Aztec Cannibalism and the Calorific Obsession

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Garn's comments (AA 81:902–903, 1979) on Harner's (1977) hypothesis on Aztec cannibalism hits the nail right on the thumb. Although Vayda and McCay (1975:295) and many others have recognized the dangers inherent in a calorific obsession in ecological anthropology, much analysis continues to be carried out based on an uncritical use of energetic efficiency as a primary criterion. Garn's comments are another manifestation of this obsession. He argues forcefully that eating people is highly inefficient in terms of calories, and provides statistics in support. This fails, however, to shed any new light on the issue. That it is inefficient to eat at the top of the food chain is a fairly self-evident phenomenon. And energetic efficiency is not the critical issue for the Aztec, according to Harner. Harner discusses cannibalism as a source of protein; Garn's comments on energy do not address the position he is arguing against. As for Garn's assertion that it would have required vast amounts of meat to provide the population with mere occasional tidbits, Harner states, "But the point of this paper is not to prove that cannibalism made a contribution to the diet of the total population" (1977:129). That Garn chose the strategy he did to attack Harner's position implies a belief that energetic efficiency stands above all others with regard to adaptation. Harner aptly shows this to be false. Perhaps the most important implication of Harner's work is that there are factors other than energetic efficiency which need to be considered, depending upon the exigencies of particular situations.

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Affluent Hunters?
Some Comments in Light of the Alyawara Case

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Our recent analysis (O'Connell and Hawkes in press) of plant food collecting among the Alyawara, a central Australian hunting group, shows that the cost of subsistence is sometimes quite high, far higher than the current conventional wisdom regarding hunters would suggest. We infer from available data that under traditional conditions, Alyawara women may have spent up to 70 hours per week collecting and processing enough food for themselves alone. If this inference is valid, it contradicts the widely held notions (1) that hunters seldom spend much time on the food quest, and (2) that they consistently underuse resources and labor.1 This contradiction results not from special features of the Alyawara case, but from different methods of calculating the costs of subsistence. The approach we take not only provides a more realistic view of these costs, but facilitates the development of testable hypotheses concerning
spatial and temporal variation in resource use.

Our tabulation of returns gained from day-long trips by Alyawara women operating from the same base camp over a ten-month period reveals surprising variation in foraging success: from 200–2000 kcal. per forager hour. Of special interest here is the median return from the closest and most frequently visited habitat, which was low: only 450 kcal. per forager hour. Assuming an average daily requirement of 2000 kcal. (Meehan 1977:518), this means that under traditional conditions, Alyawara collectors must often (though not always) have spent four to five hours a day, and occasionally as many as ten hours a day every day just to feed themselves. 2 This contrasts sharply with the situation described for the !Kung San of southern Africa, a group widely regarded as typical of hunter-gatherers. Richard Lee (1968:37) reports that !Kung family needs are met with an average 12–19 hours of effort by working adults each week, less than one-half to one-fifth the time required by the Alyawara. The contrast is especially remarkable in view of the general similarities between !Kung and Alyawara habitat and technology.

Most of this difference results from the way we measure work effort. Our calculations take account of the time spent processing food; Lee’s do not. 3 If Lee’s figures are tallied in the same way as those for the Alyawara, the difference disappears. For example, consider the mongongo nut, the principal plant food for many !Kung. Lee (1979:187) estimates the total return from an average nut-collecting trip at 12 kg., or about 11,400 kcal. 4 Foraging trips average six hours (Lee 1968:37), which means an average return rate of 1900 kcal. per forager hour, equal to the very best figures for the Alyawara. However, if we add the time spent roasting and cracking the nuts (one and ten hours, respectively [Lee 1979:198]), the rate falls to 670 kcal. per forager hour, well down in the Alyawara range. Greater investments in time spent traveling to collecting sites or in processing (e.g., pulverizing nutmeats in a mortar to improve digestibility) reduce the return rates even more. Judging from Lee’s reports (1979:153), additional processing is a regular practice. A review of data on other plant resources important to the !Kung (e.g., baobab, marula nut, tsin bean) indicates that their costs are also high when processing time is considered (Lee 1979:479–488).

If the reported difference in subsistence work between the !Kung and Alyawara is simply a matter of measurement, which procedure is to be preferred and why? Our approach is derived from models of optimal foraging developed by evolutionary biologists (Krebs 1978; Pyke, Pulliam, and Charnov 1977). These models predict the choices foragers are likely to make from an array of resources and resource locations, given the goal of gaining the best return per unit of effort spent foraging. Such models direct attention to the value of a resource relative to the cost of searching for, collecting, and processing it. In contrast, Lee distinguishes “subsistence work” from “housework,” counting the latter as “a separate category in order to make . . . [the !Kung] data comparable with data on industrial and other societies” (Lee 1979:253). Subsistence work then includes only those food collecting and processing activities which take place entirely outside the camp.

