

- val Gorge. *The African Archaeological Review* 9:1-19.
- Stiles, D. N., R. L. Hay, and J. R. O'Neil
1973 The MNK Chert Factory Site, Olduvai Gorge, Tanzania. *World Archaeology* 5:285-308.
- Swan, B.
1974 Measures of particle roundness: A note. *Journal of Sedimentary Petrology* 44:572-577.
- Toots, H.
1965 Random orientation of fossils and its significance. *Contributions to Geology, University of Wyoming* 4:59-62.
- Toth, N.
1987 Behavioral inferences from early stone artifact assemblages: An experimental model. *Journal of Human Evolution* 16:763-787.
- Turnbaugh, W. A.
1978 Floods and archaeology. *American Antiquity* 43:593-607.
- Villa, P.
1983 *Terra Amata and the Middle Pleistocene archaeological record of Southern France*. University of California Publications in Anthropology, Vol. 13.
- Villa, P., and J. Courtin
--1983 The interpretation of stratified sites: A view from underground. *Journal of Archaeological Science* 10:267-281.
- Visher, G. S.
1969 Grain size distributions and depositional processes. *Journal of Sedimentary Petrology* 39:1077-1106.
- Voorhies, M. R.
1969 *Taphonomy and population dynamics of an Early Pliocene vertebrate fauna, Knox County, Nebraska*. Contributions to Geology, Special Paper No. 1. University of Wyoming Press, Wyoming.
- Wadell, H.
1932 Volume, shape and roundness of rock particles. *Journal of Geology* 77:443-451.
- Wang, P., and C. Li
1922 Roundness parameters in barrier-lagoon systems in Northeastern Shandong Peninsula, China: Limitations to environmental discrimination. *Sedimentary Geology* 77:143-152.
- Waters, M. R.
1992 *Principles of geoarchaeology*. The University of Arizona Press, Tucson.
- Wentworth, C. K.
1919 A laboratory and field study of cobble abrasion. *Journal of Geology* 27:505-521.
- 1922 A field study of the shapes of river pebbles. *United States Geological Survey Bulletin* 730-C:103-114.
- Wood, W. R., and D. L. Johnson
1978 A survey of disturbance processes in archaeological site formation. In *Advances in archaeological method and theory*, edited by M. B. Schiffer, Vol. 1, pp. 315-381. Academic Press, New York.
- Wymer, J. J.
1976 The interpretation of Palaeolithic cultural and faunal material found in Pleistocene sediments. In *Geoarchaeology: Earth science and the past*, edited by D. A. Davidson and M. L. Shackley, pp. 327-334. Duckworth, London.
- Yellen, J. E.
1977 *Archaeological approaches to the present: Models for reconstructing the past*. Academic Press, New York.

The Social Context of Animal Husbandry in Early Agricultural Societies: Ethnographic Insights and an Archaeological Example from Cyprus

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Much of the recent literature on faunal analysis is concerned with the identification of specialized herd management strategies geared toward maximizing yields of primary and secondary products (meat, milk, wool, etc.) from domesticated animals. Models of these strategies can be very useful in the interpretation of faunal assemblages from state or market-centered economies, but their applicability to less complex societies is problematic. A review of the ethnographic literature suggests that a variety of sociocultural and ritual requirements, rather than utilitarian optimizing principles, structures patterns of animal husbandry in pre-state, pre-market (or extra-state, extra-market) societies. The archaeological implications of this observation are explored in the context of prehistoric Cyprus, where long-term changes in the composition of faunal assemblages appear to be closely linked to transformations in social organization and ritual practice. © 1994 Academic Press, Inc.

The analysis of faunal assemblages is an important tool for reconstructing diet in past societies. Over the years, studies have progressed from mere qualitative identifications of the taxa represented in bone samples to detailed quantitative analyses of species occurrence and their relative importance as sources of protein and other nutrients within the total subsistence complex. Recently, there has been considerable interest in the extent to which specialized exploitation strategies focusing on meat as a primary product and/or on secondary products—milk, wool, hides, draft capacity—can be discerned from the harvest profiles of domesticated animals such as cattle, sheep, and goat. It has been argued, based on ethnographic studies of modern specialized herders, that different emphases may result in different proportional occurrences of various age and sex classes in the sample of animals culled, e.g., large numbers of young individuals or subadults where meat is the primary focus, higher percentages of mature females where milk production is critical, and large

numbers of both mature males and females where wool production is concerned. Implicit in this approach is the assumption that herders will decide to slaughter an animal based on optimizing calculations of productivity or energy extraction versus costs of feeding and maintenance, balanced in some cases by considerations of herd security (cf. Payne 1973; Sherratt 1981, 1983; Redding 1984; Cribb 1984, 1985, 1987; Greenfield 1988).

The identification of specialized production strategies is very important to the understanding of prehistoric economies, ecological systems, and societal development. This is made especially clear in a series of highly influential papers by Sherratt (1979, 1981, 1983) in which he proposes that a complex of subsistence transformations including plow agriculture and secondary products utilization, originating in the Near East, swept across Europe during the third millennium B.C. in a "revolution" which had far reaching social consequences (explored at length in Shennan 1986; Thomas 1987; Knapp 1990). It should

be noted, however, that the chronology of individual elements and the cohesion of the overall "package" proposed by Sheratt have come under serious criticism, most notably by Chapman (1982), and a recent test of the zooarchaeological implications of his model has yielded rather ambiguous results (Greenfield 1988). Greenfield, using faunal samples from the central Balkans, has concluded that while a shift from the concentration on primary products (i.e. meat) to a more "diversified" exploitation of both primary and secondary products may be discerned between the Late and Post-Neolithic (particularly at lowland as opposed to upland sites), there is no evidence for "specialized" secondary product exploitation as attested in the more complex societies of the eastern Mediterranean (1988:585).

Many researchers have argued that specialized systems of pastoral production have in the past developed primarily in response to the exigencies of state finance, market systems, and urbanism (Lees & Bates 1974; Adams 1981; Bonte 1981; Chang & Koster 1986:104-106; see also Zeder 1991 for an archaeological case study). The economies of most ethnographically known nomadic pastoralists are of course integrated to varying degrees with the market systems of adjacent sedentary societies (e.g. Barth 1961; Bates 1973; Cole 1975; Swift 1986). For the ancient Near East, Galvin has recently proposed that there were three major phases in the development of livestock production: in the initial phase, animals were domesticated and raised mainly for their meat within the context of subsistence-oriented household economies; subsequently, new species and breeds were developed whose secondary products became increasingly important for the maintenance of state systems of staple finance; and finally, specialized mobile livestock production developed in response to

an emerging market economy and "demand stimulated by large-scale, long-distance exchange" (1987:119-120). A similar trajectory of development may be associated with the emergence of specialized pastoralism in state margin societies of northeastern Africa (Sadr 1991), although the processes of pastoral expansion over the African continent as a whole were undoubtedly more diverse (Marshall 1990; Smith 1986, 1992). With respect to the Aegean, Halstead and O'Shea (1982) and Cherry (1988) explicitly link the development of specialized wool production to the emergence of Bronze Age palace economies; Halstead (1981) found no evidence for secondary product specialization among the earlier Neolithic societies of Greece. Pastoral specialization may also have developed in the course of state formation in ancient Peru (Murra 1965; Shimada & Shimada 1985). Even in the medieval and later societies of Spain, Italy, Corsica, Sardinia, and Greece, political and market-related factors seem to have been responsible for the emergence of transhumant pastoralism (Lewthwaite 1981; Halstead 1987:80-81).

Where livestock production is geared toward state- or market-generated demands, and/or where group subsistence depends more or less exclusively on the production and reproduction of the herd, it stands to reason that specialized management strategies and considerations of economic utility will figure prominently, although not exclusively (cf. Lefebvre 1979:3), in determining which animals (according to age, sex, health etc.) are slaughtered and when. However, there are many agricultural societies (including hoe and plow cultivators alike) which maintain domesticated animals but do not rely on their meat or secondary products as staple (i.e. regular, if not daily) components of their diet or as sources of cash income. The ethnographic literature on animal husbandry in

these societies has received remarkably little attention either from faunal specialists or interpreters of subsistence trends in general. This is unfortunate, because even the most casual survey of early ethnographic "classics" and more recent works reveals that patterns of animal exploitation and consumption in pre-state, pre-market (or extra-state, extra-market) societies are strongly influenced by social considerations and ritual practices which current utilitarian models do not take into account. These socioideological variables may be the principal determinants of the types and quantities of species consumed and the timing, scale, and age-sex profiles of animal "harvests" in pre-state agricultural societies.

THE USES AND MEANINGS OF DOMESTICATED ANIMALS: ETHNOGRAPHIC PERSPECTIVES

Hayden (1990) perceptively observes that traditional farmers and pastoralists rarely consume their livestock except on special occasions or "feasts." The cost of maintaining enough domestic animals to provide meat as a dietary staple would be prohibitive in most societies; Hayden calculates that a group of 25 people relying primarily on goat meat would require two animals per day for subsistence, or a minimum herd size of at least 2000 (1990:41). Since very few agricultural or pastoral societies subsist solely or even primarily on any kind of meat, let alone goat, his argument may be moot, but the fact remains that in most pre-market economies, domestic animals are simply too valuable, by virtue of their scarcity and their implication in vital rituals of "social reproduction," to be consumed on a quotidian basis. A number of ethnographic examples from Melanesia, Indonesia, and Africa help to illustrate this point.

In Melanesia the only indigenous do-

mesticated animal is the pig. Malinowski was clearly impressed by the public spectacle associated with pig slaughter in the Trobriand Islands, remarking:

When a pig is to be killed, which is a great culinary and festive event, it will be first carried about, and shown perhaps in one or two villages; then roasted alive, the whole village and neighbours enjoying the spectacle and the squeals of the animal. It is then ceremonially, and with a definite ritual, cut into pieces and distributed (1922:171).

Subsequent research in other Massim societies highlights the importance of pigs in exchanges between affines, particularly in the context of mortuary rituals (e.g. Campbell 1989; Damon 1989; Lepowsky 1982; MacIntyre 1989; Young 1989). Damon (1989) notes that elders often distribute pigs to their children and nephews well before death to ensure prompt and proper performance of their obsequies. Affinal relatives are also required to present mortuary sponsors with pigs at the time of such rites in order to cancel old debts. Different ages and sizes of pigs may be required for different phases of the ritual sequence, and the types of pigs presented in related exchanges must be equivalent to prior prestations. Damon writes, "If I give a male pig of a particular size the return must also be male and of the same size" (1989:80). Pigs may either be butchered, ceremonially distributed, and consumed at the time of presentation or retained to settle other debts in the future. MacIntyre notes that *kula* trade partners are often expected to provide one another with pigs to help fulfill their respective affinal obligations (1989:142-144).

