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Pastoral Production Systems in Eastern Africa: A Comparative Analysis

Stephen Speranza
Western Michigan University

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PASTORAL PRODUCTION SYSTEMS IN EASTERN AFRICA: 
A COMPARATIVE ANALYSIS

by

Stephen Speranza

A Thesis 
Submitted to the 
Faculty of The Graduate College 
in partial fulfillment of the 
requirements for the Degree of Master of Arts 
Department of Anthropology

Western Michigan University 
Kalamazoo, Michigan 
August 1982
This thesis aims at examining variations in pastoral production systems of some Eastern African pastoral societies. It explores interactive models for such variations which focus on specific ecological, socioeconomic and social-structural factors of pastoral production per se. These models highlight some of the factors which create differing degrees of homogeneity or heterogeneity among Eastern African pastoral societies in general.

This problem is of intrinsic interest in anthropology because of the general lack of consensus as to the major factors related to pastoral variations in Eastern Africa or more importantly, in determining which factors are directly responsible for influencing modes of African pastoral productivity.

The societies in Eastern Africa that are discussed in this thesis have been chosen more or less at random to test, document, support, or substantiate the findings, because of the extensive literature about pastoralism in Eastern Africa.
ACKNOWLEDGMENTS

I would like to extend my sincerest appreciation to Professor Alan H. Jacobs for his many comments, remarks, and constructive criticisms which became an invaluable asset in the writing of this thesis. I pride myself with having had the opportunity to consult with Dr. Jacobs regarding my many questions and curiosities which continually transpired during my months of researching and writing. His noted reputation and academic expertise in African affairs has truly left a lasting impression in my commitment to learn as much as possible about pastoralism and Africa in general.

I am especially indebted to Cheryl Ann Brewitz for being as beautiful and loving as she is. Her many hours spent typing preliminary drafts, reading, making wonderful suggestions, and experiencing almost insurmountable backaches while typing, are all of what culminated into a paper that I can be proud of. Most of all, Cheryl's personal words of encouragement and support were the most instrumental in successfully completing this academic exercise.

Stephen Speranza
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Acknowledgments</th>
<th>ii</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>vi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vi</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>I  Introduction</td>
<td>1</td>
</tr>
<tr>
<td>The Problem</td>
<td>1</td>
</tr>
<tr>
<td>Key Concepts for Analysis</td>
<td>1</td>
</tr>
<tr>
<td>Variations in Pastoral Production</td>
<td>4</td>
</tr>
<tr>
<td>An Interactive Model of Pastoral Production</td>
<td>6</td>
</tr>
<tr>
<td>II THE ROLE OF ECOLOGY</td>
<td>13</td>
</tr>
<tr>
<td>Agro-pastoralism</td>
<td>14</td>
</tr>
<tr>
<td>Introductory Considerations: Water</td>
<td>14</td>
</tr>
<tr>
<td>Grazing Lands</td>
<td>20</td>
</tr>
<tr>
<td>Disease Vectors</td>
<td>26</td>
</tr>
<tr>
<td>Semi-pastoralism</td>
<td>28</td>
</tr>
<tr>
<td>Introductory Considerations</td>
<td>28</td>
</tr>
<tr>
<td>Water: The Somali</td>
<td>29</td>
</tr>
<tr>
<td>Water: The Tuareg (Kel Ahaggar)</td>
<td>31</td>
</tr>
<tr>
<td>Grazing Lands: The Somali</td>
<td>34</td>
</tr>
<tr>
<td>Grazing Lands: The Tuareg (Kel Ahaggar)</td>
<td>37</td>
</tr>
<tr>
<td>Disease Vectors: The Somali and Tuareg</td>
<td>39</td>
</tr>
<tr>
<td>Pure Pastoralism</td>
<td>41</td>
</tr>
<tr>
<td>Introductory Considerations</td>
<td>41</td>
</tr>
<tr>
<td>Water: The Maasai</td>
<td>42</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grazing Lands: The Maasai</td>
<td>43</td>
</tr>
<tr>
<td>Disease Vectors: The Maasai</td>
<td>44</td>
</tr>
<tr>
<td>Conclusion</td>
<td>45</td>
</tr>
<tr>
<td>III Socioeconomic Variables of Pastoral Production</td>
<td>47</td>
</tr>
<tr>
<td>Agro-pastoralism</td>
<td>47</td>
</tr>
<tr>
<td>Semi-pastoralism</td>
<td>51</td>
</tr>
<tr>
<td>Pure Pastoralism</td>
<td>58</td>
</tr>
<tr>
<td>Summary</td>
<td>64</td>
</tr>
<tr>
<td>IV Social-Structural Variations of Pastoral Production</td>
<td>66</td>
</tr>
<tr>
<td>Spatial Considerations of Mobility and Territoriality</td>
<td>66</td>
</tr>
<tr>
<td>1. Herd Productivity and Reproductive State</td>
<td>70</td>
</tr>
<tr>
<td>2. Social Properties of a Man's Herd</td>
<td>70</td>
</tr>
<tr>
<td>3. Age and Sex Distribution of a Herd Owner's Family</td>
<td>71</td>
</tr>
<tr>
<td>Domestic and Communal Forms of Pastoral Production</td>
<td>72</td>
</tr>
<tr>
<td>Camp Structure</td>
<td>77</td>
</tr>
<tr>
<td>Communal Organization: Segmentary Lineage System</td>
<td>79</td>
</tr>
<tr>
<td>Nomad-Sedentary Relationships</td>
<td>82</td>
</tr>
<tr>
<td>Human/Livestock Interactions With Other Populations Exploiting the Environment in Different Ways</td>
<td>85</td>
</tr>
<tr>
<td>A. Cultural/Ideological Factors: Dietary Preferences</td>
<td>85</td>
</tr>
</tbody>
</table>
LIST OF TABLES

1. Pastoral Production Variations .................................. 12
2. African Herbivores—Designated Dietary Requirements ........ 24

LIST OF FIGURES

1. Continuum of Pastoral Production Variations .................. 5
2. Interactive Model of Pastoral Production ...................... 7
CHAPTER I
INTRODUCTION

The Problem

This thesis aims at examining variations in pastoral production systems of some Eastern African pastoral societies. My basic concern will be to explore interactive models for such variations which focus on specific ecological, economic, and social-structural factors of pastoral production per se. With such models I hope to highlight some of the factors which create differing degrees of homogeneity or heterogeneity among Eastern African pastoral societies in general.

This problem is of intrinsic interest in anthropology because of the general lack of consensus as to the major factors related to pastoral variations in Eastern Africa. That is to say, Eastern African pastoralism takes many forms or degrees of variation, and it is by looking at variations in modes of "pastoral production systems," or livestock production, that we as anthropologists might usefully attempt to explain certain patterns or regularities generally found in pastoral societies, as well as to assert the causative factors generating such differences in sociocultural institutions.

Key Concepts for Analysis

I begin by defining some of the key concepts guiding the analysis, such as "pastoral production," "variations in pastoral
production," and "interactive models," so as to make clear my position relative to this analysis.

By "pastoral production," I mean a form of subsistence which utilizes to a varying degree sufficient productivity from the husbandry of available livestock so that people can be kept alive from one year to the next on their livestock. This thesis will explore "modes" of pastoral production and not "levels" of pastoral production; for me the two terms offer different meanings. Levels of production would concern itself with "numbers" and quantitative analysis of livestock and pastoral food produced and consumed. Such an analysis would make an excellent thesis if there were available sufficient literature dealing with such quantitative dimensions. Unfortunately, the availability of such literature is relatively sparse.

"Modes" of pastoral production, on the other hand, take into account the differing combinations of livestock and economic institutions by which they are produced. In my opinion, such an analysis can be meaningful insofar as modes of production may elucidate more clearly interrelationships between institutions--a fundamental goal of any research oriented thesis. Again, a major shortcoming in the analysis of "levels" of production is that it makes little if any attempt at developing correlative interrelationships. For example, Dahl and Hjort's (1976) study is currently the best source that I am aware of, and yet they do not illuminate our understanding of pastoralism but rather, form simple tabulations of statistical analysis based on household pastoral production.
There are, in fact, several ways that specific interrelations between variables can be applied to modes of pastoral production. For example, are differences in sociopolitical institutions related to differences in the number and kind of livestock herded by individual herd owners? What currently can be said about the notion that societies based on small stock are less equalitarian than those based on cattle? What, too, can be said about the role or value of small herding stock in a pastoral society? It is my hope that by the completion of this thesis, I may be better able to shed some light in coming to grips with some of these intriguing questions.

Another statement that needs immediate clarifications is the term, "variations in pastoral production." I see variations of pastoral production as closely tied to types of pastoralism. However, I believe it is more useful to examine the "diversities in pastoralism" as a basis for variation rather than the direct examination of "types of pastoralism." I feel that one major shortcoming in developing typologies is that they generally lead to oversimplification. This is not meant to imply, however, that typologies have no redeeming merits or utility. Such is not or has never been the case. Rather, my concern in this thesis is in focusing on a mode of analysis which attempts to examine a wide range of variation rather than the "modal type." As N. Dyson-Hudson (Irons and N. Dyson-Hudson 1972:15) has so elegantly suggested, "Our concern should be with populations rather than typology as an appropriate frame of reference for understanding human behavior."
Variations in Pastoral Production

In this section I draw attention to several variations in modes of pastoral production found in Eastern Africa. Indeed, any study dealing with pastoralism must take into account the extent to which there may be major differences in modes of livestock production among peoples grouped together in a single category as "pastoral." Clearly stated, not all societies in Eastern Africa (or for that matter elsewhere) practice the exclusivity of herding livestock for subsistence purposes. To illustrate, I wish to place East African pastoral production systems on a continuum (see Figure 1). At one end of this continuum are those societies who practice pastoralism in its purest form. These so-called "pure" pastoralists raise livestock in order to subsist solely or in large part off the milk, meat, and blood of their animals. Societies of this nature rely extensively on livestock for purposes of social exchange, an interesting point which will be examined later in further detail. Such "pure" pastoralists are both pastoral in their production orientation as well as pastoral in food dependence. Examples of societies which fall into this category are the Galla Boran of Kenya and Ethiopia, the Bedawib Beja of the Eastern Sudan, and the Maasai of Kenya and Tanzania. Again, a distinctive criterion that differentiates this mode of pastoral production from others to be discussed is that it is practiced by people who engage in virtually no agriculture and whose livestock are raised primarily for food consumption and internal social exchange, and who are not involved in extensive market
exchange, as a means of subsistence.

<table>
<thead>
<tr>
<th>Pure Pastoralism</th>
<th>Semi-pastoralism</th>
<th>Mixed Farming/Herding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock Dependent</td>
<td>Market Dependent</td>
<td>Agricultural Dependent</td>
</tr>
</tbody>
</table>

Figure 1. Continuum of Pastoral Production Variations

Further across the continuum, at perhaps the midway point, are those societies who practice to varying degrees little agriculture but engage in livestock production for market exchange purposes in order to purchase agricultural foods. Though highly pastoral in cultural orientations, in practice they actually depend significantly on agricultural foods for subsistence. The major difference between the two variations in pastoral production as defined here is seen in the degree of dependency and reliance on external trade and markets—a feature generally lacking among "pure pastoralists" (Jacobs 1965a). Examples of this type of pastoralism are best representative in Eastern Africa by the Somali of Somalia, but also includes the Fulani of Northeastern Nigeria, and the Tuareg of the Central Sahara.

A third variation of pastoral production are those societies which actively engage in a combination of both herding and agriculture. Such agricultural-dependent influences, thereby sometimes supplementing their "agro-pastoral" activities with food collecting and hunting whenever possible. Examples of two societies in Eastern Africa that come to mind are the Turkana of Kenya and the Nuer of
An Interactive Model of Pastoral Production

To reiterate briefly, my aim in this thesis will be to explore one or more interactive models focusing on specific ecological, economic, and social-structural factors of pastoral production. Although my main interest in this paper is in ecology and economics, it is nonetheless important to realize that a consideration must, too, be given to the "social" and "sociostructural" factors of pastoral societies since these will also influence "production." By exploring such "interactive models," I aim to highlight some of the "factors" which create differing degrees of similarities and differences in the general character of the pastoral societies that I will later demonstrate in my analysis. The problem of discovering and isolating which "factors" are genuinely important in elucidating our understanding of the similarities and differences in pastoral societies has been of relative interest in anthropology due largely to the general lack of consensus as to the major factors related to pastoral variations in Eastern Africa. As previously noted, East African pastoralism takes many forms or degrees of variations, and it is by looking at variations in modes of "pastoral production," or livestock production, that anthropologists attempt to explain certain patterns or regularities generally found in pastoral societies, as well as to discover the causitive factors generating such similarities and differences in their sociocultural institutions.
The construction of a simplistic model of pastoralism must take into account a human/livestock interrelationship balanced by the elements of the natural environment—namely, grazing, water, and disease vectors. Therefore, the model presented below must first demonstrate a basic consideration of the ecological factors of pastoral production as a balancing response to the carrying capacities of the natural environment. These include:

1. Available grazing lands
2. Disease vectors
3. Availability of water

I believe that these ecological "factors" or circumstances (man/resource relationship) will, to some degree, form a foundation and/or impose limits upon the social order. These ecological factors relate synchronically to the modes of pastoral production (see Figure 2). An example of this nature would include the kinds of resources exploited and the technological means of such exploitation (Goldschmidt 1976:18).

Figure 2. Interactive Model of Pastoral Production
However, such a model can be very one-sided. If our understanding of pastoralism were reduced simply to ecology, then our research energies could be or should be devoted elsewhere. What makes the study of pastoralism elusive and bewildering is the continuous interaction that takes place between the nature of the carrying capacities of the environment (ecology) and the socioeconomic factors which make for specific demands on personnel within the society.

I now wish to list several economic factors of pastoral production for consideration. Keep in mind, however, that these factors are not all inclusive. Some of these include:

1. The kinds of livestock herded
2. The numbers of livestock (man/animal ratio)
3. Variations in the subsistence strategies utilized, i.e., what subsistence variations are used
4. The specific roles that women serve in the production aspects of pastoral societies
5. Knowledge of the complete carrying capacities of the environment, i.e., the alternative possibilities of exploitation (hunting, fishing, food collecting, pastoral activities, raiding, agriculture, etc.)
6. Dependence on livestock vs. the commitment to livestock. This is by no means the same thing. The latter requires knowledge about human values-societal ideologies. The former requires economic specifications—namely dietary intake, seasonal food resources, reliance on alternative modes of technology and exploitation and the like. (Irons and N. Dyson-Hudson 1972:25)

As previously suggested, one or a combination of these economic factors makes for specific demands on all members of a population involving both the kinds of activity that people are engaged in but, even more significantly, the kind of collaborative and mutual
activities primary and indispensable to the productive process (Goldschmidt 1976:18). The statement above, therefore, reflects my feeling as to why these kinds of relationships and factors are likely to prove important in understanding the production process of pastoral societies.

