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Fulani Pastoralists and Cattle

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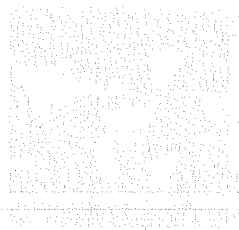
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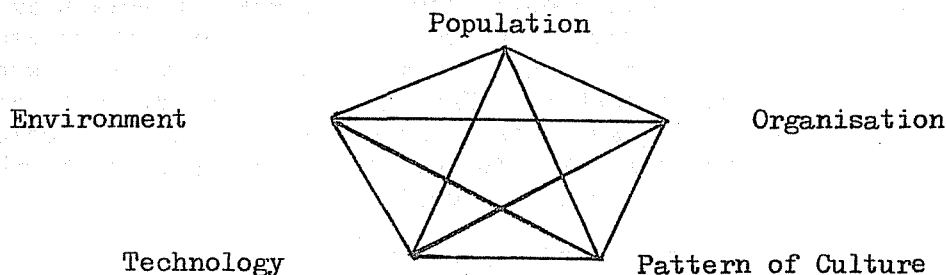
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1. THE ECOLOGICAL COMPLEX AND THE CASE STUDY

In reviewing a number of studies which aim at deepening our theoretical insight into the synthesis of economic, social-psychological, cultural and natural aspects of human occupancy and spatial differentiation in a single framework, Lambooy brings together and relates such important concepts as resource, resource system, resource process, and ecological complex.¹ Of particular significance seems the suggested refinement of Duncan's model for studying the ecological complex of a community, be it a village, town, or region.² Whereas Duncan feels that environment, population, technology and organisation are the fundamental factors affecting socio-spatial diversity and that other relevant cultural factors would find due expression through technology and organisation, Lambooy strongly stresses the need for seeing culture as an important structuring force in its own right. Accordingly, he suggests the inclusion of a fifth magnitude: the pattern(s) of culture of the human group(s) under investigation. The scheme is then as follows:



whereby: Population refers to number, density, age-sex composition, activity structure, etc. of the group(s) of occupants; Environment refers to (1) the natural attributes of the habitat which form the resource base of the occupants³ and to (2) the man-made physical environment, i.e. the physical structures which over time have been created to accommodate human occupancy;⁴ Technology refers to knowledge and material means available to take advantage of resources; Pattern of Culture refers to a specific whole of beliefs, knowledge, values, norms, ideology, customs and practices; Organisation refers to the social, political and economic structures that have emerged to arrange for the efficient running of systems of occupancy and their integration into systems of larger scale. Accordingly, the general heading encompasses both a micro and macro-dimension.

As the diagram suggests, the five components are interrelated in such a manner that a change in any of them may affect all others and is likely to produce tendencies towards an overall adaptation which ultimately will result in the restoration of a certain measure of balance. It could thus be said that this specific model of the ecological complex presupposes a dynamic equilibrium. While allowing for continual flux and tension, it stresses at the same time that the overall pattern of transformation as made up by a range of re-adjustments in response to internal and external changes will not be haphazard and chaotic. The ecological complex as it is here perceived as a concept thus shares the attributes of systems in general of being structured and dynamic in their functioning and of being open to

external influences.⁵

A final merit of this model relates to its possibilities as a unifying framework for interdisciplinary efforts. Though it is common knowledge that man, culture, and environment should be viewed in conjunction since they affect each other intimately and evolve together, the rigorous conventional separation of the natural and social sciences has tended to render either one incapable of grasping fully the complexity of a given situation. By attempting to break through this unfortunate dualism in a logical and comprehensible fashion, the ecological complex model is believed to possess considerable scope as a methodological guide to the integrated analysis and steering of socio-spatial structures.

The ecological complex that will be introduced in the present study is narrow in its perception since it has been derived from the structural analysis of basic units of social life and furthermore relates to a single human activity. But it should be remembered that considerable generalisation and simplification is bound to occur even when one seeks to apply ecological complex ideas to a relatively simple situation. Any analysis that apart from natural processes also involves socio-cultural ones and focuses on the reciprocal relationships between them is sufficiently complex to make selection imperative and to render simplification of survey procedures and generalisation of survey returns inevitable, all the more so in a situation where hard data are virtually lacking. The aim of this study is to appraise major cultural variables and interrelationships within the ecological complex of Fulani pastoralists, especially in that part of Northern Nigeria that has become known as Hausaland.

2. THE 'CATTLE COMPLEX'

Referring to the East-Africa Cattle Area, Herskovitch notes, "... it is the cattle that have become the dominant element in the cultures of the people".⁶ In his opinion, East African pastoralists would share a number of notable characteristics, together producing a complex that can be recognised wherever it exists. Since cattle and their interests would be the structuring force of the cultural elements that make up this main complex of the pastoral cultures, it was called the 'cattle complex'. As Herskovitch described it, the cattle complex would be characterised by a strong attachment to cattle, manifested in love for and identification with the animals and in dislike of killing them except in a ritual context. The prevailing strong personal affection for and attachment to cattle would also lead to uses that would not be entertained by cattle-keeping societies where the cattle complex would be lacking. The almost universal association in East Africa of cattle with ritual, such as ceremonies at birth, initiation, marriage and death, would be reducible to the emotional closeness of man and beasts. Similar considerations would be behind the use of cattle as the most prominent and often single measure of power, prestige, and status. Finally the fact that the full economic potential of the animals is not utilised and that cattle are wealth for social rather than economic purposes would convincingly point to the existence of an ideology in which emotions prevail over rational considerations.

Since the writings of Herskovitch on this subject,⁷ the cattle-complex concept has become widely used in anthropological writing. Although much evidence was initially advanced in support, more recent

studies either express disagreement on important issues or considerably qualify the interpretation of what is thought and expressed by the pastoralists themselves.⁸ I incline towards the latter group, inspired by my own findings among Fulani pastoralists.

In several myths of origin Fulani pastoralists trace their association with cattle to the benevolent intervention of a spirit. One popular version narrates how a water spirit appeared to a Fulani boy who wandered about in the bush and promised him great wealth and prestige if he obeyed its orders. The boy was told to wait by a river until cattle emerged from the water. The boy did so and when the first animals appeared he started to lead them away from the water into the bush. But hearing the swelling noise of the trampling animals behind him, he could not resist the temptation to ignore the advice of the spirit and to look back in order to assess the size of his newly acquired wealth. The flow from the river ceased immediately. This taught the boy, and all pastoral Fulani since him, a hard lesson. Counting the animals amounts to fixing the size of the herd, to inviting the sort of vicissitudes that set a ceiling to further increases. According to the story, the boy's experience at the river prompted him to follow all other instructions of the water spirit scrupulously from then on lest his animals should revert to wild state and leave him. Love and extreme care for his animals is said to have been the Fulani's central concern ever since.

Obviously, the way in which Fulani pastoralists account for the origins of existing values, virtues, and practices with regard to cattle is only of peripheral interest; what really counts is the magnitude of present realities. In general, the acquisition of stock and the continuous ensurance of its wellbeing is both a means to an end and an end in itself. It is a means to an end in the sense that as an economic activity it is instrumental in the satisfaction of such basic material needs as food, clothing, and transportation, both directly and indirectly. Cattle also enable the individual to set up an independent household and make it operate efficiently as a unit; cattle again feature prominently in institutions and arrangements that forge households together in larger social groupings. At a higher level, the ownership and rearing of cattle promote an awareness and solidarity that far transcends local and kinship bonds and help to produce a sense of belonging to a people that possesses an identity of interest and ethnic consciousness.

Somewhat harder to elucidate is that cattle are also an end in themselves, available concepts and vocabulary not being very amenable to conveyance of the substance of the meaning of this. Most illuminating is perhaps that the Fulani are also not very clear on this subject, even when using their native tongue. No other topic dominates daily conversation as much as matters pertaining to cattle and their rearing. Cattle are loved for their beauty and peculiar traits as much as they are valued for more strictly utilitarian functions which, if they had been critically assessed in terms of the standard of living they permit, would no doubt have struck and frustrated the Fulani pastoralists. The total material return derived from livestock being what it is, any such scrutiny would have brought out forcefully the marginality of their existence and would, in my opinion, have prompted the Fulani to seriously question the *raison d'être* of pastoralism. Instead, it has remained a matter-of-course that is not to be questioned. To them, the rearing of cattle has continued to be a preoccupation rather than an

activity, something that ennobles and that is good and meaningful whatever the hardship it may occasion. Accordingly, Fulani pastoralism could be said to be a more or less complete way of life, of which the main body of values and ideals is derived from the central place which cattle and cattle husbandry occupy in the system as a whole.

The cultivation of this cultural focus in children starts at a very early age. Before they can even walk they are brought into contact with the calves that are still too young to be taken out for grazing. As soon as children are able to move about, they start playing games that anticipate the roles they will later take on. Boys, for example, will construct miniature model camps with a 'cattle-crowded corral' as the most prominent feature.⁹ Likewise, girls often engage in games that have domestic tasks as their main theme. Tiny calabashes in which to store all the milk that supposedly will come in, may be collected and decorated. The children's fantasies that are expressed in their play reflect and further cultivate the major hope and aspirations and the dominant cultural values. More direct involvement in herding and associated activities usually starts from the age of 5; at the age of 7 a boy is normally considered strong enough to spend all day with the herd and it is not uncommon for an eight-year old to take out a herd for grazing on his own. Although it may take another ten years before he is thought capable of establishing a household of his own, the skills that count for cattle husbandry have been acquired much earlier. Girls start to assist their mother and other female members of the camp in milking, the preparation of food, the rearing of younger brothers and sisters, and in other tasks in and around the camp at roughly the same age. They too take on considerable responsibilities quickly and may be considered ready to be given out in marriage when 14-15 years old. With the establishment of a new household, a new cycle begins that is likely to be as effective as previous ones in passing on the pastoral tradition, the Fulani way of life.

3. THE CATTLE COMPLEX AND SUBSISTENCE SECURITY

The presentation of cattle and cattle husbandry being the alpha and omega of the Fulani way of life poses the interesting question whether the observations and findings advanced by Herskovitch for East-African pastoralists apply equally to West-Africa. It is pertinent to the present discussion to pursue this question since it may shed some light on the logic of the dominant cultural values. There is little doubt that all so-called cattle-complex traits also apply to the Fulani pastoralists and that they could be advanced as a textbook illustration. Conformance to the requirements of the complex may appear from the strong emotional attachment to cattle, the dislike of killing them, the use of cattle in ritual, and their importance for validating marriages and for measuring prestige and status. From a certain point of view it may also be argued that economic under-utilisation occurs. It is also true that what people say and think about their animals may prompt the outside observer to believe that he is dealing with a somewhat mystical mentality distinct from that which prevails among sedentary cattle rearers in his home country. Without negating this distinction and the necessity for examining the differences, I want to advance that it is at least as instructive to explore similarities. The question whether

or not pastoralism and technologically more advanced forms of animal husbandry share the same basic rationale seems particularly relevant. I believe they do and also that the sound principles that underly advanced livestock operations have a pastoral parallel; this may be shown by bringing in the survival aspect and relating it to the data on hand. Whereas initially the commitment of Fulani pastoralists to cattle and cattle keeping was associated rather exclusively with the social and emotional values placed on livestock, the dimension is now added of viewing cattle, cattle keeping, cultural values, the environment and the survival of the group in one context.