Pigs are also integral to social and ritual transactions in the central New Guinea highlands. Concerning the Mae Enga, Meggitt writes:

The Mae devote much energy and skill to pig husbandry and, by New Guinea standards,

have substantial herds (on the average about five beasts per married man). Pigs, however, are raised primarily as valuables to be circulated in prestige-enhancing exchanges; they are rarely killed and eaten outside ritual and ceremonial occasions (1977:7-8).

In the Mount Hagen area, Strathern (1971) reports exchanges of live pigs and cooked pork meat in the context of bridewealth transactions, funeral feasts, debt and dispute resolution, sacrifices to the ancestors, private *moka* transactions between individual exchange partners, and large scale public *moka* festivals at which hundreds of pigs may be amassed and distributed. Some of these animals will be slaughtered and eaten immediately; others may be saved and "re-invested in further transactions" (Strathern 1971:99). Among the Tsembaga Maring, Rappaport affirms that pigs are almost never eaten on non-ceremonial occasions. They are required for affinal prestations associated with marriage, birth of children, death of children, or marriage partners; rituals relating to warfare or truce; and sacrifices in cases of misfortune involving illness or injury (Rappaport 1968: 81-83). Pigs are also slaughtered on a much larger scale during the year-long *kaiko* festival, which may occur only once every 12-15 years or at even longer intervals, viz., whenever the pig population has become large enough to be troublesome (Rappaport 1968:153-157, 166-218).

In rural Indonesia, where there is a much wider array of domesticates than in Melanesia, pigs, goats, horses, and water buffalo again figure prominently in the rituals pertaining to marriage and death. The types of animals exchanged depend upon the type of social relationship which exists between the parties involved. For example, in primary exchanges of bridewealth among the Makassae of East Timor, wife-takers are required to present buffalo and horses to the bride's family, which in turn

will make gifts of pigs. Mortuary payments between affines also involve exchanges of livestock; for example, a man would be expected to present the family of his deceased father-in-law with a buffalo, a horse, and five goats (Forman 1980:156-157). Similarly, among the Mambai of East Timor, Traube (1980) notes exchanges of water buffalo and pigs between wife-takers and wife-givers on occasions of marriage and death. At the time of a *maeda* or secondary funeral, the sponsors are required to provide their wife-takers with a lavish feast of rice and pork; wife-takers in return are expected to make gifts of live and dead water buffalo. The dead beasts are sacrificed to the ancestors and their flesh is presented to the sponsors' wife-givers over the course of the festivities, while the live animals are distributed at the end of the ceremony and will probably be retained by the sponsors for presentation to their own wife-givers at future mortuary events (Traube 1980:101-102).

In Africa, as in Indonesia, a wide variety of domesticates is available overall, although the distribution of the various species, cattle in particular, is constrained by the range of the tsetse fly. Here again the circumstances of meat consumption are primarily ceremonial, with the nature of the occasion determining the type of animal to be slaughtered or given away. Among the Tiv of northern Nigeria, for example, chickens are commonly given as gifts to distinguished visitors or in payment for ritual services; they are seldom merely butchered for food but tend to be sacrificed instead, although "... one can always find an excuse for sacrificing a chicken" (Bohannan & Bohannan 1968: 121). For more important occasions such as marriages, goats are preferred for slaughter. Goats are in such demand that most Tiv try to hide their own animals from agnatic relatives, sending them off to distant non-agnatic kinsmen or friends whose

goats they will shelter in return. Sheep are only sacrificed in one particular fetish rite; they may be butchered at the market but usually not until they are old or ill. Pigs, whose meat is enjoyed but viewed with some ambivalence, are seemingly never sacrificed but may be butchered on festive occasions. The Bohannans note that every man owes each set of affines a pig but will probably never pay it. Pigs are also conventionally levied as fines by age-sets on their members. Cattle are more prestigious than any of the foregoing animals; they are used neither for milk nor for draft purposes but are butchered on important occasions, particularly by "big men." It is reported that every man wants to kill a cow for each of his wives, but few manage to do so (Bohannan & Bohannan 1968:120-123). Bradbury (1957) reports a generally similar pattern of animal consumption in the Benin area of southern Nigeria.

A common theme in the ethnographic literature of most of these societies is the variable prestige value associated with different types of animals and the associated sacrifices. The Bohannans' account of the Tiv exemplifies this clearly, as does Evans-Pritchard's (1940) discussion of the pastoral Nuer of the Sudan. The Nuer sacrifice sheep or goats on minor ceremonial occasions, oxen on more important ones, and fertile cows only in important mortuary rites. The Nuer also rate their cattle on a variety of physical attributes, among which "bigness and fatness" seem to be the most important. Similarly, among the Toraja of South Sulawesi (Indonesia), the water buffalo outranks all other animals as a symbol of wealth and prestige. Aspects of the buffalo's body size, coloration, and the curvature and size of the horns are all imbued with status connotations, to such an extent that Volkman likens the animal to a walking version of the house" (1985:

The Toraja present an extraordinary ex-

ample of how the care and feeding of domestic animals may be affected by their ideological importance. Volkman describes the effort which is devoted to the maintenance of the family pigs:

Even the smallest pig is quite demanding: a special cassava garden must be tended, and each morning huge bundles of leaves are picked, cut up, and boiled in a large pot for at least an hour while the fire is watched. The animals are fed twice daily on their own specially carved wooden plates, and they are served with care: the food must be warm, but not too hot; the pigs must not knock over their plates, and so on. The vegetables are called "pig rice" and they are cooked, it is said, because pigs are "our friends, like us" (*solaia*) (Volkman 1985:69-70).

Water buffaloes are also cared for in a remarkable fashion:

... the Toraja water buffalo is not a work animal. In many parts of the highlands, including the Sesean, the task of plowing the fields is accomplished by men, who turn the earth before planting season; buffalo are rarely used for this task. For most of its life the buffalo is cared for faithfully by a boy or girl whose duty it is to lead the animal around to grassy places, to bathe and scrub it, shine its horns, ride it, and generally to pamper it until it is big and beautiful enough to be used as ritual sacrifice (1985:71).

Other societies may lavish less affection on their livestock, but some do treat their animals as pets (e.g. Maring pigs, Rappaport 1968:58), and many share their houses or immediate residential areas with them (cf. Rappaport 1968:58; Strathern 1971:8; Bohannan & Bohannan 1968:122-123; see also DuBoulay 1974:16-17). More important, however, is the fact that a considerable proportion of their agricultural produce is consumed in maintaining "sacrificial" animals.

Rappaport's research on the Maring of New Guinea provides a quantitative analysis of the labor and fodder requirements associated with pig husbandry on any substantial scale. Although Maring pigs forage for themselves during the day after 4

to 5 months of age, they have to be fed enough in the evenings to ensure that they will return home at night rather than becoming feral. For one or two pigs, the provision of household garbage and substantial tubers may not entail considerable effort on behalf of their caretakers (Rappaport 1968:58-59). However, Rappaport observed that over an 8-month period, in four households with a total of 16 people and 13-15 pigs of various sizes, the pigs consumed more of the staple sweet potatoes and manioc by weight than did the humans. Roughly .15 acres of land had to be cultivated to maintain each pig, approximately the same area required for one person's subsistence. In Rappaport's assessment:

... it is quite possible that more energy was expended to raise food for pigs than was returned in the form of pork. Pig raising, furthermore, involves energy costs other than those connected with raising food for them: lost pigs must be searched for, and damage to houses and fences by pigs must be repaired. The destruction of crops by invasions of pigs into producing gardens must also be regarded as an energy loss to the human population and, thus, one of the costs of pig keeping (1968:62).

It should be noted that virtually all of the requisite labor associated with cultivation and pig-rearing is performed by women, who probably receive the least nutritional benefits in terms of quantity and quality of parts ceremonially distributed. Rappaport discounts the notion that pigs may serve as emergency storehouses of energy (cf. Vayda, Leeds, and Smith 1961), remarking, "... it is unlikely that the amount of calories that can be redeemed from the flesh of pigs raised by Melanesian practices would exceed one-fifth of the amount that they had received in rations"; in effect, the Maring would be better off concentrating exclusively on tubers (1968:66-67). The importance of ritual practices and social concerns in structuring not only animal husbandry but also an overall agricul-

tural regime can scarcely be better illustrated.

IMPLICATIONS OF THE ETHNOGRAPHIC DATA

The fact that domesticated animals are integral and essential to the performance of basic rituals and social transactions in so many societies has important implications for the interpretation of archaeological faunal profiles. From the preceding discussion it is apparent that none of the groups considered gears its slaughtering practices to considerations of economic utility. That is to say, they do not appear to be concerned with optimization of meat yield versus feeding and other maintenance costs, which usually means culling herd animals at a relatively young age. On the contrary, mature animals may be valued for their size, the growth of their coats, the size of their horns etc.—attributes which enhance the prestige associated with their ownership, display, prestation, and ultimately with their sacrifice. Moreover, although precise quantitative data are lacking, it does not appear that males are culled to the minimum number required for the reproduction of the herd. Even the Nuer, who rely extensively on milk as a secondary product, maintain a large number of male animals, for the sake of their prestige value and ritual importance (Evans-Pritchard 1940:26). Because animals are required for exchange or consumption in events that are critical to social reproduction and integration, they are "husbanded" with those events in mind and retained until it becomes necessary or desirable to consume them. Consequently an archaeological assemblage characterized by large numbers of mature animals and/or males need not imply a focus on milk, wool, or draft capacity, depending upon the species in question, nor does it necessarily represent "inefficiency" or ignorance of optimal meat-producing strategies. Rather, it may attest to the primary

social and symbolic concerns in structuring practices of animal husbandry.

