NICOLE M. WAGUESPACK

New Answers to Old Questions

WHAT DO WOMEN DO IN LARGE-GAME HUNTING SOCIETIES?

The Organization of Male and Female Labor in Foraging Societies: Implications for Early Paleoindian Archaeology

ABSTRACT I use cross-cultural ethnographic data to explore the relationship between male and female subsistence labor among hunter-gatherer populations by examining data regarding resource procurement, time allocation, and task differentiation between the sexes relative to dependence on hunted foods. The findings indicate that female foragers generally perform a variety of nonsubsistence collection activities and preferentially procure high-return resources in hunting-based economies. I develop ideas about predictable relationships concerning the amount of time female foragers expend on subsistence and technological tasks relative to the dietary contribution of meat. I then use ethnographic trends to evaluate archaeological assumptions regarding the sexual division of labor in prehistoric foraging contexts, focusing on the dichotomous views of Clovis labor organization. I argue that archaeological interpretations of prehistoric labor roles in hunting-based foraging societies are commonly polarized between stereotypical views of male and female subsistence behaviors. I develop an interpretation of Early Paleoindian labor organization, emphasizing female labor in the production of material goods and the procurement of low-risk plant and animal resources based on global economic trends among foragers. [Keywords: gender, labor organization, hunter-gatherer, Pleistocene forager, Paleoindian]

ONE OF THE more significant conclusions reached at the influential "Man the Hunter" conference of 1966 at the University of Chicago was the recognition that plant foods gathered by women can be important, if not dominant, resources in the diet of hunting-and-gathering peoples (Lee and DeVore 1968:4). It is also widely recognized that women's subsistence labor not only contributes gathered plants but also may be directly involved in the procurement of game or indirectly involved in the hunting activities of men (Bird 1999; Bruhns and Stothert 1999; Estioko-Griffin and Griffin 1981; Halperin 1980; Hudecek-Cuffe 1998). Yet the range of variation in the economic roles of males and females documented among foraging societies, both past and present, and its fundamental relationship to how labor is organized between the sexes remains unclear. Unfortunately, most studies concerning male and female foraging activities are from a sex-specific perspective and, as such, do little to advance an understanding of how sex- or gender-specific strategies work in concert. Consequently, a continued reliance on gender stereotypes, particularly among archaeologists, has served only to exacerbate the view that the labor of hunter-gatherer men and women can be viewed from the overly simplistic standpoint of hunted versus gathered food items. The following work is designed to address a relatively straightforward, but poorly documented, question regarding foraging lifeways: How does the degree to which a foraging group relies on hunted resources affect the organization of subsistence labor? This question is inspired by a far more mundane issue, one confronted by archaeologists working in a diverse array of geographic and temporal arenas—namely, what do women do in large-game hunting societies?

I address this question by exploring three issues within a global sample of foraging societies: (1) How does meat dependence affect the types of resources women procure, (2) how does meat dependence affect the amount of time women invest in subsistence activities, and (3) how does meat dependence affect the degree to which women engage in material production tasks? My analysis concerns dependence on meat resources because hunting behaviors

American Anthropologist, Vol. 107, Issue 4, pp. 666–676, ISSN 0002-7294, electronic ISSN 1548-1433.

are extremely well documented both ethnographically and archaeologically. My goal is to develop greater understanding of how male and female foragers organize their subsistence labor to facilitate, particularly among archaeologists, less gender-biased interpretations of hunter-gatherer labor. Because the Early Paleoindian archaeological record presents a potentially extreme case of forager reliance on hunted foods, it provides an ideal case for exploring interpretations of prehistoric labor organization in light of ethnographic trends.

Because of traditional interpretations of Early Paleoindian large-game-focused subsistence in North America, the archaeology of Clovis has often been singled out as a research arena with a particularly egregious use of gender stereotyping (Adovasio et al. 2001; Bruhns and Stothert 1999; Gero 1995). What is clear is that because the act of killing large prey is documented ethnographically to be a predominately male activity, inferences regarding other attributes of prehistoric foraging societies—such as mobility regimes, technological strategies, and mating systems—are often (whether purposefully or by default) structured largely around male activities. As a result, archaeological perspectives of large-game hunting foragers, such as early Paleoindians, who to some extent relied on Pleistocene megafauna, are often skewed toward an overemphasis of what are traditionally considered male concerns, for example, hunting and the production of weaponry.

In contrast, women are portrayed in a limited array of roles—primarily as plant gatherers, hide scrapers, and breast feeders, all of which are often presented as secondary to the primary male Clovis occupation—the killing of megafauna. Studies that attempt to clarify the role of female labor in Clovis economies tend to gravitate almost exclusively to the role of plant-product provisioning, the manufacturing of perishable technological items from plant products, or the processing of animals killed by men (e.g., Gero 1995; Hudecek-Cuffe 1998). By emphasizing women's role as plant gatherers and perhaps the procurers of small game (Adovasio et al. 2001), it is further assumed that these activities provided a substantial component of Clovis subsistence and technology (Adovasio and Page 2002:286–289; Dillehay 2000:28–32; Dillehay and Rossen 2002; Johnson 1991; Meltzer 1993, 2002). Because of the current lack of empirical evidence attesting to frequent or widespread use of plant resources as either food or technological raw materials (with the notable exception of Monte Verde [Dillehay 1997]), arguments concerning women's labor in this area remain largely conjectural. It cannot be denied that plant resources were utilized (see, e.g., Dent and Kaufman 1985; Tankersley 1994), but it seems unlikely that plant products, given an apparently specialized hunting strategy (Haynes 2002a, 2002b:176–181; Waguespack and Surovell 2003), would have provided a significant source of calories to Clovis foragers. The presumed exclusivity of women as plant gatherers, coupled with the lack of clear archaeological evidence attesting to any widespread use of plant resources, has led to considerable disagreement regarding both female and male economic roles among early Paleoindian populations.

THE INCREDIBLE SHRINKING PREHISTORIC WOMAN

The Clovis archaeological record, like much of the record preceding the Archaic–Mesolithic throughout the world, is dominated by the material residues of prehistoric foragers whose subsistence efforts are most visibly apparent through faunal remains. The zooarchaeological record, particularly when dominated by large-body-sized prey (e.g., Pleistocene megafauna), poses a unique challenge for developing interpretations of forager labor organization. Because hunting is generally assumed, correctly or not, to reflect the subsistence behaviors of male foragers, much of human prehistory is evidenced by a record potentially biased toward stereotypically male residues. Simply because faunal remains are more durable than stereotypically female products (i.e., plant materials), reconstructions of prehistoric male and female labor roles often remain conjectural because of perceived inadequacies in the record itself. The Early Paleoindian record of Clovis foragers provides one example of how alleged material biases in the archaeological record and associated interpretive biases among researchers have resulted in highly contentious views of human labor organization in the Pleistocene.

In the movie *The Incredible Shrinking Woman* (1981), Lily Tomlin slowly diminishes in size over the course of the film. Clovis women, and their counterparts in the multitude of other prehorticultural societies of the past, are often interpreted much like thousands of little Lily Tomlins. Their archaeological presence slowly diminishes as artifacts and evidence of their labor literally pass under researchers' trowels, slipping unnoticed through our sediment screens and behavioral models. Many archaeologists believe that until adequate attention is paid to establishing the presence and extent of plant-gathering activities, through more detailed excavation and collection techniques (i.e., flotation and the collection of macrobotanicals), the role of women will remain ambiguous (Dillehay and Rossen 2002; Johnson 1991; Meltzer and Smith 1986). For the time being, however, a dichotomy has emerged among Paleoindian archaeologists: Proponents of the interpretation that Clovis subsistence focused on the hunting of big game are accused of ignoring women by advocates of an "engendered" view, which posits that subsistence was more generalized and included a substantial proportion of plant foods procured by women (Adovasio and Page 2002:287–288; Dillehay 2000:28–32; Gero 1995). Consequently, Clovis societies were either composed of big-game hunting, male-dominated peoples or generalized foragers, with women playing a prominent role in subsistence. As such, arguments concerning the role of male and female labor are reduced to establishing who provided the majority of food: Did Clovis societies rely mostly on male

procurement of large game or female procurement of plant resources?