A major reality that should then be given due emphasis is the subsistence role of cattle among Fulani pastoralists. The Fulani are primarily dairy people and good husbandry to them means first of all the maintenance of a sufficiently large milk yield throughout the year to support the family at all seasons. Because of their offspring and the milk they produce, cows are the most valued capital. By implication, the killing or disposal of female animals is strongly rejected except in special circumstances. If a cow does not become pregnant or when it passes the reproductive age, the owner will not hesitate to dispose of it. As Evans Pritchard has observed for the Nuer, the end of every beast is the pot and that also applies to Fulani cattle.¹⁰ Admittedly, the herdsman will not himself slaughter the cow that has been part of his life and has served him for so long, but the commercial value of the barren cow will nonetheless be taken advantage of when opportunity and need arise.

A heavy preponderance of uneconomic and hence irrational elements in pastoral management also appears incompatible with the different roles of other animals in the subsistence economy, i.e. the functions fulfilled by male cattle, sheep and goats.¹¹ The frequent misunderstanding about the economic utilisation of animals seems at least partly caused by negligence of the way in which pastoral herds are composed, not only in terms of species but also with regard to age and sex. A comprehensive livestock census carried out in the Ruma-Kukar-Jangerai Forest Reserve in Katsina Province in connection with the imposition of grazing fees, also covered the age and sex distribution of the cattle. The findings for two successive years are presented in Table 1 together with the results of own surveys of herds belonging to sedentary and nomadic pastoralists in the period 1968-1970.

Table 1. Age-Sex Distribution of Pastoral Cattle in Percentages of Total

	Head of Cattle (100%)	Adult Females	Adult Males	Bulls 1-3 yrs.	Heifers 1-3 yrs.	Calves less 1 yr.
Census 1965	22,729	46.9	9.0	13.7	13.7	16.7
Census 1966	18,948	47.2	9.2	11.4	14.6	17.6
Survey herds, Katsina Province (1968-70)	839	42.4	10.5	13.0	15.3	17.9
Survey herds, Zaria Province (1968-70)	1,264	40.5	8.4	13.4	17.5	20.2

Major discrepancies in this table are occasioned by different methods of separating cows from heifers; contrary to the rather strict age measure applied by the census takers, we have included as heifers all young females that had not yet reproduced and were not believed to be pregnant.

As Table 1 indicates, the distribution of male and female cattle appears to be fairly balanced below the age of 4 years. The discrepancies which then start to develop are occasioned by the slaughter and sale of male animals. As is confirmed by marketing statistics, approximately 60 percent of trade cattle are male animals of 4 years and older.¹² It is interesting to note the motive given by Fulani for the disposal of bulls by the age of four. The remark that 'their meat is sweet' should not be taken too literally since what the Fulani have in mind is the general superior quality of the meat and the consequent high commercial value of the animal if sold. This should not be taken to imply that all male animals that are not to serve as bulls or pack oxen are sold out or consumed at that age. Disposal of animals is primarily dictated by subsistence considerations and will usually only be practised if urgent need for a large amount of cash arises when, for example, food is in very short supply. Cattle may thus die to satisfy hunger or to deflect a threat of human starvation, be it indirectly.

It is also of interest to speculate on the extent to which home slaughter fits the subsistence strategy of the Fulani pastoralists in a more direct manner. It is true that the killing and slaughter of animals predominantly occurs in a ritual and ceremonial context (naming and marriage ceremonies) and seemingly bears little direct relation to subsistence needs. But it should be remembered that crowds of fellow Fulani are always invited to such occasions and take advantage of the unusual opportunity to supplement their monotonous diet with meat. Given the fact that many occasions will be held annually in the direct surroundings, such opportunities offer themselves quite frequently. Though the direct secular advantages that accrue to the host's family in the form of presents may be quite significant, the attainment of social support and active assistance in future efforts is just as important. Finally, we should refer to the general socialising force that derives from common attendance of a feast of this nature. A group feeling of solidarity is once again fostered, existing friendships are nourished, cooperative undertakings are decided upon, betrothal arrangements are agreed upon, and new friends are made. In short, the function of all these ceremonies, through the community cooperation and solidarity they help to promote, has an undeniable subsistence dimension.

What has been said about the subsistence aspects of cattle is also to a large extent true of sheep and goats, though in the Fulani's appreciation small livestock clearly rank second. They are used for ceremonies and sacrifices as well as medium of exchange. In fact, one could argue that sheep and goats are the "small denomination of the Fulani currency". They act as buffer against the frequent need for cash to cover small expenditures for grains, salt and fines; without these means the herdsmen could easily be forced to make inroads into their main source of subsistence at a time when they do not want to do so.¹³

Viewed from the perspective of subsistence and survival, many traits of the cattle complex and the specific pastoral management practices that have been developed thus appear to have a definite rationale. Cattle husbandry in the savanna of northern Nigeria is a tedious undertaking. The constraints which nature places upon Fulani pastoralists are severe at the best of times. The cattle continuously demand constant attention and utmost care on the part of the herdsmen to safeguard their welfare. Frequent moves of camp and excessive daily trekking have also to be engaged in to secure sufficient supply of fodder for the beasts, and these movements produce a good deal of discomfort. The pastoral life of the Fulani pastoralists tends furthermore to be rather insecure. What has been gained over a lifetime with great skill, diligence and endurance might be quickly lost through bad fortune or poor judgement. Dramatic instances of herds being decimated by disease infection or by starvation can be cited by any Fulani pastoralist.

Recurring uncertainty being such a prominent feature of pastoral life, pastoralism as a livelihood appears far from effective. It also shows that the level of technology is not capable of coping efficiently with all the vagaries of the natural habitat. Admittedly, the same observation could be made for savanna farming, but if one were to compare Fulani pastoralists and the hoe farmers among whom they live in terms of general level of living and degree of subsistence security as determined by material goods available, regularity of food supply, riskiness of the two operations, and the incidence of disease and mortality, the outcome would in my opinion be quite conclusive and would indicate that pastoralism is inferior to alternative types of savanna subsistence in these respects.¹⁴ As a matter of fact, several Fulani pastoralists recognise that definite advantages are to be obtained by settling down and appear not ignorant of the general methods of cultivation and the richer reward and comfort that may be acquired, as has been noted elsewhere;¹⁵ yet not many of them have yielded.

This circumstance lends support to the earlier contention that pastoral cattle husbandry is an end in itself. Were it merely a means to an end and were the cattle primarily judged by their performance and yields, the meagre returns as measured against effort and occasional suffering would have impressed the Fulani pastoralists long ago and might have resulted in their abandoning the focus upon cattle in their daily pursuits. For the very reason that Fulani pastoralism is more than this, intensive exposure to the attractions of sedentary life has not produced the response that would seem justifiable in strictly economic terms. It is because of the existing attachment to cattle and all the values and ideals that derive from and at the same time foster this overriding emotional feeling, that the pastoral community can tolerate severe stress. Just how much infringement upon subsistence and survival imperatives, how much failure and disappointment, an individual and a community can cope with is a problem for each culture to solve. The case of Fulani pastoralists confirms that where and whenever technological means fail or are inadequate on either a lasting or temporary basis, a cluster of deeply rooted psychological forces and institutional arrangements is present to perpetuate the situation and to assist man in helping overcome setbacks and threats to his survival.¹⁶

For planning, this realisation contains a message of considerable consequence. On the one hand it brings out the potential magnitude of the resistance to be encountered by planners and administrators who are determined to introduce innovations. On the other, it indicates the need to examine the value and belief systems, and to identify the complexes of cultural elements that should be preserved and cultivated if the endeavour is to retain its significance to the people engaged in it. Finally, it points to the dangers involved in initiating a process of guided change. A major reorientation of Fulani pastoralism in the direction of a predominantly commercialised undertaking should not be contemplated except with utmost caution. In the unlikely event that outside injections intended to modify the cultural foundation of Fulani society are effective, they may well be self-defeating since loss of those values that have always given meaning to pastoral cattle husbandry could readily cause its disintegration and ultimate disappearance. There is ample scope for promoting technological advance and for improving the subsistence base. Since especially the enhancement of opportunities for security and profit may set into motion a process of self-transformation, their realisation is considered a first priority. A closer examination of other prominent characteristics of Fulani pastoralism may further substantiate this first indication of the nature and sequence of measures to be included in a development strategy. The features to be discussed are herd size, attitude to the environment, personality traits, and social organisation.

4. QUANTITY AND QUALITY

Pastoralism has been advanced as a potentially good way with which to utilise land otherwise left idle since the main areas of occurrence would set severe limitations to cropping. But prompted by signs of environmental deterioration and general low quality of life of the pastoralists, it has been argued with equal force that the forms of husbandry that have emerged display an inherent tendency to overstress the natural resources of the area and to condemn the practitioners to a standard of living that is clearly below that of the national population at large. The large size of the pastoral herd, its seeming underutilisation, and the pastoral attitude to the environment have been key elements in arguments that label pastoralism as a somewhat irrational undertaking that would be potentially dangerous to the environment and ultimately, through reduction of the carrying capacity, to the pastoralists themselves.

The size of Fulani herds has been subject to extensive debate and controversy. Whereas natural scientists and policy-makers are believed to show a general inclination to consider the number of cattle excessive in relation to people and to the land available, social fieldworkers have emphasised the nice balance between the size of the pastoral unit and of the herd, both in terms of work demand, working capacity and food output.¹⁷

To assess possible implications for planning, close examination of the facts is essential. Two sections will be devoted to this: the present one puts forward arguments in support of large cattle numbers, while section 6 on "Man, Cattle, and Environment" will examine implications which may clarify the contention that the pastoral problem

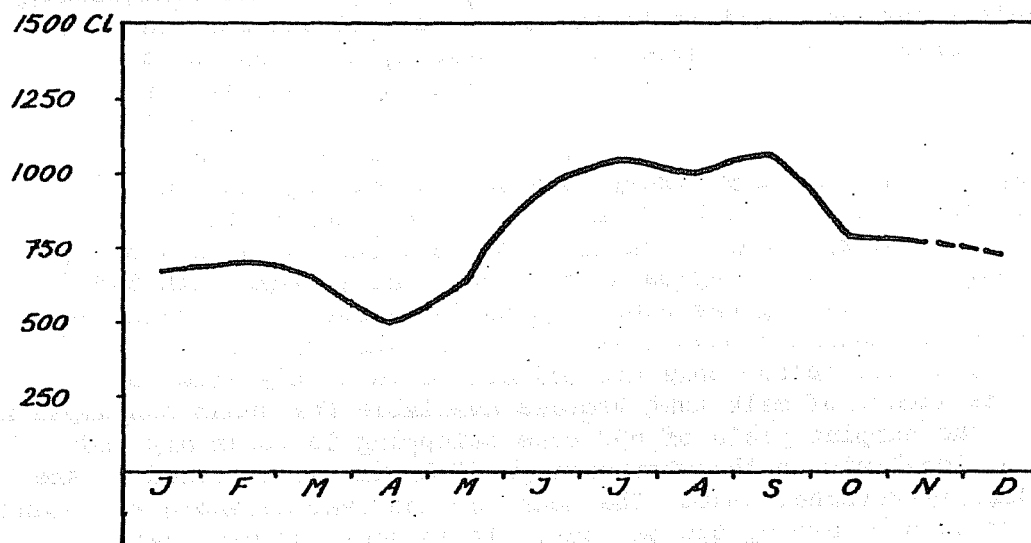
to a large extent amounts to that of too many animals. The pastoral Fulani's wish to have as many animals as he can acquire has a definite logic in terms of subsistence security. In this context, particular attention should be devoted to two aspects, i.e. the reproductive performance and the low animal milk yield. Similar to human populations, the Fulani's insistence on animal fertility is largely an adjustment to the high mortality that is experienced. The herd being the single source of subsistence in most instances, the measure of security stands in direct relationship to the size of the herd. The Fulani's aim to establish a surplus stock and hence a yield that is beyond direct subsistence needs should also be related to maximising survival opportunities as a cattle rearer. He knows what the environment can do but is incapable of foreseeing what it will do. Through a long process of trial and error, the Fulani have learned to manipulate their animals, environment and fellow pastoralists in such a way as to maximise their chances 'to fill their bellies' on a lasting basis. It has been suggested that the sort of solution obtained would be similar to the outcome if a game-theoretic framework were adopted which would formulate the situation in terms of a game with man playing against his environment. But it is obvious that the game concerned may be one of life and death.¹⁸ Of vital significance in the pastoral game is the successful manipulation of cattle. Through selective in-breeding, properties are continuously being cultivated that facilitate the adjustment of the species to a harsh environment, that promote its milk yield, and enhance its reproductive performance. Equally important is the manipulation of the herd within the environment. If properly done, the outcome of the interplay might be a substantial increase of the herd. Admittedly, this might be a temporary luxury only as natural vagaries such as prolonged droughts or epidemics may again take a heavy toll. But as has been observed by Spencer, "a man who loses one-third of his stock is much better off if he begins with 60 cows rather than with 6."¹⁹

