An appraisal of the utilisation of game on private land in South West Africa

by

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Accepted: 15 October 1982

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ABSTRACT

South West Africa is a country traditionally rich in game. The numbers and distribution of the various game species, the influence of man and the development of legislation around the protection and utilisation of game is discussed. The various forms of utilisation are evaluated on economic grounds and possible detrimental influences on the game populations themselves.

1 INTRODUCTION

There are many definitions of nature conservation, the most popular being possibly "the wise use of natural resources". Until recently this remained merely a theoretical concept in South West Africa, but the utilisation of game animals occurring on farm-land put theory into practice — to the benefit of the economy as well as the game populations.

There are approximately 5 000 fenced stock farms in the Territory covering an area of almost 32 million ha. According to the Directorate of Agriculture these farms were stocked with two million beef cattle, three million sheep and one million goats in 1978. At an average carrying capacity of one large stock unit per 4 ha, the numbers of the cattle and sheep alone account for the total grazing available. The goats and estimated half a million head of game are not taken into account, and it may therefore safely be assumed that the Territory's available rangeland is now overstocked. This is probably due to a period of what is considered higher than average rainfall prior to 1978 followed by injudicious stocking of the resultant lush pastures. Official agriculture figures indicate that the annual removal of livestock before 1979 was well below the annual population growth. During this period marketing difficulties were experienced and farmers might also have been reluctant to remove stock during a favourable period.

A combination of events which in retrospect played an important role in the increase in game numbers occurred. During 1961 to 1964 the Territory experienced a severe drought, as well as a foot-and-mouth epidemic. The latter meant that no stock could be removed from farms, which led to serious deterioration of the pastures. In an effort to improve the veld the then Department of Agricultural Technical Services introduced a scheme whereby a landowner was compensated if he voluntarily reduced the number of livestock below the officially determined carrying capacity of his farm. The following decade was characterised by high rainfall years and the low numbers of livestock caused an improvement in the veld, with game numbers rising dramatically.

Other species have benefited by changes in habitat brought about by human influence. A classic example is that of kudu. Overgrazing of pastures over many decades inadvertently led to bush encroachment, a habitat much favoured by kudu. This bush encroachment occurred over a very large area and resulted in a population explosion of kudu which culminated in large scale mortality of this species on account of rabies during 1978 – 1981. During this same period the 1967 legislation (see Development of Legislation for detail) placed an economic value on game, thus setting the stage for the development of various forms of intensified utilisation of game on farms.

During the past ten years, game utilisation in the Territory has developed from local and individual efforts to a well-organised and highly profitable industry. The animals are being used in the following ways:

- venison and biltong for domestic use;
- venison and biltong for sale;
- trophies for visiting hunters;
- live game for dealers and landowners;
- sales to culling operations.

This paper seeks to document the development which has taken place, and to evaluate the ethical and financial aspects.

2 RÉSUMÉ OF THE PHYSICAL GEOGRAPHY

2.1 Physiography

Geographically South West Africa may be divided into the following regions:

a) the coastal desert in the west;

b) the escarpment; and

c) the plateau to the east.

a) The Namib Desert stretches along the Atlantic coast and is about 80 km wide, covering the region between the coast and the foot of the escarpment zone. Perennial water-holes are virtually non-existent in these areas. The vegetation is sparse and for the greater part the ground surface is bare.

b) The escarpment is not a true escarpment, but rather a mountainous transition belt, stretching from the inland plateau to the Namib flats.

c) The inland plateau forms part of the great subcontinental plateau of southern Africa. It reaches its highest elevations, ranging from 1 500 to 2 000 m, along the western rim. This largely forms the watershed between the catchment areas of the rivers draining into the Atlantic Ocean and the endoreic basins of the Kalahari and to a lesser extent the Etosha Salina.

2.2 Climate

During the summer months of November, December and January daytime temperatures of 40°C or more are common. From approximately April until September the days are moderately warm reaching temperatures of 30°C. During this period the nights are sometimes extremely cold with frost occurring often. The rainfall is usually of the thunderstorm type. The annual rainfall pattern is extremely irregular and patchily dispersed, and most areas experience long droughts. The isohyets are more or less parallel to the coast-line and the mean annual rainfall increases towards the east and north. The rainfall varies from about 600 mm per annum in the north-eastern corner of the Territory to less than 25 mm per annum in the west and extreme south. Approximately ⅕ of the Territory can be considered sub-humid, ⅗ semi-arid to arid and ⅕ extremely arid (the Namib Desert region).

2.3 Vegetation

The vegetation has been described by various workers such as Engler (1910), Boss (1934), Pole Evans (1936), Range (1940), Keet (1949), and Giess and Tinley (1966). More recently, Giess (1971) published a comprehensive and detailed description of the vegetation of South West Africa, recognising three major physiognomic groups, desert, savanna- and woodland, and 15 main vegetation types.

2.3.1 Deserts

Although Giess divides the Namib Desert into four zones, mainly on geomorphological grounds, only the extreme southern portion needs to be mentioned. This area is characterised by rich succulent vegetation, probably due to the occasional winter showers it receives in addition to the scattered summer rainfall. Further north the vast dune area and gravel plains also support relatively large populations of gemsbok and springbok. These animals move into the escarpment zone once the vegetation becomes insufficient to support them.

2.3.2 Savannas

The savanna region can be subdivided into eight distinct zones (Giess 1971) on the basis of characteristic plant species.

In the south of the Territory the vegetation consists mainly of Karoid shrubs with *Rhigozum trichotomum* as the most dominant species. Sheep ranching is mainly practised in this area and it maintains a relatively high springbok population. Further north and east is the longitudinal red dune area of the Territory. The vegetation is mostly mixed with trees and shrubs in open park landscapes. *Acacia erioloba* and *A. haematoxylon*, the latter in either shrub or tree form, are the most typical plants. In this region one finds gemsbok as well as springbok.

The central region of the Territory is a typical thornbush savanna with trees and shrubs in dense or open clumps. Bush encroachment is one of the more serious management problems encountered in this area. Directly to the west, in the mountainous area of the Khomas Hochland, as far south as Rehoboth, one finds a highland or "berg-thorn" savanna. The most typical trees are *Acacia hereroensis, A. detinens, A. reficiens, Combretum apiculatum* and *Ozoroa crassinervis*. This region probably has the highest density of game in the Territory. Apart from springbok, gemsbok and kudu, red hartebeest occur to the east, mountain zebra to the west and eland and giraffe to the north.

The central region is bounded in the north by a range of dolomite mountains. These mountains with the adjoining Karstveld are grouped by Giess into the mountain savanna and Karstveld, excluding the areas covered by mopane. This vegetation type has a very characteristic tree stratum, characterised by *Kirkia acuminata* on the dolomite ridges and *Peltophorum africanum* on the more sandy plains. Bush encroachment also occurs here. The more common game species are kudu, eland and to a lesser extent gemsbok.

The remaining savanna veld type is the mopane savanna, with the characteristic plant being *Colophospermum mopane*. It occurs either as a shrub or tree depending on local edaphic and rainfall conditions, varying from dense woodland in areas in the east, to short-stemmed shrub with scattered trees in the western parts. This vegetation zone lies to the north and west of the dolomite mountain range mentioned above, and also includes most of the Etosha National Park with its wide spectrum of game species.

2.3.3 Woodland

The remaining major vegetation type is the woodland. Giess (1971) recognises only the "Tree Savanna and Woodland" in the north-eastern corner of the Territory with its relatively high rainfall. Two species dominate the canopy i.e. *Pterocarpus angolensis* and *Baikeaea plurijuga*. This area harbours Burchell's zebra, kudu, eland, blue wildebeest, elephant, hartebeest, giraffe and several species which do not occur elsewhere in the Territory (other than those reintroduced) eg. roan, tsessebe and buffalo.

3 THE STATUS AND DISTRIBUTION OF GAME POPULATIONS

The oldest accounts of the distribution of mammals published this century are those by the German Colonial Office (1913) and Fischer (1914). The works of Wilhelm (1931), Shortridge (1934), Bigalke (1958), Van der Spuy (1962) and Sidney (1965) are also well-known. Most of these works, unfortunately, have serious shortcomings, due mostly to the vastness and inaccessibility of large tracts of the Territory. Van der Spuy (op. cit.) concerned himself only with six species of game animals. The most recent work by Joubert and Mostert (1973) was done by means of questionnaires and could be compared with Van der Spuy's earlier work. The validity of information obtained by means of questionnaires is debatable, but the authors felt that, if the limitations of the method are kept in mind, some information regarding distribution and status could be obtained.

