

rocky cliffs along the entire length of the Levubu, at Gumbandevu and Mashikiri Poort, are all probably of this species.

SUPER-ORDER — MESAXONIA.

ORDER 11 — PERISSODACTYLA.

SUB-ORDER 1 — CERATOMORPHA.

Super-Family — *Rhinocerotidea*.

Family — *Rhinocerotidae*.

The white rhinoceros (*Diceros (Ceratotherium) simus simus*. Burchell) disappeared from the Lowveld regions towards the latter part of the last century and the few which still wandered in the Pretoriuskop area were soon killed by hunters. The black rhinoceros (*Diceros bicornis bicornis*. Linnaeus) was more widely distributed and withstood the onslaughts for a longer period. In 1936 there were still lone specimens in the dense Nwatomiri bush, but these also disappeared gradually and it may be assumed at present that this kind has also become extinct in the Park, in spite of regular reports from tourists and Native Rangers to the contrary.

This section is still striving to bring about the re-introduction of both these species, into their old habitat and the fencing of the southern district, which is now in progress, is a step in the right direction.

SUB-ORDER 2 — HIPPIOMORPHA.

Super-Family — *Equoidea*.

Family — *Equidae*.

1. *Equus (Hippotigris) burchelli antiquorum* (H. Smith) — Burchell's zebra. [*E. burchelli transvaalensis* (Ewart)].

A flourishing community which thrives everywhere and in regions, particularly in the north, is the most numerous of the larger mammal species. During the winter months large concentrations were again encountered in the vicinity of Nwashitsombe and Pafuri. After the veldburning in February fairly large herds moved into the Klopperfontein-Masanje-Kowa-Kula areas and during the summer months, there was also a mass concentration in the Matenga-Dothole strip. One day in July, a herd of 34 was counted at the Malopanyane windmill, and in March a herd of 50, including a considerable number of young foals was seen at the Dzombo experimental plots.

The March burns found great favour with the zebra population of the Pretoriuskop area and encouraging numbers are still being recorded here. During June a large herd left the burns at M and P and travelled eastwards over the hills near Stungwane.

In September a herd of 26 was seen near Machuluane picket on the plains, which is definitely a sign of progress in this former poacher's paradise. It is estimated that approximately 400 zebra grazed on the fresh burn between Mhlanganzwane and Panamana during November.

Last year, during May zebra thronged the Mlondozi area and their numbers were supplemented by herds moving southwards from the Nwamuriwa-Metsi-metsi area. However, the majority of the latter summer-concentration moved northwards and was found in the neighbourhood of Guweni dam in July.

During October, herds of zebra, which generally remain along the western boundary, moved eastwards and were found in large numbers at the western point of the Hutomi road.

The zebra of the Mlondozi area watered mainly at Mbaduankomo and here the Ranger counted more than 200 in one herd in May. During spring large herds which had moved northwards to their traditional summer-grazing in the Mlondozi upper reaches, were found beyond Muntshe.

A fairly large herd which apparently had taken up permanent abode in the vicinity of the Manzentonto dam was seen regularly, while migratory game from the western boundary was a common sight between Pswaeni and Lipape this year from April onwards.

During the summer months, a large concentration grazed heavily along the Manzentonto, between Matibzini and Kumane.

The Bangu herds spent the winter in that area, but those of Gudzane and Shikelenkane moved into the Nwanetzi block after the rains in June and July and were seen there until September. This area was subject to accidental fires during the spring and the game speedily returned to the young grass, so that even in March of this year, large concentrations could still be observed there. During February exceptionally large numbers of zebra were seen between the former aerodrome and Satara, and in March more than 150 were counted at the Nwanetzi east windmill. Since then fairly large numbers have moved westwards to the Timbavati River strip and since April large herds were again watering at the Rabelais dam and Hartbeesfontein dam in the Kingfisherspruit area.

Near Satara a young zebra stallion was seen with a large grey-brown mark across the back, shaped like a saddle, back-to-front. The colour was similar to that of a lion skin and there were no stripes.

Throughout the year young foals were observed in the herds but most were recorded from January to April. A hundred carcasses were found during the year — of these 95 were killed by lions, and 5 foals were leopard-kills.

SUPER-ORDER — PARAXONIA.

ORDER 12 — ARTIODACTYLA.

SUB-ORDER 1 — SUIFORMES.

Family — *Suidae*.

1. *Potamochoerus porcus maschona* (Lönberg) — Bush pig.

A rare animal in the Park, yet is present in all three districts and there are definite signs of progress. In the south the main habitat is the bush-covered kloofs of Numbi hill and the Mkwakwene area, yet the animals have also been seen along the Matimashewu and the Bume road.

Bush pig are found in the central district only in the Msimbit bush of Bangu-Olifants Poort and tracks and dung were again observed during a visit in June.

Punda Maria section in the north remains the forté of these animals and they have been encountered along the entire length of the Levubu, in the Matukwane bush, Malitenga, Dzundwene and Shalungwa stream. This year the animals were seen at Tulamila (Pafuri) and near the new aerodrome.

2. *Phacochoerus aethiopicus* (Pallas) — Warthog.

In spite of a particularly good breeding season, the mortality of young piglets in the Tshokwane section was high and it was noted, during the winter, that seldom more than 2 out of the large litters had survived. Elsewhere in the district conditions were more favourable and the increase was quite satisfactory. During the past breeding-season there were exceptionally large numbers of young piglets in the Kingfisherspruit section and several sows with 6 young were observed.

In the southern sections the breeding season was less satisfactory and conditions here are more or less constant.

In the northern district, the distribution is irregular, yet, especially in the Punda Maria and Shangoni sections, there are signs of development and population increase. Quite a number of new localities have been recorded — at Mtomene-mabili pan on the Shipikane road, near Shipikane mouth — Klein Letaba road near the picket, on the Shingomene and Nkulumbene fire-break roads, upper section of the Makadze fire-break near Shilowa, the Shawu experimental plots, Nkokodzi, between Tsange fire-break road and Shingwedzi, Maseya and Shalungwa stream, Dzombo experimental plots, northern Tendi detour, between Kloppefontein and Malonga, the eastern boundary road 6 miles north of the Shingwedzi drift, and others.

The following warthog carcasses were found — 20 killed by lion, 7 killed by leopard, 3 by cheetah and 1 by wild dogs.

Family — *Hippopotamidae*.

1. *Hippopotamus amphibius* (Linnaeus) — Hippopotamus.

Due to unforeseen circumstances the hippopotamus counts along all the perennial rivers could not be completed last year and only the Letaba and Levubu rivers were covered. Conditions were particularly favourable at the time of the Letaba count and the total of 392 animals shows a marked increase on the figures of the previous year. Also in the Levubu the hippopotamus population shows a decided increase and 175 were counted, most of which were observed in the Makahanja strip.

