

JU/'HOAN WOMEN'S TRACKING KNOWLEDGE AND ITS CONTRIBUTION TO THEIR HUSBANDS' HUNTING SUCCESS

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ABSTRACT 1995 fieldwork in the Nyae Nyae area of northeastern Namibia identified a substantial contribution to their husbands' hunting success by Ju/'hoan women. This contribution came from a more active use of tracking knowledge than previously reported in anthropological literature on San and other hunter-gatherers. A mixed-gender team composed of an experienced hunter/tracker (Barclay) and an anthropologist/Ju/'hoan translator (Bieseles) recorded in detail 1) the events of several collaborative hunting trips with Ju/'hoan husband-wife teams and 2) interview information about the kind and frequency of such collaboration. This team also recorded linguistic and technical details of hunting paraphernalia and techniques hitherto unelaborated in the literature, focusing on snares used by both men and women (to be presented elsewhere). The current paper presents the 1995 findings in the context of relevant information on gender and hunting from other societies. It invites colleagues to share ideas and information on this topic. In particular, it poses the question: does the current observed frequency of spousal cooperation in hunting in Nyae Nyae 1) reflect very recent circumstances, or 2) does it, as some Ju/'hoan statements suggest, have substantial time-depth? The conclusion reached is that 1) and 2) are not necessarily opposing propositions, and that further investigation is needed.

Key Words: Africa; San; Indigenous knowledge; Hunting; Tracking; Gender

INTRODUCTION

I. Introduction by Bieseles

In 1971 I had the good fortune to be present on a gathering trip with Ju/'hoan San women when a wildebeest was spotted grazing with a herd of Herero cattle not far from Dobe, Botswana. Several women hurried back to Dobe to inform hunters, who soon arrived and began to track the animal. I was excited to witness this example of what one of my teachers, Pat Draper, had referred to as !Kung women reporting to men on "the state of the bush." During the 1970s and 1980s I had a chance to participate in a number of hunting trips in Botswana, which, besides myself, involved only men. In the late 1980s, I took part in a trip which involved both men and women, near /Aotcha, Namibia—a gathering trip which was also a

joint tracking expedition for a giraffe which had been wounded with a poison arrow but whose spoor had been lost.

It was not until 1995, however, that I was asked to accompany a husband and wife as they tracked together (also near /Aotcha). One factor which made this participation possible was the presence of my husband, Steve Barclay, whose own tracking and hunting knowledge had been honed on his family's South Texas ranch conservation projects, and in hunting for the cooking pot. Another factor was that I was recovering, at the time, from a broken ankle, and was still using a cane to walk. Steve and I had requested to join a hunter, N!ani, on a tracking trip, and because of my ankle his wife Di//xao had offered to go along, to walk back to camp with me in case I couldn't keep up. This set of circumstances allowed us to make the discovery that Di//xao was fully as competent as her husband in tracking, and was his valued collaborator. (Luckily, I also discovered that I could keep up their pace, and Di//xao didn't have to take me back to camp. Afterwards I threw away my cane.)

Steve and I spent most of a July winter's day trotting closely behind N!ani and Di//xao as they headed rapidly away from /Aotcha. They were making for an area south of /Aotcha pan where many kudus, warthogs, and other animals spend daytime. N!ani and Di//xao tracked parallel to each other and about 30 feet apart, close enough to share information but far enough apart to take in a swath of ground which afforded multiple options in trails to follow. We saw them communicate, often wordlessly, with hand signs, about the most promising tracks to follow. They changed tracks at least 20 times in four hours of fast-paced movement, acting as a smoothly communicating unit to choose the most recent and potentially productive tracks in a welter of animal spoor of many kinds. They stooped and felt faeces to see how close the animal might be, weighed variables of the size of animals versus the difficulty of getting close enough to them for a shot, and generally processed, together, immense amounts of current information while covering many kilometers of ground. When we did come up close to the family of warthogs we were then tracking, Di//xao fell back so that her husband could get a good shot with his bow and poisoned arrow. But it was clear that the cerebral part of the stalking had been very much a joint activity, one made immensely more profitable by the multiplier effect of two observers working in parallel who communicated and made decisions seemingly as one.

I kept thinking that it was as if they had been doing this together all their lives. In fact, these middle-aged people told us later that they HAD been doing it most of their married lives. I knew, too, that N!ani had a trusted male hunting partner, /Kunta, as well, and that the two men worked together in tracking much as did N!ani and Di//xao. Seeing this married couple in action, however, was the impetus which led me and Steve to refocus our inquiry into Ju/'hoan hunting techniques and terminology. We learned from talking to other couples that what we had observed with N!ani and Di//xao was far from rare. We also had the opportunity to accompany another couple, /'Angn!ao and N!aq'e, as they tracked together, and to interview them later about this kind of teamwork between Ju/'hoan spouses.

