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“Production Rationales: The Commercialization of Subsistence Pastoralism”

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PRODUCTION RATIONALES:

THE COMMERCIALIZATION OF SUBSISTENCE PASTORALISM\*

by Roy H. Behnke, Jr.

Introduction

There seems to be a general consensus that livestock development is in trouble. A workshop sponsored by the International Livestock Centre for Africa noted that:

There is a tendency - after the international expenditure of some U.S.\$650 million in fifteen years on projects which have not met their targets - for some to conclude that African livestock development is a failure (I.L.C.A. 1980:5).

Among donor agencies themselves, the World Bank, U.S.A.I.D., and F.A.O. have all recently sponsored livestock development evaluations; these assessments have been almost uniformly critical.<sup>1</sup> Thus, Walter Goldschmidt was reflecting a general pessimism when he summed up a review of pastoral development in Africa with the following statement:

The picture that emerges from this review is one of almost unrelieved failure. Nothing seems to work, few pastoral people's lives have improved, there is no evidence of increased production of meat and milk, the land continues to deteriorate, and millions of dollars have been spent. What is wrong? (1981:116).

There would seem to be no more urgent problem in contemporary pastoral studies than to provide even a partial answer to Goldschmidt's sweeping question: What is wrong?

There are, of course, various things wrong with different projects, and this essay cannot attempt to address all these problems. It instead focuses on that class of intervention which is present in almost every livestock project and around which other parts of a project are typically arranged. This component is the attempt to increase commercial livestock production through the transformation of subsistence pastoralists into commercial ranchers. The thinking behind most livestock projects has been based on a simple dichotomy between subsistence pastoralism, the «traditional» pre-project starting point, and fully developed and fenced ranches, the «modern» post-project end point. According to this scheme, pastoralists were to be plucked out of history at the beginning of a project and redeposited according to project specifications at the end, a process of social engineering made possible by project inputs which suspended the normal functioning of the indigenous economic system.

No ranching scheme has ever engineered this kind of abrupt and total economic reorganization of a pastoral society. On the other hand, some pastoralists have spontaneously commercialized their herding operations, and they have undertaken these changes without the assistance of formal development projects. Even more disturbing from the point of view of development work, these commercializing

pastoralists have not immediately adopted the highly refined system of fenced ranching which the schemes attempt to promote. As this essay will document, they have instead developed a hybrid form of livestock management which is different from both subsistence pastoralism and fenced ranching but is similar to open-range ranching as it was practiced in North America before the introduction of barbed wire. It would appear, therefore, that not two but three systems of production are involved in the commercialization process: subsistence pastoralism (or «pastoral nomadism»), open-range ranching, and fenced ranching.

This paper presents a taxonomy and examples of each of these three livestock production systems. The purpose of the taxonomy is to isolate the central features of each system, thereby specifying which aspects of a pastoral economy are likely to remain stable or to shift in the transition from subsistence to commercial production. This typology will draw particular attention to the production rationale around which each of the three systems of production is organized. The second part of the essay applies the typology to the analysis of four case studies of commercializing pastoral economies. Having specified the recurrent and stable parameters of the process of commercialization, the paper concludes with some suggestions as to how livestock development projects could be designed to exploit these developmental regularities.

## Part I

### Production Rationales

The following taxonomy is based on the concept of the production rationale. That is, each of the three systems of livestock production examined here is organized in a characteristic fashion on the basis of a particular set of human, technical, and natural resources, out of which emerge a peculiar set of production goals. We are dealing, therefore, with distinct systems of production in that each is especially suited to solving different kinds of problems, and each is designed to operate efficiently under different sets of conditions. The following discussion provides an overview of how these systems of production differ from one another.

This discussion of distinctive features should not, however, obscure an important continuity among the three systems of production. Almost no livestock producers--market or subsistence-oriented--depend on livestock alone for their sustenance or income. Also, representatives of all three systems of production are engaged to some extent in livestock production for both use and exchange. Many subsistence pastoralists routinely sell or barter a portion of their livestock produce (Bates and Lees 1977; Salzman 1972; Schneider 1979); similarly, some market-oriented ranchers directly consume a significant proportion of their own produce, especially if markets are remote (Dobie 1980:36-41; Rivière 1972). The point here is not that pastoralists do not exchange livestock produce or that such exchange is not essential to their way of life, or that ranchers do not grow some of their own food. Rather, it must be emphasized that pastoralists employ a productive regime which maximizes in-kind production at the expense of commodity production, while the reverse holds true for commercial ranchers (Strickon 1965:232).

### Subsistence Pastoralism

Because pastoral production depends on human and animal energy rather than elaborate tools, pastoral economies require large inputs of labor but little

capital other than the animals themselves (Dyson-Hudson 1980:10-11). Pastoral economics can thereby employ more people than do other forms of livestock management. At the same time, pastoral societies are characterized by low ratios of livestock to dependent human beings. In comparison with commercial forms of livestock management, these two features--the relative abundance of dependent people and human labor, and the relative scarcity of animals--are the definitive elements in a pastoral production system.

Documentation of this point is provided by statistical data on human and livestock ratios among East African pastoralists. Based on data collected by Dyson-Hudson, Helland shows that East African human/livestock ratios for cattle range from 1:1 to 1:5, for camels from 1:01 to 1:4, while for smallstock the ratios range from 1:1 to 1:18 (1980:5-7). These ratios pertain to pastoralists who practice a degree of agriculture and keep a combination of two or more herd species. Additional corroborative evidence is provided by Allan based on information collected in the 1950's (1965:307), and by Schneider who includes estimates of the importance of agriculture (see Table 1).

Table 1

<u>Ratios of Cattle to People in East Africa*</u>		
Agriculture lacking or insignificant	18: 1	Barabaig of central Tanzania
	17.5: 1	Samburu of Kenya
	15: 1	Maasai of Tanzania
	9: 1	Rendille of northern Kenya
	8: 1	Dorobo of Kenya; Uganda Pokot
	6.5: 1	Borana Galla of northern Kenya
	6.1: 1	Kenya Maasai
Agriculture important in various degrees	4.1: 1	Karamojong of Uganda
	3.7: 1	Jie of Uganda
	3.6: 1	Dodoth of Uganda
	3: 1	Pokot of Kenya
	2: 1	Kipsigis of Kenya
	1.7: 1	Meru of Kenya
	1.4: 1	Teso of Uganda
	1.3: 1	Giriama; Kitui Kamba
	1.2: 1	Taita
	1.1: 1	Turu of Tanzania
	1.1: 1	Machakos Kamba

\*from Schneider 1979:87.

As Helland points out, these figures must be approached with the skepticism that is always warranted when assessing statistical data on the herd wealth of pastoral peoples. Nevertheless, these data do support the simple conclusion that pastoral techniques of animal management can feed many people on very few animals. The low standards of living prevalent among pastoral peoples (when compared to ranchers) only partly explains how pastoralists manage to survive on so few animals. Part of the explanation, as Schneider's data suggest, is that many pastoralists are also farmers who extract high-value protein from their herds but rely on crop agriculture to meet most of their caloric needs. The kinds of products extracted

from livestock by pastoralists are; however, also an important part of the explanation. Pastoralists depend heavily on replenishable animal products such as milk, blood, hair/wool and traction for plowing and transport. Meat and hides usually serve as residual products to be harvested at the end of an animal's productive life, or on exceptional ritual or festive occasions. Through the recurrent «harvesting» of live-animal products, pastoralists can extract food from their herds without slaughtering large numbers of beasts and thereby destroying the future breeding capacity of the herd. In cases in which pastoralists do not grow their own staple cereals, these techniques of herd management will also permit the retention of a number of live animals suitable for exchange.

A pastoral approach to herd management does, however, have its disadvantages. In particular, the extraction of a wide range of live-animal produce--in the absence of sophisticated machinery--demands large inputs of human labor. Daily shepherding is required in order to protect the animals, keep them available for use, and render them docile. Milking itself is a labor-intensive process, as is the processing of fluid milk to preserve it under preindustrial conditions. Finally, there is the hidden opportunity cost of keeping a large supply of labor available to service and exploit the herd. Since pastoral herds depend on natural pastures in climatically unstable environments, herd movement is a typical pastoral adjustment to seasonal and annual scarcities of pasture and water, or to the prevalence of disease. When the animals move, the people who care for them and are fed by them must move with them. When one tallies the labor involved in daily shepherding, the extraction and processing of replenishable produce, and nomadism itself, it is clear that pastoralists achieve relatively high levels of productivity per beast at the price of low levels of productivity per unit of labor. High labor demands are a burden that pastoralists are forced to bear, for people who are relatively poor in animals must extract all the value that they can obtain from those animals that they do possess. Pastoral economies make sense in terms of the realities of pastoral demography.

### Open-Range Ranching

A different set of imperatives lies behind the formation of open-range ranching. Two historic examples of range ranching economies--Spain after the Reconquista and the Great Plains before and immediately after the American Civil War--serve to illustrate the peculiarities of this form of stock management as a distinct system of production.

Medieval Spain claims our attention because it was here that the Euro-American cattle ranching system and cowboy culture were invented in the 11th and 12th centuries. The historian C.J. Bishko has identified at least three sets of factors as crucial to the production rationale of medieval Spanish ranching:

i. Spanish ranching was a commercial enterprise, and required favorable markets if it was to flourish. Favorable markets for beef, hides and tallow existed in both Spain and neighboring countries at this time, and prices for animal products rose during the fourteenth and fifteenth centuries as the Spanish economy as a whole prospered as a result of American bullion (Bishko 1952:513, 514).

ii. Spanish ranches were, by medieval European standards, large operations, and their spread was encouraged by the creation of large tracts of relatively unused land. Land of this kind was provided by the Christian Reconquista of Spain from the Moors:

The Reconquista...for centuries created frontier areas...where Christians and Moors often raided or fought; where the population huddled in large widely spaced towns...where the rural labor was scarce and where cattle and sheep, being mobile and little demanding, had obvious advantages (Bishko 1952:497).

