

NOTES ON HUNTING, BUTCHERING, AND SHARING OF GAME AMONG THE
NGATATJARA AND THEIR NEIGHBORS IN THE WEST AUSTRALIAN DESERT

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The search for kuka (meat and all fleshy foods) is a major preoccupation of the Ngatatjara and their neighbors in the West Australian Desert. Under aboriginal conditions, meat probably comprised less than fifty percent of the total diet of these people, with the bulk being made up of a wide variety of vegetable and non-fleshy foods (mirka).¹ Exact estimates of the relative importance of these different kinds of food in the native diet are difficult today owing to the increasing importance of white-introduced rations. However, there is no doubt that meat of any kind is preferred by the natives over mirka of any kind,² and close attention is always paid to the way meat is butchered and especially to the way it is shared.

In the West Desert of Australia it is still possible to observe groups of natives who regularly engage in hunting and continue to process game in the traditional manner. Above all it is possible to make quantitative observations of the butchering and sharing of meat to see exactly how many people share in an animal of a particular size on a particular occasion, and to find out the size of individual shares. In March, 1966, my wife and I began a study of the Aborigines living at the Native Reserve at Laverton. W. A. After three months we moved to the Warburton Ranges, where our study continues up to the present (February, 1967). Much of our effort has been directed toward a study of the subsistence economy of the natives at these places with particular emphasis on aspects of potential archeological interest.³

Most of the natives observed in this study are Ngatatjara people from regions to the north and east of the Warburton Mission, although a

number of the Pitjantjatjara people from the area east of the Blackstone Range and some Pintupi natives living in the Gibson Desert near the Clutterbuck Hills were also studied (Berndt 1959). Although there are some important differences in dialect, all of these people speak the Western Desert language.⁴ This language is intelligible over a vast area including the Great Victoria and Gibson Deserts and the adjacent parts of the Northern Territory. The terms used in this paper are all Ngatatjara, but they vary hardly at all from the Pintupi and Pintjantjatjara usages. The June 30, 1966, census reported 378 natives at Warburton Mission (only one of these was a half-caste) and about three hundred natives at Laverton. The majority of these people had a fairly long history of contact with whites, and many of the older people were among the first natives to be contacted by the original United Aborigines Mission started at the Warburton Ranges in the early 1930's. However, there is also a substantial minority of natives living at both Warburton and Laverton who have only recently given up their nomadic desert life. Some of these people came to the Reserves as recently as August, 1965, and two of these families returned to the desert in October, 1966, where they are still living at this time.

HUNTING OF LARGE GAME

The only large game in the Western Desert are the red kangaroo (Macropus rufus), euro (Macropus robustus), and emu (Dromaius novae-Hollandiae). Under aboriginal conditions, these animals were hunted by means of spear and spearthrower, usually in conjunction with blinds or in drives. Waterholes situated in natural defiles were (and still are) popular places to wait for game, for they offered concealment for the hunter and restricted the movement of the quarry. If no natural concealment were available, the hunters constructed circular blinds of brush or piled stones. These may be from ten to fourteen feet in diameter, and well-preserved blinds of rock masonry survive in many

places in the desert. I have observed such blinds at three sites frequented by Ngatatjara natives; ka:nka (approximately forty-six miles east of Warburton), mularpayi (approximately fifty miles east of Warburton), and wamarangu (in the Dixon Range, approximately thirty miles northwest of Giles Weather Station, W. A.). Platform-blinds situated in trees were also used, though these were less popular because of the scarcity of suitable trees in favorable locations. At the site of murku, near the east end of the Rawlinson Range, I was shown a platform of boughs about fifteen feet up in a small ghost gum tree directly overlooking a large, spring-fed pool of fresh water. My Ngatatjara guides explained that this blind was used at night and that similar blinds were used in the creek beds (where large trees are common) whenever pools of water were left by a heavy rain.

Today most natives take spears and spearthrowers with them on hunts, but they prefer to use rifles. Only once at Laverton did I hear of a kangaroo being killed with a spear. So far, I have only once seen spearthrowers in action for hunting. This occurred in January, 1967, at patjar, an important site in the Clutterbuck Hills about 160 miles northwest of Warburton. At the time there were twelve Pintupi natives living there, all of whom had walked up from Warburton four months before. They brought two rifles with them but forgot the ammunition⁵ and thus were forced to hunt with spears. The men constructed a circular brush blind (manngu) along the raised bank of a narrow creek bed which lay within a small, rocky canyon about three-fourths of a mile from the main camp. Then they dug a small soakhole in the otherwise dry creek bed, situating it about twenty feet from the blind. Emu, attracted by the water, came up the canyon to drink at the soakhole and presented an easy target to the hunters inside the blind. Over a period of four months, these men managed to kill five emu at this place. On the occasion I was present, the hunters lay prone inside the blind. After a wait of about two hours, a large emu approached the soak. Mitapuy, the oldest man

present, indicated by hand signs that he would spear the animal. When it reached the soak, he rose quickly with his spearthrower-hook already engaged and threw the spear from a standing position. Mitapuy is an excellent shot with a spearthrower, but he had bad luck this time. The rear part of his spear broke from the force of the throw, causing the spear to miss, and the animal fled instantly. The men waited for roughly another hour to see if any more game would arrive, then they returned to camp.

