

4. Causes of changes in number and distribution.

In this chapter, reasons for the diminishing numbers and curtailed ranges of the species here dealt with are discussed. Of these the first two are probably the most significant. The first of these again, directly responsible for change of habitat of many species, in all probability caused the greatest reduction in numbers and decrease in range in the past.

1. The advance of human activity.

Sidney (1965), Tinley (1966), Child (1968) and Smithers (1968) all list the destruction of natural habitat as one of the prime reasons for the decline in number of game animals in southern Africa. Habitat changes could have been the direct results of increased human activity or could have resulted from more natural causes as will be shown.

An increased number of European settlers at the Cape brought about increased agricultural activity to ensure the necessary fresh supplies for the passing ships of the Dutch East India Company. The refreshment post established at the Cape gradually expanded up the west coast, along the southern and southeastern shores and north and northeastwards into the interior, and extended agricultural activities encroached on the natural habitat of the game in the vicinity. At first alternative areas could be inhabited or utilised by the displaced animals, but this became increasingly more difficult since the complexity of man's environment was directly at variance with the natural needs of the game animals.

With the passing of the years agricultural practices such as bush clearing, ploughing, fencing, grass burning and draining of marshes altered the habitat to such an extent that certain species could not inhabit or occupy it any longer. This decrease in available habitat was one of the main features of human civilisation that led to the decline of animal numbers in southern Africa.

Together with increased farming activities came increased human populations in the settled areas. A stronger demand for food ensued, necessitating the keeping of larger numbers of domestic animals such as

sheep and cattle. This in turn led to competition between game and domestic animals for the available food plants, with the game the inevitable loser. Livestock are selective grazers, and when kept in the same area all the year round, will cause the trampling out of the perennial grass cover. In due course bush encroachment starts and annual grasses appear. The sensitive grazers such as the sable, roan, sassaby and reedbuck decline numerically, whilst species favouring bush can profit temporarily from the situation.

Tinley (1966), Smithers (1968) and Von Richter (1969) all adequately demonstrate how overstocking and overgrazing lead to disturbance of the status of the wild life populations in northern Botswana. This however, has also happened in all the other areas comprising southern Africa in the past, but has only lately been prominently brought to the front.

The diversion of water supplies for irrigation purposes contributed further to habitat changes. The opening up of waterless areas by sinking boreholes as water supply for cattle likewise aided the process. More drastic however, was the fencing off of water supplies where game in the past had unhindered access. Campbell (1968) blames the very much decreased numbers of wildebeest, hartebeest, eland, zebra, giraffe and springbuck in the Central Kalahari Game Reserves during the latter years on the construction of cordon fences across the northern boundaries of these reserves. Untill 1959 these animals had access to the water of the Botletle river. The fences resulted in enlarged herds which destroyed the available tubers and other succulents when searching for moisture and unable to reach their customary water supply. Smithers (1968) writes : ".....and the erection of great lengths of fencing, designed to control cattle and wild life movements, which appear in some cases to have cut across lines of movement of wild life, with disastrous results."

Quoting from the Annual Report of the Game Section of the Department of Mines, Lands and Surveys for the year ending 31st December 1957, Report No.5, for Rhodesia, the effect of civilisation on the game situation can be summarised as follows :

"To summarise, then, fences, boring machines, motor vehicles, increased populations, intensive forms of agriculture, mining activities and so on, have had a tremendous impact on the wild fauna and have led to its general disturbance and reduction in numbers in the southern and south-eastern lowveld." This does not apply to Rhodesia only as indicated, but to the rest of southern Africa as well. To this could be added the fact that certain species such as the hartebeest, blue wildebeest and springbok usually migrated yearly, whilst others like the kudu frequently change their environment, but owing to fencing have been prevented from doing so. This has led to the formation of isolated small pockets of game in some cases, with numbers lower than the minimum population necessary for successful breeding. In species occurring in small groups, e.g. the oribi, the loss of only one animal may lead to the inability of the group to reproduce.

The subdivision of farms has frequently led to the disappearance of a species on the smaller units since on a farm of 50,000 morgen a species could still hold its own, but when subdivided into ten farms of 5,000 morgen each, the situation changes drastically.

To single out any particular species as having suffered most from the impact of civilisation would be impossible, since all species encountered by man in his expanding activities were affected to a greater or lesser degree. Some like the steenbok, duiker and kudu could adapt themselves better to changing environments and for that reason alone are still to be found in areas where the eland, hartebeest, springbok, blesbok, black wildebeest, quagga, zebra, rhinoceros, roan and sable have long since disappeared.

