OBSERVATIONS ON THE MIGRATION AND HABITS OF THE ANTELOPES OF THE KALAHARI GEMSBOK PARK — Part II

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To follow up the observations made in the Kalahari Gemsbok Park in December, 1957, a second trip was made in June, 1958 on which the present report is based. It is intended mainly as a progress report, and a full discussion will be withheld at least until the four main seasonal periods have been covered.

1. MIGRATION

As far as migration is concerned, there is not much to add to the first report.

The Park's gemsbok, springbok, blue wildebeest and red hartebeest populations remained more or less static, as far as numbers and distribution are concerned, and with the exception of the eland, the general distributional pattern in midwinter is much the same as in summer. Indeed, if one travels in the Auob or Nossob Rivers, or even among the dunes, you can always predict with a reasonable amount of accuracy when and where to expect springbok, gemsbok and blue wildebeest. To a lesser extent the same can be said wtih respect to the red hartebeest.

The movements of the eland, however, are quite unpredictable and to come across this animal is always a pleasant and unexpected occurrence.

Everything seems to corroborate the author's statement in the first report, namely, that migration as a regular biotic phenomenon is non-existent in the Park to-day. Seasonal movements of course take place on a considerable scale, but these environmental changes usually take place within a restricted area and are characterised by the total absence of any regularity.

Since the whole problem will undoubtedly become clearer as the research work progresses, it is at this stage perhaps too early to make a statement on the principal causes of animal movements within the Park, or over the boun-

daries of the Park. In the past various factors have been named as probable or possible causes and the real cause will undoubtedly turn out to be a complex of ecological factors, but it is my conviction that FOOD will prove to be the vital factor in controlling these animal movements.

2. STUDY OF FOOD HABITS

In the short time at our disposal it was impossible to pay attention to food preferences, and observations were therefore limited to direct feeding observations and, wherever possible, to the examination of stomach contents and pellet samples.

In the examination of pellet samples the eland was the only animal that yielded positive results. In all other cases the food was so thoroughly digested that nothing could be identified.

It is perhaps desirable to point out at this stage that some of the food plants listed below are most probably of purely incidental importance to the animals concerned. When the animals crowd together at, or in the vicinity of a water hole, they often casually nibble at some plant which is not a natural food item. Some of the food plants listed below undoubtedly fall in this category.

The variety of plant species eaten by all or most of the antelope species inhabiting the Park is very great indeed and if a detailed study could be undertaken, it would probably be found that most plants growing in this Park form part of some or perhaps all of the larger antelope's diet, although every species naturally has its individual preference.

The Springbok.

The following is a list of the food plants recorded:

Kohautia ramosissima, Acacia haematoxylon, Rhigozum trichotomum, Stachys spathulata, Schmidtia kalahariensis, Aristida obtusa.

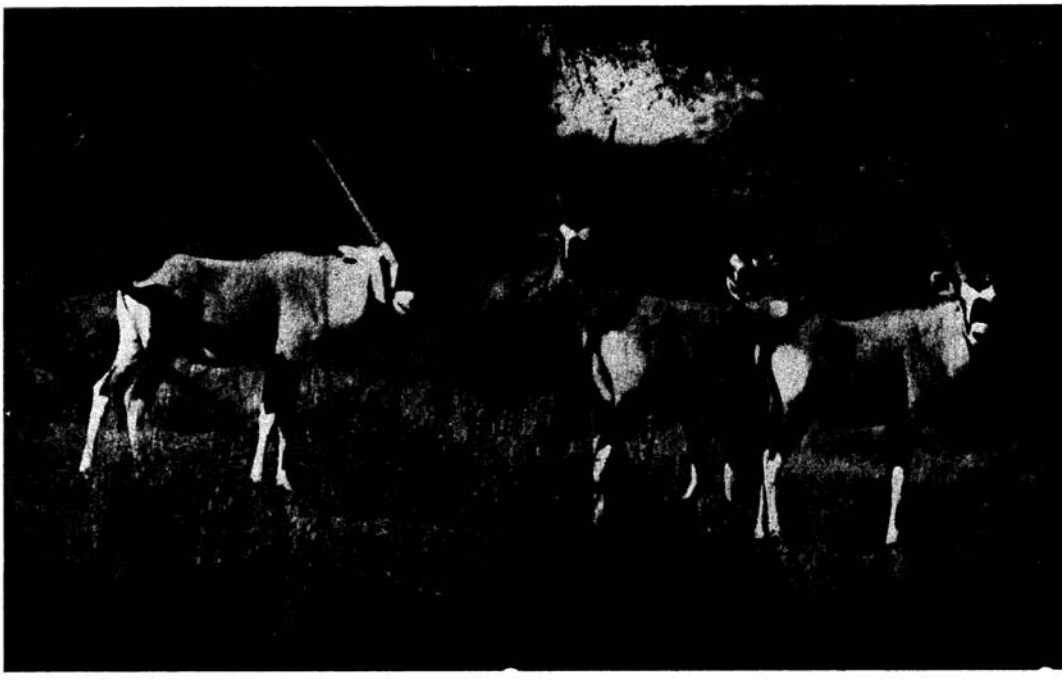
Of these, *Aristida obtusa* and *Schmidtia kalahariensis* are undoubtedly the most important, and the first mentioned species appears to be the animal's stock food.