The senior author visited many farms and found that farmers' estimates displayed certain tendencies. The numbers of those animals on which they placed a value viz. gemsbok and springbok, were either estimated accurately or under-estimated, while the numbers of the animal species which caused them problems such as jackal and mountain zebra were over-estimated. Furthermore, if the numbers of a species were high, they tended to be over-estimated. Generally speaking there seemed to be a bias towards over-estimation. Of all the game species occurring on farms in South West Africa, kudu presented the most problems in estimating numbers. This is due mainly to their secretive ways and the fact that ordinary fences do not restrict their movements. As their home ranges are also normally spread over a number of farms this complicated matters further, because a number of farmers would record the same group of kudu.

The completion and returning of questionnaires were on a completely voluntary basis. This immediately indicated which farmers were interested in their game as well as those who had game on their farms. This is borne out by the fact that on average the percentage returns were related to the density of game in particular districts. During recent years as the result of more intensified farming practices and an increased awareness of the value of game (Joubert, 1974), farmers have been paying more attention to the number of game on their properties. The number of game on a farm also plays a role in farm planning because it influences the carrying capacity for stock, and farmers have to indicate the number of game on their property when applying for participation in the stock reduction scheme. The figures obtained from the questionnaires compared favourably with estimates by the Directorate regarding the status of game in South West Africa during 1973, viz.

	Questionnaires	Directorate
Eland	7 770	8 000
Cheetah	6 252	5 000
Kudu	110 986	90 000

Historically, settlement took place around the Territory's relatively few water-holes, and game animals were driven away from their water. With the advent of drilling machines, many boreholes were sunk and new, often virgin veld opened up for grazing. Although a lot of hunting, sometimes with the intent of extermination, took place, man's influence has not always been adverse to wildlife. Some landowners had an inborn regard for game animals and only those species incompatible with farming activities such as lion and blue wildebeest were hunted.

With increase in human settlement and intensified farming, the game populations first declined and then stabilised. At this stage the approach to sheep farming management also changed. Instead of having a flock of sheep with a shepherd to look after it, large tracts of land were fenced with jackal-proof fences and all sheep predators in these enclosed areas eliminated. Sheep were then allowed to run on their own in these camps. As can be expected, this situation also had several advantages for the resident springbok populations. With the predators eliminated it meant that they had few natural enemies left. Human interference was reduced, and farmers started to care for their springbok. The ownership of a springbok herd today has acquired a prestige value.

The estimated population of the various game species in 1978 (table 1) reflects the position before the outbreak of rabies among kudu occurred.

4 DEVELOPMENT OF LEGISLATION

The first hunting regulation in South West Africa came into force during 1892. Hunting was open all the year round but permission had to be obtained from the Governor. The only restrictions were that elephant cows and calves were protected, and there was a closed season for ostrich from 1 August to 31 October every year. In 1896 the closed season for ostrich was extended to 31 November.

During 1902 the first ordinance was proclaimed and signed by Governor von Estorff. The „Verordnung betreffend Aussübung der Jagd in Deutsch-Südwest Afrika Schutzgebiete" closed certain areas to hunting (these areas were proclaimed as game reserves by Governor von Lindequist in 1907). It was also illegal to set any form of trap or snare. The Territory was divided into districts (later to become magisterial districts) and each district had an official known as a District Chief. This District Chief had the authority to enforce hunting seasons of varying duration for various game species every year, depending on circumstances in his district.

In 1909 a few amendments to the game ordinance of 1902 were passed. One amendment made provision for the Governor to give permission for any of the protected game to be shot for "economic or scientific reasons". A general closed hunting season from 1 November to the end of February also came into force, although the District Chief still had the authority to shorten or lengthen the hunting season according to conditions in his district. Permission had to be obtained from landowners to hunt on their land.

The ordinance remained in force when the Territory was occupied by the South African Forces in 1915 and E.H.L. Gorges was appointed Governor of the Military Regime. In 1921 a Game Preservation Proclamation came into effect, which was based on the legislation in use during German occupation. The South West Africa Administration was established in 1925 and E.H.L. Gorges became the first Administrator. The first meeting of the new Legislative Assembly took place in 1926 during which time Game Preservation Ordinance No 5 was passed. This extended the list of protected game species considerably and hunting licences had to be obtained from the Secretary for South West Africa.

Then followed the International Convention for the preservation of African fauna and flora in London in 1933 which resulted in Ordinance 19 of 1937 which had as purpose:

> "To provide for the preservation of the fauna and flora of the Territory in their natural state... and to amend in other aspects the law relating to the preservation of game".

Apart from *Welwitschia mirabilis* which had been protected since 1916, this ordinance for the first time made provision for the protection of plants. Enforcement of the game laws until then had been the sole responsibility of the South West Africa Police, but this ordinance also permitted interested people to help, in the capacity of honorary game wardens.

This legislation was augmented in 1951 by Ordinance 11 which made provision for the appointment of game wardens in game reserves. Authority was given to the Administrator to establish a Board to be known as the Game Preservation and Hunting Board, consisting of not less than five members. Their duty was to oversee the preservation of game and to make recommendations to the Administrator.

This "Hunting Board", as it was generally known, was disbanded by Ordinance 18 of 1958 and replaced by the Parks Board, with similar functions and duties. It also provided for the creation of the Etosha Game Park and enabled farmers to have their property proclaimed private game reserves with the same legal protection as a game park. Between 1958 and 1972, 132 farms, with an area of 1 021 902 ha, were thus proclaimed.

The legislation did not encourage private enterprise (farmers, game dealers and trophy hunting operations) to utilise game. Landowners had the right to hunt game throughout the year, but for personal use only. A hunting season was proclaimed every year which allowed the hunting of certain species of game on private land on condition that a hunting licence was obtained as well as prior permission from the landowner. The revenue obtained from the sale of hunting licences was deposited with the Department of Revenue. There was provision

TABLE 1: Population estimates of the more common game species occurring on farms in South West Africa (1973* and 1978**)

	Kudu	Gemsbok	Hartebeest	Hartmann's zebra	Eland	Burchell's zebra	Giraffe	Springbok	Duiker	Klipspringer	Dik-dik	Steenbok***	Warthog
Tsumeb	4 881	34	21	1 432	–	106	649	293	280	190	1 071	210	1 984
Grootfontein	13 875	876	681	5 030	–	49	1 065	146	10 666	1 237	1 843	887	7 070
Outjo	12 666	4 203	108	–	2 324	274	964	3 602	3 248	1 540	1 986	712	5 341
Otjiwarongo	15 037	5 837	2 172	207	50	8	19	1 392	5 999	1 145	1 013	955	13 824
Omaruru	9 440	3 442	–	–	1 427	150	3	3 903	1 870	1 015	1 427	362	4 080
Swakopmund	–	–	–	–	–	–	–	15	–	3	–	–	10
Karibib	6 277	2 396	51	3	2 204	241	16	6 021	1 719	941	257	300	1 581
Okahandja	11 223	6 753	919	85	275	60	2	2 464	3 700	596	530	635	8 568
Windhoek	18 319	5 367	4 284	137	4 729	144	–	25 368	5 405	2 945	545	970	3 651
Gobabis	11 430	5 821	3 841	308	–	–	–	25 690	17 465	1 271	425	1 757	6 230
Maltahöhe	2 226	1 150	42	1	3 159	17	–	14 415	579	1 867	–	477	235
Mariental	1 393	2 505	67	72	2	5	–	28 483	6 351	370	443	2 176	111
Lüderitz	562	809	–	–	1 263	14	–	3 461	99	1 121	–	–	20
Bethanien	1 360	316	–	–	786	20	–	4 366	303	1 360	4	260	–
Keetmanshoop	1 447	903	–	35	–	2	–	12 666	1 661	2 637	30	2 030	–
Karasburg	796	157	–	–	216	–	–	9 883	555	2 483	–	875	–
TOTAL*	110 986	40 569	12 186	7 779	16 435	1 090	2 718	141 468	62 423	20 721	9 166	12 605	52 705
TOTAL**	150 000	53 000	16 000	11 000	21 000	1 300	3 000	200 000	–	–	–	–	–

***The steenbok species was inadvertently omitted from the questionnaire and the figures in the table represent the totals given by some of the farmers of their own accord.

for the large scale culling of game other than by the landowner, and then only during daylight hours, with the limitations this represents.