Due to natural causes such as persistent droughts, floods and fires caused by lightning, large areas underwent complete deterioration with the passing of the years.

Livingstone (1857) mentions places pointed out to him approximately 14 miles from Kuruman where, within living memory, hippopotami had occurred but, owing to the drying up of the water, had moved elsewhere.

Anderson (1888) writes as follows of Moffat's Mission Station in the vicinity of the Kuruman Hills: "There is every indication that this country is drying up. Fountains that gave out fine springs of water, so the old kaffirs told me, in their father's time, have not been known to flow for many years. This is a common remark all over the country, and there is evidence that it is so." Wilson (1865) also mentions the fountains near Kuruman that have dried up, causing the vegetation and consequently the game to disappear.

Selous (1908) states that there was a gradual desiccation of the Molopo river vicinity, and that that was the reason why the buffalo had left the area.

Campbell (1968) states that the names given to various geographic features of the Central Kalahari Game Reserves by the Bushman, such as pans known as Tshukudu (rhinoceros) together with the fact that elephant and buffalo have been known to enter the reserve in the past and the occurrence of small numbers of bush pig in the northeastern corner or the annual visits of baboons to the scrub woodlands in the south, tends to give the impression that the reserve was better watered in the not too distant past. He also mentions Ghanzi farms that in 1906 had several springs that lasted throughout the year and one or two pans that held water from one rainy season to another.

Fires and flooding have on occasion changed the flora on an area and, as a consequence, the fauna too. Burning changes habitat rapidly, and especially the sensitive marginal ones may give way to bush encroachment in this manner.

2. European hunting.

Since the arrival of the first European settlers in Table Bay in 1652 with their primitive flintlocks, the shooting of South African game has continued for more than 300 years. The reasons for shooting may have differed from time to time, but the result has always been the same. Heavy hunting pressure coupled with habitat destruction, wrought havoc among a large number of species.

According to some authors hunting was the prime cause of the destruction of the South African

game fauna. An article in "The East London Daily Despatch" of April 27, 1900 has the following to say in this respect: "Between the time of the accession of Victoria to the opening of the River Diggings about 1869-70, South Africa was red with the blood of animals of the order *ferae naturae*. The evil work done has been sometimes attributed to the natives of the country, because of the artifices they adopt for the capture of game, and their general improvident manner of living. There is no doubt that the natives are in a measure to blame, but all their hunting and work of destruction does not account for the immense loss the country has sustained. It is the European with his modern rifle and patent ejector who is chiefly responsible. Given an Express rifle and plenty of ammunition, and an irresponsible instinct to hunt, stalk and kill, and you do not need much more to explain all that has taken place. Even the hopsos of the natives into which they drive their game en masse cannot touch in extent the havoc wrought by the white man with his improved hammerless guns. Selous could do more damage with his rifle than a whole tribe of natives on their own methods."

A few years later Passarge (1908) published the following similar accusation: "Die Vernichtung der Säugethiere ist vor allem durch die Einführung der Schieszwaffen hervorgerufen worden. So lange sie nur mit den primitiven Hilfsmitteln der Eingeborenen verfolgt wurden, konnten selbst solche massenschlachtungen, wie sie beim Hopo stattfanden, die Tierwelt nicht dauerend schädigen. Mit der Einführung der Feuerwaffen aber wurden die Tiere tagtäglich zu Tausenden hingemordet. Einen guten Teil haben die englischen Sportleute auf dem Gewissen, aber noch viel verheerender waren die rücksichtslosen Jagden der Buren, die besonders die groszen Tiere, Rhinozerosse, Elefanten, Büffel, Giraffen, usw., schnell ausrotteten. Als nun aber auch die Eingeborenen sich allmählich mit Gewehren bewaffneten, hörte die Jagd überhaupt nicht mehr auf, und gerade die Verfolgungen der Eingeborenen dürften schliesslich am aller vernichtendsten haben."

The following categories of hunting, according to the aims in view, can be roughly distinguished:

a. Food hunting: this includes hunting primarily to provide the hunter and his dependents with meat.

The earliest Cape settlers bartered sheep and cattle from the indigenous Hottentot tribes, but in order to establish and enlarge their own herds, they supplemented their diet by using venison as a substitute for the meat of domestic animals. According to the "Oude Wildschutte Boek", permits were granted by Governors Simon and Willem Adriaan Van der Stel to farmers to hunt in the Cape during 1687-1718, especially in the Drakenstein, Roodezand, Steenberg, Riebeekskasteel, Groenekloof and Swartland areas, as well as near the Berg and Breede rivers. Here large numbers of eland, hartebeest and hippopotami were killed.

