

Distribution and redistribution of game by foragers: How, why, and can we see it in the archaeological record?

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Most tropical and temperate foragers traditionally engage in distribution and redistribution of hunted game. Corresponding to this is primary butchery (for initial distribution) and secondary butchery (after redistribution, for cooking). The anatomical pattern of primary butchery is determined partly by anatomical constraints, but also (perhaps mainly) by the cultural practice of distribution and redistribution, and is nearly identical across a wide range of foragers. This butchery pattern is potentially observable in the archaeological record. Cultural practices governing or facilitating distribution and redistribution vary dramatically from place to place and probably over time, although the reasons for having a distribution and redistribution practice for game are predicted to be similar for all foragers. We describe the distribution-redistribution system (in particular, for the Efe Pygmies of Zaire) and its archaeological correlates, and offer possible explanations for this system based on socio-ecological theory, ethnographic observation, and literature search.

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We have studied, and have previously reported on the butchery practices of Efe and Lese people of the Ituri Forest, Congo (Zaire) and compared these practices across a wide range of foraging cultures. Here we briefly summarize these results, including indications that specific butchery practices could be visible in the archaeological record (given ideal conditions of preservation). We also characterize a particular hunting, butchery, and meat distribution practice, and discuss ways in which this could help elucidate the mystery of primary and secondary butchery and the practice of hunting itself.

The Efe (Pygmy) foragers are archers and gatherers living in a symbiotic relationship with nearby Lese agriculturists. Today the Efe get nearly half their calories from hunting and gathering wild food. The remainder of their diet comes from agricultural food received from the Lese primarily in exchange for Efe women's labor in Lese gardens. The Lese are Sudanic-speaking, slash and burn horticulturalists who live in small villages and grow cassava, rice, beans, plantains, and peanuts. They also actively trap wild animals.

Most of the animals the Efe hunt are small. One of the most commonly hunted animals is the blue duiker, weighing only about 10 to 15 lb. The Efe hunt other species of duiker, the largest weighing well over 100 lb., as well as primates. They also hunt larger animals such as giant forest hog, bush pig, okapi, forest buffalo and forest elephant.

The Efe have several hunting techniques. In ambush hunting, a lone man quietly waits in or near a fruiting tree for an animal to come to eat. Typically, one animal is killed at a time. Animals acquired this way are brought whole to camp and processed there.

The Efe also practice group hunting, called *mota* hunting. Several archers -- usually 5 to 10, spread out over several hundred meters in the forest. A beater and dogs make a loud ruckus, that drives out hidden animals from the bush, and as they run out, the archers shoot. According to Bob Bailey, animals near the periphery of this configuration often expose themselves from cover to see what the ruckus is about, and are more easily shot. Those that run at high speed from near the center of the *mota* are most likely to escape. Using this technique, Efe can obtain several animals on a single hunt.

Efe also hunt for arboreal primates, and practice other techniques not described here. The Efe foragers and Lese villagers use snare traps to catch ground-dwelling animals like duikers and pigs. The Lese use this technique far more often than the Efe, probably because they have access to metal wire, which greatly increases the efficacy of the trap.

Once an animal is caught in a group hunt, two people always butcher it together: a main butcher, and an assistant, who holds the other end of the piece being cut up. The main hunter of this animal is usually not involved in the butchery. In every instance we observed, butchery was done with more than one tool. Machetes, Arrows, knives, and spears are typically used and switched back and forth as needed.

Normally, taphonomic effects such as scavenging, weathering, trampling and burial would have further modified the bones. Most of the bones would have been scavenged and consumed by dogs, as documented for other Pygmy groups by Jean Hudson, and for southern African foragers by Sue Kent. However, for the present study, we intercepted the bones immediately after the meat was consumed, and except where the Efe's dogs outsmarted us, we were able to clean and save the bones for future study.

Generally, butchery is done in two distinct steps. Primary butchery is the initial division of the carcass for redistribution to different families within a camp's residence group, and is usually performed by men. Secondary butchery, often done by women, is distinguished from primary butchery as the preparation for cooking and consumption. The primary butchery sequence is fairly consistent from time to time and species to species, and was the same for the two residence groups of Efe studied and for all Lese that we observed.

Briefly, this procedure can be summarized as follows: First the animal is laid on its back and an incision made across the belly, in the transverse plane above the bottom few ribs. Additional incisions are then made and a square "belly piece" is removed, including the distal ends of the last few left and right ribs. At this point the animal is eviscerated, then the carcass is split in two transversely, with an additional back piece in the middle, containing a few thoracic and lumbar vertebrae and proximal ribs. We refer to this as the "loin piece." Next either the back half is

split in two sagittally through the pelvis and sacrum and the front half is split in two with a rib cage and one front leg going with the head, and the other leg going with the other half of the ribcage. Very often, instead of splitting the front half, the head is simply disarticulated.