However, the Olifants River still harbours the largest population, probably more than a thousand, and from here the animals disperse along the larger semi-dry rivers, e.g. there are quite a number in the permanent pools of the Timbavati as well as in the Bangu waterholes and dams, and in the Klaserie River. There are seven in the Orpen dam, among them an old bull with a torn left ear. Recently a calf was born.

Counts along the Crocodile River included 21 (5 small calves) in the Wiid dam, and 22 at the Crocodile Bridge Hippo Pool.

Soon after the Shisakashangondzo dam had filled for the first time, 2 hippopotami discovered it and these have remained there since.

During the rainy season there was again evidence of nomadism and some of the animals were found far up along the Tendi. Another was seen to the west of Stungwane, moving southwards in the direction of the Crocodile River and another paid a short visit to the Nkayeni waterhole in the Shingwedzi.

Quite a number of bulls were killed in fights and a number which had raided the lands along the Crocodile River, were destroyed by Provincial officials outside the Park.

SUB-ORDER 2 — RUMINANTIA.

Family 1 — *Giraffidae*.

1. *Giraffa camelopardalis* (Linnaeus) — Giraffe.

The distribution of giraffe in the northern sections is gradually continuing, and an exceptionally favourable development this year was that calves were reported among the groups in the Nkulumbene area along the eastern boundary. Giraffe in the Letaba section are probably mainly immigrants from the central district and here young animals are still rare. The giraffe cow, which was released at Punda Maria 6 years ago, was last seen in April last year, 3 miles south of the camp.

During July quite a number of giraffe tracks were seen on the Shipikane road. These animals watered at the Mahuene pan and others were observed

at Nalatsi, Hlambandlovu, Phiri, Mbyashihe, Tsombyene and Klein Letaba along the western boundary of the Shangani section.

A group of 9, including 4 calves, was seen near the Nwari-wa-Hlangari waterhole. Eight adults were observed along the Nkulumbene spruit, three bulls and 2 cows at Malonga fountain, 2 bulls at Shingomene and 3 bulls near the eastern point of the Nwashitsumbe fire-break. This year giraffe were encountered for the first time along the Letaba at Sakulungu and at the Mooiplaas experimental plots, while groups varying from 2-14 were observed regularly in the Letaba—Olifants corner, between Tende and Groot Letaba, and the Makadze area.

The central district remains the focal point of population density of these animals and large numbers of young were continually observed (especially from February to April) bearing witness of general welfare. A group of 32 was encountered at Kumane and it is no rare occurrence to count more than 100 on a single journey from Skukuza via Tshokwane to Satara. Near the Orpen Gate, the Ranger saw a young giraffe calf picking up an object from the ground and eating it. On closer investigation this proved to be a piece of dry wildebeest dung which the animal was chewing.

In the south there is a definite increase in the numbers of giraffe in the *Hyparrhenia* veld of the Pretoriuskop section and particularly after the veld burning in March fairly large numbers were observed there. Many of the animals moved eastwards after the first spring rains. On several occasions giraffe damaged the border fence and it had to be repaired. An old bull, in the Mtjulu, was bitten by a mamba and died.

Quite a number of giraffe moved into the Stolznek area this year — definitely a favourable development for the region south of Pretoriuskop.

Elsewhere in the southern sections reports indicate population increase and wider distribution, e.g. on one day 17 were counted between Rockvale and Nsikazi, along the Crocodile River, 15 in the mountains between Boulders and Matjuluane, and 19 in the mountains east of the Nkongoma picket in the Crocodile River section.

The carcasses of 31, killed by lions, were reported. One was caught by crocodiles in the Olifants River.

Family 2 — *Bovidae*.

1. *Cephalophus natalensis amoenus* (Wroughton) — Red (Natal) duiker.

Very rare in the Park and known only from Numbi Hill and the bush-covered kloofs in the vicinity of Mkwakwene picket. Formerly these little buck were also found in the Stolznek area but have not been seen there for a

long time. Population data is inadequate and this year only tracks have been reported.

2. *Sylvicapra grimmia caffra* (Fitzinger) — Grey (Common) duiker.

Reasonably plentiful and distributed throughout the Park in suitable localities. The previous annual report must be referred to for distribution data. This year duiker were observed mostly in the Pretoriuskop and Punda Maria areas, as well as in regions along the western boundary, the Manzentonto and Lebombo plains at Tshokwane, and Satara sections. Reports received on carcasses indicate the leopard as the chief natural enemy.

3. *Raphicerus campestris zuluensis* (Roberts) — Steenbuck.

Steenbuck numbers on the whole are very encouraging and at present these graceful little animals may be encountered throughout the Park (particularly in the more open, less over-grown areas). Most have been observed on the Tsende and Babalala plains, Shipikane, to the south on the Lebombo plains, along the western boundary, Malelane, and along the Nahpe road.

At Shawu a steenbuck was seen kicking soil over its dung. The interesting grazing habits of this buck are dealt with separately. Three carcasses of steenbuck were found caught by a leopard, wild dogs and a crocodile respectively.

4. *Raphicerus sharpei colonicus* (Thomas & Schwann) — Sharpe's steenbuck or tropical grysbuck.

The distribution of this timid buck is limited more to the Mopanie-veld regions. It is not plentiful anywhere and does not occur south of the Sabie. The previous annual report must be referred to for data on distribution. New localities recorded this year, include — Nwanetzi (Satara section), Mbadze and Hlangulene (Satara section), Nkommetjie Spruit (Section 11), Nkokodzi fire-break road, Shiyanamane dam site, near Punda Maria, Nwashitsumbe, the Nwambia area, Kloppefontein and the Mzanza spruit on the western boundary of the Kingfisherspruit section.

The remains of one, killed by a leopard, was found.

5. *Ourebia ourebia* (Zimmermann) — Oribi.

Extinct in the southern and central districts. In 1943 they were seen for the last time south of the Sabie near Ship Mountain, and in 1925 a lone ewe was seen on the Saliji plains by the late Colonel Stevenson-Hamilton.

In the northern district the status of this buck is uncertain and requires further study. In 1946, a few were observed in the neighbourhood of the former Punda Maria airstrip by the well-known ornithologist, Mr. Prozesky, and on 1st May last year, a lone ram was recorded by the biological section on the direct road to Pafuri, about 3 miles north of Magamba.

6. *Nesotragus moschatus zuluensis* (Thomas) — Suni (Livingstone's antelope).

Occurs only in the Nyandu bush, i.e. in the Nwambia area of the Punda Maria section. Here it has been seen on a few occasions by Native Rangers and once by the former Senior Ranger. The actual numbers and distribution of the buck, however, are still obscure and require more intensive observations. Last year during a visit to this area by the biological section, only their tracks, heaps of dung and grazing grounds could be identified.

7. *Oreotragus oreotragus transvaalensis* (Roberts) — Klipspringer.