Hunters and farmers likewise, even at much later times, only killed game animals for the meat they provided, shooting just enough for their needs. Unfortunately the animals killed most frequently were those most readily available either due to their large numbers or because they were easy to hunt, e.g. eland, hippo, rhino, hartebeest, wildebeest, springbok and blesbok. The eland was shot for its meat as well as for its fat from which tallow candles were made since, according to Burchell (1822), it was the only antelope that yielded a suitably hard type of fat for this purpose.

At the onset of European settlement the numbers of most of these animals were so vast that the shooting of a few thousand did not make much difference. Cattrick (1959) for example, estimates the number of springbuck at certain times in the past at 500 million, seemingly enough to last forever. It is doubtful if limited hunting for the sake of food would have decreased the numbers of the more viable species to a very marked extent.

The species most affected by food hunting were eland, hippopotamus, hartebeest, springbuck, blesbok and the black wildebeest.

b. Skin and hide hunting:

The multiple uses of animal skins and hides caused a much greater loss of animal life in southern Africa than did hunting for food.

Initially antelope skins were used for the making of shoes, bags, whips, sjamboks, riems, thatch cord, harness, traces and even clothes. The meat was also probably utilised since this was a purely domestic industry, South African farmers and hunters being the main consumers.

When, however, antelope skin became popular overseas, matters changed drastically. Bryden (1936) states that after 1860 a ready market for skins overseas caused the hunting of blesbok, quagga, zebra, wildebeest and springbuck to increase and to assume the form of a business instead of a sport. Wagonloads of skins were transported from the Orange Free State to Durban for export overseas. Such large numbers of game were killed in the area west of the Wilge river for their skins that it became known by the dubious nickname of the "Riemland". Springbuck and blesbok were shot in extremely large numbers and often only the skins utilised, the carcasses being left to the vultures or other scavengers.

Merriman (Varley and Matthew, 1957) writes of the skin of the gnu; "Riems, and thatch-cord, and bags, and sledges, seem the principal things they are used for;" This refers to the year 1848.

Cumming (1850) records thousands of springbuck and wildebeest skulls strewn on the plains and farms near the Brak river in the Karoo owing to excessive hunting, whilst Bryden (1899) states that quagga skins were always in demand for shoes, grain bags, bags for dried fruit or nuts, etc.

Liebenberg (1964), quoting Steytler (1932), writes that in 1870 a total of 174,340 and in 1871 311,446 blesbok, wildebeest and quagga skins were shipped from Durban.

The species most affected by this type of hunting were the springbuck, blesbok, quagga, zebra, hartebeest, kudu, eland, black wildebeest and hippo.

c. Trophy hunting:

Trophy hunting can in actual fact be stimulating to a population when only adult male animals are shot, and often very old animals since they usually carry the best horns. When carried to extremes however, trophy hunting can be quite destructive as will be shown.

Trophy hunters were interested in horns or tusks of record size, and since they were usually carried by the largest males, many of the best breeding animals were killed off in the process. Secondly, in order to have as wide a variety as possible, horns and/or skins ranging from those of the small blue duiker to the square-lipped rhinoceros were collected to complete a series of trophies.

These hunters, apart from collecting record sized horns and tusks, made a living of hunting, often travelling hundreds of miles and staying in the bush for months on end, returning with a wagonload of ivory, skins and horns. Some of them like Jan Viljoen, Piet Jacobs and Jan Engelbrecht were born in the country; others like Cornwallis Harris spent their leave here and in the space of a few months endeavoured to shoot as much as possible. Hunters like Selous, Andersson, Wahlberg, Cumming, Green, Oswell, Vardon, Baldwin and Chapman during their stay in the country, whether for a few years or for a lifetime, between them shot countless game animals.

McKiernan (Serton, 1954) claims that Frederick Green killed at least 750-1000 elephants, innumerable rhino, hippo, giraffe and other animals. Oswell and Vardon, during one hunting trip, killed 89 rhino. John Dunn, according to Findlay (1903), shot three rhino, two buffalo, two kudu and a waterbuck on one day, and five rhino on the next. During the years he spent hunting in Zululand he shot hundreds of hippopotami. Findlay quotes Dunn as follows: "The finest bag I ever made was one morning before ten o'clock - twenty three sea-cows....", and also: "That season I killed to my own gun two hundred and three sea-cows, besides a lot of other game, and was only away for under three months from the day of starting."

Baines (1877) writes: "The Boers here have abandoned their great clumsy roers and now shoot with "Westley Richards" and other rifles, vieing with each other for the possession of the gun capable of killing at the longest range."