Extensive surveying has been engaged in to assess reproductive performance and animal productivity.²⁰ Since the practice is that calves will suckle before cows are milked, we were only able to measure the amount of milk that becomes available for human consumption. In total, the surplus yield of 692 cows belonging to sedentary and nomadic pastoralists in the surroundings of Zaria was assessed in the period January-November 1970. The mean for the year as whole was found to be 0.77 l. per nursing cow per day. It is thus obvious that the contribution of each nursing cow to human sustenance is generally low.

In order to assess the fluctuation over the year, recordings have also been averaged out on a monthly basis. The results are presented graphically in Diagram 1. The variation is quite considerable, the lowest and highest surplus yields per day being 0.50 and 1.07 l. per nursing cow for April and September respectively.

This general low productivity of animals kept under a pastoral system of management combined with high seasonal fluctuation in supply constitutes another obvious incentive for Fulani pastoralists to establish large herds. Since it is often argued that to pastoralists the quantity and not the quality of animals would count, the previous account of surplus milk yields suggests that the two are closely interdependent. The extent to which this policy of compensating for low productive quality with quantity is imperative gains in force if the

*Diagram 1 : Surplus milk of nursing cows in
pastoral herds (CL per day/animal),
Zaria Province 1970*



*December outcome obtained by averaging out
data for November and January.*

portion of the herd is considered that is in milk.

A key element in this assessment is the reproductive performance of pastoral herds. Fulani cattle usually do not reach reproductive maturity until the age of three or three-and-a-half years; lactation periods are furthermore believed to be short and intervals between subsequent births long. Since available statistics show different conclusions,²¹ it is unfortunate that it has proven impracticable to verify information obtained through interviewing with the aid of quantitative measurements of the performance under field conditions. But it is believed that an indication as to the overall effect of late maturity, short lactation period and long calving interval is implied in indices relating the number of cows in milk to the herd as a whole and to the number of adult females. Investigations in 1970 into the age-sex composition and milk yields of the cattle population belonging to a community of sedentary pastoralists in Zaria Province have shown that 219 out of the 1264 animals that made up the herd were in milk, i.e. 17.3 percent.²² A study of herds in both Zaria and Katsina Provinces covering cattle of sedentary as well as nomadic pastoralists, arrived at an annual mean of 18.6 percent.²³ The variation between seasons proved slight, the mean value for the dry and wet season being 18.8 and 18.3 percent respectively. In both cases the ratio of cows in milk to dry cows was found to be around 3 to 4. Expressed as a percentage of the adult female population in its reproductive life span, milch cows thus constitute approximately 43 percent. Making allowance for the fact that the lactation period is usually believed to be in the order of 7-8 months, this index would suggest that 65-75 percent of breeding cows calve in any given year. Accordingly, the calving interval would be in the neighbourhood of 16-18 months. If we now apply the age-sex composition figures contained in Table 1, a theoretical herd of 100 would produce 28 to 32 calves per annum. Since others have arrived at similar outcomes by different methods,²⁴ an estimated birthrate of 30 percent may have some value as a guide in further interpretation. For example, it enables one to speculate on such an important issue as the magnitude of calf mortality. Table 1 shows that calves (one year and less) make up only 18 percent of the herd on the average. By implication, the suggested calf mortality would be in the order of 40 percent per annum. As we have pointed out earlier, such experiences in themselves contribute to the value that Fulani pastoralists attach to animal fertility and to large herds.

5. AGGREGATES AND THE SHARE OF THE INDIVIDUAL

However, the rationale that aims at quantity takes on particular significance if we complete our argument with an assessment of overall milk output of herds in relation to the groups that depend on it. This requires the manipulation of two highly uncertain variables, i.e. the size of the cattle population and the number of people that directly depend on its productivity. Subsequent to an estimation of the size of the populations, production implications will be reduced to a per capita base in order to show forcefully the magnitude of the problem that is faced by Fulani pastoralists.

Though assessments of livestock numbers have been made for many years on the basis of returns from officials in charge of the collection of cattle tax (jangali) and the assessment of income tax,

the figures thus obtained are generally considered much too low. Stockowners tend to declare fewer animals than they possess. Other factors are tax evasion, for which nomadic pastoralists in particular are notorious, and negligence on the part of tax collectors. Both the efficiency and integrity of district officials and the opportunities of herdowners to conceal their stock in ill-accessible terrain differ from district to district, resulting in considerable variations in the degree to which tax records reflect actual animal populations. In densely populated areas the official returns may cover as much as 75 percent of the actual population, while in sparsely populated bush areas this figure may not be more than 25 percent.²⁵ But we found that in a village near a provincial capital where tax collection was said to be relatively strict the actual cattle population thrice exceeded the tax record figures. The vaccination returns of the Rinderpest Campaign conducted from 1962 to 1965 confirm that cattle numbers in northern Nigeria as a whole are much higher than those suggested by the tax figures.²⁶ Initially, veterinary officials believed that the campaign had covered 95 percent and that the total would therefore be in the neighbourhood of 6 million. But in subsequent years it was found that large numbers of cattle had never been treated. The coverage estimate was consequently reduced. For Katsina Province, Fricke arrived at a figure of 667,000 head of cattle by assuming that vaccinated cattle represented 60 percent of the total.²⁷ If the same rate is applied to Northern Nigeria as a whole, the total population would be over 9 million head of cattle. This figure is close to estimates based on output. Hide statistics, for example, would suggest a grand total of 9.7 million.²⁸ It may be noted that the National Livestock Development Committee that met in Kaduna in 1971 has also worked on the assumption that the total would be approximately 9.5 million.

An estimation of the human population engaged in cattle husbandry is equally hard since the census returns and sample surveys have not specified this group as a separate entry. It should be realised, however, that by far the greater part of the cattle is owned by the Fulani pastoralists. It should also be noted that even when ownership is not completely confined to this ethnic group, the tending of animals almost invariably is. Cattle husbandry is thus more or less exclusively a Fulani trade. Unfortunately, the size of the Fulani population cannot be given with any great degree of accuracy since considerable difficulties have been encountered in estimating the numbers that describe themselves as Fulani or speak the Fulani language. The figure of 3.5 million Fulani in the whole of Northern Nigeria is therefore no more than an estimation.²⁹ But not all the Fulani are engaged in animal husbandry and a substantial reduction has to be applied to allow for all erstwhile pastoralists. A pastoral Fulani population of 2-2½ million including both sedentary and nomadic pastoralists seems a reasonable estimate.

On average, a pastoralist family has thus approximately four animals per member. But it is a wellknown fact that herds belonging to sedentary pastoralists are much smaller than those of their nomadic counterparts. Nigerian cattle might be roughly divided equally over these two main stock-rearing groups,³⁰ but sedentary and semi-sedentary pastoralists far outweigh the nomads in numbers. Implicitly, stock ratios vary greatly; there are by and large 1-5 head

of cattle per household member among sedentary pastoralists while this number fluctuates around 10 among nomadic Fulani.³¹

It will be very enlightening to assess the subsistence base of the more favourable case. If there are 10 head of cattle per individual household member, the milk yield is still low in both absolute and relative terms. As indicated by the herd composition and milk yield measurements, there will only be two cows in milk (=18.6 percent) on the average. Accordingly, the surplus milk available for human consumption would be approximately 2 liters per day at the best of times (1.07 l. per milch cow per day in September), while in the second half of the dry season the supply would drop to 1 liter only (0.50 l. per milch cow per day in April). Since milk constitutes the only regular source of income, these yields should cover all common daily needs. Dairy produce yielding as little as it does,³² it seems that the Fulani's needs cannot be but very limited. Usually, the daily proceeds are just sufficient for purchasing grains and for petty cash. Lower man-cattle ratios represent exceedingly critical conditions. Under the prevailing systems of management, ratios of 5 head of cattle per person and less tend to place pastoralists in the position of being forced to give up their exclusive dependence on the herd and to engage in food farming. Nomadic pastoralists who see their herds reduced by disease or starvation might have to settle down and take up cropping as an important sideline. Changes in herd size being of such potential consequence, it needs little imagination to appreciate the strength of the value and norm that cattle numbers should increase. Aiming at quantity is a subsistence and survival imperative and should be seen in this context if it is to be understood fully. The fact that Fulani pastoralists do not normally account for herd size in these terms does not necessarily contradict this conclusion. In dealings with subsistence communities, one is often confronted with incomplete answers and seemingly irrational considerations for basically sound and rational practices and the Fulani are no exception to this rule. This is not meant to belittle the possible impact of a range of other factors. Social considerations, for example, are definitely of great relevance but, in line with the view taken, it is speculative whether their importance is not an expression of something more fundamental, i.e. of the basic reality that large herds are first of all a response to the exigencies of subsistence and survival. But even though social and cultural values, norms and ideals do not provide sufficient explanation for certain practices, they are sufficient to the Fulani. These social facts may as it were assume a life of their own and continue to be the dominant guiding force of the behaviour of Fulani pastoralists despite the fact that their functional significance may have been outlived by new developments. In terms of the issue at hand this would mean continued insistence on quantity for the sake of quantity itself, producing a considerable time lag in adjustment to improved opportunities for security and profit maximisation in the best of cases.

Two important conclusions pertinent to planning efforts can thus be drawn. Firstly, the fact that Fulani pastoralists have no alternative but to aim at large cattle numbers in view of subsistence needs clearly calls for improvement of the natural setting by environmental engineering and for the application of more advanced animal technology including, as a minimum, breeding efforts and more

efficient management practices. On the whole, such measures would ensure that the economic need for large herds would lessen.

Secondly, reduction of herd size is as much a social as a technical issue. The realisation that, because of cultural traditionalism, either a change of management practices may be rejected or a time lag of considerable duration may occur between the introduction of technical measures and effective social response, clearly points to the magnitude of the social problem and emphasises the need for designing a policy that fully anticipates social resistance. Accordingly, the overall development strategy should stipulate the means, tools and instruments with which to engage successfully in social engineering.