Can be found throughout the Park in suitable, rocky localities and the numbers and distribution are highly satisfactory. (Distribution data to be obtained from the previous annual report). New localities recorded during the year are: The rock ledges at Suzeni waterhole in the Pukwane, Nyamene waterhole, Kloppefontein dam and Mshatu Kop. One was observed on the main road to Shingwedzi about 4 miles from Punda Maria — certainly an exceptional phenomenon as there are no ridges or rocky hills in the immediate vicinity. Groups of two to eight animals were also seen regularly, on patrols through other familiar habitats, e.g. along the Timbavati, the Lebombo ranges, the broken veld regions of the Mlondozi block, and the hilly country of the Letaba and Malelane sections.

The albino Klipspringer at the Tablet Hills was seen again this year during February and is now estimated to be more than 13 years old. Lately a pied Klipspringer has also been observed here and is probably an offspring of the former.

Lions were responsible for the death of one and leopard accounted for two.

8. *Redunca arundinum arundinum* (Boddaert) — Reedbuck.

According to all indications the reedbuck community of the Pretoriuskop area is thriving and during the year (but particularly after the spring veld-burning) large numbers were seen throughout the sourveld. During a single trip along the Numbi loop, during October, no less than 17 were counted. The first lambs were noted in September but young animals were still seen up to November.

Quite a number of new localities have been recorded — the Nhlowe spruit near Makutwanini hill, the Ndsio spruit (Letaba Section), Swartkops camp, Nhlarulume drift, the Nahpe experimental plots, and Nwari-wa-hlangari in the north.

Furthermore lone reedbuck or groups, varying from 2-8 were observed in the more familiar localities, such as along the Nsikazi, Mlambane dam, Dzueni, Spalên, Mpemana, between Rockvale and Malelane, 4 miles west of Malelane on the Nsikazi road, Mbyamide test plots, and at Mhulu in the south, Gudzane

dam and windmill, Pumbe, Bango, Mavumbye, Mbadzane, Lipape, Lion Pan, Manzendlovu, Nkuane, Munweni, Ngwari, Mbaduankomo, Mabakane, Shisumbe, Shingedzene, Hlangoleni, Batavia, Timbavati and Kolwani in the central district, as well as along the Makadze spruit, Shawu valley, Mahlati, Tende, Magamba, Stangene and Dothole in the north.

9. *Redunca fulvorufula fulvorufula* (Afzelius) — Mountain reedbuck.

Population data of this rare speceis, was an almost unknown factor for years, but since their home grounds in the Malelane section and along the eastern boundary of Tshokwane, are being patrolled more regularly, it appears that mountain reedbuck are present in much greater numbers, than is generally assumed. There are also signs, of a definite population increase and territorial extension. For example, last year, in July, two groups of 5 each were found on the slopes of Ship Mountain. Quite a number was seen on the Lebombo from Shingedzene to the Sabie River. On one day in April, 9 were counted along the entire length of the Shingedzene spruit and others along the Harashu, Nyanyoka and at Manzentonto poort. Small groups, of two or 3, were observed regularly during the early summer in the Mlondozi area at, among other localities, Munweni, Sabie beacon, Mabakana and Nténté.

A herd of 17 was encountered along the upper reaches of the Mlambane, 7 in the mountains surrounding Machuluane picket, and 3 on Thalabye.

The remains of one, killed by lion, was found near Nsikazi.

No further reports of grey rhebuck (*Pelea capreolus*. Forster) found in the mountains at Machuluane, have been received.

10. *Kobus ellipsiprymnus* (Ogilby) — Waterbuck.

The most favourable development has been in the north, where waterbuck have reappeared at Kloppefontein dam and a new locality has been recorded at Mashikiri Poort. These animals probably travelled north from the Levubu along the Madziringwe spruit. Reports from other sources, as well as our own observations and counts, indicate the general welfare of this species throughout the Park. A total of 64 was seen along the Shisha on one game count and in the Pafuri region there has also been an exceptional increase in numbers. A herd of 32, including quite a number of young calves, was encountered at Spandane drift, while a herd of 25 and smaller groups were counted along the Makadze stream. Large herds of up to 60 animals were seen regularly along the entire length of the Shingwedzi, and 16 at the Mariyabasa hill, between Pukwane and Zari streams. Large numbers are continually being observed in the central district along the Olifants River (particularly in the west), Timbavati and in the Gudzane-Nwanetzi area. In the Mlondozi area waterbuck are making excellent progress judging from reports received during the year. At Mbaduankomo 33 adults with 7 calves were seen, 31 adults with 18 calves at Mahlampsana, 36 at Mlondozi Dam, 26 adults and

9 calves at Munweni, and 16 at Nkuane. The Manzentonto River strip also harbours large numbers, e.g. in the vicinity of Tshokwane, between Orpen dam and Shingedzene, and at the Manzentonto Dam where 24 were counted in one herd. At the Hutomi Dam and along the western boundary in the vicinity of Pswaeni, waterbuck are no longer a rare sight.

In the south, a small herd established themselves in the vicinity of the Nahpe spring and there are also favourable reports of progress in the Pretoriuskop area, at Paben, and along the Mbyamide at Hlambamaduba. There is a marked increase in numbers in the Malelane section; a small herd at Mtjulu for instance increased from 13 to 17. At Crocodile Bridge there are also definite signs of progress and extension over a greater area. On one occasion a herd, numbering 42, was seen at the Orami dam and 19 near Nwatimiri mouth.

11. *Aepyceros melampus melampus* (Lichtenstein) — Impala.

Although impala are by far the most numerous of the antelopes in the Park and are seen practically everywhere in the southern and central districts during the summer months, there are still large areas in the north where the animals do not appear. Water is the deciding factor which limits the distribution process here, for these animals follow a strict drinking routine and never wander far from permanent water. It is, therefore, encouraging and also enlightening to take note of the positive reaction of impala in the drier regions as more adequate and better distributed artificial watering places are established there. Another factor, which must certainly influence the distribution of impala in the north is the meagre variety of fodder trees, which is a feature of large areas of the understocked regions, such as the Tsende and Babalala plains, and in addition, the large increase of shrub mopanie and other types, which in certain localities form an almost impenetrable underbrush barrier.

In any case the indications are that, where there is an adequate water supply in suitable surroundings, there will be a definite increase in numbers and colonisation by impala. The only new locality recorded this year is at Nwambiane pan in the Nyandu bush, where a herd of about 25 was encountered. However, it is encouraging to find considerable numbers of impala in the following thinly populated areas: along the eastern boundary 4 miles north of the Mahahewane fire-break road, at Maribwabasa hill between the Pukwane and Zari, Mafayeni spring, Malahlapanga, Mahlati, Nwanetzi stream (Letaba section), Shalungwa spring, along the Machindudzi fire-break road and 6 miles west of Nkokodzi.

A marked increase was noted in the south in the Pretoriuskop sourveld and several large herds were seen on the autumn and spring burns in the vicinity of the camp. An exceptionally large herd, easily in excess of 1,000

was encountered by the Ranger of the Malelane section on the Hlambamaduba road. This same herd was seen on the Voortrekker road about 3 years ago and is probably the largest single herd in the entire Park.