Ranching spread southward in Spain with the Reconquista, the frontier, and open land.

iii. Lastly, Spanish ranching thrived on the basis of a special breed of cattle and special techniques of animal management suited to this breed. The breed was Bos taurus ibericus, «the ancestor of the modern fighting bull...a stock characterized by markedly feral instincts and often complete wildness» and «unsuited for dairy or draft purposes» (Bishko 1952:497). Shepherding, milking and the use of cattle for transport or plowing were all replaced by techniques of cattle management suited to mounted horsemen. Some of these techniques - roundups, branding, and cattle drives - later became part of the standard equipment of North American ranching; still other techniques are today preserved in archaic form in the bullfight, the rodeo of the medieval Spanish livestock industry (Bishko 1952:507-510).

The parallels between medieval Spanish and 19th century North American ranching suggest that similar economic forces were at work in both cases. Range ranching in North America was essentially a frontier adaptation to free grass and a developing market for beef. Whereas the Spanish had expelled the Moors, the American settlers had exterminated both the Plains Indians and the productive basis of Indian life, the buffalo. Huge areas of virgin land west of the 98th parallel were thereby opened up to a primitive form of industrial exploitation, a form of ranching which required almost no capital investment and no landed improvements. What was required were breeding stock, supplied from Texas where cattle «grew wild...and multiplied at a rapid and constant rate,» and «had little more value than the wild animals of the Plains» (Webb 1931:211). These were the Texas longhorns, lineal descendants of old Spanish breeds, essentially feral cattle that could defend themselves from predators, drop and raise a steady calf crop without human assistance, obtain--on occasion--all the water they required from their graze or walk miles from water to pasture, and, in general (in the words of one Texas rancher) «thrive on air and scenery» (Dobie 1980:344).

On the basis of this hardy breed, Texans adopted from the Spanish and passed on to the other Plains States a form of cattle management in which there were only two really essential management operations. Owners had to handle their cattle when they were young in order to brand them as private property; subsequently, they had to collect their animals and ship or drive the saleable ones to market. For open-range ranchers stock management consisted of two roundups and a cattle drive--all else was left to nature. The ranchers were market-oriented and needed a saleable commodity, a carcass; very intermittent and violent contact between men and feral animals was sufficient to produce this commodity (Ingold 1980:235-263).

We are now in a position to summarize the rationale that lay behind the range system of production. In both medieval Spain and the Americas, ranching was invented and spread on a military and commercial frontier where rural population densities were low, where there existed wide expanses of empty land, where agricultural labor was scarce, and where unsettled conditions discouraged capital investment in the land. On such a frontier natural resources - pasture and water - tended to be plentiful relative to the number of people available to exploit them. Under these conditions labor was the limiting factor to production,

and the key to economic success lay in maximizing the productivity of scarce labor. The intensive exploitation of either land or cattle - given that both were relatively abundant and, hence, of low value - was much less critical.<sup>2</sup>

The contrast to subsistence pastoralism could not be clearer. The subsistence production of replenishable animal products required intense contact between humans and stock, and was labor-intensive; commodity production under range conditions requires almost no contact between man and animal, and is labor-extensive. These different systems of production are based, in turn, on different balances between numbers of livestock owners and livestock owned. Herders are relatively poor in stock and must exploit their animals frugally; ranchers are relatively rich in animals and can afford to take only those products that are most readily obtainable or marketable.

### Fenced Ranching

The basic technical and economic features of fenced or enclosed ranching are generally accepted, and few would quarrel with the following characterization of this system of stock management:

Ranching is carried out on large stretches of land. Most ranches cover several thousand hectares, sometimes more than 100,000 ha, and carry large, permanent herds of some 1000-10,000 animals. The term ranch is generally used to refer to properties with well-defined boundaries (fenced or unfenced), legally owned or having a long-term lease, and with certain developments present that were effected by the owner or lessee.

In ranching, the capital investment and return per hectare are very low (compared to crop agriculture). However, ranches have large stock numbers and a large fixed capital per man-equivalent invested in, for example, fences and pumps, and there is usually a high income per man-equivalent....In most cases, only one type of animal is kept in any considerable numbers, and the aim is a single product, like wool or animals for slaughter, and other products, like sheep's meat or cattle's milk, are relatively neglected (Ruthenburg 1976:315).

Like pastoralism or open-range ranching, the primary characteristics of fenced ranching make sense as a whole in which one aspect of the productive system sustains and is sustained by the other aspects. Both Australian sheep ranching and North American cattle ranching are fenced forms of animal production which conform to Ruthenburg's description. A brief review of how these fenced systems developed out of open-range conditions should help to isolate those elements which are critical in creating and maintaining enclosed systems of intensive ranching.

Fences are the tangible marker of the shift from the open to the closed range. Today fences function as the basic management tool in capital-intensive ranching and, in comparison with the other forms of animal production discussed here, permit fenced ranching to achieve exceptionally high levels of productivity per man, per acre, and per beast. There is good evidence, however, that in neither Australia nor North America did ranchers initially construct fences for the purpose of improving productivity.

Prior to fencing, Australian sheep herding was a relatively labor-intensive form of animal management more akin to traditional European shepherding

than true ranching. This situation only changed under the pressure of a severe labor crisis which occurred in the 1850's when the Victoria gold strikes in Australia claimed almost all unskilled male labor. In order to stay in business at all, herd owners were forced to institute major technical innovations such as predator-proof fencing and mounted «boundary riders», innovations which permitted a single man to control many more animals than had previously been possible. As Shaan notes, Australian sheep ranchers came out of the crisis on a stronger economic footing than they went in, but the changes were instituted out of a simple desire to find some way to stay in business, and not on the basis of fine calculations of marginal productivity or profit (Shaan 1930:119-127, 187, 185).

The case is even more straight-forward in the cattle-ranching American West. As J.F. Dobie phrased it, ranchers never «voluntarily fenced themselves in» they just felt «compelled to fence other people out», for the «push of population and economic popularity of the ranching industry drove every man who would maintain a ranch to get individual title to it and wall off all contenders» (1980:341). Free grass had provided the basis of a successful range livestock industry, but the very success of that industry had filled the plains with ever more cattle and people. With grazing becoming a scarce resource, men fenced to control land, not cattle. There is even some evidence that fenced ranching was at first less productive on a per cow and per acre basis than the old open-range system, at least until ranchers developed management styles suited to the fences. E.S. Osgood described the early years of fenced ranching in these terms:

The stringing of hundreds of miles of fence across the open range was far more dangerous to the property of the cattlemen themselves than it was to the rights of the settler. In the first place, by limiting the free movement of herds, it prevented even grazing, and in the second, it increased the winter losses. Cattle drifted for miles before a blizzard and if they could keep moving, tails to the wind, they would probably survive. Once they came to a halt before an impassable barrier, they were lost, unless the storm abated. In commenting on the fencing craze in Texas in 1883, an editor wrote the following prophecy: «Under the old regime, there was a loose adaptability to the margins of the ranges where now there is a clear-cut line which admits of no argument, and an overstocked range must bleed when the blizzards sit in judgment.» Two years later, the carcasses of thousands of cattle along fence lines of western Kansas, Colorado, and Texas were the price that cattlemen themselves paid for fencing the open range. The enclosure of the accustomed range was therefore neither practical nor legal (1970:193).

Losses of thousands of head did not, however, discourage fencing because fencing was not at first an animal management tool; it was one of several possible ploys in a struggle among ranchers and between ranchers and farmers to claim and control land.

Fences were concrete evidence that ranchers had recognized, as E.S. Osgood succinctly phrased it, the «shift in the capital basis of the [livestock] industry from cattle, to land and cattle» (1970:202). It is this shift which sets in train a process of intensification which resulted in the high productivity of modern ranching. As the open range was subdivided and fenced, increases in production or profits now had to be achieved on finite land areas; to gradually intensify production - to try to get more out of each cow or each acre of land - was a reasonable response to this situation. When this point had been reached, fences began to be used as they are today - to control the movement of stock and ensure



the efficient use of pasture. But fences were only the beginning; they were followed by the increased use of artificial watering points, fodder production, the use of irrigation and tame pastures, veterinary inputs and feed supplements.

In short, as ranchers shifted from the open range to enclosed ranching, their system of production became increasingly characterized by high rates of capital investment, either in landed improvements, mechanized equipment, or fancy «blooded» stock. In addition to improving productivity, almost all these innovations were labor saving, and the numbers of people employed on ranches remained small. The returns to human labor therefore remained high in ranching, which had to be the case if ranching was to compete effectively for labor with other sectors of an industrialized economy (Bennett 1969:172-200).

#### The Transition from Pastoralism to Open-Range Ranching: Commercializing Pastoralists

It should now be clear that all commercial ranchers do not operate under similar economic conditions and do not employ similar management techniques. That commercial livestock systems can be organized differently and yet be genuinely commercial is a point worth emphasizing, for it is a point that we tend to forget whenever we turn our attention from our own economic history and look at African or Asian systems of livestock production. Let a rancher live in a tent, migrate with his herd, or specialize in camels or reindeer, and we often have difficulty admitting to ourselves that he is a commercial rancher at all. By broadening the definition of commercial ranching, the preceding typology equips us to recognize forms of market-oriented livestock management that we might otherwise have missed, or misconstrued.

Once we are equipped with this perspective, it becomes clear that open-range ranching is not simply an archaic curiosity suited to historical investigation. The following sections of this paper will demonstrate that range ranching is the first form of commercial livestock management adopted by pastoralists on the margins of a market-based economy. To ignore the spread of range ranching would be to ignore one of the most important economic changes taking place in pastoral Africa and Asia.

The persistence and spread of range ranching under modern conditions raises, however, a major analytical problem. Range ranching made perfect sense for European colonists operating under conditions of free resources and few people. But the nature of the industrial frontier has changed in the last century. Instead of pushing indigenous subsistence producers aside, industrial expansion now proceeds by incorporating them and transforming their economies. The plentiful landed resources and low population densities that stimulated the ranching economies of settler states are not part of the experience of most contemporary pastoral societies. How, then, can commercializing pastoralists afford to exchange an intensive system of production for use for an extensive system of production for exchange?

One answer to this question is that many pastoralists successfully avoid commercialization. Subsistence pastoralism is a frugal form of animal exploitation in a situation where there is an abundance of labor, an abundance of people to feed, and a short supply of animals. There exists, therefore, a clear motive for livestock-poor people to engage in subsistence livestock management even if there exist commercial outlets for their products. This does not mean that occasional surpluses will not be sold. It does mean that the labor-intensive techniques and strategies of pastoral livestock management will remain dominant, and that the first

goal of the economic enterprise will be to feed the family through the production of a wide spectrum of live-animal products.