No legal provision was made for trophy hunting as such, but the Administrator could give permission to very important visitors to hunt during the non-hunting season. A safari-leader had to apply to the Administrator for each individual trophy hunter. These requests were normally granted, provided the prospective hunter was a foreigner. No official hunting concession areas existed in the Territory, and the safari-leader had to make arrangements with landowners. Due to these limitations only one safari company operated in the Territory for many years.

The first game dealer started operating in the Territory in 1957, and was shortly thereafter followed by another. These dealers had to apply for registration before they could operate. Until the middle 1970s no other game dealer was allowed to register as it was thought that the Territory could not support more than two dealers at a time.

5 GAME UTILISATION

The most important single factor contributing to the present healthy game industry in South West Africa, was the legislation passed in 1967 (ordinance 31). The then Division of Nature Conservation and Tourism was the first in southern Africa to ". . . give the owner or occupier of a farm full ownership of all game, other than specially protected and protected game, while such game is lawfully upon such farm and while such farm is enclosed with a sufficient fence." It also made provision for the farmer to lease his rights to any competent person.

The attitude at present is for the farmer to conserve and keep game on his property with the aid of game-proof fences, salt licks, reduction of hunting pressure by more selective hunting and various other methods. This has led to a much more efficient utilisation of wildlife to the advantage of the whole Territory. With the development of the various methods of utilisation and the growing awareness of the importance of the wildlife industry the legislation had to be updated during 1973 and again in 1975. These ordinances streamlined the industry as regards commercialised cropping at night, trophy hunting and dealing in live game. At the same time they made provision for regulations to ensure that the industry remains ethical according to established conservation norms.

5.1 Game ranching

Game ranching implies that no, or very little, domestic stock is kept on a farm and that the sole source of income is derived from game. This could be in the form of trophy hunting, trade in live game and venison. Most of the farms in the Territory do not harbour the complete spectrum of trophy species available in South West Africa. To do so would, in most instances, require the erection of a costly game-proof fence and the introduction of other species exotic to the farm. Veterinary requirements and the regulations as laid down by the Directorate of Nature Conservation further serve to discourage the non-professional from getting involved in this practice. These, as well as other factors, (the local low price of venison and health regulations to be complied with when marketing venison) make game ranching *per se* not really a viable proposition. This was recognised by the Directorate and it became clear that the best method of land-use would be one where a balance was achieved between domestic stock and game, the one complementing the other.

There have only been a few instances where companies have bought farms and turned them into game ranching outfits. One of the biggest of these has recently acquired 42 000 ha in the north of the Territory and put a game-proof fence around it. As some of these companies insisted on introducing exotic game species, strict legislation had to be introduced to curb such activities.

5.1.1 Game culling

5.1.1.1 Introduction

In order to utilise game effectively an efficient culling method had to be devised. During 1969 a joint research project by the Divison of Nature Conservation and Tourism and the Department of Agricultural Technical Services, was launched which included research into culling and marketing. The culling had to be humane, economical and in compliance with health and veterinary regulations.

5.1.1.2 Development of procedures

Several hunting procedures were tried out, but the only method that proved to be of any value was to hunt the animals at night using strong spotlights. This method was used during the dry, cold season and has the following advantages:

- no flies or blow flies are encountered;
- herd disturbance is minimal;
- it is possible to follow up and kill wounded animals;
- low temperatures plus the fact that the animals are hardly disturbed ensures high quality meat;
- it is possible to cull randomly;
- it can be carried out economically;
- with the high degree of shooting accuracy that can be achieved, meat damage is limited.

FIGURE 1: Schematic diagram of the field abattoir.

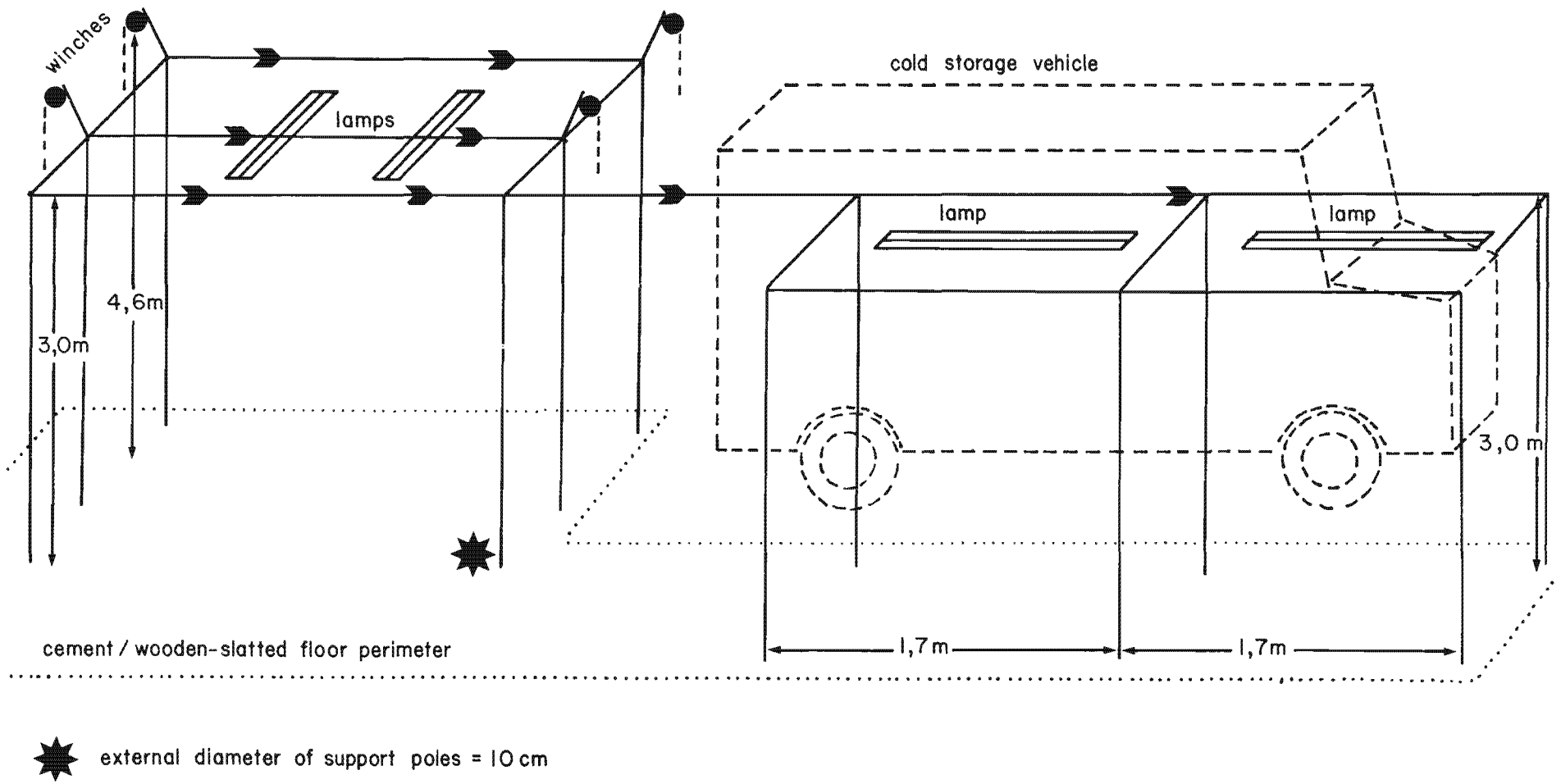
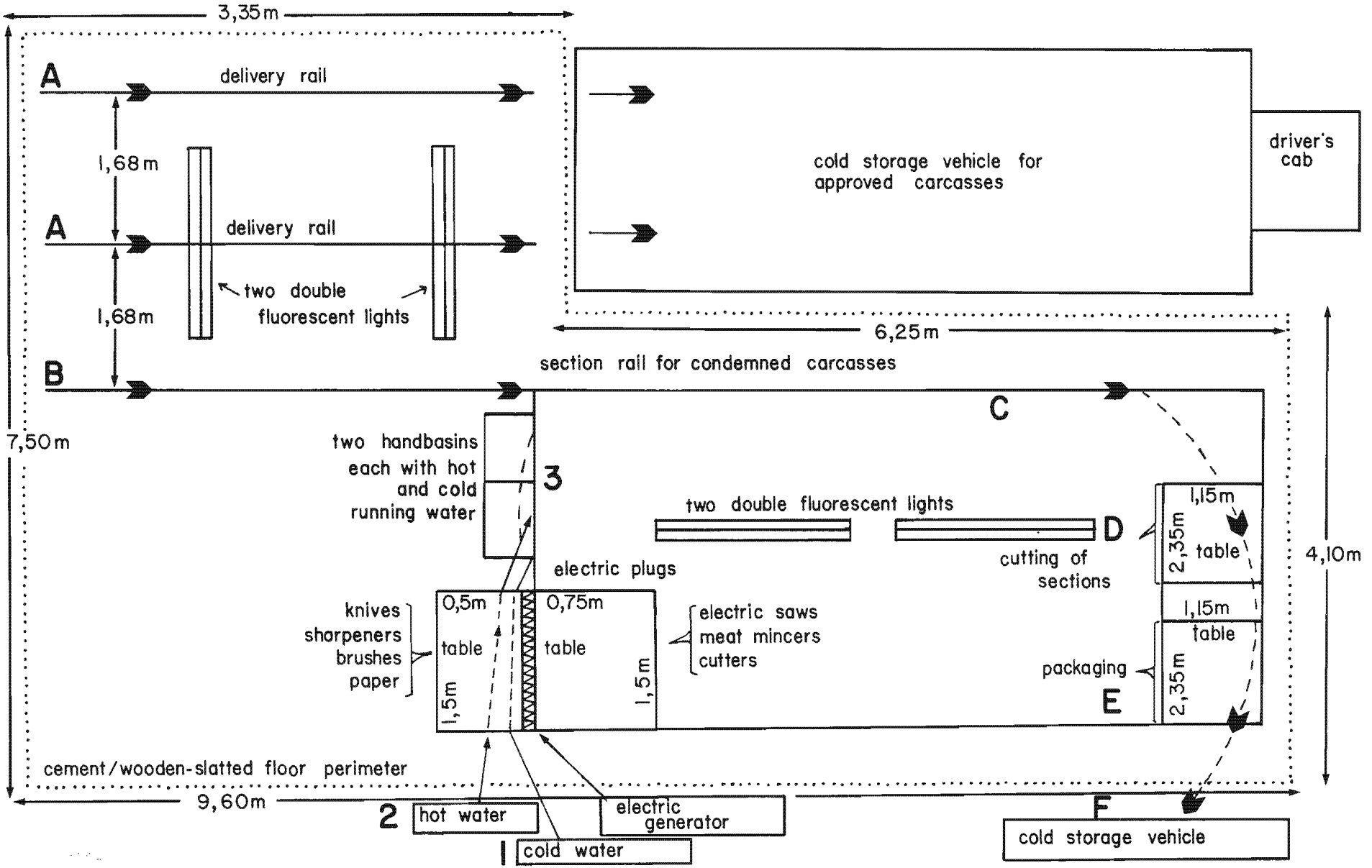