By an extension of this logic, an archaeological faunal assemblage characterized by the predominance of young animals or subadults could be interpreted to represent an intensification or heightened frequency of ritual consumption—rather than an optimal culling strategy *per se*. This in itself might be open to more than one interpretation. On the one hand, it could be indicative of ecologically benevolent circumstances and successful practices of animal husbandry conducive to the performance of frequent, regularly timed ritual events involving animal slaughter. On the other hand, it could be associated with situations of either social or ecological stress, requiring a greater frequency of ritual performances to mediate tensions, appease the gods or the ancestors, and satisfy human hunger at the expense of maintaining herd size and strength (cf. Rappaport 1968:155). These possibilities can only be evaluated with reference to case-specific ecological data and related archaeological evidence.

Given the influence of ideological and social requirements on patterns of animal husbandry, the frequency of different species' occurrence takes on a new significance as well. To the extent that particular species are required for specific types of sacrifices or exchanges ultimately resulting in slaughter, their proportional representation may be reflective of the relative frequency of associated rituals. Thus among the Tiv, we would expect to find larger numbers of chickens and goats (in terms of minimum number of individuals) than of pigs, sheep, or cattle (factors of preservation, butchering, and discard practices being equal). The infrequent occurrence of cattle would be related to their scarcity and high prestige value, of pigs and sheep to peculiar ideological prescriptions and proscriptions with which they are in-

It might also be predicted that the ritual context of animal consumption will sometimes affect not only the composition of faunal assemblages but also the preservation, spatial distribution, and contextual associations of faunal material. For example, it is possible that specific body parts will be curated "in memoriam" of past feasts. Malinowski observed that the Trobriand Islanders preserved pigs' jaws and fish tails in their houses and yam stores (1922:171), and Bohannan and Bohannan allude to the use of cattle skulls as decorations and stools in Tiv reception huts (1968:123). Depending on cultural patterns of refuse disposal and post-depositional processes, it is conceivable that ritual "middens" or dumps may accumulate in areas within or adjacent to ceremonial precincts. This need not invariably be the case, as witnessed by Malinowski's account of the casual consumption of ceremonially distributed pork: "... it will take place either within a hut, or else people will just cook a piece of flesh and eat it on the road, or walking about in the village" (1922:171). However, the distribution of "prime cuts" to members of particular age, sex, or status groups may result in a spatially patterned distribution of body parts, to the extent that these individuals consume their portions in specific locations.

The demonstrated social and ritual associations of domestic animal exploitation among "primitive" agriculturalists have broad theoretical implications for issues such as the origins of animal husbandry (cf. Hayden 1990), the causes of "economic intensification" (cf. Bender 1985), and the validity of current interpretations of European and Mediterranean faunal data premised on optimal models of secondary products exploitation (e.g. Sherratt 1981; Greenfield 1988; Knapp 1990). Explanations of changes in faunal patterning based on utilitarian considerations or, for that matter, ecological-demographic variables

alone now appear problematic, although they cannot be completely discounted. It is of course difficult to establish that any one theoretical approach is more "correct" than another; otherwise, there would be far less controversy in the archaeological literature! However, the argument for ideologically based explanations can be strengthened by formulating and testing propositions about the relationship between ritual activity and the composition of prehistoric faunal assemblages.

For example, it might be proposed that in many pre-state agricultural societies, evidence for the intensification of animal husbandry will be accompanied by evidence for the intensification of ritual activity and related social exchanges. Moreover, the faunal assemblages of these societies may be characterized by patterns of culling which are not necessarily consistent with optimizing yields of either primary or secondary products. While such observations may not "prove" direct causality, our confidence in the relationship between socioideological variables and faunal patterning may be strengthened by independent or semi-independent lines of data pertaining to (1) the spatial distribution or contextual associations of faunal remains and/or (2) iconographic representations linking domesticated animals to ritual activity.

With these expectations in mind, we turn now to a consideration of social developments and animal husbandry in the early prehistoric (Neolithic and Chalcolithic) and the prehistoric Bronze Age (Early and Middle Cypriot) periods in Cyprus.

THE EARLY PREHISTORIC PERIOD

The earlier prehistory of Cyprus, as presently known, is characterized by multiple phases of colonization, occupational florescence, decline, and resurgence or recolonization. The first definitive evidence

for human occupation comes from the collapsed rock-shelter at Akrotiri-Aetokremnos (see Fig. 1 map), where large deposits of Pleistocene fauna, including pygmy hippo and dwarf elephant, were found in association with stone tools, and hearths (Simmons 1988, 1989, 1991; Swiny 1988). This site is dated to the late 11th or early 10th millennium B.C. (Manning 1991:875). The next phase of occupation, known as the Aceramic Neolithic or "Khirkikia Culture," appears to have been initiated by new settlers whose economy was based upon the cultivation of cereals and the exploitation of a complex of fauna comprising fallow deer, sheep, goat, and pig, all apparently imported from the mainland (Watson and Stanley-Price 1977:247; LeBlond 1986:4-5; Croft 1991:64). Corrected radiocarbon dates from settlements of this period including the type site Khirkikia-Vounoi (Dikaos 1953; LeBrun 1984, 1989a), Kalavassos-Tenta (Todd 1987), Cape Andreas-Kastros (LeBrun 1981) and Dhali-Agrithi (Lehavy 1974) range mainly between 7500 and 5000 B.C. (Todd 1987:174-175; LeBrun 1988:25). There may have been a hiatus or discontinuity in occupation between the Aceramic and the Ceramic Neolithic "Sotira Culture" sites, best exemplified by Sotira-Teppes (Dikaos 1961; Peltenburg 1978; Stanley-Price 1979) and Ayios Epiktitos-Vrysi (Peltenburg 1982a) dating to the second half of the fifth millennium (see Peltenburg 1982b:111) and possibly representing yet another episode of colonization from abroad.

Subsequently, the occupation of Cyprus appears to have been continuous. However, during the Early Chalcolithic (first half of the fourth millennium: see Burleigh 1981:21; Todd 1991:11), the ephemeral quality of settlement architecture observed at sites such as Kalavassos-Ayios (Todd 1991) and Kissonerga-Mylouthkia (Peltenburg 1981; 1982b:56-66) and changes in the overall subsistence complex suggest a shift toward increasing residential mobility,

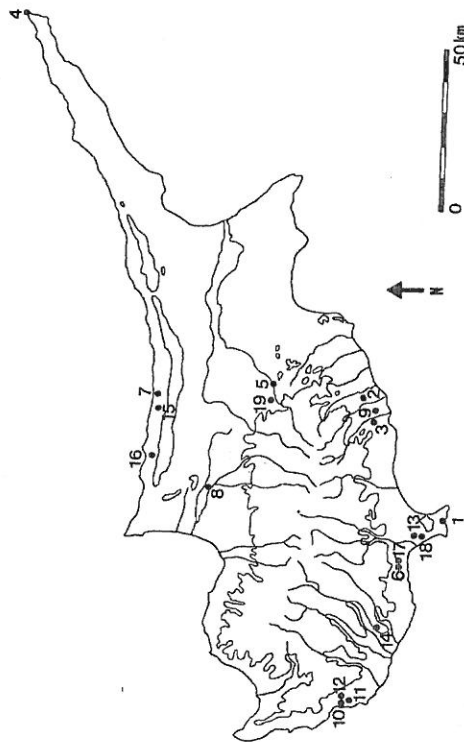


FIG. 1. Map of Cyprus showing the locations of sites referred to in the text. Key to sites: 1. Akrotiri-Aetokremnos, 2. Khirkikia-Vounoi, 3. Kalavassos-Tenta, 4. Cape Andreas-Kastros, 5. Dhali-Agrithi, 6. Sotira-Teppes, 7. Ayios Epiktitos-Vrysi, 8. Philia-Drakos A, 9. Kalavassos-Ayios, 10. Kissonerga-Mylouthkia, 11. Lemba-Lakkous, 12. Kissonerga-Mosphilia, 13. Erimi-Pamboules, 14. Souskiou-Vathykakas, 15. Bellapais-Vounous, 16. Lapithos-Vrysi tou Barba, 17. Sotira-Kaminoudhia, 18. Episkopi-Phaneromeni, 19. Kotschati. A 300-m contour interval is shown.

which may have been accompanied by a decrease in the human population (cf. Peltenburg 1982a:110; Todd 1989:12). During the Middle-Late Chalcolithic (ca. 3500-2400 B.C.: cf. Burleigh 1981:21; Peltenburg 1991a:10) "Erimi Culture" there appears to have been a renewed growth in population, especially evident in the southwestern part of the island, where recent surveys have documented an increasing number of settlements in some areas and an expansion of settlement into previously unoccupied regions (Peltenburg et al. 1983:10-11). "Erimi Culture" sites such as Lemba-Lakkous (Peltenburg et al. 1985), Kissonerga-Mosphilia (Peltenburg 1991b), and Erimi-Pamboules (Dikaos 1936) were occupied over long timespans, and the latter two sites attained exceptional areas of 12 and 15 ha., respectively (Swiny 1989:16).

The pace of sociocultural development in prehistoric Cyprus is generally regarded

as slow or backward in comparison to adjacent regions of the eastern Mediterranean (cf. Cherry 1985; Knapp 1986, 1990; Held 1993; Peltenburg 1993). Throughout the Neolithic and Chalcolithic periods the subsistence economy of Cypriot communities appears to have been based upon the hoe cultivation of various species of wheat, barley, and lentils, supplemented by the collection of olives, grapes, figs, pistachios, and other wild plants (Hansen 1991). The relative importance of deer hunting versus the husbandry of pigs and caprines varied from period to period, as discussed further on. The longstanding tradition of circular to subrectangular monocular house form (see Swiny 1989), reminiscent of various Natufian and PPNA settlements in the Levant, may have been associated with a form of social organization comprising polygynous extended family groups, as Flannery (1972) has proposed for the Near Eastern case. There is

no evidence for settlement hierarchies or ascribed social ranking for most of the early prehistoric period in Cyprus. However, important developments in mortuary ritual, architectural variability, and other lines of archaeological evidence suggest the growth of social asymmetries (perhaps deriving from the actions of "wealth-accumulating" individuals) and an expansion of public ceremonial activity beginning in the Middle Chalcolithic (Peltenburg 1991, 1993).