The conservative option - the refusal to sell animals if at all possible - is a reasonable strategy given the limitations inherent in range ranching. This option is not, however, the subject matter of this analysis, for we are interested here in pastoralists that have successfully negotiated a way around the productivity bottleneck posed by the extensive nature of range ranching. The following section of this essay will examine the history of several commercializing pastoral societies that have developed practical solutions to this dilemma.

## Part II

### Four Pastoral Economies Undergoing Commercialization

This section examines four reasonably well-documented examples of pastoral societies that have recently shifted (or are shifting) from pastoralism to commercial ranching. Fortunately, for analytical purposes, these cases come from widely separated parts of the Old World and involve five different domestic herd species: Bedouin sheep and goat herders in North Africa, camel and small stock pastoralists of the Horn of Africa, Tswana cattlemen in southern Africa, and reindeer Lapps of the European Arctic.

At the superficial level these four societies have very little in common other than animal husbandry, a dependency on natural pastures, and a recent tendency to market more animal produce. In the following analysis I will exploit these dissimilarities in order to illustrate different facets of the commercialization process. Libyan economic history will be used to illustrate the positive long-term price responsiveness of commercializing pastoralists; Somalia will exemplify the dangers of price fluctuations for small-scale commercial producers; Botswana illustrates the differential responses of large and small herders to market opportunities; and Finland will provide a clear case of declining herd productivity under commercial conditions. Thus, each case highlights particular aspects of the commercialization process, either because of the peculiar features of the case itself or because of the research interests of those who reported it. There can be no doubt, however, that in all four cases we are dealing with parallel processes of economic change which have been modified by their particular ecological, social, and macro-economic setting. Four illustrations do not make a proof. Nevertheless, given the geographical and cultural differences which separate the four case studies, it is reasonable to assume provisionally that developments which are common to all are developments which are intrinsic to the commercialization process, and which recur whenever pastoralists start to market more of their produce.<sup>3</sup>

As ideal types, pastoralism and range ranching differ from each other in four major respects - with regard to the economic orientation of producers, techniques of animal management, human/animal demographic balances, and land tenure. We can therefore expect commercialization to be a complex process involving interrelated changes in all these areas. Thus, in the case studies to be examined here, the shift from subsistence to commercial production was accompanied by four changes:

i. Economic changes: In each case there was a long-term positive response to market incentives, a response which combined increased animal sales with the reorganization of the domestic economy so as to maximize sales.

ii. Changes in husbandry techniques: As the level of animal sales increased, the productivity of the herding operation either remained unchanged or declined due to either (a) the loss of control over the herd or (b) the discontinuation of labor-intensive methods of exploiting the herd.

iii. Demographic changes: To offset this decline in animal productivity, the individual herds of successful commercial producers tended to grow in size over pre-commercial levels. In order to compensate for the increasing size of certain herds, other pastoralists were excluded from full participation in the emerging commercial economy. This exclusion was achieved in two ways: either through rural-urban migration or through the dispossession and impoverishment of the mass of the pastoral population.

iv. Changes in land tenure: As commercial herds grew in size, their owners tended to obtain de facto private control over de jure communal land.

Subject to similar market forces, four very different pastoral societies have evolved in a similar direction. The following case material documents this process of transition. In order to simplify the exposition of general themes within the four case studies, the attempt has been made to hold detail to a minimum and to refer the reader to independent published works for more complete analysis.

#### The Development of Smallstock Ranching in Eastern Libya

The commercialization of Eastern Libyan small stock pastoralism has moved through two distinct phases in 15 years:

1. 1965-69: an early period marked by rapid herd growth and the initial shift to commercial production.
2. A later period during the 1970's in which herd growth leveled off, and herders set about refining commercial management techniques (Behnke 1980a, 1980b).

In terms of the analysis being developed here, each of these periods illustrates a different aspect of the shift from pastoralism to commercial ranching. The early period, 1965-69, documents a trade-off between increasing herd size and increasingly inefficient exploitation of individual animals. On the other hand, developments during the later period, the 1970's, indicate efforts by producers to extract more value per animal by perfecting commercial techniques of animal management.

#### 1965-69

One of the most striking features of Libyan proto-ranching is the speed with which it evolved between 1965 and 1969. The rapid development of the ranching industry reflects the equally rapid rise of the Libyan nation as an oil-producing power. In order to comprehend the shift to commercial production, we must begin, therefore, with an understanding of what the oil boom meant to the average Bedouin herder of the mid-1960's.

Many of these herding families possessed no more than about sixty head of small stock, and lived very close to the nutritional minimum. For these people the new oil economy meant more cash income from two sources. First, increased demand for meat had led to inflated animal prices, and the Bedouin now received more money whenever they sold an animal. Secondly, the oil industry provided an opportunity for the Bedouin to obtain cash through intermittent wage labor.

d. Higher meat prices combined with new sources of income allowed the Bedouin to sell fewer animals in order to meet household expenses (Behnke 1980a:85-88).

e Between 1965 and 1969 reduced sales, favourable weather conditions, and the explosive reproductive potential of small stock (with short gestation periods and potentially high multiple birth rates) all came together, and the result was a jump in herd size. During this period some herds grew three- to six-fold, from a low of around sixty head per family to a maximum of around 400 head per family. At around 400 head, herd growth reached its technical limit. Depending on the season of the year, the skill of the shepherd, the roughness of the terrain, and the presence of predators, 300 to 400 small stock is about all the animals a single shepherd can control. When flocks reached this size, owners were forced to sell simply to keep the herd down to a manageable size (Behnke 1980a:88-91).

n Bedouin herders now set about adjusting their husbandry practices to a changed situation in which they were operating large herds and regularly selling large numbers of animals. In the traditional economy herd owners had been poor and were, consequently, inclined to extract every last bit of sustenance from their herd. In practical terms this meant that they engaged in labor-intensive forms of dairying and only occasionally sold or slaughtered animals. By the late 1960's and early 1970's, however, many families found that they no longer had a supply of domestic labor sufficient to maintain an intensive dairying operation for a herd of up to 400 animals.<sup>4</sup> What is more, they were no longer so poor that they were forced to do so. Therefore, as the market price of slaughter animals rose, herders abandoned the milking of marginally productive dairy animals such as sheep. By letting lambs suck all the ewes' milk, herders produced a larger, heavier and healthier lamb crop which fetched a higher price in a shorter period of time.

In sum, if proto-ranchers wanted to maximize sales, then they had to forgo using some of the products that had been available to them as subsistence pastoralists. If they wanted to sell more meat, they had to drink less milk and eat less milk products. For this reason the amount of produce proto-ranchers extracted from each animal probably declined relative to subsistence pastoralism. But this potential decline in the biological productivity of individual animals did not impede the commercialization process. In the first place, the Bedouin were now richer and could afford to engage in less intensive - and laborious - forms of animal exploitation. Secondly, declining productivity on a per-animal basis was an irrelevant issue as long as the commercial profitability of the overall herding enterprise was increased through specialization in the production of a single, high-priced commodity.<sup>5</sup>

Because of the speed with which commercialization occurred in Libya, this case clearly illustrates the long-term positive response of pastoralists to price incentives. The Libyan oil boom suddenly removed traditional blockages to the accumulation of livestock and provided strong price inducements for market involvement. The Bedouin response followed a pattern well-known to economists studying commodity supply cycles and the price responsiveness of industrialized livestock producers: market withdrawal and the holding of animals, livestock accumulation, and market re-entry after inventories have increased.<sup>6</sup>

The Libyan case is particularly compelling because this cycle of withdrawal, building, and re-entry took only five years, and because those herders who did not participate in this process migrated out of the livestock sector, a point which will shortly be discussed. At the end of five years all remaining herders had built their stock inventories (as industrialized producers would have done) and had radically restructured their management practices to downplay dairy and upgrade

red meat production. They had shifted from a multi-product system of production for use to a single-commodity system of production for exchange.

### The 1970's

In the 1970's proto-ranching entered a second phase of development in which herd growth leveled off and herders set about refining their commercial management techniques. With respect to herd growth, flock sizes fluctuated with rainfall and pasture conditions (between 1972 and 1979), but large herd owners did not introduce the kinds of technical innovations that would have permitted further permanent increases in herd size. Using traditional shepherding techniques, there is a «carrying capacity to labor» which even the most innovative proto-ranchers have thus far (1979) been incapable of exceeding (Behnke 1980b:8-10).<sup>7</sup>

In this respect Libyan proto-ranching is different from both classical range ranching and the other examples of transitional pastoralism dependent on large herd animals, to be discussed in this paper. In Cyrenaica small stock must be closely tended in order to prevent predation and loss. For this reason the Bedouin could not dispense with shepherding and adopt the fully extensive forms of open-range management which are available to ranchers specializing in large domesticated animals that can fend for themselves in a feral state.

Herd owners could only continue to increase their margins of profit in the 1970's by extracting higher cash profits from the same number of animals. The refinement of commercial management techniques took three different forms:

- i. the development of more sophisticated approaches to animal marketing in response to the lunar Muslim festival calendar,
- ii. the introduction and use of purchased feed supplements to allow animals to be held and fattened according to market conditions and irrespective of seasonal pasture conditions, and
- iii. a shift towards herd species which most efficiently converted cash inputs into cash profits - i.e., a decline in goat herding relative to sheep herding. In essence, the Bedouin set about intensifying their commercial operations rather than simply expanding their size.

The technological limitations on herd growth which are peculiar to sheep and goat ranching had implications for the distribution of wealth in Bedouin society. Subsequent case histories will show that commercialization usually exacerbates economic stratification by widening the gap between rich and poor. Libyan proto-ranching is the exception to this pattern. There, technical considerations put a brake on herd growth and favoured the development of a prosperous «middle class» of herd operators, a sort of Bedouin bourgeoisie.

### Out-migration

At all stages in its evolution, the development of Libyan proto-ranching was sustained by high rates of rural-urban migration. Out-migration supported commercialization ecologically, economically, and socially, with ecological considerations being, perhaps, the most important. The potential ecological weaknesses of a livestock production system requiring herd growth are all too apparent. We have seen that individual herds grew in size as they commercialized, and that this growth was essential to the commercialization process. While some herders were commercializing, however, other pastoralists were selling-out and

moving to the cities to take up wage employment provided by the oil boom. Thus, as the number of animals per herd went up, the total number of herds tended to go down. Out-migration therefore promoted individual herd growth while avoiding overgrazing.