Quite a number became entangled in the Numbi-Sabie fence after they had been pursued by dogs from the Trust territory and died there.

Along the western boundary of the central district the distribution is patchy and the animals are fairly scarce locally, e.g. in the Lipape-Pswaeni strip and north of Red Gort. A few have already been encountered on Zwartkops but they are still absent from the Batavia area.

This year an impala ram rounded up a number of ewes near the Manzentonto dam exceptionally early (middle January).

12. *Hippotragus equinus equinus* (Desmarest) — Roan antelope.

Due to the constant moving, breaking up and re-uniting of the roan antelope herds in the south it is difficult to assess the present numbers accurately. There are sufficient indications that the animals are maintaining their numerical strength and that there might possibly be a slight rise in the growth curve of the community, judging by reports which were received during the year. Early last year a herd of 22 (including 8 young animals) was encountered in the familiar Sithlabe-territorium and a herd of 7 adult animals approximately 5 miles from the Nsikazi River and about 5 miles south of Mavugane. Other smaller herds, varying from a few animals only to ten or twelve, were observed repeatedly and the number of calves of the previous season was also reasonably promising. This year, apparently the calving was later here than in the northern regions and at the time of writing, two calves only have been observed at Nahpe (arrived towards the end of April). During June, 2 bulls were seen on the fire-block E, north-west of Shaben — a new locality.

It is hoped that the construction of the proposed Mavugane dam will promote the colonisation of this favourable locality and the animals will probably also benefit by the system of selective predator control, which is prescribed for their home grounds.

There are more positive indications of population increase in the central district. During June, the following herds were encountered by a special patrol in the former Batavia habitat :

- (1) 10 Adults with 4 calves,
- (2) 11 adults with 5 calves,
- (3) 2 lone bulls and
- (4) 4 adult cows.

On another occasion one herd, numbering 18 (4 calves) was found in the interior veld at a water pan. It was found that the animals some times made use of the Zwartkops windmill during the dry season. The favourite

watering-place during winter is still the pool along the boundary, on the farm Brasilië, but the construction this year of the Shiyanamane dam will probably eliminate this undesirable condition. Here also, the temporary control of natural enemies is expected to have a beneficial effect.

Special mention should be made of the presence of two roan antelope (a bull and a cow) on the main road about 3 miles south of the Bangu windmill. The animals were very wild and it can be reasonably assumed that they had crossed the Lebombos from Portuguese territory. One bull was again seen at Nkuane during October.

In the northern regions, conditions remain fairly constant and this year small herds dispersed in all the familiar localities were again observed regularly. The first calves were recorded during March and the largest herd (27) was seen in the vicinity of Kloppefontein dam. A herd of 16 was counted on one occasion at the Makadze windmill and a large herd of 25 at Nwa-shitsumbe. Fairly unexpected was the record of 2 of the animals along the eastern boundary fire-break through the Nyandu bush, during October.

The nomadic herds in the Tuti-Malopene-Shivulani area will receive additional protection against natural enemies. The carcasses of 2, caught by lion, have been found.

13. *Hippotragus niger niger* (Harris) — Sable antelope.

Population records indicate that there has been a marked change, during the past few years, in the development of the sable antelope communities in all three districts of the Park. The specific counts, given below, are clearly indicative of population growth and general welfare.

(a) Northern district.

March 1958	— 1 bull between Olifants bridge and Letaba camp.
May 1958	— 23 (9 calves) a few miles north of Dzombo windmill.
June 1958	— Tracks at Malonga spring. — More than 20 with fair number of calves along the Bubube, near the western boundary. — Approximately 40 in the Combretum veld between Shangoni and Nkayeni.
August 1958	— 17 (4 calves) near Putwane hills (Letaba section). — 14 (4 calves) at Shivulani hills. — Tracks at Nkokodzi windmill and Shalungwa spring (1). — 27 along the sand road near Mahembane. — 9 on the middle fire-break near Pukwane drift.
Sept. 1958	— 30 with number of calves in the Nwambia area. — Tracks at Malopene north windmill and one at Ngwe-

- nyeni spruit.
- October 1958 — 1 lone bull in the Nyandu bush.
 — 9 (3 calves) along the Saka-sa-ingwe spruit, south of Makuene (Letaba section).
 — About 30 at Babalala.
- January 1959 — One at Magobane.
- February 1959 — 7 near Klopfontein dam.
 — 7 two miles south of Tuti spring (western boundary).
- March 1959 — 7 (3 calves) at Shantagalene.
 — 7 at cross-roads of Pafuri-Shingwedzi, near Punda Maria.

(b) *Central district.*

- April 1958 — Two herds of 6 and 8 at Nkuane on the eastern boundary.
- May 1958 — 16 (4 calves) along the Hlangulene spruit, near eastern boundary.
- July 1958 — 24 (7 calves) near Batavia (western boundary).
 — 22 (5 calves) at Zwartkops windmill.
 — 37 including a number of calves, 4 miles north west of Gudzane windmill.
 — 34 (7 calves) counted along the western boundary route, between Sand River and Mahlobyanine.
- August 1958 — Herd of 37 watered at Gudzane windmill.
 — About 30, east of Manzendlovu drift, on the northern Sabie River Road.
- September 1958 — Herd of 17 and lone bull along the Manzentonto, west of the dam.
 — Herds of 2, 5, 15, 17 and 38 in the Gudzane-Mavumbye area.
 — 7 along the Harashu stream.
 — Small herds of up to 8 in the vicinity of Nkuane and 2 at Mabakane along the eastern boundary.
 — 24 watered at Zwartkops windmill.
- February 1959 — 11 at the western point of the Hutomi circular drive.
 — 10 (4 calves) directly opposite Sarabank along the western boundary.
 — 10 adults at Kolwane drift. Later also drank in the Rabelais dam.
 — 34 (mixed herd with calves) in the vicinity of Batavia.
 — 6 between Lion Pan and the Tablet Hills.

- March 1959 — 19 adults and 10 calves at Pswaeni pan.
- April 1959 — 28 (5 calves) at the Lipape dam.
- Smaller herds in the Mlondozi area.
- On 17th April large herd of 31 (13 calves) west of the Mlondozi picket.

(c) *Southern district.*

- April 1958 — 1 lone bull, east of Mlambane dam.
- July 1958 — 7 adults in the upper reaches of the Mtjulu.
- September 1958 — Herd of 20 (7 calves) at Nahpe.
- Large herd of 43 digging for water in the river near Machuluane picket.
- October 1958 — Total of 71, counted in two large herds, between Shaben and Paben picket via Numbi.
- November 1958 — 25 (5 calves) in the Stolznek — Mavugane area.
- February 1959 — 7 along the Crocodile river between Rockvale and Nsikazi mouth.
- March 1959 — 39 counted in the new control area B 1, by special patrol.

No further reports were received this year of the presence of sable antelope in the Crocodile Bridge section. Last year, during May, a herd broke through the border fence near Numbi, but returned again.

