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# "DOMESTICATION" OF HYRAX *(PROCAVIA CAPENSIS)*, IN YEMEN

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ABSTRACT.—A case of attempted small mammal "domestication" is described based on ethnographic data from the Yemen Arab Republic (Fig. 1). Households of low economic status sought to supplement their cash incomes by taming a previously hunted species, the hyrax, *Procavia capensis jayakari*. The experiments have largely ended in failure due to factors including the animal's biology and a poor management strategy. This episode is placed in the context of animal-impact and human-impact models of domestication.

RESUMEN.—En base a datos etnográficos de la Republica Arabe Yemenita, se describe un caso de intento de "domesticación" de un mamifero pequeño. Unidades domésticas de condición económica baja trataron de suplementar sus ingresos monetarios amansando una especie que anteriormente era cazada, el hirax, *Procavia capensis jayakari*. Los experimentos en gran parte han terminado en el fracaso debido a factores que incluyen la biología del animal y una mala estrategia de manejo. Este episodio es ubicado dentro del contexto de modelos de domesticación de impacto animal y de impacto humano.

RESUME.—On decrit un cas de domestication essayee de mammiferes petits selon l'information ethnographique de la Republique Arabe de Yemen. Les maisonees du rang economique bas cherchaient a ajouter a sus revenus par apprivoiser a une espece anterieusement chassee, le damans, *Procavia capensis jayakari*. Les experiments ont principalement echoue par suite de la biologie de l'animal et d'une strategie de direction mauvaise. On place cet episode dans le contexte des modeles de la domestication de l'impact des animaux et de l'impact de l'homme.

## INTRODUCTION

The list of small mammals for which there is a record of husbandry by traditional societies is relatively short. It includes such species as the cavy and perhaps the chinchilla in western South America, the rabbit and dormouse in Europe and the Mediterranean, the cane rat in Africa, and a scattering of others. Thus the discovery of a new "domesticate," the hyrax *(Procavia capensis jayakari)*, in Yemen

(Fig. 1) is somewhat of an event. This report is of additional interest because this attempt at husbandry appears to be an indigenous event and thus can be used to test a model of how the process of small animal domestication occurs.