The economic contribution made by out-migration was, in addition, a critical factor leading to commercialization. Prior to the oil boom, Libya contained a small and relatively poor urban population. In eastern Libya in particular there were few markets for pastoral produce because nearly everyone was a Bedouin, lived in the rural areas, and already owned their own animals. The oil boom and out-migration changed all this. By 1970 Libya's cities were increasing rapidly in size and wealth, and there was an ever-increasing demand for meat and a steady inflation in meat prices. Commercializing pastoralists needed a profitable market in which to sell their produce; because of out-migration, they had one.

Finally, out-migration also created a political and social climate conducive to commercial change. Before the oil boom the Bedouin operated within a reasonably self-contained and internally stratified political and economic system (Evans-Pritchard 1949; Peters 1955, 1970). In this system a certain amount of surplus production was not sold, but rather was invested by large herd owners in the support of poorer kinsmen and clients. In the anarchic political environment which prevailed, these clients were then used to claim and defend the landed resources upon which all animal wealth ultimately rested. As a result of oil and out-migration the Bedouin were drawn into a regional social system that included large settled populations. With the growth of the oil-based economy, rich and powerful Bedouin families left the countryside in order to exploit the greater financial and political opportunities of the new cities. They took their political dependents with them, and attempted to find these people jobs, of which there was a growing, plentiful supply. Patrons came, therefore, to function as urban employment bureaus rather than as sources of animal wealth and daily maintenance (Dalton 1973; Gannous 1977).

Left behind in the countryside was a Bedouin middle class composed of herding families with enough wealth to make commercial pastoralism a more attractive option than wage employment. Following the army revolution of 1969, old patron-client ties became inoperative since the old elite was identified with the previous regime. The army also cracked down on local-level political activity involving blood feud and tribal competition over land. Thus, the last vestiges of a strictly Bedouin system of patronage and political activity were suppressed and replaced by the expanded police power of the national administration (Behnke 1980a: 91, 92, 162-179). As a result, individual Bedouin families were free to pursue commercial expansion based on animal sales rather than animal redistribution. Out-migration thereby reinforced the «egalitarian» tendencies inherent in a form of range ranching that - for technical reasons - permitted only limited herd growth.

#### Somali Commercial Pastoralism

The summary just provided of recent Libyan economic history casts serious doubt on the stereotype of the conservative pastoralist inclined to avoid animal sales and accumulate limitless herd wealth at any cost. There are reasons, however, why this stereotype should have gained currency. Most macro-economies do not provide pastoralists with an opportunity to become wealthy rapidly, and this being the case, many pastoralists cannot afford to commercialize. Some of the dangers of commercialization for small-scale operators are illustrated in the case of the development of Somali commercial pastoralism as described by Jeremy Swift.

The Somali do not feed themselves solely from the produce of their herds, and must trade to obtain basic non-pastoral commodities, especially food-grains. This trade has gone through at least three distinct historical phases, each dominated by a different primary trade item, and each marking a progressively greater involvement by pastoral households in commercial livestock production (Swift 1979:448).

In the early 19th century the northern Somali traded in exotic wild products (ivory, myrrh, ostrich feathers, and gum arabic) which were gathered by the nomads but were not, of course, actually pastoral produce. The pattern of trade changed and the volume of trade expanded when the British occupied Aden and the North Somali coast. Hides and skins (bound for the United States and Europe) came to dominate the trade, which also included slaughter animals (which supplied the British garrisons with meat), and clarified butter. Pastoral produce was now being sold, but the wide range of products indicates that the nomads were marketing the by-products of a subsistence-oriented system of pastoral production. Single-commodity commercial pastoralism only arose in the 1950's with the oil boom in Saudi Arabia and among the Gulf states. In response to rising demands for red meat, the Somali began supplying these markets with large numbers of slaughter animals (Swift 1977: 285-87, 1979:448, 449, 451).

The magnitude of this trade and its importance for the national economy of Somalia would be difficult to overestimate. Until the drought of the mid-1970's Somalia was the world's major sheep and goat exporter and the Somali port of Berbera was the world's largest livestock shipping point. Even after a severe drought and the loss of part of their Saudi market to the Australians, Somali exports in 1976 still constituted one-sixth of all world livestock exports by value (Reusse 1982:3). In 1981 live animal exports produced 91% of the country's hard currency (exclusive of remittances from workers living abroad), while the export of all animal products combined accounted for over 80% of Somalia's foreign exchange in five of the seven years between 1975 and 1981 (Holtzman 1982:9).

As a result of this level of market involvement, the Somalis--like the Libyans--began to make changes in their herd management practices. According to Swift, they probably took less milk for subsistence and instead left it for young nursing animals; they altered the species composition of their flocks from safer subsistence breeds (camels and goats) to riskier but more profitable breeds (cattle and sheep). Finally, they sold virtually all surplus male animals not required for breeding purposes (1979:454).<sup>9</sup> These changes occurred, moreover, without the kinds of technical innovations or levels of capital investment which are normally associated with fenced ranching. Despite a «surface appearance of rapid development» leading to increased animal exports, Swift notes a «lack of real development in the pastoral economy» with no «sustained increases in livestock production» through reduced mortality, improved birth rates, or better use of pasture (1977:287, 289, 1979:455). The overall picture presented by Swift is of a narrowing of production objectives from multi-product subsistence goals to single-commodity production, accompanied by a shift from intensive pastoralism to extensive ranching.

This shift in production styles was, moreover, linked to changes in rural land tenure. In the traditional economy, periodic drought had always served as a leveling mechanism. Since animals were a form of wealth susceptible to sudden loss large herd owners tended to invest surplus animals in exchange systems with other pastoralists, thereby building up credit which could be called in if disaster struck. These «traditional reciprocal redistributive networks of animal loans, gifts and other transfers» fell into disuse as merchants began to pull more and more animals

out of the countryside (Swift 1979:454). Wealthy pastoralists (who were often urban-based livestock traders as well) were able to sell their animals and invest their earnings in permanent sources of wealth which were less vulnerable to loss than animals. Many of these investments were in private sources of water which gave their owners monopolistic control of water in some areas and, by extension, exclusive access (at least in the dry season) to grazing in the vicinity of the water (Swift 1977:290, 291). In other cases there was outright enclosure of communal range for crop agriculture, in order to create areas of deferred grazing, or for the harvesting of forage to be fed to animals on their way to market (Holtzman 1982:65, 71, 108; Box 1971:226; Aronson 1980:20; Reusse 1982:7). The shift from a system of animal redistribution to animal sales coincided, therefore, with the emergence of a new system of property involving de facto private control of communal range. The relatively minimal and often temporary differences of wealth within the traditional society had solidified into permanent differential access to basic productive resources.

What remains unclear is the extent to which these changes were to the benefit or detriment of the mass of Somali livestock producers. Swift, writing during the worst drought in recent Somali history, argues that commercialization was a primary cause of mass impoverishment and desertification (1977;1979); more recent analyses conducted after the drought would tend to temper this assessment.<sup>10</sup> In any case, Swift's analysis demonstrates that market involvement exposes pastoral producers to an entirely new kind of hazard: fluctuations in the prices of pastoral produce relative to the cost of pastoral purchases. In order to measure these changes Swift constructed a rough «barter cost of living index» for Somali pastoralists based on a «minimum bundle of necessary consumption goods». He demonstrates that the purchasing power of Somali livestock has varied over time, and that the long-term trends are not favorable from a pastoralist point of view. While it can be shown that pastoral prices rebounded, prices for agricultural produce fell, and the post-drought terms of trade shifted once again in favor of the pastoralist (Jamaal 1981:285-287, 292), the implications of Swift's calculations should not be ignored. For the small producer especially, an increase in commercial risk and decrease in control over food supply must be weighed against the attractiveness of selling high value animal protein in exchange for cheap carbohydrates. Lured into commercial production when prices are good, small producers with no margin for error may find that they have nothing left when prices fall. For, once herders have specialized in commercial production, they may be trapped by structural changes in the domestic organization of production, in herd structure, and in the organization of rural society--changes that may be very difficult to reverse.<sup>11</sup>

#### The Development of Open-Range Cattle Ranching in Botswana

The development of commercial ranching in Botswana parallels developments in Somalia at both the level of superficial detail and at the level of fundamental economic processes. As in Somalia (and unlike Libya), commercial involvement developed slowly and was dominated by a group of large cattle owners. And, as in Somalia, wage employment opportunities were not plentiful enough or profitable enough to induce most small operators to abandon completely livestock production, and rich and poor alike continued to attempt to invest in the livestock sector.

The sequence of the kinds of trade items produced and exported by rural Botswana was the same as in Somalia - first wild produce, then a range of different kinds of pastoral produce, and finally specialized red meat production. In the 19th century Tswana commercial relations with the outside world were based on trade in wild animal products (Okihiro 1976; Chirenje 1977:58-65). By 1927-41, however, animal produce constituted almost 70% of the total legal exports of the Bechuanaland



Protectorate, with authoritative estimates placing the number of illegally exported cattle at five times the legal number at certain periods. At this time a wide spectrum of pastoral products were sold, including hides, dairy produce, and small stock (Schapera 1943:210; Pim 1933). After Botswana's independence (1966), however, the export of beef became dominant, first to neighboring countries in Southern Africa and latterly to Britain and the European Economic Community (EEC).

As the kinds of trade items changed, so did the level of dependency of the Batswana on trade itself. At first the Batswana were self-sufficient in food and traded for manufactured commodities, especially firearms (Parsons 1977:113-143). By the 20th century, however, the Batswana were in precisely the position of the Somali with respect to food grains, and were particularly independent in drought on imports from South Africa (Roe 1980). The Batswana possessed in sufficient quantities only two potential commodities which were valuable enough to pay for extensive grain imports--their cattle and their labor. Labor migration to South Africa began in the middle of the nineteenth century and primarily involved employ on South African farms. By the turn of the century, however, the Witwatersrand gold mines had opened, and by 1912 the demand for African labor was high enough to encourage the creation of a centralized labor recruitment bureau which was active in Botswana and other «supplier» areas. Thereafter, the level of Batswana dependence on mine labor and their involvement in labor migration remained high and tended, in general, to increase (Kerven 1979; Schapera 1947).