This procedure results in four main quarters, one for each leg, a belly piece, a loin piece, and a separate head piece or a head and one forequarter still attached. The Efe and Lese disarticulate the same pieces in the same basic sequence for all sizes of animals we observed, from an elephant shrew to a giant forest hog.

These pieces are then placed directly on the fire for several minutes to burn off the fur, residues scraped off with an arrow. The Efe do not skin their animals, for several reasons. They usually eat the skin, and it is very difficult to control rotting and maggot infestation in this environment and so they use leaves and other material for most tasks for which other groups might use skins.

Investigation of the literature revealed that many forager groups have a similar pattern of primary butchery (but with variations). Western Desert Aborigine butchery is in many ways most similar to that of the Efe, which is interesting considering that the most commonly processed animals are kangaroos: They also don't skin the animal, probably because they roast meat directly on coals without pots. Gould claims that they cut kangaroos up in the field into the same 10 pieces every time, no matter how many people were hunting, how far they have to travel, the number of carriers, or the number of animals killed.

For the Hadza of Tanzania, primary butchery of impala results in 12 basic pieces. They do skin their animals, the phalanges coming off with the skin. The Hadza do their primary butchery and some consumption, especially of marrow, in the field.

When bushmen hunt animals as small as a duiker, they carry the animal back whole and conduct primary butchery including skinning in camp. Because of this, it is hard to distinguish primary butchery from secondary - cutting up and cooking take place at the same time. This is also true of Dassenetch who have a mixed economy including domesticated animals.

The Aka of the Central African Republic, who hunt with nets more frequently than do the Efe are also heavily involved in trading meat. They carry their animals to camp whole, in contrast to the Efe, who always butcher the animals taken in a group hunt before returning to camp. Like the Efe, they also do not skin. Primary butchery of net-caught duikers yields 7 segments, while trapped duikers, involving fewer people-- yields 5 segments. Interestingly, when the Efe we worked with captured game specifically for market sale, their pattern of butchery was more similar to the Aka, and the animals were butchered in camp.

In secondary butchery, the Efe progressively cut up the carcass into smaller and smaller units during secondary butchery. Most of the limb bones are disarticulated from the adjacent bone. Then, many of these bones are split in half. The Efe boil the meat on the bones in pots, and often add palm oil to sauté it.

Despite the effects of secondary butchery, primary butchery can be identified on the bones. 42% of the vertebrae have been chopped -- reflecting sections of 4 or 5 vertebrae separated during secondary butchery. But only 17 % of these are burned (by the fire applied to clean fur off the skin) *and* chopped, exactly the number predicted from the removal of the distinctive "loin piece." There are no skinning marks on Efe butchered bones.

Most of the prey the Efe hunt can easily be carried by a single individual. But whether these small animals are brought to the base camp whole does not depend on their weight. If an animal is taken by a solitary individual it is usually brought back to the camp whole and butchered there. When ambush hunting is near camp, help may be solicited to assist the ambusher in tracking a wounded animal, in which case they sometimes do primary butchery in the field.

If the animal is taken during a group hunt, primary butchery is done in the field, before returning to camp. This is not to spread the effort of transport costs among the individuals. The animal is just too small to make it matter. We suggest that this practice requires some special explanation, or perhaps more appropriately, provides an opportunity for insight into the strategies involved in meat acquisition, processing, and distribution.

Clearly there are some cultural differences in primary butchery -- but not many. At the same time, some aspects of butchery are due to anatomy, such as the placement of filleting and disarticulation marks. However, there is nothing about the anatomy of animals that predicts the cutting out the characteristic loin piece, nor is it obviously the most efficient or optimal way to butcher.

It is possible that the practice of separating primary butchery and secondary butchery, and conducting primary butchery outside of camp, can be interpreted in such a way as to elucidate the role of hunting and meat distribution in a broader economic, ecological, or social context. Here we present a few thoughts on this.