This year sable antelope (3) were observed for the first time in the Makadze area, at a point approximately 6 miles to the north of the windmill. Other new localities are 12 miles west of Shingwedzi on the river road where 25 were seen, and also 2½ miles north of the Malopene-Letaba bridge crossroads (7), as well as 11 miles west of Skukuza on the Nahpe road (4).

The remains of one only killed by lion, was found this year.

14. *Damaliscus lunatus lunatus* (Burchell) — Tsessebe.

Tsessebe have made no attempt since 1949-50 to cross the Sabie River from the adjacent game farms and the animals must be regarded as extinct in the southern district. The region north of the Olifants River remains the focal point of population density of these animals, and there are signs of a slight increase in numbers here with the exception of the Letaba section where numbers remain reasonably constant. Herds varying from 6-14 have been observed regularly in all the familiar home grounds. Cows started calving during October and the present crop of calves is definitely better than that of the previous season. Two new localities were recorded, viz. on the sand road just west of the Magobane branch road (Punda Maria section), and at Shipikane on the way between Tende and Mahlangene.

During the past two years there has been a marked increase in the tsessebe population in the central district and the recording of several new localities reflects this favourable tendency. For example a bull and a cow were seen no less than 3 miles from Satara on the Orpen road. They were very timid and fled immediately. This area was part of a former tsessebe habitat where there was still an established community in the 1920's. It is thought that these animals were gradually forced by unfavourable developments in the composition of the locality to move southwards. Two others were seen north of the Manzentonto, along the eastern boundary at Hlangulene, as well as two on the main road south of the Orpen Memorial Tablets. Last year a few were encountered again at the Mareyo windmill, for the first time in a long while.

Elsewhere in the district the most encouraging reports were received from the Tshokwane section. Last year during March 15 (5 calves) were observed at the Lipape dam No. 3. A herd of 25 was seen by Native Rangers along the Tswiriri.

Herds of up to 11 were encountered regularly in the Mlondozi area — e.g. at Mlondozi dam, beyond Muntshu, Mahoshangwembe, Shibedshane, Machechene, Mabakane, Nkuwane and Ngwari. The calf crop here was very promising. During November 1957, 44 adults and 10 calves were counted here by a special patrol and during a routine survey during June last year, the Ranger counted a total of 32 (5 calves).

Along the western boundary of the Kingfisherspruit section small herds of 7, 7, 9 and 5 were seen near Mahlobyanine, Rabelais dam, Batavia and Zwartkops windmill respectively. Here also calves were well represented.

The most predator kills were reported from the northern sections and on the whole area, 5 carcasses killed by lion, and one by cheetah, were found.

15. *Connochaetes (Gorgon) taurinus taurinus* (Burchell) — Blue wildebeest.

The most noteworthy regional development with regard to the blue wildebeest population of the Park, again occurred this year in the relatively sparsely populated region north of the Olifants River. This occurrence was the recolonization of the former Klopfontein habitat. The first three blue wildebeest were seen there during August and since then, the number has increased to 8.

The Nwashitsumbu herd increased and 19 (6 calves) were counted during October. Three adult animals were also found at the Shisha west windmill for the first time.

On one count along the Bubube river during June, 36 blue wildebeest were encountered in 3 herds. Between Nkayeni and Shangoni there is a herd which varies from 15-20 and further south, along the western boundary, there is also a fairly large herd in the vicinity of Nalatsi. During March last year 22

(6 calves) were counted along the Mbyashishe, and in June 7 were recorded at Shihobomo drift, south of Shangoni.

A few wildebeest frequently drank from the small earth dam, along the eastern boundary fire-break road in the Nkulumbene area. At present there are more than 30 in the Dzombo area. These animals also drink at Mahlati and early this year 32, with 7 calves, were observed at the Dzombo windmill. During June it was surprising to find 9 (one calf) in the Makadze area and also a herd of 18 on the Shawu experimental plots.

A herd of 15 (4 calves) was seen during February immediately west of the Vumunyundu picket. Small herds were again observed along the western boundary of the Letaba section, in the vicinity of Malopene and Tuti, but a few were lost crossing the border.

The central district has a well-established and large wildebeest community, and the following general observations are of interest:

- (1) During June a fairly large herd of wildebeest was encountered at the Swartkops windmill.
- (2) Substantial herds were seen during July on the brak flats between the Shisakashangondzo dam and the Timbavati River.
- (3) Since December, the Satara wildebeest herds have moved southwards and to the north-west to the burns in the Nwanetzi-Sweni strip and the Ngotsa block.
- (4) In spite of the fact that the Mazite dam was dry during winter, large herds of wildebeest still grazed in this area and drank in the Manzentonto. Fairly large herds were encountered in company of zebra concentrations at the Guweni dam during July. Last winter the Mlondozi area had remarkably few wildebeest due to the lack of water, but there were large herds beyond Nwamuriwa along the Metsi-metsi. However, during the summer months there were fairly large numbers again, particularly along the Mahlampsana.
- (5) The large number of young animals and calves in the herds in the Orpen-Kingfisherspruit-Blackberry Glen area was noteworthy and since March this year, very large herds have been drinking in the Rabelais Dam. On one day more than 350 animals were counted at the water.
- (6) During December there were exceptionally large numbers of wildebeest on the burn north of Mahlobyanine, and very few animals to the south, along the boundary as far as Lipape.
- (7) The western boundary herds apparently discovered the Hutomi dam and early in November large herds were found here and at the western point of the tourist road.

- (8) A herd of 18 wildebeest was encountered on the western boundary road, near Batavia picket, as well as 10 at the north eastern corner beacon of Peru and 20 on the boundary of the farm, Durham, along the Olifants River strip.
- (9) The wildebeest of the Bangu area visit the pools in the Bangu gorge and an old carcass was found there.
- (10) One day, during March last year, the wildebeest were counted along the road from Tshokwane via Lindanda and the Trichardt road back to the Rangers' quarters. The result was as follows: 70 bulls, 77 cows, 9 year-old calves and 32 young calves. The wanderings of the nomadic western boundary herds will be discussed under the heading "boundaries".

In the southern district the wildebeest have made most progress in the Pretoriuskop area and on the Lebombo plains. Last year, during March, 28 adults and 14 calves were counted in the well-known territory south of the Pretoriuskop camp.

Counts made on the autumn burns showed 34.4% calves which is exceptionally high. Towards the end of May, a large number of wildebeest which had grazed on the block O, south-east of Manung, suddenly moved further eastwards in the direction of the Mlambane upper reaches. At this stage the grazing and water supply left nothing to be desired and it is difficult to find a reason for the move, except in terms of their innate nomadic instincts.

This year, during January, wildebeest were plentiful in the Paben and Matupa areas and apparently their numbers were augmented from the Mbandene area, where they had stayed for a long while. The numbers of calves in the Paben and Skurukwane areas were probably slightly below average this year due to wild dog raids.

A wildebeest with a yellow blaze on the forehead was seen below Shaben.