Hunts like this are uncommon today, but this one at least gives a picture of a traditional way of hunting large game. It was also a common practice to drive animals (both large and small) with fire toward the hunters or over cliffs. Several Ngatatjara men have described to me how they used to drive rock wallabies over the cliff by lighting fires behind them at puntutjarpa, a site about three miles south of Warburton. Although this method is not in common use today, a vivid account of a kangaroo drive with fire has been presented by the zoologist, H. H. Finlayson, after his visit during 1932 with a group of Pitjantjatjara men near the Musgrave Ranges (Finlayson 1935). Another popular method of killing large game was to poison certain rockholes by crushing leaves of the kungkungu plant (Duboisia hopewoodii, called pituri in other parts of Australia) in the water. This method involves covering the main rockhole with boughs to prevent the game from drinking there while a smaller, adjacent rockhole is contaminated. Because of its simplicity and effectiveness, this method is sometimes still used in preference to hunting with rifles. The poison in no way damages the meat.

Even with rifles, the skills of tracking and stalking are much used, for the natives tend to neglect the care of their firearms and to be poor shots as well. Some popular writers to the contrary, there is nothing fantastic or mysterious about the natives' exceptional ability to identify and follow tracks. This skill is the result of a lifetime of close observation of both the tracks and habits of different animals

coupled with an intimate knowledge of the local terrain. Successful tracking is as much a matter of knowledge as eyesight. For example, a party of hunters may see the fresh tracks of a kangaroo crossing a sand-hill. They will discuss the direction these tracks take, following them for a short distance as they do so, and then consider the waterholes in the immediate area toward which the animal might be headed. After deciding on the likeliest waterhole, the hunters will proceed directly to it. They do not actually follow the tracks but watch from time to time to see if they cross them again. In most cases, they have picked the right waterhole, and it is simply a matter of approaching it cautiously so as to get a good shot at the animal. They may even get there ahead of the animal and will crouch behind some cover until it arrives.

In stalking an animal, natural cover is used as much as possible for concealment. However, I have often watched a hunter approaching a kangaroo browsing in an open spinifex-plain, where no natural cover is available. The favored technique in such a case is to get downwind of the animal and then walk upright directly toward it. Windy days are best for this, for the wind covers the noise of the approach. Kangaroos and euro are particularly susceptible to this technique, for their eyesight is poor. The hunter fixes his eyes on the kangaroo's head and ears, for he must freeze in place instantly at the slightest movement or sign that the animal hears him coming. He may remain frozen for several minutes until the animal returns to its browsing; then the approach is resumed. I have seen hunters approach kangaroos out in the open like this on windless days from distances of over one thousand feet to within seventy-five feet, with particularly difficult approaches taking up to as much as twenty minutes.

While travelling from place to place, the natives usually carry firesticks of smoldering mulga bark, setting fire to the brush as they walk along. They tell me this makes the green grass-shoots appear, thereby attracting kangaroos. This behavior is most common during the

driest months, from about October through December, when clouds of smoke seem to hang over the countryside in every direction. The early explorers in this region, particularly Giles, who visited the Warburton and Rawlinson Ranges in 1874, repeatedly mention sighting heavy clouds of smoke or large charred areas from these burnings. This technique of burning also has another effect, not discussed by the natives, of clearing out the underbrush in mulga country, making it easier for hunters to see kangaroos browsing or sleeping under the mulga trees. The hunters make a point of visiting these burned-over places as soon after a rain as possible, for they know the grass-shoots will appear immediately, drawing kangaroos into the area.

At Laverton, several families own large dogs which have been specially trained for kangaroo-hunting. I also observed such dogs in use with Mantjiltjara families at Wiluna during a brief visit there in February, 1966. In most cases, the women use these dogs while the men hunt with rifles and spears, though on occasion I have seen men use them, too. This technique has definitely developed as a result of white contact and has yet to take hold at Warburton. Nowadays, ordinary camp dogs are not used to chase game or otherwise assist in hunting, and I have been able to find no evidence to show that they were used for hunting in the past. The "kangaroo dogs" are trained both to follow and to kill the kangaroo, and part of their training includes tying part of a rotting sheep carcass around the dog's neck. This is left in place until the dog can no longer stand the smell of sheep; then it is considered safe to take the dog onto station properties where flocks of sheep are common. These dogs are well-fed and live in special kennels made from old petrol drums or boughs. The use of dogs is an efficient technique and is gaining popularity.

THE TAKING OF SMALL GAME

Although the kinds and numbers of small game have altered drastically since the arrival of whites, the native techniques for capturing and cooking these creatures have hardly changed at all. Most of the smaller native marsupials are now greatly reduced in numbers, some almost to the point of extinction. These include the rabbit-eared bandicoot (Thylacomys lagotis), the "native cat" (Satanellus hallacatus), the brush-tailed possum (Trichosurus vulpecula), and the rat-kangaroo (Bettongia penicillata). Most of these have been the victims of predation by white-introduced cats and foxes, and at least one, the rat-kangaroo (mitika), has been the victim of direct displacement by rabbits. Several old Ngatatjara people have told me how, in their own lifetimes, at a site called mitika about seventy miles north of Warburton, they saw rabbits replacing the mitika by actually moving into the burrows used by these marsupials! This site was formerly renowned as a place to catch mitika, and it even contains some rock art depicting mitika tracks. Today it is a mass of rabbit warrens. These accounts and others serve as evidence that the arrival of rabbits (nani, rapita) in this area has been within the last forty or fifty years. Myxomatosis has not reached the Warburtons yet, and rabbits continue to be abundant there and comprise an important food source for the natives. Feral cats are hunted, too, though they are much less common than rabbits.