Why divide the animal into an initial set of parts, with rules, however variable, as to temporary ownership of these parts? Why carry out this initial division outside of the camp, where only those men involved in the hunt are present? These questions may relate to other questions raised in forager circles, notably by Fiona Marshall, Kristen Hawkes, and others. Why do men hunt at all, and when they do so, just what are they up to? It is generally presumed that a typical tropical foraging group forced to do without the returns from hunting would fare much better than a group forced to do without plant foods. Is exchange of meat a means of smoothing over variation in the food supply, a kind of food storage, where the excess is stored in the form of expected reciprocal returns, in a broader system of reciprocal altruism? Are men foraging sensibly -- i.e., meat is not as useless as many seem to claim -- but in this context, trying to control the distribution of this resource? Is hunting ability important, either because hunting itself important, or because it is an indicator of something else, and thus important to potential mates?

In order to simplify a discussion of these issues, we focus on the particular characterization of group hunting based the Efe, but similar to practices by other groups. We characterize this form meat acquisition as having the following characteristics:

1. Men hunt in groups with fairly consistent membership.
2. The returns from hunts vary greatly from hunt to hunt
3. The relative role of individuals in hunts (their contribution to success) varies.

4. Variation in individual contribution and overall group success has a large random component, but may also reflect some degree of individual ability
5. Men involved in the hunt divide animals into a fairly consistent set of parts prior to their return to camp or home base
6. The division of animals into parts follows a set of rules that may be variable from place to place or time to time, but follows a fairly consistent pattern
7. Individual animal parts are temporarily possessed by individual men at the time they return to camp or home base. The man who organized the hunt may have the loin, the man who hit the animal with the first arrow may have one foreleg and the head, etc.
8. On return to camp, pieces of meat are distributed among members of the residence group in a way that usually accords with need, often resulting in a fairly even, or at least sensible, distribution of meat.

For this sort of activity, we identify two features for special focus:

1. The consistent pattern of carrying out primary butchery outside the camp, under the eyes of those involved in the hunt but hidden from others in the residence group; and
2. The distribution of the resultant body parts among members of the group hunt, also before entry into the camp.

Group hunting and some form of distribution could serve any one or more of several functions:

1. Manipulate the display to other (non-hunting) group members, especially women, of the prowess of those involved in the hunt, by walking into camp with a signal of one's involvement in the hunt (the signal being the particular piece of meat being carried).

2. Mediate or expand on a system of reciprocal altruism (sensu Trivers) by including exchange of meat (or credit for role in the hunt) at primary butchery. In this arrangement, we would expect behaviors that are most supportive of reciprocal arrangements to be part of the system, including regular interaction with known individuals, and the ability to detect cheating behavior and to act on that behavior by inflicting a cost on the cheater.
3. Militate against variation inherent in hunting. For this, we make no assumptions about the inherent value of meat. The central theme of this strategy is simply an arrangement among regular hunting partners to cooperate in an investment of effort and share the returns roughly equally. While this may involve reciprocal altruism among individuals, this is primarily an economic strategy analogous to the Western practice of an individual buying mutual funds rather than specific stocks.

We suggest that the first option, controlling the display to other group members of the prowess of specific hunters, is an unlikely explanation for this pattern of behavior. Although it is possible that a system of rules of possession would serve this purpose, it is far too easy to "cheat" this system, whereby one individual passes off his animal part to, say, an unmarried younger brother -- who happens to be a lousy hunter -- to impress the folks back at camp. The inherent possibility of "dishonest advertising," and the lack of a mechanism for mitigating against cheating, would make this an ineffective means of display of quality. Prowess as a hunter could still be displayed in the context of individual hunting.

We further suggest that it is unlikely that the exchange of animal parts is involved in a broader system of reciprocal altruism. It would be too often in the interest of some individuals to have this exchange worked out in front of others in order that accounts are kept honest and accurate. Were this system part of a broader system of reciprocation, we would expect there to be conflict on some hunts as to whether butchery of these small animals should be done in camp or prior to arriving at camp, which in turn would result in variability in this feature. The lack of variability suggests that this is not the case.

Finally, the system we observe with the Efe hunters does accord with a simple attempt at smoothing out variation between hunts. Again referring to a Western

business and economics analogy, mitigating this variation is probably most efficiently done, and done with appropriate attention to the actors' self interest, if it is kept separate from other ongoing reciprocal arrangements. Were the division of meat to be carried out in the presence of other members of the residence group, the politics and accounting of other reciprocal arrangements would likely be forced onto the exchange, and thus included in the calculations. In Western contexts, there is just so much information one access regarding the internal workings of a particular corporate entity, without buying into part ownership of that entity. Similarly, carrying out primary butchery outside the camp serves the purpose of excluding other individuals, their interests and intentions, and their debts and credits, in the distribution process.

System broadly similar but with efe, opportunity to butcher outside common... so, why do they do that?