Selous (1908) writes as follows: "For the extermination of the giraffe in the Transvaal, Bechwanaland, and the country immediately to the

north of the Limpopo, Europeans are entirely responsible. The Boers killed most of them, of course, because up to 1890 Boer hunters were always in the proportion of at least ten to one to white hunters of any other nationality. But man for man, English hunters were quite as destructive as Boers."

Most species of game animals suffered as a result of trophy hunting, but the larger, more picturesque ones with long horns or tusks, or beautiful skins or hides, suffered most. These included the rhino, hippo, kudu, buffalo, sable, gemsbuck, zebra, giraffe springbok, blesbok and other species.

d. Armed trading:

Traders with wagon-loads of beads, axes, cloth, tea, salt and other goods, bartered ivory, skins and horns from native tribes. They hunted as well, both for meat or trophies. For this purpose some of them employed large numbers of native hunters whom they armed and sent out to kill elephant and rhinoceros. These traders usually carried a large stock of guns and ammunition or gunpowder and these were traded for elephant tusks or offered as bribes for hunting concessions. In this way large numbers of native tribesmen acquired fire-arms and thus accelerated the tempo of destruction of certain species.

According to Selous (1908), in about 1880 rhino horn was in big demand in Europe. Traders in Matabeleland began to employ native hunters to shoot rhino for the sake of their horns. He writes: "One trader alone told me that he had supplied four hundred Matabele hunters with guns and ammunition, and between 1880 and 1884 his large store always contained great piles of rhinoceros horns - of all sorts and sizes, often the spoils of over a hundred of these animals at one time, although they were constantly being sold to other traders, and carried south to Kimberley on their way to Europe." Selous estimates that, for this reason alone, between the plateau of Matabeleland and the Zambezi river, at least a thousand black rhinoceroses were killed in the five years before 1886.

Stevenson-Hamilton (1934) mentions native hunters in the service of white traders and attributes the final extinction of both the white and black species of rhinoceros in the lowveld of the Transvaal

to the activities of Albasini's well-armed native hunters, who for many years did nothing else than hunt for ivory and hides.

Besides elephant hunted for ivory, other species suffering most in this respect were the black and white rhinoceros. Since these are all slow breeding species, the impact of hunting on them was much more severe than on others. Animals with the most sought-after hides or skins, such as hippopotami, zebra, kudu, giraffe and others likewise, suffered to a large extent.

e. Poaching:

Poaching usually has the most impact on isolated species, slow breeders or species at the limit of their range.

Owing to the high prices received for venison, skins or horns, commercial poaching also led to the decrease in the number of game.

Other circumstances in which poaching usually occurred were when roads or railways were being built, then animals were poached either for a change of diet or for lack of other sports or entertainment.

Findlay (1903) mentions that during the construction of the Beira-Salisbury railway line, hippopotami in the Pungwe river were shot indiscriminately so that they fled to the Madingue-dingue and Urema rivers.

Poaching in the Caprivi from neighbouring countries is lamented by the "Kaiserliches Gouvernement für Deutsch-Südwest-Afrika" (M 2, a 1, Band 3, Windhoek Archives).

The numbers and kinds of animals hunted by poachers are difficult to determine. However, whatever species occurred in an area were shot. This could include steenbok, duiker, impala, kudu, buffalo, roan, sable, hippopotamus or any other species.

f. Compulsive shooting:

This category includes the "trigger happy" band of so-called "hunters" who fired away at everything that moved, be it feathered, furred or scaled.

Of one of these white hunting parties Moffat (Wallis, 1945) writes that they shot an

unnecessary number of animals that were then left to rot in the sun. This was shooting not out of necessity, but because of some inner urge to hunt and kill. Moffat refers to this as follows in a letter to his wife in 1854: "The Nimrods then get eloquent at the evening bivouac in their descriptions of how they levelled this one with one ball, and how he had a near chance of losing a fine bull or a cow but at last made him bite the earth; and then, with a crow - for such are like game-cocks - number how many they have bagged, or rather destroyed, as if they were beasts of prey instead of lovely antelopes. They often shoot down these beautiful animals, whether they need them or not, and often in places where there is not an inhabitant and are soon devoured by the eagles and beasts of prey."

This factor probably did not account for significant numbers of animals being exterminated, but is included for the sake of completeness.

3. Native hunting:

The cumulative effect of native hunting is difficult to assess. It was widespread throughout the country, but was at first no doubt not as destructive as that of the white hunter, thanks to the more primitive weapons or hunting methods used. Furthermore it was carried out strictly out of necessity, and nothing of the animal was wasted.