The "social structural" or organizational feature of pastoral nomadic societies is a third interactive variable of relative importance to pastoral production. The social feature of a pastoral society is, at the onset, a local exploitation group. Local exploitation groups are a set of domestic or herding units who are periodically drawn together for a temporary but peaceful exploitation of local resources. Such social factors for consideration would include:

1. Nomad-sedentary relationships
2. Spatial mobility
3. Ecological-social linkages
4. Political manifestations and consequences of pastoral movements

Figure 2 illustrates a highly interactive model of pastoral productivity. Note the functional interrelationships that are operative. The nature of the diagram becomes a useful instrument for disentangling certain aspects of a pastoral situation because it allows the reader to deal illuminatingly with the complex and diverse responses which are "active" without rigid separations of time and space.
In recent years, there has developed a growing recognition of a fourth factor in the study of the production aspects of pastoral societies (though not discussed as a separate chapter in this thesis) and that has been the examination of the sociocultural complexities of human behavior (R. Dyson-Hudson 1972; Goldschmidt 1976; Irons and N. Dyson-Hudson 1972). For instance, I previously suggested that ecological factors are central in determining the relative nature of the social order. As I look at the social system, there are sociocultural factors which may serve as intervening variables. I have listed three of many possible sociocultural factors below. Needless to say, a number of these factors are made obvious with the recognition that a society is made up of individuals each of whom is engaged, in one form or another, in building his/her own personal career (Goldschmidt 1976:20). Goldschmidt defines "career" as the individual's life history through time and space. Therefore, the sociocultural attributes as they pertain to pastoral production may well include the following:

1. The individual's pursuit of economic satisfaction or economic uncertainties
2. Social prestige
3. Personal influence or power

I now leave this section to focus attention on the specific pastoral societies I have chosen to compare based on the variations in pastoral production. To demonstrate this ongoing analysis, I will select two or three East African pastoral societies from each of the designated "pastoral variations" to show how, based on the
specific ecological, economic, and social-structural factors of pastoral production listed earlier, the following propositions can be deductively analyzed:

1. Those societies of similar pastoral production orientations will be more like one another in their livestock ideologies.

2. As there becomes a growing disparity in the variations of pastoral production, so too will there become larger degrees of dissimilarities or differences in the social composition and organization of the group.

3. The differences in the number and kinds of livestock herded is indirectly proportional to the mode of pastoral production utilized.

4. Societies based on small herding stock are less equalitarian than those based on cattle.

5. The differences in the sociopolitical institutions is directly correlated to variations in pastoral production.

In Table 1, I list in tabular form the pastoral societies chosen, based on the pastoral variations discussed earlier. The societies were selected as the result of two factors: The first factor concerns itself with my personal interest in the societies mentioned, as a result of my exposure to the various ethnographic accounts throughout my graduate training. Secondly, and more importantly, I feel that the particular societies listed appear to be appropriate for this exercise because they each in one way or another best "fit" the productive aspects in the variations as so listed.
Table 1
Pastoral Production Variations

<table>
<thead>
<tr>
<th>Type of pastoralism</th>
<th>Societies selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure pastoralism</td>
<td>1. Maasai</td>
</tr>
<tr>
<td>Semi-pastoralism</td>
<td>1. Somali</td>
</tr>
<tr>
<td></td>
<td>2. Tuareg</td>
</tr>
<tr>
<td>Agro-pastoralism</td>
<td>1. Turkana</td>
</tr>
<tr>
<td></td>
<td>2. Jie</td>
</tr>
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<td></td>
<td>3. Nuer</td>
</tr>
</tbody>
</table>
CHAPTER II

THE ROLE OF ECOLOGY

This chapter has several aspects. First, in addition to the substantial information already provided by anthropologists regarding the role that certain ecological factors play in pastoral societies, there is nonetheless a matter here that I will present which attempts to focus on these ecological factors individually. That is, the ecological factors for consideration will be presented independently based on variations in modes of pastoral production. Such an approach will enable the reader to understand more thoroughly the role of the environment and how it "influences" to some extent the "productivity" of pastoral production.

Secondly, this chapter is designed to provide critical data for understanding the relationship that ecology plays in pastoral societies with other intervening variables as stated in the introductory chapter; though I should add that such relationships may not become totally apparent until the concluding chapter of this thesis.

Thirdly, this chapter aims at providing the reader with "bits and pieces" of information regarding the diversity of environments utilized by pastoral people. Information will be presented relating to the three main ecological factors affecting pastoral production: water, grazing lands, and disease vectors.

Finally, I try to strike a balance between the general features of the ecology relative to the three main variations in pastoral
production and the total functional interrelationships of other intervening variables for future consideration.

Agro-pastoralism

Introductory Considerations: Water

With all the precarious uncertainties that seem to plague pastoral environments, none are more apparent than the lack of, or geographical variations in, rainfall. Agro-pastoral environments have one redeeming subsistence option generally open to them, namely, the ability to grow crops during a portion of the year. This is not to imply that because the environment is conducive to agriculture such subsistence activity will be automatically assumed. For instance, the "pure" pastoral Maasai, whom I shall speak of later, live in an environment which is relatively conducive to agriculture and yet due to "cultural values" engage in virtually no agricultural activity whatsoever.

Many agronomists argue that a minimum of 22 inches of rainfall is necessary per annum to support agricultural production. However, there are other considerations which must also be examined. For instance, this minimum depends on the variety of crop grown—corn generally requires more water than does sorghum. There are also many varieties of drought-resistant corn—some strains of which can better adapt to more arid environments than can others. Other factors involved in the feasibility of agriculture includes the conditions of the nutrients within the soil, the amount and intensity
of the rains which might cause leaching and soil erosion, the extent to which ultraviolet radiation influences evaporation, the degree of flooding followed by corresponding drought, and so on. These conditions must be cautiously and discriminately analyzed to understand the implications of the positive and/or negative factors involved in plant growth.

**Water: The Jie**

The Jie are an agro-pastoral group who occupy part of the undulating plains of northeastern Uganda. Although recent statistics are unavailable, Gulliver reported in 1955 that the average annual rainfall for central Jieland was about 25 inches with a considerable range of variation east to west. As the Jie move further west, the rainfall increases to between 30 and 40 inches per annum. Due to the nature of the environment, the Jie have a transhumance system which is a special kind of migratory pattern whereby people and herds migrate between two fixed points seasonally— in this case east and west, generally returning to the same areas each season. The organizational structure of the family is bounded by fixed homesteads and stock camps. It is within these fixed homesteads that older men, women, and children stay with the herds about 10 months of the year (Gulliver 1955).

An important point of ecological consideration is that all agricultural activity that takes place at these homesteads is done so in a westerly direction. That is, the further west that the Jie concentrate, the better are the chances that there will be enough
rain to support agriculture.

Water: The Turkana

Comparatively speaking, the environment occupied by the Turkana of the eastern branch of the African Rift Valley is much more harsh than Jieland with severe, desert-like conditions. Rainfall is limited considerably and so too is the amount of agriculture within any given area. What is typical about the Turkana is reflected in the movement of the inhabitants. There is always the dichotomy—the plains and the mountains. However, it should be pointed out that the Turkana see themselves as "people of the plains" and they move unwillingly to the mountains and only when environmental pressures (mainly the lack of plains' water) necessitate such a move.

Generally, the wet season extends from about April to August and the dry season from about September to March (Gulliver 1955:18). However, not only does there appear to be a large degree of demographic variations in the amount of rainfall in any given location and between successive years, but occasionally the rains fail more or less altogether.

As a general rule, the average annual rainfall in the plains is between 12 and 16 inches and about 6 inches in the central desert regions. The mountain areas, on the other hand (at altitudes above 4,000 feet), supply significantly greater quantities of rainfall: 25 inches and more in some areas. It should be pointed out that variations and irregularities in rainfall are less severe in the mountains than in the plains.
Although the environment does not allow for a significant amount of agriculture, there is nonetheless an attempt to grow crops in the mountainous area whenever possible. Also, unlike many other "pastoral peoples," Turkana supplement their daily diet with hunted and gathered foods whenever possible. Indeed, they are said to "eat anything that crawls" (Jacobs 1982). The rains usually come in sharp storms for several unending days during the wet season which results in sandy soils and rapid runoffs. Consequently, water retention is low, and this matter is greatly precipitated due to the high degree of evaporation brought about by intensive daily heat buildup. Therefore, the nature of the environment greatly hampers both the grazing and browsing capabilities for livestock, but also agricultural production.

After the rains, ponds are formed. Water supplies are created mainly from watercourses. There are no individual rights of water control; water, as in grazing rights, belongs to all Turkana. Only under emergency situations in which water resources have been artificially developed, do Turkana claim specific rights. Soon after the dry season commences, water holes must be dug in the beds of watercourses. This requires a considerable amount of initial labor and investment, not to mention periodical maintenance. It is for this reason that people who dig such water holes are taken to be the owners, with specific rights pertaining thereonto.
Water: The Nuer

The Nuer are located in the south-central region of the Sudan and number some 200,000. The climatic conditions in which the Nuer live is comparatively similar to the Turkana and Jie, at least to the extent (and severity) of annual drought. During the rainy season, however, such ecological similarities end. As the rains commence at around April, it is not until the end of May that heavy and (more often than not) continuous downpours occur. The velocity and fierceness of rains combined with the flatness of the country (thus preventing surface drainage) and the subsequent annual flooding of rivers lead to an excessive amount of surface depressions or huge puddles, thus inhibiting the slightest possibility for drainage from the saturated earth. By mid-June, the entire country, except for relatively elevated areas, is temporarily inundated. Here, surface water sits several inches deep until about mid-September giving the appearance of a grass-like swampy condition.

Excess or insufficiency of water are two of the more serious problems confronting the Nuer. As a way of overcoming the insurmountable problem of excessive flooding, the Nuer are forced to situate themselves on more elevated ground. Here they remain with their herds practicing agriculture and fishing until about December, when the water begins to recede and pastoral production can once again resume intensively. Since family herds are the most economically prized resource, the Nuer do not hesitate to provide their animals with the best care humanly possible. For instance, animals
are continuously driven on what appears to be the best grazing and water availability possible. Also, fences are erected in the form of Kraal camps as a way of offering protection from carnivorous beasts, especially during night hours.

The lack of rain during the dry season can be more devastating not only from the point of hampering the availability of grazing land, but also disrupting to a large extent horticultural activity, specifically millet (sorghum) production. Since wet and dry season transitions are very pronounced and sudden, the Nuer act quickly and skillfully to maximize the resource base of their limited environment.

Owing to the general nature of their particular environment, the Nuer are forced by necessity to occupy two strategic locations on a seasonal basis—this movement between two fixed points (generally termed transhumance) is a special kind of migratory pattern enabling the Nuer to obtain the optimal available resource potential provided by their meager environment. For example, during flooding conditions, the Nuer are compelled (along with their herds) to occupy higher ground where the implementation of both horticulture and fishing can be substituted for pastoral-related subsistence activities. However, as the dry season approaches and subsequent water accumulation recedes, the absence of available water and grazing land on these sandy elevated grounds requires of the Nuer a movement towards lower and more suitable topographic conditions. Even though the Nuer would very much like to subsist solely on the products of their cattle, they are nonetheless unable, due mainly to two specific
factors. The first and most important is the result of the general nature of Nuer environment: Since impending floods and droughts are a continuous problem, they can keep no more livestock than can be supported by grazing lands which are not inundated during the rainy season. Secondly, although the Nuer are continuously "obsessed" with the need for obtaining more cattle, they have for the most part been unable to attain the minimum number of milch cows necessary for this purpose. Therefore, they must supplement their milk/meat diet with grain and fish, such that from a dietary point of view they can be described as an agricultural/fishing people who also keep livestock.

Grazing Lands

In the understanding and appreciation of the environmental limitations imposed on many pastoral societies, few limitations are more important than continuous need for good pastural land. The reason is obvious: Herds need a constant supply of vegetation to sustain life. Since agro-pastoral societies rely to a varying degree on agricultural production as well as herd management, diversities in subsistence will, to some extent, compliment and circumscribe each other. One form of subsistence may be more dominant than the other (as in the case for the Turkana and Jie), but this in effect may be due to the imposed environmental conditions and limitations operative within that designated society which restricts the amount of agriculture which is possible.
The need for good grazing land is a constant concern for all pastoral societies who rely extensively on their herds for survival. As a way of coping with this continuous struggle, many pastoral societies have developed a method of achieving the maximum amount of grazing land given the limitations of the environment. The system is called "transhumance," wherein the environment dictates the seasonal pattern of pastoral movements. As indicated previously, the Jie is one of many pastoral societies who have successfully incorporated such a system. To understand and appreciate the extent to which this transhumatic system operates, the following remarks are presented.

First, there is the recognition of two main seasonal variations in Eastern Africa—wet and dry. As for the case of the Jie, it is during the dry season (September-March) that livestock is concentrated mainly to the west. As the rains commence (around April), new succulent grasses and shrubs begin to appear over most of the western area, now that surface water becomes readily available. It is also a time when herds tend to disperse due to new water and grazing availability in order to rest or create standing hay in their dry season. By mid-June, grass in the west becomes thick and tall, while in the east, surface water is now collecting, thereby allowing new short grasses to take root. Since short grass is highly desirable for cattle, a movement is made to the east and east-central, leaving the west relatively uninhabited. When the rains cease at about September, surface water dries up quickly leaving the sun-baked earth with virtually no vegetation. As a way of counteracting these
limitations in the carrying capacity of the environment, herds are driven back in a westerly direction where surface water tends to last longer permitting far-denser quantities of vegetation and subsequent grazing availability. Here in the west, herds remain until the next season commences whereby the cycle is again repeated (Gulliver 1955:18).

The environmental situation for the Turkana is comparatively more severe due in part to the limited quantities in rainfall and their inability to obtain (in many cases) other avenues for creating water reserves. As such, natural resources tend to be generally poor, in both quantity and effectiveness (as contrasted to the Jie) and this in essence has caused considerable structural fragmentation and instability in Turkana settlement patterns, since herds must be moved fairly often in order to obtain adequate pasturage. I do not wish to belabor this point here since I am ultimately concerned with the "components of grazing," but there must also be some recognition of the apparent effects underlying "nomadism" if we are to increase our understanding of social-spatial relationships in connection with pastoral social order.

Due to the severe limitations and precarious nature of the environment, the Turkana are basically left with little choice but to implement nomadism as a way of strategically adapting to these limitations. Since Turkana survival depends to a large extent on herds, and since herds need an adequate supply of grazing land, it follows, therefore, that the very nature of nomadism denotes a particular type of subsistence pattern relative to the indigenous populations.
who inhabit such inhospitable environments. Again, as in the
Turkana case, there becomes a distressing need to understand more
thoroughly the exigencies of nomadism as spatial relations frequently
change. For example, Gulliver (1955) was able to comprehend with
keen insight the relative nature of Turkana nomadism and how it pro-
duces a self-perpetuating "instability" in their social system not
generally found among the Jie. In a well-written passage, Gulliver
categorized the nature of such instability:

In Turkanaland, there are no close ties or face-to-face
relationships in work, leisure, or ritual activity.
There is a continuous break-down in communication even
among close kin members due to the relative frequency of
geographical separation. The group obtains no permanent,
underlying unity of constant cooperation and contacts.
These manifestations are the result of the stock-owning
unit being isolated geographically over long periods of
time. (Gulliver 1955:252).

The Turkana environment consists of two different ecological
zones—the plains and the mountains. Since rainfall tends to be
small and irregular in both quantity and effectiveness, there will
be, to a considerable extent, corresponding variations in the supply
of vegetation as well as the grazing movements of the Turkana herds
(Gulliver 1955:23). Since there is a greater quantity of rainfall
and subsequent precipitation in the mountains (above 5,000 feet)
with proportionally smaller rainfall variations and irregularities,
such an ecological zone offers an invaluable "escape route" during
the dry season, particularly for cattle.

Grazing considerations are more complex for the Turkana and
this in part is attributed to the requirements and capabilities of
the various kinds of stock herded by individual herd owners. For
instance, all types of animals have to some extent differing dietary needs. At one end of the spectrum are cattle which must have grass (or certain kinds of herbage generally associated with grass). At the other end are camels which need to browse (i.e., the leafage of bushes and trees) and generally refuse to graze if for no other reason than due to anatomical differences. About somewhere center are goats and sheep which are capable of both grazing and browsing, though sheep fare considerably better on grass. Table 2 illustrates the various kinds of African herbivores and their designated dietary requirements.