CHANGING PATTERNS OF FAUNAL EXPLOITATION

Croft's exemplary (1991) overview of the faunal data from early prehistoric sites reveals major changes in the composition of faunal assemblages over time. The first notable phenomenon occurs in the Aceramic Neolithic, with a shift in emphasis from deer to caprines apparent in successive levels at Kalavassos-Tenta and Khirokitia-Vounoi, as indicated in Table 1. Croft regards this as an instance of economic intensification necessitated by population

increase at both sites (1991:67-68). Alternative hypotheses based on the use of animals in emerging ritual and social networks of the Neolithic may be suggested, but are difficult to evaluate within the restricted timespan of the associated stratigraphic units. However, LeBrun (1990:77-78) does note rare occurrences of deer and sheep/goat bones in mortuary contexts and a few examples of stone animal figurines or "protomes" which may be indicative of their ritual significance and consumption. At the Aceramic site of Cape Andreas-Kastro, there was a contrasting decrease in the importance of caprines and a growing emphasis on deer and pig, possibly related to declining population along with local environmental conditions (Croft 1991:67-68).

During the Ceramic Neolithic period, deer predominate in faunal assemblages from sites throughout the island, including Philia-Drakos A, Ayios Epiktitos-Vrysi, and Sotira-Tappes (Croft 1991:69). As illustrated in Table 2, this trend continues at the Early Chalcolithic sites Kalavassos-Ayios, Kissonerga-Mylouthkia, the Period 1 (earlier Middle Chalcolithic) deposits at Lemba-Lakkous, and in two samples from Erimi-Pamboules (Croft 1991:69-72). The frequency of deer bones relative to other species exceeds 70% at several of these sites. Croft attributes the preeminent focus

TABLE 1
Diachronic Changes in Faunal Assemblages from Aceramic Neolithic Sites in Cyprus

	N	Deer (%)	Pig (%)	Caprines (%)
Kalavassos-Tenta ^a				
Period 4	365	56.4	22.7	20.8
Period 3	77	39.0	39.0	22.1
Period 2	331	42.3	32.0	25.7
Khirokitia-Vounoi ^b				
Level 3	325	33.8	20.9	45.2
Level 2	451	22.8	18.8	58.3
Level 1	785	8.5	10.1	81.4
Cape Andreas-Kastro ^c				
Period 2		32.0	38.0	30.0
Period 6		41.0	52.0	7.0

^a Data from Croft (1991:68, Table 1). Croft has taken into account differences in the number of body parts in pigs versus deer and caprines.

^b Data from Croft (1991:68, Table 1, based upon Davis 1984:149, 1987: Fig. 21).

^c Data from Croft (1991:67, based upon Davis 1987).

TABLE 2
Faunal Assemblages from Ceramic Neolithic and Early Chalcolithic Sites in Cyprus

	N	Deer (%)	Pig (%)	Caprines (%)
Ceramic Neolithic				
Philia-Drakos A ^a	252	71.0	17.0	11.0
Sotira-Tappes ^b		76.0		
Ayios Epiktitos-Vrysi ^c		46.0	11.0	43.0
Early Chalcolithic ^d				
Kalavassos-Ayios	698	78.1	6.9	15.0
Kissonerga-Mylouthkia	1134.5	63.7	18.6	17.6
Lemba-Lakkous Per. 1	73.5	63.9	17.0	19.0

^a Croft (1991:69) and Note 3.

^b Croft (1991:69) and Ducos (1965:4).

^c Croft (1991:69) and Legge (1982, Table 5).

^d All data from Croft (1991:71, Table 3).

on deer hunting to an extremely rapid and successful establishment of imported and probably undomesticated deer populations which would have flourished in the deciduous forests of the Neolithic, unhampered by competition from any other species of mammalian herbivores (1991:64-66). Ritual consumption of animals may well have continued, as attested by the presence of deer antlers in the context of inter-colithic graves at Erimi-Pamboules and Karavas-Gyrisma (Dikaio 1936:12, 74; Toumazou 1987:101, 104), but in the context of population decline and/or dispersal, the impetus to "husband" animals for social purposes would have been reduced.

Finally, in the Middle and Late Chalcolithic levels at Lemba and Kissonerga (see Table 3), there is again a significant decline in the exploitation of deer and a concomitant rise in the importance of pig, with the ages of culling for both species apparently decreasing through time (1991:70-73). Croft proposes that population increase in the Chalcolithic may have led to overhunting and depletion of the deer supply, necessitating an intensification of animal husbandry. But it might also be suggested that a parallel process of intensified ritual consumption of animals would similarly have favored a renewed emphasis on husbanded livestock. This in itself would have been related to population growth, as expanding communities relied increasingly on ritual celebrations and for-

malized social exchanges to mediate conflicts and facilitate "social reproduction" through marriage and other alliance networks. The apparent decrease in culling ages noted by Croft may reflect the increasing frequency or regular scheduling of ritual festivities and the increasing consumption of animals in the context of interpersonal and intergroup social relationships.

That something more than mere "economic intensification" was involved in later Chalcolithic patterns of faunal exploitation is clearly suggested by the unusually high ratio of male to female caprines observed at Kissonerga-Mosphilia, Lemba-Lakkous and even the earlier Chalcolithic site of Kissonerga-Mylouthkia. On the basis of detailed examinations of skeletal morphology, Croft has established that the vast majority of the caprines at third millennium B.C. sites were goats rather than sheep, and that there was a high degree of sexual dimorphism in size, frequently permitting the sexing of skeletal remains. The nearly equivalent ratios of males to females (.79 at *Mylouthkia*, .73 at *Lemba*, and .95 at *Mosphilia*) are inconsistent with an efficient strategy of either meat or milk exploitation, and the predominance of goats over sheep rules out the likelihood that wool production was involved. Excluding the fairly remote possibility that feral herds were being exploited instead of domestic stock, the most compelling explanation which Croft offers for this anomaly is that "... mature male goats with their massive, graceful, backward-sweeping horns advertised the wealth and status of their owner" or "... symbolized certain social values of aspirations, possibly connected with fertility" (1991:74).

THE INTENSIFICATION OF RITUAL IN THE CHALCOLITHIC

The material expression of ritual practices and cosmological beliefs increases to an unprecedented level in the Middle and

TABLE 3
Middle and Late Chalcolithic Faunal Assemblages from Lemba-Lakkous and Kissonerga-Mosphilia in Cyprus^a

	N	Deer (%)	Pig (%)	Caprines (%)
Middle Chalcolithic				
Lemba Period 2	208	47.6	20.2	32.3
Kissonerga Period 3	189	51.3	34.4	14.3
Late Chalcolithic				
Lemba Period 3	354	35.9	36.4	27.7
Kissonerga Period 4	2863	44.4	37.1	18.4

^a All data from Croft (1991:71, Table 3).

Late Chalcolithic periods. Mortuary ritual is one form of ceremonial activity that was clearly elaborated. Neolithic burials most often consisted of simple primary inhumations, placed in a flexed position in shallow earthen pit graves within or adjacent to domestic structures. Evidence for any form of post-interment ritual or secondary treatment is extremely limited (Toumazou 1987; LeBrun 1989; Niklasson 1991). However, at both Lemba-Lakkous and Kissonerga-Mosphilia, there are a substantial number of graves containing incomplete and/or disarticulated skeletal remains with indications of special processing and attention to the skull (Niklasson 1991:186-190). Interestingly, the majority of these cases pertain to infant or child burials, possibly expressing a serious concern with the high local rate of child mortality (see Niklasson 1985:241; Lunt 1985) and the fertility of the community in general. At Lemba-Lakkous, there was also an unusual complex of pit graves equipped with libation holes" associated with Building 2, the largest structure excavated (Peltenburg et al. 1985:116-118). Even more remarkable are the extramural cemeteries of rock-cut shaft tombs at Souskiou-Vathykakkas and Souskiou-Laonias (Christou 1989) which seem to have been used for multiple secondary burials (Niklasson 1991:189). The distinctive ritual, architectural, and locational characteristics of the Souskiou tombs are complemented by the presence of an unusually rich array of grave goods, including numerous dentistium shells; bone, and bluish-green stone "picrolite" pendants; a unique copper bead; and a variety of ceramics notable for their quality and elaborate decoration. Further evidence for increasing material and energy expenditure in mortuary ritual derives from the appearance of the first known chamber tombs at Kissonerga-Mosphilia during the Late Chalcolithic (Peltenburg 1991b:30).

The practice of other "life-cycle rituals" associated with pregnancy and childbirth

may also have intensified during the Chalcolithic (Peltenburg 1993). Although a variety of alleged "fertility" figurines have been recovered from earlier prehistoric contexts (cf. Peltenburg 1989; LeBrun 1989b), at no time before the Chalcolithic was there such a pervasive complex of material symbolism concerned with fertility. The most ubiquitous symbols of this complex, found in both settlement and mortuary contexts, are the numerous picrolite cruciform pendants and stone and ceramic figurines schematically rendering female figures in a variety of postures which may have been related to birth (Peltenburg 1989, 1992; Goring 1991; Bolger 1992). An extraordinary collection of these objects was found in the so-called "birthing deposit" from Kissonerga-Mosphilia, which included a collection of 18 figurines placed inside a deep bowl modeled in the form of a Chalcolithic house (Peltenburg et al. 1988, 1989; Peltenburg 1989).

Other evidence for ritual or convivial social activities comes from a number of buildings at Lemba and Kissonerga. The Middle Chalcolithic Building 1 at Lemba, with an unusually large diameter of approximately 7 m, containing a 36-cm-tall stone figurine, an axe clutch, and fragments of six or seven storage jars (Peltenburg et al. 1985:35-36, 324). The contemporaneous Building 20 yielded an exceptional concentration of over 40 worn ceramic bowls, sized for individual portions, and three flasks distributed around a hearth (Peltenburg et al. 1985:111, 326). The Late Chalcolithic Building 2, the largest structure found on the site with a diameter of 8.5 m, was built over the graves equipped with libation holes and may conceivably have served as a focus of communal gatherings or ceremonial activity as well as the residence of a senior group member (Peltenburg et al. 1985:114-115, 327-328). The contemporaneous Building 7, equipped with an unusual complex of basins, grinding equipment, and spaced

ceramic flasks, may have been the locus of some sort of process involving the separation of liquids, possibly beer-making (Peltenburg et al. 1985:121-122, 328).