What we learned caused us to look back at the ethnographic literature on the Ju/'hoansi-!Kung and other hunter-gatherers with new eyes. Did other groups

report anything like what we had seen on women's participation in tracking? Were colleagues' earlier statements that they had no information on Ju/'hoan women hunting to be taken as definitive, i.e. were Steve and I witnessing something new in Ju/'hoan life, linked perhaps to sedentization and other recent changes, or had this kind of collaboration previously just gone unobserved? (After all, few of my colleagues were themselves skilled trackers, and the white hunters who did have the knowledge and went out with San men not only did not speak the language but likely never dreamed of asking women to accompany their husbands on such a hunt.) With our combination of tracking experience and expertise in the Ju/'hoan language, however, along with our own status as partners and my game leg, maybe Steve and I had stumbled—literally—on the chance to see a partner activity with some time-depth in Ju/'hoan communities.

Accordingly, we focused our limited period of Namibian fieldwork (a few weeks in the southern winter of 1995) on questions about women's tracking skills and their contribution to male hunting success. We also studied the specifics of hunting techniques used by both men and women, adding to the Ju/'hoan ethnographic literature a bit of new vocabulary. This work was possible thanks both to Steve, who knew the right questions to ask, and to !Xuma, my longtime language teacher, who traveled from Dobe, Botswana to Namibia to help us pin down linguistic details from the hunting narratives we had put on tape. Much of our success, we feel, was due to our being a mixed-gender team ourselves.

So we offer the following experiences now to our colleagues for commentary, hoping we may make some contribution to what Agnes Estioko-Griffin and P. Bion Griffin called for in 1981 in "Woman the Hunter: the Agta." Commenting on the need to reexamine available ethnographic literature concerning women and hunting worldwide, they point out that "We may have overlooked off-the-cuff comments which suggest that women were hunting in many situations...Part of the problem is in the definition of hunting itself and in an ill-defined separation of big from small game...(For instance, in Mbuti data from the Ituri forest) no hint was given that women use bow and arrow or spear, or that they kill buffalo or elephant. However, one might ask again...That (women) also collect plant foods is beside the point. Men do, too." (1981: 140-41).

II. Introduction by Barclay

The purpose of tracking in south Texas brush is to study patterns of animal movement, using evidence like tracks, trails, hog wallows, scrapes, etc. All physical evidence is used to know where to set blinds, the most common form of hunting in this area. The brush is too thick to stalk animals, as they will hear and smell a person long before one can get a clear shot. Blinds need to be set according to the terrain and the height of brush and tree lines, for visibility, as overgrazing and previous cultivation have caused bush encroachment. Though some do hunt with bow and arrow in south Texas, the majority use guns, in contrast to the poisoned arrows and spears used in the Kalahari.

The San's tracking, also in contrast, is actual stalking of a moving animal. This is done in order to get close enough to put the shaft of a small, poisoned arrow into contact with its bloodstream. Thereafter there is more leisured tracking, observing the signs of poisoning and eventual death, with the aim of catching up to the animal in time either to dispatch it with knives, clubs and spears or to take possession of its meat before other carnivores do. While making the original stalk, San hunters change from one track to another ceaselessly, looking for the freshest spoor. When they get close they choose one, weapons come out and the hunting partner, when there is one, falls back for the hunter to get the shot. If both are shooting they circle, alternate, and otherwise enable each other to get advantageous shots.

Sometimes (rarely), two or three hunters crouch in a shallow depression blind near a pan where the animals come to drink. They stay in the blind all night, with a small fire for safety and warmth, as the animals drink in the morning. Blind hunting is now quite rare: Ju/'hoan people today regard it as ineffective. Alison Brooks (1978), and Aron Crowell and Robert Hitchcock (1978) write that blind hunting used to be quite common. Polly Wiessner told us that "With the intrusion of cattle into the area, game became more shy of settlements and (blind hunting) became more infrequent. One can see the remains of game blinds around all waterholes and Ju/'hoansi can tell you much about hunting from blinds. Still, animals shot from blinds must be tracked until they die." (Wiessner, P. pers. comm., December, 1999).

The Ju/'hoansi never use bait, as we do in Texas (deer corn, etc) to slow animals down and to keep them in open areas long enough to give opportunities for a shot, partly because they do not have surplus food to use as bait. But also this is because they must slip up closely (to within 25-75 feet of an animal) due to the shooting range of their light arrows. Whether stalking or using blinds, they use persistent teamwork and constant calculation and recalculation of evidence. We observed, as did Louis Liebenberg, the three distinct levels of tracking he characterizes *as simple, systematic, and speculative* (1990: 29ff).