During the autumn and winter months fairly large herds were seen at various points along the Doispan road and in the Maklari-Mutupa-Shugela area, and smaller herds in the vicinity of the Skukuza hills and the upper reaches of the Nwatimhiri.

During July-August approximately 80 were encountered on the Panama plains, 13 on the Dzueni flats, and 17 at Mhlanganzwane.

The herd near Malelane quarters increased from 26 to 33 and fairly large herds were reported regularly from the Mlambane area, and along the Crocodile River and Nsikazi.

Wildebeest remain the chief prey of lion in the Park (particularly in the central district) and 177 carcasses of wildebeest, killed by these predators, were found during the year.

16. *Tragelaphus scriptus sylvaticus* (Sparrman) — Bushbuck.

Population data of bushbuck is difficult to procure on account of their limited distribution and timid way of life. However, there are no perceptible signs of deterioration and lone bushbuck or family groups were seen regularly during the year, in all suitable localities. It is clear that the more densely vegetated areas of Punda Maria have the heaviest population, although the bush-covered kloofs of the Malelane mountains, as well as areas of the Pretoriuskop section, also harbour fairly large numbers. Thus on occasion no less than 6 have been observed in the immediate vicinity of Machuluane picket. The riparian undergrowth of all perennial rivers in the Park, as well as some of the larger pool rivers (such as the Shisha, Mapongola, Shingwedzi, Pukwane, Bubube, Mbyashishe, Tende and Makadze in the north; the Timbavati, Nhlalarume, Nwanetzi, Bangu and Manzentonto in the central district; and the Mbyamide, Mlambane, Mtsawu and Bumi in the south) affords shelter to growing bushbuck communities.

Bushbuck have also been observed along the more densely vegetated regions of the Malonga, Shitsakana, Mlondozi, Mbadzane and Orami streams. Two young lambs were found near the Makadze waterhole early in August.

Leopards are the chief natural enemies and the carcasses of 4, victims of these wily hunters, have been found.

17. *Tragelaphus (Nyala) angasi* (Gray) — Nyala.

In the northern regions the distribution of nyala continues unabated and at present the entire Levubu river strip, as well as the Matukwane forest, has been colonised. Here the largest numbers are also encountered and during one game count in June no less than 115 were counted at Pafuri. Groups of nyala are observed regularly at Malonga spring and along the entire length of the Shingwedzi river. A few lone bulls have been encountered in the Nyandu bush and at Nwambia.

The Dzundwene community is growing and quite recently seven were seen there. One ewe and a lamb were found at Dzombo windmill, and along the Letaba, there are also signs that the numbers of animals are increasing, particularly in the vicinity of the Gorge and Makadze mouth. In October 3 ewes were found at Tende drift and 2 bulls in the hilly veld between Letaba bridge and Tende.

In the central district, nyala have now definitely established themselves in the Msimbit bush in Bangu and Olifants poort and during a visit to this area, during September, fairly numerous tracks and other signs of their presence were found there.

Reports of a promising lamb crop were again received this year and in the Pafuri region most lambs were born during the September-October period.

Three carcasses were reported — 1 lion kill and 2 leopard kills.

18. *Tragelaphus strepsiceros strepsiceros* (Pallas) — Kudu.

One of the most thriving communities in the Park and the antelope with the widest distribution in all sections. In certain regions of the Punda Maria section, particularly the Matukwane forest and the sandveld north of Gumbandevu, they are also definitely the most numerous of the larger mammal species. Reports from all sections indicate signs of population increase and young animals are well represented among the majority of the mixed herds. Most calves were born in February and March, although a few young calves were noted as late as May. It is remarkable how quickly the animals lose condition during a cold winter, except in the wooded regions where there is no lack of evergreen fodder trees. However, after the first spring rains the animals recover quickly and are soon in prime condition.

Last year during March the Ranger of the Punda Maria section found a dead, newly-born kudu calf in the veld on his way to Shalungwa spring. The animal had been born without forelimbs and there were only two cartilaginous buds under the skin instead of the normal shoulder blades.

This year kudu were fourth on the list of lion kills and 87 carcasses were found.

19. *Taurotragus oryx oryx* (Pallas) — Eland.

Even before the establishment of the Sabie game reserve eland had been exterminated in the area south of the Sabie by hunters and the Rinderpest epidemic. Between the Sabie and Olifants Rivers, there is still a small herd to be found on farms along the western boundary of the Kingfisherspruit section. During the summer months these animals sometimes move into the Park as far as Sikkeltowkloof and Hartbeesfontein, but this year they have not been seen.

Conditions are different in the northern sections and there an already well-established eland community is increasing annually and extending to new localities.

Early in March last year a herd of more than 100 was encountered at Nwashitsumbe, but the western boundary strip, between Malitenga and Shangoni, harbours the largest numbers and the proposed new Mbomene dam in the Mapongole will ensure a permanent water supply in this area. A herd of 22 (7 calves) was counted in the Mbyashishe area. During May a large herd of between 25 and 30, including many young animals was seen at Kloppefontein Dam and in June 8 were encountered in the Nyandu bush, where they came to drink at the Nwambia Pan at 1.20 p.m.

Up to 60 eland have been counted by patrols in the veld between Shangoni and Bubube and Hlangupalala and Pukwane. During the winter months the animals have watered at Mafayeni and Malahlapanga and frequently crossed the boundary to the Native Trust territory. On one occasion

19 were encountered at the little earth dam in the upper reaches of the Nkulumbene. During October a herd of 40 watered again at Nwashitsombe and 37 (13 calves) grazed the Dzombo experimental plots during November. Three were seen on the Shingwedzi River road about 12 miles west of the camp.

Fairly large herds of eland, with calves, were observed repeatedly south of Shangoni, along the western boundary — e.g. between Nalatsi and Klein Letaba, at Tsombyene (7), Nalatsi (25), Nwatisema (7), and the Tierkoppie. Recently 3 were seen at Masanje windmill, and 17 at Dzombo west.

In the Letaba section eland are also making good progress. There is a definite tendency of extension towards the south. For example, a lone eland bull has already been encountered along the Letaba circular drive and small herds have been seen repeatedly in the vicinity of Tuti and Putwane along the western boundary. One day in August, the Ranger found a herd of approximately 30 along the Makadze spruit, two bulls a short distance away, and yet another large herd of 30-35 at the Shawu experimental plots.

According to Mr. B. de la Bat, eland cows in the Etosha Pan Reserve frequently abandon their calves during the winter months, but nothing similar has as yet been observed here. The majority of calves are born during September — beginning of October.

An eland bull found with a broken leg, near Tsumanene windmill had to be destroyed and quite a number were snared along the western boundary. Lions killed 3, and a calf was a leopard's victim.

20. *Syncerus caffer caffer* (Sparrman) — Buffalo.

During the dry season it was again possible to locate several large buffalo herds in all three districts, with the exception of the Malelane section, but during the summer, the animals wander about a great deal and there is also the confusing disintegration of the large herds, which makes the calculation of their numerical strength very difficult.