At Kissonerga-Mosphilia, several structures with diameters of over 8.5 m were built during the Middle Chalcolithic. Their construction was of exceptional quality, with calcarenite blocks in the wall foundations and distinctive internal features such as areas of lime-plastered floor, radial partitions, and unusual rectangular central hearths. Building 206 had red-painted floors and walls (Peltenburg 1991b:21-22). While there is no direct evidence for ritual activity in these buildings, Peltenburg notes the occurrence of "special" pottery and storage containers in these structures, perhaps indicative of their function or the status of their occupants (1991b:26). The most outstanding evidence of preparations for or after the aftermath of ritual activity comes from the Late Chalcolithic Building 3, which stood at the north end of a group of relatively smaller buildings. This structure, which had been destroyed by fire, was equipped with the standard circular platform hearth and may have served in part as a domestic unit. Eleven "permanent" storage jars were located on stands near the wall, presumably representing the personal provisions of the occupant(s). In addition, a group of at least 40 storage jars or "pithoi" and 20 smaller vessels were found occupying half the internal floor area, with the densest concentration near the hearth. For a number of reasons it seems likely that they had originally been stacked empty upon the floor (Peltenburg 1991b:28-29). It is possible that they were gathered together before or after some important ceremonial event involving a large number of guests.

The precise nature of the festivities represented in these buildings remains a matter for speculation, but any number of possibilities may be suggested. It is clear that rituals relating to pregnancy, birth, and

death were of considerable importance in Chalcolithic communities, and other rites pertaining to agricultural fertility would probably have been practiced on a periodic basis also. Agricultural produce may have been stored for ritual consumption as well as for daily needs, and beer or some similar beverage appears to have been brewed from barley for special occasions. The frequency of stone tool caches (Elliott 1985) and the occurrence of exotic materials such as picrolite (Peltenburg 1982c, 1991c), malachite (Peltenburg et al. 1989:35), various species of shells (Peltenburg 1991b; Christou 1989), and small quantities of copper (Peltenburg 1982c; Swiny 1982; Gale 1991) at Chalcolithic sites may reflect the development of regional exchange networks and partnerships through which wealth could be amassed for ritual use, social payments, and distribution at major festivals.

In light of the earlier discussion of animal exploitation in ethnographically known societies, it seems highly likely that domesticated animals would have been implicated in Cypriot Chalcolithic social and ritual transactions as well. The intensification of animal husbandry is clearly accompanied by the intensification of ritual, and the unusually high ratios of male to female goats which Croft has noted at three different sites appear to reflect ideological rather than economic concerns. Although direct contextual or iconographic evidence for the ritual exploitation of domesticated stock at Lemba-Lakkous and Kissonerga-Mosphilia is difficult to elicit from published excavation reports, the cemetery site at Souskiou-Vathykakkas offers some important indications of the use of animals in mortuary ritual. Christou (1989:84-85) notes the presence of thick layers of ash mixed with animal and bird bones in the fill of the intact Tombs 1, 2, and 3, a phenomenon which he interprets as evidence of "sacrifices" in honor of the dead. A unique animal-shaped pendant made of picrolite was recovered along with

dentalia and numerous anthropomorphic figurines from Tomb 3, and an unusual Red-on-1 hite vase in the form of a quadruped with a human face was found in another looted tomb. These objects prefigure the dramatic florescence of zoomorphic representations in the ceramic art of the prehistoric Bronze Age.

Another, albeit slightly anachronistic indication of the ritual use of domestic animals is presented by the famous *Vounous* (Tomb 22) bowl of late third millennium (Early Cypriot) date (Dikaio 1940; Kareageorgis 1982:48; Morris 1985:281-282). This object, which Peltenburg (1989:114-115; Peltenburg et al. 1988:47) compared directly with the ritual building model from Kissonerga-Mosphilia referred to above, depicts a ceremonial scene with human figures holding snakes and wearing bull masks inside a circular building of Chalcolithic type. An interesting feature of the bowl model is the presence of two animal pens, each enclosing two bovines, in the interior of the building on opposite sides of the entrance. The association between domesticated animals and ritual practices attested in the *Vounous* bowl presumably expresses a tradition which had its origins in the early prehistoric period. The *Vounous* model further poses a possible explanation for the enigmatic "radial partitions," uneven or subdivided floor surfaces, and occasional "annexes" observed in the Chalcolithic huts at Lemba and Kissonerga; some of these features may well represent indoor animal pens. The general increase in floor area of Chalcolithic houses compared to those of the Neolithic, and the unusual size of buildings with possible ceremonial functions, could also be partially attributable to the indoor stabling of livestock.

THE PREHISTORIC BRONZE AGE

The Early and Middle Cypriot periods in Cyprus, now commonly referred to as the

"prehistoric Bronze Age," witnessed an unprecedented growth in the number and size of settlement and mortuary sites (Swinny 1989:16-17). There was also a considerable expansion in the geographical range of settlement (see Catling 1962:140-141) which may have been facilitated by the introduction of the cattle-and-plow complex from abroad (Knapp 1990:156-158). Concurrently, changes in domestic architecture suggest the occurrence of significant transformations in household and community organization (Swinny 1989:21). Agglutinative and sometimes multi-roomed rectilinear houses with private storage and work areas replaced the more communally oriented circular hut compounds of the Chalcolithic and earlier periods. These developments seem to reflect changes in the organization of production consistent with Flannery's (1972) model of "village" society and the general complex of social changes characteristic of a transition from hoe to plow agriculture, prominent among which is a shift from extended polygynous family groups to monogamous nuclear or extended family structure (Boserup 1970; Goody 1976; Sherratt 1981, cf. also Murdock 1949:23-40).

A local metallurgical industry based on the exploitation of the rich copper ore deposits of the Troodos mountains was also established during this period (Swinny 1982; Merrillees 1984; Muhly 1989), with important ramifications vis-à-vis the intensification of prestige competition and the emergence of social hierarchy (Swinny 1989:27-28; Keswani 1989a:507-512; Knapp 1990). The demand for copper in coastal communities such as Bellapais-*Vounous* (Dikaio 1940; Stewart & Stewart 1950) and Lapithos-*Vrysi tou Barba* (Gjerstad et al. 1934; Herscher 1978), located at a considerable distance from the mines, may additionally have promoted the development of a more formalized system of intra- and inter-regional alliances, probably based on marriage, which seems to be expressed in

the distributional patterning of ceramic designs and motifs (Frankel 1974). However, there is yet no evidence for the existence of hierarchically integrated settlement systems or of a stratified elite making use of a distinctive complement of prestige symbolism as observed during the Late (or "protohistoric") Bronze Age (Keswani 1989a, 1989b, 1993).

FAUNAL ASSEMBLAGES AND THE "SECONDARY PRODUCTS REVOLUTION" IN CYPRUS

Due to the limited number of settlement excavations undertaken and published to date, patterns of faunal exploitation in the prehistoric Bronze Age are as yet poorly documented. The best evidence comes from the assemblages of late third millennium B.C. "Early Cypriot" Sotira-Kamoudhia (Swinny 1985, 1986a, 1989) and the late Middle Cypriot (eighteenth to seventeenth century B.C.) site of Episkopi-*Phaneromeni* (Carpenter 1981; Swinny 1986b), both of which are dominated by cattle (33 and 31%, respectively) and caprines (36 and 32%), with deer (20 and 11%) and pig (12 and 26%) present but at much reduced levels compared to the Chalcolithic (Swinny 1989:23, Table 2.1). Detailed analyses of the faunal remains from these sites have yet to be published, but Swinny notes with reference to *Kamoudhia* that most of the cattle bones derived from mature animals (sex ratios unspecified), while the caprines were predominantly young females (1989:23). The introduction of cattle early in the prehistoric Bronze Age undoubtedly had important ramifications for subsistence technology and later socioeconomic developments.

Knapp (1990) has suggested that the changing composition of faunal samples from Bronze Age sites in comparison with those of earlier periods should be inter-

preted as another instance of the "Secondary Products Revolution" postulated by Sherratt for third millennium Europe. Certainly cattle were being exploited for their draft capabilities, as evidenced by the unprovenanced "plowing scene" model from *Vounous* and the "plowing" jug from Tomb 37 (Dikaio 1940). The occurrence of spouted containers widely interpreted as "milk bowls" may indicate that cattle were used for milk as well (cf. Swinny 1989:23; Knapp 1990:157), although as Knapp points out, spouted bowls were also present in earlier periods. However, contrary to Knapp (1990:157), the age-sex profile of the caprine remains is not overtly consistent with a focus on milk and wool production (cf. Payne 1973; Sherratt 1981; Greenfield 1988), and the decline of pig and deer may represent changing cultural preferences as well as the effects of progressive deforestation and land clearance. The circumstances surrounding the adoption of the cattle-and-plow complex in Cyprus are as yet poorly understood. It is difficult to argue that cattle were required at the onset of the prehistoric Bronze Age as sources of food and traction because of population increases, inasmuch as population growth apparently accompanied or followed, rather than preceded, their introduction. And while the shift from hoe to plow agriculture may have facilitated the accumulation of surplus by extending the productive capabilities of the individual farmer (Goody 1976:20-25), this attraction might well have been mitigated in part by the high costs of obtaining and feeding draft animals (cf. Halstead 1987:84; Cherry 1988:24) and the exigencies of an agricultural regime which actually requires an increased labor input from men—who might otherwise be occupied with mining, metalworking, and exchanging goods to the enhancement of their wealth and prestige—in comparison to women (cf. Boserup 1970; Goody 1976; Sherratt 1981). Another argument which has been put

forward is that the adoption of extensive agriculture based upon the cattle-and-plow complex was perceived as desirable due to the social contradictions inherent in "lineage society"—i.e. conflicts between junior and senior males (Knapp 1990:158; cf. Thomas 1987 *passim*; Shennan 1986:129-133). Plow agriculture would have permitted the fissioning and dispersal of settlement, leading to the transformation of traditional authority structures. However, this argument is problematic in the Cypriot, as opposed to the European context, since archaeological sites of the prehistoric Bronze Age appear to have clustered in the same regions over extended time periods (Swiny 1989:17). The initial scarcity and high value with which cattle are likely to have been imbued would if anything have increased the dependence of juniors upon elders as providers of the means of agricultural production and social reproduction.

THE RITUAL CONSUMPTION OF ANIMALS IN THE PREHISTORIC BRONZE AGE

Ritual activity in the prehistoric Bronze Age is best attested in mortuary contexts. Extramural cemeteries of rock-cut chamber tombs, often used for multiple burials, reveal both synchronous variability and general diachronic increases in the energy expenditure associated with tomb construction and the material expenditure in ceramic and metal grave goods (Keswani n.d.). The frequent occurrence of secondary treatment (now mainly pertaining to adults) and occasional examples of collective secondary burial (Keswani 1989a:491-499) suggest an unprecedented elaboration of ritual practices and the development of an extended, multi-stage ritual cycle. The consumption of cattle and caprines in the context of mortuary festivities is amply documented by their frequent occurrence in the EC tombs at *Vounous* and the EC-

TABLE 4

Occurrences of Cattle and Caprine Remains in Early-Middle Cypriot Tombs at Bellapais-Vounous and Lapithos-Vrysi tou Barba

	Number of tombs where species were reported ^a	
	Cattle	Caprine
<i>Vounous</i> Site A (ECI)	8 ^b	6 ^c
<i>Vounous</i> Site B (ECII-ECIII)	9 ^d	3 ^e
Lapithos (EC-MC)	7 ^f	5 ^g

^a Given the historical context and methodology of the excavations, actual frequencies may have been higher.