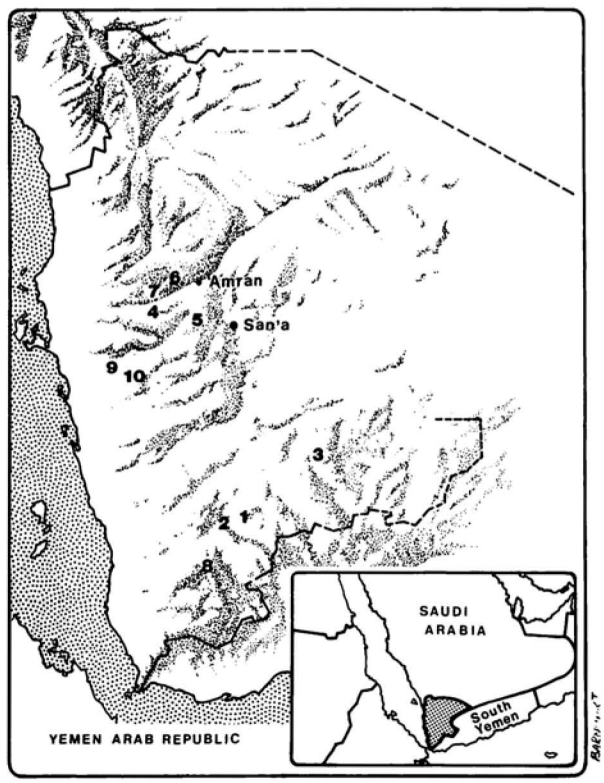


FIG. 1.—In the southern highlands the hyrax is reported #1 in the Ba'dan area (Jon Swanson, pers. comm.), #2 near Jibla (Nadeem Ashuraey, pers. comm.), and #3 Rada' ('Aish al-Nussiry, pers. comm.). In the central highlands it is reported in #4 al-Mahwit (Richard Tutwiler, pers. comm.), #5 al-Ahjur (Varisco 1982:527), and #6 al-Ashmur (Abdu al-Ashmuri, pers. comm.). In the northern highlands, it is reported around #7 Bani al-'Awwam (Jon Swanson, pers. comm.). Harrison (1968:317) reports them in the mountains near #8 Ta'izz, in the hills around the lowland town of #9 Bajil and in the #10 foothills near Sabt al-Mahrab (Stone 1985:28-29). This report concerns 'domestic' hyrax in the town of 'Amran.

## DOMESTICATION AS SOCIAL PROCESS AND BIOLOGICAL RESULT

The episode of small mammal management described in this brief note takes on significance beyond its value as an ethnographic curiosity through the contribution it makes to a broader understanding of the nature of animal domestication. *Domestication* has been much discussed over the last couple of decades (see most recently Clutton-Brock 1989, in particular the contributions of Bokonyi and Ducos). This debate has gradually led to a polarization of opinion over the

proper sense of the term, a situation that threatens to slow future progress towards an historical understanding of domestication.

Two positions have been staked out. The first emphasizes the impact on the animal explaining that domestication alters the selective pressures affecting animal reproduction and development. Initially the new human-animal relationship, often labeled taming or cultural control, yields limited and perhaps unintended effects on animal morphology and behavior through genetic drift in the small tamed populations. However, at some point in the process, the potential of controlled reproduction becomes apparent to the domesticator. Then 'domestic' populations appear with new genetic and phenotypic distributions that contrast with 'wild' ancestors. Ultimately this gives rise to ever-diversifying domestic morphologies. Operationally the domestication process is expressed as technological stages. For example hunting is expected to be replaced sequentially by selective hunting, game ranching and pastoral management for meat as the flight response is reduced; Hediger (1968:15, 106) characterizes this as a conditioning of the animal from a technophobic to a technophilic psychology. This in turn is superseded by deliberate selection to amplify the capacity to generate such secondary products as fiber, milk and work. In its most extreme form the animal-impact perspective demands that human intent to modify the morphology or behavior of a wild species be present to justify the label of domestication. Said most simply *domestication is a process which results in a domestic animal.*

The contrary opinion focuses on the human side of the equation, viewing domestication as a process which incorporates animals into the social and ideological fabric of a culture. Taming creates a renewable biological asset that is simultaneously a form of capital and a consumable resource. Because domestication requires new subsistence technologies the process may demand a reallocation of the division of labor both within and between household and settlement units. Said most simply, *domestication is a process that produces domesticators.*

Both of these propositions are obviously true. However, the tendency to follow one or the other leads to sharply divergent models of the domestication process itself. Since biological changes tend to be slower paced than social ones, the animal-impact approach creates an historical record of domestication with a 'late' chronology, the human-impact perspective with an 'early' one. Endorsement of the first position draws attention to the productive potential of the animal being domesticated. The decision to domesticate is related both to the behavioral proclivity of the proposed species to be tamed and managed in meaningful numbers *and* to the domesticating society's perception of the economic advantage from doing so. Domestication is thus a rational response to such factors as population growth or resource variability (Hesse 1982).

The human-impact position emphasizes the social and ideological complexity of the technological decision. Because domestication results in a radical reordering of values it is expected to be resisted by the society's existing institutions. Thus, the possible productive advantage of animal management is seen as one achieved only at a cost. The most obvious expenses derive from the need to accumulate capital in the form of animal stock and the time lag between deciding to domesticate and the reaping of any rewards, the period of initial experimentation with animal management including its many failures and few successes. Because both of these demands deflect effort from traditional subsistence activities,

the initiation of domestication lowers rather than raises total household production. A less obvious cost is the threat to the maintenance of social cohesion that results from enhancing the value of property, in particular a capital asset like livestock or seed. Those who accept the values associated with domestication, in which animals and plants are valued for their potential yield, may alienate themselves from the social network of their hunter-gatherer brethren, since the source of next year's herd or crop will be husbanded rather than shared resources. The effect will be to dilute or sour the traditional ties to people who used to be counted on in times of trouble.