The techniques used most often in taking rabbits are directly related to the methods formerly used for catching rabbit-eared bandicoots (ninu, matura). Since bandicoots are still caught on rare occasions, it is possible to observe these techniques side-by-side. Both animals dig large, deep burrows. The hunters capture them by digging directly into the burrows and reaching inside at the bottom to grab the animals. Usually it is the women who dig for these animals. The holes thus dug may be as much as eight or nine feet deep. Before embarking on such an elaborate excavation, the women carefully examine each main tunnel and

side branch by looking for faeces at the entrance and tracks inside. Then they take a moistened stick about three feet long and probe inside for hairs shed along the sides of the tunnel. If hairs are brought out on the stick and there are no signs of exiting tracks, the chances are very good that there are animals inside. Today one can see this digging done with either wooden digging-sticks (wana) and digging-bowls (wira) or their modern counterparts, iron crowbars and digging-bowls made from sheet metal. On hot days this is particularly hard work, but diligence is rewarded by an almost sure catch.

Rock wallabies (Petrogale penicillata) are still fairly common and are sometimes shot by the men, as are the large bustards (the so-called "bush turkeys," Ardeotis australis) of the spinifex-plains. However, both of these species appear to be declining since the introduction of firearms. Goanna do not grow to as large sizes as in other parts of Australia, but they are a staple food of the Western Desert natives. Indeed, they are among the easiest game to catch in the desert and give a relatively large reward for very little labor. The taking of goanna and other lizards by the Pintupi people is such a common occurrence with them that they are often referred to in the popular literature as the "lizard eaters."⁶ The kurkati (Varanus gouldii) is the most commonly-hunted species of goanna, though ngintaka (Varanus giganteus) are sometimes captured, too. Kurkati are most often found on the spinifex-plains, where their tracks are easily detected and followed to their holes. It rarely takes more than ten to twenty minutes to track a kurkati to its burrow, and it takes only a few minutes to catch it. First the hunter stamps on the ground close to the burrow to locate the hollow part underground and to collapse it behind the animal to retard its escape. Then he digs from the entrance along the tunnel until he reaches the burrow and pulls the animal out. Goanna burrows are rarely more than a foot deep and three or four feet long, so very little digging is needed. An experienced hunter always checks the burrow before leaving it, since it

is common to find the animal's mate inside as well. On one occasion I watched a Ngatatjara man capture a kurkatı which weighed two and a quarter pounds. It yielded about one and a half pounds of meat, which my informant declared would be a satisfactory day's meal for an adult man. The following account illustrates the ease with which these lizards can be taken. In December my wife and I once accompanied a party of twenty-one Pintupi people (eight adults and thirteen children) on a foraging expedition through a large spinifex-plain north of the Warburton Ranges. In two and a half hours these people collected fifteen goanna (totaling about thirty pounds of game) and forty to fifty pounds of an edible wild fruit called ngaru (Solanum eromophilum).

A variety of other kinds of small game is taken, too, although these are supplementary rather than staple items of the native diet. Buderigars (Melopsittacus undulatus) are captured in their nests inside hollow white gum trees whenever they are sighted, and small birds like galahs, parrots, finches, and pigeons are killed near waterholes by the children, who hurl stones at them at every opportunity. The force and accuracy of this stone-throwing, even by children only four or five years old, is remarkable and accounts for a surprisingly large number of killed birds. Bats (patjupiri) once were very common in a cave at the site of tjantjara, about fifteen miles southwest of Warburton. Here the technique was to set fire to piles of spinifex-brush at the cave entrance and over a hole in the roof of the cave. The asphyxiated bats fell to the floor of the cave in heaps, where they were easily gathered up. This technique has fallen out of use now, but at tjantjara one can still see clear traces of carbon from these past fires.

TRANSPORTING AND COOKING SMALL GAME

Women carry small game inside wooden carrying-bowls (ngurma, piti) on their heads, while men generally carry rabbits, lizards, and other small game tucked inside their hairstring belts (nanpa). Sometimes a

stick is run through the ears of several rabbits and used as a kind of handle for carrying them.

All small game is roasted directly in coals but without any sort of pit as in the case of big game. As with large game, however, small animals are left in to cook until the coals have cooled; that is, about forty to fifty minutes (though sometimes less if the people are hungry and impatient to eat). Thus small game tends to be better cooked than large game. On several occasions I have watched Pintupi and northern Ngatatjara people take roasted goanna from the coals and prepare to eat them by placing the pieces of the animal (especially the back and ribs as well as the head and neck) on a small, flat rock and pounding them with another rock until the meat and bone are pulverized into a single shredded mass. This pulpy mass of meat and bone is eaten in its entirety, without waste. Rabbits are cooked in their skins, like other furred animals, but sometimes the hair is plucked off first to be used later in making string (a now popular substitute for human hair-string). Birds, both large and small, are plucked of their feathers before being roasted. Aside from the pounding of goanna-meat, there are no recipes or other techniques for preparing meat before eating.