At this time of the year *Rhigozum* probably plays a negligible part because the plants have very little to offer.

We once saw a solitary springbok actively digging into the ground in the dry bed of the Auob. Investigation showed that he was digging out a specimen of *Kohautia ramosissima,* which was barely visible above the ground, but had a number of small, young shoots below the surface. As a food plant, however, it is unimportant, at this time of the year at least, because it was very scarce and over a wide area only two other specimens could be located.

On the other hand, although *Stachys* (Boesmantee) is quite plentiful in the bed of the Auob, the springbok are not very fond of it, and only once did we observe a springbok nibbling at it.

SPRINGBOK



GEMSBOK

The Gemsbok.

The following plant species have been found to be consumed by gemsbok on our last visit:

Aristida obtusa, Aristida ciliata, Aristida amabilis, Asthenatherum forskalei, Schmidtia kalahariensis, Panicum coloratum, Acacia haematoxylon, Boscia albitrunca, Ehretia rigida.

Grasses probably make up a large percentage of the animal's diet and, with the possible exception of *Panicum,* the grasses listed above are important food items on the gemsbok's menu. Even *Schmidtia,* which seems to be very dry and unpalatable at this time of the year, was found to be of more than passing importance.

Boscia albitrunca is an important food plant, because it is fairly abundant in the Park and the animals appear to be fond of it. We once saw a gemsbok browsing for at least 10 minutes on a stunted *Boscia.*

An investigation of the stomach contents of a gembsok that was killed by a pack of spotted hyaenas yielded the following:

More than 50% of the contents consisted of *Aristida obtusa.* There were plenty of *Boscia* and *A. haematoxylon* leaves, and also quite a number of leaves and young shoots of *Ehretia rigida* (Deurmekaarbos). *Asthenatherum* was also observed, although the actual percentage observed was much lower than expected; however, it could be due to the relative scarcity of this species in the area where the animal was killed.

The Blue Wildebeest.

On two different occasions a herd of blue wildebeest was found to be grazing on *Aristida obtusa* and *Schmidtia kalahariensis* respectively.

The Eland.

Although a considerable number of eland were seen, they never allowed us to make a single feeding observation.

An examination of their pellet contents, however, yielded unexpected results. No less than 11 species of plants could be identified in this way. It would be interesting to know why the eland is the only antelope in the Park in which it is possible to identify the food plants after it has passed through the digestive tract.

The full list of plants identified in this way is as follows:

1. Fruit of the tsamma (*Colocynthis citrullus*).
2. Fruit of the wild cucumber (*Cucumis hookeri*).
3. Seeds of *Acacia haematoxylon* (Vaalkameel).
4. Seeds of *Acacia giraffae* (Kameeldoring).
5. Seeds of *Acacia uncinata* (Basterkameel).

6. *Asthenatherum forskalei.*
7. *Schmidtia kalahariensis.*
8. *Boscia albitrunca.*
9. *Grewia flava.*
10. *Tribulus sp.*
11. *Solanum sp.* (Bitterappel).