Therefore in unstratified societies where the stress of maintaining a balance between population and resources can be managed by alternative, immediately effective methods—shifting to less productive gathered/hunted resources (Russell 1988, Chap. 1), relocation, settlement fragmentation, infanticide, or senilicide—it is more effective not to invent domestication. While it might make sense to expand effort on a pre-existing domestication technology, the *initiation* of domestication is an irrational response to population growth or resource variability.

However, in stratified systems characterized by differential wealth, the co-evolving politics of labor allocation and investment are seen as powerful mechanisms capable of explaining the decision to domesticate by certain sectors of society. The rich, buffered economically from demographic and environmental hazards, may invest in the domestication technology as a sort of speculation; the poor may diversify into animal keeping and marketing to provide access to the resources of the well-to-do and as an alternative income source should their subsistence pursuits fail.

Since the two models of domestication are divergent without being contradictory, it is possible to employ both in the case of the hyrax and its husbandry in Yemen described here. On the one hand, socioeconomic factors account for the decision to experiment with hyrax husbandry and provide an historical context for understanding the innovation. On the other hand, the biology and behavior of the animal as they are linked to available management techniques seem to be critical in explaining the failure to produce a new and successful domestic resource.

## HYRAX BEHAVIOR, ZOOGEOGRAPHY, AND TAXONOMY

Members of the Hyracoidea of Africa and Asia are known by a variety of vernacular terms including daman, tree hyrax, rock hyrax, dassie, and coney. Hyraces are small animals, standing about 30 cm. at the shoulder with a length of up to 75 cm (Fig. 2). In the wild, adult hyrax *(P.c. syriacus)* weights range between 2.8 and 3.6 kg for females and 2.6 and 4.6 kg for males (Harrison 1968, Mendelssohn 1965, Olds and Shoshani 1982). Some data suggest that captive hyraces weigh more than feral animals. Flower (1932:431) reports that wild animals range from 2 to 2.5 kg with captives weighing 3.26 to 4.25 kg.[1] One hyrax (subspecies not known) in the Jimmy Morgan Zoo, Birmingham, Alabama, weighs just over nine kg (Robert Truett, pers. com.), perhaps indicating that captives may become grossly obese.

According to Mendelssohn (1965) hyraces can live more than 12 years. Sexual maturity is reached at about 16 months and full body size is achieved at about three years. The gestation period of seven to eight months is abnormally long for an animal of its size (Mendelssohn 1965). Although some subspecies may bear up to six young (Dorst and Dandelot 1970), hyraces average three offspring which are well developed at birth (Olds and Shoshani 1982). While Hardy's report (1947) of a young hyrax being successfully adopted by a Kurdish dog may overstate the minimal requirements of hyrax nursery, Dorst and Dandelot (1970) note that young may be collectively raised.

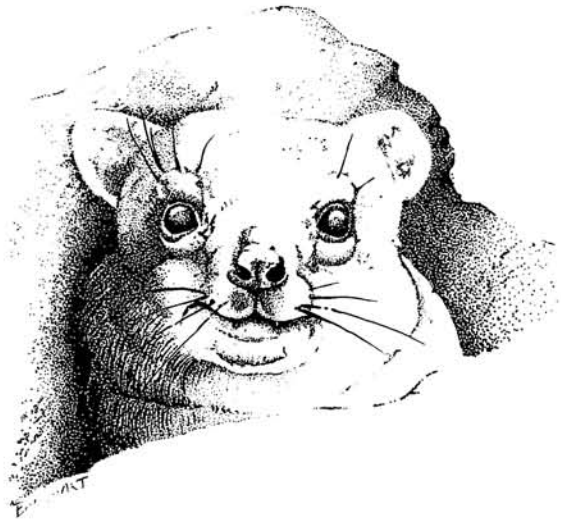

FIG. 2.—The hyrax of Yemen, *Procavia capensis jayakari.*

Hyraces are thigmotactic (crowding together) animals with group sizes as large as 80 individuals (Olds and Shoshani 1982). Colonies are divided into polygynous groups. They are diurnal foragers with omnivorous palates. Their habit of utilizing communal latrines produces concentrations of feces and dried urine, which some African groups collect and use (see below). They are not burrowers but inhabit the nooks and crevices of rocky terrain for protection both from predators and climatic extremes.