^b See Stewart and Stewart 1950: Tombs 82A, 93, 95, 105, 107, 111, 161, 164A.

^c See Stewart and Stewart 1950: Tombs 87A, 87B, 105, 113, 153, and 164B.

^d See Stewart and Stewart 1950: Tombs 131, 132, 137, 139, 156, 162 and Dikaos 1940: Tombs 8, 13, and 36.

^e See Stewart and Stewart 1950: Tombs 131, 137, and 143.

^f See Grace 1940: Tomb 6A; Herscher 1978: Tombs 806B and 827B; Gjerstad et al. 1934: Tombs 303A and 322E; Gjerstad 1926: Tombs 45 and 201A.

^g See Herscher 1978: Tombs 801, 831, 836B, and 838; Gjerstad et al. 1934: Tomb 312B.

MC tombs at Lapithos-Vrysi tou Barba (summarized in Table 4). Among these examples, Tomb 36 at *Vounous* site B is particularly notable; this tomb was used for nine apparently collective secondary burials accompanied by a rich array of ceramic and metal goods and the larger part of an entire ox skeleton, along with other faunal remains (Dikaos 1940:72-76).

Mortuary contexts have also yielded a number of ceramic models and other artistic "documents" which may represent ritual occasions of non-mortuary character. These include the *Vounous* bowl described earlier, two jugs from *Vounous* with incised renderings of masked dancers (Stewart and Stewart 1950: Tombs 91 and 160A) and two ceramic plaques from Kotchati each depicting a woman standing beside a jar, in front of a building with bull skulls atop the wall supports (Karageorghis

1970). The *Vounous* bowl, the Kotchati plaques, and numerous other ceramic representations of cattle, rams, stags, unidentified quadrupeds, and birds on the "cult vessels" and models are additional indications of the symbolic significance and ceremonial consumption of animals, both domesticated and wild.

Whatever the "secondary" purposes for which domesticated animals were used in the prehistoric Bronze Age, their ritual and social functions are likely to have remained preeminent concerns in structuring practices of animal husbandry. The expansion of regional alliance networks in conjunction with the development of the metals trade may have entailed exchanges of animals as well as of women, copper, and ceramics. The elaboration of mortuary ritual would have created further contexts for the exchange, sacrifice, and consumption of animals. One suspects that in communities which had previously known only small stock such as caprines and pigs, the greater size and physical attributes of cattle would have rendered them highly attractive additions to the local complement of domesticates. It might even be suggested that cattle were initially desired mainly by indigenous Cypriot communities for their prestige value, which was by no means diminished as their draft and milk-producing capacities came to be exploited as well.

CONCLUSION

A small but vocal minority of archaeologists (e.g., Bender 1985; Hayden 1990) have recently asserted that the causes of economic intensification should be sought in the realm of social rather than ecological, demographic, or utilitarian "optimization" considerations. While I would not presume to exclude any of these forms of explanation on an a priori basis, I would hope that some models may be more appropriate than others given the types of

societies to which they are being applied. With respect to practices of animal husbandry, it is clearly important to consider the contexts in which animals are consumed in pre-state, pre-market (or extra-state, extra-market) societies. The ethnographic literature suggests that these contexts are overwhelmingly "ritual" festivals and feasts, sacrifices, gift-giving and exchange partnerships, and social transactions relating to bridewealth, mortuary payments, or other life-cycle events. This observation has important implications for the origins of animal domestication, as Hayden has noted, and for the interpretation of culling patterns in the faunal assemblages of pre-state societies such as those of Neolithic and Bronze Age Europe, currently viewed as the beneficiaries of a "secondary products revolution" (e.g., Sherratt 1981; Greenfield 1988). The application of models relating to optimal harvest "strategies" developed in the context of state-managed economies or market-oriented systems may lead to misleading analyses of faunal data from less developed societies such as these. Until more intensive scrutiny is directed at the sociological context of animal exploitation, the implications of patterns of species occurrence and age-sex profiles will not be properly understood.

It is more difficult to dismiss the importance of ecological and demographic variables within communities at any level of social complexity. Human activities and changes in population size are not only constrained by but also impinge directly upon the environment and its natural resources, with effects that may necessitate changes in subsistence practices. These changes in turn will have further ecological ramifications. However, in most societies the acquisition and maintenance of food resources are motivated not merely by concerns for survival, but by a variety of social and ideological requirements, and these requirements may determine the

specific dimensions of change in subsistence practice. This is especially likely in the case of domesticated animals, which are raised in many agricultural societies not so much with their end use—food—in mind as with their intermediary exchange and sacrificial uses.

In the case of prehistoric Cyprus, the decline of hunting and the intensification of animal husbandry are correlated with at least three episodes of apparent population increase: in the Aceramic Neolithic, the mid-late Chalcolithic, and the prehistoric Bronze Age. However, the linkages between these phenomena may have been more complex than "more people mean fewer deer to eat so raise more pigs and goats (or cattle) instead." In the Chalcolithic there is clear evidence for the intensification of ritual activity which in itself would have been a concomitant of the growth in community size and the need for new modes of social integration and conflict mediation. Rising consumption of animals in social exchanges and ritual "sacrifices" would have favored the intensification of animal husbandry, initially focusing on pigs, presumably because of their adaptation to what is believed to have been a heavily wooded environment. Goats, although less numerous, may have been even more highly valued, and the maintenance of large numbers of mature males, an inefficient practice by utilitarian standards, probably reflects their prestige value, as Croft has astutely suggested. The trend toward culling younger animals (deer and pig) over time is consistent with an increasing frequency of ritual occasions requiring animals for slaughter. Although direct contextual and iconographic links between animal exploitation and Chalcolithic ritual practices are as yet limited, they are abundant in the succeeding prehistoric Bronze Age. The inclusion of cattle and caprine remains in Early and Middle Cypriot tombs and the depiction of these species on ceremonial vessels and ceramic

models suggest that their ceremonial functions and symbolism were more important than ever. Social and ritual requirements, rather than practices overtly concerned with optimizing either primary or secondary product yields, are likely to have determined patterns of animal husbandry and culling practices well into the second millennium B.C.

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REFERENCES CITED

- Adams, R. McC. [editor]
1981 *Heartland of cities*. University of Chicago Press, Chicago.
- Barth, F.
1961 *Nomads of South Persia*. Universitetsforlaget, Oslo.
- Bates, D.
1973 *Nomads and farmers: A study of the York of Southeastern Turkey*. University of Michigan Anthropological Papers 52.
- Bender, B.
1985 "Emergent tribal formations in the American midcontinent." *American Antiquity* 50(1):52-62.
- Bohannan, P., & L. Bohannan
1968 *Tiv economy*. Longmans, London.
- Bolger, D. L.
1992 "The archaeology of fertility and birth: A ritual deposit from Chalcolithic Cyprus." *Journal of Anthropological Research* 48(1):141-164.
- Bonte, P.
1981 "Ecological and economic factors in the termination of pastoral specialization." *Journal of Asian and African Studies* 16(1-2):33-46.
- Boserup, E.
1970 *Women's role in economic development*. London.
- Bradbury, R. E.
1957 *The Benin kingdom and the Edo-speaking peoples of South-Western Nigeria*. Ethnographica.
- Bureau, R.
1981 Radiocarbon dates for Lemba. In *Chalcolithic Cyprus and Western Asia*, edited by J. Reade, British Museum, London.
- Campbell, S.
1989 "A Vakutan mortuary cycle." In *Death rituals and life in the societies of the Kula Ring*, edited by F. H. Damon & R. Wagner, pp. 46-72. Northern Illinois University Press, DeKalb.
- Carpenter, J. R.
1981 Excavations at Phaneromeni, 1975-1978. In *Studies in Cypriote archaeology*, edited by J. C. Biers and D. Soren, pp. 59-58. UCLA Institute of Archaeology Monograph 18.
- Catling, H. W.
1962 Patterns of settlement in Bronze Age Cyprus. *Opuscula Atheniensia* 4:129-169.
- Chang, C., and H. A. Koster
1986 Beyond bones: Toward an archaeology of pastoralism. In *Advances in archaeological method and theory*, volume 9, edited by M. B. Schiffer, pp. 97-148. Academic Press, New York.
- Chapman, J. C.
1982 The "secondary products revolution" and the limitations of the Neolithic. *Bulletin of the Institute of Archaeology, University of London* 19:107-122.
- Cherry, J. F.
1985 Islands out of the stream: Isolation and interaction in early East Mediterranean insular prehistory. In *Prehistoric production and exchange: the Aegean and the Eastern Mediterranean*, edited by A. B. Knapp and T. Steh, pp. 12-29. UCLA Institute of Archaeology Monograph 25.
- 1988 "Pastoralism and the role of animals in the pre- and proto-historic economies of the Aegean." In *Pastoral economies in classical antiquity, supplement 14*, edited by C. R. Whitaker, pp. 6-34. Cambridge Univ. Press, London/New York.
- Croft, P.
1981 The Chalcolithic cemetery of Souskion-Vathylakas. In *Early society in Cyprus*, edited by E. J. Peltenburg, pp. 82-94. Edinburgh University Press, Edinburgh.
- 1985 *Nomads of the nomads. The Al Murrah Bedouin of the empty quarter*. AHM Publishing Corp., Aidington Heights, Ill.
- 1990 Computer simulation of herding systems as
- an interpretive and heuristic device in the study of kill-off strategies. In *Animals and archaeology*, Vol. 3, *Early herders and their flocks*, edited by J. Clutton-Brock & C. Grigson, pp. 161-170. British Archaeological Reports International Series 202.
- 1985 The analysis of ancient herding systems: An application of computer simulation in faunal studies. In *Beyond domestication in prehistoric Europe*, edited by G. Barker & C. Gamble, pp. 75-103. Academic Press, New York.
- 1987 The logic of the herd: A computer simulation of archaeological herd structure. *Journal of Anthropological Archaeology* 6:376-415.
- Man and beast in Chalcolithic Cyprus. *Bulletin of the American Schools of Oriental Research* 282/283:63-79.
- Damon, F. H.
1989 The Myuvu Lo'un and the end of marriage. In *Death rituals and life in the societies of the Kula Ring*, edited by F. H. Damon & R. Wagner, pp. 73-94. Northern Illinois University Press, DeKalb.
- Davis, S. J. M.
1984 Khrokita and its mammal remains. A Neolithic Noah's Ark. In *Fouilles récentes à Khrokita (Chypre)*, 1977-1981, by A. LeBrun, pp. 147-162. Editions recherche sur les civilisations, Paris.
- 1987 La Faune. In *La Néolithique préhistorique de Chypre*, by A. LeBrun et al., pp. 305-309. *L'Anthropologie* 91:283-316.
- Dikaolis, P.
1936 The excavations at Ermi, 1933-1935. Report of the Department of Antiquities of Cyprus, pp. 1-81.
- 1940 The excavations at Vounous-Bellapais in Cyprus, 1931-1932. *Archaeologia* 88. Oxford.
- 1953 Khrokita. Oxford University Press, London.
- 1961 *Sotira*. University of Pennsylvania, Philadelphia.
- DuBoulay, J.
1974 *Portrait of a Greek mountain village*. Clarendon Press, Oxford.
- Ducos, P.
1965 *Le daim à Chypre aux époques préhistoriques*. Report of the Department of Antiquities of Cyprus, pp. 1-8.
- Elliott, C.
1985 The ground stone industry. In *Lemba Archaeological Project I: Excavations at Lemba Lakkiou, 1976-1983*, by E. J. Peltenburg et al. Paul Astöms Forlag, Göteborg.
- Evans-Pritchard, E. E.
1940 *The Nuer. A description of the modes of livelihood and political institutions of a Nilotic people*.