With the exception of *Tribulus* these plants were identified from pellets collected at a single spot. In some pellets as many as 9 seeds from Vaalkameel or Kameeldoring were found.

Duiker.

A duiker was found to be nibbling at the leaves of a young *Acacia haematoxylon.*

3. NUMBER OF ANIMALS

The census method employed is the same as that described in the first report.

TABLE 1

Number of animals counted on a trip from Twee Rivieren to Mata-Mata on 22.6.58.

Time of departure 2.30 p.m. Time of arrival at destination 5.30 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest	Eland
0— 4	48			
5— 9				
10—14	20			
15—19	56	2		
20—24	1	3		
25—29		1		
30—34		1		
35—39		7		6
40—44	1	35		
45—49	1	18		
50—54	1	8		
55—59	25		1	
60—64	20	38		
65—69	12	16	103	
70—74		2		
75—77	4	2		

The large number of blue wildebeest occurred a few miles from the 16th borehole, and were peacefully grazing on *Aristida obtusa*, on a high overgrown dune adjoining the river. The presence of this large herd of over 100 blue wildebeest in this area is rather puzzling. It is probably the same herd of animals found there in previous years, and which are known to remain there right through the year. The herd sometimes splits up into smaller groups, but they are always found in the immediate vicinity of that borehole.

What is so surprising in the present case, is the fact that grazing conditions in that area were extremely bad. Due to low rainfall and probably also to overgrazing, the bed of the Auob was almost bare. Even water was scarce; due to the large concentration of game at this point the demand exceeded the supply. Yet, only a few miles lower down in the direction of Twee Rivieren, grazing conditions were much better, as a result of some good local rains that had fallen there a few months earlier. In contrast to the area around 16th borehole the river bed was covered with lovely stands of *Panicum*, while *Aristida* was also plentiful and not much grazed. If the blue wildebeest therefore migrated only a few miles downward, they would have found much better grazing and plenty of water. Why they did not do so, but remained in the overgrazed section around 16th borehole, is a mystery, especially if it is considered that the blue wildebeest is by nature an animal that is always in search of better grazing.

As pointed out in the first report, this herd of blue wildebeest has developed a sedentary habit, and prefer to remain in their usual haunts, even under adverse conditions.

TABLE 2

Number of animals counted on a trip from Mata-Mata to Kamkwa on 23.6.58. Time of departure 9.30 a.m. Time of arrival at destination 2 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest
0— 4	18		
5— 9	18	8	
10—14	6	18	
15—19	12	3	
20—24	3	47	1
25—29		35	
30—34		17	
35—39	1	26	

TABLE 3

Number of animals counted on a trip from Kamkwa to Auob (16th borehole) on 23.6.58.

Time of departure 3.15 p.m. Time of arrival at destination 5 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest
0— 4		34	
5— 9		1	
10—14		19	
15—19	1	43	2
20—24		13	
25—29	31	75	5

TABLE 4

Number of animals counted on a trip from Mata-Mata to Groot Kolk on 24.6.58.

Time of departure 10 a.m. Time of arrival at destination 5.30 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest	Red hartebeest	Steenbok	Duiker
20—24		1				
25—29						
30—34		16				
35—39		1				
40—44						
45—49		37				
50—54		12				
55—59	200	67				
60—64	12	100	3	47	1	4
65—69		6				
70—74	9			1		
75—79	57	3	1			

The sudden rise in the numbers of gemsbok at the 10th class interval coincides with a change of vegetation. The dominant grasses were the same as that found on the first part of the trip, but the trees showed a distinct change. Previously, stunted Vaalkameel, Kameeldoring and *Terminalia sericea*

(Vaalbos) were the only trees observed. Now they not only showed an increase in numbers, but also an increase in size, and for the first time really large Vaalkameel and Kameeldoring occurred.

The flatness of the country was relieved by a few high, irregular dunes and amongst these we found some gemsbok standing in the shade of a few large trees.

This strip of larger trees lasted for a few miles only. When we left the dunes behind, we were on the typical Vaalkameel flats again and the number of gemsbok correspondingly decreased. After a number of miles the vegetational picture changed again and we found ourselves in typical savannah country, with numerous Kameeldoring. On entering this we immediately encountered a herd of 30 gemsbok, and within another mile herds of 17, 30 and 60 respectively as well as a herd of 200 springbok. The herd of 60 gemsbok was observed from a dune, and as it was not visible from the road, is not included in the table.