Game, both large and small, which is wounded or stunned is killed by blows from either a specially-made beating club (kupulu) or an untrimmed piece of wood (punu) or stone picked up by the hunter as he rushes toward his quarry. Although they are made today for the tourist market in Perth, boomerangs were not used in the Warburton area in precontact times. However, some of the Pintupi from the sandhill country to the north and northwest of the Rawlinson Ranges use a boomerang-like throwing-stick (walanu) for killing small game.

CLEANING AND TRANSPORTING LARGE GAME

All game, large or small, is cleaned of its intestines before being transported or cooked. For kangaroos and euro, an incision about six inches long is made in the belly and the intestines are pulled out. After cleaning, the flaps of the incision are pulled together and laced tight with a small stick inserted through the flaps, closing up the body cavity. To remove the intestines of a goanna one squeezes the rear part of the body until the anus protrudes, then pulls the anus until it and the intestines come free (the method preferred by Pintupi and northern Ngatatjara people). Another method is to insert a small barbed stick into the animal's mouth and tear out the intestines with this (a technique seen among some Ngatatjara natives from east of Warburton). With most other animals it is simply a matter of cutting into the body cavity and removing the crop or intestines.

To transport a kangaroo a short distance, it is first cleaned; then the intestines are used to bind the forelegs together. After this, a stick is inserted through the tail, and the tail is curved around until the stick is firmly hooked to the knot tying the forelegs (see Fig. 2). The tied animal thus forms a kind of bundle called kaliki which may be carried either on top of the head or over the shoulder (with the looped tail serving as a handle). A large animal is always cooked and butchered before being carried for any long distances.

The final step before cooking is the removal of leg tendons for use as sinew (pulyku) for repairing and hafting tools. I have only observed this being done for emu, though I am told the method for removing kangaroo sinew is roughly similar. A cut is made through the lower leg, between the tendon and the bone, and a large stick is inserted through the hole. This stick then serves as a lever which is pulled toward the animal's foot, drawing the sinew out as it is pulled. This operation requires much effort, since the tendon is usually very tough. After removal, the tendon is laid out in the sun to dry, then rolled into a

bundle and kept for future use. Sinew is used for hafting sections of composite spears together, for tying barb to spearhead, for tying hook to spearthrower, and for repairing cracked or split spearthrowers. Since the introduction of European materials, sinew has acquired some new uses, such as tying on the sights to rifles and hafting metal bits onto wooden handles to make woodworking tools.

Emu fat is prized as a fixative for decorative pigments and is rubbed onto wooden artifacts to keep them from splitting and cracking in the dry desert heat.

Unless the hunter is alone, he is never the cook, for the kamuru (MoBr) or a brother of the spearman will perform all stages of the cooking. First, the cook puts the carcass of a kangaroo or euro on its back and breaks the hind legs. For all large game, including kangaroo, a shallow trench about ten to twelve inches deep, eighteen to twenty inches wide, and three feet long is dug. A large fire is allowed to burn down on top of this pit. As the fire burns, the kangaroo is thrown on it and turned over for about three minutes in order to singe the fur. The carcass is then placed on its back inside the earth-oven (taralpa), and mixed coals, ashes, and earth are heaped over it with a long stick. After this, all one can see is a mound of smoking earth with two large hind legs sticking straight up into the air at one end and two forelegs sticking out at the other end. Nothing more is done until the coals cool, which takes between forty and fifty minutes, after which the animal, regardless of size, is considered cooked. The carcass is taken out and placed upon a bed of green boughs, and the cook, sometimes assisted by the spearman, butchers it.

Two points are worth noting. First, roasting large game this way results in very lightly cooked meat on the outside and utterly raw meat in the center. Second, the skin and fur of the animal are completely ruined during the singeing. The natives do not believe that cooking particularly improves the flavor of the meat, though they prefer the

slightly altered consistency of the lightly roasted meat to absolutely raw meat. Clothing and robes (or any sort of artifacts) made of animal skin are entirely absent from the material culture of these people, though they would be of use to them.⁷ When asked about this latter point, a native invariably agrees that kangaroo-fur would make fine robes and clothes but insists that if he takes the skin off a kangaroo first he cannot cook it properly.

To an outside observer, these points naturally raise the question: why cook the animal at all? In fact, this is a general question worth asking, since one of the commonest assumptions in Western culture is that cooking somehow makes meat more edible and that, historically, this must have been one of the earliest uses for fire. In fact, the natives do not eat any of the large pieces of meat until they get back to camp, by which time it is usually cold. The principal reason stated by the natives for cooking is that this is the traditional and correct way of preparing game. When this problem is raised to a conscious level, however, a few people have suggested that it makes it easier to butcher and divide the carcass. This, it seems to me, is the principal reason for cooking as practiced by these Aborigines. Roasting stiffens the whole carcass and makes the skin weak and easy to cut. This is especially true for kangaroos and euro, though it also applies to emu to a lesser extent. Also, by leaving the skin on, the natives keep out most of the grit which might otherwise get into the meat during cooking. Of course, one can think of other ways to cook a kangaroo, but this method is the one to which these Aborigines are committed.