Following the assumption that women's labor is only manifest in either the procurement of plant foods or the manufacture of material goods from plant products, the archaeological signature of female labor could potentially "shrink" in four ways. First, direct evidence attesting to the frequent use of gathered-food resources (i.e., botanical remains) could become underrepresented because of the better preservation of faunal materials. Reliance on hunting could then be construed as significantly overrepresented in the Clovis archaeological record, a position many researchers advocate (Dillehay 2000; Meltzer 1988, 1993, 1995). Likewise, indirect evidence of gathered foods—such as the technology used to process or procure plants—could be underrepresented in Clovis technological assemblages. One small grinding stone from Blackwater Draw (Hester 1972) and two "cobbles" possibly used for pounding or grinding plant products from the Michaud site (Spiess and Wilson 1987)—although often mentioned as confirmation for plant use—do not indicate that such tools were common implements in the Clovis technological inventory. In fact, their function remains ambiguous. Obviously, the lack of gathering-related tools could also occur because plant procurement and processing tools were preferentially manufactured using perishable materials (Adovasio et al. 2001). Their paucity in the record could further be attributed to a lack of representative Clovis residential sites where such technologies were presumably manufactured, deposited, and utilized (Meltzer 1993, 1995). Alternately, components of the tool kit that may have served plant-processing functions may not have been identified through nonmorphological criteria such as microwear analysis or experimental evidence.

The first two issues, the extent to which plants contributed to the diet and the visibility of plant-processing and plant-procurement technologies, are certainly related and are not unique to the Paleoindian case. The more plants contribute to the overall diet, the greater the likely reliance on processing-intensive resources such as nuts and seeds (Keeley 1988, 1995; Waguespack 2003). Investment in specialized plant-processing technologies is often associated with these particular resource types (Edwards and O'Connell 1995; Hayden 1981; Wright 1994). In addition, specialized features related to plant processing, such as cooking and storage facilities, are also typically associated with bulk harvesting and processing (e.g., Smith et al. 2001; Wandsnider 1997). Procurement of resources such as fruits and some tubers may involve nothing more than a digging stick and carrying device and may require little, if any, specialized processing technology (Keeley 1988, 1995). In short, archaeological evidence of plant use may be largely contingent on the type and quantity of plants exploited. Investment in artifacts such as grinding slabs, mortars or pestles, and in features like roasting pits is likely to occur only when particular plant resources provide a significant source of calories. Whether evidenced by a reliance on processing intensive plant foods or by bulk-harvesting strategies, both imply that relatively large quantities of plant products are being utilized. It is difficult to establish just how much of a dietary contribution plants must provide before these material signatures become commonplace within a foraging group's technological inventory, but conversely, it seems reasonable to suggest that the lack of specialized plant technologies may imply considerably less reliance on plant foods by some prehistoric hunter-gatherer populations than documented ethnographically.

GATHERED FOODS AND LABOR RELATIVE TO HUNTING

Whether construed as the de facto result of different physical capabilities (Brightman 1996; Brown 1970; Murdock and Provost 1973) or the product of reproductive goals (Bird 1999; Hawkes et al. 1997; Hurtado et al. 1985; Hurtado and Hill 1990), the division of labor exists as an empirical fact in all hunter-gatherer societies. Even tentative conclusions regarding how the extent of dependence on hunted resources impacts the organization of labor among hunter-gatherers would help clarify current archaeological interpretations. Although many approaches may prove suitable to resolving this problem, my approach is to begin establishing clear, logical ties between the organization of subsistence labor (primarily dependence on hunted vs. gathered products) and the allocation of male and female labor to nonsubsistence tasks. My intent is neither to force ethnographically documented labor roles onto prehistoric populations nor to imply that the economics of subsistence are necessarily determinant of all facets of labor organization. However, because hunting behaviors result in material signatures (the zooarchaeological record), it provides an empirical starting point from which other labor-intensive, perhaps less-archaeologically visible activities can be inferred. Essentially, how do we begin building inferences regarding the activities of women—plant collecting and otherwise—based on the predominately male activity record evidenced by large-game hunting?

In light of the general dichotomy between male and female foraging goals and the attributes of different resource classes, some basic predictions regarding which resources should be targeted can be generated. First, if the types of plants utilized are wholly independent of the amount of meat procured, then gatherers should always target the most highly ranked plant foods available to maximize their own foraging returns. Regardless of the quantity of prey taken, gatherers would be expected to procure plants that satisfy the subsistence needs of themselves and their dependents in the shortest amount of time with the least amount of effort, maximizing time for other activities. As hunting becomes less reliable and contributes less to the overall diet, maximization of the total plant caloric yield could then be expected as plant foods would then, by necessity, provide a greater dietary contribution. As the dependence on or availability of meat decreases, lower-ranked plant resources can be expected to enter the diet in an effort to increase foraging yields.

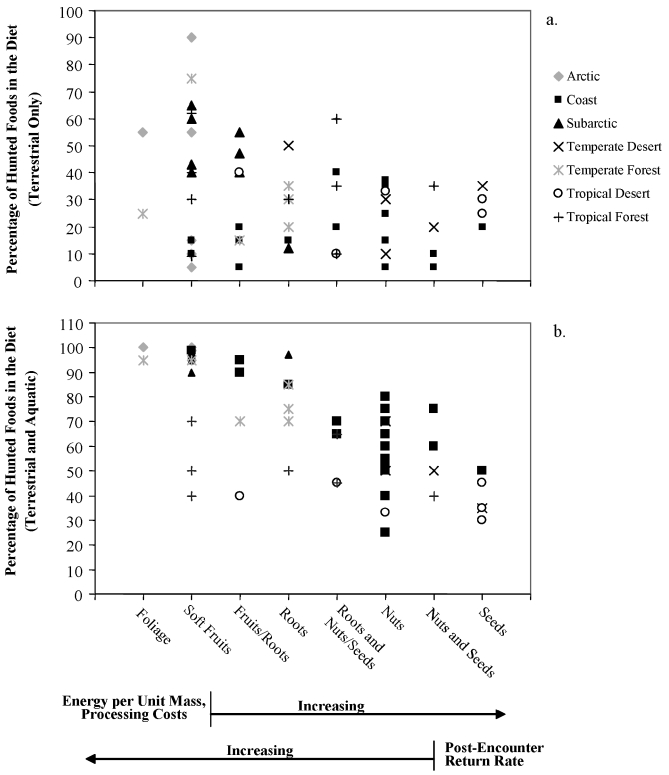

FIGURE 1. (a) Staple plant use relative to dietary dependence on terrestrial meat; (b) staple plant use relative to dietary dependence on terrestrial and aquatic meat sources. Processing costs increase from left to right along the x-axis and return rates decrease for each plant type (data from Keeley 1995: table 9).

