ANIMAL HUSBANDRY, NOMADIC BREEDING, AND DOMESTICATION OF ANIMALS

Andrew B. Smith
Department of Archaeology, University of Cape Town, South Africa

Keywords: Origins of domestic animals, traditional pastoralism, transhumance, communal grazing, future of pastoralism, brideprice, tragedy of the commons, Pleistocene, biomass, forage, water, sedentarization, ecological niches, gazelles, ovicaprids, Mesolithic, ranching, ritual, animal disease

Contents

Summary

Domestication of animals was a major step humans took toward food production. This shift resulted in significant and enduring social changes, based on the responsibility of people for animals, and on the potential for social inequalities through ownership. The earliest domesticated animals (goats and sheep) first appeared in the Near East about 10 000 years ago, at the end of the Pleistocene, but were followed independently in Mesoamerica, the Indian subcontinent, and, some would argue, Africa. The potential range of animals for domestication was huge, and experimentation with controls over many animals occurred, but only a selected few were chosen.

By taking on the responsibility for animals, hunters had to make radical changes to their way of life. The close proximity of people to their stock might even be seen as a domestication of people. No longer could people be as free to hunt and gather when they needed to, because the animals increasingly had to be taken to pasture and water. The animals were such valuable assets for exchange and ritual purposes that they needed protection against both human and nonhuman predators.

In the twenty-first century, traditional pastoral people occupy the open grassland plains and shrub steppes where rainfall is too low or irregular for grain agriculture. Such semi-arid environments require a mobile transhumant lifestyle, with the pastoralists taking their animals to grazing and water. The herders know empirically how to maintain their animals against epizootic diseases endemic to their area. They usually stress quantity, rather than quality, because their wealth and prestige are tied to the number of animals, which can be distributed among a number of dependents to spread risk and political power, or for bridewealth payments.

While there has never been an “empty land” with hunter/gatherers, pastoralists, and agriculturalists successively using the spaces and exploitation areas, pastoral people are more and more under pressure from expanding population growth, and there is less room to practice transhumant strategies.

At the beginning of the twenty-first century, pressures on land are affecting the grazing space of pastoral people, with rich and politically “connected” people dominating the pastoral economy and markets. In addition, many of the people of Africa and Central

Asia have been subjected to nasty conflicts where large numbers of automatic weapons disrupted their lives. These have compounded life in the somewhat precarious rangeland environments where droughts and subsequent famines have resulted in huge animal losses. Even so, transhumant pastoralism still remains the most efficient and sustainable use of these event-driven rainfall areas, and even though some "modern" descendents of pastoralist families may look down on their parents' way of life, the majority cling to the lifestyle as both rewarding and fruitful in psychosocial and economic terms.

1. Introduction to Animal Husbandry

1.5. What is Animal Husbandry? Why Domesticate?

The word husband derives from the Old English meaning of "husbond," a substantial farmer in the northern part of feudal England who lived in a house (in contrast to cotters who lived in cottages), and who was bonded to do work for the Lord of the manor. According to the Oxford English Dictionary, "husbandry" is the "business or occupation of a husbandman or farmer; tillage or cultivation of the soil (including also the rearing of livestock)." This article will be concerned with traditional livestock rearing, and how this fits into the economic and social life of subsistence farmers and pastoralists in various parts of the world.

A person who rears livestock would be different from someone who hunted wild animals. Herders have their stock immediately to hand, but need to look after them. Hunters, by contrast, allow the wild game to take care of themselves. At one level this difference lies in access to meat and animal products, but at a more basic level the contrast is social, with animals being used in quite different ways, such as to cement social relationships, or for ceremonial needs.

Recognizing this difference leads to the question: why domesticate animals? To answer the question, a number of factors will be considered, such as when and where domestication occurred, and the social and economic ramifications of the responsibility for keeping stock (see *Historical Origins of Agriculture*).

1.6. Nomadic Pastoralism

When one thinks of pastoral societies one usually has the impression of people on the move with their domestic stock. In many parts of the world grassland adaptation permits high biomass of large ungulates, such as the Serengeti plains of northern Tanzania, which are used by people with stock. The adaptive strategy requires residential mobility, because grazing animals will eat up the grass within an area and will need to move on. With livestock herding, such a pattern of movement is called *transhumance* and often requires whole family groups to move to new camps on a regular basis. Usually, however, this is not a random movement, but part of a yearly cycle where herders will use seasonal pastures and jealously guard their territories. The greater the pressure from animal and human population density, the more rigid the group boundaries become, unless there is an agreement between groups to allow access to forage. Such negotiation is crucial where droughts are common, or highly localized rainfall is the norm. Thus, where rains may fall in different places in different years, pasture areas become

common property, and rights to pasture seldom prohibit access when the necessary protocol is followed.