- Oxford University Press, New York and Oxford.
- Flannery, K. V.
1972 The origins of the village as a settlement type in Mesoamerica and the Near East: A comparative study. In *Man, settlement, and urbanism*, edited by P. J. Ucko, R. Tringham, and G. W. Dimbleby, pp. 23-53. Duckworth, London.
- Forman, S.
1980 Descent, alliance, and exchange ideology among the Makassae of East Timor. In *The flow of life: Essays on Eastern Indonesia*, edited by J. J. Fox, pp. 152-177. Harvard University Press, Cambridge, MA.
- Frankel, D.
1974 *Middle Cypriot White Painted pottery. An analytical study of the decoration*. Studies in Mediterranean Archaeology 42. Paul Åströms Forlag, Göteborg.
- Gale, N. H.
1991 Metals and metallurgy in the Chalcolithic period. *Bulletin of the American Schools of Oriental Research* 282/283:37-61.
- Galvin, K. F.
1987 "Forms of finance and forms of production: The evolution of specialized livestock production in the ancient Near East." In *Specialization, exchange, and complex societies*, edited by E. M. Brumfiel & T. K. Earle, pp. 119-129. Cambridge University Press, Cambridge.
- Gjerstad, E.
1926 *Studies on prehistoric Cyprus*. Uppsala Universitets Årsskrift, Stockholm.
- Gjerstad, E., J. Lindros, E. Sjöqvist, and A. Westholm
1934 *The Swedish Cyprus Expedition. Finds and results of the excavations in Cyprus 1927-1931*. Vol. I. Victor Petterssons Bokindustriaktiebolag, Stockholm.
- Goody, J.
1976 *Production and reproduction. A comparative study of the domestic domain*. Cambridge University Press, Cambridge.
- Goring, E.
1991 Pottery figurines: The development of coroplast art in Chalcolithic Cyprus. *Bulletin of the American Schools of Oriental Research* 282/283:153-162.
- Grace, V. R.
1940 A Cypriote tomb and Minoan evidence for its date. *American Journal of Archaeology* 44:10-52.
- Greenfield, H. J.
1988 The origins of milk and wool production in the Old World: A zooarchaeological perspective from the Central Balkans. *Current Anthropology* 29:573-593.
- Halstead, P.
1981 Counting sheep in Neolithic and Bronze Age Greece. In *Pattern of the past: Studies in honour of David Clarke*, edited by I. Hodder, G. Isaac, and N. Hammond, pp. 307-339. Cambridge University Press, Cambridge.
- 1987 Traditional and ancient rural economy in Mediterranean Europe: Plus ça change? *Journal of Hellenic Studies* 107:77-87.
- Halstead, P., and J. O'Shea
1982 A friend in need is a friend indeed. In *Ranking, resource and exchange*, edited by C. Renfrew & S. Shennan, pp. 92-99. Cambridge University Press, Cambridge.
- Hansen, J.
1991 Palaeoethnobotany in Cyprus: Recent research. In *New light on early farming. Recent developments in palaeoethnobotany*, edited by J. M. Renfrew, pp. 225-236. Edinburgh University Press, Edinburgh.
- Hayden, B.
1990 Nimrods, piscators, pluckers and planters: The emergence of food production. *Journal of Anthropological Archaeology* 9:31-69.
- Held, S. O.
1993 Backwater blues: Einstein's islands and the disharmony of interaction spheres. *Bulletin of the American Schools of Oriental Research* 292:25-33.
- Herscher, E.
1978 *The Bronze Age cemetery at Lapithos, Vrysi tou Barba, Cyprus. Results of the University of Pennsylvania Museum Excavation, 1931*. Ph.D. Dissertation, University of Pennsylvania. University Microfilms, Ann Arbor.
- Karageorghis, V.
1970 *Two religious documents of the Early Cypriote Bronze Age*. Report of the Department of Antiquities of Cyprus, 1970, pp. 10-13.
- 1982 *Cyprus. From the Stone Age to the Roman*. Thames and Hudson, London.
- Keswani, P. S.
1989a *Mortuary ritual and social hierarchy in Bronze Age Cyprus*. Ph.D. dissertation, Department of Anthropology, University of Michigan.
- 1989b Dimensions of social hierarchy in Late Bronze Age Cyprus: An analysis of the mortuary data from Enkomi. *Journal of Mediterranean Archaeology* 2(1):49-86.
- 1993 Models of local exchange in Late Bronze Age Cyprus. *Bulletin of the American Schools of Oriental Research* 292:73-83.
- n.d. *Mortuary ritual and society in Bronze Age Cyprus*. Unpublished manuscript.
- Knapp, A. B.
1986 Production, exchange, and socio-political complexity on Bronze Age Cyprus. *Oxford Journal of Archaeology* 5:35-60.
- 1990 Production, location, and integration in Bronze Age Cyprus. *Current Anthropology* 31(2):147-176.
- LeBrun, A.
1984 *Fouilles récentes à Khirókittia (Chypre), 1977-1981*. Editions recherche sur les civilisations, Paris.
- 1986 Khirókittia: Une civilisation originale? In *Acts of the International Archaeological Symposium, Cyprus between the Orient and the Occident*, edited by V. Karageorghis, pp. 1-11. Department of Antiquities, Nicosia.
- 1988 *La stratigraphie de Khirókittia et les nouvelles dates 14C*. Report of the Department of Antiquities of Cyprus, 1988, part I, pp. 25-88.
- 1989a *Fouilles récentes à Khirókittia (Chypre), 1983-1986*. Editions recherche sur les civilisations, Paris.
- 1989b "Le traitement des morts et les représentations des vivants à Khirókittia." In *Early society in Cyprus*, edited by E. J. Peltenburg, pp. 71-81. Edinburgh University Press, Edinburgh.
- Lees, S. H., and D. G. Bates
1974 The origins of specialized nomadic pastoralism: A systemic model. *American Antiquity* 39:187-193.
- Lefebvre, C.
1979 Introduction: the specificity of nomadic pastoral societies. In *Pastoral production and society*, pp. 1-14. Cambridge University Press, Cambridge.
- Legge, A. J.
1982 The vertebrate fauna. In *Vrysi. A subterranean settlement in Cyprus*, by E. J. Peltenburg, pp. 76-87, 401-414. Warminster: Aris & Phillips Ltd.
- Lehavy, Y. M.
1974 Excavations at Neolithic Dhali-Agriditi, Part I: Excavation report. In *American Expedition to Idalion, Cyprus, first preliminary report: Seasons 1971 to 1972*, edited by E. L. Stager, A. Walker, & G. E. Wright, pp. 95-102. American Schools of Oriental Research, Cambridge, MA.
- Lepowsky, M.
1989 Death and exchange. Mortuary ritual on Vatinai (Sudest Island). In *Death rituals and life in the societies of the Kula Ring*, edited by F. H. Damon and R. Wagner, pp. 199-229. Northern Illinois University Press, DeKalb.
- Livshait, J. G.
1991 Plain tails from the hills: Transhumance in Mediterranean archaeology. In *Economic archaeology: Towards an integration of ecological and social approaches*, edited by A. Sheridan & C. Bailey, pp. 57-66. British Archaeological Reports International Series 96.
- Lunt, D.
1985 Report on the human dentitions and Discussion of the human dentitions. In *Lemba Archaeological Project I: Excavations at Lemba Lakous, 1976-1983*, by E. J. Peltenburg et al., pp. 54-58, 150-153, 245-249. Paul Åströms Forlag, Göteborg.
- Macintyre, M.
1989 The triumph of the *susu*. Mortuary exchanges on Tubetube. In *Death rituals and life in the societies of the Kula Ring*, edited by F. H. Damon & R. Wagner, pp. 133-152. Northern Illinois University Press, DeKalb.
- Malinowski, B.
1972 *Argonauts of the Western Pacific*. Waveland Press, Prospect Heights, IL. [1984].
- Manning, S. W.
1991 Approximate calendar date for the first human settlement of Cyprus? *Antiquity* 65: 870-878.
- Marshall, F.
1990 Origins of specialized pastoral production in East Africa. *American Anthropologist* 92(4): 873-894.
- Meggitt, M.
1977 *Blood is their argument. Warfare among the Mae Enga tribesmen of the New Guinea Highlands*. Mayfield Publishing Company, Palo Alto.
- Merrillees, R. S.
1984 "Ambeikou-Aletri: A preliminary report." *Report of the Department of Antiquities of Cyprus*, 1984, pp. 1-13.
- Morris, D.
1985 *The art of ancient Cyprus*. Phaidon Press, Oxford.
- Muhly, J. D.
1989 "The organisation of the copper industry in Late Bronze Age Cyprus." In *Early society in Cyprus*, edited by E. J. Peltenburg, pp. 298-314. Edinburgh University Press, Edinburgh.
- Murdock, G. P.
1949 *Social structure*. The Free Press, New York.
- Murra, J.
1965 Herders and herds in the Inca state. In *Man, culture, and animals: The role of animals in human ecological adjustments*, edited by A. Leeds & A. Vayda, pp. 185-215. American Association for the Advancement of Science, No. 78. Washington, DC.
- Niklasson, K.
1985 The graves and burial customs. In *Lemba Archaeological Project I: Excavations at Lemba Lakous, 1976-1983*, by E. J. Peltenburg et al., pp. 43-53, 134-149, 241-245. Paul Åströms Forlag, Göteborg.
- 1991 *Early prehistoric burials in Cyprus*. Studies in Mediterranean Archaeology 96. Paul Åströms Forlag, Jönköping.