The hyrax is found in the Levant and the Arabian Peninsula. In addition to contemporary sightings discussed below, Doughty (1936) observed hyraces in central Arabia in the 1880s, Bury (1915) reports seeing them at 'midaltitudes' in Yemen at about the turn of the century, and Musil (1928) saw them in the northern part of the Arabian peninsula in the 1920s (Fig. 1).[2] These sightings are in the region dominated by the Serat Mountains, a rugged range with average elevations of 2,000 to 3,000 meters that extends north along the Red Sea coast through the Yemen Arab Republic into Saudi Arabia. The climate in these mountains is mild and the southern portion is relatively well watered.[3]

Usually hyrax are placed into three genera (Bothma 1971, Hoeck 1978, Olds and Shoshani 1982) although Roche (1972) suggests only two. All of those in Arabia and the Levant are referred to the species *Procavia capensis.* Harrison (1968) divides the hyrax in this region into two subspecies differentiated primarily by size. The larger subspecies, *P. c. syriaca,* is found in northern Arabia and the smaller, *P. c. jayakari,* in southern portions of the peninsula. The boundary between the subspecies is located in the vicinity of al-Ta'if, near the northern limit of the Serat mountain chain.

## HYRACES IN YEMEN

There have been many contemporary sightings in the Yemen Arab Republic (Fig. 1). The present report concerns "domestic" hyraces captured in the hills around the town of 'Amran.

Yemeni hunt hyrax for its meat as well as for sport (Swanson, pers. com.; Tutwiler, pers. com.).[4] Harrison reports that hyrax is prescribed to increase potency (Stone 1985:28-29) but does not suggest how it is prepared. In 'Amran and elsewhere, the broth is considered particularly good in reducing swellings.

Hoogstraal (1952:220), describing the hyrax in Yemen, notes that "in East Africa it is valued for its thick, soft fur which is often made into rugs." While the Arabic term, ***wabr***, connotes both hyrax and fur, neither this latter meaning nor the fur seem to be in use in Yemen today. Moreover, unlike cultural practices in Africa, the urine and feces are not converted for medicinal purposes or perfume (Hardy 1947, Kingdon 1974).

## HYRAX HUSBANDRY IN 'AMRAN

'Amran is a market town of about 9,000 residents in Yemen's central highlands about 50 km northwest of the capital, San'a. The region is relatively dry, relying on seasonal rain to produce the major crops of cereals. Traditional agricultural households kept few domestic animals, generally donkeys and bulls used for traction and the occasional milch goat or cow. With the exceptions of livestock brokers, butchers, shepherds, and the now rare caravan operator, individual management of large numbers of animals was unknown. Household animals are fed the remains of harvested crops or freshly cut and purchased alfalfa.

Traditional Yemeni architecture inhibited the housing of livestock. The typical house was of four storeys, abutting others on two sides, and facing directly onto the street. All animals were kept in dark rooms on the ground floor. The chicken was the most commonly kept small animal; a few houses maintained rabbits. Although new houses tend toward one storey, villa styles often including a courtyard, generally these walled areas are not used for animals.