Other pasture systems may follow a serial use of the land, with one group moving in and out of a region, to be followed by another. This way tensions around access to pasture can be avoided.

Access to pasture is not the only resource that has to be negotiated. Water is another crucial factor in the adaptive strategy equation. After the rains, water can be widely available in surface pools or pans, but during the dry season families with animals are often forced to rely on permanent water sources, such as wells or riverbeds. Deep wells need to be maintained, and the person(s) who keeps the well open would be considered the "owner." In Mali, lower-status Tuareg men do this heavy work and own pulleys used to draw water. Anyone else has to pay to use the pulleys.

Within the strategy of nomadic pastoralism, the dry season is the make or break time of year, and this will be conditioned by the distance the herds have to travel between pasture and water. As the dry season progresses, the radius around a water hole from where pasture might be obtained increases to a point that the animals may become too weak to make the journey.

1.7. Sedentary Stockowners

Not all stockowners need to be transhumant. Animal holdings among farmers can be considerable, with their wealth tied up in cattle. Animal husbandry among such groups might entail the bulk of the herd being taken away from the homestead where fields are to be found for considerable periods of time, with the young men herding them staying in cattle camps. Alternatively, the animals can be given to other people to be looked after. The *mafisa* system of the Tswana is one such example, where Basarwa (Bushmen) herders will take care of the herds in turn for the milk and a small part of the reproductive output of the herd.

There are even examples of nomadic pastoralists whose grassland environment is so rich that they can stay in one place for long periods of time. The rich volcanic soils of the Serengeti allow some Maasai herders only to have to move their homesteads when dung and tick levels get too high.

1.8. Domestication of People

By taking on the responsibility for animals, hunters had to make radical changes to their way of life. The close proximity of people to their stock might even be seen as domestication of people. No longer could people be as free to hunt and gather when needed, because the animals increasingly had to be taken to pasture and water. The animals were such valuable assets for exchange and ritual purposes that they needed protection against both human and nonhuman predators.

While a number of stock-holding groups managed to create the social mechanisms for leveling, so that no individual or family had greater numbers of animals than another, the more common pattern was realization of the potential for separation between rich

owners and those with little or no stock. These wealth differentials could be translated into control of surplus, which, in turn, could be redistributed to give status to the rich.

While there are obvious advantages to hunters taking meat and other products from wild herds that can take care of themselves, the disadvantages are the time needed to procure the resource, and the periods when the prey species might be rare and difficult to find. By taking on responsibility for the herds, people had more immediate access to the animals for meat, and later milk.

2. Trends Toward Domestication of Animals

2.6. Hunters becoming Herders

Why people bothered with domestic animals probably had to do with a number of converging factors. As most of the dominant domestic animals used in farming today were domesticated in the Near East, it is in Eurasia that evidence for significant trends toward domestication is to be found.

At the end of the Pleistocene, some 12 000 years ago, conditions in Europe changed markedly with the retreat of the glaciers that had covered the northern latitudes. New ecological niches were opened up that offered resource potentials that had ramifications over a wide area (see *Forests and Grasslands as Cradles for Agriculture*). New aquatic environments were exploited, which led to the phrase "broad spectrum revolution" being coined. The basic condition was the adoption of smaller food "packages," not only of aquatic animals (fish, mammals, shellfish, and so on), but also plant foods. This is where there is a quantum leap in the harvesting of wild grains, which had to go hand in hand with the technology to roast and prepare cereals for human consumption (see *History of Agriculture* and *Ethnographic Aspects of Human Nutrition*). Grain consumption, and gradual control over wild stands, meant greater human population growth, to the extent that pressure on other resources, such as meat, meant looking for new ways of access. Heavy predation on herds of gazelle in the Near East may have resulted in diminishing returns. On the Mesopotamian Plain, the use of traps, called "desert kites," probably pushed gazelle populations close to the edge of extinction. For example, the site of Abu Hureyra has shown a faunal shift from 80% gazelles and 10% goats/sheep in the earlier period (11 000 years ago to 8500 years ago), to 80% ovicaprids and 10% gazelles by 8000 years ago. The ovicaprids were by this time domesticates, and, along with an increasingly sedentary lifestyle around grain agriculture, are indications of considerable economic and social shifts having taken place in this part of Syria and throughout much of the Near East.