Table 2
African Herbivores—Designated Dietary Requirements

<table>
<thead>
<tr>
<th>Grazing</th>
<th>Browsing</th>
<th>Grazing/browsing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle(^a)</td>
<td>Camels</td>
<td>Goats</td>
</tr>
<tr>
<td>Sheep</td>
<td>Goats</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)In instances, boran cattle are able to browse when environmental limitations are imposed on grazing.

By putting the above illustration in perspective, it becomes obvious that dietary requirements determine the specific areas in which the kinds of stock can be kept. For example, cattle are generally restricted to grassland and therefore are unable to intrude into ecological zones which may be more suitable for goats or camels. The kinds of animals herded and the corresponding relationship to
their varying ecological zones of adaptation is important in understanding Turkana grazing procedures. Cattle are driven down from the mountains only during the height of the rainy season when there tends to be sufficient graze on the plains. As grazing availability diminishes, cattle are cautiously and decisively driven back towards the mountains where grass appears to be of far greater abundance. Thus, depending on the quantity and effectiveness of rainfall, pastoral movements are somewhat "conditioned" in response to the appearance of new vegetational resources.

The Turkana subsist on three main types of stock throughout the year. Although there appears to be a far greater number of cattle (current statistics are not available), little information is illuminated in the anthropological literature as to the exact role that smaller stock serve in Turkanaland, specifically sheep and goats.

Grazing Lands: The Nuer

It is commonly agreed by agronomists or soil experts that grazing lands tend to be the most pastorally productive at the inception of the rainy season when young shoots begin to actively germnate. Here, grasses are able to renew their growth after the long drought; it is these young new shoots that offer cattle the best selection of palatable species. As the rains continue, it becomes more difficult to graze on the open plain. As repeated earlier, Nuer cattle are compelled to move to vegetational areas along sandy ridges. As rains cease, the Nuer burn the dry and withered grasses on the plains since a few species send up new shoots shortly after being fired.
After the grasses have been burned, cattle can wander where they please since there is now plenty of pasture lands and available water. Variations in both water and vegetation forces the Nuer to move (and to a considerable degree) determines the direction of their movement (Evans-Pritchard 1940:61).

**Disease Vectors**

It is reasonably safe to assume that any consideration devoted to pastoral production must in some manner appropriately address the dilemma of diseases in pastoral societies. The geographical distribution of animal husbandry in Eastern Africa is largely concerned with not only the presence or absence of available grazing land and water, but also the climatic conditions for which certain kinds of diseases are likely to manifest themselves. For instance, it is an acknowledged fact (and one in which all pastoral people are probably the most keenly aware) that increasing precipitation or humidity will likely contribute negatively to the general conditions of pastoral production. This is largely the result of the tsetse fly which can totally obliterate a family’s herd in merely several hours. Therefore, a major reason that pastoral production is avoided in tropical rain forest areas (or where damp-humid conditions continuously prevail), is the result of trypanosomiasis (sleeping sickness) the disease transmitted by the tsetse fly. Although there have been considerable strides made in the past few years in improving animal health, more work is needed in hopes of eradicating this major disease which critically effects both man and animal.
The literature is full of historical instances which have documented the devastating effects caused by the tsetse fly to numerous herds in pastoral societies. For example, given the relative nature of Jie environment, with a considerably higher rainfall per annum (as compared with the Turkana), it should not appear tremendously surprising that the Jie have suffered a much higher incidence of bovine epidemics, particularly rinderpest.

The Nuer have in the past been plagued by the tsetse and it is for this reason which has prevented them from expanding into other areas, specifically eastward. There has also been the presence of many other microscopic organisms which have resulted in diseases of both man and cattle. Two of the more serious diseases to cattle are bovine pleuropneumonia and rinderpest—the former of which has caused heavy casualties among Nuer herds (Evans-Pritchard 1940:68). As for rinderpest, the Nuer have found no way of combating the disease once it has attacked, but they are very much aware that an infected herd ought to be isolated since the disease is highly contagious. One precautionary measure taken by most pastoral societies to insure the welfare of their cattle is by simply splitting up their herds into widely separate camps, so that if an out-break should occur, cattle placed in a neighboring area may escape unharmed. Such a strategic measure, therefore, becomes a form of insurance in semi-arid and arid environments where catastrophes (natural or social disasters) are commonly present in the production aspects of pastoral societies.
**Introductory Considerations**

This section of the chapter deals primarily with the principal ecological significance of two semi-pastoral societies: the Somali of Somalia and the Tuareg of the central Sahara. As indicated from the introduction, the general features that characteristically comprise semi-pastoralism tend to rely (to a varying degree) on external trade and markets as a way of obtaining agricultural foods; and who, for the most part, practice relatively little agricultural activity *internally* within the perspective society. In other words, pastoral production is intensively utilized and then such products are sold or bartered on the open market as a means of acquiring agricultural-related subsistence items.

Semi-pastoral environments are not dramatically different from those of agro-pastoral ones—generally, the same kinds of environmentally imposed limitations tend to be operative in both instances (e.g., scarcity and irregularity of rainfall and grazing lands, etc.). What differentiates or separates these two main forms of pastoral production orientations (as suggested from this analysis) is seen in the relative nature of several *eco-cultural* associations. For instance, not only are ecological factors important (as the preceding pages have attempted to illustrate), but also significant is the appearance of human/animal occupation in tropical grazing land ecosystems which have resulted in specific processes in *production specialization(s)* of pastoral societies. In other words, pastoral
productivity must be viewed from more than just a simple triumphant framework over the multitude of environmental constraints. Instead, the totality of interrelationships must be analyzed between the primary producer, the primary consumer, and the secondary consumer in pastoral societies. Moreover, since African eco-cultural associations are primarily concerned with the relative scales of technicality, pastoral specialization, and productivity, then researchers must focus their attention on the nature of these indices and how they relate to the various uses of livestock and different herding policies. On that note, I wish to now turn attention to the ecological variables that comprise Somali pastoralism.

**Water: The Somali**

The Somali are a Cushitic-speaking people who are located on the Horn of Africa along the periphery of Ethiopia, as well as the northeastern region of Kenya. Although recent population figures are unavailable, estimated projections indicate that the Somali may well number over 3 million strong.

It is difficult to describe the prevailing ecology of Somalia due not only to the relative inconsistencies in available rainfall and grazing lands, but moreover, by the enormous geographical distribution of Somali territory. There are three main topographical zones termed, Guban, Ogo, and Haud, respectively. Each zone corresponds to relatively different ecological characteristics with respect to plant-life and rainfall availability. Guban is generally the most meager with annual rainfall rarely exceeding 4 inches.
Within the Ogo region, rainfall tends to vary roughly between 4 and 20 inches allowing for both pastoral activity and limited cultivation of sorghum. In many instances, wells have to be dug with considerable labor expenditure and periodical maintenance, thus it is for this reason that many Somali wells become marked as "private property" belonging to the specific lineages or clans involved in their construction.

Zone three (Haud) is the most ecologically resourceful in both water and grazing availability. The primary ecological variability of each designated topographical zone, therefore, reflects the corresponding differences in available grazing lands as a result of the disparities in rainfall and, consequently, all three zones combine to form typical Somali environment. With this in mind, there are basically "four major climate seasons--two wet and two dry and a host of subsidiary seasons throughout the year" (Lewis 1955:329).

The rains generally begin around April and continue until July when the S.W. monsoons commence, blowing fiercely and unpleasantly. Then, vegetation and pastures dry up rapidly until the next pattern of watering starts--somewhere around September or October. It is usually during January that the main dry season commences. This is the most devastating time out of the entire year when the loss of some of the herd is normally expected due to the debilitating effects of the environment.
The Tuareg are commonly described as Berber-speaking nomadic stockbreeders who occupy the vast mountainous regions of Ahaggar in southern Algeria. Although the Tuareg are extensively concentrated in this area, there are other such Tuareg groups (Kel Ajjer, Kel Adrar, etc.), who inhabit the Sudanic regions of Niger, Mali, and southwest Libya. Both Nicolaisen (1963) and Keenan (1977) have reported that the total number of Tuareg may well number some 250,000-300,000 (Keenan 1977:7). It should be noted that although the Tuareg are located extensively in the Western Sahara as well as the northern parts of the Western Sudan, the specific area that I wish to focus attention on are the Tuareg from Ahaggar.

It is interesting to note that the Tuareg were part of a historic "trading empire" of North Africa, involving complicated trading routes, etc. Hence, one of the most important ecological factors for Tuareg related to water, grazing, and disease vectors was their "trade route movements," per se. To understand how these trading routes came about, attention should be briefly focused on the distinctive character of Tuareg class structure which has appropriated social relations of production and integrated it within the overall economy. For instance, Keenan (1977) indicates that the "nobles" (Ihaggaren) dominance and control over the "vassals" (Kel Ulli) may have been the result of two factors: the utilization of camels (which made long-distance trading a more successful enterprise) and the use of superior weaponry (e.g., double-bladed sword).
Indeed, "the camel provided the Ihaggaren with their use of arms, enabled them to establish and maintain their dominance over Ahaggar and neighboring regions" (Keenan 1977:33).

The Ihaggaren's continued success at raiding southwards into Sudanese regions to capture slaves was a logical means of appropriating and increasing labor resources. Thus, the Ihaggaren's ability to maintain and exert military control over the surrounding territories of Ahaggar provided elaborated trans-Saharan caravan routes and trading networks for which they were able to obtain dates and certain cereals from specifically the oases of Touat and Tidikelt to the north. It was not until recent times (around the 1920's) that caravans were encouraged and organized on a regular basis. Keenan suggests that these caravans traded locally mined salt for millet and thus provided Ahaggar with the bulk of its cereal requirements (Keenan 1977:35). However, what is most significant about the caravan trade is that it is generally organized and undertaken with environmental conditions in mind. Since trading expeditions are extremely strenuous, such expeditions usually take place during the fall or early winter when heat tends to decrease substantially.

Also, since water and pasture are often rare in the desert country, most Tuareg must bring with them large supplies of dried grass which serves as fodder for the pack-camels. Thus, great care is taken in the initial preparations for the journey—that, and the use of the camel, provide the people of Ahaggar with fairly intermittent trading networks designed to supplement the Tuareg's mainly pastoral subsistence base with dates, millet, and certain cereals. To
further understand the importance of caravan trading:

The Ahaggar Tuareg cannot live exclusively on stock-breeding products all the year round—not even in good years when animal pasture is well developed in autumn and early winter. Even in good years the nomads mainly eat vegetable food throughout the hot season, and some bread or porridge is also consumed during the period of abundant milk yields. (Nicolaisen 1963:209)

In another section one finds:

It is mainly through caravan trading that the Ahaggar Tuareg acquire their vegetable food products. Their two important trading expeditions to the Tidikelt oases and to the Sudan are carried out annually for the main purpose of acquiring dates and millet. (Nicolaisen 1963:210)

North African pastoralism has similar kinds of climatic vagaries as does many other parts of Africa, particularly with the inconsistencies and fluctuations in rainfall. In Ahaggar, for example, rainfall varies considerably in its intensity, seasonal and geographical distribution, and annual amount. In fact, nothing has obstructed the Kel Ahaggar's predominantly pastoral and nomadic existence more than the cumulative effects of inadequate rainfall and overgrazing throughout successive years. According to monthly precipitation records, there are generally three main periods of rainfall in Ahaggar—August—September, May, and to a lesser extent, December and January (Keenan 1977:213). During the summer months, rainfall comes in the form of torrential thunderstorms leaving several centimeters of rain in a matter of 1 or 2 hours. The possibility of flooding is quite real during the summer thus endangering the lives of both humans and livestock. Towards the end of the summer months, however, rain tends to take the form of intermittent drizzle and this
unquestionably becomes highly desirable for the nomadic Kel Ahaggar thus ensuring the freshest grazing land and subsequently reducing the risk of possible famine during the hardest months.

It would be a serious mistake to deny the extent to which periodic droughts have effected pastoral production among the Kel Ahaggar. Indeed, between the period of 1959 to 1964, there had been 6 consecutive years in which rainfall was well below the statistical average "With both 1961 and 1964 recording only 5 mm" (Keenan 1977: 214). As a way of alleviating or reducing the environmental "risk" involved in pastoral management, Keenan eloquently states the following:

Such drought periods are of course nothing new to the Kel Ahaggar. They are part of their experience, and like nomadic pastoralists the world over they have developed certain means of "insurance" against them. The maximization of herd sizes, migration into other regions, diversification of livestock holdings, and such social institutions as bridewealth payments, corporate holdings, sharing, and so forth, which function in various degrees to maximize the circulation or dispersion of livestock, all provide some measure of insurance against loss. (Keenan 1977:214)

Grazing Lands: The Somali

As stated earlier, any definitive appraisal made about the considerations of grazing must initially take into account the diversity of stock-holdings in a typical Eastern African society, since various types of animals have differing dietary requirements. Northern Somali pastoralism is based on the husbandry of a diversified number of animals: sheep, goats, camels (single-humped dromedary), cattle (Zebu), donkeys, and horses (Gibbs 1965:329). It must
be noted, however, that camels represent the most highly prized ani-
imals in Somalia; the major uses of such animals range from the prin-
cipal means of transport among nomads to milk and meat by-products.

Generally, there are no exclusive rights held over water or
grazing territory (except under the provisions of man-made wells
which require considerable construction labor). Yet, there is some
effort made particularly at the clan level to defend one's grazing
territory against outside intrusion if the stretch of land in ques-
tion is continuously utilized on a regular basis by the same clan
members. Here, "custom" and "regularity" dictate or intervene over
generally acknowledged management procedures.

The pastoral Somali have developed two separate forms of graz-
ing units partially as a way of responding to their ecologically
limited resource base: the nomadic hamlet which is a sheep and goat
herding unit and the camel camp which contains browsing camels
(Gibbs 1965:332). The nomadic hamlet consists of a group of nuclear
families and principally related agnatic kin joined with their
flocks— a few milch camels and/or cattle. More often than not, the
hamlet consists of several nuclear or polygynous families and sig-
nifies, to some degree, a "kin-group" identity. The camel camp, on
the other hand, represents a "rites of passage" or initiation into
manhood activity. At the age of 7 or 8, boys are sent to the camel
camp to learn the art of camel husbandry. Although I would agree
that the dispersal of various types of animals is indicative to some
extent of the ecological adjustments to various grazing capabilities,
it should not be ignored that the nomadic hamlet/camel camp dichotomy
represented by the Somalia, is an "institutionalized" form of soci­et­al enculturation, particularly for young men. Moreover, the sepa­ration of camps and subsequent dispersion of animals also helps re­duce the competition for keen resources; a vital prerequisite in environments where the line between survival and disaster is pre­cariously narrow.

Unfortunately, what is contained in most of the research about the Somali (or for that matter about most research conducted on pas­toral societies) is the "unequal" emphasis devoted to various kinds of herding animals. For example, considerable effort is made to discuss the role and economic contributions that camels serve for the Somali (taking into account that camels, above all else, repre­sent the most important animal in the internal economy) but little such recognition is applied to the use of smaller stock—namely, sheep and goats. Although it is true as Lewis (1955) suggests that camels have less-demanding watering needs in comparison to those of sheep and goats and so are therefore able to go without water for at least 14 days or more, thereby also having a correspondingly wider range of geographical movement, he nonetheless fails to recognize the overall economic contributions that smaller stock (namely, goats) serve for the Somali. For instance, it is generally agreed upon that goats (in contrast to camels) are more resilient to the climatic exigencies of Somalia and, subsequently, herds are able to reproduce at a much faster rate than camels given an adequate supply of fresh vegetation. It should also be noted that goats serve a far more im­portant economic contribution in market exchange than do camels.
Ideally, the study of production systems in pastoral societies must take into account the equal (yet different) contribution(s) of all breeding animals to the subsistence economy which would invariably be concerned with the changes in herd size, milk yields, and so forth, in relation to variations in ecological, economic, and social factors (Keenan 1977:226).

