intractable. Included among the first category is the fact that few PN sites have been dug, not more than three dozen scattered from northern Kenya to central Tanzania (not counting outliers such as Lukenya Hill), and the excavations have usually been very limited, sampling only a small fraction of the site. Moreover, the data yield from the sites has often been poor, sometimes because of limited sampling but too frequently because the excavated material has been inadequately collected and/or analyzed. A particularly serious deficiency is that hardly any effort has been made to obtain information on plant remains from PN sites, other than the charred material from the crematorium at Njoro River Cave (Leakey and Leakey, 1950).

A problem which stems largely from the impoverished nature of the PN data base and the general lack of extensively excavated sites is that of establishing the specific cultural identity and chronological position of archaeological debris. Although it is often possible to attribute materials confidently to the Pastoral Neolithic, recent work suggests that this entity includes a variety of (ceramically defined) cultures and spans a very large range of time, from perhaps 8,000 - 1,200 radiocarbon years ago. Not only is there evidence to suggest considerable variety in adaptations among the cultures, but some of them apparently persisted over many centuries, during which they probably experienced substantial re-adaptation. This implies that material broadly identified as Pastoral Neolithic may be of little value in drawing inferences about specific cultural systems. And such broad identifications are often the only ones possible in dealing with surface occurrences or sparsely excavated sites.

Among the many conceptual problems that beset efforts to derive testable models of PN subsistence-settlement systems, two deserve special mention. One stems from the bewildering variety of settlement practises observed among contemporary East African pastoralists (Turner, 1969), which makes it difficult to use ethnographic information in the modelling process. The problem, which has yet to be effectively tackled, is to identify a limited number of axes of variation that can account for most of the formal differences observed among the settlement practises of different pastoral cultures. The other major problem in a sense stems from the resolution of the first, namely, that the use of ethnographic information in model building rests upon uniformitarian assumptions. This is, of course, an old problem in archaeology, but it is especially troublesome in the present context because a growing body of evidence suggests that some of the PN cultural adaptations may have been utterly unlike any ethnographically known pastoral cultures of East Africa (cf. Gifford and Kimengich, this volume). Thus, the use of ethnographic information in constructing models of PN subsistence-settlement systems may introduce unwarranted constraints.

Nature of the data

Before identifying the specific kinds of data available for constructing models of PN subsistence-settlement systems, it will be useful to summarize their general characteristics, particularly their broad geographic and cultural attributes and some of the problems that arise in applying them to the issue at hand. The data come from extensive ecologicaly stratified surveys and limited test excavations in two contrasting regions: (1) the Central Rift Valley of Kenya and adjoining lands and (2) the Serengeti National Park, Tanzania (Bower *et al.*, 1977; Bower and Gogan-Porter, 1981). Apart from geographic separation, the main difference between these regions is that the former is a complex, ecological mosaic, wherein ecozone boundaries are often abrupt, while the latter is not only ecologically simpler but also exhibits

gradual change from zone to zone. Included in the data are surface observations and collections from about 130 sites and excavated information from about a dozen sites. In addition, I have considered data from about half a dozen sites, such as Narosura, excavated by others in or near the Kenya Rift. Despite the geographic breadth and ecological diversity of the material, there is substantial overlap in PN cultures between the two regions. For instance, at least three of the PN ceramic wares commonly found in the Kenya Rift and adjoing areas – Akira, Narosura and Nderit – also occur in the Serengeti region.

The occurrence of given cultural entities in ecologically distinct regions offers interesting possibilities for comparative studies of subsistence-settlement systems. However, the prospects are presently clouded by the incomparability of data from different research projects. The reason for this is that sampling procedures, data collection methods and analytical systems often vary markedly from project to project. Thus, although some attempts at comparison will be undertaken here, they are regarded as highly tenuous and will be limited to those classes of data which appear to be least affected by differences in sampling procedures, etc. Four classes of data that seem to meet this criterion are: (1) site size, (2) stone tool frequencies (3) variety of artifact classes and (4) intensity of occurrence of pottery. The omission of faunal data from the list may seem odd; this is due not only to their being included in Gifford's and Kimengich's contribution (this volume) but also to the fact that the problems of comparability outlined above apply to them with special force.