TABLE 1. Hunter-Gatherer Subsistence Time Allocation

Society	Minutes Spent Foraging (Daily Average) Male	Female	% of the Diet from Meat	Reference
Kung	249.0	152.0	33	Lee 1979
Ache	417.0	79.0	80	Hill et al. 1987; Hurtado et al. 1985
Hadza	249.0	240.0	20	Hawkes et al. 1997; Woodburn 1968
Hiwi	108.0	106.0	57	Hurtado and Hill 1990
Kade	489.7	284.1	20	Tanaka 1980
Batak	246.0	174.0	30	Kelly 1995
Gunwingu	174.0	138.0	40	Altman 1987
Agta	359.0	100.0	23	Rai 1990

Note: Summary of time spent in the procurement of food resources for eight hunter-gatherer societies. The percent meat in the diet is based on values/estimates provided in the referenced source material.

On the basis of the staple plants procured by a sample of 71 hunter-gatherer populations analyzed by Lawrence Keeley (1995: see table 9), plant food type and dependence on hunting show some consistent relationships. A distinct wedge-shaped distribution is apparent in Figure 1a, when plant foods were divided into eight classes and were arranged on the x-axis to represent categories of increasing caloric value per gram and increasing processing costs. When less than 50 percent of the diet is derived from terrestrial game, a broad diversity of staple plant types is represented. Greater dependence on hunting is associated with a narrower range of plants, and these are predominately fruits and roots. Of the forager groups that derive over 50 percent of their subsistence from meat, none have staples of nuts and seeds. Adding aquatic meat sources to the comparison presents a somewhat different distribution in Figure 1b. As the percentage of meat in the diet decreases, the range of plant staples utilized increases. With little to moderate use of hunted or fished resources, the majority societies sampled have predominately nut- and seed-based plant economies. The use of fruits, other vegetables, and roots is highly variable, but these are the most common staple plant foods utilized in hunting-dominated foraging societies.

Although these trends suggest broad-scale relationships between hunting and the types of foods gathered, it is important to determine if they are the sole result of differential availability of plant types caused by environmental variability. Although the possibility that some plant types are unavailable or occur too infrequently to be regularly exploited, it remains difficult to attribute the overall pattern to environmental factors. With the exception of arctic and subarctic groups (which have few plant types available and are poorly represented in the sample), hunter-gatherers in the remaining environmental categories (coastal, temperate, and tropical regions) display a wide range of variation in staple plant use and have a relatively wide range of plants available to them. Keeley (1988, 1995) first made this point in regard to environmental and other factors. He shows that plant use generally decreases with latitude and finds that, as reliance on hunting and fishing declines, nuts and seeds increasingly dominate staple foods. So, although the specific plants being consumed as staples varies between environments, the fact that nuts and seeds as a resource class are not utilized as staple foods unless hunting contributes relatively little to the diet suggests this relationship is not entirely caused by the environmental availability. If it were, the availability of meat and of nuts and seeds would have to be consistently negatively correlated, an untenable environmental scenario. As Keeley notes, the explanation for the negative relationship between hunting and dependence on seeds and nuts is the high processing costs of the latter. Foods with significant processing costs are commonly interpreted as the last resources to enter the hunter-gatherer diet prehistorically (Edwards and O'Connell 1995; Elston and Zeanah 2002; Keeley 1995). At least among the Alyawara, seeds were the first resources abandoned when other foods became available (O'Connell and Hawkes 1981).

If women in societies that have less than 50 percent dependence on meat primarily collect relatively high processing-cost resources, then they are also likely devoting considerably more time to gathering and processing plants than their counterparts in societies with more hunting-based economies. Do these women work longer hours?

Unfortunately, time allocation data for foragers differentiated by gender is not widely available. A small sample of data for eight foraging populations is assembled in Table 1. The average number of minutes spent directly engaged in foraging for food per day represents primarily the amount of time women were engaged in plant-procurement activities. The average time spent does not include processing collected resources, only the amount of time spent away from their residences while engaged in food collection activities. For all groups, the data represent the mean values for a minimum of six women over a three-month period, and all are considered representative samples of female labor in the societies studied by the original researchers. The proportion of the diet derived from meat represents the estimated value for each group as presented by the original researchers.[1] The data are problematic in the sense that observation and recording procedures varied among the researchers as well as how strictly they defined subsistence "work." For the Gunwingu and the Agta, the data certainly represent time spent gathering plants along with activities such as fishing (and for the Agta women, hunting). Data on the Hadza, Ache, and Hiwi were all collected by researchers using similar collection methods. The data must be considered only a rough approximation of women's subsistence labor, and comparisons between the eight societies must be considered somewhat tenuous.

Women's subsistence work is negatively correlated with dietary importance of meat, on the basis of the amount of the diet comprising hunted game and the average number of minutes women spent per day engaged in subsistence activities ($p \leq .001$, $r^2 = .979$; see Figure 2a). The data, excluding the Agta, present a clear nonlinear trend: As meat contributes less to the diet, women work increasingly longer hours. If the constituents of the diet are transformed to a ratio, the amount of "other" food (which includes plants, aquatic resources, and store-bought and traded food) relative to meat, the relationship is linear (Figure 2b). With the exception of the Agta, women in societies in which the majority of food is derived from hunting, or primarily male labor, work significantly fewer hours out of camp procuring food than women in societies with more plant-based economies. Why the Agta deviate from the pattern is unclear. The fact that nearly 50 percent of their diet was derived through trading hunted game for agricultural products (Rai 1990:85–96) would suggest that the amount of meat in their diet is considerably less than the amount of meat actually procured. As such, Agta women's foraging hours may reflect the amount of meat hunted but not necessarily available for consumption. It must also be noted that the Agta are the only group in which individual women actively hunt fairly large game (Estioko-Griffin and Griffin 1981), so their average foraging minutes includes hunting as well.

It is difficult to make direct comparisons of the trends presented in Figures 1 and 2 because of inherent differences in the data. However, it can be expected that women who target high-ranked plant resources should have correspondingly shorter subsistence work hours. Analysis of