Rainfall is not the only factor which influences adequate grazing; also important is the relative characteristics of the soil. Although soil conditions vary depending on the area (North or South Somaliland), generally, most of the soil is calcareous, particularly in the North. In the South and Southwest, the soil is sandy and can be more effectively drained thus producing a higher quality and more fertile grade of vegetation. In Somaliland, the vegetation pattern corresponds to the relative amounts of saline within the soil. Since the "salty sea-coast predominates in the lower parts of the gypseous valleys," the amount of vegetation will be far below the amount necessary for grazing purposes (Lewis 1955:65).

Grazing Lands: The Tuareg (Kel Ahaggar)

One dominant physical feature of Ahaggar environment is the mountainous regions characterized by formations of craters, isolated peaks, and generally rugged terrain. Tuareg country primarily consists of rocky mountains of variable altitudes and "flat, extensive plains of gravel and stone" (Nicolaisen 1963:26).

Although there is generally a "fixed" rainy season in Southern Tuareg territory during the summer, such is not the case for the
regions comprising Northern Tuareg (specifically the Ahaggar and Ajjer territories). The reason for this unpredictable rainfall pattern has to do with both frontiers being situated on the extreme of two different rainfall belts—"namely the Sudan where the rain falls in summer, and that of the Mediterranean with a wet season in winter" (Nicolaisen 1963:27). Not only is there an unpredictable pattern of seasonal rainfall which hampers grazing considerations, but to complicate matters, rain does not fall every year, at least in Ahaggar. For instance, Nicolaisen reported that within a 10-year period, there were 4 years which were completely dry (Nicolaisen 1963:27).

The plains which lie adjacent to the mountainous areas of Ahaggar experience situations in which many years may pass between two rainfalls on one of the same spot. Here, perennial vegetation is so sparse that the Tuareg must situate themselves in or around the mountain massifs where the possibility for better quantities of rain and greater grazing potential increases at proportionally higher altitudes. Toward the end of summer, Ahaggar experiences violent thunderstorms of varying intensity. "This in conjunction with the morphology of the mountains makes a perennial vegetation possible" (Nicolaisen 1963:27).

Typically, the territories which comprise Ahaggar and Ajjer are considered "true desert." Again, rainfall is irregular with subsequent plant growth being relatively sparse or completely void in many areas. To understand more thoroughly the intricate detail of grazing considerations, Nicolaisen has reported that the Ahaggar mountains fall into three distinct zones of vegetation:
1. A Tropical zone up to 1700-1800 meters above sea level.

2. A Lower Mediterranean zone between 1800 and 2300-2400 meters above sea level.

3. An Upper Mediterranean zone from about 2400 meters up to 2918 meters which is the extreme altitude of Ahaggar. (Nicolaisen 1963:29)

Each of these three Tuareg zones have their own particular plant characteristics. There is little point in discussing the various species found in each designated zone since a description of such material would mean little to someone with no botanical experience. What is important in this context is that at least for the Kel Ahaggar, where the main livestock are goats and to a limited extent sheep, such zones offer a suitable form of dietary intake. This to some extent also explains why the Tuareg from Ahaggar have virtually no cattle for available grazing potential is too limited to support cattle.

**Disease Vectors: The Somali and Tuareg**

In this section, I have combined the disease vectors for both the Somali and Tuareg keeping in mind that the same kinds of infections and diseases generally hold true for both societies. Probably, one of the most dangerous of all African cattle diseases is rinderpest. Having touched on this subject in the preceding section, I tried to point out the potentially destructive character caused by the disease. This type of cattle disease is widely found in Eastern Africa and the Sudan, and although extremely rare or unknown in Northern Tuareg countries (Ahaggar and Ajjer), Southern Tuareg
regions as well as Somalia have been less fortunate.

Nicolaisen has indicated that there are a wide-range of contagious stock diseases particularly from Ahaggar. Some of these include lung diseases (e.g., B.P.P.—Bovine Pleuropneumonia) which affects cattle, goats, and camels whereby the lungs become filled with pus—the animals inflicted usually die within 5 to 10 days due to suffocation. Also, various eye diseases among animals are relatively common and some are highly contagious. The Tuareg have names for, and are familiar with, more than 30 different camel diseases—three of the more serious infectious diseases are anthrax, pasteurellosis, and trypanosomiasis (Nicolaisen 1963:121).

Although camels are often considered relatively adaptive to their environment, they often have foot problems from long journeys through plains and sandy deserts caused by the continuous friction against the sand. Often, a Tuareg nomad will have to provide his animals with leather shoes to protect the soles.

Finally, it should be noted that the majority of pastoral people are not only excellent herdsmen, but provide the kind of medical treatment to their animals that is both extremely rational and highly effective. For instance, many such pastoral people who are without formal veterinary training are considerably more knowledgeable in terms of the objective treatments of stock diseases than are most modern veterinaries.
Pure Pastoralism

Introductory Considerations

Pure pastoralism, as it exists, is a rarity among most Eastern African pastoral societies or, for that matter, pastoral people the world over. As stated in the "Introduction," what differentiates this form or variation in pastoral production from all others is the freedom either directly or indirectly from relying on or obtaining agricultural products. Such societies, generally, are devoid from such agricultural dependence and who, for the most part, are sufficiently content with their singular mode of pastoral activity. One society that I will discuss seems to best fit this general trend of pastoral production—namely, the Maasai of Kenya and Tanzania.

Before I enter into the ecological considerations of Maasai pastoralism, the following point should be made. Obviously, man alone is not just a product of his environment. There will always be a multitude of external cultural, historical, and political influences which affect man in his society irregardless of the constraints or confinements operative within his physical environment. The organism is to some degree an intellectually creative individual who is a product of human choice and for which decisions and actions are continuously taking place in an ecologically oriented setting—in time and space. The freedom of choice, therefore, becomes a variable of key interest in many pure pastoral societies, and one which determines to a considerable extent the patterns of subsistence and settlement along with the resulting sociopolitical organization.
Any reference made to the ecological characteristics which comprise Maasailand must first take into account the distinct topographical features which may be summarized as follows. Typically, the Maasai, who form part of the East Africal Plateau complex, are situated roughly from 3,000-6,000 feet above sea level (Jacobs 1965b:120). From north to south, the Great Rift Valley separates Maasailand into two broad topographical regions—an "eastern" and "western" region (Jacobs 1965b:120). Generally, each of these geographical territories give rise to further ecological variations with respect to rainfall, soil conditions, grazing availability, wind and evaporation, and so forth. Essentially, the western region is considered the "highland" area if compared with the eastern region; the former having an altitude of 8,000-13,000 feet and the latter 2,000-3,500 feet (Jacobs 1965b:120).

Given the relative nature of altitudes, "the total climatic picture is thus one of great daily as well as seasonal variation" (Jacobs 1965b:129). Rainfall tends to be seasonal in character and torrential in character. The following remarks give further insight regarding the rainfall "pattern" in Maasailand:

In the highland regions west of the Rift valley there tends to be only one rainy season per year, with rain falling at intervals from November to May, and heavy rains in April and May. The Rift Valley and most of the eastern region, on the other hand, have two main rainy seasons: a "long" and heavy rain from March to June, and "short," two to three week rain in November-December. (Jacobs 1965b:130)
It can generally be said that the majority of Maasailand receives an average of 22-30 inches of rainfall annually. Note, too, that this annual amount is more than adequate for agricultural production. One conclusion which emerges from this analysis which is more often than not typical of the rainfall pattern in Eastern Africa is the general assertion that only once in every 6 or 7 years will rainfall be heavy and evenly dispersed throughout the country.

**Grazing Lands: The Maasai**

Having described in a previous section the general topographical features of Maasailand, it is obvious to assume that grazing areas will tend to vary enormously in composition and degree of coverage east to west. Since the western highland regions receive greater quantities of rainfall, so too will there be vegetation of quantitively greater and denser proportions as compared with the drier, scattered vegetation types found in the eastern region. The eastern region on a whole, comprises scattered thorn savannah grasslands with isolated areas of open grasslands (Jacobs 1965b:136). Again, grazing characteristics for Maasailand vary in importance east to west based on transitional zones and local successions—the western regions being regarded as the most suitable for livestock whose dietary needs require grazing.

Another prominent feature of Maasailand's total pastoral economy is the relative abundance and variety of trees and shrubs—"which play an important role in the total ecology of the country" (Jacobs 1965b:138). Some of the ecological benefits of trees and shrubs is
eloquently stated by Jacobs:

In addition to acting as agents in water catchment and storage in the highlands, they also serve as wind and water breaks against erosion in the lowlands and help to convert heavy night mists into supplementary moisture during the dry season by reducing surface evaporation in their shade. (Jacobs 1965b:138)

Disease Vectors: The Maasai

As was earlier suggested, the two most serious diseases to cattle are rinderpest and trypanosomiasis, the later of which is carried by the tsetse fly. Due to the general distribution of the tsetse fly, in conjunction with the Rift Valley fault, Jacobs suggests that it has greatly affected the shape and expansion of Maasailand. For instance, "Today, most of the permanent rivers in Maasailand, and the rich pastures which surround them, are denied to herds because of tsetse fly" (Jacobs 1965b:170).

Other diseases, all of which have taken heavy tolls among Maasai livestock include:

1. East Coast Fever (E.C.F.) is a disease particularly prominent in the eastern region and is generally contracted by a specific variety of ticks especially in open grasslands. The frequent burning of grass at the end of the dry season helps to destroy heavily tick-infested grass.

2. Anthrax and Bovine Pleuropneumonia (B.P.P.), both diseases are highly contagious and wide spread.

3. Foot-and-Mouth diseases.
These diseases give some indication of why the Maasai in particular need large herds which ultimately provide some insurance against complete devastation by such diseases. One final note—it has been estimated that "E.C.F. and tsetse fly together were responsible for 80,000 cattle deaths per year in South Maasailand alone—almost 30% of the area's total holdings" (Jacobs 1965b:172).

Conclusion

This chapter was not designed to bring about any dramatic revelations to the study of pastoral production systems. Although long and descriptive in character, my aim was merely to discuss the relative nature of certain environmental variables on a selected number of pastoral societies, and to show how—based on these variables—certain elements of herd productivity will be affected. Obviously, the environment does interact with pastoral production via seasonal variations of resources. I investigated this environmental/pastoral interaction based on topographical considerations along with the more prominent ecological characteristics: water availability and distribution, grazing lands (vegetation), and disease vectors. To deny the existence of the environment as influencing or affecting herd management and/or herd productivity on marginal habitats of low resource abundance and low resource diversity would, in my opinion, be a major oversight to the gains which have been made in social anthropology over the past 2 or 3 decades, particularly in the area of arid and semi-arid environments.
On the other hand, those trained in anthropology have an academic obligation of avoiding the ideologies inherent in "environmental determinism." The point to be made here is that we must continue to develop a "happy medium" which not only balances the relative importance of the environment to the study of pastoral production systems, but also, there must be the attempt made at ascertaining other "functional" factors (including human choices) in elucidating our understanding of the subject-matter. On that note, I wish to turn attention to Chapter III, "The Socioeconomic Factors of Pastoral Production," where it is hoped that further insights into the production aspects of pastoral societies can be expounded upon.
CHAPTER III

SOCIOECONOMIC VARIABLES OF PASTORAL PRODUCTION

The purpose of this chapter is to provide general information in "isolating" a number of socioeconomic variables of pastoral production. It should be noted from the "Introduction" that my particular emphasis is on the examination of "modes" of pastoral production, that is, the various combinations of livestock used, and the differing economic institutions from which they are produced. In order to make a general assessment as to which socioeconomic factors are useful to particular pastoral production systems, it will be necessary to approach such material by focusing attention independently on "variations in pastoral production." Clearly, it would be difficult to list the entire range of socioeconomic variables involved in the various pastoral production systems. Therefore, this chapter aims to examine only those factors which I feel have been instrumental in understanding more thoroughly the dynamics (and interrelationships) of herd management practices from an economic perspective.

Agro-pastoralism

As has been previously made clear, agro-pastoral societies are generally involved in two types of production: agriculture and animal husbandry. One way of putting herding activities in broad perspective is by looking at mixed farming/herding societies and specifying "the alternative possibilities of exploitation offered by..."
the environment (hunting, fishing, agriculture, trading, mineral exploitation, warfare, e.g.) and the utilization of alternative resources which the population exhibits" (Irons and N. Dyson-Hudson 1972:25).

When comparing pure pastoral environments with agro-pastoral ones, other socioeconomic differences begin to surface. For example, one of the first noticeable considerations is the different patterns of land use associated with agro-pastoralism and the numerous social ramifications which emerge. Land ownership by individual family members becomes an increasingly important feature of agriculturally related production systems. With land ownership, primary class systems evolve in relation to the differing internal needs and aspirations of people. The primary factors affecting the acquisition and distribution of wealth among households will strive towards establishing inequality, thus assuring and perpetuating various class distinctions. One example of this is illustrated in Iron's (Iron and N. Dyson-Hudson 1972) study of the pastoral Yomut and the Basseri—both groups located in Iran.

In understanding the entire implications of land ownership and usage which differ for pastoralists and agriculturalists, the following principle can generally be applied:

When human effort has been expended to make such products useful (dislodging salt, trapping an animal, digging a well) then that product is the private right of the person who expended the effort. The grasslands are available to anybody, but cultivated lands belong to the cultivator and are private rights. (Goldschmidt 1976:148-149)
To proceed slightly further in understanding the complex interrelationships between land investment (ownership) and agricultural development, the following quote is instrumental as it applies directly to the Sebei, Jie, and Nuer:

Rights extend over ownership of land. However, land cannot be exchanged like animals and as a result, there has been rapid development of market exchanges and the modification of several social institutions. Thus, the age-grade system, which has retained a form identical with that of neighboring societies, has changed function: it increases control of the young by the old, and emphasizes seniority to control better the exchange of land. (UNESCO 1979:283)

For example, this point is illustrated and supported from Goldschmidt's research among the Sebei. Here he states that although women are generally involved in the production of crops from the land, "land rights are held by the man throughout most of Sebei District and land passes patrilineally to his sons" (Goldschmidt 1976:152). In another paragraph:

This transfer of property concepts from cattle to land creates certain disharmonies, for land is by nature a very different kind of property. This application of rights in cattle ownership to rights in land involves more than merely ownership, sale, and purchase. It involves the notion that land, like cattle, is owned by individual adult men, not women. It involves the expectation that rights to some of the land will be transferred to sons when they marry, just as cattle are transferred. It involves also the man's allocation of land to his wife for use, and to each of several wives in cases of polygyny. In short, what our older literature called a "culture complex," a set of interdigitated elements of standardized behavior, was transferred as a unit to a new set of circumstances. (Goldschmidt 1976:151).

Generally, when agriculture is added to pastoralism not only is the carrying capacity of the environment expanded, but it is also
changed. The development of agriculture creates new kinds of demands that are far different and removed from the demands required of the individual for pastoral considerations, such as cultivation, irrigation, and the like. Even though it was stated in Chapter II that the two forms of production can complement and circumscribe each other, conversely, they can also be antagonistically conflicting.