What is of interest to us here is that in selling their labor the Batswana gradually altered their style of livestock management. In 1911 outside observers could write:

The wealth of the Bechuana consists principally in their cattle which they tend with great care, showing a shrewd discrimination in the choice of pasture suited to oxen, sheep and goats (Cana and Hillier 1911:605).

By 1947, however, both Schapera and his Batswana informants could see the effects on agriculture of labor withdrawal:

Owing to labor migration, many people are no longer available at home to attend to the routine tasks of tribal life, and as a result both animal husbandry and agriculture have suffered.

All Tswana are agreed that migration has led to deterioration in the herding of cattle, and that losses due to straying and neglect are far more numerous than before....The Walker-Hobday report also stressed the need for steps «to protect the cattle industry from the harmful effects of excessive recruiting in the country, which removes the most active and vigorous sections of the population....»

In the old days, boys usually remained at the cattleposts until they had grown up and married. Nowadays most of them, on reaching maturity, go away to work in the Union....The ordinary Native, who relies chiefly on members of his own family, now has little alternative but to entrust the care of his cattle to his younger sons. The latter, however willing, cannot always cope with the work, especially during the dry winter months, when the animals have to be closely herded to prevent them from straying, and when water for them to drink must often be laboriously hauled out of wells. It is almost inevitable, in the circumstances, that there should be a high proportion of losses (1947:164).

d By the late 1970's the situation was even clearer: livestock were no longer herded to take them to pasture so much as to keep them out of trouble. Whenever there was no threat of predators or danger of trespass on fields containing crops, the animals were left to roam (CARL BRO International 1982). Small herds of sheep and goats tended to stay close to the homestead, while cattle usually favored «home ranges» where their owners could go periodically to collect them. Owners also developed special techniques (such as the kraaling of calves) which discouraged the straying of cows in seasons of plentiful surface water when movement was easy. In general, therefore, labor withdrawal and the commercialization of the livestock industry were accompanied by the shift from intensive shepherding to more extensive forms of loose herding.

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Even more important, however, was the impact of trade on the political economy of traditional Botswana society. Although it was more stable and hierarchically organized, the traditional Botswana political system was in many ways similar to that in rural Libya prior to oil. The political authorities - tribal chiefs and village headmen - accumulated cattle as a prerogative of office, and, in return, loaned out cattle on a long-term basis to their clients in order to retain office. In what was essentially a patronage system, cattle were circulated in an effort to concentrate political authority, and to the extent that wealth was redistributed, it was redistributed in the interests of the political authorities (Schapera 1938:64, 65; Cliffe and Moorsom 1979). However, with the existence of South African markets for their cattle and with their positions assured by the colonial administration, the traditional elite learned to serve their private interests in new ways. Cattle wealth that had once been retained within rural society was sold and the profits reinvested in water development and education, among other things. Areas that had previously lacked surface water were thereby opened to year-round grazing by cattle (Peters 1980; Chambers and Feldman 1973; Hitchcock 1979). As in Somalia, the owners of privately developed water sources became the *de facto* owners of large tracts of legally communal land. Finally, with independence the educated sons of the old tribal elite came to town to become the administrators and politicians in the new state. With their control of the state apparatus, this urban cattle elite could restructure rural land tenure, obtain development capital for further expansion, and control the parastatal livestock marketing system (Holm 1980; Parson 1977; Livestock Development Progress Report 1978/79, 1979/80, and 1980/81).

There was from the first, therefore, a difference in the way large and small herders responded to and were involved in the cash economy. The attitude of wealthy herd owners to commercialization was summarized by a Tswana chief in a statement to a colonial commission of inquiry in the 1930's:

It is the ambition of every Native to increase his stock, and he is greatly concerned with his yearly income which is derived from the ordinary and natural increase of his stock...He is not like the primitive Native, but he increases his stock for commercial purposes (cited in Schapera 1943:211).

Responding from the point of view of the smaller herd owner, Schapera felt called upon to qualify the chief's description of the situation:

With few exceptions, the Tswana do not yet carry on animal husbandry with the sole or even main object of production for the market...They have many other uses for cattle, and unless they are wealthy, they generally part with their animals one or two at a time, and then only in order to satisfy immediate requirements like the payment of tax or the purchase of trade goods (1943:211).

Thus, small-holders were primarily «target sellers» in the sense that they sold to meet limited and reasonably stable goals. Whenever grain prices were high or there was crop failure in the Protectorate, the number of cattle exported tended to increase, while the inverse was true whenever crops were good or grain prices low (Roe 1980:29-33). Small herders were, therefore, intimately involved in a cash economy, but under extremely unfavourable terms. Whereas large herders could «rationalize» their operations to effectively exploit the market, small herders were forced to buy and sell on a contingent basis. Recent statistics support this conclusion, showing that the smallest herds (1-10 head) tend to both buy and sell more animals than larger herds (Botswana Agricultural Statistics 1979, 1980, 1981). Buying, one can conclude, is done on a windfall basis, selling on an emergency basis, and the small herder is therefore in no position to approach animal sales systematically and with an eye to maximizing the profitable commercial exploitation of his herd (Gulbrandsen 1980:152). Like Somalia, therefore, Botswana amply illustrates the problems of commercial involvement for the small herd owner, and it seems unnecessary to further belabor this point. Instead, we can carry the analysis forward by concentrating our attention on a kind of data that does not exist for Somalia - comparative production figures for large and small herds. Everything said thus far points to the fact that small herders will strive to avoid commercial entanglement. The following material quantifies this avoidance, and goes further by illustrating the positive advantages of subsistence production for the small herd owner.

Table 2 summarizes the economic data gathered by a research program which monitored nearly twenty thousand head of cattle in over three hundred herds in seven study sites (CARL BRO International 1982). Data presented in Table 2 and additional material support the following four conclusions:

i. Smaller communal area herds produce fewer marketable commodities and more in-kind value - milk, traction for plowing, and meat and hides from home slaughter or cattle deaths. The largest herds reverse this relationship and produce more cash output (through cattle sales) than in-kind subsistence output. To take the extremes, for sample herds of 1-20 head 38% of all output is in cash and 62% is in-kind; for sample herds over 150 head 83% is in cash and 17% is in-kind (see Rows 1 and 2).

ii. Capital investments in the herding operation increase markedly with increases in herd size, as shown in Row 3. Rates of sale also increase steadily with increases in herd size. The rates of sale for the largest herds are nearly double those of the smallest, as shown in Row 4.

iii. Gross margins per animal were the highest for the 1-20 sample herd size class. This would seem to indicate that small herds were managed at least as efficiently in an economic sense as large herds. Diseconomies of scale have been offset by an intensive, subsistence-oriented method of extracting value from cattle (see Rows 5 and 6) gross margin per head, and per cow.

iv. Gross margins per cattle herd and net cash receipts per cattle herd were much higher for the larger sample herds. The gross margins per herd of the largest herd class were about fourteen times larger than those for the smallest herds (see Rows 7 and 8, gross margin per herd and net cash receipts).

Table 2 suggests that small cattle herds in Botswana are poor, efficiently run, and subsistence-oriented. The preceding analysis suggests why efficient production should take the form of in-kind production among smaller

TABLE 2: COMPARATIVE ECONOMIC PERFORMANCE OF LARGE AND SMALL BOTSWANA HERDS\*

	Herd Sizes (number of head per herd)						Average
	1-20	21-40	41-60	61-100	101-150	Over 150	
1. Cash as a % of output	33	36	48	61	70	83	53
2. In-kind value as % of output	62	64	52	39	30	17	47
3. Capital investments in Pula <sup>a</sup>	1 296	3 010	4 678	7 398	11 534	20 577	6 051
4. Sales p.a. as % of total herd	5.9	4.8	6.2	6.8	7.7	11.2	6.3
5. Gross margin/head (Pula)	26	22	24	22	23	23	22
6. Gross margin/cow (Pula)	73	63	70	61	64	68	62
7. Gross margin/herd (Pula)	348	672	1 205	1 737	2 810	4 905	1 367
8. Cash receipts p.a. in Pula	109	181	388	771	1 480	3 996	547

<sup>a</sup> 1 Pula (Currency of Botswana) = US\$1.2 in 1981.

\* CARL BR0 International 1982, Tables 4.5.A and 4.5.B. for the period 1980-81.

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herders and commercial production among larger herders. The answer lies in the difference between produce that can be used and produce that can be sold. In-kind subsistence produce consists largely of live-animal products rather than sales for slaughter. The subsistence producer can profit from his animals without killing them, and there is no contradiction between accumulating cattle as capital investment and realizing immediate income from the herd. In sum, cattle can serve as both a store of wealth and a source of immediate income, an arrangement which is particularly attractive to a small herd operator trying to build for the future.

This aspect of subsistence production takes on added significance in the light of Libyan and Somali economic history. Libya demonstrated that herds must grow in order to profitably commercialize; Somalia demonstrated that herds must grow in order to safely commercialize. The Botswana case demonstrates that - despite the apparent paradox - a subsistence mode of production may be the means to this growth for the small herd owner and, hence, the ultimate means to achieve a commercial level of operation. This realization calls for a reassessment of the persistence of subsistence livestock production in a semi-commercialized economy. Subsistence production is often treated as a null category - as the kind of primitive production system that develops when markets are not available and when people cannot sell their products. Pastoralists get in the habit of not selling, or so the reasoning goes, and develop social and cultural traditions which reflect this fact. When finally offered the opportunity to sell, producers react conservatively, fall back on their old values and attitudes, and decline the invitation (Doran et al 1979).

The situation in Botswana does not lend much credence to this line of reasoning. In Botswana small subsistence herders are surrounded by large, commercial producers. It is difficult to imagine that these small operators cannot see the advantages of being rich. The question is how to become rich, and they can best do this by adopting management practices suited to their condition and the size of their herd, not by imitating the more commercial management practices of the large operators. Thus, subsistence modes of livestock production are not in all instances an economically dysfunctional hold-over from another era; they are an adaptive strategy suitable to certain classes of livestock producers operating within even a commercial economy. To pry these pastoralists loose from a predominately subsistence mode of production will, therefore, take much more than simply offering them a market in which to sell.