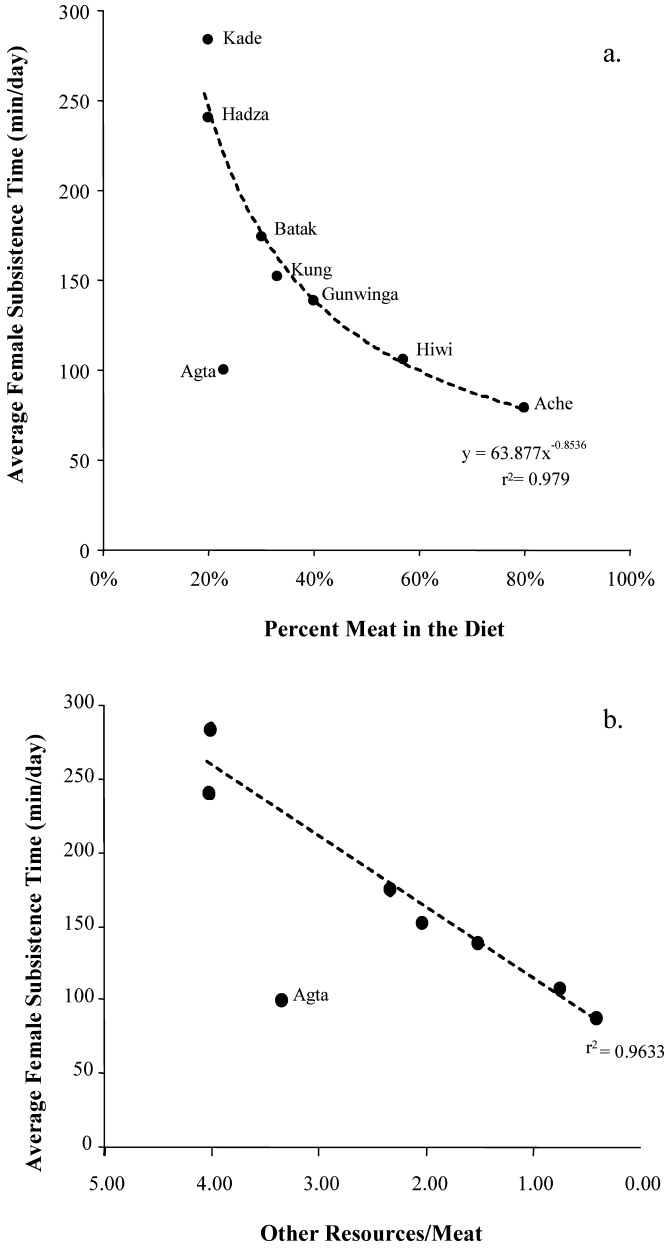

FIGURE 2. (a) Scatterplot of average female food procurement time (hours) and percent meat in the diet, regression excludes the Agta; (b) average female foraging hours plotted against the ratio of resources to meat in the diet (calculated as the percent nonmeat/percent meat), meat contribution increases as the ratio approaches zero, regression excludes the Agta (data presented in Table 1).

Hadza foraging patterns by Kristen Hawkes et al. (2001) has established that the wives of better hunters (those who bring in more game than the average male) actually work longer hours than the wives of less-successful hunters. They interpret this positive relation in male and female work effort to mean that better hunters attract better (i.e., harder working) wives. Although male and female work effort may be positively related among the Hadza, and perhaps in some other societies as well, cross-cultural comparison generally indicates a decrease in the amount of time allocated to food resource procurement relative to meat dependence.

Conversely, women may spend relatively little time engaged in subsistence activities in societies in which meat constitutes a major percentage of the total diet. It can then be asked: How are these women spending their time? Women's subsistence efforts may differ in relation to the amount of meat in the diet in two ways: (1) the types of plants utilized and (2) the time spent procuring them and their participation in activities that facilitate the hunting success of others (i.e., men). Some obvious facilitating activities would include participation in locating and aggregating prey (e.g., involvement in game drives) and the manufacture of hunting-related technology, including clothing, weaponry, and transportation equipment. Among Plains bison hunting (Ewers 1949; Kehoe 1995; Peters 1995), high-latitude, reindeer-hunting societies (Binford 1991; Giffen 1930; Halperin 1980), and tropical net hunters (Bailey and Aunger 1989; Hart 1978), women often played a critical role in surrounding and driving game animals toward male hunters. It must also be considered that the more facilitating tasks women perform, the more time and energy males can potentially devote to actual hunting.

To explore how task differentiation between the sexes relates to hunting, data on the predominant gender that performs eight common activities was assembled for a sample of 32 hunter-gatherer societies. Activities include weaving, pottery making, butchery, house building, rope making, leather working, basketry, and burden carrying; all are drawn from data published by George. P. Murdock (1981) and Murdock and Caterina Provost (1973). As originally tabulated, the data included (1) the presence or absence of each task and (2) whether each activity was performed exclusively or predominately by a single gender, performed equally by both genders, or performed by both genders but with one predominating (Murdock and Provost 1973:203–204). I have simplified the data further by assigning each task as either performed by males, performed by females, or as performed by both sexes. Because the total number of these tasks performed varies by society (e.g., few produce pottery), the total number of activities performed in each society was used to create the percentage of activities performed predominately by men, by women, or by both genders. This measure of task differentiation is compared to the percentage of the diet comprising meat.

If women in foraging societies with hunting-based economies are using the time they are not spending procuring food resources to carry out other activities, a positive relationship can be expected between my measure of task differentiation and the amount of meat in the diet. A significant positive relationship does exist between these two variables ($p \leq .05$, $r^2 = .387$; see Figure 3). Although considerable variation is present, there tends to be a greater degree of female-dominated tasks as meat dependence increases.

Aggregating the data into four groups with differing amounts of meat in the diet (0–25 percent, 26–50 percent, 51–75 percent, and 76–100 percent) makes the differences even clearer (see Figure 4)—setting the 76–100 percent group particularly apart. The percentage of tasks performed by each diet subset represents the sum of all activities performed by the groups in each sample segregated by sex. The number of tasks performed by women is dramatically greater than those performed by men in the most meat-dependent group, but some difference is present once the diet exceeds 50 percent meat (see Figure 4). A chi-square test of the four diet subgroups and the activity data (including female, male, and equal sex participation) is not statistically significant, or is at least not statistically robust ($\chi^2 = 11.55$, $p \leq .073$). However, the overall trend suggests that women's participation in the eight tasks recorded increases relative to the amount of meat in the diet, with the greatest difference between the sexes present in the most meat-dependent societies. The extreme set is arguably the most relevant to Clovis peoples.

Specific tasks that become increasingly dominated by female labor as meat dependence increases include house building, leather working, and burden carrying. All three of these tasks are performed by nearly all groups in the sample (Murdock did not record leather working in nine cases and burden carrying in three cases) and are presented relative to hunting in Figure 5. The increased involvement in house building and burden carrying suggests women's labor is linked to moving and establishing new residential camps. Measures of hunter-gatherer mobility, both in terms of the number of residential camps established and the distances between moves, are known to be positively associated with reliance on hunting (Binford 2001:269–280; Kelly 1995:111–160). Women not only perform these roles more commonly than men when the majority of the diet is derived through hunting but also are likely to perform these tasks more frequently as well. Chi-square statistics on these three activities—segregated into four categories of meat use and including activities performed preferentially by women, men, and both sexes—are not statistically significant for each individual task. However, if these tasks are combined and the total number performed by each gender within each diet category, the relationship is highly significant ($\chi^2 = 17.37$, $p < .008$).

What has been established so far is that as the percentage of meat in the diet increases, a concordant shift in both the types of resources women procure and their degree of involvement in manufacturing activities occurs. First, plant-gathering activities tend to focus on high post-encounter returns from items such as fruits and roots, and processing-intensive plant foods like seeds and nuts are generally avoided. Second, the average amount of female time spent in the procurement of food decreases with the proportion of meat in the diet. Third, female participation in nonsubsistence activities increases in societies with hunting-dominated subsistence economies. Although many of the examined tasks such as burden carrying and butchery are likely to be associated with subsistence, they are not directly involved with food procurement. I interpret these general relationships to reflect a substantial difference in the organization of labor between predominately hunting-based versus predominately gathering-based forager economies. As female labor is increasingly oriented to tasks other than direct food procurement and especially