6. MAN, CATTLE AND ENVIRONMENT

Earlier it has been noted that cattle numbers in Fulani pastoralism are frequently believed to be in excess of environmental potential. Instances of environmental degradation due to overgrazing and management practices being in such abundant supply, there seems ample justification for condemning prevailing forms of pastoralism on certain grounds and to favour their transformation or elimination. It appears that negative effects of the pastoral system are closely associated with arrangements by which land is held and used. Pastoral land tradition has been described as a free range philosophy because of the emphasis placed on free access to all resources of forest, fallow land and harvested fields. For the present argument, particular attention should be devoted to the implied lack of firm identification of pastoral groups with a specific tract of land.

Nomadic pastoralists in Nigeria, as in other parts of Africa,³³ do not normally hold exclusive rights to any area, nor have they so far been able to adjust herd size and production technology to the limitations set by confinement. As in the past, they move from one area to another, making extensive use of all fodder resources. Saving for later on by controlled grazing of pasture is normally not contemplated. Such a practice would involve a considerable additional burden for the herdsmen and would serve no other purpose but to invite active outside competition. Any but a 'reap the day' attitude may be self-defeating since what is not taken advantage of immediately is likely to be gone tomorrow. This in itself may not entail detrimental consequences for the environment, but it should be remembered that news of good grazing opportunities tends to spread surprisingly quickly. Although Fulani nomads usually share experiences and detailed information regarding the location of water and fodder only with a close group of intimates, broad indications on general conditions are part and parcel of all greeting exchanges with fellow pastoralists. The increases in cattle density that come about as a result may far exceed the carrying capacities of the areas concerned. If repeated frequently, such local explosions of stocking rates may considerably upset the ecosystem.

It is obvious that the situation on the whole is not conducive to environmental protection. As has also been noted for East Africa, a migratory undertaking such as pastoralism is not amenable to the maintenance of good grazing.³⁴ Over the centuries it has been found that migration and a free range concept are most instrumental to

ensuring the welfare of man and cattle in a highly variable natural and social environment. A notion of the necessity or desirability of concern for the environmental setting that is temporarily taken advantage of and to which they may never return is not part of the overall tradition. As has been stressed repeatedly, the overriding principle to which all other matters, including manipulation of the environment, are subjected is to enlarge or at least to preserve the herd. This renders nomadic pastoralism a potentially destructive activity to any locality that is included in its grazing orbit. There are no doubt many reasons for desiring a modification of management practices among nomadic Fulani, but I feel that possible environmental repercussions should be given prominent place.

If my conclusion is correct that for pastoralists the conservation of herd counts and not the conservation of the environment, one may argue that settlement and subsequent engagement in sedentary and semi-sedentary forms of pastoralism would not offer a solution: village territories would be eventually destroyed, thus forcing the people to locate elsewhere. Since this question is basic to the evaluation of development alternatives, we shall consider two aspects which are believed to be directly relevant, i.e. the employment of fire and the beneficial effects of cattle grazing.

7. THE EMPLOYMENT OF FIRE

The deliberate burning of grazing grounds could be seen as the most spectacular manifestation of the nature of the nomad's relation to the natural habitat. Admittedly, Fulani pastoralists are not the only ones who burn, as hunters and farmers also set fire to forest and grassland. It is equally true that many devastating fires start accidentally. But it is generally believed that Fulani nomads in particular are responsible for intentional and indiscriminate burning of vast areas. Most Fulani nomads indulge upon a general movement south in the course of the dry season, from the grazing grounds in the northern part of the Nigerian territory to the river valleys further south. Before leaving the northern grazing grounds, extensive bush fires are initiated for no other reason but to ensure a ready supply of fresh regrowth upon return in April and May of the next year.

Nearly all vegetation of northern Nigeria has been subject to such fires at one time or another and there is little doubt that indiscriminate burning has done much damage to plant and wildlife and that it has caused the general deterioration of many habitats. Annual grasses and undesirable shrubs have replaced perennial grasses and timberland. The denudation of the soil has led to accelerated erosion and exposure of subsoil, especially in shallow soil areas. The extreme high ground level temperatures developed by bush fires have furthermore resulted in oxidisation of mineral nutrients, destruction of humus, and disturbance of vital biotic soil processes. It is equally obvious that a lot of adequate forage is burned in the process, thus complicating the plight of those Fulani pastoralists who do not join the drift to the south and continue to be dependent on the grazing resources of the area. Two indirect effects must be referred to in this context. Firstly, burning will increase the pressure upon grazing grounds in the north and will induce overgrazing, thus encouraging another detrimental practice. Secondly, burning contributes to the necessity to leave the

northern grazing grounds and to engage in a highly demanding trail over long distances southward.

The practice of burning in the tropics has been reviewed extensively by several authors,³⁵ and it is beyond question that adverse consequences far outweigh beneficial effects from the ecological point of view. If repeated frequently, it will eventually cause a decline of the carrying capacity of the area affected and threaten the subsistence base of the people who occupy it. It is therefore of great relevance to examine how pastoralists who have established more permanent ties with a particular habitat view and employ fire. From surveys conducted among settled, semi-settled and also semi-nomadic Fulani pastoralists in Zaria and Katsina Provinces, it can be concluded that pastoralists who have fixed homesteads and are continuously dependent on the resources of a more confined area tend to strongly reject indiscriminate burning. They readily confess to employing fire in November and December but are opposed to its application in the second half of the dry season. Whenever it happens in this period, they will point to it as an irresponsible act and insist that not they but others, hunters in particular, are to blame. Instances have indeed come to my attention of herdsmen reporting hunters to range-management officials for initiating bush fires in the period December-April. This is all the more interesting since it concerned pastoralists who could only lay claim to a piece of farmland on the edge of a forest area to which no other rights could be exercised but the common and vague entitlement to graze. This indicates that a general concern for the environment and a feeling of responsibility for the conservation of its resources may be compatible with a free range notion if at least groups of pastoralists are concerned who endeavour to secure their existence in a particular area on a more lasting basis. It should be noted in this context that these groups are not aware that early burning might be equally detrimental to the perennial vegetation since it occurs at a time when food reserves have not yet returned to the root system of the plants, thus causing a gradual decline of their vigour. This ignorance is understandable in view of the fact that some range-management officials themselves have favoured this practice as a means to prevent more serious burn at the height of the dry season. Confidence may be expressed that at least the sedentary and semi-sedentary Fulani pastoralists would become more reluctant to initiate early fires in their main grazing area if sufficiently informed that the so-called 'leopard burning' system, i.e. the system whereby only the dried-up spots in a predominantly moist surrounding are burned, is also unadvisable as a range-management practice. The realisation that manipulation of the environment tends to change in character once more sedentary forms of pastoral husbandry are taken up points to a capacity of Fulani pastoralists to adjust quickly to the exigencies of a new situation.

8. BENEFICIAL EFFECTS OF CATTLE GRAZING

A discussion of environmental implications of pastoralism would be incomplete if due allowance was not made for an important factor. So far, we have mainly stressed adverse effects of pastoral practices and have neglected consequences of a more beneficial nature to the ecology and permanent inhabitants of an area. Although not restricted to this

period, positive side-effects become particularly clear in the dry season when the pastoralists shift their interest from forest and natural grassland to adjacent farms where the cattle graze the crop residues on the farms that have been released.

According to the farmers, the practice of residue-grazing is said to offer several distinct advantages. The livestock break up the cultivation ridges and strip the stalks which are later used for fences and house construction, thus saving the people a lot of effort. To have cattle in the vicinity also ensures a ready supply of milk and butter. But best liked by the farmers is the enrichment of the soil that is said to be brought about by the pastoral livestock. Heavy fertilisation seems indeed likely on fields where stock stay for a prolonged period. Cattle are normally corralled on one spot for a few nights and then moved to an adjacent one, this procedure being repeated until a considerable piece of land has been manured. Dispersed animal droppings are furthermore collected and applied to the field in a concentrated manner. To my knowledge, the value of this system for soils and yields has not yet been examined, but its practitioners claim that in doing so they realise a doubling of crop yields.

The benefit to farms which are merely grazed is believed to be much less in view of the limited amount of cattle dung that is deposited. The farmers feel that the excreta left after grazing are not of sufficient quantity to have any bearing upon soil fertility. Still they maintain that grazing is also beneficial to the soil as part of the residue which otherwise would be blown away is now broken to pieces and mixed with the topsoil as the result of cattle trampling.

The rules surrounding residue-grazing generally reflect the value attached to it by the farming populace as it provides for pasturing cattle on stubble and fallow land freely and ensures maintenance of access to farms and water by means of cattle tracks. On the whole, Fulani pastoralists have had little difficulty in finding camping sites in the farmed area when the harvest of most crops has been completed. Passing groups are often invited to make camp and to utilise the residues and sometimes the Fulani find the stalk huts already erected for them by farmers with foresight. The farmers might also give the Fulani food-stuffs and sometimes money to show their appreciation. This could hardly be called payment. The farmer is not obliged to make gifts and no fixed rates exist. In addition, the Fulani will often reciprocate this gesture of kindness with milk. However, the traditional pattern of relationships is undergoing a process of change. Most pertinent to the present argument is that no indications are encountered of the merits of the traditional system. Rather it is felt by the farmers that advantages derived from residue-grazing by pastoralists do not match concomitant disadvantages.

In order to substantiate information obtained by interviewing and by observation, an attempt has been made to estimate the quantities of dung deposited and to the possible impact upon soil fertility of farms in Katsina Province. The actual survey covered only 12 farms and took five days. The methodology adopted was the following:

- (1) assessment of the amount of cattle dung deposited on farms (kg/ha) after completion of residue-grazing (February and March 1969); a random procedure was used for the selection of sample squares only, (100 square metres) not for the selection of farm holdings;

- (2) analysis of the organic carbon content of the soils of these farms in the period immediately prior to planting (May 1969); actual sample taking and analysis were carried out by personnel of the Soil Survey and Soil Science Sections of the Institute for Agricultural Research at Samaru;³⁶
- (3) repetition of phase 2 at the end of the rainy season (September 1969).

The results of the survey are contained in Table 2. Considerable variation in the amount of dung as between grazed and corralled field, i.e. a field that has been grazed and has had a cattle corral on it, is indeed confirmed. The wide range of recordings for corralled farms may also be noted; this is mainly occasioned by the length of stay on a particular site, ranging from a fortnight to two months, and by variable duration of the intervals between successive shifts of the cattle corral on the same field. Since it proved impossible to make adjustments which would allow for these time differentials, it was decided to employ a range with the minimum and maximum values as benchmarks. It will be observed that only one parameter has been adopted to bring out variation in soil fertility. Although the laboratory analysis of the soil samples included several variables (mean Ph, colour, texture, and % organic matter), it was suggested that organic carbon content constituted the best index for the present purpose.