#### North-East Finland: The Development of Predatory Reindeer Pastoralism

North-East Finland provides the final, and in some ways the most compelling, case study. On the surface everything is different from the African cases. Reindeer replace the more usual herd species; the Arctic replaces arid Africa; and, for the first time, a major technical innovation - the snowmobile - figures in the commercialization process. But underneath these differences, the underlying processes of economic change remain the same. As in the other three cases, the biological productivity of the individual animal remains unchanged or declines under commercial management conditions, while commercializing herds grow steadily in size and the owners of these herds gain private control over communal land.

During the 1960's the traditional pastoral methods of Lapp reindeer management broke down in much of northern Finland and were replaced by an extensive form of animal exploitation which one observer has labeled «predatory pastoralism» (Ingold 1974, 1976, 1980). Three factors were instrumental in bringing about this shift: the expansion of commercial markets for reindeer meat, overstocking and pasture deterioration, and the adoption of the snowmobile (Ingold 1976:29). The

existence of profitable markets is a necessary precondition for commercialization. In previous cases these markets were bolstered by inflated oil economies or - in Botswana - by a buoyant world beef market and by import tax rebates to livestock producers from the European Economic Community, Botswana's major market outlet. In the Finnish case there was a sharp rise in the price of reindeer as a novelty item on the meat markets of Europe during the 1960's (Ingold 1976:34, 40). The existence of profitable markets does not, however, explain the peculiar features of the commercialization process in different localities. To understand the distinctive features of commercial reindeer ranching we must look at the interplay between the two other casual factors - overstocking and the snowmobile - and the way reindeer responded to these factors.

Lapp reindeer are not genetically different from wild deer. They have not been bred to a dependency on humans, and are domesticated only in the sense that they are accustomed to human contact. The nature of reindeer domestication becomes critical as herd sizes increase and pasture quality deteriorates. Under the stress of poor pasture conditions, a natural response of domesticated deer is to scatter into smaller and smaller herd groups and to wander further afield in search of graze. Thus, as grazing becomes more scarce, the deer become wilder and it becomes increasingly difficult for a shepherd to keep his animals together. This process is self-perpetuating once some deer break loose of human control, since the presence of wild deer makes it more difficult to control those that remain tame. Eventually shepherds are forced to set their animals free to search for food on their own. The deterioration of pasture conditions and herding techniques had reached this point in much of north-eastern Finland in the early 1960's, as herds were built up following World War II. As a consequence, owners had completely abandoned the herding of their animals and the tethering of individual cows during the calving season. Deer now ran free in all seasons, and calving took place «in the wild» (Ingold 1976: 29-34).

The progressive loss of control over the herds was accelerated and reinforced by the advent of the snowmobile. Since transport was improved, the snowmobile made it unnecessary to maintain a tame herd of draught geldings for household use. In herding, the snowmobile replaced the traditional combination of skiman and herd dog which were no longer able to control widely scattered and unruly deer. But if it solved the immediate problem of control, the snowmobile also reinforced the deers' wildness:

According to traditional herding methods, control was established by recognizing and taking advantage of certain innate characteristics of reindeer behavior, such as the tendency to follow a lead, to bunch up when approached by a dog, and the attraction to the sound of a bell. Under the herder's control, deer moved at a natural pace. Snowmobile herding strategy is based on entirely opposite principles. Rather than following a lead, deer are driven from behind. Frightened by the noise and speed of the machines, they run in panic. Whereas deer bunch when approached by a dog, they scatter in all directions on approach of a snowmobile. Drivers therefore circle behind the herd in order to restrict the only line of escape for the deer to the required direction. Many animals split off and are lost on the way, whilst weaker animals drop from nervous or physical exhaustion. Those that arrive at the separation fence are in poor condition resulting from fatigue, nervousness and hunger (Ingold 1976:36).

Like old Spanish cattle ranching, snowmobile ranching substituted the herding of domesticated animals for the hunting of feral animals. No longer herded, the animals were simply rounded up and sold, a process which was perfected through

the use of light aircraft for animal surveys and two-way radios to coordinate the drives. The use of snowmobiles and increasing malnutrition of reindeer had a predictable negative impact on the biological productivity of the deer population.

Both [the snowmobile and pasture deterioration] whether through stress or malnutrition, depress the rate of fertility and the chances of survival of calves. Both cause scattering, and both preclude the possibility of maintaining localized, coherent herds over any length of time... [Deer] have learnt to avoid 'snowmobile man' at all cost, and to hide in the most inaccessible parts of the forests (Ingold 1976:36).

With lowered rates of reproduction and increasing rates of «lost» deer, the efficiency of predatory pastoralism was less than that of traditional pastoralism.

Predatory pastoralism did, however, open up new avenues for making profit if one controlled large numbers of animals. Big owners could be fairly sure of finding a predictable number of animals suitable for sale at each roundup. Given the scale of his operation, the big operator could afford to let his unfound deer remain uncaptured as a reserve breeding stock. For the smaller operator, on the other hand, loss of control over the deer meant that husbandry became progressively «randomized» as his chances of predictably locating his deer diminished with the size of his holding (Ingold 1976:43).

Snowmobile herding therefore favored the larger owner prepared to sell animals in large lots, not the small man who wanted to occasionally sell one or two beasts. The breakdown of control also favored the growth of large herds by producing what American range ranchers called «mavericks», calves which had not been captured and branded while they followed their mothers and whose owner could not subsequently be identified. Younger men with capital to invest, innovative attitudes about commercial possibilities, and few family obligations to drain their resources, could invest in buying these mavericks. The herds of these innovators grew rapidly, supplied by the stray deer of more conservative, older, and heavily obligated herders who could not or would not invest in commercial expansion. Armed with greater resources and greater incentives, the commercial innovators came to dominate the new management techniques associated with open range reindeer ranching, in particular the summer roundup in which calves were given their owner's mark. Like big ranchers in the American west before fences, expanding «big reindeer men» came to dominate these roundups by force of their personalities, their wealth, and the paid loyalty of their hired hands; they also marked the best deer as their own (Ingold 1976:56-60).

Small men needed to control and intensively manage their deer if they were to profit from them, and thus they were progressively pushed out of the reindeer business. Those who owned snowmobiles could take up wage employment as hired hands of large reindeer men, but the amount of labor needed in herding had been cut by approximately half from its pre-commercial level. For the remainder of men, Ingold notes that «The small man is no longer a pastoralist but a hunter and gatherer, intermittently involved in casual labor» (Ingold 1976:106). Pushed out of pastoralism, older men with families to support turned increasingly to fishing, hunting unmarked deer with rifles, wild berry picking for sale, and irregular manual labor on roads and construction sites, all supported at intervals by welfare and unemployment compensation - a combination of productive activities that Ingold has labeled «subsidized subsistence» (Ingold 1976:103-123).

In sum, open range reindeer ranching may at first appear very removed from African pastoralism, but the economic characteristics of the commercialization process are the same in Finland as in Africa. They are:

1. A favorable long-term response to very profitable meat markets.
2. A decline in the biological productivity of the animal population.
3. An increase in the individual herd size of commercial operators.
4. The exclusion of large numbers of former pastoralists from participation in the emergent commercial system.

### Part III

#### Applications

This conclusion elaborates on the practical benefits for development work that result from an ability to predict the stable parameters of a process of economic change in herding societies.

Since the early 1960's the economic goals of livestock development projects have centered on increasing marketable livestock production through the creation of fenced ranches (Tietelbaum 1980:49-63; Horowitz 1979:14-17, 20-26). Inevitably, there were problems involved in this approach to inducing social change. Since project interventions were exogenous and arbitrary from the point of view of local producers, it was very difficult to predict how these producers would respond to the project. Moreover, since projects were foreign graftings onto functioning economic systems, project activities tended to collapse whenever outside support was withdrawn. In sum, projects had very little spread effect, were not self-sustaining, and - when the accountants were called in - were not cost-effective.

Despite these difficulties, it would appear that donor agencies and national governments had no alternative but to push ranch development as long as they were committed to livestock development and as long as it was assumed that subsistence pastoral production systems were inherently static and unchanging. The situation alters fundamentally only when it can be shown that pastoral production systems change spontaneously and predictably in response to specific casual factors such as the availability of markets, differences in herd sizes, rates of rural-urban migration, or technical innovations such as borehole development or the introduction of snowmobiles. Instead of attempting to engineer a complete break with indigenous systems, it might then become feasible to attempt to marginally speed up, redirect, or selectively suppress aspects of a process of change that already exists but would otherwise be unplanned and unassisted.

We must assume - if the preceding analysis is to have any practical value - that monitored and planned commercialization will evolve along lines similar to spontaneous commercialization. If this is the case, then development planners may be justifiably reluctant to artificially promote commercialization, for at least two reasons. First, western-trained development planners are accustomed to think of economic development in ahistorical terms as progress involving both increased levels of commodity production and improved levels of biological productivity. This, as we have seen, is not normally the case in the initial phase of commercial pastoral development. An initial reduction in the kinds of available pastoral produce is an integral part of the development process because it reduces competing forms of subsistence animal use which interfere with the increased production of a single profitable commodity. Commercialization involves a redefinition of production goals, not an absolute increase in the level of productivity.

A second potentially unattractive aspect of the commercialization process



is an outgrowth of this decline in efficiency. Commercial production will appeal most strongly and will confer a competitive advantage on large herd owners whose scale of operation will permit reduced productivity. Herds will therefore tend to grow and commercialize at unequal rates, and some herd owners will successfully make the shift to commercial production and others will not. The commercially successful will, then, attempt to reinforce their new superiority by acquiring private use rights to land that in theory is still communally owned. Thus, the process of commercialization entails the exclusion of former subsistence pastoralists from full participation in the emerging commercial system. Again, this process of exclusion is a necessary feature of commercialization if rangeland is to escape overgrazing and if ranchers are to nonetheless succeed in creating the larger units of production which are necessary in a commercial setting.

Commercialization is not, therefore, a uniformly attractive process - either for displaced pastoralists or for the national planners who must find ways of accommodating and employing these displaced people. But however unacceptable the process may be, development planners can profit from the simple fact that it occurs in predictable ways and results in foreseeable consequences.