The following general observations, however, give some indication of the population fluctuations and movements of the buffalo in the respective areas, during the year.

(a) Southern District.

The Mbyamide herd, sometimes numbering more than 400 animals, was encountered along the Mbyamide and also seen frequently when crossing the Nahpe road on route to Maklari and the Nwashitsaka upper reaches. On occasion they moved as far east as Randspruit. During the summer months there were quite a number of smaller herds and lone buffalo which had strayed. Some of these nomadic groups watered at Komapite and at the waterholes at Mtomene and grazed in the Stolznek area. Others tarried for

a while in the Faai-Stungwane area and then moved eastwards, and yet others were encountered along the Nsikaze strip as far as Mnyelene spruit. It is clear that during this time buffalo are progressively spreading southwards and the Malelane hill country is invaded as far as the upper reaches of the Mlambane, Mtjulu and Machuluane. Several old bulls and small groups were again seen along the Mtsawu spruit during February.

The well-known large herd of the Crocodile Bridge area grazed the veld south of the Panamana dam during April of last year and also watered at the Crocodile River, to the east of the quarters. Early in May the herd was encountered on the Makambene flats and in July they were still watering at the Crocodile River, east of Dick's picket. Later, however, they moved northwards and during August-September grazed the veld south east of Lower Sabie and watered in the Sabie at Mabjanzau and Matiwuhlungu. After the spring rains they shifted southwards again, wandered a while and since then have been encountered at, among other localities, Shimangwane, Dzueni, south of Munzwini in the Lebombo ranges and along the Nhlowa spruit. During January they were in the vicinity of Mhlanganzwane and then moved in the direction of Crocodile River.

A few small herds and old bulls crossed the Crocodile River but did not cause much damage. During July a tourist car was attacked by a buffalo bull on the Crocodile River road, about 15 miles to the east of Malelane, but apart from denting the car, no further damage was caused.

(b) *Central District.*

The one large herd, numbering from 400 to 500 animals, of the western half of the Tshokwane section moved about a great deal during the winter months and was observed at Mazite and Kumane, Hlangolweni, the airforce dam, Lipape and the Manzentonto dam. In November they were in the Lipape area again and 41 very young calves were counted among them. Later in the summer they moved along the Manzendlovu and quite recently watered at the Manzendlovu dam. The herd which moves up and down along the Manzentonto was seen east of Hutomi drift in October and recently again at Kumane. In the summer months they have been found as far west as Mahlobyanine and the Kolwani area. During August their tracks were seen fairly far west on the Trichardt road.

The large eastern herd was observed in the Mlondozi block where they watered at the Sabie and Mlondozi dam during the winter. Apparently the herd scatters during the summer and thus smaller herds were seen regularly on the Lebombo plateau at Munweni, the upper reaches of the Mlondozi, and even at Shingedzene. One day in February, on the way to Nkuane a herd of 290 was encountered, and plus-minus 150 along the Saliji in December.

In the Satara section, the Gudzane-Nwanetzi herd of 250-300 animals, was seen on several occasions at the Gudzane windmill and at Richachane spruit, and they also moved up and down along the Nwanetzi and Sweni. During the summer smaller herds were seen at, among other localities, Nwanetzi west windmill, Makonkolwine and Lindanda. During January a herd of 150 watered at Mareyo. The Bango herd (180-200) was seen on one occasion only at Hlahleni drift.

During June a large herd of approximately 300 animals, including quite a number of young calves, was found at Timbavati Drift (on the way to Shisakashangondzo) and several smaller herds were observed further down the river practically to the mouth. In February as was customary in the past, buffalo travelled up along the Nyari spruit from Shisakashangondzo and 290 were observed at the Zwartkops windmill.

Early in March this year a herd of approximately 100 was encountered between Timbavati and Ngirivane windmill and among them a young (week-old) pure white albino calf was observed.

(c) *Northern district.*

A large herd has established itself in the Dzundwene area and sometimes moves eastwards in the direction of Nwashitsumbe. The herd at Pafuri is at present estimated at 300 and it is thought that these animals trek along the Machindudzi spruit in the direction of Machai pan and Malonga, as a similar herd was seen there during May.

The herd of 300 or more which was observed at Kloppefontein and Mashikiri on several occasions, travels up along the Madziringwe spruit and also grazes the sandveld between Mahembane and Shalungwa. During August the well-known, large herd (450-500) again appeared in the Shipudze-Matukwane area and remained there until November. This time they were also seen at Thulamhila and Dongaziba.

A herd, varying from 300-350, was frequently seen by tourists along the Mapongole, while another large herd moved up and down along the Shingwedzi and sometimes also watered at Nkokodzi and the Dzombo windmills. During the winter months fairly large herds were seen along the Bubube, at Malahlapanga, Makadze (100), Mbyashishe and Malopene spruit (100).

The Tende herd (approximately 150) was observed at the Dzombo experimental plots during October and also earlier at Shawu. During June it was noted that a large herd of buffalo had cropped the reeds closely along the Letaba river at Shipikane mouth.

Fairly large herds were again reported along the Olifants River in the Tuti area and between the Letaba and Nwanetzi.

The carcasses of 49, which had been killed by lion, were found during the year.

(2) F L O R A .

A. GENERAL.

During the past year conditions were less favourable for the vegetation than during the previous year. The total rainfall figures show very little difference compared with those of the previous year, but the distribution was poorer with the result that it became fairly dry in certain areas between rains. During the winter of 1958 very little rain fell and fairly dry conditions prevailed, but grazing was nowhere scarce, except in the overgrazed areas.

On 18/6/1958 the winter temperatures reached the lowest point, viz. 0.6°C and frost occurred on most of the low lying areas of the Park. It was noted that the leaves of *Trichilia emetica* (Natal mahogany — Rooi-essenhout) and *Lonchocarpus capassa* (appelblaar) were damaged by the frost.

In contrast with the previous year, accidental fires destroyed large areas during the past year and great damage was done. Especially the central and northern districts came to much harm, but no single section, from the south to the north, escaped. It was very unfortunate that the greater part of the Punda Maria sandveld was again destroyed. The extent of the accidental fires is indicated on the attached sketch map (Appendage A).

Grazing was good throughout and sufficient during the whole year in all sections, although fairly dry in certain areas at times. The March burns supplied enough green vegetation for the winter in Section 1, and in Section 2 especially zebra and blue wildebeest enjoyed good grazing in the valleys. The grazing was sufficient in the Central District right through the winter, in spite of the fact that it was fairly dry. It was also relatively dry in most sections of the northern district, except the Punda Maria section, where, because of the exceptionally good rains of the previous summer, the grazing remained green until late in the winter. It was noted that the mopani trees held their leaves till late in the autumn.

The spring rains came early in the south and the vegetation sprouted magnificently. From Tshokwane northwards, the rains were late and the first good showers only came in December. In certain areas of the Park it was already so dry in February, 1959, that accidental fires occurred. Pafuri and Shangoni enjoyed exceptionally good summer rains.