At this point it was noticed that the grass, especially the lower portions, appeared to be much greener than further south. It transpired that at the beginning of the winter the northernmost region of the Park, up to Union's End, had had some good rains which did not fall further south.

Within the next 5 miles we came across a herd of 100 gemsbok, 35 red hartebeest, 3 blue wildebeest and 6 springbok, grazing together over a wide area where the grass was in excellent condition. The dominant grasses were: *Eragrostis lehmanniana, Aristida uniplumis, Asthenatherum forskalei, Schmidtia kalahariensis.* Unfortunately it was not possible to make a single feeding observation.

The large number of game encountered within the last 10 miles are probably due to:

1. the better condition of the grazing,

2. the presence of more and larger trees,

3. a greater variety of shrubs, with *Grewia* more noticeable. It definitely indicates a strong Bechuanaland element,

4. the proximity of the river. Although the river bed itself is completely barren in that area, it is always a great attraction.

TABLE 5

Number of animals counted on a trip from Groot Kolk to Union's End on 25.6.58.

Time of departure 8 a.m. Time of arrival at destination 8.30 a.m.

Class Interval	Springbok	Gemsbok	Red hartebeest
0— 4	45	4	21
5— 9	5		1
10—14	22		

TABLE 6

Total number of game counted on a trip from Union's End to Swartpan (Bechuanaland) on 25.6.58. Total distance 40 miles.

Springbok	2
Gemsbok	8
Steenbok	6
Duiker	6

In the pan itself we counted 1 gemsbok and 2 springbok. It is a huge and lovely pan, with plenty of "brak". It is known as a focal point for immense numbers of game, but with only 3 head of game and a large number of skeletons and bones lying scattered about on the floor of this magnificent pan, it presented a tragic and desolate picture indeed. The skeletons and fresh car tracks indicated that this was indeed a real poacher's paradise.

The vegetation through which we travelled that day was much the same as the northern part of the Park, with perhaps one important difference. Although the dominant grasses, trees and shrubs were the same, there was far more *Grewia,* and although *Catophractes* (Gabbabos) was relatively scarce, this important food plant is reported to be abundant in some parts of Bechuanaland.

TABLE 7

Number of animals counted on a trip from Union's End to Kameelsleep on 26.6.58.

Time of departure 9.30 a.m. Time of arrival at destination 6 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest	Red hartebeest	Steenbok
0— 4	13				
5— 9	22			14	
10—14	8	6			
15—19	2	9		2	
20—24	19	3	13	1	
25—29	6	8	2	1	
30—34	41	3		1	
35—39	31	4	6	16	
40—44	3			1	1
45—49		1			
50—54					
55—59	16	20		28	
60—64	28	11		34	
65—69	28	38			
70—74					
75—79		2		2	
80—84		13			
85—89					
90—94	6	11			
95—100 ...	3	3			

At Groot Brak, about 40 miles from Union's End, we left the Nossob and went up the Pollentswa River into Bechuanaland for about 7 miles.

The total number of game counted in this stretch of 7 miles is as follows:

Springbok	100	Red hartebeest	513
Gemsbok	98	Blue wildebeest	4

The number of red hartebeest counted is far more than the total number seen on the rest of our 10-day trip in the Park.

At one point the river bed widens to form an enormous pan, where we saw 50 springbok, 60 gemsbok, 2 blue wildebeest and 270 red hartebeest, grazing together or eating "brak".

It is not difficult to account for the concentration of game in this dry river.

The first, and main reason is probably the great variety of grasses and shrubs found in and along the river bed. Where it enters the Nossob the banks of the Pollentswa resemble low dunes, which are overgrown with short, well-grazed *Aristida obtusa*, still slightly green and ideally suited for the springbok and red hartebeest. In the river bed itself, which is very broad for the last few miles before its confluence with the Nossob, *Salsola* (Gannabos) is dominant, with a variety of grasses which include *Schmidtia, Panicum, Sporobolus* and *Eragrostis*. Where we turned back, 7 miles from the Nossob, the nature of the vegetation changed. At this point the river bed resembled typical sandveld, and was covered with tall *Aristida uniplumis* and *Asthenatherum*, and small Vaalkameel trees. Where the dunes adjoining the Pollentswa become higher a few miles from the Nossob, there were plenty *Grewia, Boscia* and *Acacia detinens*, and an occasional Vaalkameel.