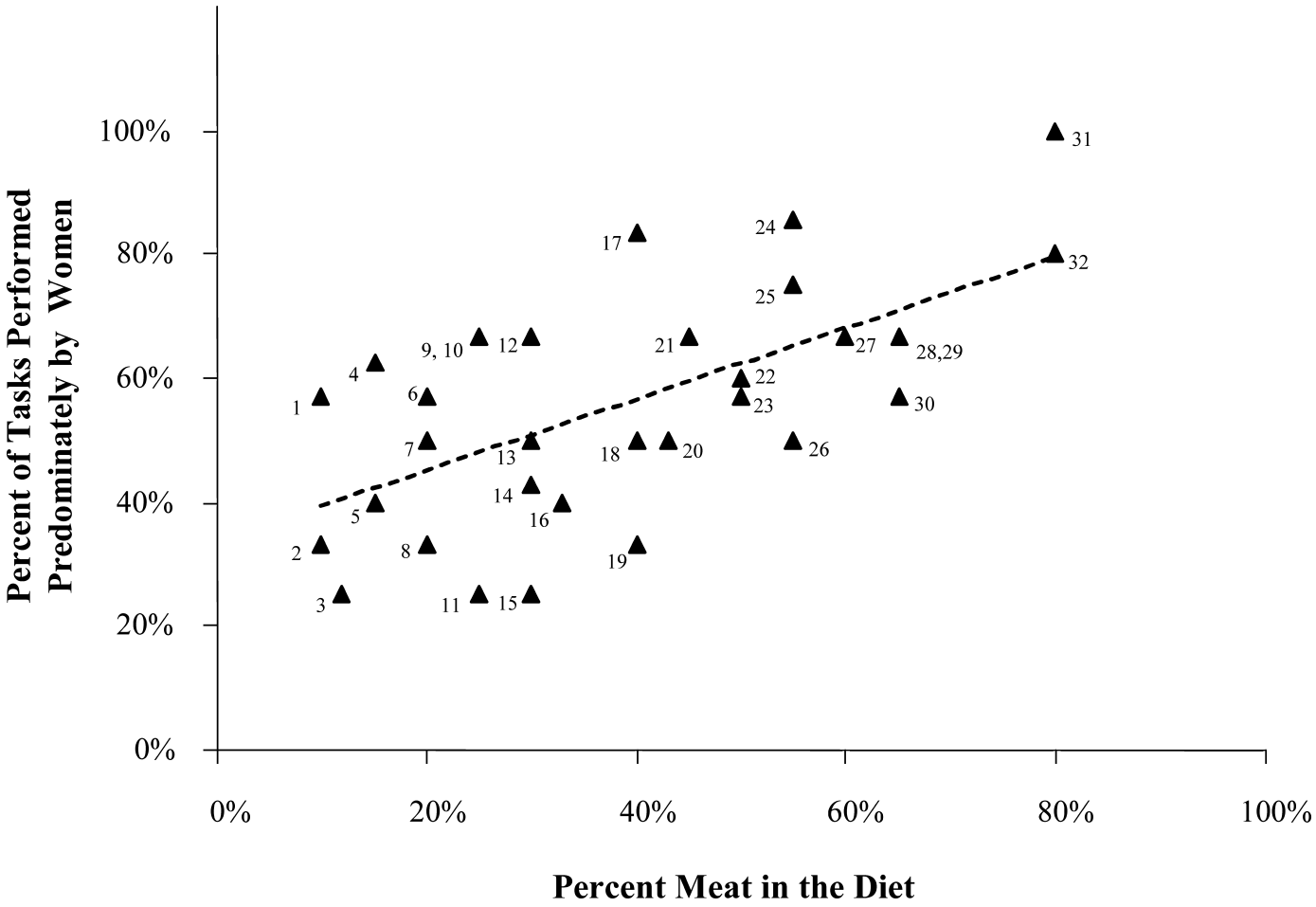

FIGURE 3. Scatterplot of the percent of female participation in tasks not directly involved in the procurement of food resources relative to the amount of meat in the diet ($r^2 = .387$). Tasks performed include the following: weaving, pottery, butchery, house building, rope making, hide working, basketry, and burden carrying (from Murdock 1981; Murdock and Provost 1973). Figure includes 32 foraging societies: (1) Haida, (2) Yurok, (3) Gilyak, (4) Ainu, (5) Pomo, (6) Klamath, (7) Twana, (8) Yokuts, (9) Tiwi, (10) Yahgan, (11) Bella Coola, (12) Arranda, (13) Boto Cudo, (14) Paiute, (15) Vedda, (16) Kung, (17) Chiricahua, (18) Semang, (19) Hadza, (20) Ingalik, (21) Kutenai, (22) Montagnais, (23) Siriono, (24) Micmac, (25) Yukaghir, (26) Caribou Inuit, (27) Aweikoma, (28) Kaska, (29) Saltaeux, (30) Teheulche, (31) Comanche, and (32) Gros Ventre.

activities that facilitate hunting, male hunters may have potentially more time and energy to devote to resource acquisition. So, to the question of what are women doing when male hunting provides the majority of food, the answer is "quite a bit": foraging for high-return plant foods and performing a variety of material production tasks, hauling goods around, and constructing shelters.

CLOVIS SUBSISTENCE AND LABOR

Archaeological residues of Clovis subsistence indicate that Early Paleoindian foragers exploited a wide range of prey species encompassing a diverse array of prey body sizes (Cannon and Meltzer 2004; Waguespack and Surovell 2003). It has been argued that Clovis hunter-gatherers engaged in a "generalized" foraging strategy utilizing a broad array of available plant and animal foodstuffs, and that arguments supporting the consistent use of large-bodied game species are the result of a biased archaeological record (Cannon and Meltzer 2004; Meltzer 1993, 1995) or interpretative biases on the part of Paleoindian archaeologists (Gero 1995; Hudecek-Cuffe 1998). However, when quantified with respect to numbers of animals or to the presence or absence of taxa in faunal assemblages, the Clovis faunal record does suggest that these early foragers preferentially exploited the largest and least-abundant game species available—implying that Clovis hunters frequently eschewed opportunities to acquire small-bodied prey (Waguespack and Surovell 2003). If a *large-game specialist* is defined as a forager who preferentially exploits high-ranked (large-bodied) prey at the expense of procuring smaller, more-available prey, Clovis hunter-gatherers can be interpreted to have practiced a subsistence strategy based, at least in part, on the specialized hunting of extremely large-bodied prey (e.g., mammoth, mastodon, and bison).

Their specialized hunting strategy suggests a largely meat-based subsistence economy (see also Haynes 2002a, 2002b; Kelly and Todd 1988). That the selection of prey documented in Clovis sites is geared toward the procurement

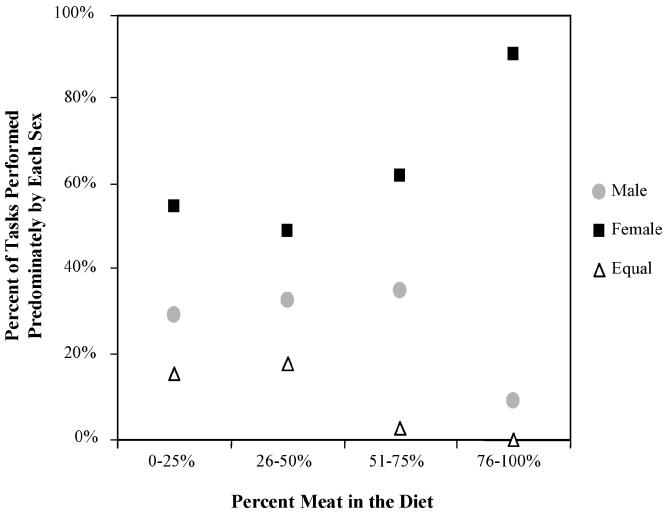

FIGURE 4. The percent of all tasks performed predominately by males, predominately by females, or performed with equal participation by each sex, relative to the percent of meat in the diet. Figure includes averaged values for 32 foraging societies presented in Figure 3.

of extremely large animals implies that the preferred prey was available in sufficient quantities to meet, and perhaps exceed, their caloric needs (Waguespack and Surovell 2003). In contexts in which human population densities are low and large prey are available and frequently encountered, specialized hunting and minimal plant use can be expected because fauna simply provide higher postencounter returns than plant resources (Haynes 2002a). Two basic attributes of Clovis plant use can be tentatively surmised, on the basis of their apparent hunting strategy: (1) plant resources likely contributed substantially less to the overall diet than hunted animals, and (2) the plants utilized were likely high postencounter return-rate items requiring little processing (Waguespack 2003).