FIGURE 2: Field abattoir: ground plan



5.1.1.3 Hunting equipment

There is a wide variety of vehicles on the market that can be used for culling, none of which however can be used without the necessary mechanical and electrical modifications. The vehicle should be sturdy with a four-wheel drive and capable of carrying a thousand kilogrammes. The modifications and miscellaneous loose equipment we found necessary or useful for the operation, are detailed in the appendix.

5.1.1.4 Hunting procedure

Hunting is a team effort between the handlers of the spotlights, the driver and the marksman. When a herd is located the spotlights are shone onto a selected animal and it is killed by a brain or neck shot; several animals may be killed before the herd moves on. Not more than five animals should be killed in any particular spot. When a carcass is reached the throat is cut at the angle of the lower jaw and the animal is hung on the trellis or hoisted into the loading platform with head down. As the heart continues beating for several minutes after death, carcasses are thus properly bled.

The vehicle then moves on again and more animals are killed. Carcasses must be eviscerated within 20 – 30 minutes after death otherwise bacterial infection from the intestines may take place.

5.1.1.5 Evisceration

The operator washes his hands with a disinfectant soap and uses a disinfected knife to make an incision in the abdominal wall posterior to the cartilage of the sternum. Using a belly ripper the abdominal cavity is opened up to the symphysis pubis. The contents of the rectum are separated upwards and downwards and a fencing stapler is used to seal off the rectum with two staples approximately 2 cm apart; the rectum is then severed. The oesophagus is similarly severed where it enters the rumen. The mesenterium which joins the intestines to the wall of the abdominal cavity is cut and all the intestines (excepting the liver) removed. The abdominal cavity is then closed with the fencing stapler and hoisted into the vehicle.

5.1.1.6 The field abattoir

The site of the abattoir has to be carefully chosen. It should be on reasonably level ground, close to a regular supply of water and in the proximity of a main road and the culling area. The ground on which the abattoir is erected must be sprinkled with water to eliminate dust and covered with wooden slats. Ideally a concrete floor should be constructed. The abattoir itself is constructed of 50 mm pipes which, when assembled, should form a firm framework 3m x 3m x 3m with three sliding rails on which carcasses my be hung (figs 1 and 2). The following are also essential:

- running hot and cold water;
- a 220v power supply lighting, hot water geyser, etc;
- a refrigeration truck with a 20 tonne capacity.

A stock inspector must be present to carry out inspections.

The abattoir is manned by a butcher and 5-10 labourers depending on the number of animals and species to be culled.

The carcasses are off-loaded onto a delivery rail (fig 2). The head, feet and red offal are removed. The latter is given the same number as the carcass and hung on a separate framework to facilitate the work of the stock inspector. The kidneys only are left in the carcass. The carcass is inspected and approved or condemned.

Approved carcasses are then moved into the refrigerator truck. The truck must reach the factory within 72 hours.

5.1.1.7 Economics

Before cropping became established the accepted price for springbok was R6 per head and R20 per kudu. During 1979 a farmer who allowed cropping on his land earned R25 to R28 per head for springbok and R150 to R180 per head for kudu, and during 1980 many farmers earned between R40 000,00 to R60 000,00 by cropping game on their land.

The cropping team earned R10 per springbok and R50 per kudu. The butcher earned approximately R3 per animal handled. Transport costs in the refrigeration truck (± 10c/kg) have to be added, which means that a springbok costs in the region of R35 – R40 and a kudu up to R200. It stands to reason that the best markets had to be exploited, and the venison had a very good reception in France and Germany. An interesting aspect was that in France springbok were more popular than either kudu or gemsbok. It turned out that the easier handling of the smaller carcass caused the bias and not the quality of the meat.

Four commercial private game cropping units, consisting of six to ten hunting teams are at present operational in the Territory. They normally do their own financing and pay the farmer before they leave his land. They rent the refrigeration truck and assume responsibility until the meat reaches an overseas market. They have to pay R200 per night "standing fees" for the refrigeration truck while cropping, plus an additional 10c/kg freight. The truck reaches capacity when ± 500 head of springbok have been loaded. In accordance with the veterinary regulations (which are especially strict for export), the animal must be completely bled and the guts removed within 30 minutes of being shot. The carcass must be delivered at the point of export within 72 hours of being shot. This means that only two nights are available for cropping before the truck has to leave for Cape Town, 1 600 km away.

A group of six to 10 hunting teams, with well-equipped vehicles and experienced personnel may shoot as many as 500-600 head of springbok per night. Their expenditure is approximately R4 per springbok. With a profit of approximately R6 per animal it means that a team may earn anything between R240 to R360 per night.

For the export of venison the game cropping season starts at the beginning of April and ends on 18 September. A detailed account of the 1980 cropping season is presented in table 2.

The cropping method developed in South West Africa has proved to be practical. During the years 1976 to 1979 there has been a gradual increase in the total numbers of game animals utilised which corresponds with the growth rate of the game populations (table 2). However, there has been a definite shift in the utilisation of these animals, particularly noticeable with springbok. In 1979 the number of carcasses exported considerably exceeded the carcasses utilised locally. The same trend is noticeable with kudu. Game carcasses utilised locally represent those animals shot by the farmers as rations for their labourers, by the so-called "meat hunters" and by trophy hunters. The low percentage of kudu utilised, as compared to springbok, is probably due to their more secretive habits, as well as the bush encroachment in their haunts, which makes it extremely difficult to launch cropping operations there.

The gross income for the Territory in the form of foreign exchange rose from R1,5 million during 1978 to R2,8 million in 1979 indicating that game cropping on private land has become an important method of game utilisation in South West Africa.

5.2 Game dealers

Several groups dealing in live game, which they mostly catch themselves, are at present operating in the Territory. These companies have to be registered with the Directorate before they are allowed to capture game. Most of the game is caught on private land with prior permission of the owners. Most of them use helicopters to herd game into nets and complaints have been received from neighbours who claim that the game is herded across boundary fences and caught. Regulations now require that notice be given to every adjoining farm at least a week prior to the capture operation. The boundaries of the farms also have to be clearly marked and easily recognisable from the air.

