clay. On the morning of the 23rd of May, 1938, after the usual preliminaries of plotting and insertion of the cylinders, etc., the colony was gassed with compressed air, and the necessary picrate tests were performed. After the tests were completed the cylinders were taken out and the openings were filled in with earth.

The following morning all the holes were re-opened by hand and the cylinders were inserted in the same positions as the previous day. Tests were taken in the cylinders. When these proved negative for H.C.N., two squirrels distinctively marked were introduced, one at G (see sketch XI) and the other at B. Gassing was to take place through B. The gassing with the hand pump was then proceeded with from the same holes and in the same sequence as the previous day.

Gassing was commenced at 9 a.m. and was completed at 9.30 a.m. The picrate tests were then repeated as on the previous occasion, which lasted until 1 p.m. At 10.50 a.m. two squirrels with one injured foot each, having been caught in a trap, were inserted through cylinder 1 at hole A.

The colony was dug up when all the cylinders except No. 1 gave negative tests.

Results of the Experiment.

(1). On the morning of the second day before the gassing with the ~~compressed air~~ hand-pump was undertaken, two holes in the colony were found open. (2). When the two squirrels were introduced through cylinder 1 at 10.50 the picrate test paper took 30 seconds to discolour and after the introduction the time was 20 seconds only. (3). Spent Cyanogas powder was found at the point indicated between the opening D and Cylinder VII, loose sand was

found at the point marked "sand", and partially obliterating the tunnel. This explained the negative test at cylinder V11, where only a trace of Hydrogen Cyanide was recorded. (4). The following dead animals were found: At cylinders 1 and 3 stiff carcases of Cynictis were found, while at cylinder 2 a fresh carcase of the same species of animal was discovered. It must be remembered that no Cynictises were introduced. Carcases of Geosciurus were found as follows:

Geo. 1: A stiff carcase.
Geo. 2: do.
Geo. 4: do.
Geo. 5: do.

At Geo. 3 and Geo. 7 the carcases of the squirrels introduced at G and B respectively were found, and at Geo. 8 and Geo. 9 those introduced through A at 10.50 a.m. were found. A fresh unmarked carcase of a Geosciurus was found at Geo. 6.

Experiment V. 3.5.38.

The previous experiment was repeated in every detail on the same farm, in a very large Colony (B) (Sketch XII) of which only a portion seemed to be inhabited. As the openings in that portion were fallen in and showed no signs of meercat activity, to save unnecessary digging, a trench, 40 inches deep, was dug right across the colony separating the used from the unused section. Several tunnels were found opening into the trench, all at more or less the same level, from 12 to 18 inches from the top of the trench. The trench thus completely intersected all tunnels leading into the disused section. These holes were plugged with clay. Three Cynictis caught in traps were introduced into opening A1. The gassing and testing were completed at 5.37 p.m. The cylinders were left in

position over night. At 8.30 the following morning two Geosciurus were introduced, one each at C3 and B5. None of the openings were reopened during the night.

After all the openings were carefully reopened by hand, gassing was repeated with the hand pump and the picrate tests were made.

Results.

The following carcases were recovered:

1. Two Cynictis, one each at X1 and X2, both stiff and marked.
2. Three Geosciurus carcases, one each at G1, G.2 and G.3. The two former were fresh and marked, while the latter was stiff and unmarked. The carcase of the third Cynictis which was introduced the previous day was not recovered.

Discussion of the Results on the HCN Experiments.

Experiment 1. "Trassiebos" : Graph No. 3.

(a) High concentrations of Hydrogen Cyanide were maintained in openings 1 and IV for at least 1¾ hours.

(b) Within 1 hour from the time of completion of gassing the concentration in four openings dropped to below 1:30,000.

(c) In two openings 11 and 111 the concentration increased at the same time, in No. 111 the concentration reached 1 ; 15,6D0

The colony was unfortunately not dug open to see the results of the gassing. The explanation for the discovery of the Cynictis in Cylinder No. 11 can only be speculative. It is thought, that the Cynictis was prevented from excaping into the colony by our presence, and that soon after we had departed, and everything seemed safe he opened one hole and entered, and disturbed some of the Cyanogen

powder that had settled. In its endeavours to escape the Cynictis was trapped in the cylinder. This explanation is quite acceptable, for as can be expected, from the structure of a "Trassiebos" colony consisting of big chambers, even if the animal had travelled through chambers connected with openings 1 and VI, where the concentration remained high 1 : 7-9,000 he could still have reached the place where he was found, for such a concentration is fatal in 105 seconds only.