For instance, since agriculture leads to settlement constraints, this invariably creates problems of complementarity between the two types of production (UNESCO 1979:294). Pastoralism requires strategic nomadic considerations for obtaining renewable resources whereas agricultural production requires sedentary considerations by the very nature of the activity. One way of alleviating the constraints imposed by these production systems is by the implementation of transhumance which is highly effective for both semi-pastoral and agro-pastoral societies.

Moreover, the mutual inclusion of agricultural activities into pastoral societies increases labor demands, thus requiring larger production units than would normally be necessary if such a society were exclusively pastoral. Farming requires clearing, weeding, plowing, harvesting, and a host of other subsidiary considerations involving (in many instances) a rather large number of working parties. The various cultivation practices among the Sebei, for example, attest to this enormous production output where on occasion more than 300 workers are involved in clearing several acres of land for farming. These work parties are organized for a variety of agriculturally related tasks.
Another feature generally ascribed to agro-pastoral societies is the specific role and economic contributions served by women. For instance, it is largely assumed that while cattle herding is the responsibility of men, farming is seen as women's work. This economic dichotomy of sex-related roles increases economic productivity thus ensuring the social network of task-related obligations. Women are usually involved in the sowing of seeds, weeding, harvesting, and the like, and any contributions made by men in the way of farming are always viewed as "helping the women." Men's work usually entails the economic dispensation of management-related herding activities.

Semi-pastoralism

To review, semi-pastoralists, as defined in the "Introduction" are chiefly herders who raise livestock mainly for the purpose of exchange because they subsist primarily on agricultural foods. All signs suggest that such groups are extensively dependent on external trade and markets from which they barter and trade for various goods (Jacobs 1965a). It should also be noted that few nomads can afford to be exclusively pastoral (the Maasai are one of the few and rare exceptions). "Though parts of some populations may subsist entirely from milk and pastoral products some of the time, generally every nomadic population makes nutritionally and economically significant use of nonpastoral foods" (Spooner 1973:45-19).

One of the more prominent features which characterize semi-pastoral societies is the direct economic interrelationship between...
market exchange systems on the one hand and pastoral nomadism on the other. This lack of self-sufficiency and economic dependence on external markets constitutes an extremely important cultural and economic "symbiosis" with neighboring sedentary peoples, for whom such pastoral societies are in a large part dependent (Jacobs 1965a:148).

Unfortunately, most of the literature on pastoralism has done little to adequately address the issue of the specific roles and economic contributions of how and in what ways small herding stock (sheep and goats) serve semi-pastoral societies. Incidentally, the differences in, or economic importance of sheep and goats seem to be one of the major significant factors separating semi-pastoral societies from "pure" pastoral types. From examination of the literature it must be noted that all African pastoralists keep sheep and goats which would "suggest that sheep and goats are of primary economic importance only among the semi-pastoralists, as defined above, for whom they constitute the main stock of subsistence and trade, irrespective of the greater social importance often placed on other livestock in such societies" (Jacobs 1965a:146-147).

One way to understand the economic interrelationship between various stock-holdings in Eastern Africa is by examining a wide range of variables beginning with the types of animal(s) herded followed by: "gestation period; fertility period; mean calving (lambing, etc.) interval; whether calving is free or must be assisted; neonatal mortality rates; sex ratio at birth; lactation period; milk yield; milk composition; food requirements, by type and amounts;" and so forth (Irons and N. Dyson-Hudson 1972:24). Obviously, such
an analysis of this scope and magnitude would make an interesting dissertation. Quite understandably, the above considerations go far beyond the scope of this thesis. However, in keeping with the trend at developing interrelationships of a general nature, I would like to focus on a relatively small but nevertheless important feature of all pastoral societies, namely a reflection on the growth rate and reproductive capabilities of small herding stock as one way of increasing our own awareness of the importance and economic reliance of how such small stock serve pastoral societies.

As noted earlier, small herding stock may very well contribute to the primary economic importance of both subsistence and trade for semi-pastoralists (Jacobs 1965a). The growth rate and reproductive capabilities of small herding stock far exceeds that of larger ungulates (camels and cattle) provided an adequate supply of vegetation remains at least seasonably available. To understand completely the economic process of herd productivity particularly with the use of small stock, the following quote will help illustrate this point:

An important factor in the efficiency of the system is the animals' rate of growth, which is biologically determined but partly changed by man (by lowering the age of first calving, extending the fertile period, raising fertility rates, hygiene, protection and veterinary care, etc.). Efficiency will differ between systems based on fast-maturing animal species (sheep, goats) and relatively slow-maturing species (cattle, camels). (UNESCO 1979:272)

For example, Dahl and Hjort reported that female goats are usually allowed to mate within 9-10 months after which goats give birth either twice a year or three times within 2 successive years (Dahl and Hjort 1976:92; Keenan 1977:226). Maturation and reproduction
in female sheep have, for the most part, similar breeding dimensions if compared with goats. The specifics involved in maturation, gestation, and reproduction are really not significantly important in this discussion, suffice it to say that from a comparative analysis of large vs. small livestock, under free mating conditions there will be a tremendous increase in small herds, provided that there should remain an adequate supply of both vegetation and water. Another point which must be reiterated is that the increase in both the growth and reproductive rate of small stock will in turn bring about substantial increases in efficiency and energy flow through the system. This can be highly advantageous and critical in marginal environments.

The utilization of small stock has another redeeming quality which is generally not available to larger stock and, hence, partly explains why most African societies keep sheep and goats as well as larger-type of stockholdings. In an earlier section, I addressed the issue of the potentially destructive character of many African diseases by stressing the point that entire herds can literally be destroyed in a matter of several days. One way of reducing this risk is by the acquisition of small stock. Inasmuch as sheep and goats are generally not as susceptible to the same kinds of diseases (e.g., tsetse fly, pleuropneumonia, etc.) that often strikes cattle, small stock can usually provide auxiliary forms of subsistence, at least on a temporary basis.

Westerners and colonial administrators alike have often criticized African pastoral populations without understanding or realizing...
the entire ramifications involved in herd management and productivity. The first accusation centers around the notion that most pastoral breeding techniques are highly irrational. Not only are such claims unjust, but also lack supporting evidence to validate their critical appraisals. For instance, Nicolaisen in reference to the Tuareg has stated that stock breeding is essentially rational and well adapted to their particular environment. He goes on to say, "that the animal is always judged rationally, and [the herder] takes into consideration such qualities as age, build, stature and the like" (Nicolaisen 1963:117). Goldschmidt (1976), Gulliver (1955), Jacobs (1965b), Lewis (1955), and others have also made similar claims among the people whom they have studied at great length by indicating that pastoral people are not only highly rational in their breeding techniques, so as to ensure healthy and strong animals, but are also well aware of the regulatory limits to herd size, based on the seasonal availability of optimal resources.

Most herding societies worldwide administer various techniques aimed at improving herd composition and productivity with the inclination of increasing the carrying capacity of the environment.

Thus birth-control techniques ensuring that young animals are born at a time of best pasture ensure better use of this pasture. Changes in domestic herd composition from that of a wild herd, and the potential separation of milking females, breeding females and males selected for slaughter, and as transport animals also influence carrying capacity. (UNESCO 1979:293)

The second accusation leveled unjustly against pastoralists is that they generally keep more livestock than necessary which invariably leads to land deterioration thus decreasing the quality and
quantity of land resources available. To address this statement, examination must initially be focused on the possible alternative modes of subsistence utilized by the "variable" nature of pastoralism. Obviously, agro-pastoral societies own quantitatively less animals than do semi-pastoralists or "pure" pastoralists. The utilization of alternative resources such as agriculture requires far less reliance on herds than is the case among the latter two types of pastoralists. Some of the northern Karamajong tribes of northeastern Uganda for instance are for the most part, semi-pastoralists, wherein various grains provide the major portion of their diet. It is significant to note that among many of these semi-pastoralists, cattle and meat are traded for grain, particularly sorghum and corn. The use of smaller stock generally plays a major economic role here, inasmuch as the actual proportion of sheep and goats to larger stockholdings is substantially greater, this leaving one to conclude that the major trading networks emphasize the use of small stock irrespective of the greater social and economic importance usually attached to larger animals.

Another factor in understanding the exigencies of African pastoralism with its emphasis on large herd sizes can be partly explained in the "production output levels" of each species of animal herded. For instance, it is an acknowledged fact that the main function of animal production is to provide food in the form of milk, meat, and/or blood. Although the size of the herd or flock necessary for this purpose will vary with different societies, we know for instance that under adequate grazing and water conditions camels
provide slightly higher proportions of milk yields than do cattle—
cattle more than goats—goats more than sheep. From an economic
view point, large herds are at least partially necessary to offset
the relatively low production "output" level for smaller herding
species. In Eastern Africa, for instance, there tends to be great
variability in the number of cattle alone—ranging anywhere between
4-12 per individual stockholder. Among the Maasai, Jacobs (1965b)
indicates that approximately 12-14 head of cattle are necessary to
sustain adequate subsistence levels for each individual—assuming,
of course, that six or seven out of these are milch cows. On the
average, the Maasai are said to own approximately 15 head of cattle
per individual, of which 60% are adult milch cows. These statistics
are significant inasmuch as 80% of Maasai's diet comes from milk,
while about 20% consists of meat usually consumed during ceremo-
nially marked occasions. Blood, which is also a significant supple-
ment, containing relatively high amounts of protein, is either mixed
with milk to enhance the flavor, or drunk separately during the dry
season when milk production diminishes. The point of relevance here
is that generally animal production is so low that large herds are
necessary to produce even modest amounts of milk, meat, and blood
needed to sustain merely one individual.

There is another reason for large herds besides per unit pro-
duction output and increasing security during possible famine,
drought, or disease conditions. In many instances, various animals
are sent out on loan to a neighboring tribe or close friend as a way
of extending the man's network of social obligations. These
reciprocal rights of exchange can form important economic contributions between neighboring pastoral groups as one way of increasing the size of production units.

To summarize briefly, "cattle which is the most important and most used part of the herd, are utilized in eastern Africa for" (UNESCO 1979:269):

1. Milk is utilized above all else even though milk production is generally low: only 20% of animals are in milk at any given moment in time (Netting 1977).
2. Blood (as previously indicated) is an important protein supplement, but cannot be extracted from the animal more than once a month.
3. Meat, although its dependency and usage varies among tribal groups, generally, animals are slaughtered particularly for feasts; for social and/or ideological reasons or during periods of low milk production to supplement diet. Small stock are also slaughtered.

The result of the low productivity of African nomadic pastoralism is the need to build up large herds: in Uganda, a Karimojong family has 100-150 cattle and 100 sheep and goats (Dyson-Hudson, 1966). Other reasons contribute to this also (such as the maximization of producers' strategic options, protection against large animal fluctuations in herd size, and insurance against famine). (UNESCO 1979:269)

Pure Pastoralism

Jacobs (1965b), in his analysis of the economic trends among the Maasai, has revealed some interesting contrasting features which separate this rare group from the majority of groups found in Africa.
To reiterate these features, pure pastoralists are generally economically independent of trading influences and external markets and who, for the most part, have developed within their culture ideological or cultural prohibitions against eating agricultural foods.

Since pure pastoralists have refused (for whatever reason) to utilize alternative forms of exploitation, not only are herd sizes increased dramatically (if compared with other societal groups which utilize alternative subsistence options), but production units, i.e., the herd/family relationship changes in composition, namely, in the form of cultural values. For example, the economic reliance and significance of bridewealth payments among various pastoral groups illustrates and supports this suggestion.

The entire system of bridewealth is an interesting phenomenon among pastoral people inasmuch as it seems to be predicated on two factors:

1. A family's ability to pay based on individual prescribed "status"—e.g., social and/or economic.

2. The individual's (or society's) own perception of the importance attached to his herd.

To understand the economic ramifications of bridewealth, it will be necessary to compare the "significance" attached to family herds among two societies—the Maasai and Nuer, as these societies offer excellent contrasting views of livestock ideology. For the Maasai, ownership of cattle is a personal matter and one that is never displayed as a symbol of status. Although cattle are vital to Maasai's economy, their particular institutions and customs prevent them from discussing, displaying, or praising one's livestock in any
manner whatsoever. The Nuer, on the other hand, view livestock as the object of such lavish social display or personal identification as do many semi-pastoral and agro-pastoral societies. To gain a better understanding of "livestock obsession" among the Nuer, Evans-Pritchard illustrates this well with the following remarks:

They [the Nuer] are always talking about their beasts. I used sometimes to despair that I never discussed anything with the young men but livestock and girls, and even the subject of girls led inevitably to that of cattle. Start on whatever subject I would, and approach it from whatever angle, we would soon be speaking of cows and oxen, heifers and steers, rams and sheep, he-goats and she-goats, calves and lambs and kids. I have already indicated that this obsession—for such it seems to an outsider—is due not only to the great economic value of cattle but also to the fact that they are links in numerous social relationships. Nuer tend to define all social processes and relationships in terms of cattle. Their social idiom is a bovine idiom. (Evans-Pritchard 1940:18-19)

Having stated the importance of livestock, I wish now to turn to the analysis of bridewealth. The point I wish to emphasize is that the concept of bridewealth will generally provide a far more important and sustaining economic role among semi- and agro-pastoral societies than will be the case for those societies who practice pastoralism in its purest form. Among the pastoral Maasai, for example, Jacobs (1965b) indicates that the customary payment of bridewealth usually ranges from between 3-5 head of cattle. The implication here is that such a transfer will not significantly "alter" the production unit per domestic group—nor might I add, was it ever designed to. Its role is merely to "legitimize" parental acceptance in marriage between the perspective bride and groom as well as being closely tied to the transfer of rights over her
reproductive powers (Jacobs 1965b:164).

The payment of bridewealth (which is generally inversely proportional to the degree of pastoral specialization and the size of the herds) is an essential part of the matrimonial system. It helps regularize the age when men marry (generally 30) in a way that maintains a certain rate of polygyny and encourages parallel development of family and herd. It enables real agnatic relationships to be defined, since giving and receiving groups are particularly evident on this occasion. (UNESCO 1979:276)

The Nuer and Turkana, on the other hand, are so obsessed with the need for obtaining more cattle, that it is customary for the perspective groom's parents to give the future groom's in-laws anywhere between 60-65 head of cattle. Not only does this fulfill certain "social" obligations, but also significantly alters (or shifts) the production-output feasibility among various domestic groups. What is unique about this system of bridewealth payment (at least for the Nuer and Turkana) is that the society places a "quantitative premium" on the acceptable limits of herd transfer and yet few Nuer or Turkana families can actually afford to relinquish that many animals. Thus bridewealth payments, being as high as they are, invokes an undue economic dilemma on family members (particularly during the dry season when cattle are essential), and for whom, many family members do not own enough livestock necessary to fulfill the obligations of such a transaction. In most instances, the Nuer are forced to borrow animals from their neighbors or extended kin thus reinforcing the social obligations pertaining thereof. In short, the entire concept of bridewealth functions in a slightly different manner depending on the degree and intensity of pastoralism practiced. Agro- and
semi-pastoral societies greatly emphasize the need for large herds by placing a "premium" on bridewealth payments. This in turn alters or "shifts" the production output level among the various domestic groups involved in the exchange, thereby integrating economic specificity into pastoral production. As pastoral specialization increases, such societies generally do not view marital transactions from a "quantitative" dimension; bridewealth is merely the acceptance and permission between parties of the particular union in marriage—a union which the Maasai recognize as legally binding for both partners.

The examination of the distribution of wealth among various households is crucial to understanding the effects of economic organization. This is achieved primarily by identifying the composition of various production units and by acknowledging one fact that appears to be mutually agreed upon by all pastoralists: "Every pastoralist faces a dual necessity: to obtain livestock and one or more wives, who are themselves producers; and to obtain a labor force and children in order to maintain this herd and its production" (UNESCO 1979:272).