BUTCHERING AND DIVISION OF LARGE GAME

The butchering of large game occurs in two phases. First the animal is cut up and divided by the spearman and his companions shortly after the kill. The second phase comes after the pieces from the first division have been brought into the main camp and are divided among

further relatives. If the animal is killed by a single hunter close to camp, these two phases are compressed into a single operation, but this is a special case.

In butchering a kangaroo or euro, the following portions are cut (see Fig. 3): kata (head and neck), witapi (back), karpa (in two halves, each with a rib section and forefeet attached), tjunta (two pieces, each consisting of a leg and thigh), yangkalpa (a large "U"-shaped piece of rump meat, cut into two halves), and wipu (tail). The hind feet (tjina) are cut off before cooking and thrown away. Thus the animal is cut into nine pieces, no matter how many people share in the meat from it. Sometimes the tail of a very large kangaroo is cut into two sections, making ten pieces in all, but this is exceptional. This represents the first phase of butchering. An emu is cut up into only four pieces: kultu (foresection, including head, neck, and breast), karilpa (hind-section, including tail, which is rich in fat), and tjunta (two pieces, each consisting of a large leg and thigh). For large game, the important thing to note is the way the animal is divided up into a fixed number of pieces during the first phase of division, regardless of who is present. The description by Douglas (1959:20) of the division of kangaroo-meat at Warburton includes most of these terms but confuses them with others which are purely anatomical and do not refer to divisions of meat.

Only the innards are eaten at the time of division. The spearman gets the heart (kututu) and liver (yalu), but, of course, this is nothing more than a token share amounting to very little meat. His companions share the rest. Usually the innards are removed before the animal is actually cooked and are placed separately in the coals to roast. They are eaten while the men wait for the animal to finish cooking. These pieces are quite gritty but are eaten with relish anyway.

Today the butchering of large game is generally done with steel hatchets and knives. However, on many occasions I have watched untrimmed

stone flakes or fragments of broken bottle-glass being used to make the incision for removing the intestines and for cutting the tendons of the hind legs and joints. In such butchering, the flake is simply held between thumb and forefinger and is thrown away after use. The heavy butchering after roasting is done by means of a minimally trimmed wooden wedge with a hand-held rock used as a hammerstone. Although stone handaxes were an important part of the traditional material culture of these natives until about twenty years ago, they were used only as wood-working tools and rarely if ever for butchering. This information should be of interest to archeologists concerned with Paleolithic studies, since butchering of large game has always been regarded as a likely function for ancient stone handaxes.

The stated rule for the first phase in the division of meat is that in-laws of the spearman (first, the father-in-law and his brothers, then brothers-in-law) get the first choice of pieces. Then it is the turn of the spearman's brothers to choose, older brother (kuta) first, then younger brothers (malanypa). If only a few men were together on the hunt, these relatives may take more than one piece. After relatives belonging to these categories have chosen their portions, the spearman may take whatever remains. Naturally, much depends on how many men have participated in the hunt and the particular nature of their kinship ties to the spearman. If a large party has been hunting together, the spearman may not get any meat at all other than the innards. However, by virtue of his kinship ties to the other men, the spearman is entitled to share in the distribution of game killed by someone else in the party. This pattern of sharing extends to other areas of the culture as well and is not limited only to the division of game.

Particular circumstances are even more important during the second phase of sharing. Each member of the hunt brings his share back to camp with him. He then further divides this share between other classes of relatives who are present (parents, wives, children, etc.). There is

also a general rule which provides that any person with food is obliged to share it with any relatives who are present and do not have any. This rule, combined with the others, ensures that even distant categories of kin will share in the catch, provided they are present in the camp. Under aboriginal conditions the size of the camp fluctuated in relation to the amount of food and water supplies which could be obtained at a particular place and time of year. To judge by descriptions in the accounts by Giles (1873-74) and J. Forrest (1874), as well as by present-day practices, the maximum number of natives who could camp together under ideal hunting-and-gathering conditions in this region was about 150. This occurred only in years when there had been good rainfall and generally took place early in the dry season (September through December), when game is forced to cluster around a relatively limited number of more or less permanent waterholes, but before the numbers of animals had been reduced by intensive hunting. Larger native gatherings sometimes reported in the early 1900's can be attributed to the introduction of flour and other rations by whites, often given as an inducement to perform ceremonies. Normally, though, as hunting reduced the number of animals in an area the size of individual shares of meat became conspicuously smaller, a signal to shift camp to a more favorable locality and perhaps to exploit some other food resource. The Aborigines of this region possess no techniques whatever for preservation or storage of meat. Thus game is shared out quickly and widely so as not to be wasted, with no thought of keeping it for more than a few days. I have never seen meat kept around camp for longer than six days, by which time it has begun to rot, although it is still eaten without hesitation.