Simple tracking involves following a trail of clear track prints. This situation is not frequent in the dry Kalahari, so systematic tracking must be used to interpret signs and conditions if track prints are not easy to follow. For example, a bent-over grass leaf in a track print which has not yet straightened up may indicate the animal is near, or one may see blood from the arrow-wound on leaves, or may be able to determine the closeness of the animal by seeing and feeling whether the faeces are dry, wet, warm, etc. If the animal is walking at its ease, it will be scattering faeces occasionally. If it is scared and running, it will hold its faeces until it reaches a stopping point. And there are many other clues which can be used to inform the progress of more difficult tracking.

Speculative tracking, the next level, involves a whole new way of thinking, with the creation of a working hypothesis, involving knowledge of animal behavior and terrain. It's here that San people excel, with a combination of inductive and deductive reasoning outsiders have yet to understand. The main point to stress is that this hypothetical, speculative activity is done equally well by men and women, and this is why Ju/'hoan women join men as efficient hunting partners though, according to them, they rarely carry weapons.

Liebenberg, the only researcher on San hunting whose work supports our observation that women do some tracking, wrote to us that he has always wanted to go hunting with women hunters he knows personally, but has not yet had the chance. He mentions the role of women in passing in *The Art of Tracking* (1990: 4, 55, 73), but says “in a sense it does not do justice to the fundamental role I believe tracking plays in hunter-gatherer understanding of nature. Both men and women have a scientific understanding of animals and plants based on the interpretation of signs in nature. The interpretation of signs forms the basis of any theoretical science, including modern physics ... Only by showing that women play an indispensable role in the collective tracking knowledge of hunter-gatherers can one demonstrate the fundamental role of tracking in their culture.” (pers. comm., July, 1997).

After the day we spent with Di//xao and N!ani and another with /'Angnao and his wife N!aq'e, I had one full day of tracking as a non-weapon-carrying partner for /'Angn!ao, when Megan was busy on another project. Though I knew little of the Ju/'hoan language, that experience spoke volumes to me about the interactive nature of Ju/'hoan hunting partnerships, whether with women or with other men. I began to see how extremely valuable the already-honed communicative skills of a married couple could be in this context. Interviews with other Ju/'hoan men and women reinforced the impression Megan and I were getting that spousal collaboration in tracking is (at least today) far from rare, and may even be fairly routine. Yet to my knowledge at that time, the only previous researcher who had remarked upon it was Liebenberg. (Unfortunately, his book, *The Art of Tracking: The Origin of Science*, based on extensive first-hand experience in the Kalahari, to this day remains little known outside of southern Africa.)

So Megan and I asked ourselves 1) whether the collaborative tracking might reflect a big change in Ju/'hoan life just over the last few years or 2) whether this kind of collaboration might be a fundamental part of longterm Ju/'hoan history. Realizing that we were not in a position to formulate or test rigorous hypotheses concerning this topic, we nevertheless wished to draw attention to the fact that there might be modern reasons for cooperative hunting.

Thus with this paper we would like to invite interested colleagues to share ideas and information on spousal cooperation in hunting among foragers. In what follows, we present a brief survey of other ethnographic literature, including that on San peoples, which mentions foraging women's participation in hunting. We then present the remainder of our observations from our 1995 interviews and hunting trips, comment on them, and offer some preliminary thoughts on the above question.

ANTHROPOLOGICAL LITERATURE ON WOMEN AND HUNTING

I. “Man the Hunter” and the CHAGS Conferences

There is an extensive, fairly recent literature on sex roles and egalitarianism on record with regard to hunter-gatherers which has relevance for this paper (see for example Barnard, 1983; Begler, 1978; Bernt, 1978; Biesele, 1993; Endicott, K.,

1981; Gale, 1978; Guenther, 1983-4; Imamuru-Hayaki, 1996; Kent, 1993; Testart, 1986). There is also a great deal of published material on the ecology of hunting and gathering to provide background on knowledge and use of a range of environments by hunter-gatherers (Bicchieri, 1969; Hawkes, 1991; Hewlett, 1996; Hitchcock et al., 1996; Kitanishi, 1995; Lee & DeVore, eds., 1976; Nonaka, 1996; O'Connell et al., 1983; Yellen & Lee, 1976). Some of the literature on settlement, sedentism, and change has relevance to the sociological study of subsistence foraging (eg. Draper & Kranichfeld, 1990, Hitchcock, 1995; Hitchcock, 1998; Osaki, 1984; Sugawara, 1991; Wilmsen, 1989). Two recent papers which focus from different angles on traditional San hunting may also be mentioned (Ikeya, 1989; Thomas, 1990).