However, native hunters made up in numbers for what they lacked in weapons, since large numbers throughout the country were constantly hunting. Hunting, next to making war, was considered the only activity proper for the males of many tribes. Consequently, fulltime hunting by such a large body of hunters no doubt accounted for the loss of large numbers of ungulates.

Domestic cattle were only slaughtered on special occasions and the diet of most tribes therefore had to be supplemented with venison. The following types of native hunting can be distinguished:

a. By means of game pits:

This was one of the favourite methods and adopted by most tribes. A number of pits were dug at strategic positions, e.g. in game paths or near

drinking spots. These were then lightly covered with branches, grass, leaves and earth and inspected regularly to remove any animal that had fallen into the pit.

The sizes of the holes varied with the size of the intended victim. They were usually from five to eight feet deep, from 12 to 15 feet long and from four to six feet wide when dug for smaller mammals. For larger animals such as the giraffe, Cumming (1850) describes those that he saw in the Chue vicinity as being from 9 to 10 feet deep and arranged in the form of a crescent extending for a quarter of a mile. Andersson (1856) in Great Namaqualand found that for the giraffe two separate pits were dug, divided by a wall of earth. The idea was that the animal would get its fore feet in one hole and its hind legs in the other and so see-saw helplessly on the dividing wall until killed.

Game pits are also mentioned by Lichtenstein (1812) as being dug by the Bushmen on the banks of the Orange river in order to capture hippopotami. Isaacs (Herrman, 1936) describes pits with sharp stakes at the bottom dug for hippopotami in Zululand.

Smith (Kirby, 1939) saw two kinds of pits in the Chue vicinity near the junction of the Mashowing and Kgokgole rivers. The one kind was narrow and oblong, the other round and covered over with soil. The open holes were intended to force the game into the covered ones.

Bain (Lister, 1949) writes that he had to take a circuitous route to avoid the numerous pitfalls dug for game when he travelled near the Mashowing river in 1826.

Campbell (1815) on his way to various mission stations in the northern Cape, passed pits along the Brak river dug by the Bushmen, provided with sharp stakes at the bottom and covered by branches and grass.

In Botswana, Anderson (1888) mentions 8 to 12 pits in a row, 15 feet apart and 5 feet deep. The soil removed from these holes was used to erect walls between the adjoining pits, thus forcing the animals around the walls and into the covered pits.

In the vicinity of the Nossob and Black Nossob rivers, a succession of pits is mentioned by Andersson (1856) and by Tindall (Tindall, 1959) in 1839.

As far north as the banks of the Zambezi river, Selous (1907) describes numerous pitfalls. They were 10 feet deep, dug in the game pathways and covered up to trap hippopotami, elephant and buffalo.

Other authors mentioning pitfalls are Baldwin (1894) in northern Zululand and near Lake Ngami; Gordon (Barnard, 1950) along the lower Orange river for hippo in 1770; Elton (1873) along the lower Limpopo for hippo and Stevenson-Hamilton (1934) among the Lebombo hills.

b. By means of the "hopo":

This was a combination of pitfalls and hedges, the latter erected to gradually force the game towards the pits at the narrowest end of the funnel.

Wikar (Mossop, 1935) in 1778 describes this means of trapping game along the lower Orange river as follows: "Hier heb ik de eerste kaysi of wildgaate gezien daar ze zeekeeye, hartebeeste en meer wild in vangen." Furthermore he describes the two "haak-en-steek" hedges in the form of a funnel leading to the covered pits. Wikar personally saw hippo and hartebeest in these.

The length of the two hedges varied. They were described as being a mile long by Livingstone (1857) near Kolobeng and likewise by Methuen (1848) in Botswana, whilst Alexander (1838) mentions miles of hedges of 3 feet high ending in covered pitfalls of 4 feet wide and 4 feet deep.

At the mouth of the V the two hedges were at least a mile apart and tribesmen encircled the game for 3 or 4 miles around the area adjoining the hedges, gradually closing in. The animals were then driven by shouts towards the narrowest part where they were killed off after falling into the pits.

At the angle of the V a lane of approximately 50 yards sometimes led to the pit or pits which sometimes had overlapping edges constructed of large tree-trunks to prevent animals from escaping out of the pits.

The animals most frequently caught in the pitfalls or the "hopo" were the hippopotamus, buffalo, hartebeest, rhinoceros, giraffe, impala and other smaller species that frequented river banks or visited rivers or fountains for water.

c. Hunting parties and grand batteaux:

Circular drives were carried out when large numbers of the male members of certain tribes enclosed large numbers of game and then gradually closed in until at last the game was speared or otherwise killed.