In cases where permission is requested to capture game which is on the protected list, the Directorate carries out an aerial survey with its own helicopter. This survey covers the farm on which the actual operation is going to take place as well as all the surrounding farms. Based on the figures obtained a catch quota is determined. If the game dealer fails to remove the whole quota, he is allowed to return the following year to capture the balance plus 20 per cent. Species involved here are mostly hartebeest, giraffe and eland. A farmer may only allow a game capture team in accordance with the above regulations, to capture protected game on his land once every three years.

Game dealers have to apply to the Directorate for export permits and are only allowed a certain quota for protected and specially protected species. This method has proved to be a satisfactory control mechanism for the scarcer game. Because of the high operating costs these game dealers have lately concentrated on export with its more lucrative market and prices. The Directorate, with its cheaper supply of game from over-populated game reserves, supply local farmers with live game.

5.3 Trophy hunting

The first official trophy hunting in the Territory started in 1959. Its development and present status are illustrated in table 4. There are at present 29 registered professional hunters, while 185 hunting guides hunt on 289 farms, as some own more than one farm. There has been a decrease in the number of hunting operators since 1979, which is attributed to the serious drought experienced in the Territory. Although only six hunting guides cancelled their registrations, quite a number have been forced to leave their farms for emergency grazing elsewhere.

In South West Africa trophy hunters must be accompanied by either a professional hunter or a hunting guide. Both the professional hunter and the hunting guide need to be registered with the Directorate of Nature Conservation and the Road Transportation Board for permission to transport paying passengers. The registration fee for a professional hunter is substantially higher than that of a hunting guide.

A professional hunter must either be the owner of a registered guest farm or the owner or employee of a *bona fide* registered safari company. A professional hunter is allowed to accompany his client anywhere in the Territory to hunt. The accommodation offered to the client by the safari company, normally tented camps, and/or guest farms has to comply with strict specifications. The hunting guide is restricted to his own farm(s) which he must register as a hunting farm for trophy hunting. The accommodation on a hunting farm also has certain specifications that must be complied with. The specifications, however, are less strict than those in respect of a guest farm. Annual inspections ensure that these standards are maintained. Both the professional hunter as well as the hunting guide must pass an examination to be eligible for registration, the standard for the former being substantially higher. Except for December, the professional hunter is allowed to hunt throughout the year, while hunting guides are restricted to a season from March until October.

While trophy hunters are occasionally affluent locals, they are usually visitors from overseas. During the 1980 season 798 trophy hunters originated from Germany,

TABLE 2: An analysis of the 1980 game cropping season* for export purposes.

Month	Number of animals offered			Number of animals actually cropped			Number of carcasses approved**			Number of carcasses condemned			Number of nights cropped	Number of farms
	Springbok	Kudu	Gemsbok	Springbok	Kudu	Gemsbok	Springbok	Kudu	Gemsbok	Springbok	Kudu	Gemsbok		
April	2 650	1 190	380	2 332	964	232	2 283	947	215	49	17	17	29	25
May	8 320	1 249	910	7 155	1 024	757	7 023	1 007	739	132	17	18	59	50
June	10 762	671	839	10 243	547	788	10 032	538	767	211	9	21	61	76
July	15 891	315	740	13 931	211	548	13 568	208	535	363	3	13	63	53
August	6 875	1 110	832	5 576	670	628	5 418	662	624	158	8	4	54	53
September	1 250	75	381	995	75	344	711	75	340	25	—	4	13	11
TOTAL	45 748	4 610	4 082	40 232	3 491	3 297	39 035	3 437	3 220	938	54	77	279	268

*These are the combined figures of all four game cropping teams operational in the Territory.
**Approved for export.

TABLE 3: The total utilisation of venison obtained by cropping, trophy hunting, meat hunters as well as those animals utilised by the farmers themselves

Year	Total number of animals utilised			Number of carcasses exported and number of farmers involved				Number of carcasses used locally			Export of carcasses as percentage of total utilisation		
	Springbok	Kudu	Gemsbok	Springbok	Kudu	Gemsbok	Farmers	Springbok	Kudu	Gemsbok	Springbok	Kudu	Gemsbok
1976	51 892	22 741	11 598	7 739	110	249	52	44 162	22 361	11 349	14,9	0,005	0,02
1977	69 933	27 926	5 885	23 746	1 117	1 237	194	46 187	26 809	4 648	33,96	4,0	21,0
1978	73 064	25 077	3 738	34 487	1 398	1 359	299	38 577	23 688	2 424	47,2	5,5	35,9
1979	82 799	18 832	8 791	43 663	3 547	3 020	411	31 609	13 573	4 972	59,0	14,1	79,8

TABLE 4: The growth of trophy hunting as an earner of revenue as a form of utilisation of game in South West Africa.

Number of trophy hunters	Number of safari companies	Number of hunting guides	Number of hunting farms	Number of professional hunters	Levies paid on trophy licences	*Gross contribution earned by farmers from trophy hunting to the national revenue
					R	R
1974 305	2				7 625	114 000
1975 343	2				8 575	986 125
1976 495	3				12 375	1 423 125
1977 732	5	74	96	11	13 800	1 587 000
1978 1 129	6	159	203	23	28 225	3 097 855
1979 1 479	5	193	295	31	36 975	4 067 250
1980 1 524	6	185	289	29	38 200	4 392 825

*Includes farmers who act as hunting guides as well as those who allow trophy hunting on their land without being actively involved themselves.

191 from the USA, 150 from Austria, 56 from Argentina, 35 from France, 28 from Denmark, Portugal, Alaska, Japan and several other countries. This group as a whole is used to paying high prices for trophies and hunting safaris. Trophy hunting has, as most forms of game utilisation in the Territory, only recently become established as an accepted form of utilisation. This may be attributed to the relatively small variety of trophy species in the Territory – they are mainly kudu (*Tragelaphus strepsiceros*), gemsbok (*Oryx gazella*), springbok (*Antidorcas marsupialis*), hartebeest (*Alcelaphus caama*), eland (*Taurotragus oryx*) and Hartmann's mountain zebra (*Equus zebra hartmannae*) and only very recently lechwe (*Leche kobus*) and sitatunga (*Tragelaphus spekei*) – as well as the fact that until recently no hunting concession areas existed in the Territory (at present there are two – one in Damaraland and the other in the Eastern Caprivi). The daily tariffs of hunting farms vary from R40 to R200. These, however, are the extremes and the average price is R115 per day per person, all-inclusive excluding the trophy. The length of visits varies between eight and 21 days with an average of 15 days. The average prices for trophies in the Territory during 1980 were as follows:

Eland	R380,00
Blue wildebeest	225,00
Hartebeest	195,00
Blesbok	100,00
Steenbok	90,00
Kudu	245,00
Gemsbok	210,00
Springbok	100,00
Duiker	100,00
Warthog	85,00
Ostrich	100,00
Both zebra species	260,00

During the 1980 season the gross income earned by farmers from trophy hunting was in excess of R4 million. The lucrativeness of the trophy market induced some farmers to reintroduce to their farms game species which had occurred in the Territory previously. These are impala, Burchell's zebra, blue wildebeest and white rhinoceros. In an effort to increase their spectrum of trophies, a few farmers also introduced game species to their farms which had not previously occurred there. Permission for this practice is only granted by the authorities when the farms are fenced by a gameproof fence according to set specifications. Some of these species are black wildebeest, nyala, blesbok, and even water buffalo and llamas.

The most popular trophy species by far, are kudu, warthog, gemsbok and springbok. Trophies from these four species constitute 84,6 per cent of all trophies hunted in the Territory, steenbok and Hartmann zebra 8,3 per cent and the remaining seven species 7,1 per cent. Other animals also shot for trophies include elephant, white rhino (illegally), lion, cheetah (illegally), cats, black-backed jackel, rock rabbits, klipspringer, lechwe, sitatunga, roan and baboons.

5.4 Meat hunting

This form of sport hunting is done mainly by local town residents and visitors from the Republic of South Africa. It is probably the most neglected source of income in the game industry, and the practice should be cultivated and catered for. In the United States this group forms the largest section of the hunters. In Texas alone landowners earned more than R100 million dollars in 1973 from leasing hunting rights to hunters. Some of the large cattle ranching operators survived the 1974 slump in the beef industry by income derived from deer hunters.