Experiment 11:

Colony Sketch No. IX. Graph No. 4.

(a).

In cylinder 111 a negative test was recorded, in spite of the fact that it was the first hole from which the gas emerged when dusting from B. The gas emerged after 1 minute.

(b).

A concentration of 1 : 30,000 was maintained in five of the test tunnels for 2½ hours after completion of gassing of the colony. In one tunnel No. V the comparatively high concentration was maintained for 3¼ hours. The high concentration is the result of a large amount of calcium cyanide deposited in the vicinity of the test cylinder, as the powder was blown in at D.

(c).

The fact that a live Cynictis was found at X1, is evidently due to the animal having escaped contact with gas while in the blind tunnel.

Experiment 111.

Colony 111. Sketch X. Graph 5.

(a).

The sudden decrease in the Hydrogen Cyanide

concentration in the opening 1 is due to the small amount of cyanogen that was precipitated at that point on account of its distance from D. from where the dusting took place.

(b).

A negative test was recorded at cylinder 111 as can be expected, as the tunnel was partially filled with sand. The negative test in V11 cannot be explained.

(c).

The test was not continued for a long enough period.

Experiment IV.

Sketch XI. Graphs Nos. 6 and 7.

(1). Gassing with hand-pump. Graph 6.

(a).

In three of the cylinders a high concentration was maintained for more than two hours.

(b).

In two cylinders No. VI and VII a trace only of Hydrogen Cyanide was recorded.

(c).

A slight rise in the concentration was recorded in No. 1 after the two squirrels were introduced. The rise in concentration was obviously due to disturbance of the precipitated cyano gas by the animals.

(2). Compressed Air. Graph 7

(a).

In contrast to the high concentration produced in 5 cylinders when using the hand pump, concentrations of lower than 1 : 96„000 were produced in five cylinders.

(b).

In two cylinders only, was a concentration of higher than 1: 24,000 recorded. In No. 111 it was maintained for 20 minutes only, and in one No. 5 was a high

concentration maintained for more than 1¼ hours.

(c).

It is further noticed, that the gas did not emerge from the same openings and in the same sequence, when gassing was done from the same hole and using the hand-pump and compressed air. For instance, when gassing was done from Aa, and similarly when gassing took place from Bb. While gas emerged when using the compressor at B_3, it would not emerge from the same opening when the hand-pump was used, so that gassing had to be resumed at B_3, when it emerged at C_1, Cc_2, etc.

The same is noticed to a lesser extent in Experiment V. It is doubtful whether this variation in air currents produced had any effect on the HCN concentrations in the warrens.

Experiment V.

Colony B, Bestersrust, Graph 8 and 9.
Sketch XII. Hand-pump.

(a).

In 5 cylinders a high concentration of HCN was maintained for 2½ hours.

(b).

In two cylinders (7) and (6) a concentration of 1 : 24,000 was maintained for 30 minutes only. This is obviously due to a small deposit of dust in the corresponding tunnels, owing to the distance away from the openings Cc and Bb from where the dusting took place.

Compressed Air. Graph 9.

(a).

Better results were obtained in this case with compressed air than in the previous experiment. The longer interval which elapsed between the commencement of the gassing and the testing, in the previous experiment

may be ascribed as a contributory factor. The colony in the previous experiment being very much larger than in this experiment.

(b).

In two openings, I and IV, a high concentration was maintained for some time. This is obviously due to fair amounts of deposits of cyanogen in the corresponding tunnels. Gassing was done through cylinder I, and IV although situated some distance from B where gassing took place, it is connected with a number of tunnels, which had a combined effect.

(c).

In the remainder of the cylinders a high concentration was maintained for a comparatively short period only.

General Discussions.

(1).

It is observed, that in all cases where the hydrogen cyanide concentration was recorded until negative tests or very low concentrations were obtained, that the concentration with minor fluctuations remained fairly constant, until a point was reached when it decreased very rapidly, indicating, that the hydrogen cyanide is as rapidly absorbed into the soil as it is given off from the calcium cyanide, when the moisture content ranged from 2·6 to 3·05 per cent.

(2).

The length of time the concentration of hydrogen cyanide remained at or above a concentration of 1 : 30-24,000 depends on the amount of calcium cyanide deposited. This is particularly well illustrated in Colony B, Experiment V where the gassing took place in both instances with compressed air and the hand-pump through opening 1.

(3).