Smith (Kirby, 1939) describes the use of this method near the upper Modder river in the Orange Free State in 1834. The hunters split up in two parties, the largest number forming a semicircle on the windward side and the rest forming another semicircle that enclosed the game. At the onset the circle was about three miles in diameter, but when the two semicircles met, it was gradually decreased from all sides. The trapped animals were speared when trying to break out. Clubs and dogs assisted in the killing.

Drummond (1875) mentions two occasions in Zululand when similar batteaux took place. In one case 500, and in the other approximately 5,000 men armed with spears, took part.

According to Holub (1881) Botswana hunters hid in the long grass at intervals of 50 to 200 yards. Another group forming a semi-circle drove the game towards them. Isaacs (Herrman, 1936) describes how Zulu hunters armed with spears lay in ambush in narrow passes whilst other parties drove the animals towards the hidden hunters.

Both Bisset (1875) and Collins (1907) describe the grand battue in honour of H.R.H. Prince Alfred on the farm Rietvlei near Bloemfontein in 1860. Large numbers of game were encircled and blesbok, springbuck, black wildebeest and quagga as well as smaller species were killed. Collins also describes a similar hunt on the farm Bains Vley in June 1862 carried out by approximately 500 Barolong hunters. On this occasion he estimated the number of game killed as not less than 4,800 head, including wildebeest, quagga, blesbok and springbuck.

The success of these circular hunts depended on the presence of large numbers of game since a large number of hunters had to share the spoils. The animals most frequently killed in the past by means of this method of hunting were springbuck, blesbok, quagga, hartebeest, black and blue wildebeest and zebra. These were the species found in large numbers on the open grassland. Other less numerous species such as steenbuck, duiker, kudu, reedbuck and bushbuck, as well as warthog and bushpig no doubt were also occasionally included among the animals killed.

d. Hunting with fire-arms:

Once the indigenous tribes began acquiring arms and ammunition either by trade or as remuneration for work done, greater numbers of game were killed than ever before. The Griqua hunters organised large parties for hunting the northern Cape. In Botswana Holub (1881) mentions native hunters armed with guns, shooting game at night from cover near waterholes.

Andersson (1856) states that the Namaquas, after acquiring arms, shot large numbers of game in South West Africa, whilst the inhabitants of Ngamiland also had fair numbers of guns. Baldwin (1894) found the tribes in the vicinity of Lake Ngami well supplied with guns, powder and lead from Walvis Bay and with these hunted at drinking pools at night.

Anderson (1888) mentions organised hunting amongst the inhabitants of Botswana, who with wagons, pack oxen and guns, hunted for weeks on end.

According to Selous (1908), in about 1872 the natives were beginning to acquire large numbers of guns as remuneration for work done in the diamond mines, and with these shot large numbers of buffalo. He found fire-arms amongst the Matabele in Rhodesia and these were used to a large extent for hunting buffalo.

Not being very good shots in the early days of acquiring arms, the native hunters relied more on point blank shooting. This was done by lying in ambush, especially on moonlight nights, near watering holes and there shooting rhinoceroses and zebra when they came to drink. Buffalo, being numerous, were stalked and shot at close range. All other species that could be shot fell prey to these hunters and hippopotami probably also suffered a great deal.

e. Snares, running nooses and nets:

Various methods were applied to trap game, and some of these were very ingenious. According to Le Vaillant (1796) a funnelled trap was used to catch springbuck and Lichtenstein (1812) mentions a similar method used by the Xhosa who built hedges up to a mile long with openings in which snares for smaller animals were set.

Alexander (1838) mentions a running noose attached to a young tree bent over, and set for smaller game that he encountered in Damaraland.

Cumming (1850) describes the falling spearhead, consisting of a small assegai or spike in a heavy block of thornwood measuring 4 feet in length and 5 inches in diameter. A bark cord was attached to pegs on both sides of a game path, and when any animal touched the cord, it dislodged the block of wood in such a manner that the spearhead entered the neck of the animal. Similar traps are mentioned by Andersson (1856) near Lake Ngami, suspended above the hippo paths. These were weighted with rocks and the spear sometimes poisoned. Holub (1881) found them near the Notwani river above paths in the thickly wooded areas. Many of these hanging spearheads were also poisoned. Baldwin (1894) laments the killing of one of his oxen near the Nata river by a spiked poisoned spearhead suspended from a tree.

Selous (1907) writes of a Mashona tribe that weaved nets from the bark of what he calls the "Machabel" tree, constructing nets from 15 to 20 yards in length and 6 to 7 feet high. Large numbers of these segments were mounted on poles and arranged in a row forming a barrier a few hundred yards long into which game was driven and, when entangled, killed. These nets were strong enough for most animals except elephant and rhino.