Hyrax keeping was noted during ethnographic field research in 'Amran in 1978, when animals were observed in three households. While no confirmation survey was undertaken, women keeping hyraces reported this practice to be common. This was taken to mean the practice was not new, although it was new to these owners. However, since neither a survey of Yemeni agriculture (Tutwiler and Carapico 1981) nor the 1975 geographic survey and census (Steffen *et al.* 1978) make reference to the hyrax as a domesticate, it seems clear that while 'Amranis are aware of the practice and know where to obtain animals, this is an isolated case. In 1987 when a search was made for hyrax keepers, only one household was located. None of the households that in 1978 had hyraces still had animals. Households with hyraces were clearly at the low end of the socio-economic spectrum.

Two methods of hyrax management were observed. In 1978, animals were kept in a narrow crawl-space storage area between the ground and first floors of traditional houses. With walls of mud and straw bricks and floors of mud and

straw applied over supporting branches, these areas were constantly dark and cool. It was estimated that there were 12-15 hyraces in one room. In one case each in 1978 and in 1987, the hyraces were kept in enclosed wooden boxes in the courtyards of villa style houses. The boxes were kept in the shade and were provided with only a few air holes. Raisers know hyrax are not prone to digging under walls like rabbits and so are easier to contain, but believe the animals prefer the dark. Hyraces are fed left over breads and fresh cut alfalfa, and are supplied with water.

Women are the owners and managers of all small animals. In general, owners did not seem to have extensive or intimate knowledge of hyrax reproductive patterns or gestation period. Although the owner observed in 1987 could not sex her animals, she was expecting her pair to reproduce. Some former owners said they did not know what went on in the dark.

These "management" techniques were not successful. Although an estimated 40 animals were observed in 1978, the owners reported that they all died, probably by the end of 1979. One owner reported buying new stock and attempting to reported buying new stock and attempting to raise them in cages on the roof. These also died. Another owner reported that it was the young that tended to die, and implied that, like rabbits, there were some hyraces that were 'domestic' and did well in captivity and others which were 'wild' and did not. While this might suggest two groups of animals, it is more likely the speaker was referring to the animals' temperament.

There is little information on how the hyraces were obtained, but there is agreement that they were very hard to catch. Some report the wild adults are killed and the young are captured. Others say they are caught in nets thrown over their lairs. One woman reported that her father, a skilled hunter and a man of very low ascribed status in the Yemeni social hierarchy, caught them. Efforts are made to obtain both sexes.

## MOTIVATION FOR ATTEMPTED DOMESTICATION

The mid to late 1970s was a period of rapid economic change in Yemen characterized by a growth of commerce and a decline in subsistence farming. The shift to a cash economy was accompanied by high inflation brought on by the influx of funds earned in expatriate labor in Saudi Arabia and the Gulf States. As none of the hyrax owners' households had a stable cash source, it appears they entered the business with the intent of earning extra income. Given raisers lack of knowledge about hyraces, it may be inferred they expected hyrax husbandry to be uncomplicated, perhaps comparable to raising rabbits.[5] Additional impetus may have been provided by the availability of animals. In apparent contrast to the situation in 1987, informants reported that in the late 1970s hyraces were plentiful and easy to catch.

Hyraces are not sold in the market. Customers seek out the breeder and buy at the "farm-gate." It is fairly easy to learn who has hyraces for sale. The prices in the late 1970s were estimated to have been about 20 Yemeni riyals (then about $4.50) for an adult. In 1987, immature animals were sold for 30 YR and adults for 50 YR (then between $4.20 and $6.20). Adults were defined as being over seven

months of age. Although there is no information on the 1978 sales volume, in 1987 there were few sales.

Yemeni meats include mutton, beef, chicken, and rarely camel and goat. In 1978 mutton sold for 70 YR/kg and beef for 20-30 YR/kg. Most chickens were imported frozen and sold for prices of about 10 YR/kg. Smaller, 'indigenous' chickens sold for about 40 YR and were eaten rarely. These meat prices still obtained in 1986 except that frozen imported chicken had been replaced by birds raised locally from imported eggs. Local chickens weighed between 0.5 kg and 0.75 kg and sold for 25 YR. Cooked hyrax observed by the senior author seemed to have as much meat as a 1 kg chicken and less meat than 20 YR worth of beef.