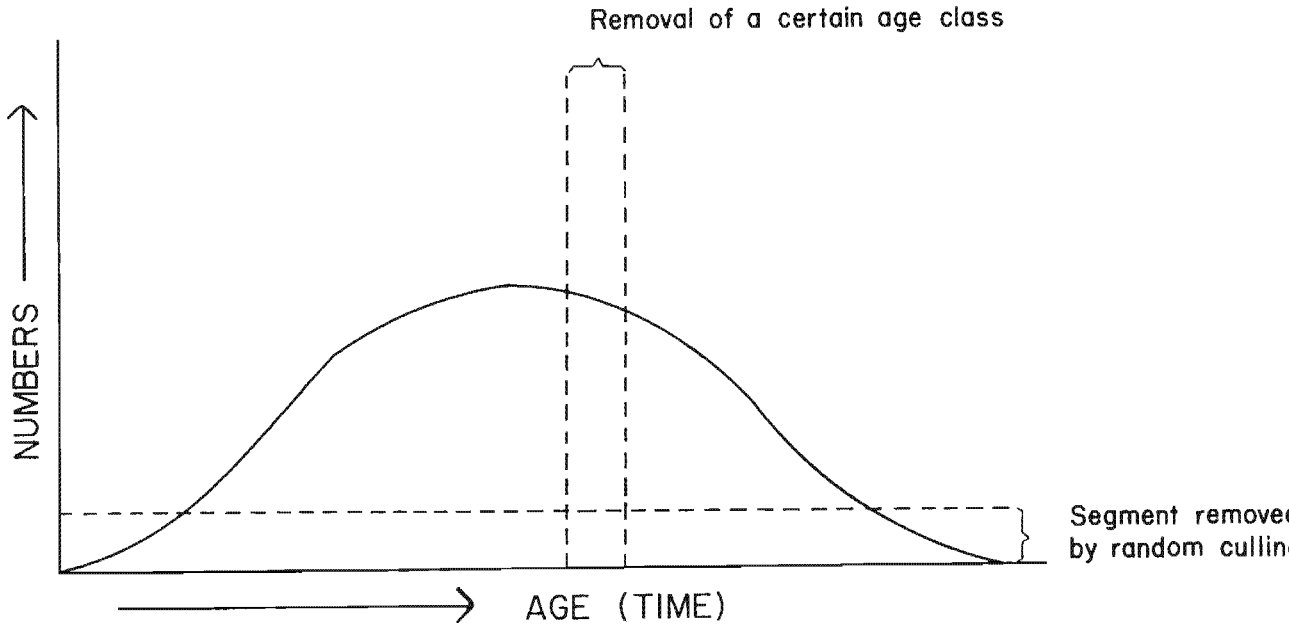


FIGURE 3: Illustrating the small effect that the removal of a random sample (horizontal) would have on the population as opposed to the break created in the curve when a certain age class (sex group) is removed.

In South West Africa there is a growing realisation that apart from trophy hunting and game cropping there is also room for this practice. Game cropping teams only operate when the number of animals that can be removed assures an economically successful venture. To allow trophy hunters on his land, the farmer must either get himself and his farm registered or invite a safari company to hunt on his land. For many farmers this is not acceptable. Meat hunters are for the most part self-reliant as regards vehicles and camping equipment.

It is extremely difficult to determine how many game animals are shot by meat hunters and by farmers for their own use. There are indications, however, that the latter has declined considerably. Taking an average price for the skins and hides that were received by local tanneries or exported to tanneries in the Republic of South Africa as a basis, the value of game utilised in this way during 1980 was in the order of R2,3 million.

6 THE INFLUENCE OF UTILISATION ON THE POPULATION DYNAMICS OF GAME

Many farmers are worried that the constant removal of prime specimens from a population – especially through trophy hunting – may lead to inferior progeny. A much-quoted example is the fear that biologists in the Kruger National Park had about their big tusker elephant bulls, i.e. that after crossing the international boundary they would get shot in the adjoining concession areas of Mozambique. As tuskless males would then do more and more of the mating, the Kruger National Park may end up with a population of tuskless elephants.

It should, however, be borne in mind that tusklessness of an elephant bull is definitely of genetic origin, and as such may be inherited by male progeny. This example is not strictly applicable to the situation where trophy hunting is practised on artiodactyls. All male animals may develop into top trophy animals. Horns continue to develop as animals reach maturity and grow older. The best trophy animals are therefore old. Due to natural selection and intra-specific competition the males that are actively involved in the reproduction activities are those in the prime of their lives. In the case of gemsbok, the females carry the longer horns.

Another point of concern to many farmers is the ratio of male to female animals which may be disturbed. This would influence the rate of reproduction. Of a total of 10 164 springbok killed in 1977, 44,2 per cent were males and 55,84 per cent females, giving a ratio of 1 male to 1,26 females. Of the 875 kudu cropped 43,3 per cent were males and 56,7 per cent females. This represents a male: female ratio of 1:1,3. With gemsbok on the other hand, slightly more males were cropped than females, the figures being 51,9 per cent male and 48,1 per cent female in a sample size of 797. Annual variations do occur but do not represent statistically meaningful differences. Night cropping for all practical purposes is thus successful in removing a random sample from the adult population.

Concern has also been expressed about the number of pregnant females being culled. This, however, is a difficult matter and it is often pointed out that the number of livestock slaughtered at abattoirs has a higher pregnancy ratio than shown by the number of females of various game species culled. The matter is, however, receiving attention.

The months with the lowest occurrence of pregnancy in springbok are May, June, July and probably August. Kudu show a very marked calving season starting in August. This coincides with the annual spring flush of shrubs and trees, which occurs independently of rainfall in the Territory. With gemsbok on the other hand, breeding seems to take place throughout the year. It could therefore seem advisable that culling be limited to April, May, June, July and August.

7 ACKNOWLEDGEMENTS

We wish to express our sincere gratitude to Mr. P. le Roux (Director, Nature Conservation, O.F.S.), Mr. C.G. Coetzee (Director, State Museum, Windhoek) as well as Mrs. A. Schoeman, who read through the initial manuscript critically. We are also indebted to Dr. H.H. Berry and Mr. G. Brand who supplied the photographs and Miss J. Lautenbach for preparing the diagrams.

A word of gratitude also to those of our colleagues who uncomplainingly spent endless bitterly cold nights in the veld during various culling operations.

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APPENDIX I

Modification and miscellaneous loose equipment needed for a vehicle used for culling.

Modifications

- heavy duty tyres (10 – 12 ply rating);
- a mechanical or electrical hoist to lift large carcasses;
- a separate alternator and heavy duty battery for operating the hoist as well as the spotlights;
- extra shock absorbers;
- a chair for the marksman;
- two chairs on either side of the marksman's chair for spotlight handlers;
- a padded rest for the marksman's rifle mounted over the vehicle's cab;
- an intercom system between the marksman and driver;
- long range fuel tanks;
- a fifty-litre water container with tap;
- a platform of flat iron mounted at a 45° angle for loading large carcasses; rollers at the lower edge of the platform;
- a sturdy trellis mounted on the loading box;
- short range 7m radio for communication with the base camp and other vehicles; and
- all lights and wiring to be protected against bush damage.

Loose equipment

- a high-powered rifle equipped with a suitable telescope and bullets (the muzzle energy of the bullets to be used for different species of game is prescribed);
- a telescope of at least 4 × magnification;
- a 5 – 10 litre container of stainless steel with a suitable disinfectant dissolved in water;
- 2 butcher's knives of stainless steel with handles that can be sterilised;
- a belly ripper of stainless steel;
- a knife sharpening steel;
- a stainless steel fencing stapler;
- two 55 – 100 watt spotlamps; and
- shooting lists, electric torch, labels and string.