But neither the "Man the Hunter" nor the successor CHAGS Conferences had much of a literature on which to draw in considering the question of women's hunting—if this question was considered at all. Aside from a few comments on the importance of women's roles in the preservation of fish and meat, for instance by Gould for the Northern Territory of Australia (Lee & DeVore, 1968: 64), the conference on Man the Hunter held in Chicago in 1965 touched not at all on foraging women's possible roles in hunting. In fact it barely acknowledged women's economic role in such societies. By 1981 scholars had reacted to this omission by publishing papers which showed the substantial contribution of women's gathering (and food-processing) to many foraging economies (Hunn, 1981; Dahlberg, 1981; Hawkes & O'Connell, 1981).

Also in that year, Agnes Estioko-Griffin and P. Bion Griffin published "Woman the Hunter: the Agta" (1981) describing the predominating role in hunting of some groups of Agta women in northeastern Luzon, Philippines. They called attention in that paper to several earlier works which discussed female hunting, such as Jenness, 1922; Flannery, 1932; 1935; Fox, 1952; Goodale, 1971; Briggs, 1974; Hammond & Jablow, 1976. They also suggested a critical reexamination of other ethnographic literature, where clues to women's hunting may have been missed due to the prevailing academic model of men as hunters and women as gatherers.

Burch (1975) and Meehan (1982) showed that in fishing and shellfishing, respectively, women often play major roles, even if they do not hunt in the usual sense of the term. By 1990 and the VIth International Conference on Hunting and Gathering Societies, women's hunting, in the context of gender awareness, had become a "key issue" in hunter-gatherer studies (Burch and Ellanna, 1994, reporting on the 1990 CHAGS held in Alaska). This conference was immediately followed by the 1990 Inuit Studies Conference, also held in Fairbanks. In that conference, Ann Fienup Riordan chaired a special session on Inuit ethnography and anthropological theory. That session resulted in a special issue of *Etudes/Inuit/Studies* (1990, 14[1-2]) in which both Riordan and Barbara Bodenhorn looked specifically at the ways in which they thought their own material contributed to gender theorizing. Bodenhorn's seminal article, "I am not the great hunter: my wife is": Inupiat and anthropological models of gender" appeared in that special issue. Marion McCreedy's paper in the Burch and Ellanna volume, "The Arms of the Dibouka" (1994), first presented at Alaska, outlined Biaka Pygmy women's roles in doing most of the hunting for their group.

As Burch and Ellanna stated (1994: 12): "In a few societies, females have hunted big game, in others they have cooperated with males in the pursuit of big game, and in quite a few they have hunted small game and have fished, with or without male assistance. Even where they have not actively participated in hunting, females often have played a major part in the rituals that have helped to ensure hunting success...One cannot really make sense of the division of labor along gender lines in a given society without reference to the allocation of power and responsibility, ritual, symbolism, communication, and emotional expression. The straightforward focus of many early gender studies on the amount of time males and females spent in different activities is no longer sufficient."

In short, Burch and Ellanna called for more nuanced and contextualized approaches to the question of gender roles. Accordingly, they began the anthology they drew from the Alaska conference with two papers focused on gender roles and power in hunting, in gathering, and in foraging economies as wholes (McCreey's paper mentioned above, and Henry S. Sharp's paper on the Chipewyan, both 1994). Taken together, McCreey's and Sharp's papers are a study in the extreme flexibility of gender definition in foraging economies and social systems, ranging from a high degree of egalitarianism (the Biaka) to high male dominance (the Chipewyan). If Biaka women hunt so much and Chipewyan women do not do so, what might this mean in terms of the relationship between this valued activity and women's status relative to men?

II. Diversity and Women's Hunting: the Agta and Ache

In 1995, Robert L. Kelly's survey of hunter-gatherer diversity posed the status question another way: "If men acquire higher status by virtue of the fact that they hunt, why, then, do women not hunt more than they apparently do?" He dismissed the earlier assumption that women simply do not have the strength and endurance to hunt large game by citing a number of well-documented cases of their doing just that, and pointed out as well that hunting requires knowledge and patience as much as it does strength. Among the cases he cited was one in the Peruvian Amazon (Romanoff, 1983); two in the Arctic (Landes, 1938: 137; Watanabe, 1968: 74) and several among Pygmy women who participate in communal game drives (Turnbull, 1965; Bailey & Aunger, 1989). These and other cases, notably those of the Agta and Ache, he used in a contextualized discussion of the roles of childcare and breastfeeding practices in determining division of labor in regard to hunting.

Estioko-Griffin and Griffin (1981; 1985) and Estioko-Griffin (1986) present what Kelly calls "the exception that proves the rule" in ethnographic studies of women hunters. About 85% of Philippine Agta women hunt, and they hunt the same quarry as men. Agta women hunt in groups and with dogs, and have a 31% success rate as opposed to 17% for men. Their rates are even better when they combine forces with men: mixed hunting groups have a full 41% success rate among the Agta. M. Goodman and her co-workers (including Estioko-Griffin) conclude in their 1985 book that Agta women are able to hunt because of their childcare practices: they can leave their children with others, and they tend to hunt within

10 km. of camp so they can return at the end of the day. Breastfeeding children are taken along in a sling. But most of the serious hunting by women is done by those who have come to the end of childbearing. Bion Griffin told Kelly that while younger women with children may hunt if the opportunity arises, it is the older women who set out to hunt intentionally (Kelly, 1995: 269).