2.7. Changes in Social and Economic Conditions

As mentioned above, once people began to control animals and selectively breed them, they took on responsibility for assets that ultimately depended upon human intervention for survival and even reproduction. Close proximity to the stock meant learning about health needs of the animals. Because a number of diseases can be transmitted from wild animals to domestic stock, such as bovine pleuro-pneumonia, anthrax, and so on, some

herders stopped eating wild game, or they were cautious at least about keeping wild game products away from their herds.

Herd structure would have to contain at least 100 animals of all ages to allow for successful herd growth, while permitting regular off-take (both of meat and milk/blood), and to give some leeway against natural disasters. Having these many animals, or greater, would tie a herding family down, with the limiting factor becoming labor to take care of the needs of the herd, such as watering. This results in larger social groupings of herders than of hunters. An important social phenomenon among humans is that as the group size becomes larger than 10 individuals to 14 individuals, stresses will appear over time. If the group wishes to stay together, this will require mediation to resolve the disputes.

Individuals who perform mediating tasks are usually respected elders who are leaders or chiefs. Among nomadic hunting populations, leadership is not usually formalized and dispute is often settled by fission, with the antagonists moving away. The larger size of herding groups makes this more difficult, so leadership develops. This need not be fixed leadership, in a hereditary sense, or power passed on from a chief to his son, but the potential for control, both of wealth and labor, is nonetheless there and could be manipulated by a powerful personality. There are egalitarian herding societies, such as the Nuer of the Sudan, who are conscious of individual power and have institutional mechanisms against it. Even though they are considered acephalous, they were capable of effectively uniting against a common enemy, as the British forces found out to their peril in the 1920s.

2.8. Choice of Domestic Animals

The potential range of animals for domestication was huge, and experimentation with controls over many occurred, but only a selected few were chosen. Why? There were probably several reasons. At the biological level, certain ungulate species were probably too difficult to control. In particular, various species of gazelles and *Ammotragus lervia* (Barbary sheep), which were heavily exploited by hunters, all have archaeological evidence of some attempts at control. As far as gazelles are concerned, their annual rutting pattern, where a male collects a harem of females and fights off intruders, may have made them difficult to breed under controlled conditions without some form of fencing. By contrast, work among other herd animals, such as wild buffalo, suggests that using the herd behavior to human advantage where people are not seen as a threat to the herd, could have allowed manipulation and control to take place.

Cattle and fat-tailed Eurasian sheep may have been a conscious choice by hunters whose usual prey tends to produce lean meat. The fat of cattle would have been highly prized. Among the Bushmen of southern Africa, fat, human sweat from trance healers, and honey all have spiritual potency, and to eat eland fat has a sexual connotation.

Another aspect of choices made may also have been the use of certain animals in ritual by hunters, and later by herders. The bull motif is a strong one in early Neolithic societies of Mesopotamia and Egypt, and cattle burials have been found in the Western Desert of Egypt dating to more than 7000 years ago.

2.9. Archaeological Evidence of Early Domestication of Animals

By far the greatest effort to find origins of domestic animals has been concentrated in the Near East (see *Historical Origins of Agriculture*). In spite of many years of work, however, there are still questions to be answered. These have mostly to do with the mechanisms of change, mainly because it is difficult to see the transitions from hunting to food production in the archaeological record. Two areas have shown the most promise for understanding the changes that took place: the Zagros and the Levant.

2.9.1. Zagros Mountains of Iran

Intensive work on the edge of the foothills of eastern Iran has yielded important evidence of the transition to food production and the ecological adaptation of early herding societies there. At Ali Kosh on the Deh Luran Plain, a 7 m deep, stratigraphic sequence covering 2000 years was found in an area where domesticates could survive but not flourish without human intervention. In the earliest phase (dated between 9500 years ago and 8700 years ago), already crude rectangular houses of mud brick were being used. Most of the plant foods were natural to the area, but two grains (barley and emmer wheat) were exotics.

The animal remains included goats, sheep, and gazelle. The Deh Luran Plain would not have been the natural habitat for mountain species, such as goats, so it is reasonably certain that these were domesticates. About 40 sites are known from this area at different altitudes. There are good indications that the people were moving up into the hills in summer to avoid the stifling heat, and going down onto the plains in winter, a seasonal transhumance.

Of interest is the history of the shift from hairy to woolly sheep. The natural habitat of wild hairy sheep would have been the rolling foothills. Selection for wool-bearing sheep by about 9000 years ago meant problems for these animals, as one of the grasses, *Stipa*, will screw into the pelt causing serious infections in woolly animals. A new ecological niche on the Mesopotamian Plain opened up about 8000 years ago, which allowed a new *Stipa*-free habitat for the woolly animals and the industry of weaving.