- Payne, S.
1973 "Kill-off patterns in sheep and goats: The mandibles from Asvan Kale." *Anatolian Studies* 23:281-303.
- Peltenburg, E. J.
1978 "The Sotira Culture: Regional diversity and cultural unity in Late Neolithic Cyprus." *Levant* 10:55-74.
1981 "Some implications of recent Lemba Project radiocarbon dates for the later prehistory of Cyprus." In *Chalcolithic Cyprus and Western Asia*, edited by J. Reade, pp. 23-40. *British Museum Occasional Paper* No. 26. British Museum, London.
1982a *Vrysi. A subterranean settlement in Cyprus*. Aris & Phillips Ltd., Warminster.
1982b *Recent developments in the later prehistory of Cyprus*. Studies in Mediterranean Archaeology Pocketbooks. Paul Åströms Förlag, Göteborg.
1982c "Early copperwork in Cyprus and the exploitation of picrolite: Evidence from the Lemba Archaeological Project." In *Acta of the International Archaeological Symposium: Early metallurgy in Cyprus, 4000-500 B.C.*, edited by J. D. Muhly, R. Maddin, and V. Karageorghis, pp. 41-62. Perides Foundation, Nicosia.
1989 "The beginnings of religion in Cyprus." In *Early society in Cyprus*, edited by E. J. Peltenburg, pp. 108-126. Edinburgh University Press, Edinburgh.
- 1991a Toward definition of the Late Chalcolithic in Cyprus: The monochrome pottery debate. In *Cypriot ceramics: Reading the prehistoric record*, edited by J. A. Bartlow, D. L. Bolger and B. Kling, editors, pp. 9-20. The University Museum of Archaeology and Anthropology, University of Pennsylvania, Philadelphia.
1991b Kissonerga-Mosphilia: A major Chalcolithic site in Cyprus. *Bulletin of the American Schools of Oriental Research* 282:283-35.
1991c Local exchange in prehistoric Cyprus: An initial assessment of picrolite. *Bulletin of the American Schools of Oriental Research* 282/283:107-126.
1992 "Birth pendants in life and death: Evidence from Kissonerga Grave 563." In *Kypraki Spoudai, Studies in honour of Vassos Karageorghis*, pp. 27-36. Leventis Foundation, Nicosia.
1993 "Settlement discontinuity and resistance to complexity." *Bulletin of the American Schools of Oriental Research* 292:9-23.
- Peltenburg, E. J. et al.
1983 "The prehistory of West Cyprus: Ktima Lowlands investigations." *Report of the Department of Antiquities of Cyprus*, 1983:9-55.
- 1985 *Lemba Archaeological Project I: Excavations at Lemba Lakkous, 1976-1983*. Paul Åströms Förlag, Göteborg.
1988 *Ritual deposit, Unit 1015*. Report of the Department of Antiquities of Cyprus, 1988, part I, pp. 43-52.
1989 *Excavations at Kissonerga-Mosphilia, 1983*. Report of the Department of Antiquities of Cyprus, 1989, pp. 29-40.
- Rappaport, R. A.
1968 *Pigs for the ancestors. Ritual in the ecology of a New Guinea people*. Yale University Press, New Haven & London.
Redding, R.
1984 Theoretical determinants of a herder's decisions modeling variation in the sheep/goat ratio. In *Animals and archaeology, Vol. 3. Early herders and their flocks*, edited by J. Clutton-Brock & C. Grigson, pp. 223-242. *British Archaeological Reports International Series* 202. Batsford, London.
Sadr, K.
1991 *The development of nomadism in ancient Northeast Africa*. University of Pennsylvania Press, Philadelphia.
Shennan, S. J.
1986 Central Europe in the third millennium B.C.: An evolutionary trajectory for the beginning of the European Bronze Age. *Journal of Anthropological Archaeology* 5:115-146.
Sherratt, A. G.
1979 "Early agricultural communities in Europe." In *The Cambridge encyclopedia of archaeology*, edited by A. G. Sherratt, pp. 14-151. Cambridge University Press, Cambridge.
1981 "Plough and pastoralism: Aspects of the Secondary Products Revolution." In *Patterns of the past: Studies in honour of David Clarke*, edited by I. Hodder, G. Isaac, and N. Hammond, pp. 261-305. Cambridge University Press, Cambridge.
1983 "The secondary exploitation of animals in the Old World." *World Archaeology* 15:99-104.
Shimada, M., and I. Shimada
1985 Prehistoric llama breeding and herding in the North Coast of Peru. *American Anthropologist* 50(1):3-26.
Simmons, A. H.
1988 Test excavations at Akrotiri-Aetokremnos (Site E). An early prehistoric occupation in the Department of Antiquities of Cyprus, 1988, part I, pp. 15-24.
1989 Preliminary report on the 1988 test excavations at Akrotiri-Aetokremnos. Report of the Department of Antiquities of Cyprus, 1989, pp. 1-5.
- 1991 Humans, island colonization and Pleistocene extinctions in the Mediterranean: The view from Akrotiri-Aetokremnos, Cyprus. *Antiquity* 65:857-869.
- Smith, A. B.
1986 Review article: Cattle domestication in North Africa. *African Archaeological Review* 4:197-203.
1992 Origins and spread of pastoralism in Africa. *Annual Review of Anthropology* 21:125-141.
- Stanley-Price, N. P.
1979 The structure of settlement at Sotira in Cyprus. *Levant* 11:46-83.
Stewart, E., and J. R. Stewart
1950 *Vinous 1937-1938. Field report on the excavations sponsored by the British School of Archaeology at Athens*. Svenska Institutet i Rom Skriftserien XIV, Gleerup, Lund.
Stathern, A.
1971 *The rope of moka. Big-men and ceremonial exchange in Mount Hagen, New Guinea*. Cambridge University Press, Cambridge.
Smith, J.
1986 The economics of production and exchange in West African pastoral societies. In *Pastoralism of the West African savanna*, edited by M. Adamu & A. H. M. Kirk-Greene, pp. 175-190. Manchester University Press, Manchester.
Stump, S.
1982 Correlations between the composition and function of Bronze Age metal types in Cyprus. In *Acta of the International Archaeological Symposium: Early metallurgy in Cyprus, 4000-500 B.C.*, edited by J. D. Muhly, R. Maddin, and V. Karageorghis, pp. 69-80. Perides Foundation, Nicosia.
1985 Sotira-Kaminioudhia and the Chalcolithic/Early Bronze Age transition in Cyprus. In *Archaeology in Cyprus 1960-1985*, edited by V. Karageorghis, pp. 115-124. Department of Antiquities, Nicosia.
1986 "The Phila Culture and its foreign relations." In *Acts of the International Archaeological Symposium, "Cyprus between the Orient and the Occident"*, edited by V. Karageorghis, pp. 29-44. Department of Antiquities, Nicosia.
1987 *The Kent State University Expedition to Eyskopi-Plataneromni, Part 2. Studies in Mediterranean Archaeology* 74. Paul Åströms Förlag, Göteborg.
- 1988 *Excavations at Akrotiri-Aetokremnos (Site E). An early prehistoric occupation in the Department of Antiquities of Cyprus, 1988*, part I, pp. 15-24.
- 1989 Preliminary report on the 1988 test excavations at Akrotiri-Aetokremnos. Report of the Department of Antiquities of Cyprus, 1989, pp. 1-5.
- 1991 Humans, island colonization and Pleistocene extinctions in the Mediterranean: The view from Akrotiri-Aetokremnos, Cyprus. *Antiquity* 65:857-869.
- Thomas, J.
1987 Relations of production and social change in the Neolithic of North-west Europe. *Man* 22:405-430.
Todd, I. A.
1987 *Vasilikos Valley Project 6: Excavations at Kalavassos-Tenta I. Studies in Mediterranean Archaeology* 71:6. Paul Åströms Förlag, Göteborg.
1989 "Early prehistoric society: A view from the Vasilikos Valley." In *Early society in Cyprus*, edited by E. J. Peltenburg, pp. 2-13. Edinburgh University Press, Edinburgh.
1991 "The Vasilikos Valley and the Chalcolithic period in Cyprus." *Bulletin of the American Schools of Oriental Research* 282:283-315.
- Tournazou, M. K.
1987 *Aspects of burial practices in early prehistoric sites, c. 7000-2500/2300 B.C.* Ph.D. dissertation, Bryn Mawr College. University Microfilms, Ann Arbor.
Traube, E. G.
1980 "Affines and the dead: Mambai rituals of alliance." *Bidraggen tot de Taal-Land-en Volkenkunde* 136:90-115.
Volkman, T. A.
1985 *Feasts of honor. Ritual and change in the Toraja Highlands*. Illinois Studies in Anthropology, No. 16. University of Illinois Press, Urbana and Chicago.
Watson, J. P. N. & N. P. Stanley-Price
1977 "The vertebrate fauna from the 1972 sounding at Khrokia." *Report of the Department of Antiquities of Cyprus*, 1977:232-260.
Young, M. W.
1989 "Eating the dead." Mortuary transactions in Bwaldoka, Goodenough Island." In *Death rituals and life in the societies of the Kula Ring*, edited by F. H. Damon & R. Wagner, pp. 179-198. Northern Illinois University Press, DeKalb.
Zeder, M. A.
1991 *Feeding cities: Specialized animal economy in the ancient Near East*. Smithsonian Institution Press, Washington, DC.