Lee’s description has provided both source and support for Sahlin’s (1968, 1972) characterization of hunter-gatherers as the “original affluent society” in which labor and resources are consistently “underused” as a result of limited needs. Sahlin’s emphasizes the differences between the level of resource use in hunting and commercial economies and attributes them to differences in culturally specified “wants.” Other arguments predicated on “underuse” interpret features of culture as buffering mechanisms which prevent hunter-gatherers from crossing some dangerous carrying capacity threshold. Whatever their advantages, these perspectives offer no tools to explain variation in the use of resources or resource sets across time and space, no general principles which enable predictive statements about such variability.

In contrast, attention to the costs as well as the benefits of resource use alters the description of work effort and provides a framework for developing testable hypotheses which may explain variability in foraging behavior. We illustrate this point with a simple example.

A fundamental model derived from optimal foraging theory is based on the observation that resources can be ranked according to the ratio of gains from consuming them (usually measured in calories) to costs incurred in collecting and processing them (usually measured in time). The model predicts that resources will be included or excluded from the diet as a function of (1) their rank relative to other available resources, and (2) the abundance of higher-ranked resources, or more precisely, their encounter rate. As the encounter rate for higher-
ranked resources goes up, low-ranked resources will be eliminated from the diet, and conversely, regardless of the absolute abundance of the lower-ranked resources (MacArthur and Pianka 1966; Emlen 1966). Among other things, this means that the same resource may or may not be exploited, depending on the character and abundance of other resources available in a given situation.

Certain patterns of resource use recognized among the !Kung may be explained by this model. For example, Lee notes differences in the importance of various food plants from one water hole to another and concludes that “in poor food areas less desirable foods may assume major importance” (1979:177). We propose (but cannot demonstrate from Lee’s data) that “less desirable foods” are those which produce low returns relative to the effort expended in searching for, collecting, and processing them.

On a larger scale, Lee (1979:180–181) contrasts the Gwembe Tonga with the !Kung:

The Tonga live at a population density approximately 100 times that of the Dobe !Kung. When Tonga crops fail, enormous pressure is brought to bear on the Gwembe wild plant foods—far greater than that exerted by the !Kung on their plants even in time of drought.

Lee notes that the Tonga make use of a large number of wild plant species, including some not considered food by the !Kung. Among these are the seeds of Acacia albida, which are abundant in both Tonga and !Kung territories, but ignored by the !Kung. These seeds are toxic to humans and require substantial processing, including repeated washing and leaching, before they can be eaten safely. We suggest (but again lack data to show) that returns from A. albida may be too low relative to those available from higher ranked resources to allow it to enter the !Kung diet. Only when these other resources are depleted—in the Tonga case through drought and heavy collecting pressure (Scudder 1971)—are low-ranked items like A. albida likely to be used. In these examples, the failure to take low-ranked resources need not be “underuse.” Rather, these patterns may be seen as optimal foraging. Different population densities associated with different patterns of resource use might be seen as the long-term consequence of relatively short-term cost-benefit decisions.

It should be made clear that although Lee (1979:167–175) has also constructed a ranking of !Kung resources, it is quite different from the one we describe here. Ours identifies the relative value of resources in cost-benefit terms, while Lee’s addresses their relative contribution to the diet. We do not deny the utility of Lee’s ranking, but again emphasize the predictive capability of the cost-benefit scale. In Lee’s terms, mongongo nuts are the top-ranked resource, but in ours they are near the bottom of the list. If our ranking is correct, we would predict mongongo nuts to be among the first resources dropped from the !Kung diet given either an increase in the abundance of higher-ranked resources (e.g., large game) or a decline in the !Kung population. H. Harpending (personal communication) tells us that the San ignore mongongo nuts in some parts of the Kalahari because they are “too hard to crack,” an observation quite unanticipated by Lee’s ranking. It would be interesting to know if returns from higher-ranked resources were greater in these areas.

By calling attention to the unexpectedly high cost of subsistence among arid-zone hunters like the Alyawara and !Kung, we do not intend to resuscitate the recently discredited view that nomadic hunting is generally more difficult than settled agriculture. On the contrary, an optimal foraging perspective suggests that hunters only rely on seeds and other high-cost potential domesticates when returns from less costly but higher-ranked resources diminish. Consider Harlan’s (1967) widely cited experimental seed harvest in Anatolia. Harlan found that he could gather more than two pounds of wild cereal grain in an hour, and inferred from this that a family could easily collect enough in three weeks to feed itself for a year. If we assume a caloric return of 3000 kcal./hr. and a cost of one hour per kilogram roasting and threshing (which seems conservative), yields from this resource are no greater than 1500 kcal./hr., which is better than mongongo nuts (875–950 kcal./hr., counting collecting and processing, but not travel or the other activities of a six-hour foraging trip), but lower than any nonseed plant resource now taken by the Alyawara. Seen in cost-benefit terms, stands of wild cereals represent a much less attractive resource than descriptions emphasizing their abundance would imply.