Hyraces are skinned, dressed, and cut in pieces (including the head) for cooking. Like all meat, hyrax is boiled in water with spices. Both the broth and the meat is consumed. Yemeni report the meat tastes like lamb, the highest quality meat in Yemen. In fact, to the author, both in texture and taste, hyrax seems to be indistinguishable from chicken.

Comparatively, then, the hyrax could have been a competitive meat source. Further, the medicinal value of the broth would have insured a small but stable market. Finally, since Yemeni prefer and will pay higher prices for any locally produced food, the hyrax would have been a suitable food and income source.

## DISCUSSION AND CONCLUSION

These data correspond to the models of animal domestication presented above. Hyrax production was done on a household basis as part of women's economic activities. Those households which attempted hyrax breeding were in a marginal economic position and were driven by the need to enter the cash economy. The objective was to supplement rather than replace existing income sources such as egg and poultry production. Without this stimulus the attempt probably would not have been made. This, coupled with the relative ease with which the species could be otained, the prospect that a relatively inexpensive, local meat would enjoy strong sales, and the medicinal qualities attributed to the meat, seem adequate explanation for trying to domesticate the hyrax.

Prospects for the continued raising of hyraces are dim. Either the animal or Yemeni livestock management techniques appear inadequate to the task. While raisers are unsure about the period of gestation and age of reproducton, it seems unlikely that obtaining this information would make hyrax husbandry viable, since the late reproductive age and lengthy gestation of the animal reduce their potential as a productive domesticate. Additionally, the high loss rate of animals substantially increases the cost per individual. Also of importance is that prior to domestication, breeders seem to have known almost nothing about keeping them in captivity. While some did have experience raising rabbits, they were certainly not well versed in small livestock management techniques. Apparently it was assumed that this was either easy or that sufficient knowledge could be obtained through experience. Taking what is already known from the management of one species and combining it with trial and error experience may work with some species, but not those with the biological limitations on productivity characteristic of the hyrax.

## ACKNOWLEDGEMENTS

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## NOTES

[1]This involves a comparison of two subspecies, captive *P.c. syriacus* with Burton's hyrax [now *P.c. ruficeps* (Bothma 1971)].

[2]Despite widespread sitings in Arabia, the Levant, and the Sinai, hyraces are rare in Holocene archaeological samples (e.g. Noy *et al.*, 1980). However, ancient records contain the Biblical citations [Leviticus 11:5, Deuteronomy 14:7] that include it among species forbidden to the Israelites.

[3]Psalms 104:18, and Proverbs 30:24, 26 describe the hyrax's habitat as rocky (Meyer 1978: 286). A pre-Islamic poet of the Hadramaut, Muhariq b. Shihab b. Qais al-Tamimi, mocks people who live in the hyrax's habitat while praising those fortunate to live where ibex are common (Serjeant 1976:17), a habitat contrast also struck in Psalms 104.

[4]In Africa, since the Pleistocene (Brian 1981), the hyrax has been hunted. In modern East Africa the species is a minor meat resource (Dyson-Hudson and Dyson-Hudson 1970:117).

[5]No rabbit raisers were observed in 1986-87.

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**Navajo Land Use: An Ethnoarchaeological Study.** Klara B. Kelley. New York: Academic Press, 1986. Pp. xvi, 233. $35.00 (hardcover).

The title, *Navajo Land Use,* may be misleading, if only a bit. This general title masks an important study for specialists. Researchers interested in Navajo family land uses, the transformation of traditional peoples by market forces and public policy, or a model application of archaeological evidence will enjoy this book.

Here is a study which seeks to explain changes in Navajo family land use from 1880 to the present in a small land area of slightly more than 20 square miles. The south McKinley Mine is a strip mining area located in New Mexico, southeast of Window Rock, Arizona. *Navajo Land Use* began as a technical report on research conducted by the Office of Contract Archaeology of the University of New Mexico in 1978 and 1979.