Ache women of Venezuela, similarly, show less efficiency as hunters if they are still breastfeeding. Hurtado et al (1985) point out that while hunting for these women is not more strenuous than it would be for men, it IS more strenuous for their children, who put constraints on the lengths to which their mothers will go to bring down an animal. Gathering can be interrupted by children's needs, but following an animal, overnight if need be, is much less compatible with childcare and breastfeeding.

Kelly makes a final point of relevance to our discussion of women's hunting in referring to the choices made by some older women among the Hadza, Mbuti, and Ju/'hoan. Citing Kristen Hawkes et al ("Hardworking Hadza Grandmothers," 1989) he surveys alternatives to older women's hunting: if women are sometimes prevented (by childrearing) from learning to hunt earlier in their lives, they may opt to forage for their daughters so they can do so (Hadza) or take care of their children (Ju/'hoansi). Mbuti mothers decide whether to participate in hunting based on comparative returns from hunting and wage labor. All these strategies, importantly, can become socially defined and passed on symbolically to further generations (Kelly, 1995: 269).

III. Women and the Technology of Net Hunting

Several writers have remarked upon the prominence of women's roles in Mbuti net hunting as opposed to that with bow and arrow. Tanno (1976) and Harako (1976) described this net hunting in some detail, and Ichikawa summarized its basic principles in the same year (1976: 28). Mbuti women's participation is critical, as they serve as beaters and also carry the captured animals. Using this information in contrast with his own observations in the Central Kalahari, Tanaka (1980) posits a continuum between extremes of individualistic male bow hunting in the dry, open Kalahari, with its sparse but large-size game populations, vs. the communal, men-women-children net hunting of medium-to-small game in the lush, limited-vision environment of Central Africa inhabited by Pygmy groups and their prey.

Taking a center point along this continuum, Tanaka suggests, are the Mbote (Bambote) of the western shore of Lake Tanganyika in the current Democratic Republic of Congo, reported upon by Terashima (1980). Three environmentally-linked characteristics of Mbote hunting distinguish it from that of the Mbuti: 1) irregularities in the Mbote environment mean that hunting can only take place in a few areas, so more territory is required, 2) sparse tree cover dictates that the Mbote carry along poles to support the nets, so they use only half-circle net arrangements rather than full circles as do the Mbuti. This in turn puts more stress on the role of the beaters, so that 3) men as well as women act as beaters, and "the entire group participates as a single unit," according to Tanaka (1980: 167).

This three-point continuum locates Kalahari San groups, partly due to their terrain, far from both communal hunting and from participation in hunting by women. Tanaka (pers.comm., 1996) stated that he had no report of Kade San women hunting or helping their husbands to hunt, and others, eg. Osaki, who work in the Central Kalahari of Botswana, said the same thing (pers. comm., 1996)

In contrast are our recent observations on Ju/'hoan women's involvement in hunting, identified both within and outside their society as chiefly the work of men. Our experience suggests that Ju/'hoan women play informational, communicational, and cognitive as well as ritual roles in enabling successful hunting. We begin the discussion by outlining relevant comments in earlier literature on San and Ju/'hoan women. Though this is surely not an exhaustive listing of references, it does give an idea of what have been the generally accepted views about San gender roles in regard to hunting and the division of labor.

IV. Earlier Literature on San and other Women's Hunting

Much of the earlier San literature emphasized that women's roles in regard to hunting were mostly ritual ones. The prevailing point of view was that hunting proscriptions involving women in these societies, emphasizing the need not to damage men's hunting prospects, were of primary importance. Less often, the positive effects of female ritual participation were brought out. Lorna Marshall (1976: 130) states that !Kung (Ju/'hoan) women never hunt, and stresses the people's feeling that femaleness must be kept apart from male hunting activities. In Marshall 1999 (xxxiv, 188, 192, 200-201), she outlines the positive ritual role of girls at menarche in conferring hunting luck and prowess on the young men of the group. Similarly, Heinz (1975: 8) describes !Ko (!Xoo) girls at menarche shooting an arrow into a gemsbok-brow-skin target, for the purpose of "bringing luck to the weapons of the men." Many clues in different Khoisan societies, in fact, link the power of the newly adult woman to the health of the land and to abundance of hunted and gathered food.