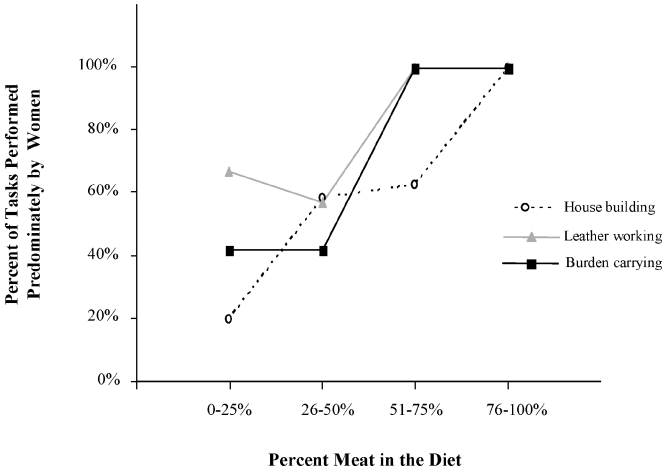

FIGURE 5. Percentage of house building, leather working, and burden carrying performed predominately by women relative to the amount of meat in the diet. Figure includes averaged values for 32 foraging societies presented in Figure 3.

We may further speculate that the types of plants collected by Clovis peoples did not require intensive harvesting or processing technologies. General trends documenting the relationship between the types of plants procured and the proportion of plant foods in the diet (e.g., Keeley 1988; O'Connell and Hawkes 1981) suggest that only with substantial reliance on resources such as nuts and seeds would durable technological goods and features be evident archaeologically. The "negative" evidence of Clovis plant use may not be solely the product of preservation or site bias, but simply a reflection of the minimal use of plant resources. Rather than assume the record is hopelessly biased toward the preservation of male activities and that the role of women will remain wholly conjectural until more evidence of plant use is found, why not entertain the hypothesis that plants probably played a minimal role in the Clovis diet and that women's activities were concentrated elsewhere? Clovis peoples appear to have utilized small-game animals (Cannon and Meltzer 2004; Meltzer 1993; Waguespack and Surovell 2003) to some degree, and many of them, if not most, were easily collected prey with low procurement costs (e.g., turtles and tortoises), which may not have been hunted exclusively by males (Waguespack 2003). This is all the more reason to expect that women's labor may have been consumed with tasks other than plant gathering.

WOMEN, MEN, AND TECHNOLOGY

It has long been recognized that women in foraging societies often produce more perishable forms of technology. By preferentially manufacturing goods out of "soft" organic raw materials (i.e., plant products, leather, and sinew) as opposed to harder materials (i.e., stone, bone, antler, and wood), technological items manufactured by women are unlikely to be preserved in most contexts (Adovasio et al. 2001; Colley 2000; Murdock and Provost 1973; Soffer et al. 1998). This does not mean that women did not make and use tools made of "hard" materials. The pattern of female involvement in the production of goods manufactured out of perishable raw materials is drawn primarily from the recent ethnographic record, wherein many items once made of chipped stone, bone, and antler or ivory had long since been replaced by metal. It is reasonable to question whether flintknapping would have been exclusively a male activity where chipped stone figured prominently in hunter-gatherer technology.

Archaeologically, the technological inventory of Clovis consists almost entirely of items manufactured out of stone and, to a lesser extent, of bone and ivory. But there is no a priori reason to exclude women's labor from the production of "hard" technologies, and it remains likely that both men and women also worked softer, more-perishable materials as well. Observations among peoples who still manufacture chipped stone tools, such as the Konso hide workers of Ethiopia (Brandt and Weedman 2002), and among peoples who until recently knapped stone (Colley 2000; Gero

1991; Hamilton 1980), indicate that women are, or at least were, actively involved in stone-tool production.

Clovis and other large-game hunting peoples of the past provide what may seem the worst possible contexts for exploring gender roles, but it is worth considering that these might have been the contexts in which female labor was most involved in the production of technology. As shown previously, women take on a greater share of the manufacturing and other activities as the contribution of meat in the diet increases. Large-game hunting societies may then provide the ideal contexts for exploring the role of women's labor through material goods. Although I am not willing to assume that the specific activities identified previously (leather working, house construction, and burden carrying) necessarily apply to Clovis women, I believe it is justified to expect that Clovis women took a prominent role in the production of technology. In a similar vein, work by Marcia-Anne Dobres (1995, 2000) concerning European Upper Paleolithic bone and antler technologies is beginning to elucidate the role of women in these "hard" technologies as well.

DISCUSSION

I clearly favor the interpretation of Clovis peoples as specialized hunters (Haynes 2002a; Waguespack and Surovell 2003), but I see no reason to view women as peripheral economic players in Clovis society (Waguespack 2003). There is a good chance that women's economic contributions will never be detected as long as the efforts of women's labor in Clovis societies are equated solely with plant gathering and are only evidenced archaeologically through plant materials and related technologies. If, as has been shown for ethnographically documented hunter-gatherers, women in the most meat-dependent foraging societies spend less time procuring food and more time engaged in the production of technology and performing nonsubsistence tasks, then Clovis women likely spent the majority of their time not gathering plants. In this sense, equating women solely with plant gathering is reducing their role in prehistoric societies to activities for which they may have spent little time and effort. The "shrinking" phenomenon may not be entirely the effect of preservational bias but the inherent bias of archaeologists limiting female labor to the plant realm.

Cross-cultural ethnographic comparisons give no reason to assume that the labor of Clovis women was peripheral to the economic system or limited to plant-gathering roles. Rather than assume that big-game hunting necessarily equates to male dominance in the food quest, it should be acknowledged that the ability to devote time and energy to hunting is facilitated by the labor of nonhunting individuals. By taking on a greater proportion of nonsubsistence tasks, women's labor was likely to have been an integral component the Clovis big-game predation strategy. Although it may be easier for many archaeologists to simply ignore the role of women or base their interpretations on appeals to negative evidence and stereotypes, such approaches may never yield insights into the diversity of prehistoric labor strategies. Beyond the Paleoindian record, the organization of production activities with regard to hunting has larger-scale implications for the sexual division of labor in prehistoric contexts. A major shift in the partitioning of labor is generally associated with the advent of plant and animal domestication and increases in hunter-gatherer population density (Arnold 1993; Bender 1978; Binford 2001; Hayden 1994; Layton et al. 1991). However, my analysis of hunter-gatherer economy—and the work of others (e.g., Keeley 1995; Hurtado and Hill 1990) on this topic—suggests that the partitioning of labor between food procurement and other often-related tasks is, in part, related to the degree of dependence on hunted foods. This may imply that a fundamental change occurs in the organization of labor when hunting-based economies become increasingly reliant on gathered foods, a change often antecedent to the shift from foraging to food-producing subsistence regimes.

NICOLE M. WAGUESPACK Department of Anthropology, University of Wyoming, Laramie, WY 82071

NOTE

Acknowledgments. I need to thank the following individuals who have read and commented on drafts of this article and whose insights I greatly appreciate: Mary Stiner, Steve Kuhn, John Olsen, David Meltzer, Paul Martin, Robert Kelly, Mary Lou Larsen, Marcel Kornfeld, and Todd Surovell. The *American Anthropologist* editors—and *AA* reviewers David Anderson, Kristen Hawkes, and Lucille Johnson—provided thoughtful editorial comments, and their recommendations have significantly improved the clarity of my arguments and writing. The efforts of these colleagues and reviewers, many of whom provided opposing viewpoints, both clarified and expanded my interests in the division of labor, for which I am grateful.