Thus, at certain times of year (mainly the early part of the dry season) there is a direct relationship between Aboriginal camp size and the amount of large game available in this part of the Western Desert. As an illustration, there were 107 people camped at Wanampi Well, twenty miles east of Warburton, on December 13, 1966. For two weeks these

people were living entirely on the kangaroos they were able to kill, along with some rabbits collected nearby. On this one day I saw nine kangaroos being divided in the camp. The population at this camp remained stable during this time but increased sharply after the Mission started trucking rations out each week. Were it not for these rations, the natives there told me, they would have moved to another waterhole about twenty-five miles northeast of where they were when the number of kangaroos diminished. But there is no road to the other waterhole, so the natives elected to stay where they were and contented themselves with allowing small parties to go out for a few days at a time in this direction to look for game.

THE QUANTITATIVE ASPECT OF SHARING

Archeologists today are especially interested in the quantitative aspect of the butchering and division of large game, for it offers the opportunity of making controlled estimates of the size of prehistoric groups. From an examination of food bones deposited around an ancient hunters' camp, for example, it is possible to estimate the number and size of animals consumed there. The classic example of a study of this kind can be seen in the report on the mesolithic site of Star Carr in England (Clark 1954). In this case, the game animal concerned was red deer. On the basis of calculations derived from the physiology of African species similar to modern-day red deer, the excavators estimated the amount of meat these butchered animals represented and the number of people this amount could have fed, thus arriving at some idea of what the prehistoric human population at the site must have been during the time it was occupied. Other excavators, working in sites of the European Paleolithic, have also been exploring the possibilities of this approach. Population estimates of this sort will be given even greater validity if this data can be compared with actual ethnographic instances of butchering and sharing of game.

On six occasions I was able to record the total weights of the animals killed and count the number of people sharing in the meat both during the first and second phases of division (see Table 1). The figures given for the second phase of sharing are based upon actual observation of the distribution of the meat in the camp when the hunters returned. I was unable to observe this phase of sharing beyond the first day after the hunt, but I was able to check on these divisions by interviewing afterwards. The difficulties of making an empirical study of this kind can only be appreciated if one realizes that the actual sharing of meat is done entirely without ceremony and that several distributions may occur simultaneously, making counting difficult. So these figures may be regarded as incomplete in the sense that they do not include all the small shares of meat handed out to distant categories of kin several days after the hunt. From a quantitative standpoint, however, these additional figures would not be particularly significant.

Table 1. Sharing of Kangaroo and Euro Meat by Ngatatjara Natives at Laverton and Warburton, W. A.

Total Weight of Animal in Pounds	Number of People Sharing		Dates
	First Phase	Second Phase	
58	5	39	4-2-66
40	5	39	4-2-66
72	6	29	4-16-66
35	6	64	4-19-66
47	6	64	4-19-66
16	6	64	4-19-66
66.5	6	64	4-19-66
63.5	4	26	4-23-66
29	2	29	4-27-66
31.5	1	9	8-13-66

Recent studies by D. E. Tribe at the University of Melbourne have shown that "the kangaroo is perhaps the best converter of poor quality roughage to protein or edible flesh" (1962:28). Through a careful program of dissecting and weighing various parts of kangaroos it was found that slightly over fifty percent of the total body weight of these animals consists of edible flesh. This is in contrast to British sheep and cattle, in which only about one third of the total body weight consists of edible meat. However, the fat content in kangaroos is extremely low. A ninety-seven pound kangaroo dissected during this research contained only four ounces of removable fat, an amount regarded as about average for kangaroos in general. For all practical purposes, then, the Aborigines were able to utilize about fifty percent of the weight of each kangaroo and euro they killed. On the basis of this estimate, it is possible to calculate the average amount of meat which each person received as his share following each of the hunts recorded in Table 1. These calculations are presented in Table 2.

Table 2. Average Amount of Kangaroo and Euro Meat Per Share Following Hunts at Laverton and Warburton

<u>Dates of Hunts</u>	<u>Average Amount of Meat Per Share in Pounds</u>
4-2-66	1.26
4-16-66	1.24
4-19-66	1.28
4-23-66	1.22
4-27-66	0.50
8-13-66	1.85

In spite of the variation of availability of game, group size, etc., the amount of meat per share is remarkably consistent at around an average of 1.23 pounds. Unfortunately, I was never able to make similar

measurements on the butchering and sharing of emu. Since emu contain much more fat than kangaroos, one might expect to find some differences in the size of shares; but this matter remains a problem for future research. However, the figures on kangaroos and euro offer some clues to the archeologist trying to estimate the prehistoric population of an Aboriginal hunting camp. The two principal variables he must control in making such an estimate are: 1. the length of time during which the camp was occupied, and 2. the number and size of game animals consumed at the site (as estimated from the faunal remains) during that time. The bones of large game preserve far better archeologically than the bones of lizards, birds, and small mammals, so most of the measurements made during this research were of large game (kangaroo and euro). After dealing with these two variables, the archeologist can divide the estimate of the amount of meat consumed at the site by the amount suggested as the actual consumption, on an average, by individual ethnographic natives, to arrive at the approximate number of individuals inhabiting the site. This approach should not be expected to yield exact population figures but, rather, will furnish a clear picture of the scale of habitation at the site.