Stevenson-Hamilton (1934) mentions snares of rawhide with a running noose, attached to a bent sapling.

f. Hunting in water:

Hippopotami were fired upon from the banks of rivers or pools in which they were found, but other methods of killing them were also devised.

Selous (1907) describes one such method by which thick hedges were erected around pools to keep the hippo from leaving the water to feed. After being weakened owing to lack of food, they were then more easily killed by means of spears.

Selous (1907) mention lechwe in the Chobe river being driven into deep water by natives in canoes during the rainy season. Thanks to the superior speed of the hunters in their boats, the animals were easily speared.

g. Ambush and camouflage:

Wikar (Mossop, 1935) in 1778 mentions Bushmen using ostrich-skin covers in order to stalk game, especially zebra and quagga, which were often found in the company of the ostrich.

Smith (Kirby, 1939) in 1834 mentions how natives in the Smithfield (O.F.S.) district used poles with black ostrich plumes attached to help them hunt springbuck, blesbok and wildebeest. These poles were placed at regular intervals in a circle around the game, but gradually brought nearer by diminishing the circumference of the circle. An open space towards the windward side was left where previously hunters secreted themselves. The latter killed the game that tried to escape in their direction. He also describes piles of stones erected by Bushmen to represent men in a circle, whilst the Bushmen placed themselves upwind where a greater space was left open, shooting the animals with bow and arrow as they ran past.

Holub (1881) describes pits dug by natives near waterholes in which the hunters hid, shooting the game as it came to drink, especially at night.

Tindall (Tindall, 1959) describes the hunting of rhino at night by Bushmen who erected circles of stones about 18 inches high and hiding behind these. The natural curiosity of the animals were exploited, since when investigating the phenomenon of the circles of stones, they were shot.

h. Poisoning:

Poison was used mainly by Bushmen who used small poisoned arrows with which large game such as gemsbuck were shot. Since the poison was slow-acting, the animal sometimes had to be followed for many miles

before it dropped.

The hanging spearhead as described above, was also sometimes poisoned.

Tindall (Tindall, 1959) mentions the fact that Bushmen sometimes poisoned the pools or fountains at which game came to drink and in this manner obtained their meat. Gillmore (1888) writes of an euphorbia species ground between two stones to produce juice which was added to the water of pools where game came to drink. He personally saw 50 dead zebra after they had drunk at such a pool during one night.

i. Miscellaneous:

Dogs were used to assist in hunting as mentioned by Wikar (Mossop, 1935) along the lower Orange river in 1778. The German Government of South West Africa (M 2, a 1 Band 3) lists the dogs of the native tribes as one reason for diminishing animal numbers. Bain (Lister, 1949) mentions the fact that Botswana tribes erected their dwellings a half mile or more away from the wells and springs in order to induce the game to continue using them and so keep them in the vicinity.

4. Epidemic diseases.

From time to time epizootic diseases have killed off many thousands of antelopes. Since these diseases were highly infectious particularly at high densities, they spread throughout southern Africa and were at one time or another to be found in the different areas here considered. The most important of these diseases were:

a. Rinderpest:

This disease swept the country in 1896, coming from north of the Zambezi, down to the Cape, and was responsible for the death of thousands of buffalo, as well as other species such as kudu and eland. This epidemic is mentioned by Bryden (1899), Findlay (1903), Selous (1908), Vasse (1909), Stevenson-Hamilton (1934) and Sidney (1965), all of whom lament its destructive powers when it wrought havoc in the first place amongst the buffalo, but also amongst other species such as kudu, eland and other, smaller, species.

b. Scab or mange:

Cumming (1850) writes of this disease as follows: "I have shot hartebeests, black wildebeests, blesbucks and springbucks, with their bodies covered with this disease. I have known seasons when the three latter animals were so generally affected by it, that the vast plains throughout which they are found were covered with hundreds of skulls and skeletons of those that had died therefrom."

Gillmore (1886) also mentions the disease amongst springbuck, and Barrow (1801) finds the eland susceptible to it.

c. "Snotsiekte":

Cumming (1850) mentions this disease borne and spread by the black wildebeest, which as the name implies, is a malignant catarrhal fever.

d. Lungsickness:

This was a disease that affected the cattle of traders and hunters (Andersson, 1856). These animals were infected by blue wildebeest and zebra.

5. Game clearance operations:

Sidney (1965) mentions game clearance either as a tsetse control measure or for the purpose of planting ground nuts.