1. The proportion of the diet derived from meat is commonly recorded in two ways: (1) the proportion of total food consumed comprising faunal resources (based on food weights or observed eating habits; e.g., Murdock 1981), and (2) the proportion of total calories consumed derived from faunal resources (e.g., Hawkes et al. 1997). Estimates based on total diet versus calories can yield drastically different results. For example, the Hadza have an estimated meat reliance of 20 percent as recorded by Woodburn (1968) based on the relative use of faunal and floral products. Solely on the basis of calories consumed, however, it has been reported that 48 percent of their diet is derived from meat (Cordain et al. 2002). Considering the average kilocalorie per kilogram return on hunted resources is approximately 2.2 times the amount of calories derived from an equivalent amount of gathered products (see Surovell 2000: figure 3, for average resources values), these values are roughly equivalent. The difference between the two measures reflects dietary estimates based on the quantity of different foods consumed versus the caloric quality of those foods. I use estimates based on proportion of food types consumed because the data is widely available in Murdock (1981) and elsewhere.

REFERENCES CITED

Adovasio, James M., David C. Hyland, and Olga Soffer
2001 Perishable Technology and Early Human Populations in the New World. *In* On Being First: Cultural Consequences of First Peopling. Jason Gillespie, Susan Tupakka, and Christy de Mille, eds. Pp. 201–222. Calgary: Chacmool, the Archaeological Association of the University of Calgary.

Adovasio, James M., and Jake Page
2002 The First Americans: In Pursuit of Archaeology's Greatest Mystery. New York: Random House.
Altman, Jon C.
1987 Hunter-Gatherers Today: An Aboriginal Economy in North Australia. Canberra: Australian Institute of Aboriginal Studies.
Arnold, Jeanne E.
1993 Labor and the Rise of Complex Hunter-Gatherers. Journal of Anthropological Archaeology 12:75–119.
Bailey, Robert C., and Robert A. Unger Jr.
1989 Net Hunters vs. Archers: Variation in Women's Subsistence Strategies in the Ituri Forest. Human Ecology 17(3):273–297.
Bender, Barbara
1978 Gatherer-Hunter to Farmer: A Social Perspective. World Archaeology 10(2):204–222.
Binford, Lewis R.
1991 A Corporate Caribou Hunt. Expedition 33(1):33–43.
2001 Constructing Frames of Reference: An Analytical Method for Archaeological Theory Building Using Hunter-Gatherer and Environmental Data Sets. Berkeley: University of California Press.
Bird, Rebecca
1999 Cooperation and Conflict: The Behavioral Ecology of the Sexual Division of Labor. Evolutionary Anthropology 8:65–75.
Brandt, Steven A., and Kathryn Weedman
2002 Woman the Toolmaker. Archaeology (September–October):50–53.
Brightman, Robert
1996 The Sexual Division of Foraging Labor: Biology, Taboo and Gender Politics. Comparative Studies in Social History 38(4):687–729.
Brown, Judith
1970 A Note on the Division of Labor. American Anthropologist 72(5):1073–1078.
Bruhns, Karen O., and Karen E. Stothert
1999 Women in Ancient America. Norman: University of Oklahoma Press.
Cannon, Michael D., and David J. Meltzer
2004 Early Paleoindian Foraging: Examining the Faunal Evidence for Large Mammal Specialization and Regional Variability in Prey Choice. Quaternary Science Reviews 23:1955–1987.
Colley, Sarah
2000 Sisters Are Doing It for Themselves? Gender, Feminism, and Australian "Aboriginal" Archaeology. *In* Gender and Material Culture an Archaeological Perspective. M. Donald and L. Hurcombe, eds. Pp. 20–32. New York: MacMillan Press.
Cordain, Linda, S. Eaton, Janette Miller, Neil Mann, and Kim Hill
2002 The Paradoxical Nature of Hunter-Gatherer Diets: Meat-Based, Yet Non-Atherogenic. European Journal of Clinical Nutrition 56:42–52.
Dent, Richard J., and Barbara E. Kauffman
1985 Aboriginal Subsistence and Site Ecology Interpreted from Microfloral and Faunal Remains. *In* Shawnee-Minisink: A Stratified Paleoindian-Archaic Site in the Upper Delaware Valley of Pennsylvania. Charles McNett, ed. Pp. 55–79. New York: Academic Press.
Dillehay, Tom D.
1997 Monte Verde: A Late Pleistocene Settlement in Chile, vol. 2. Washington, DC: Smithsonian Institution Press.
2000 The Settlement of the Americas: A New Prehistory. New York: Basic Books.
Dillehay, Tom D., and Jack Rossen
2002 Plant Food and Its Implications for the Peopling of the New World: A View from South America. *In* The First Americans: The Pleistocene Colonization of the New World. Nina Jablonski, ed. Pp. 237–254. San Francisco: Memoirs of the California Academy of Science.
Dobres, Marcia-Anne
1995 Gender and Prehistoric Technology: On the Social Agency of Technical Strategies. World Archaeology 27(1):25–49.
2000 Technology and Social Agency: Outlining a Practice Framework for Archaeology. Oxford: Blackwell.
Edwards, Douglas A., and James F. O'Connell
1995 Broad Spectrum Diets in Arid Australia. Antiquity 69(265):769–783.
Elston, Robert G., and David W. Zeanah
2002 Thinking Outside the Box: A New Perspective on Diet Breadth and Sexual Division of Labor in the Prearchaic Great Basin. World Archaeology 34(1):103–130.
Estioko-Griffin, Agnes, and P. Bion Griffin
1981 Woman the Hunter: The Agta. *In* Woman the Gatherer. Frances Dahlberg, ed. Pp. 121–151. New Haven, CT: Yale University Press.
Ewers, John C.
1949 The Last Bison Drives of the Blackfoot Indians. Journal of the Washington Academy of Sciences 39:355–360.
Gero, Joan
1991 Genderlithics: Women's Roles in Stone Tool Production. *In* Engendering Archaeology: Women and Prehistory. Joan Gero and Margaret Conkey, eds. Pp. 163–193. Oxford: Basil Blackwell.
1995 Railroading Epistemology: Paleoindians and Women. *In* Interpreting Archaeology. Ian Hodder, Michael Shanks, Alexandria Alexandri, Victor Buchli, John Carman, Jonathan Last, and Gavin Lucas, eds. Pp. 175–180. New York: Routledge.
Giffen, Naomi M.
1930 The Roles of Men and Women in Eskimo Culture. Chicago: University of Chicago Press.
Halperin, Rhoda H.
1980 Ecology and Mode of Production: Seasonal Variation and the Division of Labor by Sex among Hunter-Gatherers. Journal of Anthropological Research 36:379–399.
Hamilton, Annette
1980 Dual Social Systems: Technology, Labour and Women's Secret Rites in the Eastern Western Desert of Australia. Oceania 51(1):4–19.
Hart, John A.
1978 From Subsistence to Market: A Case Study of the Mbuti Net Hunters. Human Ecology 6(3):325–353.
Hawkes, Kristen, James F. O'Connell, and Nicholas G. Blurton Jones
1997 Hadza Women's Time Allocation, Offspring Provisioning, and the Evolution of Long Postmenopausal Life Spans. Current Anthropology 38(4):551–577.
Hayden, Brian
1981 Subsistence and Ecological Adaptations of Modern Hunter/Gatherers. *In* Omnivorous Primates. R. Harding and G. Teleki, eds. Pp. 344–421. New York: Columbia University Press.
1994 Competition, Labor, and Complex Hunter-Gatherers. *In* Key Issues in Hunter-Gatherer Research. E. Burch and L. Ellana, eds. Pp. 223–239. Oxford: Berg.
Haynes, Gary
2002a The Catastrophic Extinction of North American Mammoths and Mastodons. World Archaeology 33(3):391–413.
2002b The Early Settlement of North America. Cambridge: Cambridge University Press.
Hester, James
1972 Blackwater Locality No. 1: A Stratified Early Man Site in Eastern New Mexico. Rancho de Taos: Fort Burgwin Research Center Publication.
Hill, Kim, Hillard Kaplan, Kristen Hawkes, and Ana Magdalena Hurtado
1987 Foraging Decisions among Ache Hunter-Gatherers: New Data and Implications for Optimal Foraging Models. Ethology and Social Biology 8:1–36.
Hudecek-Cuffe, Caroline
1998 Engendering Northern Plains Paleoindian Archaeology. Oxford: B. A. R. International Series.
Hurtado, Ana M., Kristen Hawkes, Kim Hill, and Hillard Kaplan
1985 Female Subsistence Strategies among Ache Hunter-Gatherers of Eastern Paraguay. Human Ecology 13(1):1–27.
Hurtado, Ana M., and Kim R. Hill
1990 Seasonality in a Foraging Society: Variation in Diet, Work Effort, Fertility, and Sexual Division of Labor among the Hiwi of Venezuela. Journal of Anthropological Research 46:293–346.
The Incredible Shrinking Woman
1981 Joel Schumacher, dir. 88 min. Lija Production and Universal Pictures. Hollywood.
Johnson, Eileen
1991 Late Pleistocene Cultural Occupation of the Southern