Table 2. Cattle dung and its possible impact upon soil fertility of farms in Katsina Province in 1969

	Cattle Dung (kg/ha)	% Organic Carbon (mean value May)	% Organic Carbon (mean value September)
Ungrazed farms	-	0.26	0.27
Grazed farms	70-400	0.48	0.43
Corralled farms	2100-6200	0.72	0.43

It is worth noting that the sample range has been too limited to produce conclusive results. Also, the short survey that was undertaken neglected differences in inherent qualities of the sample farms and has been exceedingly exclusive in only paying attention to dung as a soil input. All that was hoped for was to show that concentration of cattle dung is indeed substantial if the system of coralling is applied, and to point to the likelihood of considerable soil improvement as a result. Whether the latter aim is sufficiently achieved is hard to say. It is indeed true that the organic carbon content of corralled fields in May is high as compared to the scores for grazed and ungrazed fields, but the extent to which this can be attributed to the manure input could not be determined.³⁷ Whatever the case, the common practice of leaving the droppings exposed for several months before working them into the soil at the beginning of the planting season will lessen their impact considerably. If a better and more timely treatment of the manure is to be achieved, ploughing should become much more widely established. To break open the hard dry season soil will be beyond most farmers as long as the symbiosis of animal husbandry and cropping is not taken one step further to also include the provision of animal traction. In this context, it may be

noted that Fulani pastoralists form the only substantial group that has the opportunity and the skills to mobilise cattle for draught purposes without excessive difficulty. Almost all believe that only cattle kept on 'government farms' can stand the yoke. In interviews, however, several sedentary pastoralists who also engage in cropping expressed an interest in giving it a try with their own animals.

9. THE PASTORAL PERSONALITY

The discussion of the pastoral way of life has so far been in both broad and narrow terms as it consisted of general references to a certain life style as well as of detailed analysis of the logic of certain values, norms and attitudes in relation to specific aspects of the total human and natural environment. It is felt that inadequacies that result from such an approach may to some extent be compensated by an examination of the Fulani cultural personality.

The distinctiveness of the pastoral personality is subject to little doubt. Generally, most people have not only been struck by the physical appearance of the pastoralists but have also been impressed with the way they go about things and with a certain regularity in their behaviour. A number of distinctive traits are usually assumed to be present which have earned them the respect and admiration of many, not last the foreign observer, whether government official, field researcher, or mere tourist.

Several studies on the cultural identity of African pastoralists ascribe it a range of traits which reveal considerable correspondence. The large measure of uniformity in pastoral behaviour and personality characteristics has been stressed. Goldschmidt, for example, has endeavoured to prepare a sort of model for pastoral life, "a construct of institutional and behavioural relationships in terms of the requisites of the system".³⁸ After stressing the need for mobility, for flexibility in social organisation, for patri-orientation in residence, filiation and heritage, for making independent decisions, for engaging in independent action, for operating in a larger context and even accepting the authority of others when concerted action is called for, and finally explaining the rationale of aggressive militarism, Goldschmidt speculates on the personality attributes of the 'ideal' pastoralist. Those identified are quoted in full since they are also believed to apply to Fulani pastoralists: "a high degree of independence of action; a willingness to take chances; a readiness to act, and a capacity for action, self-containment and control, especially in the face of danger; bravery, fortitude, and the ability to withstand pain and hardship; arrogance, sexuality, and a realistic appraisal of the world."³⁹

Obviously, this summary statement is no more than a skeleton that can be more closely qualified by more detailed specification and the addition of a number of other attributes. For Fulani pastoralists, one should also stress the strong sense of group consciousness, loyalty and hospitality, while reference may also be made to the timidity, modesty and shyness which seem hardly compatible with their reputation as warriors and conquerors. In addition to modesty and reserve, Stenning points to patience, fortitude, care and forethought as basic virtues of the 'Fulani way'.⁴⁰ One may furthermore note the attitude of resignation and detachment in the face of setbacks; losses of cattle

through drought and disease are, for example, accepted fatalistically. But what should be brought out emphatically are attributes which seem to have a direct bearing upon development efforts.

It has been suggested previously that traditionalism pervades the life of nomadic pastoralists and both negative and positive implications were pointed to. While scrupulous adherence to traditional values and norms has stood in the way of attempts to modernise pastoralism and is likely to continue to do so, it is equally true that it has facilitated the survival of the pastoral culture and of cattle husbandry. It should also be realised that the sort of traditionalism that prevails has not precluded transformation. Fulani pastoralists have shown a remarkable flexibility in readjusting to changing conditions. To appreciate this, their realistic appraisal of the world and their considerable capacity to act accordingly should be linked to the voluntaristic way in which man's role in the total environment is traditionally perceived.

A survey has been conducted to gain more insight into this important issue. It consisted in interviewing 26 family heads of semi-nomadic Fulani groups which made use of the grazing resources of the Ruma-Kukar-Jangerai forest reserve in Katsina Province during the wet season of 1967. The interviews usually lasted for two to four hours and were carried out at the dwelling place of the respondent. The sessions were always concluded with 17 statements with which the interviewers were invited to agree or disagree.⁴¹ These statements are contained in Table 3, though it should be noted that they were presented in a different order during the interviews.⁴²

It is clear from Table 3 that respondents failed in several cases to give a conclusive answer, their reason being that the choice open was too restrictive and that they did not want to commit themselves wholeheartedly to either 'yes' or 'no'. Notably statement 7 evoked considerable debate, as is suggested by the annotation in the right-hand column. Most respondents refused to make a choice either because both luck and intelligence are considered to be important ("luck and intelligence go together") or because "success is the blessing of Allah", as was stated by three respondents.

In several other instances there was clear hesitation in opting for either alternative without further qualification. This was particularly true of statements 3, 4, 8, and 11. The substance of the comments with regard to social interaction and independence has been conveyed in Table 3, but more space is needed for reflecting on reactions to statements 8 and 11.

Statement 8 on school education prompted quite different responses. Most respondents were in favour but several wanted to restrict it to a child who could be spared ("I would not mind trying it with one if I had enough children" and "If there were an opportunity, I would send a girl to see what it is like"), or expressed interest in Koranic school only; several respondents appeared to have sent sons to Koranic schools ("Nothing worse than ignorance"). Opposition to formal education for the children was clarified with such phrases as "It will spoil our way of life"; "No use to us"; "Can you see a school-leaver go out with the cattle"; and "I would rather die".

Statement 11 usually prompted the respondents to elaborate at length on the general state of affairs. It appears highly relevant to review the objections that were raised frequently since they may be of

Table 3 Indications of Personality Characteristics among Semi-Nomadic Fulani in Katsina Province, 1967

Statements:	Indications of:	Results:		Remarks:
		yes	no	
1. Most people can be trusted	Suspicion, independence, individualism, and cooperative inclination	1	25	Several respondents stressed that one should mix socially but that independence should be retained.
2. One cannot be too careful in dealings with others. ⁺		23	3	
3. It is better for people to mind their own business		15	11	
4. A person is likely to lose and suffer when working together with other Fulani groups all the time		24	1	
5. When man is born, his life is determined and he cannot change it.	Appraisal of the world, and perception of man's own role and capacity.	26	0	14 respondents stated that they could not answer this question (see text)
6. When man behaves badly, illness will punish him.		0	26	
7. Success depends on luck, not on intelligence.		4	8	
8. School education of children is something to be aimed at.		16	9	
9. It is wrong if sons give up cattle rearing		26	0	Answers were clarified. (see text).
0. The "Sooro" is no longer of use ⁺⁺ .		7	11	
1. Things should remain as they are and no improvements are necessary		0	26	
2. One should accept things as they come		6	20	
3. When an epidemic or bad luck arises, man has to endure it		3	22	Refusals and answers may be affected by the practice being officially prohibited.
4. It is better to see what happens and not to plan for the future.		5	21	
5. One can plan for the future because the future depends on man		15	11	

It was observed that the phrase "others" was usually interpreted as referring to non-pastoralists.

"Sooro" or "sharo" is a flogging contest whereby young men of competing clans take turns to flog each other with a leather whip or a twig. The man to be flogged stands erect with his hands up and his opponent strikes with all his force somewhere between the belt and the neck. Cruel though this may sound, the Fulani nomads consider this test of endurance and bravery an essential part of their life.

use in defining appropriate policy measures. However, the results should not be taken as indicative for what is felt by the pastoral Fulani population at large: the semi-nomads interviewed belong to groups which remain all the time in a fairly confined area (approximately 600 km²) that has been the scene of considerable public effort to improve general grazing conditions. The circumstance that many of these groups furthermore engage in cropping has also coloured the responses; if specialised nomads had been interviewed the range of complaints would probably have shown a different emphasis.

It is in itself instructive that the dissatisfaction expressed invariably concerned conditions over which the Fulani pastoralists can exercise little or no control. The most prominent among these external conditions of Fulani pastoralism are the following:

1. indiscriminate burning of forest (rejected by all respondents: "We feel the burning in our heart"; "The most evil practice"; "Our main enemy"; "I don't like to see even the smoke");
2. the difficulty of access to water and the grazing resources of savanna and farms;
3. the official prohibition to live in the public forest reserves, resulting in an unfortunate split in the household and its activities, and in excessive trekking ("It divides our minds");
4. the prohibition to open farms in the public forest reserves;
5. the difficulty of acquiring farm land;
6. the imposition of taxes ("What happens to the money; we don't see it");
7. the 'inflated' fines imposed by courts in cases of crop damage;
8. the imposition of grazing fees in certain forest reserves;
9. oppression by public officials;
10. the changing attitude of farmers and their constant interference ("Farmers have become greedy"; "Farmers are no longer kind");
11. the difficulty of marketing dairy produce and the low price it commands;
12. the low price obtained for beef cattle from middle men, especially in the dry season.

It thus appears that many of the complaints are addressed to aspects of organised life. This should not be taken to imply that organised life is exclusively conceived of as having a negative bearing upon their pursuits. The generally peaceful conditions that have come about were often advanced as an important asset. It is of equal interest that government efforts to improve water supply by the construction of dams and water holes was highly commended. The beneficial effect of occasional distribution of subsidised supplementary feeding during the dry season was also stressed in several instances. Frequent reference was furthermore made to the merits of veterinary services, although two respondents remarked "We don't like it because our cattle are always healthy". But on the whole it is felt that much too little has been done for them and that the overall balance is to their disadvantage.

Considerable caution is needed in interpreting the results of the survey, which has been too narrow in scope to even contemplate the possibility of generalising on the common response pattern of Fulani pastoralists. Conclusive answers as to the consistency of the cultural personality of the Fulani pastoralist being clearly unwarranted, the

results of the survey provide no more than indications of some central tendencies among a semi-nomadic group that is believed to be reasonably representative for a large section of the Nigerian pastoral population. It may then be concluded that the evidence produced supports earlier comments on the independence of the pastoralist, his realistic appraisal of the world, and his rather voluntaristic perception of the role of the individual.

It may be true that the very character of the pastoral existence implies obedience to the dictates of nature, submission to something all-powerful, as is perhaps also indicated by the consistent confirmation that life would be determined and man cannot change it (statement 5). The Fulani pastoralists who were interviewed recognise that there are things over which they can exercise no control but which, on the contrary, control them. At the same time the conviction seems to prevail that, within the broad confines set by the total environment, there is ample scope for affecting the course of events and that individual success is closely related to intelligence and to the skillful manipulation of human and natural resources. It is evident that this particular perception of the possibilities of man could prove indicative of the response that might be anticipated to innovations. If the perception is as I tend to believe and if the misgivings expressed during the survey reflect a more general experience, one may foresee a ready response to efforts in the areas of improved grazing conditions, more advanced animal production technology, and increased opportunity to engage in farming. Initiatives in this field are least likely to clash with what is considered to be good animal husbandry and are believed to be most conducive to setting into motion a process of dynamic readjustment. It is realised that this is only a first step in a policy that aims at fuller integration of the pastoral section into the Nigerian society, but it is submitted that it is a crucial step. Improvement of important external conditions and technological advice and assistance are major instruments in establishing a new group of Fulani pastoralists that will be more responsive and at the same time better able to further improve both crop and animal farming and to participate more fully in the life of the area.