Though pure pastoral societies generally lack ranked systems of social class and a centralized form of political organization, this need not imply, however, that wealth should necessarily be distributed equally among various domestic units. Irons (Irons and N. Dyson-Hudson 1972), for instance, has indicated that there are two factors which should not be overlooked in the study of economic organization among pastoral groups. The first point is that the distribution of
wealth is continually changing. Secondly, despite this situation of flux, "there is a strong correlation between the distribution of wealth and the distribution of labor resources among domestic units" (Irons and N. Dyson-Hudson 1972:95).

Earlier, I indicated some of the factors which would be instrumental in effecting patterns of fluctuations in the distribution of wealth for pastoralists—e.g., droughts, diseases, severe cold, possibly bridewealth payments, the proportion of birth rates to death rates among various animal groups, maturation and reproductive potentials, etc. Nothing more needs to be said on this point. The second point offers an entirely different dimension to herd management procedures inasmuch as the degree of pastoral wealth will correspondingly relate to the various indices of labor requirements. For example, as pastoral specialization increases, i.e., from semi- to more pure forms (assuming that there will be relative increases in the number of herds), labor investment will not only "shift" but also increase in correlation to this multiplicity of wealth. The Yomut of northern Iran, for instance, many times hire shepherds to assist the kin in the management of the stock. Such shepherding arrangements offer one large advantage—namely, making it possible for a family who has lost most, or even all, of its livestock to build up large herds thus establishing economic self-sufficiency in a manner of 4 or 5 years by entering into such contracts or arrangements. Moreover, families with large numbers of adult males are able to give their herds better care over a longer period of time; the implication here is "that herds of larger families tend to
increase while those of smaller families tend to decline. Households with a large number can also afford to hire out some of their members as shepherds providing an additional source of income in cash and livestock" (Irons and N. Dyson-Hudson 1972:95).

Irons concludes his analysis of the Yomut which, incidently, appears typical of most pastoral groups, with the following remark:

The data relevant to the correlation between wealth and labor resources indicate not only a strong tendency for families with many adult members to be wealthier than families with few adult members, but also a tendency for families with greater labor resources to have more wealth per adult member than families with more limited labor resources. (Irons and N. Dyson-Hudson 1972:95).

Summary

In this chapter I have tried to present some of the more salient features involved in the production aspects of pastoral societies by focusing primarily from a socioeconomic perspective. I began by isolating a number of these economic differences by examining directly the diversity of technical and economic criteria related to the identifiable forms of pastoral production as presented—e.g., agro-, semi-, and pure pastoralism. Ultimately, the variations in pastoral production as described here are the result of different forms of economic rationality which prescribe corresponding increases or decreases in the various levels of pastoral production and the complementary roles suitable for that particular society.

One tentative conclusion which could be drawn from this analysis (though I wish to proceed rather cautiously) is that quite possibly, what characterizes pastoral societies and forms the real
division between the variable forms as defined, is primarily a socio-economic one. Yet, before this can officially be stated as correct, the analysis must now be turned to Chapter IV, "Social-Structural Variations of Pastoral Production."
CHAPTER IV

SOCIAL-STRUCTURAL VARIATIONS OF PASTORAL PRODUCTION

This chapter's goal is to provide insights into the variations in the structural or general organizational features of pastoral nomadic societies and how this may or may not relate to variations in modes of pastoral production. It was suggested earlier, that the social organization of a pastoral society generally comprises local exploitation groups. With this in mind, the subsequent joint formulation of multiple exploitation groups as a set of domestic or herding units creates, to some degree, an entirely different social dimension among pastoral groups by virtue of the extent to which local populations compete with and respond to the presence of each other.

This chapter, therefore, will explore a wide range of social-structural variables involved with, for example: nomad-sedentary relationships; how human/livestock populations respond to or compete with other populations exploiting the environment in quite different ways; spatial considerations of mobility; domestic and communal forms of pastoral production; camp structure; and any other conspicuous sociostructural variations between the societies selected for comparison in this thesis.

Spatial Considerations of Mobility and Territoriality

Since temporal variation in pastoral productivity are essentially seasonal, the rational utilization of ecological niches

66
normally makes animal movement necessary. Pastoral nomadism commonly is defined as: "when the seasonal herd movements are accompanied by the domestic units (which often use a type of dwelling easily carried by animals)" (UNESCO 1979:267). Few anthropological researchers have attempted to ascertain the effects of mobility on aspects of social organization, particularly on political and territorial organization. One rare exception is the work conducted by Salzman (cited in UNESCO 1979) in which he has developed a theoretical model of political and social organization based on resource quantity and predictability. For Salzman, resource availability not only regulates the general pattern of pastoral movements (within relative limits generally planned by herdspeople) but resource predictability and quantity are indirectly linked to types of political structures, social organization (or coordination), population density, economic surplus, and the like. Below, in outline-type form illustrates Salzman's theory:

Resource quantity and predictability is inversely proportional to:

A. Degree or types of political organization with social coordination.

B. Demographic variables (population densities).

C. Economic surplus.

Salzman goes on to suggest:

It is clear that where resources are very predictable it is possible to co-ordinate group enterprises; this is not possible in an unpredictable environment where competition may be more likely. Where resources are abundant and predictable, high human population density is possible; this increases the need for and means of co-ordination; the
production of surplus is more likely and this can lead to status and/or role differentiation; especially where population density is high.

Societies exploiting environments where resources are predictable and abundant are likely to elaborate authority roles and to be composed of stable groups. The authority will regulate internal co-ordination among and between groups, and with peripheral societies, for example during migratory movement; it will have the machinery for positive and negative sanctions, and may have a source of revenue. In unpredictable environments, with few resources, there will be no political authority or it will remain weak, and there will be continual population exchange between constituent groups. (UNESCO 1979:274)

Salzman attempts to validate or support his hypothetical constructs by comparing pastoral nomads from different geographical regions—the nomads of the Zagros (e.g., Basseri, Bakhtiari, and Qashqai) with Eastern African pastoralists (e.g., Somali, Turkana, Jie, and Nuer). Accordingly, the former live in favorable environments where resources are generally abundant along fixed and specified points; "they have a single leader assisted by a communications apparatus (Basseri) or by a hierarchy of lesser leaders (Bakhtiari, Qashqai)" (UNESCO 1979:274). The latter, on the other hand, live in difficult environments where resource predictability and availability is generally low, and therefore, any specified types of leaders, should they exist, are of religious persuasion, and for whom political and social equilibrium is achieved via a segmentary lineage type of structural organization.

Salzman's model holds some fascinating insights into the integrative components responsible for identifying specific types of political and/or social organizational features of pastoral societies using resource predictability as a dependent variable. However, the
model should be applied cautiously inasmuch as in some instances it doesn't explain the developing social organizational character for all pastoral societies. For instance, political dominance and rigid class structure notable among Tuareg societies was not the result of resource abundance and predictability as much as it was the techno-economic diversities in the subsequent appearance of the two class structure (noble/vassal). The control and use of the camel and certain specialized arms (double-bladed sword) resulted in far-reaching implication, namely, the controlled means of physical force resulting ultimately in political dominance by the one group over the other. Keenan sums it up rather nicely with the following remarks:

We can also see the political and economic constraints that gave rise to, and maintained the system of, class specialization between Ihaggaren and Kel Ulli. While the Kel Ulli preoccupied themselves predominantly with goat-breeding, the Ihaggaren's exclusive control over camels and certain specialized arms (e.g., takouba--double-bladed sword) enabled them to maintain themselves as a warrior class, raiding outwards from Ahaggar and establishing domination over the vital oases of Touat and Tidikelt to the north, neighboring Arab nomads (e.g., the Kunta), and the trans-Saharan caravan routes that passed east and west of Ahaggar. (Keenan 1977:34)

Along with the environmental factors which influence the spatial considerations of mobility, as discussed in Chapter II, there are also several social factors which determine these moves. For instance, the particular characteristics and dynamics of a man's family and his herd also influence decisions of which animals to move where and when. This is reflected in a 3-year study undertaken by R. Dyson-Hudson (1972) on the Karimojong and can be summarized as follows:
1. Herd Productivity and Reproductive State  
(see Chapter III)

Again, the age and sex distribution, along with the general physical condition of a man's herd, all combine to determine herd productivity.

Because of the high proportion of male stock in most herds (estimated at forty percent), the high calf mortality, short lactation period, and long calving interval, only an estimated 25 percent of a man's herd actually gives milk at a particular time. Of those giving milk, about half yield enough for their calves, while the remainder yield a surplus of between one and three pints a day of milk for human use. (R. Dyson-Hudson 1972:35)

Thus, in many pastoral societies, herd owners usually try to strategically isolate animals based on those actually producing milk; male stock and dry cows are generally situated in peripheral areas and watched by young men who guard them. The point of significance here is that the potential productivity and reproductive state of a man's herd will likely determine how and when they will be moved.

2. Social Properties of a Man's Herd

Based on the number of pastoral societies that I have reviewed, there has been one common feature generally prevalent throughout: the societies studied tend to be male dominated with a typical lineage system of patrilineality. Although males generally hold exclusive rights over the family herds and are subsequently designated as "his property," some cattle (or smaller stock) can be allocated specifically to wives. However, it should be noted that under these particular circumstances, women hold only "limited rights" in that
generally they are forbidden to sell, trade, or transfer their animals without the express permission from their husband.

From the above, it should not appear surprising that for most pastoral societies, women are generally excluded from inheritance rights, particularly with regards to large animals. Specific rights specify that all animals must be transferred to the sons as they grow up, or if death should occur. Most herding boys are given a particular animal of their choosing as a way of learning the necessary responsibilities of animal care. Here again, the social attributes of individual animals in his herd are factors in determining where a herd owner sends a particular animal and when.

3. Age and Sex Distribution of a Herd Owner's Family

This factor is particularly significant in agro-pastoral societies where the needs of the more sedentary segment of a man's family must be considered. The Nuer and Jie, for instance, institute a sexual division of labor where women and girls generally stay at relatively permanent settlements where they practice agricultural activity. As R. Dyson-Hudson suggests among the Karimojong—"moreover, many older women, and women with young children, prefer to remain in the settlement throughout the year because they are safer and more comfortable there than in the camps" (R. Dyson-Hudson 1972:38).

The number and ages of sons also significantly influence the movement of livestock. Since every pastoralist strives to obtain a male labor force in order to maintain the herd and its production
(since only males herd livestock), young boys are generally instructed to herd near settlements only.

Consequently, a man must have both men and boys available as herding assistants in order to exploit grazing areas far from his permanent settlement, and also feed his dependents in the settlement.

Thus the sociological and biological properties of a man's herd; the herding labor available; and dependents in the settlement, are all factors which influence a man's decisions about livestock movements. (R. Dyson-Hudson 1972:38)

Domestic and Communal Forms of Pastoral Production

What emerges from the preceding discussion is that the number and diversity of elements which comprise nomadic pastoralism along with the complexity of other determining mechanisms, all combine to result in unique forms of social organization. Regardless of the specific type or variation in pastoral production, there will always be a number of similarities and differences in the structural or social organizational feature of the society being investigated, I indicated a number of these similar features, notably, patrilineal descent, rights of inheritance maintained exclusively by males, etc. From the onset, I suggested that the simplest and most common form of social organization is made up of a local exploitation group based on three primary elements: herd structure, camp structure and its unifying ability, and family organization.

The following paragraph from UNESCO (1979) illustrates the domestic/communal forms of pastoral activity as instruments of production:
Pastoral activity is characterized by a network of social relations showing a unique combination of domestic and communal forms of production. Production is organized within domestic groups, which hold the main means of production (livestock and, less important, cultivable land). Whatever the rights of any individual over any animal, the domestic herd and social group which holds it constitute an autonomous production unit. Production is also organized in a communal framework. The domestic groups which make up the community have rights over the means of production: pastures, water-points, salt deposits and other natural resources which have been transformed and improved by the labour of the group which uses them. The community may thus take the form of a collectively utilized territory, and may be seen as the spatial expression of relationships of co-residence, of co-operation in resource use, or of livestock exchanges. (UNESCO 1979:274)

In Chapter III, I indicated that family organization among pastoral societies represented the primary form of the production unit by virtue of the family division of labor into sex and age groups. This sexual and/or age division of labor which I have found to be common practice among most pastoral societies irregardless of the intensity or degree of pastoral specialization "is often institutionalized and justified by a system of interdictions and particular rites" (UNESCO 1979:275).

Although a discussion of age-sets and age-grades would be better off analyzed in a separate section, it should nonetheless be pointed out that its development among Eastern African Nilotics is based primarily on the implementation of the sex/age division of labor. For example, the basic structure of age-sets among the Maasai and Sebei are organized on the basis of age into a number of named corporate groups (e.g., Junior Warriors, Senior Warriors, etc.). However, unlike the commonly-known generation-set system (based on genealogical generation), age-set groups are recruited on the basis
of biological age in which membership is "open" and "closed" to new recruitments during certain periods. Here, age-sets are formed and organized as corporate groups by individuals passing through a series of ceremonially marked stages. The important point to remember in relevance to labor resources is that membership within age-sets define the particular tasks, responsibilities, and duties of members belonging to their designated group, thus contributing substantially to the total economic sphere of pastoral production via various membership responsibilities.

At this point it is instrumental to give an example of how the division of labor reflects age differences. In the majority of pastoral societies, adult, married, and old men have more exclusive management responsibilities, while young, unmarried men are generally responsible for surveillance. No where does this appear more evident than among the Turkana.

At 4 years of age a Turkana child looks after goat kids and baby camels; at 7, he looks after calves, goats and sheep; at 12, camels; from 14 onwards, cattle; during all this time his father oversees his work. The large amount of women's work and the prolonged control of young men's work help to explain polygyny. (UNESCO 1979:276)

The analysis of pastoral production in conjunction with Maasai age-set systems is illustrated with the following remarks aimed specifically at the level of Junior Warrior status:

The pastoral production responsibilities of Junior Warriors simply shifts from domestic family to local community (territorial) group responsibilities. That is, Junior Warriors are still part of the pastoral production system, but are performing a different function within it, insofar as, since elders cannot fight or bear offensive weapons, now Junior Warriors (released from family herding tasks) take up this important function--along
with others, such as communal watering of livestock during dry season, carrying of messages between local groups, etc. (Jacobs, 1982)

To summarize the main elements of age-sets in relation to pastoral productivity and communal organization, two points need to be re-emphasized:

1. Those societal structures dominated by age-set systems will demonstrate a continuing "shift" in work-related responsibilities and tasks by group members within and between a designated number of named corporate groups throughout the individual's life (e.g., Junior Elders, Senior Elders, Retired Elders, and so on).

2. As suggested previously, labor resources (namely through sex and age division of labor) will be substantially enhanced by virtue of membership within designated age-sets. This is achieved primarily through a series of task-related goals and responsibilities which define the duties of members belonging to that designated group (keeping in mind that there is always a degree of overlap within and between group membership activity). Quite understandably, if members of a society have achieved substantial familiarity in task performance, not only will this be equated with some degree of efficiency, but overall levels of production will increase in demonstrated proportions.