In contrast with this the Nossob can offer but a very unattractive menu. *Salsola*, which seems to be an important food plant, is very scarce in the Nossob. Its bed of silt is probably not favourable for the growth of this plant. And some of the grasses mentioned above are definitely scarcer along the Nossob.

A second reason is that the "brak" of the Pollentswa is probably much more attractive than that of the Nossob. The upper part of the Nossob does not contain much, if any, natural brak. Its bed consists mainly of silt and small particles of mica, and although the antelopes make use of it, it seems to be nothing more than an inferior substitute. It is only from Kransbrak, about 40 miles from Twee Rivieren, that the Nossob has real deposits of lime, similar to that found in the Auob.

The bed of the Pollentswa which has a completely different catchment area than the Nossob, has very little silt, and good deposits of brak, which is very well utilised.

There can be no doubt that the Pollentswa has much more to offer to the antelopes than the Nossob.

TABLE 8

Number of animals counted on a trip from Kameelsleep to Twee Rivieren on 27.6.58.

Time of departure 9.45 a.m. Time of arrival at destination 12.15 p.m.

Class Interval	Spring-bok	Gems-bok	Blue wilde-beest	Red harte-beest	Eland	Steen-bok
0— 4	53			2		
5— 9	98	42	15	3		
10—14	71	23		2		
15—19		7				
20—24						
25—29	34	5			2	
30—34	21	1				
35—39	189	3				
40—44						
45—49	5					
50—54	34					1
55—59	25					

The number of animals shown in the 2nd and 3rd class intervals occurred in the immediate vicinity of Jans Draai. This place has, per unit area, the greatest number and variety of game found anywhere in the Nossob.

It has a natural water hole and a great variety of plants, which appeared to be in better condition than elsewhere in the Nossob. This place was struck by a severe hailstorm a few months earlier, and this was not without its beneficial effects on the vegetation. The grass seems to remain green and juicy much longer and the old, unpalatable grass is knocked down, giving the winter ephemereal plants a better chance to develop.

Oof the food plants observed, *Plinthus sericeus* and *Pentzia incana* deserve special mention. Like *Salsola, Plinthus* is also a ganna-bos and although it is probably inferior to *Salsola* as a food plant, it is much sought after by springbok. So is *Pentzia* (Anker-karroo).

On both occasions that we travelled along this part of the Nossob we found a number of springbok in the vicinity of Kij Kij. The limy ridges bordering the river in this area have abundant *Aristida obtusa, Plinthus, Monechma* and a few other species of Karroo-like plants which are probably very attractive to the springbok.

TABLE 9

Number of animals counted on a trip from Twee Rivieren to Lekkerdraai (on S.W.A. boundary) on 27.6.58.

Time of departure 3.30 p.m. Time of arrival at destination 6 p.m.

Class Interval	Springbok	Gemsbok	Eland	Steenbok
0— 4				
5— 9		2		1
10—14	55	3		
15—19		1		
20—24	3	4	3	
25—29		1		3
30—34		22		
35—39		1		
40—44				
45—48				

The large herd of springbok found in the 3rd class interval was grazing in an area where such winter ephemereal plants as *Helichrysum argyrosphaerum* and *Indigofera alternans* were especially abundant. Although we could not establish that they were actually eating it, these ephemereals are probably an important source of attraction for the springbok.

TABLE 10

Number of animals counted on a trip from Lekkerdraai to Mata-Mata (via Klein Skrij Pan, Rooibrak) on 28.6.58.

Time of departure 10.30 a.m. Time of arrival at destination 6.15 p.m.