As the field of Australian archeology expands, there will be many opportunities to make quantitative population estimates of the kind suggested in this paper. There will also be occasions when it will be useful to make qualitative inferences suggested by the observation of ethnographic Aboriginal groups. This is particularly true with regard to technology. Yet this should not be taken to mean a simple extrapolation of present-day techniques into past situations. Rather, it should be regarded as a way of providing a tangible set of cultural alternatives which, according to the known prehistoric ecological conditions, have greater or lesser probabilities of being comparable. Bearing these points in mind, Australia still offers unique opportunities for the study of living hunter-gatherers with reference to a

reconstruction of prehistoric hunter-gatherer ways of life. Owing to the rapidity of change resulting from white contact, the time left for this kind of study is limited. But it is hoped that more anthropologists will be encouraged to approach these remaining traditional cultures with an interest in "living prehistory" while there is still time left.

NOTES

¹In a general way this supports the suggestion made by Meggitt (1964:2-9) that many hunting and gathering societies depend more heavily on vegetable resources than on game.

²There is no hierarchy of preference for these two food categories.

³This work is being supported by the Social Science Research Council (U.S.A.) with a supplementary grant furnished by the Australian Institute for Aboriginal Studies for the use of a Landrover while we are in the field.

⁴The phonology used in this paper follows the usage suggested by Douglas (1964).

⁵One of these men had been given a broken and useless rifle by a relative. The other had a rifle which worked, but he regarded it as a powerful kind of sorcerer's pointing instrument, and had not realized that it needed ammunition to make it shoot!

⁶See for example D. Lockwood, The Lizard Eaters, Cassel Ltd., Melbourne, 1964.

⁷About a year before we arrived in Laverton, the West Australia Department of Native Welfare sponsored a handicrafts project to encourage the natives to make kangaroo-skin moccasins for the Perth tourist trade. It was expected that kangaroo skins could be procured locally, but the natives continued to roast all the kangaroos they caught in the traditional manner. Thus no skins were obtained locally, and kangaroo skins had to be ordered from South Australia instead. This was uneconomical, and the project collapsed.

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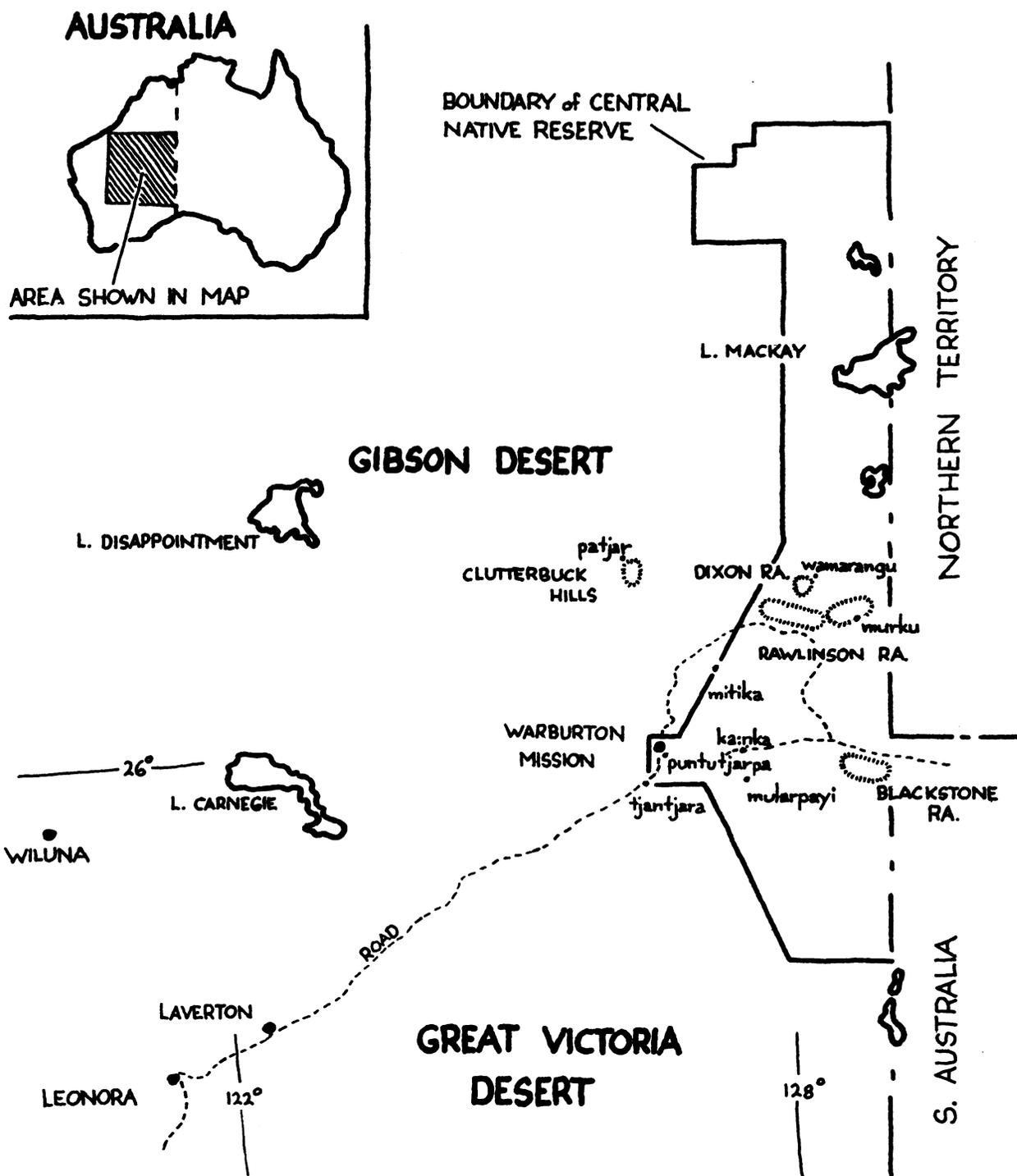