Just as the political unit of a tribal society changes physical dimensions (namely, expanding and contracting) depending on the needs or circumstances external to the tribe, so too does there appear to be physical changes in the structure of domestic group organization among pastoral societies as a result of increases in labor productivity. The following paragraph from UNESCO illustrates this point clearly and concisely:

The actual structure of the domestic group, and its position between these two extremes, depend on the speed of fission. As pastoral specialization grows and labour productivity increases, domestic group fission takes place more often and production units are more fragmented: hence the extended family of the Jie, the polygynous
family of the Samburu and Maasai; the house of the Turkana and, to a certain degree, of the Wodaabe Fulani. (UNESCO 1979:276)

I have suggested that the domestic herd and social group represent an autonomous production unit. By obtaining livestock and one or several wives and a labor force of children (preferably males), the "ideal" form of domestic unit is established. Among African pastoralists, the maintenance of this domestic organization requires the transmission of goods and women. The former is primarily achieved through preinheritance which begins during the birth of a male individual and normally continues throughout the life of that individual. The majority of pastoral societies in Eastern Africa have specific inheritance rules designed primarily to maintain a "smooth" and continuous transmission of specified rights should the domestic group become suddenly fragmented due to let's say, the father's death or some other unfortunate, unexpected incident. Here, the father's death represents an "extremely temporary" break-up of the independent production unit; the son's inheritance rights represents an independent formulation of a new production unit. Again, some of the ways that this is achieved and at different moments include, his father's death, marriage, and the birth of his first son.

The latter point, namely, the exchange of women, is a relatively important factor in the domestic organization of pastoral societies, "its control through marriage is essential for control of the circulation of animals and men. Exchange of women also enables privileged social relations to be established with the domestic unit from which the wife is obtained" (UNESCO 1979:275).
Camp Structure

Up to this point, I have highlighted the essential factors which I conceive as being partly responsible in creating the overall structural features of pastoral production by focusing primarily on both, communal and domestic forms of organization. However, there is yet a wider form of labor cooperation which goes beyond the domestic unit, and for which, loosely organized, small, and primary groups tend to be economically and politically autonomous. I will refer to this wider social unit as merely a "camp" made up of generally, multiple domestic groups (although, noting that depending on the time of year and resources available, a single domestic unit may also be referred to as a "camp").

The primary need for camp organization is exemplified in UNESCO by the following remarks aimed specifically at understanding the integrative components of group structure:

They become necessary when domestic labor is insufficient for shared herding and transhumance, diversified animal husbandry, commercial journeys, periodic agriculture, defence, etc. These activities are normally carried out within the camp (very exceptionally within the clan or tribe). The camp, together with the domestic group, is the basis of socio-economic organization. According to the season, the area and the social groups involved, camps may be a single domestic group or form very large groups. The camp is also the co-residence unit, a group whose stability can vary according to circumstances, and which has in common only access to certain resources (pastures, wells, etc.) without integrative co-ercive political mechanisms. (UNESCO 1979:275)

Camp structure, then, is primarily characterized by the multiple fusion by a number of domestic groups (though not necessarily) and by their ability to attain at least a minimal amount of inter-group
cooperation. Furthermore, this structural stability or instability reflects the need for flexible adaptation to variable ecological and techno-economic conditions. Thus the size of camps generally varies seasonally, as does the distance between them. This distance determines whether it is possible to refer to the neighborhood groupings level of residential organization, beyond that of the camp. (UNESCO 1979:278)

Among the Maasai, the principal unit of cattle management is termed the "kraal camp." Jacobs characterizes the descriptive nature of such camp organization as follows:

The "kraal camp" consists of several independent polygynous families joined together by a common interest in the economic exploitation of their immediate vicinity. Kraal camps are also, as we shall see later, the basic units of settlement and the principal centres of domestic life. A typical camp will consist of four to eight families, some 30-50 persons, and a total herd of 400-700 cattle. (Jacobs 1965b:166)

And in another section: "But it is a measure of the common economic interest and congenial co-operation which prevails within Maasai kraal camp that the entire camp's cattle are usually pastured and watered as a single herd" (Jacobs 1965b:166).

What appears significant from the above quote is contained in the words—"congenial co-operation." I believe that the sustaining unity of camp structure in pastoral societies is correlated to a large extent with the success of inter-group cooperation amongst the various domestic units. This mutual cooperation and respect is the cohesive element which binds to form camp solidarity and level of residential organization within the camp.

However, it must also be noted that an element of rigidity is introduced by various social relations which organize the camp:
livestock relationships, generally among pastoralists of the African eco-cultural association, with emphasis on agnatic relations among the Jie and Maasai, and a greater importance of affinal relations elsewhere; but also relations of free access to women in the rather unusual case of the Bahima of the old Ankole Kingdom (Elam, 1973); (UNESCO 1979:278)

Finally, in the analysis of labor and productivity factors, one point needs to be reiterated: "herding in common is one of the most advanced forms of labor co-operation; solidarity is also evident in consumption, especially at a time of famine or in the entertainment of an important guest" (UNESCO 1979:278). Moreover,

The relative unity of camps comes from the process of production. Common interests are based on co-operation in work and on marriage alliances (less often are they contractual), or on kinship. These interests define an awareness of a common heritage, an opposition to other identical groups and a certain social and political unity. (UNESCO 1979:275)

Communal Organization: Segmentary Lineage System

Several societies in Africa have types of community structure which are "based on a segmentary lineage organization which defines rather precisely the territorial rights of the component units" (UNESCO 1979:280). Two societies which incorporate such a system are most notably the Somali and the Nuer (though there are several other pastoral societies which utilize this form of social organization, e.g., Iranian Basseri and Bakhtiari, the Imazighen tribes of the Moroccan High Atlas, Beduin pastoralists, Arabs in the Sudan, among others). The segmentary organization is generally confined to those societies which maintain themselves at a certain techno-economic
level of cultural development—characteristically at the tribal level which, hence, serves to differentiate this group from the more advanced chiefdoms or less-developed band level of structural organization. Since the tribe is a larger more segmented society which is structurally based on a coalescence of a number of unspecialized multifamily groups, it has within its multidimensional political organization, the ability to remain typically "variable." That is, tribal organization has the potential to expand and contract depending on the circumstances external to the tribe. In instances of warfare (such as attacking or repelling an enemy, territorial expansionism, and so on) primary segments will unite to achieve the stated purpose and then fragment at a later time. Again, what is unique about Tiv-Nuer segmentary lineage organization is that it is a highly adaptive and specific variety found within the tribal level of society and culture.

Sahlins highlights the main features of Tiv-Nuer segmentary lineage organization with the following remarks:

The significance of the preceding discussion lies in this: The Tiv and the Nuer are tribal societies, adaptive varieties of the general type. Their economies are neolithic; the Tiv are small-scale shifting agriculturalists, the Nuer transhumant mixed farmers with a pastoral bias. Both have solidary, autonomous primary segments: the Nuer village and the Tiv "minimal tar" (a grouping of related compounds). Like many tribes, neither are permanently organized (integrated) above this level. Yet both are expanding, or rather, intruding into an ecological domain already occupied by other peoples. And success in this intrusive push for "living-space" depends precisely and directly on ability to mobilize above the primary segment level, to deploy the concerted pressure of many local groups on the tribal borders. The Tiv-Nuer segmentary lineage is a mechanism for large-scale political consolidation in the absence of any permanent.
higher-level tribal organization. To use the Bohannans' apt phrases, it has the decisive function of unifying "within" for the purpose of standing "against." Evans-Pritchard viewed this, in its manifestation in feud, as a means of preserving equilibrium in Nuer society; yet in the larger and more revealing perspective of the intercultural milieu its significance is precisely that it disturbs equilibrium. (Sahlins 1961:327-328)

If, as suggested, the primary purpose of segmentary lineage societies is ultimately aimed at achieving territorial rights and subsequent expansionism, then it must also be assumed that:

The correlation often observed between a territorial system and a lineage system in segmentary societies has generally been described as an essential characteristic of this form of social organization. Thus Evans-Pritchard (1940) stresses the fact that, among the Nuer, the most inclusive political unit—the tribe—controls its own territory and is divided into primary, secondary and tertiary sections (the latter containing several villages); each section owns its land and defends it against segments at the same level. (UNESCO 1979:280)

Finally, one other point should be emphasized regarding the segmentary strategies employed by pastoral and nonpastoral societies alike: From a theoretical stance, although segmented societies encourage principles of binary opposition between elements of political equilibrium/disequilibrium (dis-unity), and internal peace/war without any institutionalized forms of hierarchical organization, it tends to encourage the evolution of roles and positions of authority. "For example, among the Iranian nomads, the Khan, a supreme chief with extensive powers, organizes pastoral movements, allocates pastures, settles disputes and represents his group; he is assisted by a large number of subordinate chiefs at different segmentary levels" (UNESCO 1979:281).
Nomad-Sedentary Relationships

There is commonly held, a generalization and misconception in many studies conducted on pastoral societies, which have attempted to explain nomad-sedentary relationships primarily from an aggressive and ferociously war-like perspective. The assumption follows that warfare, particularly aggressive militarism, dominates the majority of African pastoral societies. On this point, I tend to disagree with those authors who make such claims. First of all, aggression is not (nor should it ever be) a "label" used to help characterize pastoral peoples from their agricultural counterparts. If, however, pastoral societies have had to show aggressive tendencies (in so far as there may be the slightest truth in this belief), it will have occurred primarily by mixed farming semi-pastoralists (e.g., Turkana, Karamojong, or Zulu) or market-dependent semi-pastoralists (e.g., Tuareg and Somali) and usually, I might add, with some substantiated justification. However, I would again like to point out that if we examine pastoralists as a group, there is really little evidence that, in actuality, pastoral people are more aggressive or treacherous than agriculturalists. To shed some light as to how this may be so, Jacobs provides the following information using the pastoral Maasai as case-in-point:

It can now be shown from an analysis of documentary sources and a comparison of Maasai traditions and those of neighboring tribes that it was not the pastoral Maasai who prevented Arab and Swahili caravans from entering the interior of East Africa, but rather the neighboring mixed farmers, such as the Kamba, Kikuya and Arusha; and that it was not the pastoral Maasai who were actually responsible for all the cattle raiding attributed
to them, but rather the Arusha, Baraguyu, and other extinct Maasai-speaking semi-pastoralists, such as the Laikipiak and Losegelai tribes. Moreover, it can be additionally argued (or conjectured, since there is little data one way or the other to support such arguments) that the so-called "warrior" sets of the pastoral Maasai emerged in the first instance as a purely defensive measure against raids made upon them by better protected highland agriculturalists, who caught Maasai defenseless on the open plains. Even today it can be shown from police records that the per capita incident of cattle raiding or theft by Maasai is far smaller than neighboring agricultural tribes, such as the Kikuyu, Kamba, or Sukuma. In short, although Maasai are not to be absolved of raiding for cattle, it is important to see that their military organization was as much defensive as it was aggressive, and that as a pastoral society they were never more warlike than surrounding agricultural societies. (Jacobs 1965a:152-153)

Ideally, the relationship which exists between pastoral nomadic and sedentary populations is reflected in their market exchange systems. Pure pastoral societies, as we have seen, raise livestock for food consumption and internal social exchange; there is virtually no markets involved in the economic sphere of production or distribution. Semi- and agro-pastoral societies, on the other hand, utilize markets either indirectly (through exchange purposes as a way of obtaining agricultural foods) or directly in which agricultural goods are grown as one way of supplementing their subsistence options. Many of these societies may also become "part" of the market system by virtue of the division of labor in which the various techniques of production tend to be organized on a sexual basis, as is the case for the Sebei and Nuer (and most other societies who are involved in agricultural and pastoral activities combined). In any case, there is an element of "dependency" involved in agro- and semi-pastoral forms of production and for which the economic importance of such
markets tend to remain relatively crucial—if for no other reason, than to acquire goods and various products which would normally re-main unattainable without such markets.

The fact remains that market production has never been com-pletely unknown to most pastoral societies. In the preceding chap-ter, I suggested the economic significance of long-distance trade among the Tuareg and the relatively important role of the various exchanges in the urban market economy. For example, the Tuareg would sell their animals to buy cereals and other desirable products. The Saharan salt trade was another significant trading network estab-lished, designed and controlled primarily by various Tuareg groups.

Again, the partial or complete dependence on agricultural products by pastoralists reveals clearly the economic importance of exchange.

The ramifications involved in the increasing use and number of markets in relationship to pastoral productivity is well illustrated in the following paragraph by UNESCO:

An important element is the increasing number of markets. In the Sahel-Sudan zone, markets have become increasingly adapted to new economic conditions (Dupire, 1961). Through markets, the pastoral economy becomes progres-sively part of national economic exchanges. New relation-ships are formed between agricultural and pastoral pro-ducers, between herdsmen and merchants. This makes the internal functioning of the pastoral economy more deli-cate, and its relationship with the environment more frag-ile since the environment is used more intensively and beyond its capacity. (UNESCO 1979:288)
Human/Livestock Interactions With Other Populations Exploiting the Environment in Different Ways

A. Cultural/Ideological Factors:
Dietary Preferences

One of the best ways to document how and in what manner populations go about exploiting their environment is by examining directly the "dietary preferences" and actual foods generally consumed by pastoral peoples. Towards the end of Chapter III, I suggested that what characterizes nomadic pastoral societies, and thus, forms the real division between the variable forms as defined, is primarily a socioeconomic one. Insofar as that statement is correct if we examine pastoral societies totally from an economic perspective, somehow I inadvertently neglected another conspicuous dimension, namely, the "cultural/ideological" distinctions which also form obvious divisions between the variable forms of pastoralism as defined. For instance, the refusal of many pastoralists (such as Maasai) to eat fish, or fowl, or the meat of wild animals, or agricultural foods not only represents an economic distinction, but a cultural/ideological distinction as well. Maasai could eat the meat of wild animals (which environmentally abound in their territory), but they chose not to, and their choice is a reflection of "cultural/ideological" factors.

To illustrate this point, Jacobs writes:

For example, the pastoral Maasai of East Africa, who practice one of the purest forms of pastoralism in Africa, inhabit an environment in which alternative modes of subsistence (agriculture or hunting) are not only possible, but are actually carried out by neighboring tribes inhabiting the same sort of environment. The fact that Maasai
do not engage in other forms of subsistence is better understood in terms of their social attitudes and religious beliefs concerning agriculture and hunting, and in terms of the history of their relationship with neighboring agriculturalists and hunters which reinforces these beliefs and attitudes, rather than in terms of environmental limitations.

Again, dietary choices or preferences seem to me to be a crucial factor in understanding the relationship of pastoralists to their environment, and since patterns of consumption (whether these be goods or food) invariably possess strong positive sanctions, these sanctions are likely to exert a strong influence on the development of specific social institutions. In short, we need to examine how such choices and attitudes relate directly to social organization, and how they may determine modes of social relations or economic trends. (Jacobs 1965a: 151-152)

Based on the above analysis it would be short-sighted to overlook that there is no direct correlation between cultural/ideological factors and the development of specific modes of social or political organization. In fact, the exigencies of animal husbandry are such that they impose distinct (if not unique) adjustments found in many of the organizational factors of pastoral societies by virtue of the specific choices and attitudes that people may have or are likely to develop. The Maasai's refusal to accept all nonpastoral forms of subsistence reflects specific kinds of cultural attitudes and beliefs which become economically and socially patterned. For example, the extensive hospitality pattern of the pastoral Maasai is a reflection of this social eminence as indicated by Jacobs:

The remarkably free and extensive hospitality patterns of the pastoral Maasai are clearly related to the fact that they do not make cheese or blood-cakes, as do the Turkana or Nuer, but rather keep larger herds of cattle from which fresh milk can be obtained during the dry season than are actually necessary for subsistence if milk and blood were stored, thus permitting the surplus
of wet season production to be used for hospitality. Similarly, the fact that the Maasai do not drink the milk of their sheep and goats, as do the Turkana and Jie, has contributed importantly to the increase of small stock in their country and subsequent overgrazing, and is greatly influencing the direction in which their form of pastoralism is likely to develop. (Jacobs 1965a:152)

B. Singular and Alternative Forms of Subsistence

Another way in which populations exploit their particular environment is through the deployment of a number of subsistence strategies. This may represent (though not necessarily) a mode of life which integrates a special ecological adaptation to a particular, usually arid or semi-arid sort of environment from which the domestic unit (family members and herd) move in order to secure adequate environmental resources. Agro- and semi-pastoral environments tend to maximize their subsistence base by practicing numerous forms of subsistence, and who utilize their livestock to meet certain socio-ritual obligations or to trade for agricultural foods. Pure pastoral environments, on the other hand, generally disregard (or culturally reject) alternative forms of subsistence due to ideological/cultural values, and thereby practice animal husbandry intensively. Societies of this category are predominately "atypical."