The site size datum is based upon measurement of the maximum observable dimension of a site. The relevance of this datum to subsistence-settlement systems rests on the assumption that site area is a gross relative measure of population among PN settlement, and that area is positively correlated with maximum dimension. While it is obviously preferable to use a direct measurement of area for assessing relative settlement population, few such measurements are available. On the other hand, there are data on maximum dimension for all of the sites found in surface investigations in the Kenya Rift and Serengeti regions. (Since this is not true of the excavated sites, no attempt has been made to estimate their relative sizes.)

The data on stone tool frequencies are limited to relative values (*i.e.*, percentages) among three broadly defined categories: scrapers, backed pieces and *outils écaillés*. Again, the great breadth of the data "mesh" is designed to maximize comparability. The relevance of tool frequency data to the issue at hand depends upon the assumption that differences among sites reflect variation in activities, which is in turn related to the use of different resources in different ecological settings and/or during different phases of a settlement cycle.

Artifact variety is intended to provide an estimate of the relative "functional size" of sites (Johnson, 1977), which is more or less the reciprocal of site specialization – *i.e.*, if one site exhibits greater "functional size" than another, it is also less specialized. While it may be possible to identify a series of artifact classes whose presence or absence would serve to estimate relative "functional size", expediency has

dictated limiting the list to one: the stone bowl. Although the funtcion of stone bowls in PN cultures remains enigmatic, they do occur in at least several, if not all, of the cultures and they seem likely to reflect specialized (ritual?) activities. Because of the generally low, but extremely varied, intensity of sampling in the surface investigation, data on "functional size" are restricted to the excavated material.

The intensity of occurrence of pottery was measured differently in surface investigations and test excavations. In the former, it was estimated by computing the ratio of pottery sherds to shaped stone tools, while in the latter it was measured in terms of the ratio of pottery sherds to all stone artifacts. However, in each case differences among the ratios were assumed to reflect differences in mobility, with lower ratios expressing greater nomadism.

Since space limitations preclude a detailed tabulation of the data in each of the four classes, a general summary will be provided. The summary is divided into two sections, one dealing with survey data and the other with excavated information; in addition, each summary will be organized so as to reflect comparison between the two regions involved, the Kenya Rift and the Serengeti.

In considering the survey data, it is important to note that the sample from the Kenya Rift, representing somewhere between 51 and 85 PN sites, has greater statistical utility than the Serengeti sample, which represents a mere 11 to 14 sites. Moreover, the data for measuring the intensity of occurrence of pottery are unavailable from the Serengeti, and, as was indicated earlier, "functional size" is altogether omitted from the summary of survey data.

The survey data from the Serengeti suggest that the largest sites occur in the arid, short-grass plains, while the size distribution may be "primate" – that is, the large sites are larger and small ones smaller than would be expected if rank and size were linearly related. The data from the Kenya Rift suggest a markedly different situation, wherein the larger sites are concentrated in the wetter, more heavily forested ecozones and the size distribution more nearly approaches a rank-size rule (site of rank x is 1/x the size of the largest site). As for stone tool frequencies, the only clear pattern to emerge from the Serengeti data refers to backed pieces, which are abundant in sites on the short-grass plains, scarce in wooded regions and totally absent from sites in the intermediate zone, namely, the tall-grass plains. In the Kenya Rift, a broadly parallel situation occurs: that is, backed pieces tend to be more abundantly represented in the drier, more open environments, although they are not absent from any of the ecozones recognized in the study, while the frequencies of scrapers and *outils écaillés* show no pattern with respect to environment. Finally, the intensity of occurrence of pottery in the Kenya Rift sites also does not appear to vary systematically with environment (or anything else, for that matter).