Discarding the minor fluctuations in the hydrogen cyanide concentrations as probable experimental errors in judging the intensity of the colouration of the picrate test papers, the major fluctuations in openings 11 and 111 Experiment IV (Graph 6), 11 and 111 Experiment V (Graph 8); 11, VI and IV in Experiment 1 (Graph 3) can only be explained as probably due to air currents in the burrows.

(4).

The greatest concentrations in HCN in the burrows were recorded from those openings through which gassing took place, or in openings close to those through which powder was blown into the colony.

(5).

Comparison of the efficiency of the gassing by means of compressed air and using a hand-pump:

(a).

If the maintenance of the concentration of hydrogen cyanide may be taken as being dependent on the amount of Cyano_gas blown into the colonies through the different openings then less cyanogas is used with compressed air than by using a hand-pump.

(b).

By comparing the results obtained on the animals found dead after excavations, it is found that the two methods employed are equally effective, in spite of the fact that very much less powder is used when gassing with compressed air. In both experiments IV and V the carcases recovered could be accounted for. The only carcases that could not be accounted for, were the one of a Cynictis at point Cyn. 6 and the one of a Geosciurus at Geo. 6, Experiment IV. But if it is remembered that two holes were reopened after the gassing with compressed air had taken

place and the positions where these carcases were located, it is thus likely that these animals entered after the gassing with compressed air had taken place.

(b).

The only occasion on which a live animal was found after the colony had been dug up, was in Experiment 11. In this instance the section of the colony in which the Cynictis was found was gassed from opening B, (Sketch IX) involving test cylinders 11, VI and VII. In the latter two cylinders high concentrations of HCN were recorded for 2 hours, while in the first a negative test was given. Apart from the fact that the Cynictis had taken refuge in a blind tunnel, his chances of escape were further increased by the very small amount of Hydrogen Cyanide which circulated in that section of the colony. The amount was so small that a negative test was recorded at opening 111.

(7).

From the results obtained in gassing colonies with compressed air and using a hand-pump, it is clear that the effectiveness of gassing meercat burrows with Hydrogen Cyanide does not entirely depend on large amounts of dust being blown into the warrens, so as to maintain high concentrations for long periods, but that it rather depends on a thorough distribution of lethal concentrations of HCN even for short periods, in the warrens.

Conclusions.

Assuming that the meercats are in their burrows, factors which influence successful gassing can thus be summarised as follows:

(1). Distribution of the Dust.

Of the greatest importance is a thorough distribution of dust in all the warrens of a colony. This can be obtained by using a double action pump in perfect

working order and pumping with continuous forceful strokes, or using a jet of compressed air. A good length of tubing inserted into the burrow as deeply as possible will further assist in blowing the gas to the deeper sections. Before commencing work the operator should satisfy himself that the pump is in good working order and that none of the parts or the nozzle is choked. The pressure and the cloud of dust should be tested at frequent intervals.

(2). Quantity of Dust.

The cloud of dust which is blown out should be regulated beforehand, so that it is easily perceptible and not too thick. It is essential to test this at intervals by one or two strokes of the pump with the nozzle in the open, as the dust sometimes cakes or openings in the dust reservoir may become blocked.

(3). Quality of Dust.

Only fresh dust, of good quality, in fine powdery form should be used. The dust should be supplied in the original containers, provided with a press-in lid covered with a screw on top. The container should always be tightly closed after each filling, since exposure to air deteriorates the powder. Good dust is of a blueish slate colour, and spent dust which is of a brownish colour and is useless, should be discarded. Any dust remaining in the pump after use should always be returned immediately to the container and the pumps should be cleaned out every morning before operations start.

(4). Humidity of the Soil.

A very dry atmosphere somewhat retards the liberation of the poisonous gas, Hydrogen Cyanide, while on the other hand the gas is readily absorbed into the moisture in the soil. The optimum conditions in the burrows are

when the soil can be moulded by hand on applying some pressure. During the rainy season good results will only be obtained if gassing is postponed to the dry spells, when the soil is not saturated with water.

(5). Looseness or Gas Absorbing Properties of Soil.

Gas diffuses very easily into loose soil of a porous texture, thus limiting the period for which lethal concentrations are maintained.

(6). Volume and Intricacy of Tunnel Maze.

Efficiency in gassing a colony does not so much depend on the size of the colony as on the intricacy of the tunnel maze. The airflow usually takes the line of least resistance, with the result that the gas does not circulate in side tunnels and by-passes.