Fig. 1 The Western Desert of Australia.

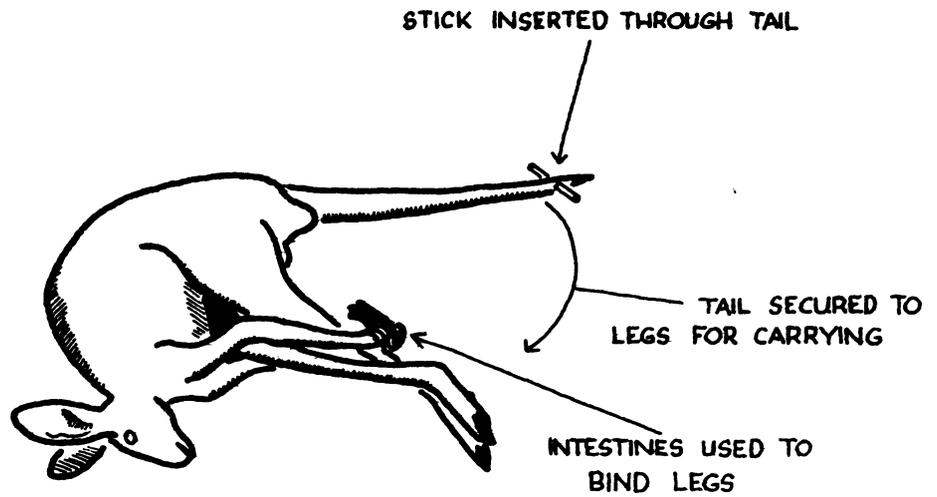


Fig. 2 Kangaroo tied into kaliki bundle for carrying
(drawn from photograph taken by author).

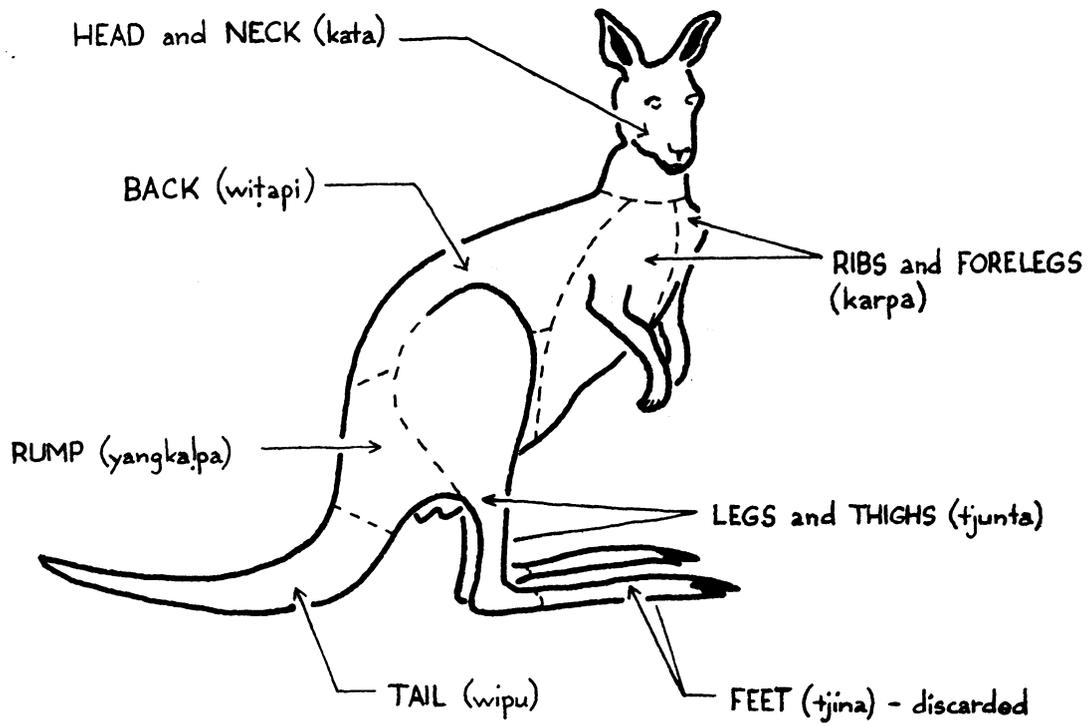


Fig. 3 Divisions of meat for kangaroo and euro.