10. THE HOUSEHOLD

It is important to stress that any ecosystem analysis, in addition to examining relationships between man, culture and habitat, should include relationships between individuals and groups that inhabit the area. If social organisation is paid little attention to or is overlooked completely, the analysis will leave out a crucial dimension and will fail its major objective of unifying all relevant aspects of the man-environment interplay in a single framework. Whereas we have previously discussed matters such as various occupancy systems, pressure of population, land tenure arrangements, and the interaction of Fulani pastoralists with other groups of occupants, we shall now expand upon the internal social organisation insofar as some important social concomitants of a particular form of environmental utilisation are concerned. Taking this perspective, the structure and functions of groups that work and live together seem particularly pertinent to an understanding of the pastoral ecosystem at large.⁴³

The alternation of dry and wet seasons has important social consequences. During the short wet season, from May/June- September/October,

carrying capacities are at their maximum and the work involved in maintaining herds and, implicitly, the need for economic cooperation at their minimum. Yet several family households may congregate and form a camp when pastoral groups concentrate in the wet season grazing grounds in the northern part of the Nigerian territory. It is then that the existence of such wider groupings as lineage and clan becomes most apparent. It is in this period that social life is most intensive, that information is exchanged, that betrothals and weddings are prepared and officiated, that all sorts of cooperative arrangements are agreed upon. The wet season is also the period of pleasure, of feasts and ceremonial, and of contests between competing clans.

The long dry season, on the contrary, sees the progressive worsening of grazing conditions, the increased necessity of dispersal, and the steady lessening of social interaction with fellow pastoralists. The change in social life is usually marked and rapid; camps break up and the several component families scatter. Though recognising such wider groupings as lineage and clan, foremost in the mind of the Fulani pastoralists is the localised kin group that is able to move autonomously in search of pasture and water and that is self-sufficient for labour and water throughout the year. It is with this unit, i.e. the household, that we shall particularly deal; subsequent to an account of the formation of this primary sphere of cooperation and mutual solidarity and the size and composition required for household viability, the need for fluidity in social organisation will be demonstrated.⁴⁴

The foundation for the basic unit of social and economic life is laid with the legal union of man and wife in marriage. Through their offspring and through possible subsequent marriages, the household will continue its expansion and may form a compound family consisting of the household head, his several wives and their respective children. When the first child gets married, the household enters a new phase. It may still expand as the result of new births to junior wives mainly, but at the same time the household will be subject to reductions. Eventually, complete dissolution occurs when all offspring have married. Man and wives then take up residence with their eldest son which usually will mean distribution over several homesteads and the separation of a man from his junior wives. The elders will spend their last days on the periphery of the homesteads of their sons; this is also where they are buried. To quote Stenning: "They sleep, as it were, over their own graves, for they are already socially dead".⁴⁵

It is of great interest to see what happens between the two extremes of the life history of simple and compound families, to assess the major hazards to which they are exposed during their growth to maturity and subsequent dissolution. For a household to act as an independent unit that is self-sufficient for labour and food at all seasons, there should be a certain balance between the human group and the herd associated with it. While the herd should be large enough to meet the subsistence needs of the group, it is equally clear that there should be sufficient humans to tend the cattle and to take full advantage of their resources. A fundamental issue is therefore to look at the size and structure of the household and the associated herd that is required to turn it into a viable unit.

In this context, reference may first be made to a survey conducted in the western part of Katsina Province in the wet season of 1967. The

life history of 24 households as narrated by the household heads produced the following results:

1. the average age of household heads was estimated to be 50,
2. 16 out of the 24 households had had a polygynous foundation involving 2-5 wives,
3. 11 parental households were still polygynous at the moment of recording,
4. considerable age disparity may occur between husband and junior wives; in three cases, the difference in age was believed to exceed 25 years,
5. dissolution of marriage by divorce had affected 11 parental households of the polygynous type,
6. dissolution of marriage by the death of a wife had affected 8 households,
7. the number of live births amounted to 157,
8. of this total, 52 were said to have died before the age of 5 and eight in the range 5-10 years; infant mortality appears particularly high during the first two years of life,
9. average size of households was found to be in the order of 6 persons; 6 households had a membership of 4 persons and less,
10. 12 households functioned as independent corporate units,
11. 12 households had established cooperative ties with other households, the most common form being the association of father and son(s),
12. the labour force of the corporate units, covering both the single and multi-household type, was found to be in the order of 7 persons if all members above the age of 5 were included,
13. from official records it appears that the average herd size of the households which were surveyed would be 35, but it should be remembered that figures obtained for the purpose of tax collection and grazing fees fail to reflect actual livestock populations. Field observations seem to justify an upward correction of 50 percent; if applied the average herd per household is approximately 50 head of cattle.⁴⁶

Obviously, these figures must be treated with reserve. Owing to the size of the survey and its reconnaissance nature, the results provide no more than indications of important determinants of household viability among Fulani pastoralists. It is also clear that the averages quoted ignore the highly relevant dimension of fluctuations around mean values; many households are below or close to minimal requirements in terms of both labour and cattle.

Man and wife might - and have been known to - jointly assume full responsibility for a herd that is sufficient for their sustenance.⁴⁷ But they will do so at a price as great effort is involved and both man and wife are only able to partially fulfil their responsibilities. A man who has to devote almost all his energy to herding and watering his cattle will have very little opportunity to engage in such important auxiliary activities as rope-making, reconnaissance of the surroundings, and the gathering of information at markets. Insufficient knowledge of water and fodder resources and disease infection in particular may have serious repercussions. The women will also find it difficult to combine milking and marketing effectively with the demands placed on her for child-bearing and rearing. To achieve a reasonable measure of efficiency and autonomy, a corporate unit should thus have a labour

force of at least four persons including, for example, a herdboy and milkmaid in addition to the herdowner and his wife.

A household, to be viable, should thus have a definite size and structure whereby each component plays a distinct role. While all matters pertaining to the care of animals are the responsibility of the males, milking, processing, marketing and the care of the household and homestead all belong to the female sphere. The internal division of labour is in fact affected by both sex and age. Men are herdowners and managers, the male children are herdboys. Whereas the first determine the grazing strategy, the latter could be said to arrange for the grazing tactics. Likewise, married women are dairy and household operators, female children and adolescents are dairymaids and housekeepers. However, a lack of rigidity may be noted; if need arises, man may assist in milking, and dairymaids and women may take out the herd for grazing.

The herd associated with the minimal corporate unit should be in the neighbourhood of 20 to 40 head of cattle if the group depends exclusively on the proceeds of animal rearing.⁴⁸ There seems little doubt that most couples are not in the fortunate position to be able to start with a herd of this size. To appreciate this, some attention should be paid to the procedure by which herds are built up. At naming, shortly after birth, each boy is given one or two calves which form the nucleus of his future herd. Further transfers take place at subsequent ceremonies and occasions. As a result of these several allocations and the natural increase experienced over the years, each boy builds up a distinct herd of his own; full right of deployment and disposal over the animals is usually transferred by the time he becomes husband and father. Over the years, all children, both male and female, obtain a proportional share of that section of the herd over which their mother had milking rights; the father is left with none when all are married. Once all children have left, the parental household, homestead, and herd thus cease to exist.

Ideally, newly-wed couples should be provided with sufficient animals but what was observed for labour also holds in respect of cattle. Most simple families tend to enter a very critical phase on account of their being short of humans as well as of animals. At its inception, each household is bound to be non-viable in one, if not both respects. Obviously, the two are intimately interdependent and subsequent improvements should evolve in close conjunction since a change in either population that is not followed by adjustment in the other will create serious tensions and might considerably complicate the development towards larger self-sufficiency and independence. While increases in the herd should be accompanied by expansion of the labour force and vice versa, it should also be noted that even minor reductions of either tend to upset the precarious balance and might produce premature dissolution of the conjugal foundation of the household. In fact, sterility of women and insufficient milk output of the herd are considered equally good grounds for divorce by males and females respectively.

Human and animal fertility, the two being associated with female merits and male husbandry skills respectively, are thus of crucial importance for a couple that aspires to establish a viable, domestic unit. However, it is equally clear that few simple or compound families could or want to be left completely to their own devices before the time that there are children who are capable of assisting in the discharge of

regular domestic activities. It is true that pastoralism may favour fragmentation and that the widespread insistence on maximising viability with a minimum of kin prompts considerable capacity for adjusting internally to imbalances between the herd and the dependent group. However, for reasons of security, economic efficiency and leisure, households tend to enter into a number of cooperative arrangements whenever the minimal labour force of four persons is not attained. In this context, it may be noted that any state of equilibrium beyond the minimal level tends to be temporary only; a range of disequilibria which require resolution will arise during the lifetime of almost any household. Readjustments in the relationship of family and herd are achieved by changes in the size and composition of both the human and animal component; social devices that serve the Fulani pastoralists in this respect are polygynous marriage, divorce, loan of cattle, temporary allocation of herdboys and milkmaids, and interfamily cooperation. The fluid social response to the vicissitudes of pastoral life will be elucidated particularly by examining arrangements which involve relations with people outside the sphere of the simple and compound family. Distinction will be made between social provisions for limited household viability related to shortages of cattle and humans respectively.

Inadequacies in the size and composition of the herd are met by a series of loans of cattle. If the shortage lies in the area of pack oxen and breeding bulls, thus hampering the mobility of the household and threatening the reproductive capacity of the herd, more fortunate agnatic kinsmen of other households will give the needed animals when appealed to. Temporary transfers of cows are more common, the reason being that because of fluctuations in the reproductive performance of the herd, considerable drops in milk output may frequently occur, to the extent that yields may fall below the bare minimum for subsistence. The obligation to support needy kinsmen with cattle is readily adhered to; today, as in the past,⁴⁹ no compensation in either cash or kind is demanded or expected.

If deficiencies in the herd are of a more lasting nature due, for example, to decimation through disease, loans may not be sufficient to recoup the losses. Fellow lineage members and also clansmen may then help set-up the herdowner again by outright gifts. The network of reciprocal rights and duties may even be extended beyond the clan to include exchange between friends. Obviously, this system of loans and gifts between kinsmen is advantageous to all parties. Today's giver might be tomorrow's receiver.⁵⁰

Labour shortages will be mainly a question of too few herdboys and dairymaids and will be more commonly felt in the dry season. If internal adjustments, such as the taking-on of tasks which are normally executed by the other sex, do not suffice in meeting the immediate need, two alternatives are open to the household. One will consist of securing additional labour, the other of joining up with other households.

The possibility of obtaining slaves being no more, the recruitment of helpers takes the form of appealing to kinsmen to make one of their 'surplus' household members available. Particularly common is the practice of a wife calling in the assistance of an unmarried sister or a sister's daughter to help her in domestic activities. When the household is short of herdboys, the other alternative is usually adopted.

Two or more households co-reside and start combining such labour-consuming activities as herding and watering. However, households to a large extent retain their identity; while pooling up in certain respects, a considerable amount of distinctiveness is retained in others. Each household, for example, will have its own corral and will keep the milking and the milk separate.

Such multi-centered corporate units usually consist of the households of father and son(s) or of brothers, and often last for a great many years. The association of father and married son will extend over a period of at least six years, i.e. the absolute minimum for establishing an adequate labour force in terms of size and diversity. Likewise, corporate units involving brothers tend to be fairly stable. Unless serious tensions arise, constituent families will not break away until a considerable measure of labour sufficiency is achieved in the two sections that would emerge if separation were to occur.