The eastern parts of the Park generally had better rains in the late summer, especially Crocodile Bridge section. As portions of the eastern border were already so dry towards the end of March 1959, they were subject to fires from outside and fire-breaks had to be cleaned to ward them off. The western half of the Park was dry in autumn but recent good rains relieved the situation considerably.

Signs of overgrazing in localities again appeared in the Crocodile Bridge and Malelane Sections, especially along the Crocodile River; at Faai, Sithlabe and Doispans in the Pretoriuskop area; around Skukuza and along the Sabie; around Tshokwane, Satara and Kingfisherspruit; along the Olifants and Letaba Rivers; along the Shingwedzi; at Pafuri and in the immediate surroundings of several windmills and permanent water holes in the north.

The floods of the January, 1958, summer removed much of the top soil in the Pafuri area and in some places silt was deposited. On these no grass grew but pioneer vegetation, of which *Epiltes alata* was the most important, appeared. Grazing conditions were poor and the game showed signs of being thin and disease occurred. (This is discussed elsewhere). Pafuri, however, had had good rains in the past summer and during a recent visit to that area, there was abundant grazing and conditions seemed more favourable than during the previous year.

As a result of the early spring rains in the south, the controlled burning programme was already completed by October. Owing to the fact that the rains in the central and northern districts were late, the burning there was delayed and could only be completed during the latter half of December. Luxuriant growth appeared on all the burns, but growth was retarded on some blocks because of the dry conditions and heavy grazing. Such conditions prevailed especially around Tshokwane and in the Satara Section.

A few interesting facts, closely related to veld burning, became evident during botanical surveys and other observations.

In the diary of the Ranger of Section 1, the following was recorded on 16/12/58:

"One little spruit and vlei near the camp (Pretoriuskop) has held water right through the year which is not normal but as I have kept fire out of this for some years now, I am sure the cover provided has had a lot to do with this."

It was very interesting to establish, by means of botanical surveys, exactly what happened to the veld in the Pretoriuskop area which was not burned, in comparison with veld which was regularly subjected to burning. The area in the Wolhuter Circle at Pretoriuskop has not been burned for the past 9 years, while the surrounding areas have been subjected to regular triennial rotational burning, and these were last burnt during 1956. The surveys were done on the north eastern side of the Wolhuter Circle, on the western side of the road, and on the adjoining block just east of the road. The results are attached as Appendix B. The most important differences which became evident, were as follows:

(a) Grass surveys.

(i) The actual percentage cover of *Hyparrhenia dissoluta* (thatch grass)

is appreciably lower in the Wolhuter Circle than in the neighbouring block.

- (ii) *Panicum maximum* (buffalo grass) is slowly spreading underneath the trees. The actual cover percentage is somewhat higher in the Wolhuter Circle than outside. The percentage frequency of *Panicum maximum*, however, is much higher inside the Wolhuter Circle, i.e., it is a more important component of the grass cover inside the Wolhuter circle, than outside.
- (iii) The actual cover percentage of *Hyparrhenia dissoluta* decreases, as that of *Schizachyrium semiberbe* increases.
- (iv) The actual cover percentages of both *Sporobolus eylesii* and *Elyonurus argenteus* (suurpol) are noticeably higher outside the Wolhuter Circle.

(b) *Tree and Shrub Surveys.*

- (i) The number of *Terminalia sericea* (silver terminalia) plants with single trunks is roughly 5 times more in the Wolhuter Circle than outside. In contrast the number of *Terminalia sericea* showing bush growth is three times higher outside the Wolhuter Circle than inside. The relative frequency percentage of *Terminalia* is more or less the same in both surveyed areas.
- (ii) The number of live *Dichrostachys nyassana* (sickle bush) which was found on the Wolhuter Circle was much less than those on the block which is burnt every three years. Of the number of live sickle bush plants found in the circle, 52.17% had single stems and 47.83% were showing bushgrowth; of the live sickle bush plants outside the circle, only 16.6% had single stems and 83.33% showed bushgrowth. The relative frequency percentage of *Dichrostachys nyassana* is much lower inside than outside the Wolhuter Circle — 25.27% compared with 41.38%.
- (iii) The number of dead sicklebush plants recorded in the Wolhuter Circle during the survey was 4 times higher than that on the adjoining block.
- (iv) The relative frequency of trees with single stems (all tree species) is 68.50% inside the Wolhuter Circle, compared with 25.0% in the adjoining block. The relative frequency of all tree and shrub species showing shrubgrowth is 31.50% inside the Wolhuter Circle compared with 75.0% on the adjoining block which is burnt every 3 years.

To summarise, it can be said that if the veld in the Pretoriuskeep area is not burned for a number of years, the rest will have a beneficial effect on

the veld generally. The vegetation in the Wolhuter Circle, however, is not yet in equilibrium with its environment and premature deductions may be dangerous. It will, however, be very interesting to follow the plant succession in this part for a number of years. It may be mentioned that a botanical survey of another portion of the Wolhuter Circle was done, with the object of burning this during the coming spring, to establish what influence burning has on vegetation after a rest period of 9 years.

It has been noted in the Central District that burning stimulates the flowering and seed production of *Themeda triandra* (red grass). It was found that on the southern side of the Trichardt Road, red grass was growing more luxuriantly and produced more tassels than on the northern side. There was also apparently more red grass on the block south of the road. The block south of the road was burnt in August, 1955, and again in November, 1957, while that on the northern side of the road was burnt in August, 1955, only.

The same phenomenon was noticed in the Northern District on two blocks, one to the north and one to the south of the Tropic of Capricorn fire-break road. The block to the south of this road underwent drastic treatment: it was burnt four times within five years, viz. in 1953, 1955, 1956 and 1957. The block to the north of this road was burnt accidentally in 1956 and at the time of the survey (August, 1958) had had a rest of two years. The red grass in the southern block grew very well and produced more seed than that in the northern block, where comparatively few tassels were present. It appeared as if more red grass was growing on the block south of the road. This observation, however, was proved to be incorrect, because a botanical survey showed that the actual cover percentage and the percentage frequency of the red grass was very nearly the same on both sides of the road. The actual cover on the south side of the road was 4.10% compared with 4.00% on the north side and the frequencies were 60.29% and 60.61% respectively.

The beneficial effect of complete protection against veld fires on Mopani veld is clearly illustrated on the Tendi flats, an area which has been protected for 6 years. The rehabilitation of this area was so impressive, that a survey was done here and the result compared with that of one done in an area which was protected for three years. The most important differences were as follows (the tables giving the results are attached as Appendage C):

(a) Grass Survey.

- (i) There was conspicuously less *Bothriochloa insculpta* (stinkgrass) on the plot protected for 6 years as compared with the one protected for 3 years.
- (ii) There was conspicuously more *Panicum coloratum* (buffalo grass) on the plot protected for 6 years.