Class Interval	Spring-bok	Gems-bok	Red harte-beest	Eland	Steenbok	Duiker
0— 4		2			3	
5— 9		25			1	
10—14		11		23		1
15—19		14		1		
20—24	2	71		12		
25—29		41		2	2	
30—34		113				
35—39		11	2		4	1
40—44		5			1	
45—49						
50—54	1	47				
55—59	1	2				
60—64	1	8				
65—69		30				
70—74		5				
75—79	9	52				
80—84	6					
85—87						

Route followed: Lekkerdraai, Kafirs Pan, Klein Skrij Pan, Montrose (in the Auob River) and from there along the Auob to Mata-Mata.

As the number of game indicates, the large pans in the area that we traversed, namely Kafirs Pan and the two pans at Klein Skrij, are a very great attraction to the game. And as they did not hold any water the attraction must be their liberal supply of brak. The areas between and immediately around these pans are heavily grazed and, wherever it occurs, especially *Asthenatherum, Eragrostis lehmanniana* and *Aristida uniplumis,* are very short-cropped.

Asthenatherum is, in spite of its coarse appearance, very much sought

after and, together with *Aristida obtusa* and *Aristida uniplumis*, it forms one of the most important grazing elements of the Park. At this time of the year *Asthenatherum* always appears to be much greener than any other type of grass.

Wherever we came across *Aristida amabilis* it was also well grazed.

TABLE 11

Number of animals counted on a trip from Mata-Mata to Kamkwa on 29.6.58. Time of departure 10.30 a.m. Time of arrival at destination 2.45 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest
0— 4	14	1	
5— 9	6	7	
10—14	14	46	15
15—19	9		1
20—24	1	43	
25—29	8	55	30
30—34		14	
35—39		38	

TABLE 12

Number of animals counted on a trip from Kamkwa to Mata-Mata on 29.6.58. Time of departure 4 p.m. Time of arrival at destination 5.45 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest
0— 4		3	
5— 9	1	9	
10—14		21	
15—19	2	41	
20—24	5		5
25—29	48	95	8
30—34			
35—39	1		

TABLE 13

Number of animals counted on a trip from Mata-Mata to Jans Draai via Seven Pans on 30.6.58. Time of departure 8.15 a.m. Time of arrival at destination 5 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest	Red hartebeest	Eland	Steenbok	Duiker
0— 4						1	
5— 9		6					1
10—14		9				2	
15—19		10				3	
20—24		5			3		
25—29		1				1	
30—34		1				4	
35—39						2	
40—44	2	7		2	6	1	
45—49		14				2	
50—54						1	
55—59							
60—64	16	51	1		13		
65—69	2	3					
70—74	5	60	18				
75—79	7						
80—84							
85—89	13	15					
90—94	26	6					
95—100	2	5					

In the area through which we travelled the veld was in excellent condition and there was an abundance of such grasses as *Asthenatherum, Schmidtia, Aristida uniplumis, A. meridionalis* and *Eragrostis lehmanniana*. In spite of this, game was scarce, as this table shows.

A very large part of this area consists of Vaalkameel flats, where there is too little variation in the vegetation, especially in shrubs, and topography, to attract a large population of gemsbok. As is well known this animal prefers the open dune country, with scattered trees, a veld type which is very scarce in almost the whole of this area.

The springbok and red hartebeest too will never populate this area. The grass is too dense and tall for their liking. The eland again thrives on variety and the scarcity of such shrubs as *Grewia, Boscia, Catophractes* and large *Acacia giraffae* and *A. haematoxylon* is a severe limiting factor.

Although the numbers in table 13 are rather misleading in estimating the population density, it becomes clear that this area is not, and probably will never be, fully utilised.

On approaching the Nossob a Bechuanaland element clearly crept into the vegetation. For the last few miles there was much greater variation: more *Grewia*, more and bigger *Acacia giraffae, Boscia, Acacia detinens* and other shrubs and trees. Like the northern part of the Park this area could support a reasonable eland population, even Kudu, if it extends along the river far enough. About one mile from the river we counted 13 eland.

We entered the Nossob at Rooikop and the number of game immediately showed a considerable increase.

TABLE 14

Number of animals counted on a trip from Jans Draai to Twee Rivieren on 1.7.58.