Finally, the solution in the event of the untimely passing away of the father merits attention. If a father dies before any of his sons has married, i.e. if physical death overtakes him well before reaching social death, the dead man's brother or, in his absence, the patrilineal parallel cousin will act as guardian of the children, supervise their betrothals, and inherit at least one of the widows; he will also assume the role of caretaker of the deceased's herd and see to the proper division of the animals among the inheritors.⁵¹

All in all, a variety of social arrangements prevails that appears highly instrumental to general subsistence security and to the establishment and maintenance of household viability. The efficacy of the household not being achieved automatically, a range of social mechanisms has evolved to assist individuals in this arduous task. These mechanisms are well-defined but yet lack rigidity and exclusiveness. The psycho-cultural flexibility that has been stressed thus has a social parallel. Both in their own right help the Fulani pastoralists to overcome hazards, odds and deficiencies by favouring considerable individual fluidity in meeting the demands of the immediate situation, and at the same time providing for the indispensable element of complementary social insurance whenever needed. It is believed that these particular psycho-cultural and social attributes will prove an important asset in the years to come; in the future as in the past, Fulani pastoralists may display a remarkable ability to readjust and to help themselves.

11. A TYPOLOGY OF FULANI PASTORALISTS

The previous account of general features would be incomplete if adequate allowance were not made for the variation that exists among Fulani pastoralists. A local survey involving interviews and field observations was therefore conducted in and around Zaria in the period 1968-1970 to gain insight into the prevailing diversity.⁵²

Even in so small an area as Zaria and its immediate surroundings, diversity in forms of animal husbandry and in people engaged in its execution is a most striking feature. Many attempts have been made to give a typology of livestock rearing communities on the basis of their mobility and the distinction into nomadic, semi-nomadic and settled categories is well-established. However, these terms are often used so loosely that they may fail to be of value if their precise meaning in the Nigerian context is not examined more closely. Such a discussion

should at once be instrumental to an understanding of the varied pattern which livestock rearing takes in and around Zaria. While the differentiations of Fulani communities made by de St Croix (1945), Hopen (1958) and Stenning (1959) have primarily a cultural basis, and Fricke (1964) distinguishes principal methods of cattle raising, the classification presented below attempts an integration of both methods by relating values, language and socio-economic organisation to forms of animal husbandry of groups of stockowners.⁵³ A semi-settled category is introduced as distinct from semi-nomadic rather than using semi-nomadic, semi-settled and partly settled as inter-changeable terms.

Fulani Nomads

The nomadic category comprises genuine nomads who depend exclusively on their livestock and also the semi-nomadic Fulani who engage in some arable cultivation. The Fulani who frequent the Zaria area with their herds of cattle and accompanying flocks of sheep and goats are known as Bororo. Despite age-long contacts with the Hausa-speaking peasantry, they all have Fulfulde as their first language and still adhere to the traditions and values which for so many centuries have given meaning to their pastoral existence. In its minimal form their corporate groups answer to a nuclear family, but most often they consist of several such families as primary male relatives tend to stay together; these migratory units are self-sufficient for labour and food at all seasons, the men tending the common herd and the women milking and preparing the food.

The Bororo live in a state of perpetual wandering, moving south in the dry season and north in the wet season. Although at liberty to vary place and time, the annual cycle of migration of each group usually describes a distinct orbit which over the years has proved to meet most adequately the location of markets and the seasonal variation in the distribution of fodder, water and human and bovine diseases. Many Bororo are reported to shift camps at least each fortnight and at most every two or three days. Though less frequent moves occur, particularly during the wet season, the Bororo corporate groups have no fixed homesteads. Even when group elders are left behind with some milch cows, their homesteads become meeting points at most, in the neighbourhood of which the other members of the group build temporary shelters.

Semi-Nomadic Fulani Pastoralists

Practising some cultivation mainly of millets, the distinctiveness of semi-nomadic Fulani pastoralists lies in their having other than grazing titles to land. Near the farm a permanent homestead is found where the elders stay throughout the year, to be joined by the rest of the group at the beginning of the wet season when tillage has to be organised. Though herding is easiest in the wet season and the men then have time to spare, the semi-nomadic Fulani have enough of the nomad in them to disdain agricultural work and will recruit labourers whenever possible. They are typical pastoralists who esteem cattle more than anything else. Though their herds are smaller in size than those of the nomadic Fulani, the techniques of animal husbandry, social organisation and forms of economic cooperation are comparable. They speak Fulfulde and are as individualistic, elusive, suspicious of strangers, proud and tough as

the Bororo. They also share the nomad's appreciation of the ceremony that so highly tests the courage of the Fulani boy, the 'sooro' or beating ceremony. In short, the semi-nomadic Fulani feel and think like the genuine nomads and in the Zaria area they are normally not distinguished from the Bororo. Several cases have been recorded in which they took up a fully nomadic life again. On the other hand, many from this group have opted for a more settled life.

Semi-Settled Fulani Pastoralists

The semi-settled category concerns Fulani pastoralists to whom cropping and livestock rearing constitute more or less equally important aspects of life. They have fixed habitats where they remain throughout the year except for a few months in the dry season. Their herds of cattle are considerably smaller than those of the Fulani discussed earlier. Hausa is their first language. They do not share the nomad's contempt of land labour or his aversion to intermarriage with non-Fulani. They do not take part in the beating ceremony or in any other great Fulani ceremony, nor do they feel strongly about other traditions to which their ancestors adhered. In particular, the fact that they do not compete in the beating ceremony is interpreted by the nomadic Fulani as a sign that they have ceased to be Fulani, and have 'become Habe'. During part of the year, however, their way of life resembles that of the nomads. In the first half of the dry season the herdsmen still return nightly to the village, or camp so close to it that the women can bring their food and collect the milk. But in January and February they embark upon a gradual movement southward and the greater distances make it imperative for the women to join them. Stalk huts and even simpler shelters will serve them as abodes until just before the start of the rains when they return to their aged and children in the village. It must also be noted that the organisation of cooperation and the size and composition of corporate units show a good deal of correspondence with forms obtaining among nomadic pastoralists.

Settled Stockowners

This category refers to those who maintain uninterrupted contact with their homesteads. Although the number of animals per household is low on the average, the greater portion of the small livestock population is believed to be associated with this category of stockowners. The liking of meat, milk and eggs, the role of livestock in religious ceremonies and social life, the use made of donkeys for riding and as beasts of burden and the value attached to mobile capital in an unstable situation, all help to explain why at least 85 percent of all rural households have livestock.⁵⁴ However varied the composition of the settled population of Zaria and its surroundings, all people, whether settled Fulani, Hausa or otherwise, whether urban or rural, literate or illiterate, consider livestock a highly valued property. But the opportunities of the diverse segments to acquire and keep livestock vary and so therefore do forms of management. Two broad subdivisions present themselves: stockowners who tend their own animals and those who do not.

The first are farmers - settled Fulani, Hausa and others - who have some animals which, if not kept within the compounds, graze and are corralled nearby. The settled Fulani are still faithful to their tradition in respect of cattle; almost all the big animals belonging

to the settled population are under their care. Often, livestock are grouped into a few herds which are taken out daily for grazing by men or boys. Such practices are rare among their non-Fulani neighbours who focus upon such less exacting animals as goats, sheep, donkeys and fowls which are either kept inside the compound or, as is the case during the dry season, are released to graze unattended around the settlement. It is interesting that the descendants of the slaves of the Fulani around Zaria, despite the long association of their ancestors with cattle rearing, do not normally acquire cattle.

The stockowners who let others look after their animals are primarily well-to-do people in Zaria City. Among members of the Fulani aristocracy, well-paid government and company employees, businessmen, and also among rich farmers in the villages, there is a widespread tendency to convert savings into livestock. Particularly high on the list of investment alternatives are cattle, the ownership of which can be a paying proposition. Cattle reflect wealth and also indicate status, wealth being one of the determinants of prestige. Lacking time and skill himself, the man who considers cattle only as a sideline asks a Fulani within the social sphere of Zaria to tend his animals. If he owns many head of cattle he will, singly or in combination with others, employ a herdman who is paid for his services in money and kind, the latter consisting of foodstuffs and milk and at least one young animal per year. Otherwise he will leave his animals with the settled or semi-settled Fulani from whom he bought them. In this case he can lay claim only to the progeny while the daily returns realised from the sale of milk are for the caretaker. It is rare that cattle are entrusted to nomadic and semi-nomadic Fulani. About them the saying is, 'accept what you see', indicating that one may suffer losses.

The category of settled stockowners includes also the livestock traders. Local meat consumption and Zaria's function as a veterinary checkpoint and restplace for trade cattle on their way to the markets of the south explain the presence of many specialist livestock traders in the area. In the year April 1st 1968-March 31st 1969, 23,180 head of cattle were offloaded, rested and re-railed at the Zaria railing point; 57,767 head of cattle proceeded on hoof from the Zaria control post after their movement permit had been endorsed; and many of these animals changed owners in Zaria. The cattle traders also normally take on Fulani to look after their animals. It is thus obvious that the Fulani are still cattlemen par excellence. Even when the ownership of cattle is spread between Fulani and others, as is the case in Zaria, the herding is still in the hands of the Fulani.

The contributions of these four groups of stockowners to the socio-economic life and appearance of the Zaria area are varied. The settled and to a slightly less extent also the semi-settled constitute an integral part of the area, all being incorporated in the social, economic and administrative framework that is centred on Zaria. This area is their sphere of life; here they build houses, clear fields, tend crops and animals, and introduce other changes into the local landscape. Here also they take their place in the social setting as determined by birth and achievement, gain wealth and prestige, or lose it. But whatever the other roles of the individual stockowners, the significance of the group as a whole is that it produces a surplus of such animal products as milk, meat and eggs for sale. Every morning Fulani women go a long way to sell milk in the city. Not less than

40 head of cattle, 20 goats and 12 sheep are slaughtered daily on the local slaughter slab and many of these animals are drawn from the local livestock population. Mainly of local origin are the fowls and eggs which are readily obtainable during most of the year. Of great importance too is that the livestock help maintain soil fertility. All animal droppings in the compounds are carefully collected and applied to the fields. Best off are the farmers who have cattle, i.e. the Fulani farmers; as we have noted, they are able to apply a system of corralling.

Zaria's location between the main wet season pastures to the north and a sparsely populated bush area to the south, which is the dry-season destination of many pastoral Fulani, has made the area an important thoroughfare. The ample supply of crop residues in the heavily cultivated surroundings, the presence of surface water, the healthiness of the cleared land, and the availability of a large urban population, make many groups stay in the Zaria area for a prolonged period and return to it later. The inflow usually starts after completion of the guinea corn harvest during November. The area east and south of the Zaria urban sector is favoured most; to the west and north much land is in use for non-agricultural purposes and the competition of the settled and semi-settled stockowners is keener. A contributory factor is that the main cattletrack reaches Zaria from the northeast.

In particular, the land close to the valleys is dotted with Fulani camps. Although most of these are abandoned in February when all residues have been grazed, the physical structures remain a salient feature of the rural landscape until farmers start preparing their fields for cultivation at the end of the dry season. During occupation, the distribution of the human and animal population follows a fixed pattern. The shelters and the cattle corral are on the eastern and western extremes of the camp respectively, with the rope to which the young animals are tied, the calfrope, in between. The shelters, ranging from two to six dependent on the size and composition of the corporate group, are cones of guinea-corn stalks or dome-shaped thatched huts. In either case, they are arranged in straight rows or semi-circles with entrances normally facing west. It has been argued that this orientation is instigated by religious considerations, Sokoto to the west being the prominent Moslem centre.⁵⁵ Clearly, this arrangement is most convenient in the dry season when the cold dust-laden harmattan blows from the east.