PLATE 1: An equipped vehicle used for night cropping

PLATE 2: A hunting unit with its vehicles, ready to start

PLATE 3: A vehicle arriving at the abattoir with its load

PLATE 4: The entrails being removed in the veld

PLATE 5: Evisceration in progress

PLATE 6: Note staples used to seal off the entrails

PLATE 7: Body cavity closed up using the same tool

PLATE 8: Carcasses at the abattoir. Note the scale on the right

PLATE 9: Carcasses being inspected. Note ticket on hind leg

PLATE 10: Carcasses in refrigerated truck

PLATE 11: The mobile abattoir

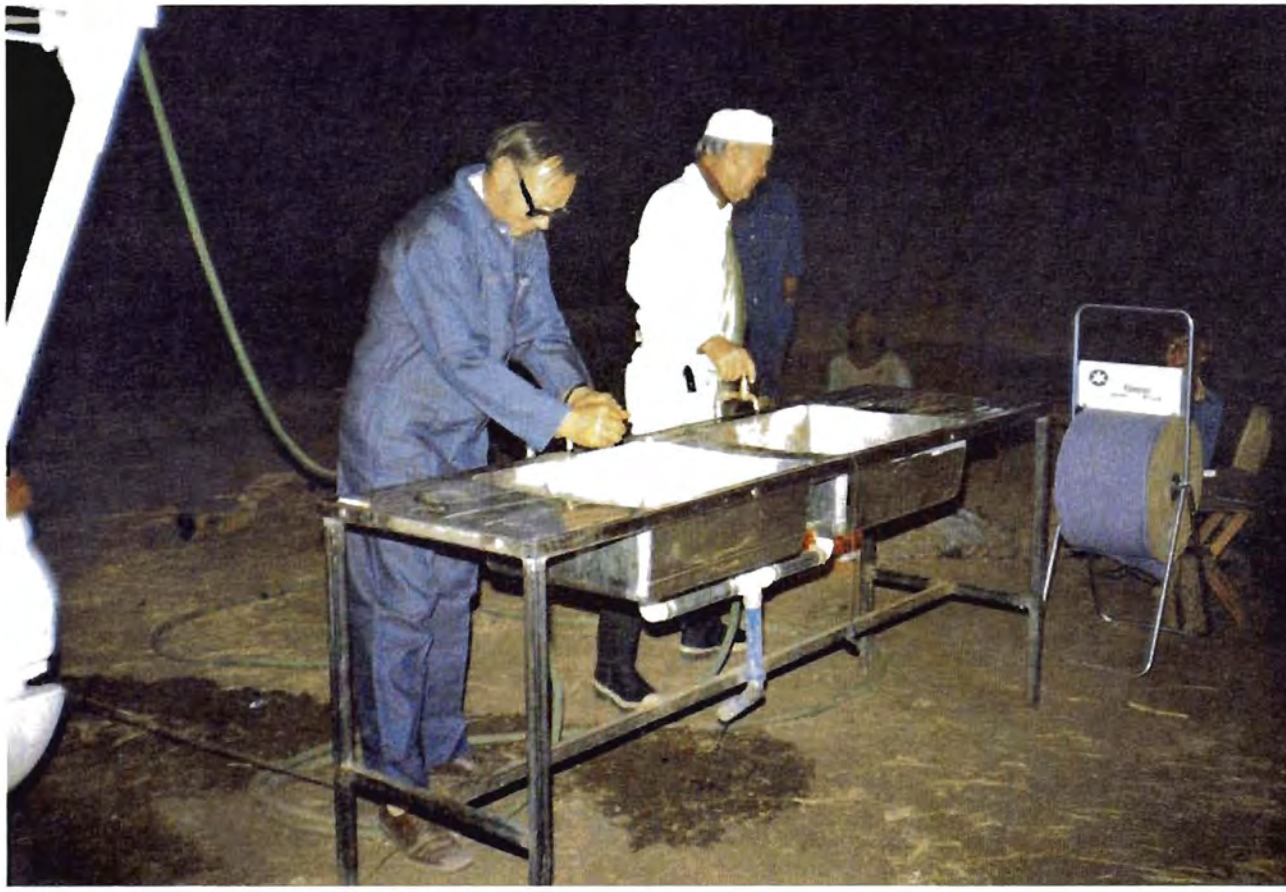

PLATE 12: Wash basins