Time of departure 10.30 a.m. Time of arrival at destination 1.30 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest	Red hartebeest
0— 4	75	4	26	6
5— 9	54	7		1
10—14		3	1	
15—19				
20—24	39	27		
25—29				
30—34	21	16		
35—39	19			
40—44	3	8		
45—49	1			
50—54	18			
55—56				

The reasons for the variety and number of game in the area around Jans Draai has been discussed before.

The springbok and gemsbok of the 5th class interval occurred at a water hole.

TABLE 15

Number of animals counted on a trip from Twee Rivieren to Mata-Mata on 1.7.58.
Time of departure 2 p.m. Time of arrival at destination 3.45 p.m.

Class Interval	Springbok	Gemsbok	Blue wildebeest
0— 4	7		
5— 9			
10—14	10	11	
15—19	8	1	
20—24	1		
25—29			
30—34		30	
35—39		40	
40—44		48	
45—49		31	
50—54	?	84	
55—59		1	
60—64		70	55
65—69	7		
70—74			
75—76			

4. DISTRIBUTION OF GAME ANIMALS

The general distributional pattern agrees with the summer distribution, as the following table indicates:

TABLE 16

COMPARISON OF THE TOTAL NUMBERS OF ANIMALS COUNTED IN THE AUOB AND NOSSOB SECTIONS OF THE PARK RESPECTIVELY

	No. of miles travelled	Spring-bok	Gems-bok	Blue wilde-beest	Red harte-beest	Eland	Steen-bok
Auob	434	453	1632	226	2	47	15
Nossob ...	409	1384	718	86	186	24	20

Compared to table 15 of the first report the numbers and general distribution do not show any significant changes.

The number of springbok is more or less the same, indicating firstly, that no large-scale migration could have taken place and secondly, that the lamb crop was poor.

In both sections the number of gemsbok shows a considerable increase.

Although the blue wildebeest of the Auob section seems to show a considerable decrease in numbers, it is not really the case. On the first trip, on which the first report is based, the main herd at 16th borehole, numbering about 100, was encountered several times, while it was encountered only once on the present trip. In the Nossob there is a slight increase in numbers.

The red hartebeest of the Nossob shows a decrease in numbers but the difference is not significant.

On the previous trip only three eland were observed, and the fact that the total of 71 eland counted on the present trip is made up of animals encountered at 13 different places, is a clear indication that the increase cannot be solely attributed to chance.

The low number of steenbok is easily accounted for. Steenbok occur almost exclusively among the dunes, and the grass in these areas was much higher than in December, making it extremely difficult to detect this small animal.

The following special notes could be added:

The Springbok

In the previous report it was pointed out that the present status of the springbok is not at all satisfactory, but it was confidently expected that the position would show some improvement in winter, when large herds consisting of up to several thousand animals are said to concentrate in the rivers.

Unpublished data shows that on the 24th May, 1956, over 2,000 springbok were counted on a single trip from Twee Rivieren to Mata-Mata — a distance of 76 miles — and it was said to be an everyday occurrence in winter. The largest number of springbok counted on this road in the winter of 1958 on a single trip was 189, compared to 2,047 in 1956. In fact, the total number of springbok counted on the last trip (in which 843 miles were covered), is less than the number counted on a single trip from Twee Rivieren to Mata-Mata, a distance of 76 miles as already pointed out, in 1956. It shows an alarming decrease in the number of springbok.

The Gemsbok

The Auob River and the uncovered red dunes south-west of it are still the stronghold of the Park's gemsbok, although the Nossob area had relatively more gemsbok than the preceding summer.

Whereas the springbok population shows a serious decline in numbers compared to previous years, the numbers of gemsbok remain fairly stable; in fact it shows an overall improvement, and the general position with regard to this antelope is very favourable.

In the previous report a lot of attention was paid to the gemsbok's very strong preference for the red dunes. It was suggested that it could be due to the red dune country's greater variety of annuals in summer. In winter, however, when there are hardly any annuals to be found on the dunes, the variety of food plants could not be an important factor, because the dominant grasses associated with the covered and uncovered dunes are more or less the same. Food is therefore not the decisive factor, although it could be a contributory factor.