In order to carry on cattle farming in lowveld areas, the game hosts of the Ngana-causing Trypanosoma parasite had to be cleared from the area. This was done in parts of northern Zululand, Mocambique and Rhodesia, and led to the destruction of thousands of head of game.

Fraser (1958) writes in this connection: "Large tracts of land in the Colony (Rhodesia) today can only be described as faunal deserts. The wild animal population, excepting elephants, is poor. This state of affairs is not surprising having regard for the fact that over 620,000 head has been destroyed in anti-tsetse fly operations."

An analysis of figures according to the "Annual Report of the Department of Wild Life Conservation (Division of Irrigation and Lands) for the year ended 31st December, 1960; Report No. 8, Appendix

Six B", shows that until 1960 from more or less the early 1920's, the following animals were killed in tsetse fly control operations (in order of highest to lowest numbers):

Duiker.....	201,269
Kudu.....	89,088
Warthog.....	76,187
Bushbuck.....	40,520
Sable.....	37,657
Impala.....	36,724
Sharpe's Grysbok....	34,898
Bushpig.....	22,733
Reedbuck.....	19,143
Klipspringer.....	14,464
Waterbuck.....	14,085
Eland.....	10,274
Zebra.....	9,284
Buffalo.....	6,597
Steenbok.....	6,087
Roan.....	5,525
Oribi.....	3,177
Tsessebe.....	2,819
Hartebeest.....	1,138
Black Rhinoceros....	374
Livingstone's Suni..	167
Nyala.....	134
Blue Wildebeest.....	56
Hippo.....	6
Giraffe.....	3
Gemsbok.....	1

According to Spence (1963), game clearance was carried out in Mocambique to prevent the spread of the tsetse fly to the south. He refers to the areas near the Rhodesian border southwest of the Save river and in the Govuro circumscription south of the estuary.

Child et al. (in press) describe tsetse control undertaken along the Maun Front in Botswana since 1942. The objectives, to halt the spread of the fly and to clear it from areas where it has already become established, entails not only the hunting of the wild ungulates, but also the erection of game fences and the spraying of the most favoured habitats of the fly.

Tinley (1966) describes the piling up of migratory herds at disease and tsetse control fences that cut off access to the riverine areas of the Botletle and Lake Dow from the entire southwestern Botswana. In this way large numbers of wildebeest were killed by running against the fences in July 1964, to the southeast of Ngamiland.

6. War:

As a contributing factor, war has only played a minor role in the decline of game numbers in southern Africa. The following instances illustrate that it could, however, have had an effect.

Selous (in Bryden, 1899) describes the effect that Barotse tribal war had on the puku population in the Chobe swamps. Large numbers of natives fled from their homes along the upper Zambezi in 1876, crossed the Chobe and camped on the south bank of that river. Most of the puku population was duly shot or caught in pits, and when peace was restored and the tribe settled once more in its former home, only a few puku were left where earlier on large numbers had occurred.

During the Anglo-Boer war of 1899-1902, the Boer commandos had on many occasions to rely on game for meat or even for shoe leather, saddle covering or other needs.

During the German-Herero wars between 1904-8, the German troops were requested by their government to shoot game to supplement their provisions.

Stevenson-Hamilton (1934) mentions an English regiment called Steinaecker's Horse, stationed near Komatipoort during the Anglo-Boer war, and hunting in that area.

7. Geographical isolation:

Species that were geographically or otherwise isolated, were also very prone to overhunting. Even without the intervention of the European settler or hunter, certain species were doomed to extinction.

The number of bluebuck was too small to ensure the establishment of breeding populations, and the species was therefore easily exterminated in the early years of the Cape settlement.

The bontebok was no doubt only saved by the early protection afforded by certain farmers.

Although not occurring in such small numbers in the past, the mountain zebra at present is in a precarious position regarding its chances of survival.

Species such as the sable and roan that occur at the edge of their range in southern Africa, were also more prone to the impact of hunting in the past than were those species more widely distributed.

8. Conclusions:

The following conclusions can be drawn from the investigation:

(a). The past distribution of each of the different species concerned was in all cases much wider than the present one.

(b). The numbers of all species concerned have decreased to a very great extent, some having disappeared totally.

(c). The main causes for decreased ranges and numbers were:

i. Activities associated with human civilisation leading to a destruction or reduction in the available habitat.

ii. Hunting with firearms.

iii. Other natural causes such as endemic diseases, the deterioration of habitat or geographical isolation.

(d). A commendable effort is being made throughout southern Africa by various instances, such as Departments of Nature Conservation as well as by the National Parks Board to re-establish species lost to certain areas.