Plains. *In* Clovis: Origins and Adaptations. Robson Bonnichsen and Karen L. Tunmire, eds. Pp. 215–236. Corvalis: Center for the Study of the First Americans.

Keeley, Lawrence
1988 Hunter-Gatherer Economic Complexity and "Population Pressure": A Cross-Cultural Analysis. Journal of Anthropological Archaeology 7:373–411.
1995 Protoagricultural Practices among Hunter-Gatherers: A Cross-Cultural Survey. *In* Last Hunters First Farmers: New Perspectives on the Prehistoric Transition to Agriculture. T. Douglas Price and Anne B. Gerbauer, eds. Pp. 243–272. Santa Fe: School of American Research Press.

Kehoe, Alice B.
1995 Blackfoot Persons. *In* Women and Power in Native North America. Laura F. Klein and Lillian A. Ackerman, eds. Pp. 113–125. Norman: University of Oklahoma Press.

Kelly, Robert L.
1995 The Foraging Spectrum. Washington, DC: Smithsonian Institution Press.

Kelly, Robert L., and Lawrence C. Todd
1988 Coming into the Country: Early Paleoindian Hunting and Mobility. American Antiquity 53(2):231–244.

Layton, Robert, Robert Foley, and Elizabeth Williams
1991 The Transition Between Hunting and Gathering and the Specialized Husbandry of Resources. Current Anthropology 32(3):255–274.

Lee, Richard B.
1979 The !Kung San: Men, Women, and Work in a Foraging Society. Cambridge: Cambridge University Press.

Lee, Richard B., and Irven DeVore, eds.
1968 Man the Hunter. New York: Aldine.

Meltzer, David J.
1988 Late Pleistocene Human Adaptations in Eastern North America. Journal of World Prehistory 2(1):1–52.
1993 Is There a Clovis Adaptation? *In* From Kostenki to Clovis: Upper Paleolithic: Paleo-Indian Adaptations. Olga Soffer and N. D. Praslov, eds. Pp. 293–310. New York: Plenum Press.
1995 Clocking the First Americans. Annual Review of Anthropology 24:21–45.
2002 What Do You Do When No One's Been There Before? Thoughts on the Exploration and Colonization of New Lands. *In* The First Americans: The Pleistocene Colonization of the New World. Nina Jablonski, ed. Pp. 27–58. San Francisco: Memoirs of the California Academy of Science.

Meltzer, David J., and Bruce D. Smith
1986 Paleoindian and Early Archaic Subsistence Strategies in Eastern North America. *In* Foraging, Collecting, and Harvesting: Archaic Period Subsistence and Settlement in the Eastern Woodlands. Sarah Neusius, ed. Pp. 3–31. Carbondale: Center for Archaeological Investigations, Southern Illinois University.

Murdock, George P.
1981 Atlas of World Cultures. Pittsburgh: University of Pittsburgh Press.

Murdock, G. P., and C. Provost
1973 Factors in the Division of Labor by Sex: A Cross-Cultural Analysis. Ethnology 12:203–225.

O'Connell, James F., and Kristen Hawkes
1981 Alyawara Plant Use and Optimal Foraging Theory. *In* Hunter-Gatherer Foraging Strategies: Ethnographic and Archaeological Analyses. Bruce Winterhalder and Eric A. Smith, eds. Pp. 99–125. Chicago: University of Chicago Press.

Peters, Virginia B.
1995 Women of the Earth Lodges: Tribal Life on the Plains. Norman: University of Oklahoma Press.

Rai, Navin K.
1990 Living in a Lean-To: Philippine Negrito Foragers in Transition. Ann Arbor: Anthropological Papers, Museum of Anthropology, University of Michigan.

Smith, Craig S., W. Martin, and K. A. Johansen
2001 Sego Lilies and Prehistoric Foragers: Return Rates, Pit Ovens, and Carbohydrates. Journal of Archaeological Science 28(2):169–184.

Soffer, Olga, James M. Adovasio, David C. Hyland, Bohuslav Klima, and Jiri Svoboda
1998 Perishable Technologies and the Genesis of the Eastern Gravettian. Anthropologie 36(1):43–68.

Spiess, Arthur E., and Deborah B. Wilson
1987 Michaud: A Paleoindian Site in the New England-Maritimes Region. Augusta: The Maine Historic Preservation Commission and The Maine Archaeological Society.

Surovell, Todd A.
2000 Early Paleoindian Women, Children, Mobility, and Fertility. American Antiquity 65(3):493–508.

Tanaka, Jiro
1980 The San: Hunter-Gatherers of the Kalahari. D. W. Hughs, trans. Tokyo: University of Tokyo Press.

Tankersley, Kenneth B.
1994 Clovis Mastic and Its Hafting Implications. Journal of Archaeological Science 21:117–124.

Waguespack, Nicole M.
2003 Clovis Hunting and the Organization of Subsistence Labor. Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.

Waguespack, Nicole M., and Todd A. Surovell
2003 Clovis Hunting Strategies, or How to Make Out on Plentiful Resources. American Antiquity 68(2):333–352.

Wandsnider, Luann
1997 The Roasted and the Boiled: Food Composition and Heat Treatment with Special Emphasis on Pit-Hearth Cooking. Journal of Anthropological Archaeology 16:1–48.

Woodburn, James
1968 An Introduction to Hadza Ecology. *In* Man the Hunter. Richard B. Lee and Irven DeVore, eds. Pp. 49–55. New York: Aldine.

Wright, Karen I.
1994 Ground-Stone Tools and Hunter-Gatherer Subsistence in Southwest Asia: Implications for the Transition to Farming. American Antiquity 59(2):238–263.