Other contributory factors are: the "open-ness" of the red dunes with their unrestricted view; the isolated trees, which are more abundant on the red dunes, where the animals can relax in the shade when they are not feeding; the presence of several large pans in the area south-west of the Auob, because if they are attracted to the pans by the brak, the gemsbok will naturally concentrate in the areas where these pans occur.

The Eland

In the first report concern was expressed at the small eland population inhabiting the Park in summer. On the last trip a total of 71 eland were counted at 13 different places, which seems to indicate that they have a fairly even distribution over the Park and although they occur in very small numbers at any particular place, the total winter population of eland in the Park seems to be fairly high.

The eland is a true nomad and it is very doubtful whether the Park will ever have a large summer population of eland. The available evidence is not conclusive yet but it nevertheless points to a conclusion which seems to fit all the facts.

The eland seems to prefer a variety of food and certain shrubs and trees play an important part in its daily diet. Plants which have been identified as important food items of the eland include *Grewia, Boscia,* the tsamma, cucumber and trees like Vaalkameel and Kameeldoring. To this list could be added the so-called gabbabos (*Catophractes*), which is reputed to be an important food plant.

Boscia is fairly well represented in the Park but *Grewia* is very scarce. The only place in the Park where it can be considered as a food factor is in the extreme part and some places, never wide, along the Nossob. Although *Catophractes* has been recorded in the Park, two extensive trips have failed to show a single specimen of this plant. From a practical point of view, therefore, this plant could be regarded as absent from the Park.

Tsamma and cucumber are wellknown in the Park, but for the last few years tsamma has become very scarce.

Several important food items of the eland are therefore not present in the Park at all, or present in such small quantities that it can be regarded as a negligible factor.

Bechuanaland, on the other hand, has plenty of *Boscia* and *Grewia* and in some parts *Catophractes* is reported to be abundant. With its higher rainfall tsamma has always been, and probably is still, plentiful.

In winter, when shrubs like *Grewia* and *Catophractes* are without leaves and tsamma and cucumber are scarce, the eland wander about a great deal, and enter the Park in fairly large numbers. According to the rangers it was noticeable that the eland started entering the Park at the beginning of June. At that stage there is probably not much difference in what the Park and Bechuanaland have to offer. *Grewia, Catophractes,* tsamma and cucumber are either unavailable or very scarce. Grass, *Boscia,* Kameeldoring and Vaalkameel are equally abundant in both areas, therefore the eland spread out over a wide area.

Although it has not been observed, it is believed that the eland leave the Park in large numbers from September onwards, depending on several factors, but it usually coincides with the time that the Protectorate's great variety of shrubs — especially *Grewia* and *Catophractes* — start budding. It is an attraction that the eland cannot withstand.

Bechuanaland, therefore, holds the trump cards as far as the eland is concerned.

5. GENERAL OBSERVATIONS ON THE HABITS OF CERTAIN ANTELOPES

In the previous report certain aspects of the reproduction of the Park's antelopes were discussed at some length. As a comprehensive study of the reproductive activities of African mammals is at present being undertaken in collaboration with the officials of the various Parks in Africa, any observations made in the Gemsbok Park with respect to reproduction will merely be recorded without further discussion.

Although a fair number of young were observed, the springbok do not appear to have had a good lamb crop. According to the Warden they started dropping their fawns from the middle of December to the end of February.

Observations made on the gemsbok corroborate a previous statement that this animal does not have a regular breeding season. Although it is impossible to make a correct estimate of any young animal's age, it can be done fairly accurately within reasonable limits, and young animals of all ages, from one week upwards, were observed. In addition, a few cows that were heavily in calf, were seen.

Young hartebeest and blue wildebeest were fairly numerous and both these animals probably had a good calving season, but it is noteworthy that not a single eland calf was seen.

As far as herd composition is concerned it was noticed that the herds of all gregarious species were of mixed composition, consisting of both sexes. Solitary gemsbok bulls were fairly numerous, especially in the flat country between the Auob and Nossob Rivers.

In size the herds vary from a few individuals to several hundred. The largest herds observed were: springbok 175; gemsbok 95; blue wildebeest 102; red hartebeest 200 (this was in Bechuanaland, the largest herd in the Park numbering 35); eland 12.

None of these large herds were encountered at a watering place.