(7). Presence of Blind Ends or Air Locks in the Tunnel System.

In nearly every instance where live meercats were found after gassing, they were recovered from blind-ends, or where air-locks existed. On no account should holes be closed before dust has emerged from them.

(8). Presence of Obstruction in Tunnel.

Very frequently an animal or caved-in earth forms an obstruction to the passage of the gas. The latter obstruction frequently happens in winter before rains have fallen, and the burrows are not cleaned out by the inhabitants. Gassing should be commenced from those holes which show fresh activities and recent occupation or excavations.

(b). Carbon Monoxide.

The next gas tested was Carbon Monoxide. An easy, but not the most economical way to obtain the gas,

or a mixture of it and Carbon Dioxide, was from the exhaust pipe of a motor car. A long hose pipe was connected to the exhaust pipe, and the free end inserted into the openings of the burrows, while the engine was running at a speed corresponding to 10 - 15 miles per hour in top gear. As a test to see if the gas emerged from an opening, an ordinary lighted safety match was used. The lighted match was lowered as far down the opening as the hand could reach. If the light was extinguished the hole was closed. Repeated check tests were made at the same hole. The hose pipe, as in the case of dusting with a pump, was inserted into successive openings until all the openings had been closed.

The first test was performed on Beestekraal, 2.2.38. Two Cynictis were seen to enter a colony, which was gassed. Five days later the openings were still closed; one can assume, therefore, that they were killed.

The second test was on a colony on Bestersrust on 5.5.38. into which two Cynictis were seen to enter. The gassing lasted 25 minutes. On partial excavation 1 dead Cynictis and 1 dead Geosciurus were recovered, from which one can conclude that the gas is effective. It has since come to my notice that there is a small portable CO generator on the market. If it should prove efficient there is little doubt that the cost of gassing would thereby greatly be reduced.

(c). Sulphurous Gasses.

Various makes of gas cartridges or fumigators are found on the market, guaranteed to be effective in eradicating small burrowing animals.

On account of its economy, only requiring one man to operate, these fumigators were tested out on the Vryburg Commonage during November, 1938.

The fumigators that were used, are designed to generate, on burning, Hydrogen Sulphide, Carbon Monoxide, Carbon Disulphide and small quantities of Sulphur Dioxide. The lethal gasses are only generated if the cartridges are burnt under the proper conditions, i.e. in a restricted space. If burned in the open the gasses formed are Sulphur Dioxide and Carbon Dioxide. Each cartridge gives off 1 Cu. foot of gas. The lethal properties of the gasses in the burrow will persist for ten minutes. If the soil is damp the Hydrogen Sulphide will dissolve in the soil moisture.

The fumigators were used according to directions and under ideal conditions, no rain having fallen since the previous summer. The holes, that were not to be charged were closed according to directions, and from one to two cartridges were ignited and inserted into the other holes, which were immediately closed.

On the day following the first test, it was found, that all the colonies were reopened. Consequently, in the next colony up to five cartridges were inserted into one hole, and in many instances cartridges were inserted into each hole of the entire colony. Even this gave disappointing results. It was then decided to establish definitely the effect of these gasses on two colonies. The one of a very simple construction and the other of a more complicated structure, were selected. See sketches II and XIII.

As a test for the Sulphuretted Hydrogen, Lead Acetate papers freshly prepared were used, and employed in the same way as the picrate test for Hydrogen Cyanide.

It was noticed, that the fumes liberated from the ignited cartridge on insertion into the hole, were drawn in, and advantage was taken of this as the cartridges were too big to be inserted through the stoppered openings in the test cylinders. The ignited cartridges were inserted

and the cylinders were placed in position as quickly as possible. The actual times, when the cartridges were inserted are indicated on the sketches.

Experiment 1.

This was conducted on the colony of simple structure, consisting of five openings only, connected by straight tunnels without branches. One cartridge was inserted into each hole. Lead Acetate tests were not conducted. See Sketch No. 11.

Results.

On excavation of the colony two dead squirrels were found at the places indicated on the sketch. In all five live suricates were found at the places indicated. At hole No. 111 one suricate escaped and ran away. The other two in the same burrow were prevented just in time from escaping, by one of the labourers placing his foot on the opening. The hole was closed and a cartridge was inserted at the point indicated on the sketch. The tunnel was then about three feet long. After three minutes of interruption the excavations were continued and both suricates were found dead. The other two suricates were killed in the same way.

Experiment 11.