PLATE 13: A condemned carcass, due to a shot in the body

PLATE 14: The abattoir with kudu carcasses

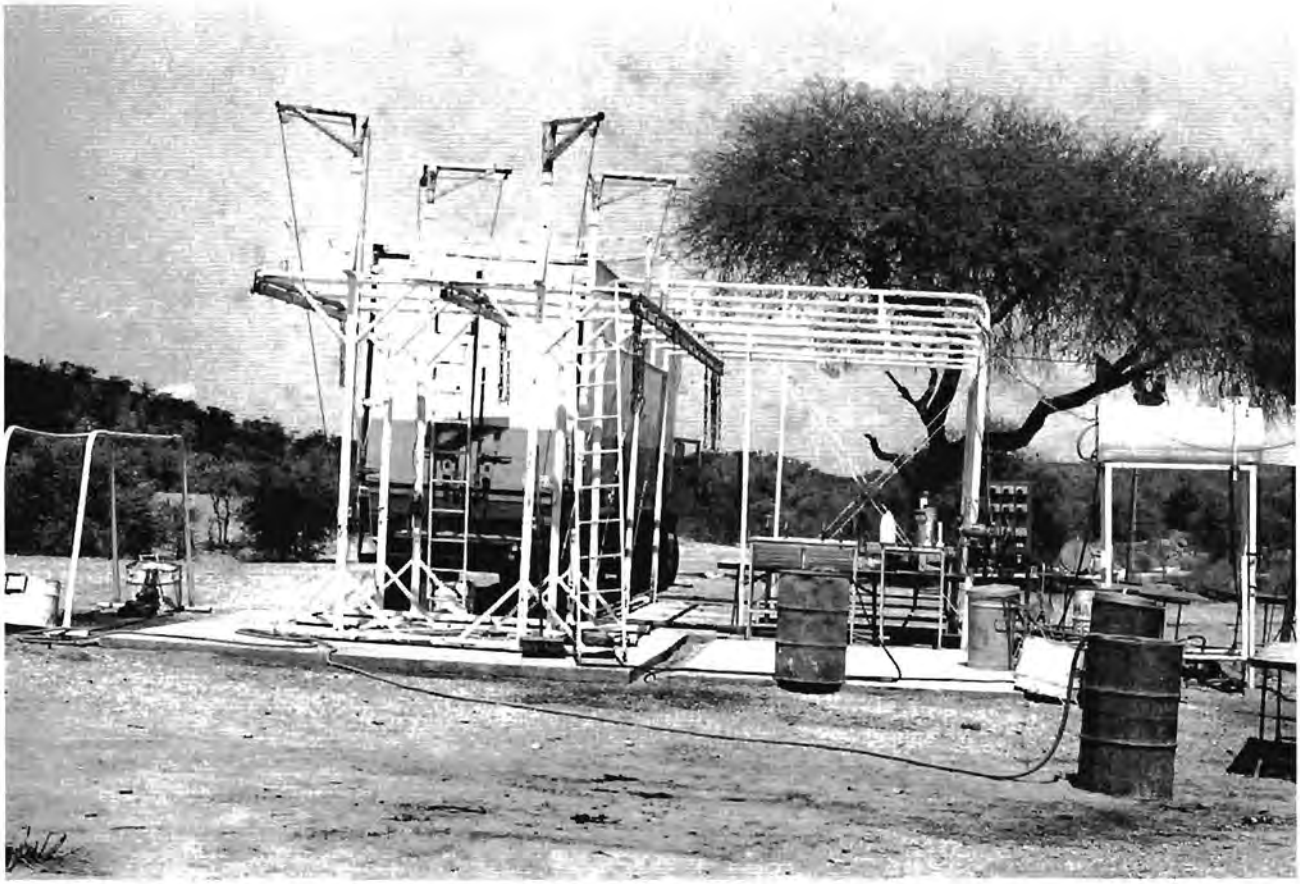

PLATE 15: The field abattoir assembled on a concrete floor

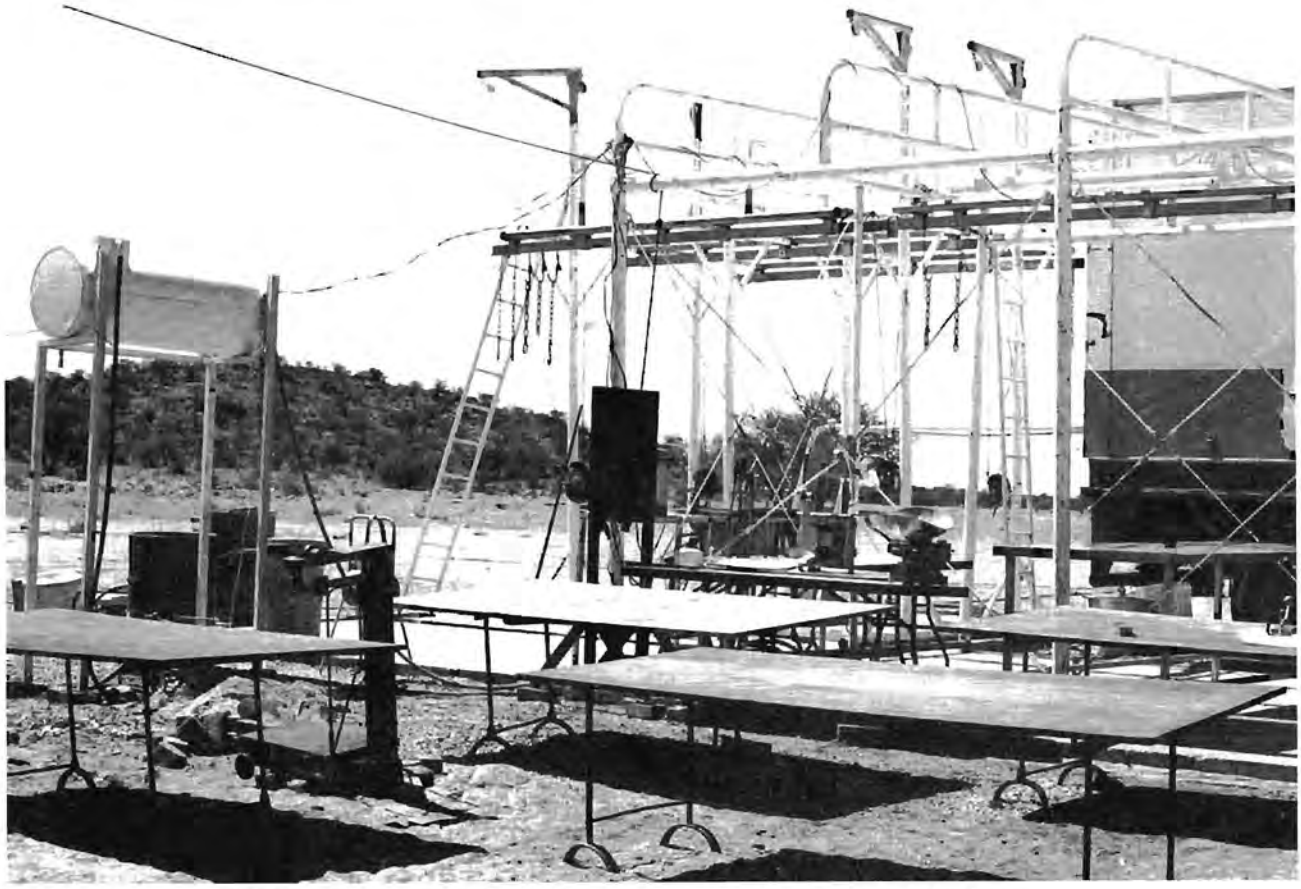

PLATE 16: Tables on which the meat is removed from carcasses which are condemned due to body shots

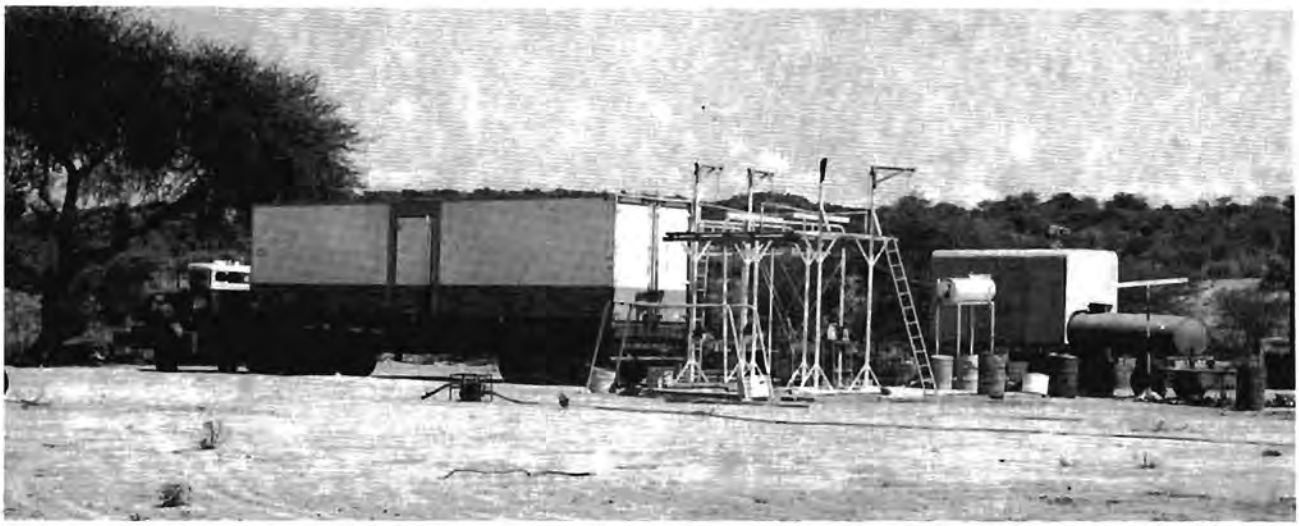

PLATE 17: The field abattoir. Note position of the refrigerator truck, the tank trailor containing water on the right and the tank on the stand with heated water.

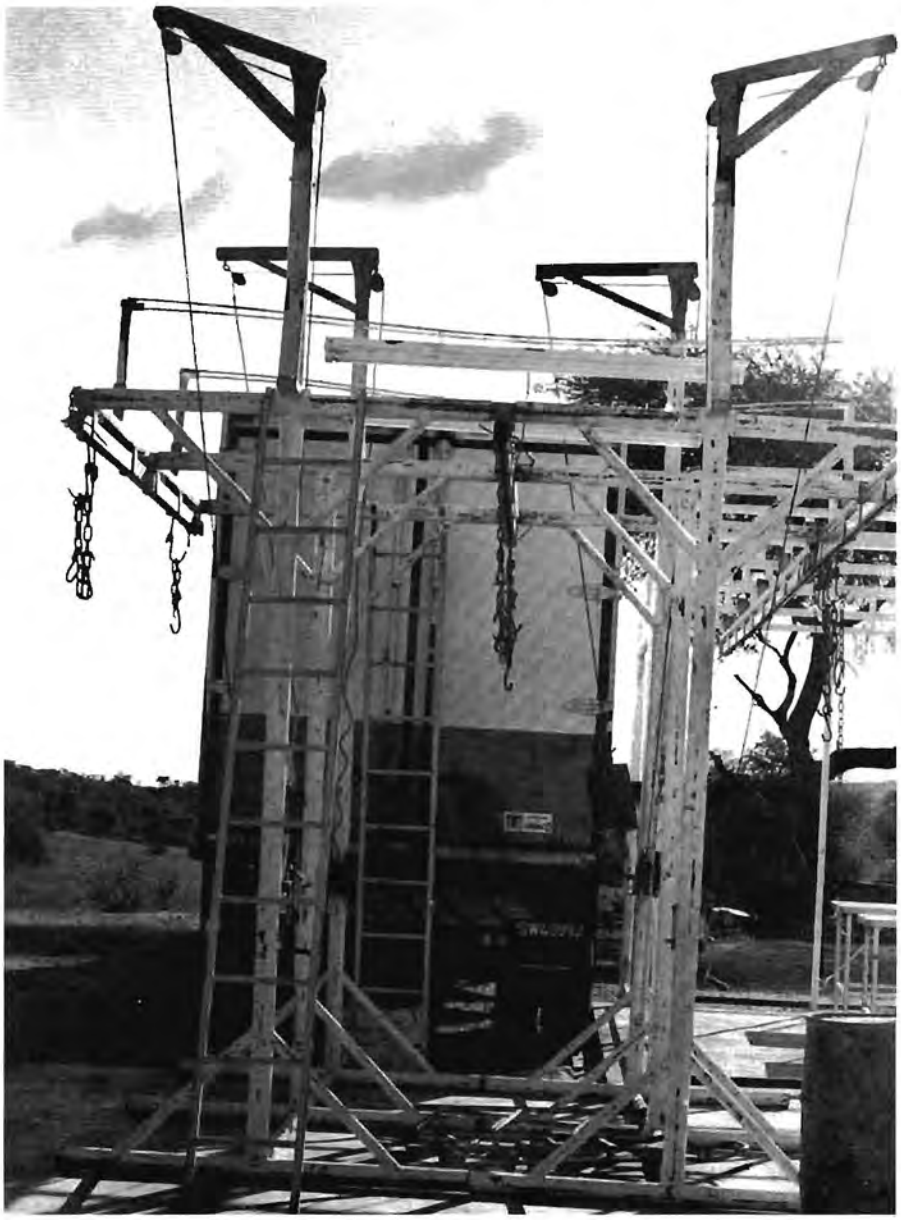

PLATE 18: A firm framework high enough to handle big game.