The data from excavated sites is summarized largely in Table 1, which includes information from three sites in the Serengeti (HbJd1, HbJd3 and HcJe1), two sites in the Western Highlands of Kenya (Tunnel and Muringa Rockshelters; Sutton, 1973) and sites in or on the edge of the Central Rift Valley, Kenya. In most cases,

the summaries include the entire sample of excavated material from the site; the sole exception is HbJdl, the Seronera Game Lodge site, where a major cultural break was observed between levels 2 and 3 at SE-2 (Bower, 1973). That is, the pottery from levels 1 and 2 was predominantly Akira ware, while the sherds from level 3 were

Table 1

Summary of excavated data: Serengeti and Kenya Rift

Provenience	Tool ratios scrapers backed pieces/OE	Stone bowls	Pottery/stone
HbJd1 (SE-2, lev. 1)	.55/1/.36	?	.07
HbJd1 (SE-2, lev. 2)	.72/1/.52	?	.10
HbJd1 (SE-2, lev. 3)	1/.84/.69	?	.03
HbJd3 (SRI Kopjes)	1/.86/.85	–	< .01
HcJe1 (Gol Kopjes)	1/.26/.82	–	.02
Tunnel Rockshelter	.54/1/.59	–	.05
Muringa Rockshelter	.04/1/.04	–	< .01
Hyrax Hill (PN)	.05/1/.02	×	.03
GqJc6 (Maringishu)		×	.29
GsJh1 (Remnant)	.34/1/.04	–	.36
GsjJ25 (Maasai Gorge)	1/.89/.11	–	
GtJi3 (Ndabibi)		–	< .01 - .03
Crescent Island	1/.25/.03	×	.09
GuJj2 (Akira)		–	.10
GuJj13 (Salasun)		×	< .01 - .03
Narosura	.26/1/.25	×	.28

mainly Nderit ware (Actually, level 2 is probably best viewed as transitional between Akira and Nderit). The question marks concerning stone bowls at Seronera reflect the fact that all of the bowls recovered at the site came from disturbed contexts, such that it is impossible to determine their associations. Crosses indicate presence, bars absence; blank cells represent missing data.

Evaluation of data

Although data suitable for testing the assumptions underlying the interpretation of site size are not yet available, some preliminary evaluation of the other three data classes is possible. As regards the significance of tool frequencies, the broad similarity in covariation between backed pieces and environmental parameters in the Serengeti and Kenya Rift surveys noted earlier lends support to the assumption that this tool category is more or less functionally specific. What seems to have

happened is that PN cultures in both of these widely separated regions varied the intensity with which they used backed pieces in response to the same kinds of environmental circumstances, and this suggests that the tools were used for a similar, rather narrowly defined range of purposes in both regions. The fact that scraper frequencies do not exhibit any readily discernible pattern of variation, but rather seem to vary more or less haphazardly, suggests either that the tool may have served a multitude of purposes or that the purpose(s) it served were not environmentally determined. This observation may also apply to *outils écaillés*, a category which appears to grade into bipolar cores and may, in fact, often embrace substantial quantities of the latter.

More focussed light can be shed on the assumption regarding tool frequency by considering the excavated data. What apprears to emerge here is that, for a given culture in a particular environmental setting, the ratios of tool frequencies are more or less stable, but they fluctuate widely when either of the other variables is altered. Thus, for example, the ratios in the Akira levels (1 and 2) at HbJd1 are closely similar, as are the ratios at level 3 of the same site and HbJd3, which occupy about the same range of time, seem to include broadly similar wares and lie within the same ecozone. On the other hand, Narosura and Crescent Island, which have virtually identical pottery but occur in markedly different environments, differ strikingly in tool ratios.