2.9.2. The Coastal Area of the Levant and Interior

Early work at such sites as Jericho (Palestine), Beidha and El Mallaha (Jordan), and later, Abu Hureyra (Syria) have offered a reasonable picture of a society known as the Natufian who lived 10 000 years ago. This cultural group was first recognized by Dorothy Garrod at the type-site of Wadi Natuf (Israel), who thought she was dealing with a Mesolithic industry adapted to fishing. Subsequent work showed that the early inhabitants of these sites relied more heavily on grain exploitation, and analyses showed these to be wild food grains. Significantly, the combination of fish and wild grain foods encouraged people to become sedentary. Other animal proteins came from the hunting of gazelles, goats, and sheep. In the later development at the sites during pre-pottery Neolithic "A" times, about 8000 years ago, the grains can be identified as domestic, and there is an increasing reliance on ovicaprids, leading to their control and domestication.

-
-
-

Bibliography

Barth F. (1961). *Nomads of South Persia: the Basseri Tribe of the Khamseh Confederacy*. Boston: Little, Brown. [A classic anthropological study of Iranian nomads which can be used as a general model for many pastoral people of the mountains of the Near East.]

Clutton-Brock J. (1989). *The Walking Larder: Patterns of Domestication, Pastoralism and Predation*. London: Unwin Hyman. [A collection of papers presented at the First World Archaeological Congress in Southampton in 1987. The three sections of the book are: processes of animal domestication, studies of pastoral people, and human foragers of animals.]

Davis S.J.M. (1987). *The Archaeology of Animals*. London: Batsford. [A concise introduction to archaeozoology with several chapters on the domestication of animals.]

Equipe Ecologie et Anthropologie des Sociétés Pastorales (1979). *Pastoral Production and Society*. Cambridge, UK: Cambridge University Press. [Papers presented at an international colloquium on nomadic pastoralism in 1976, dealing with various aspects of pastoralism, such as pastoral models, environmental constraints, access to resources, social organization, and power, external forces, and trade.]

Fratkin E., Galvin K.A. and Roth E.A. (1994). *African Pastoralist Systems: An Integrated Approach*. London: Lynne Rienner. [Studies of various aspects of African pastoralism, ranging from the archaeology of East African pastoralism, mobility, and land use, through diet and nutrition, decisionmaking, land tenure, and so on.]

Galaty J.G. and Johnson D.L. (1990). *The World of Pastoralism: Herding Systems in Comparative Perspective*. London: Belhaven Press. [A collection of ethnographic studies of herding societies divided into ecological zones: 1) plains pastoralism; 2) pastoralism of desert and tundra; 3) mountain pastoralism.]

Mellaart J. (1975). *The Neolithic of the Near East*. London: Thames and Hudson. [A somewhat dated review of the development of neolithic societies in the Near East. Useful book on the archaeology of the period.]

Smith A.B. (1992). *Pastoralism in Africa: Origins and Development Ecology*. London: Hurst. [Encyclopedic review of pastoral origins in Africa, and interpretation of archaeological evidence through the study of adaptive strategies of modern pastoralists. Deals with the development of modern African pastoralism, its ecological adaptation, and its future.]

Spencer P. (1997). *The Pastoral Continuum: Marginalization of Tradition in East Africa*. Oxford, UK: Oxford University Press. [A detailed anthropological review of social and economic changes that have affected East African pastoralists during the colonial and post-colonial periods.]

Biographical Sketch

Andrew B. Smith, Ph.D., is Associate Professor and Acting Head, Department of Archaeology, University of Cape Town. He received his Ph.D. from the University of California, Berkeley, in 1974 with a thesis on the origins of pastoral societies in the Saharan and Sahel Zones of West Africa. He did ethnoarchaeological work among Tuareg camel herders, and taught at the University of Ghana, Legon, 1973–1975. He was Adjunct Professor at Portland State University, Oregon, US, in 1976, and moved to

Cape Town in 1977 where work began on the history of the Khoekhoen and the origins of pastoralism in Southern Africa. Subsequent research has led to ethnohistorical work among the Ju/'hoansi Bushmen of Namibia for clues to the process hunters go through in becoming food producers. Dr. Smith is author of 60 research papers, 38 chapters in books, and 5 books, including *Pastoralism in Africa* (London: Hurst). Projects include monographs on Saharan and South African research, and putting the Robert Jacob Gordon eighteenth century atlas (housed in the Rijksmuseum, Amsterdam) on the Internet.