These ritual clues liken San attitudes to women and hunting to a number of other world examples. Barbara Bodenhorn's 1990 article, "I am not the great hunter: my wife is," describes the ritual role of Inupiat women in attracting the animals so that their husbands can kill them. So appreciative are the men of this role, that they categorize the women as hunters (1990: 5). Similarly, Baka women as described by Veronique Joiris play important ritual, though not physical roles in elephant hunting. They act as diviners and as mediators with the world of the animals on behalf of the men (1990).

But over the last few decades practical as well as ritual roles of women in hunting have been discussed. After hearing the version of the present paper presented at CHAGS 8, for example, Barbara Bodenhorn concurred with Ernest Burch that Inupiat women's knowledge of their environment might have to be even greater than Inupiat men's, as the women are the ones who locate the animals and then drive them to the men (pers. comm., October, 1998). Ernest Burch recalled to us

historical writings on northern Alaska confirming the roles of women in tracking their men to the sites of seal kills in order to drag the seals home (pers. comm., October, 1998: see also Bockstoce, ed., in Bibliography). In Bender's 1993 book "Landscape: Politics and Perspectives," Bodenhorn includes a chapter ("Public spaces, private places: public and private revisited on the North Slope of Alaska") which expands one aspect of her 1990 paper with particular reference to Mauss' seasonal variations essay. She explores there the extent to which the marital relationship is constructed as a hunting relationship. *Tuvaqati*, for instance, which is the non-gendered term for spouse, literally means companion on a hunting trip. Spring hunting in particular is a time when families are meant to hunt together. (B. Bodenhorn, pers. comm., May 24, 2000).

The practical involvement of women in San hunting has also been mentioned by a number of authors. In 1975 Patricia Draper stated categorically that !Kung women do not hunt, but stressed their importance to male hunters in bringing back news of animals and signs observed in the bush (1975: 82-88). H.-J. Heinz and M. Lee (1978) mentioned that !Xoo women hunted. Richard Lee in his 1979 book, while stating that "basically (Ju/'hoan women) leave hunting to the men" (1979: 235), nevertheless acknowledged that women participate actively in hunting preparation discussions, sharing information gleaned from gathering trips (1979: 210).

Lee's work, and Lorna Marshall's work, also bring up questions about the relationship between gender and the ownership of the means of production among the Ju/'hoansi. Women can, like anyone else, be owners of arrows, which fact allows them to become distributors of meat from animals shot with those arrows. Bodenhorn points out that, similarly, in Barrow, a woman can own whaling guns—or can give guns to quite wide-flung kin—which generates rights to shares in the take in which those means of production played a part (pers. comm., May 24, 2000)."

Where cooperative hunting among Ju/'hoansi is concerned, some extremely relevant fieldwork carried out by Alison Brooks and Aron Crowell in the mid-1970s must be mentioned. They followed husbands and wives along the same track about ten minutes apart, and compared notes of what tracks were identified and what information derived from them. Wives of excellent hunters identified and drew information from tracks of important food animals, whereas wives of non-hunters commented on mouse tracks and toad tracks, and missed many economically important ones (A. Crowell and A. Brooks, pers. comm., January, 2000).

Polly Wiessner additionally commented that, in her experience, "couples who cooperate are only those who engage in traditional bow and arrow hunting. Women do not assist men in non-traditional forms of hunting like hunting with guns or with spears on horseback." However, she continued, "in southern communities of Nyae Nyae (Namibia), it is interesting that men have many arrows in their quivers from their wives—their wives do not make them but receive them in *xaro* (ritual gift-giving) from male relatives, or, more frequently, from their husbands. If the hunter kills an animal with an arrow that he or somebody else has given his wife, the meat belongs to his wife. When I photographed arrows at //Aru and other southern Nyae Nyae communities in 1997, I was surprised how many had been made by husbands and given in *xaro* to their wives, a practice that

transferred the ownership of the meat of the animal killed with that arrow to the hunter's wife. She would then have the right to distribute it. I had not encountered this practice frequently in northern Nyae Nyae communities nor in Ju/'hoansi communities on the Botswana side of the border. When I asked if this was a new or old practice, I was told that people's grandparents had done the same. However, arrow *xaro* between spouses is not strict convention. Some men chose to *xaro* arrows to their wives and others did not. Unfortunately I did not ask if arrow *xaro* between spouses was correlated with cooperation in other phases of the hunt." (pers. comm., December, 1999 and January, 2000). Accompanying figures provided by Polly Wiessner showed that fully one-third (33 of 98) of the arrows contained in the quivers of five actively hunting men at //Aru in 1997 belonged to their wives.