As they are present during part of the dry season only, the contribution of the nomadic and semi-nomadic Fulani is subject to great fluctuation. The role of these components of the livestock-keeping population is more strictly economic than that of the settled and semi-settled stockowners, as active participation in the life of the area is unusual. Taking little interest in anything but their cattle, the migrating Fulani keep aloof from the daily affairs of the settled communities as long as these do not affect them. However intimate their knowledge of the area, familiarity with its occupants is rare. Frequent attendance at the markets of the area by Fulani men and women make them meet many people but these contacts remain superficial, the main concern of the Fulani being the sale of milk, the purchase of necessities and the collection of information relevant to the wellbeing of their animals. The most that has been reached in the way of integration is a partial economic interdependence. This accounts for

much of the ambivalence so typical of the present relationship. Pastoral and sedentary people recognise that their co-existence is beneficial and both groups show appreciation for each other, but at the same time there is a good deal of tension and friction.

12. CONCLUSION

The present differentiation of Fulani communities provides a strong indication of the potential for change. Most Fulani pastoralists can no longer be reckoned to belong to the nomadic category; they have settled down completely or partially. The great majority has furthermore given up exclusive dependence on livestock and has engaged in some form of arable cultivation. The ability to adopt some form of settlement and to take up cropping has so far been quite considerable.

The realisation that spontaneous sedentarisation and economic diversification has been going on for a long time is of major importance. If this process is intensified, it would appear that the traditional disdain for farm labour is less an obstacle than the lack of land. Many Fulani pastoralists may indeed show initial reluctance and will at first employ hired labour to do the farm work if they can afford it, but this does not negate a genuine interest in farming and in the greater subsistence security that can be realised by combining animal keeping and crop tillage.

In this context, it must be noted that imbalances in herd and dependent human group cannot always be restored by internal readjustments and mutual help. Whenever certain adverse experiences affect a great many people, as is for example the case when an epidemic or prolonged drought strikes the area and its population at large, such mechanisms as mobility, dispersal, fusion, fission, and reciprocal mutual assistance, perforce break down. It is then that more dramatic changes are needed, involving either the adoption of farming as an important sideline or the permanent removal of families from the pastoral community and the consequent complete dependence on farming as a livelihood. The noted average herd size of 50 head of cattle for semi-nomadic households of approximately 6 persons points to the marginality of many operations; it need occasion no surprise that it was this group of semi-nomadic pastoralists that expressed such strong insistence on increased opportunity for opening-up farms. Though a large portion of northern Nigeria is theirs in terms of grazing rights, they are in fact part of a landless group. The granting of secure title to land is therefore considered the most crucial element of a strategy that sets out to achieve the complete or partial sedentarisation of the nomadic Fulani and their genuine integration into the Nigerian society.

FOOTNOTES

1. J.G. Lambooy, "De Agrarische Hervorming in Tunesië; proeve van een sociaal-geografisch onderzoek" ("Agrarian Reform in Tunisia"; Assen, 1969), pp.3-12.
2. O.D. Duncan, "Human Ecology and Population Studies", in P.M. Hauser and O.D. Duncan (eds), The Study of Population (Chicago, 1969), pp. 678-717.
3. Obviously there might be other potentialities but as long as these are not recognised as such by the human group concerned, they are not seen as resources.
4. Lambooy specifically refers to infrastructural works and buildings, several of which may be products of outside technologies, thus considerably limiting the elements of material culture to be included ("De agrarische hervorming", pp.3-6). Cf. also C. van Paassen, "Geografische Structureren en Oecologisch Complex" (Geographical Structuring and Ecological Complex; TKNAG, 1962), pp. 215-233.
5. Cf. also D.R. Stoddart, "Organism and Ecosystem as Geographical Model", in R.J. Chorley and P. Haggett (eds), Models in Geography (London, 1967).
6. M.J. Herskovitch, "The Cattle Complex in East Africa", American Anthropologist (1926) 28, p.653.
7. Ibidem, pp. 230-272, 361-388, 494-528, 633-644.
8. Walter Dethler, "Cattle in Africa: distribution, types and problems", Geographical Review (1963) 53, pp.52-58; "Native Cattle Keeping in East Africa" in A. Leeds and A.P. Vayda (eds), Man, Culture and Animals (American Association for the Advancement of Science, 1965), pp.153-168. Rada and Neville Dyson-Hudson, "Subsistence Herding in Uganda", Scientific American (1969) 220, pp.76-89. E.E. Evans Pritchard, The Nuer (Oxford University Press, London, 1940); "The Sacrificial Role of Cattle among the Nuer", Africa (1953) 23, pp.181-197. Walter Goldschmidt, "Theory and Strategy in the Study of Cultural Adaptability", American Anthropologist (1965) 67, pp.402-407. P. Gulliver, The Family Herds (London, Routledge & Kegan Paul, 1955). A.H. Jacobs, "African Pastoralists: some general remarks", Anthropological Quarterly (1965) 38, pp. 144-154. Robert McC. Netting, "The Ecological Approach in Cultural Study" (A McCaleb Module in Anthropology, Addison-Wesley Publishing Co. 1971). Harold K. Schneider, "The Subsistence Role of Cattle among the Pakot and in East Africa", American Anthropologist (1957) 59, pp. 278-300. Derrick J. Stenning, Savannah Nomads (Oxford University Press, 1959).
9. Cf. C.E. Hopen, The Pastoral Fulbe Family in Gwandu (Oxford University Press, 1958).
10. Evans Pritchard, The Nuer, p.26.
11. Gulliver, for example, favours the term 'stock complex' for the group he describes since the term 'cattle complex' would make no allowance for sheep and goats. P. Gulliver, "A Preliminary Survey of the Turkana" (University of Cape Town, New Series No. 26, 1951).

12. W. Fricke, "Cattle Husbandry in Northern Nigeria" in H. Werhahn, W. Fricke, F. Hunger, F. Weltz, H. Gottschalk and H. Saager, The Cattle and Meat Industry in Northern Nigeria (Frankfurt, 1964).
13. Several authors quoted thus far have reached similar conclusions in their analyses of pastoral communities in other parts of Africa.
14. Supported by the results of interviews conducted among farmers and pastoralists in Katsina Province.
15. Hans G.T. van Raaij, "Subsistence Economies and the Environment", in Van Raaij and Lugo (eds), Man and Environment Ltd. (forthcoming).
16. What has been noted by Rada and Neville Dyson-Hudson for East African pastoralists also applies to the Fulani; these psychological and social attributes "are cultural elaborations of one central fact: cattle are the major source of subsistence..."; "Subsistence Herding in Uganda", p.78.
17. Stenning, Savannah Nomads. Hopen, The Pastoral Fulbe Family. Fricke, "Cattle Husbandry".
18. Peter R. Gould, "Man Against his Environment: a game-theoretic framework", Annals of the Association of American Geographers (1963) 53, pp.290-297.
19. Paul Spencer, The Samburu (London, Routledge & Kegan Paul, 1965).
20. The assistance of the co-recorders Dele and Magaji is herewith acknowledged.
21. Fricke has reviewed statistics gathered over a period of approximately 30 years; "Cattle Husbandry", pp. 63-71.
22. The assistance of Mr. P.N. de Leeuw and associates of the Shika Research Station of Ahmadu Bello University is herewith acknowledged.
23. Including the returns that produced an overall mean of 17.3 percent.
24. Fricke, p.71.
25. Ibidem.
26. Statistical Yearbook 1966 (Ministry of Economic Planning, Kaduna).
27. Fricke, "Cattle Husbandry".
28. Ibidem.
29. Stenning, Savannah Nomads.
30. Fricke, p.23.
31. Cf. Stenning, Savannah Nomads, and Fricke, "Cattle Husbandry".
32. The sour milk that Fulani women take to market commands a price of \$0.10 - \$0.20 per lb, dependent on the season.
33. Supporting evidence is found in most of the studies previously referred to.
34. R. and N. Dyson-Hudson, "Subsistence Herding".
35. See, for example, P. Gourou, The Tropical World (fourth edition, 1966).

36. For assistance in sample taking, for laboratory analysis of the samples, and for interpretation of the findings, I wish to thank the personnel of the Soil Survey and Soil Science Section of the Institute for Agriculture Research of Ahmadu Bello University; particular thanks are due to Messrs. R. Klinkenberg and R. Heathcote.
37. In the broader context of savanna soils in general 0.72 percent organic carbon would be considered to be a score in the medium-good range; this indicates that the survey of only 12 farms has failed to make allowance for the several categories of savanna soils.
38. Goldschmidt, "Theory and Strategy in the Study of Cultural Adaptability", p.403.
39. Ibidem, pp. 404-405. Reference should also be made to the investigations by Edgerton into the values, attitudes and personality characteristics among the farming and herding sectors of four tribes in East Africa (Kamba, Hehe, Pokot and Sebei). Employing Rohrschach plates, value pictures, colour slides, and a wide range of questions covering many subject areas, Edgerton has produced statistically significant confirmation of striking contrasts between sedentarists and pastoralists (p.442). To quote, "the farmers divine and consult one another, the herders act individually; the farmers do value hard work, the herders do not; the farmers are indeed relatively more hostile and suspicious of their fellows than the herders. Some confirmed differences even extended as far as personality; e.g., the farmers tend to be indirect, abstract, given to fantasy, more anxious, less able to deal with their emotions and less able to control their impulses. The herders, on the contrary, are direct, open, bound to reality, and their emotions, though constricted, are under control." Robert B. Edgerton, "'Cultural' vs. 'Ecological' Factors in the Expression of Values, Attitudes, and Personality Characteristics", American Anthropologist (1965) 67, p.446.
40. Stenning, Savannah Nomads, p.55.
41. Several of the questions and statements in the questionnaire were derived from a questionnaire employed during a rural survey carried out by a team of Michigan State University in what was then Eastern Nigeria.
42. For advice with regard to the interpretation of the results, my thanks are due to Mrs. D. van Arkel.
43. Compare R. McC. Netting, "A Trial Model of Cultural Ecology", Anthropology Quarterly (1965) 38, pp. 81-96.
44. Extensive use has been made of a study by D.J. Stenning, "Household Viability among the Pastoral Fulani", in J.R. Goody (ed), The Development Cycle in Domestic Groups (C.U.P., 1958), pp.92-119.
45. Ibidem, p.99.
46. The upward correction of 50 percent has been justified supra.
47. Stenning, "Household Viability", p.104.
48. As we have indicated previously, approximately 10 head of cattle are needed to provide one person with one liter of milk per day during the dry season.
49. Stenning, "Household Viability", p.112.
50. Ibidem, p.114.
51. Ibidem, p.117.

52. Zaria is the capital of the province that carries the same name. The results of the survey have been published in J.G.T. van Raay, "Animal Husbandry in the Zaria Region" in M.J. Mortimore (ed), Zaria and its Region (Department of Geography, Zaria, 1970; Occasional Paper No. 4).
53. F.W. de St. Croix, The Fulani of Northern Nigeria (Government Printer, Lagos, 1945); Fricke, "Cattle Husbandry"; Hopen, The Pastoral Fulbe Family; Stenning, Savannah Nomads.
54. Federal Office of Statistics, Rural Economic Survey of Nigeria, Livestock Enquiry 1963-1965 (Lagos).
55. Stenning, Savannah Nomads.