Finally, we do not contend here that optimal foraging theory provides the one best perspective on hunter-gatherer subsistence, nor do we argue that the behavior of hunters will always be consistent with predictions derived from this theory. However, this view substantially
modifies notions of hunter-gatherer work effort, thereby challenging notions of underuse. We emphasize that it can guide the description of ethnographic cases, facilitate the comparison of these cases, and enable the development of testable hypotheses about observed similarities and differences in resource use. Our goal here is the same as Lee's (1979:454):

If we can discern the principles underlying foraging behavior in all its variability, we can apply these principles to more dynamic models of foraging societies past and present.

Notes


1 The first point has recently been criticized by others, e.g., Colson (1979), Gould (in press), on different grounds.

2 Strenuous work requires significantly higher calorie allotments, implying that conventional estimates of 2000 kcal./day entail a restriction on activities (Passmore and Durin 1955).

3 Johnson (1975) has addressed this same point for a different purpose.

4 The number 9490 kcal. given in Lee's (1979) Figure 7.2 is evidently a typographical error.

5 See also Hitchcock and Ebert (1980) for further discussion of the potential utility of optimal foraging theory as applied to the !Kung case.

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Fieldwork Ethics in Policy-Oriented Research

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Joan Cassell’s recent (1980) discussion of fieldwork ethics is helpful in preserving a sense of traditional field relations. We feel, however, that if the statement is accepted in its entirety, we would be left with little ability to adapt to our present circumstances—in particular, to the challenge of policy-oriented field research. Further, strict adherence to Cassell’s model for fieldwork ethics could have the potential of actually contributing a disservice to the subjects of applied social research.1

Cassell’s argument may be summarized as follows: (1) anthropologists are in danger of losing control of their ethical commitments to research subjects; (2) the threat comes from federal regulations designed to protect the subjects of scientific research; (3) the regulations are inappropriate for social research because they were developed in response to problems in biomedical research, which has different intentions than social research, particularly the kind that uses fieldwork as its prime method of inquiry; (4) fieldwork (regardless of whether it is conducted under the “veranda,” “noblesse oblige,” “going native,” or “advocate” models) is essentially an innocuous undertaking involving pure and mutual trust between investigator and subject; (5) federal regulations are unnecessarily restrictive of the work of anthropologists; and, therefore, (6) we should resist outside regulations and use peer pressure, if necessary, to discourage unethical conduct.

We feel the above is an accurate simplification of Cassell’s views. We do not argue with them all. The influence of the biomedical model is clear in much of the past several years of federal regulation concerning the protection of human subjects. As Cassell has pointed out, fieldwork is obviously different from other forms of research (e.g., biomedical experimentation, psychological experimentation, and survey research). We feel that fieldwork does deserve special consideration appropriate to its style and rationale. We know that federal regulations have posed serious difficulties for anthropologists working in a variety of research settings.

Unfortunately, Cassell’s approach falters if one introduces a fifth variety of fieldwork to augment her description of classic fieldwork relationships. We refer to client-commissioned field research that is directly related to policy research. This type of research is performed in the service of or at the request of the evaluation and assessment needs of public or private agencies. The fieldwork is usually done as a part of a major research effort, thereby mixing the kinds of research brought to bear on specific policy problems. Quite often, this involves working closely with several research populations, including: federal bureaucrats, local program managers, operations staff, and low-income individuals who are to benefit (one hopes) from a new program or policy direction. Obviously, the relationships and ties established by researchers will vary among groups and among individuals. In many cases, normal field ethics may not be appropriate. Confidentiality, for example, can seldom be promised key decision-makers working within a government agency. Their visibility is high; their liability in an evaluation effort is similar to that which they can incur in a financial audit of their agency (Chambers 1977, 1980).

Fieldwork in these settings seems far removed from the relatively innocent research activity Cassell describes. In our experience with this style of work, the field-worker is generally perceived by his or her subjects as a considerable threat, particularly where research reports bear directly on subjects’ job performance. The intentions of the field-worker are beside the point. The simple attrition of agency defenses that result from the long-term presence of the field-worker, accompanied by evenhanded reporting, creates a powerful weapon which perceptive research subjects are likely to feel is far more