Summary

This chapter has attempted to demonstrate and isolate a few of the many important components which comprise the structural or organizational features of nomadic pastoral societies. Clearly, there
are many additional items which could have been added, but due to
time and space limitations and my particular interests, I've man­
aged to cover those areas which I have considered significantly im-
portant.

The essential dynamics of pastoral production begins at the
level of local exploitation groups generally comprising the domestic
unit and family herds. This "structural foundation" represents the
primary social dimension from which other organizational variables
were considered: camp organization, factors influencing spatial
mobility and territoriality, domestic and communal forms of pastoral
production, and so on. The structural components of pastoral soci­
eties are not uniform; the various domestic and communal forms of
production units operate in different environmental and social con­
ditions.

This chapter can best be summed up with the following quotation
from UNESCO:

The family labour force, which means the number of chil­
dren, particularly male children, determine the capacity
for developing the herd; climatic risks, the chance of
escaping drought and epidemics, are different for each
group. The personal ability of producers is also impor­
tant, particularly since every individual has to master
all the technical knowledge necessary to manage his live­
stock: there are always good and bad herdsmen. Thus
each production unit develops, within a given institu­
tional context, an autonomous strategy, using as best it
can its own capacity to increase its herd. (UNESCO 1979:
278-279)
CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

In this final chapter, I will make a number of qualitative assessments concerning the limited range of facts presented on pastoral production systems. From the beginning of this thesis, I have suggested that the anthropological inquiry into the various modes of pastoral production should ideally be approached from a multitude of levels. Each of these levels represents not only a distinct approach to the various issues about pastoralism for which we must focus our attention, but more significantly, we need to develop a coherent framework from which the network of interrelationships between the "parts" and the total system can be more precisely understood.

Therefore, if we are to understand the complexity of interrelationships found within pastoral systems per se, than one logical place to begin is with the presumed notion that pastoralism (like most cultural systems) is composed of a number of integrated parts, each designed to fulfill its own specialized role or function within the total system.

The structural-functional approach to the study of pastoral production has demonstrated a level of analysis focused primarily on isolating many of the component features designed to maintain the system's viability. Frankly, the utility of using the functional approach has several redeeming qualities which seem to outweigh other
possible drawbacks (depending, of course, on the kinds of information and conclusions the researcher is seeking to obtain). For instance, when I started writing this thesis, I was ultimately concerned with one principle problem: What are the factors or variables responsible for influencing and generating modes of African pastoral productivity? To isolate a number of these factors, it was necessary to begin my analysis by constructing preliminary hypothetical models designed primarily to support or refute my intuitive propositions. Ideally, the utilization of the functional approach enabled me to pursue just that. By looking at pastoral systems as a set of interrelationships of varying complexity, and then by isolating a number of component parts (e.g., the structural dynamics of pastoral systems), certain variables could be tested (e.g., environmental vicissitudes and irregularities, disease effects, social dynamics of human groups, etc.) to see not only if they conform, but more importantly, how and to what degree do these intervening variables alter or influence the general pattern of pastoral production. I hope that to some extent, I have demonstrated many of these factors with adequate proficiency.

In Chapter III, for instance, I emphasized the relative importance of what effect certain socioeconomic variables have (if any) on modes and/or levels of pastoral production and to what extent such variable forms of production (e.g., pure, semi-, and agro-pastoralism) influence differences in labor requirements which in turn alters or manifests different kinds or degrees of social relationships. For example, agro-pastoral environments would generally
be less concerned with the technical aspects of production (at least at the primary stage of consumption) and more concerned with social relationships by virtue of the complementary roles of production—agriculture and pastoral activity combined. Pure pastoral societies, on the other hand, would very much be concerned with the overall technical aspects of animal husbandry since this form of subsistence is practiced intensively, and whose social values and relationships (though highly regarded) are not perceived or based exclusively on factors of production.

For the most part, it has been possible to rank the variations in pastoral production (by establishing a number of economic indices relevant to a broad sector of pastoral societies) and by examining such associations on roughly increasing scales of technicality, specialization, and productivity. As indicated earlier, it would be difficult and beyond the scope of this thesis to list the entire range of economic variables involved in pastoral production of the African eco-cultural association—such relationships invariably show a multitude of social and techno-economic differences too numerous to mention. In Chapter III, I tried to isolate a number of these economic differences by examining directly the diversity of technical and economic criteria related to these identifiable forms of pastoral production (e.g., agro-, semi-, and pure pastoralism).

As the preceding chapters have attempted to demonstrate, what ultimately characterizes nomadic pastoral societies and thus form the real division between the variable forms as defined are primarily socioeconomic and cultural/ideological factors. For example, in
looking at the economic viewpoint, one finds highly specialized pastoral societies (although rare) are extremely rational in herding management procedures. Moreover, being intensive stock breeders as they are, such societies generally subsist almost exclusively on their herds for survival, and who, for the most part, treat technical solutions with care. Semi-pastoral environments, on the other hand, although encouraging economic rationality in the technical skills of pastoral production, are nonetheless extensively dependent on markets for which they receive agriculturally related goods. "Such societies produce animals (or products) for the open market; there is not the parallel reproduction of herds and human groups which characterizes nomadic pastoral societies" (UNESCO 1979;266).

Another important point is that agro-pastoral societies are based on a relationship of agriculture to pastoralism resulting less from a technical combination and an association at a stage of consumption than from social relationships which ascribe different but complementary roles of agricultural production and to pastoral production. (UNESCO 1979;265)

Moreover, "the articulation of agricultural and pastoral activities may take place within a relationship of political and ideological exclusion corresponding to an inequalitarian, stratified society" (UNESCO 1979;270). Such examples would include the Tuareg and several Fulani societies of western Africa.

In essence, therefore, each described variation in pastoral production is the result of different forms of economic rationality. Principally, this results in a corresponding increase or decrease in the productivity of labor in the complementary roles suitable for
the particular pastoral society.

But, there is yet another feature found in pastoral societies which in some instances may not be detected at first glance. These cultural/ideological factors are generally made up of a unique blend of "pastoral values" which are identified with, and ascribe the groups' behavior, particularly at the level of collective values. Here for instance, the "collective choice" made in regards to dietary preferences in actual foods generally consumed by various pastoral peoples (speaking in reference to the Maasai and Galla Boran) is based on an ideological component which must be emphasized with the same precision and care as many of the socioeconomic factors. It is only by examining this cultural component, will researchers be better able to narrow in (more concisely) on establishing the essential criteria responsible for modes of pastoral production with its emphasis on institutionalized permanence and community values.

An essential feature of livestock, particularly in eastern African societies, is to create social relationships which are neither exclusively ideological nor exclusively economic, but serves to establish and reproduce social relations in a number of ways: "either directly when animals are exchanged as bridewealth or as reciprocal loans of indeterminate length between herdsmen, or indirectly, through ritual sacrifices which create a link between men and god, who ultimately warrants social life" (UNESCO 1979:285).

The herdsmen's image in the exchange of animals is exemplified in the following passage from UNESCO:

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In these conditions a real animal fetishism comes about (Bronte, 1974); this is not a psychological and cultural characteristic (the cattle complex) as Herskovits (1925, 1926, 1927, 1928) thought, but the image in the herdsman's mind of the specific conditions necessary to the functioning of his society and, as a result, necessary to this functioning. These herdsmen imagine their society according to a mirror image in which social order, relationships between individuals and the unity of the community appear to depend on the exchange of animals. (UNESCO 1979:285)

In summary fashion, pastoral productivity should ultimately be approached from a number of different levels of analysis. The ecological factors of production is the primary linkage by which human/livestock interrelationships become balanced by the elements of the natural environment: grazing lands, disease vectors, and water availability. Each of these elements or factors determine not only the quantitative and qualitative dimensions of production, but relate synchronically to other aspects in the model presented.

The socioeconomic factors of production (though more complex when compared to ecological relationships) are concerned primarily with defining what is meant by variations in pastoral production, followed by interspecific variables involved with subsistence strategies and alternative possibilities of exploitation. Here, "levels" and "modes" of pastoral productivity become increasingly differentiated, though it becomes difficult to discuss one factor--levels or modes without some underlying reference to the other. Again, there are a multitude of economic variables involved with pastoral production. My purpose here was merely to list what I consider to be the more salient features and to suggest that as research continues in this area, a continuing number of economic indices will be isolated.
and ultimately focused on, such as, the various components of the herding model (e.g., information about animal numbers and the variety of animals herded, mean calving, gestation, and so forth). Also, significant is the need for obtaining information on technological and management practices as it influences the dynamics of production.

The social structural or organizational features which comprise pastoral nomadic societies is the third level of analysis operative within production systems. This component in the overall model begins with the presumed notion that the primary level contained in the structural features of pastoral societies begins at the level of a local exploitation group—whose purpose is the peaceful coalition and exploitation of local resources. Here, various kinds of interrelationships are analyzed such as: spatial considerations of mobility and territoriality, nomad-sedentary relationships, ecological-social linkages, and others, to see what affect these variables have on both communal and domestic forms of pastoral productivity.

Conclusions

I hope that, in some manner, the information presented here about pastoral production systems does in fact illustrate a formidable body of evidence strongly supporting the contention that pastoral strategies are highly active and multidimensional in their structural components. Each component part can be separated and analyzed independently and then later integrated to see how and in what manner it functions within the total system.
Based, then, on the evidence contained in this thesis, there is indeed a wide variety of different levels of pastoral peoples throughout the world. Since pastoralism encompasses different modes of pastoral production, I chose to investigate some of the factors that seem to be "suggestively" related to different kinds of pastoralism and different modes of pastoral production.

I now wish to conclude my analysis on pastoral systems by listing a number of conclusive statements designed primarily on the evidence provided in this thesis. The conclusions can be listed as follows:

1. Based on the types or variation in pastoral production systems suggested here, as pastoral productivity and specialization increases (e.g., from agro- to pure pastoralism), there will also tend to be corresponding increases in the need for establishing and reproducing the diversity and intensity of various social relationships (e.g., descent affinal, stock associates, and so forth). This is particularly evident in pure pastoral societies in which the individual is at the center of a network of economic and social interests for which he can, at will, draw considerable benefits. By establishing social relationships of increasing diversity (and intensity), the individual is better able to minimize the possibility of economic catastrophes while maximizing his ultimate resource potential (herds). This is maintained primarily by borrowing animals on request and by establishing a network of social "friends" or stock associates (Gulliver 1955) whereby optimal access is achieved to the best pastures and water points. Here, pure pastoral modes of
production tend to be more structurally equal in the production units as a result of this wider range of social relations and social institutions (e.g., age sets) which contribute towards the growth of an egalitarian ideology. The Maasai and Turkana are, for example, two societies who are far from identical in actual pastoral strategies utilized, yet the Turkana (unlike the Maasai) are said to have "weak" and unsustaining social and interpersonal relationships outside the nuclear family (Gulliver 1955). This is largely the result of two factors: ecological limitations in which families and herds must be shifted fairly frequently in order to obtain adequate pasture and the utilization of alternative forms of subsistence (when available) thereby diminishing or reducing the need for stabilizing or diversifying social contacts and interrelationships. The pure pastoral Maasai, on the other hand, will tend to maintain more diverse and intensified social relations as a result of their unitary mode of subsistence which stresses the need for intergroup cooperation and contacts among a wide range of economic and social groups.

2. Based on the analysis of sexual division of labor, the following assertions can be made regarding the role or contribution of women in pastoral societies: As pastoral specialization increases in intensity, labor specialization will generally decrease to include women in the less diversified factors of production. That is, as the requirements for labor become less specialized to include women, both men and women alike will become involved with similar aspects of production. For instance, the sexual division of labor in highly specialized pastoral societies (e.g., pure) is such that
the particular labor roles for both sexes will likely take on similar dimensions with less identifiable distinctiveness, at least at the production level of herd management. Agro-pastoral societies, on the other hand, usually separate labor procedures with women ultimately controlling the agricultural spheres of production and men generally overseeing the majority of pastoral activity. To compensate for the minor differences that do occur in pastoral production, women will generally be given the less demanding and more degrading aspects of animal husbandry, particularly for those societies which are pure pastoral such as milking, castration, and the like. However, as pastoral specialization decreases, women become more involved directly with alternative forms of exploitation (agricultural work and the like) and, subsequently, form a more inclusive autonomy unit in production. Although further investigation will be needed to confirm this hypothesis, the evidence that I have presented leads me to believe that as pastoral specialization increases, the levels of values which affects the status of women will generally be lower (as perceived by men) than is the case for women in less specialized pastoral societies. An example of this is the Maasai who integrate labor procedures to include women, yet women are solely responsible for milking since such activity is generally defined as unacceptable and degrading for men to pursue. Since agricultural work tends to generally be done exclusively by women in agro-pastoral societies (one notable exception is the Karimojong), women will ultimately control an essential part of economic life and contribute substantially to overall levels of production.
3. The major differences in sociocultural institutions of pastoral societies is directly correlated to variations in pastoral production. This contention is largely supported by the evidence related to the economic and social conditions of production. For instance, in highly specialized pastoral societies, there is a reduction in human effort to transform the food chain, which "partly explains the limits and difficulties which attend human action in the grazing land ecosystems" (UNESCO 1979;261). However, human actions as this relates to production is much more diversified in agro-pastoral environments. In less specialized pastoral societies (either based on market dependency or on recognition or acceptance of alternative modes of subsistence), there is less concern for economic rationality in the technical skills of pastoral production and generally less mobility and social flexibility in the organizational component of group structure. This invariably leads to closer kin ties and extended family relationships made possible by virtue of reduced pastoral movements. Gulliver (1955) suggests that this cohesive organizational component is particularly evident among the Jie (when compared to the Turkana) due largely to abundant resources thereby reducing the need for continuous mobility. Such is generally not the case where pastoral production is practiced intensively and where continuous movements lead to more fragmentary and unstable social relationships—particularly with extended kinship (e.g., Turkana). Moreover, there is not a smooth and harmonious articulation in the production aspects of agro-pastoral societies since agriculture imposes a number of limiting restraints which are
pragmatically unacceptable as well as unfeasible to pastoral production. Here also, the direct association of agriculture and pastoralism involve distinctive social conditions of production. A multitude of social relations (e.g., age and sexual division of labor) ultimately form where men and women alike are responsible for different tasks.

4. There does not seem to be enough conclusive evidence to support my hypothesis that ecological factors are instrumental in influencing African pastoral productivity. Though I have suggested that water insufficiency, prevalence of disease vectors, and lack of potential grazing land are factors which inhibit or prevent degrees of pastoral development, more is needed to explain the variations in particular livestock production systems. In other words, these factors do not explain the modes of variable specialization of societies in zones where both forms of production (agriculture and pastoralism) are possible. The Maasai's choice to remain exclusively pastoral in an environment which is relatively conducive to agriculture, while the Turkana continue to engage in some agriculture in an environment generally unfavorable to farming, suggests not only the analysis of economic and social conditions of production, but also an examination of the cultural/ideological factors which ultimately govern many aspects of production.
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