The assumptions concerning "functional size" and the ratio of pottery to tools are, to some extent, mutually supportive. That is, one would expect specialized sites to be occupied episodically and thus to exhibit a low ratio of pottery to stone artifacts coupled with small "functional size". In addition, sites with evidence of prolonged, possibly continuous, occupation would be expected to contain a high ratio of pottery to tools and evidence of substantial "functional size". Both of these expectations are largely fulfilled in the excavated data. Sites that lack stone bowls generally have low pottery to tool ratios, and, although the converse is not consistently true, one of the exceptions (Salasun) has yielded only one stone bowl fragment. The only site (Remnant) which lacks stone bowls yet has a high ratio of pottery to tools also contained structural features suggestive of prolonged or continual occupation. On the other hand, it must be admitted that the Gol Kopjes site, HcJe1 which has a very low ratio of pottery to tools, also includes impressive structura, features in the form of boulder lines (Bower and Gogan-Porter, 1981). However, the sampling intensity was exceptionally low at HcJe1, and it is possible that the pottery/tool ratio is not representative. While this may sound like special pleading, the reader is reminded of the shortcomings in the data enumerated earlier, of which the present case is a specific example.

The models

In an earlier work (Bower *n. d.*), I proposed two models for Pastoral Neolithic subsistence-settlement systems, one called the Transhumant Pastoralist (TP) mo-

del and the other, the Peripatetic Pastoralist (PP) model. It now seems clear that no such simple scheme will suffice for so complex a phenomenon as the PN. But, despite the need for additional models, it remains likely that PN cultures in the two regions considered here differed fundamentally in their subsistence-settlement systems. This is evident in, for example, the more or less reciprocal patterns of site size distribution in the Kenya Rift and in the Serengeti. In this section, I shall outline a series of models with illustrations of specific archaeological occurrences that may fit them.

The TP model is broadly analogous to the Nuer system (Evans-Pritchard, 1940), except that game substitutes for fish. Subsistence depended largely on livestock (and possibly cereals) during the wet season, when settlement was essentially confined to large villages with sharply defined territories. During the dry season, subsistence shifted to wild game, and this involved a phased movement from large villages on the short-grass plains to ephemeral camps in the woodlands. This model may be illustrated in the Serengeti by the three sites mentioned earlier: HcJe1, HbJd1 and HbJd3. The first is a large site with evidence of permanency, such as boulder structures, and indications of territoriality, including the fact that raw materials for stone-tool manufacture are largely restricted to locally available quartz. Of the remaining two sites, HbJd3 appears to be a small hunting camp, while HbJd1 seems to be a larger site, embracing numerous activities and containing evidence that occupation was restricted to the wet season. At both HbJd1 and 3, there are substantial quantities of exotic stone, suggesting wider range of interaction among social units.

At high elevations, there may have been a variant of the TP model in which populations aggregated in relatively wet areas during the dry season and dispersed in drier regions during the wet season. The Remnant and Maasai Gorge sites, respectively, may reflect the two seasonal phases of this model (Ambrose, 1980).

The PP model is one for which no modern analogue exists. Subsistence may have broadly paralleled that of such contemporary East African hunter-gatheres as the Hadza, with the addition of small numbers of livestock. The range of a given social unit was probably large, but territories were not defended and settlement mobility perhaps was geared to the migration of prey herds. Settlements representing this model might tend to be monotonous and should contain abundant remains of wild game together with small quantities of domestic fauna. Examples might include Ndabibi, Akira (both the type site and the Akira levels at HbJdl), Salasun and the Naivasha Railway site (cf. Gifford and Kimengich, this volume). This model, too, is likely to have had variants, although it is presently impossible to specify their attributes.

Another model that emerges from both logical and empirical considerations can be called the Stationary Pastoralist (SP) model. It involved fixed settlement and subsistence based upon a combination of domestic livestock, wild game and perhaps crops. Modern parallels for this system can be found among various cultures borde-

ring the Kenya Rift, including several identified as Kalenjin (Sutton, 1973). Prehistoric sites illustrating the system might include Narosura and Prospect Farm (cf. Gifford and Kimengich, this volume). Again, one might suppose that the model included variants.

Conclusions

While it is obviously impossible to test the models for PN subsistence-settlement systems adequately on the basis of present data, it seems fair to conclude that data suited to this purpose are available in and on the ground. What seems to be needed is a series of intensive, small-scale regional studies of PN cultures aimed at generating reliable data on site size, activities, catchment, range of interaction, season of occupation and, above all, subsistence practises.

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