Marjorie Shostak's 1981 book *Nisa: The Life and Words of a !Kung Woman* reported a first-hand account of a young girl killing first a baby steenbok by herself (1981: 94) and later a young kudu (1981: 102). One of the authors (Biesele) also heard accounts of young Ju/'hoan girls during the 1970s and 1980s in Botswana hunting, usually small or immature animals. George Silberbauer reported (1981: 214) that adolescent G/ui boys and girls alike set traps for gallinaceous birds and small mammals. Susan Kent (1993: 489-90) described women at Kutse, in eastern Botswana, hunting small animals with snares or clubbing them with digging sticks, though they "do not hunt with bows and arrows." Kutse women also routinely make and set bird snares. If their husbands are away, women may check traps and butcher any animals captured. Also, "some husbands and wives forage together, both collecting wild plants and checking traps." Of great interest is Kent's observation that after 1988, when the idea of using plastic threads from mealie-meal bags to make snares for traps caught on among Kutse women, animals caught in such traps belonged to the women, not the men. From then on, ritual scarifications believed to bring animals into these traps could be performed for women as well as for men.

Liebenberg (1990: 4, 73) provides, to our minds, the most persuasive perspective on San women's participation in hunting. With his permission, we quote in full two paragraphs from his chapter on hominid evolution in *The Art of Tracking: The Origin of Science*:

It has been pointed out that the traditional "Man the Hunter" formulation of human evolution, with the emphasis on hunting and male dominance, is an outcome of male bias on the part of anthropologists working in a male-dominated world. These anthropologists have played down the evolutionary importance of the woman's role: their economic contribution in gathering and sharing food; their role as primary socialisers and pivotal members of the family unit; and their role as information "bankers" in the success of male hunters. Earlier anthropological bias also denies women's direct involvement in hunting (Dahlberg, 1981). As far as the art of tracking is concerned, we should remember that both men and women were involved.

The art of tracking, as practised by contemporary trackers of the Kalahari, is a science that requires fundamentally the same intellectual abilities as modern

physics and mathematics. It may well have been the first creative science practised by the earliest members of anatomically modern *Homo sapiens* who had modern intellects. Natural selection for an ability to interpret tracks and signs may have played a significant role in the evolution of the scientific intellect.

This perspective provides an admirable transition to the last few observations we wish to report from our work with Ju/'hoansi in 1995. Following our initial tracking trips with two Ju/'hoan couples, we did interviews with women, men, and mixed groups. As is usual with Ju/'hoansi, many answers came in the form of stories. Thus we heard contextualized information, data embedded reliably in mnemonically-powerful narratives—information, thus, with perhaps more substance than mere brief answers to a questionnaire.

We heard that “many women,” including those of the previous generation, had “for a long time” accompanied their husbands on hunting trips. Some took nursing infants along, as they do when gathering. These women are said to be excellent trackers. They share signals with the men but the men are “in charge”—in the sense that they carry the weapons, that the poisoned arrow has the power, in the last analysis, to bring the animal down, and that both sexes respect that.

While gathering, as well, women often find priority tracks and spoor, as well as baby animals that require immediate response by the hunters to obtain access to the mother. Baby animals are used, often by women, to lure the mothers to men so they can shoot them. The babies are tied or their legs are broken or bitten to make them cry out to call the mother. Men and women alike cautioned that this strategy is never used with gemsboks, as the females have horns that are as formidable as those of males. Kudu cows and calves are preferred, as kudu cows are hornless and relatively non-aggressive.

Women sometimes lead the hunt and the tracking/stalking until the game is closely approached. When the hunter draws the arrows from his quiver, he takes the lead. Women (as do other male hunting partners) drop back to be out of the way, and all use hand signs from then on to be as silent as possible.

From hands-on demonstrations by both men and women of snaring techniques, we learned how extremely terrain-specific are the various sorts of snares. It was clear that women knew as well as men how to set snares. In one memorable interview at Baraka, Namibia, /'Angn!ao's ten year old daughter, //Ukxa, raced to collect the materials for a demonstration snare as her father described them to us. She put them together expertly as he talked: it was clear that she knew as well as her father and brother how to construct, set, and check this snare.

It was clear also that both men and women Ju/'hoansi felt that hunting in mixed groups was likely to be productive. There was a good feeling about their positive descriptions, one that went beyond the occasional jokes made about husbands and wives having to go to such great lengths to have time alone together. Instead, women's sagacity and judgment and strength were celebrated by all. There was just no male arrogance noted: the appreciation of women's contributions here appeared absolutely genuine.

These observations, though brief, point some very interesting directions for further study. Our evidence is admittedly scanty, and we suggest further study by ourselves or others whenever possible. Our observations bear similarity to those

of Steven Romanoff in the Peruvian Amazon, who wrote on "Women as Hunters among the Matses" there (1983: 339-43). Matses couples working together provide more meat than men alone. Men and women alike capture a collared peccary, a large catch. Women accompany their husbands on about half of their hunting days. Women gather on these trips but also take an active role in hunting. They spot game, take part in the chase, retrieve arrows, bring water to flood armadillo holes, encourage dogs, strike animals with sticks or machetes, participate in orienting the party, and carry meat home. In the case of polygynous men, only one wife at a time hunts with her husband, a fact which seems to reinforce the idea of clear, well-honed communication contributing to the success of the hunt.