The kinds of constraints that inhibit the development of commercial ranching are essentially demographic and macro-economic conditions which prevent the humane relocation of people and the profitable removal of animals from pastoral areas. These are not the kinds of constraints that can be overcome through the institution of development projects operating intellectually and physically in delimited «project areas» and aimed at reforming the way individual herders manage their animals. The traditional project format may be an appropriate medium for achieving either the intensification of subsistence production or the intensification of commercial production; these kinds of economic transformations do require changes in herd management techniques and do not require major changes in the demographic composition and political structure of pastoral society. On the other hand, what is needed to promote commercialization is not a livestock development «project» - however well designed - but livestock development programs and policies which place the pastoral sector within the context of the national economy.

On the evidence presented here, it may be unrealistic to pursue or anticipate commercial pastoral development unless a national economy can provide two fundamental inputs: favorable markets for livestock produce, and the capacity to absorb displaced pastoralists and their labor. In this respect a flourishing commercial or industrial sector capable of employing large numbers of people at high wages may do more for commercial pastoral development than a dozen «ranching» projects - Libya is a case in point. Pastoral domestic economies are inherently bouyant; pastoralists (unlike peasants) possess a naturally reproductive form of capital and are accustomed to balancing the expenditure of herd wealth against investment in the form of animal accumulation (Barth 1973). Moreover, pastoralists have given ample evidence in Africa that they are ready to make the kinds of investments in larger herds that are an essential prerequisite to successful commercial involvement. The message is clear: pastoralists can take care of themselves. They are fully capable of undertaking sustained commercialization should their total economic and social environment change in ways which permit such innovation. Barring such changes, subsistence production will remain a profitable form of animal exploitation, and they can be expected to cling tenaciously to it. There remains, therefore, only a small and modest niche for the livestock development project which would promote commercialization by working among pastoralists to «improve» their traditional husbandry techniques. On the basis of a theoretical knowledge of the direction commercialization is likely to take, these projects would be confined to facilitating a pre-existing process of economic

change. The interventions would be modest, the resultant changes would be incremental, and the project goals would be defined and redefined by the emerging commercial needs of the pastoral community which was served.

#### NOTES

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1. For the F.A.O. see Oxyby (1981). For the World Bank see Sandford (1981). For USAID see Horowitz (1979), USAID (1980), and Teitelbaum (1980). The impact of these critiques is evident in a revised USAID strategy for the development of the livestock sector (1982). For a review of developments within USAID see Atherton (1983). Atherton cites two projects--Mali Livestock Sector II and the Niger Integrated Livestock Production Project--which reflect the new USAID strategy toward livestock.
2. «It [sheep ranching] was favoured by the environment and the climate. It was favoured by the system of land occupancy, and it required little organization, either on the pastoral estate or at the ports. Wool growing was a form of extensive exploitation of land, suitable in a colony where capital and population were relatively scarce» (Hartwell 1955:89). For South Africa, consider the following: «Throughout the [18th] century...more and more [stockowners] became trekboeren (graziers) who lived permanently on grazing farms, migrating seasonally for pasture, or moving altogether as land became exhausted. Some lived such nomadic lives that they never settled down anywhere and lived in ox-wagons. During the first two decades of the 18th century the agricultural depression in the Western Cape...gave a special impetus to full time stock farming. But throughout the century, when the white population increased rapidly and capital and skills were scarce, only pastoralism could take advantage of the Cape's abundant land by using it extensively...It also needed fewer laborers than agriculture...It was possible to make a living as a grazier, since there was a constant demand for mutton, trek oxen for transport and ploughing, and pastoral by-products like soap, butter and tallow. After 1713, when the Khoikhoi were decimated by smallpox and their stock attacked by disease, the Cape market for pastoral products was supplied by white graziers, who moved even further afield» (Katzen 1982:208-210).
3. The analytical approach employed here was developed by R. Murphy and J. Steward (1956). The present paper merely reapplies Murphy and Steward's ideas to the analysis of change in pastoral societies.
4. The insufficiency of domestic labor supplies can be inferred from the number of migrant Egyptian laborers hired at this time (Behnke 1980:90; Ahmed Abou-Zeid 1968).
5. Major difficulties arise in attempting a quantified comparison of herd productivity before and after the shift to commercial production. Three different approaches have commonly been taken, and all have their limitations.

i. One can assess herd performance through such standard measures as mortality rates, calving rates, rates of calf weight gain, etc. The drawback here is that one is measuring the health and vigor of the herd, not the rate at which the herd produces goods or services suitable for human use. By these measures under-used (and, consequently, unstressed) herds may «perform» better than their heavily used and highly productive counterparts.

ii. One can assess the nutritional/caloric output of the herd by comparing the food values of in-kind herd produce versus the amount and quality of the food which could be purchased with the cash obtained through the sale of animals. The drawback here is that a good deal of pastoral produce either cannot be consumed by humans (hair, wool, hides, transport) or can be consumed only after the addition of other inputs or processes (as in the case of traction power for plowing).

iii. Finally, one can seek economic measures of herd productivity by ascribing cash values to in-kind produce. The ascription of such values may, however, be difficult in situations in which trade is infrequent precisely because of exchange value of a particular product does not accurately reflect its use value in a domestic setting. In these situations calculations of relative productivity will be highly sensitive to the assumptions made about the correct cash value of in-kind inputs and outputs (Behnke 1983).

In some cases all of the above techniques will be unsuitable for the simple reason that good statistical data does not exist on the productivity and performance of pastoral herds. This is largely the case with respect to the Libyan Bedouin during the 1960's. In these cases, changes in productivity can only be indirectly inferred from informant accounts regarding changes in herd sizes, changes in the numbers of people sustained by a given number of animals, and changes in the kinds of produce extracted from the herd.

6. With respect to American beef producers, the price and production cycle has been described in the following terms: «When beef slaughter is high and beef prices are depressed, beef producers get depressed too. They send a high proportion of their breeding stock to market, thus increasing market receipts and slaughter and reducing prices further. Beef-cattle numbers on farms decline. Within a few years this causes a decline in market receipts and slaughter, and prices begin to rise. The beef-cattle business begins to look up. Farmers and ranchers begin to hold back more cows and heifers to build up their herds. The unstable equilibrium then begins to work upward instead of downward. The retention in slaughter raises prices further. This continues until the build-up on farms and ranches begins to approach the limits of carrying capacity, and market receipts from the larger herd become large enough to halt the rise in prices and turn it downward. Farmers and ranchers then send a higher than normal proportion of their breeding stock to market as profits begin to decline. Receipts increase further and drive prices lower. This induces further liquidation and further price reduction» (Shepherd et al 1976:122).
7. The phrase «carrying capacity to labor» is taken from Horowitz (1979:45).
8. In 1974 many camels in the area where I worked were herded for at least part of the year (Behnke 1980:37-38, 70-72). By 1979 all camels in the same area were allowed to run free and were rounded up only prior to sale (unpublished field notes). The gradual shift from intensive to extensive camel herding in Cyrenaica is paralleled by developments in reindeer herding. Paine's description of alternating periods of intensive and extensive reindeer herding in north Norway is reminiscent of conditions in Cyrenaica in 1974; Ingold's

description of fully extensive reindeer herding in Finland, on the other hand, more closely parallels the Cyrenaican situation in 1979 (Paine 1972:81-86; Ingold 1976, 1974).

9. Recent and reliable field studies on Somali livestock production do not exist. Therefore, while available data do lend credence to Swift's position, almost all evidence is entirely circumstantial, as follows:

i. No good studies are available on herd milk production or levels of household milk consumption. Declines in milk production can, however, be inferred from changes in herd culling practices (Swift cites the work of Bozzi and Triulzi 1954), the decline in dairy exports noted by Swift, and the declining trade value of milk relative to meat (Jamal 1981:298, 310).

ii. Regarding the shifting species composition of pastoral herds, see the ILO/JASPA report quoted in Hoben et al 1983, IV page 12. The data provided here pertain only to the relative numbers of camels and cattle.

iii. The dramatic impact of animal sales on herd structures is demonstrated by Box (1971:224-225) and Holtzman 1982:128-131) who document the almost complete absence of male animals beyond those required for breeding. However, the breakdown of animal sharing networks can be inferred from these data only if we also assume that male animals made up the bulk of the loaned animals.

10. Thadis Box, who studied Somalia's rangeland in 1966 and again in 1982, provides the testimony against desertification: «My general observation is that the rangelands of central Somalia are in as good condition or better than they were sixteen (16) years ago at the time of my extensive field work» (1982:3). The evidence regarding the impoverishment of small producers is more equivocal. Ruisse argues that Somali herds recovered quickly after the drought (1982:4), which suggest the persistence of networks for livestock redistribution and sharing. It is an open questions, however, whose herds were rebounding--those of large or small herd owners. Jamal argues that there has been a vast overestimation of Somali poverty based on an underestimation of the milk yields of nomadic herds (1981:291). As distinct from the outright impoverishment of small producers, Jamal does argue for an increase in economic stratification and inequality under conditions of commercial production (1981:297-299).
11. Price fluctuations and climatic fluctuations may have a multiplier effect on one another which intensifies their negative impact on small producers. Drought typically leads to increases in livestock marketing and sharp declines in livestock prices in African markets (Sutter 1982; Roe 1980; Quam 1978; Behnke unpublished field notes on drought in Dyrenaica). Conversely, crop failure due to drought is likely to inflate the values of food grains. Thus, livestock producers are likely to experience a cost/price squeeze at the same time as they are facing severe climatic stress. For reasons clearly explained by Strickon, large commercial operators are better situated than small commercial producers to survive these periodic squeezes (1965:246-248).

#### REFERENCES

- Abou-Zeid, Ahmed  
1968 «The Changing World of the Nomads.» In Contributions To Mediterranean Sociology, ed., J.G. Peristiany. Paris: Mouton.
- Allan, William  
1965 The African Husbandman. Westport, Connecticut: Greenwood Press.