Like the situation with the Agta, this description of the Matses attests to the flexibility of hunter-gatherer economic arrangements, and particularly to the opportunism of both men and women in response to various environmental options. We propose, therefore, to quote a suggestion by Estioko-Griffin and Griffin, that Ju/'hoan data as well as Agta data "already deny the universality of the woman-the-gatherer model, and go far to advance the concept of hunter-gatherers as incredibly flexible in all their organizational characteristics." (1981: 143). Whether the observed collaboration of men and women trackers among Ju/'hoansi is shallow or deep in time is an historic fact which can possibly still be ascertained. But world data on women's hunting in other societies, as well as many nuanced clues embedded in time-tested areas of Ju/'hoan practice and belief, would not at this point seem to argue AGAINST either 1) the "recent change" hypothesis, or 2) the possibility that spousal collaboration may have been an ancient, long-lived option.

As an opener to a more general discussion of these issues, we would like to offer Louis Liebenberg's answer to an early version of our question. "My answer to the question you pose would be that spousal collaboration in tracking/hunting has substantial time-depth," he wrote (July 14, 1997). His reasons included:

1. A tracker does not work in isolation - tracking involves the interpretation of specific signs and predictions on the basis of extensive knowledge of animal behavior and the environment as a whole. This knowledge is based not only on the tracker's own observations, but also those of other members of the community, including women.
2. Most information is shared in the context of storytelling, which involves men and women. The tracker's understanding of nature is based on an oral tradition that involves generations of hunter-gatherers.
3. Hunter-gatherers can identify each others' footprints in the same way that you recognize the handwriting of someone you know well. The interpretation of tracks and signs is as fundamental to men and women in hunter-gatherer societies as reading and writing is for you. To say that women are not trackers is like saying that you cannot read or write because you are a woman.
4. For hunter-gatherers the interpretation of tracks and natural signs in nature is equivalent to the interpretation of *artificial signs* in the city environment (advertising signs, road signs, words in newspapers and books, adverts on TV that use metaphors to symbolize desired lifestyles, economic indicators, etc.) Whether you live in nature or in a city, your survival depends on your ability to interpret signs in your environment, irrespective of whether you are a man or a woman.

Our tentative conclusion leans well in the direction pointed by Liebenberg's remarks, i.e. that spousal collaboration in hunting may have substantial time-depth. These remarks support in a most comprehensive way the apparently long-tenured relationships between Ju/'hoan knowledge and its communication through expressive culture that one of us (Bieseles) has explored in numerous research projects and publications, and that both of us have experienced in talking and tracking with Ju/'hoan people. However, it does not seem that the "recent change" and the "ancient, long-lived" hypotheses are necessarily opposing ones. It appears to us that spousal cooperation in hunting may have deep roots in the past, with the degree of cooperation worked out individually by each couple according to the circumstances at hand. Whether circumstances have encouraged or discouraged such cooperation today and why is a matter that needs further investigation.

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ENDNOTE

In a personal comment (Sept. 20, 2000), Edwin Wilmsen mentioned the importance in this paper of the voice of an author (Barclay) informed about subsistence hunting in his own area of the world. This voice allows the paper, he said, to begin to demystify San knowledge and to emphasize its practical application to the conditions under which the San live.

Wilmsen also noted that Herero pastoralists in the same environment are equally good at reading spoor. In his experience at /Kae/kae, Botswana, this expertise could be found among both old and young Herero women as well (though as they live today they seldom travel far on foot so have little need to use it). This observation, along with instances Wilmsen recorded of Ju/'hoan San women tracking game with their husbands, and with other (eastern Botswana) pastoralists tracking cattle, underscores the point made by Barclay in this paper that all peoples who depend on animals need to acquire tracking skills.

AUTHORS' QUALIFICATIONS

Megan Biesele has done anthropology and human rights work in the Ju/'hoan areas of Botswana and Namibia since 1970, and has published in a number of areas touched on in this paper, including environmental knowledge, gender issues, and language. Steve Barclay learned tracking and hunting from his father and uncles, subsistence hunters and sportsmen in South Texas, where the environment has many similarities with that of the Kalahari. With his son Butch, he has made a lifelong study of animal behavior there. Steve and Megan's collaboration as a husband-wife team, combining technical hunting knowledge with experienced Ju/'hoan translation, enabled them to observe husband-wife tracking and hunting expeditions and to place their details in the context of information from other world hunting traditions.

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