- Atherton, Joan  
1983 «The Evolution of a Donor Assistance Strategy for Livestock Programs in Sub-Saharan Africa.» Paper presented at the Conference on Overcoming Constraints to Livestock Development in Sub-Saharan Africa, sponsored by the University of Florida, Gainesville.
- Aronson, Dan  
1980 «Kinsmen and Comrades: Towards a Class Analysis of the Somali Pastoral Sector.» Nomadic Peoples 7:14-23.
- Bates, Daniel and Susan Lee  
1977 «The Role of Exchange in Pastoral Specialization.» American Anthropologist 79:824-841.
- Barth, Fredrik  
1973 «A General Perspective on Nomad-Sedentary Relations in the Middle East.» In The Desert and the Sown, ed., Cynthia Nelson. Berkeley: Institute of International Studies.
- Behnke, Roy  
1980a The Herders of Cyrenaica. Urbana: University of Illinois Press.  
1980b «Indigenous Modernization in Pastoral Cyrenaica.» Paper read at the African Studies Association Meetings, Philadelphia.  
1983 «Measuring the Benefits of Subsistence versus Commercial Livestock Production in Africa.» Paper read at Farming Systems Research Symposium, Animals in the Farming System, sponsored by Kansas State University, Manhattan, Kansas.
- Bennett, John  
1969 Northern Plainsmen. Arlington Heights, Illinois: AHM Publishing Corporation.
- Bishko, Charles  
1962 «The Peninsular Background of Latin American Cattle Ranching.» The Hispanic American Historical Review 32:491-515.
- Botswana Ministry of Agriculture  
1979, 1980, 1981 Botswana Agricultural Statistics. Gaborone, Botswana.
- Box, Thadis  
1971 «Nomadism and Land Use in Somalia.» Economic Development and Cultural Change 19:222-228.  
1982 Central Rangelands Development Project, Somalia: Consultant Report. Mogadishu: Louis Berger International.
- Bozzi, L. and G.A. Triulzi  
1954 Gli Animali Domestici Allevati in Somalia. Mogadishu: AFIS.
- Canan, Frank and Alfred Hillier  
1911 «Beckuanaland.» In Encyclopedia Britannica, 11th Edition, Volume III.
- CARL BRO International  
1982 An Evaluation of Livestock Management and Production in Botswana. Gaborone Ministry of Agriculture.
- Chambers, R. and D. Feldman  
1973 Report on Rural Development. Gaborone: Ministry of Finance and Development Planning.
- Chirenje, Mutero  
1977 A History of Northern Botswana. London: Associated University Press.
- Cliffe, Lionel and Richard Moorsom  
1979 «Rural Class Formation and Ecological Collapse in Botswana.» Review of African Political Economy 15-16:35-52.
- Dalton, William  
1973 «Economic Change and Political Continuity in a Saharan Oasis Community.» Man 8:266-284.
- Dobie, J. Frank  
1980 The Longhorns. Austin, Texas: University of Texas Press. (First published in 1941).
- Doran, M.A. Low and R. Kemp  
1979 «Cattle as a Store of Wealth in Swaziland: Implications for Livestock Development and Overgrazing in Eastern and Southern Africa.» American Journal of Agricultural Economics 61:42-47.

- Dyson-Hudson, Neville  
1980 «The Human Factor.» In Pastoral Development Projects. Addis Ababa: International Livestock Centre for Africa.
- Gannous, Subhi Mohammed  
1977 The Social Structure of al-Abiyar Township. Doctoral dissertation, University of Manchester.
- Goldschmidt, Walter  
1981 «The Failure of Pastoral Economic Development Programs in Africa.» In The Future of Pastoral Peoples, eds., J.G. Galaty, D. Aronson, P.C. Salzman. Ottawa: International Development Research Centre.
- Gulbrandsen, Ørnulf  
1980 Agro-Pastoral Production and Communal Land Use. Gaborone: Ministry of Agriculture.
- Hartwell, R.M.  
1955 «The Pastoral Ascendancy.» In Australia: A Social and Political History, ed., G. Greenwood. New York: Praeger.
- Helland, J.  
1980 «Some Issues in the Study of Pastoralists and the Development of Pastoralism.» I.L.C.A./Kenya Working Document 15.
- Hitchcock, Robert  
1979 Kalahari Cattle Posts. Gaborone: Ministry of Local Government and Lands.
- Hoben, Allan et al  
1983 Somalia: A Social and Institutional Profile. Boston: African Studies Center, Boston University.
- Holm, John D.  
1980 «The State, Social Class and Rural Development in Botswana.» Paper delivered at the African Studies Association meetings, Philadelphia.
- Holtzman, John  
1982 The Economics of Improving Animal Health and Livestock Marketing in Somalia. Mogadishu: USAID.
- Horowitz, Michael  
1979 The Sociology of Pastoralism and African Livestock Projects. Washington: Bureau for Program and Policy Coordination, USAID.
- International Livestock Centre for Africa  
1980 Pastoral Development Projects. ILCA: Bulletin 8.
- Ingold, Tim  
1974 «On Reindeer and Men.» Man 9:523-538.  
1976 The Skolt Lapps Today. Cambridge: Cambridge University Press.  
1980 Hunters, Pastoralists and Ranchers. Cambridge: Cambridge University Press.
- Jamal, Vali  
1981 «Nomads and Farmers: Incomes and Poverty in Rural Somalia.» In Agrarian Policies and Rural Poverty in Africa, eds., Dharam Ghai and Samir Radwan. Geneva: International Labour Office.
- Katzen, M.F.  
1982 «Pastoral Farming.» In A History of South Africa to 1870, eds., Monica Wilson and Leonard Thompson. Cape Town: David Philip.
- Kerven, Carol  
1979 Botswana Mine Labour Migration to South Africa. Gaborone: National Migration Study, Central Statistics Office.  
Ministry of Agriculture  
1978/79, 1979/80, 1980/81 Livestock Development Progress Report. Gaborone: Ministry of Agriculture.
- Murphy, R. and J. Steward  
1956 «Tappers and Trappers: Parallel Processes in Acculturation.» Economic Development and Cultural Change 4:335-355.
- Okiihiro, Gary  
1976 Hunters, Herders, and Cultivators and Traders: Interaction and Change in the Kgalahadi, Nineteenth Century. Doctoral dissertation, University of California, Los Angeles.

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- Osgood, Ernest  
1970 The Day of the Cattleman. Chicago: University of Chicago Press. (First published in 1929).
- Oxby, Clare  
1981 Group Ranches in Africa. Rome: FAO (W/P3098).
- Paine, Robert  
1972 «The Herd Management of Lapp Reindeer Pastoralists.» In Perspectives on Nomadism, eds., William Irons and Neville Dyson-Hudson. Leiden: E.J. Brill.
- Parson, Jack  
1977 «Political Culture in Rural Botswana.» Journal of Modern African Studies 15:639-650.
- Parsons, Neil  
1977 «The Economic History of Khama's Country in Botswana, 1844-1930.» In The Roots of Rural Poverty in Central and Southern Africa, eds., R. Palmer and N. Parsons. London: Heinemann.
- Peters, Emrys  
1965 «Aspects of the Family among Bedouin of Cyrenaica.» In Comparative Family Systems, ed., M.F. Nimkoff. Boston: Houghton Mifflin.  
1970 «The Proliferation of Segments in the Lineage of the Bedouin of Cyrenaica.» In Peoples and Cultures of the Middle East, ed., L. Sweet. Garden City, New York: Natural History Press.
- Pim, A.W.  
1933 Financial and Economic Position of the Bechuanaland Protectorate. London: HMSO.
- Peters, Pauline  
1980 «Preliminary Findings and Observations on Borehole Syndicates in Kgatleng District.» Boston: African Studies Center (mimeo).
- Quam, Michael  
1978 «Cattle Marketing and Pastoral Conservatism: Karamoja District, Uganda, 1948-1970.» African Studies Review 12:49-71.
- Reusse, E.  
1982 «Somalia's Nomadic Livestock Economy: Its Response to Profitable Export Opportunity.» World Animal Review 2-11.
- Rivière, Peter  
1972 The Forgotten Frontier: Ranchers of North Brazil. New York: Holt, Rinehart and Winston.
- Roe, Emery  
1980 The Development of Livestock, Agriculture, and Water Supplies in Eastern Botswana Before Independence. Ithaca, New York: Center for International Studies, Cornell University.
- Ruthenburg, Hans  
1976 Farming Systems in the Tropics. Oxford: Clarendon Press.
- Sandford, Steven  
1981 Review of World Bank Livestock Activities in Dry Tropical Africa. Washington: World Bank.
- Salzman, Philip  
1972 «Multi-Resource Nomadism in Iranian Baluchistan.» In Perspectives in Nomadism, eds., William Irons and Neville Dyson-Hudson. Leiden: E.J. Brill
- Schapera, Isaac  
1938 A Handbook of Tswana Law and Customs. London: Frank Cass.  
1943 Native Land Tenure in Bechuanaland Protectorate. Alice: Lovedale Press.  
1947 Migrant Labour and Tribal Life. Oxford: Oxford University Press.
- Schneider, Harold  
1979 Livestock and Equality in East Africa. Bloomington: Indiana University Press.

- Shaan, Edward  
1930 An Economic History of Australia. Cambridge: Cambridge University Press.
- Shepherd, Geoffrey and G.A. Futrell and J.R. Strain  
1976 Marketing Farm Products. Ames, Iowa: Iowa State University Press.
- Strickon, Arnold  
1965 «The Euro-American Ranching Complex.» In Man, Culture and Animals, eds., Anthony Leeds and Andrew P. Vayda. Washington, D.C.: American Association for the Advancement of Science.
- Sutter, John  
1982 «Commercial Strategies, Drought, and Monetary Pressure: Wo'daa'be Nomads of Tanout Arrondissement, Niger.» Nomadic Peoples 11:26-60.
- Swift, Jeremy  
1977 «Pastoral Development in Somalia: Herding Cooperatives as a Strategy against Desertification and Famine.» In Desertification: Environmental Degradation in and Around Arid Lands, ed., Michael H. Glantz. Boulder, Colorado: Westview Press.
- 1979 «The Development of Livestock Trading in a Nomad Pastoral Economy: The Somali Case.» In Pastoral Production and Society. Cambridge: Cambridge University Press.
- Tietelbaum, J.M.  
1980 Nutritional Impacts of Livestock Development Schemes Among Pastoral Peoples. Washington: Bureau for Program and Policy Coordination, USAID (PASA A6/PPC 096-1-80).
- USAID  
1980 The Workshop on Pastoralism and African Livestock Projects. Washington: Bureau for Program and Policy Coordination, USAID Program Evaluation Report No. 4.
- 1982 «Livestock Development Assistance Strategy Paper.» Washington: Africa Bureau, Office of Technical Resources, Agriculture and Rural Development Division.
- Webb, W.P.  
1931 The Great Plains. Waltham, Mass.: Blaisdell Publishing Co.

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