A fair sized colony was selected for this. Sketch XIII. Two Cynictis were seen to enter it, and later the suricate that escaped from the colony above also entered into one of the burrows. The openings marked L2 indicated those into which two cartridges were inserted and L1 where only a single cartridge was inserted. The Roman numerals indicate the identification numbers of the test cylinders. The other holes were closed up before the cartridges were inserted. Lead Acetate tests were

performed at fifteen minute intervals.

Results.

The details of the Lead Acetate test are recorded in the table IX.

Table IX.

Large Colony. Experiment II. Vryburg 16.11.38.

Lead Acetate Test- gas cartridges, liberating hydrogen-sulphide and other sulphurous gasses.

Time of Test, at 15 min. interval:	Cylinder No. I Loaded:	Cylinder No. II Loaded:	Cylinder No. III Loaded:	Cylinder No. IV Unloaded:
10 a.m.	Instantaneous.	Instantaneous.	Instantaneous.	Some delay.
10.15	do.	do.	do.	Negative.
10.30	Slight delay.	Slight delay.	do.	do.
10.45	Slight delay.	Slight delay.	do.	do.
11.	Delayed.	Weak.	do.	do.
11.15	Weak.	Weak.	do.	do.
11.30	Weak.	Weak.	Delayed.	do.

On excavations both the Cynictis were found alive, as well asthe Suricata. The one Cynictis was killed with a gas cartridge when only 24 ins. of tunnel was left.

Experiment III.

An experiment with fumigators was repeated on a "Trassiebos" colony on the Hoopstad commonage a week later. Four Cynictis were seen to enter the colony. Out of the ten openings, seven were charged. On excavations two adult Cynictis escaped, while two young ones about six weeks old were found dead at a place 24 inches from where two cartridges were inserted.

Conclusions.

The fumigators, that were used, are ineffective on

meercats under ordinary circumstances, and effective in short tunnels only, in which an exceedingly high concentration of gasses can be obtained.

The slow rate of diffusion, which is dependent on the density only of the heavy gasses and not assisted by any air currents in the tunnels, coupled with the quick rate of absorption of one of the lethal gasses into the soil, renders the use of such fumigators impracticable.

On account of disappointing results, the use of gas cartridges liberating lethal gasses can not be recommended for tne eradication of meercats.

(d). Heavy Gasses.

(1).

It was considered, that if heavy poisonous gasses could be liberated in the warrens, that these would gravitate down to the deeper sections and so reach the animals, which could otherwise not come in contact with the gasses used in the previous experiments.

Carbon Bi-sulphide gas was thought to be suitable. Before the experiment was commenced the M.L.C. was established. This was done in the following way. A Geosciurus was introduced into the lethal box, described before. Five c.cs of CS_2 were poured onto cottonwool and introduced into the box.

Result.

After six minutes the animal showed no effects beyond coughing during the first minute. A further 10 ccs. were introduced. Two minutes afterwards the animal scratched its nose and fell over. The respirations became shallow and slow, and eventually died 22½ minutes after introduction of the further 10 ccs. of Carbon Bi-sulphide.

As a result of the large amount of Carbon Bi-sulphide, which had to be used and which proved fatal only

after 22 minutes, the experiment was abandoned.

Heavy war gasses like Chloropicrin and mustard gas, which are five times as heavy as air, were also thought of, but not being procurable locally they could not be tried. On account of their expense and danger in handling it is doubtful whether their use could even become a practical proposition.

2. Granulated Calcium Cyanide.

Hydrogen Cyanide is liberated very slowly from granulated Calcium Cyanide. Advantage was taken of this to create in the opening of the warrens chambers in which the air was charged with Hydrogen Cyanide. The idea being that such chambers would form a trap and so gas the animal entering it.

Colony 162 on Beestekraal was selected for this experiment. Two Cynictis were seen to enter the colony. The lethal chambers were constructed as follows:

The warrens were closed at an arms length on the inside with earth. A heaped-up teaspoonful of granulated Calcium Cyanide was deposited in a heap and the opening was finally closed with earth.

Another unnumbered colony was treated in the same way.

The following morning on inspection one hole was found open, through which the meercats evidently had escaped. The other holes were opened by hand to find the chambers intact. In the other colony all the chambers were intact.

Further trials were not carried out.

2. Trapping.

All three species of animals are very easily trapped with ordinary three inch gin traps.

Setting of Traps. The methods which gave the most success

are shortly as follows: After the hole at which the trap is to be set has been selected, sand is pushed into it until about a third of it is filled up, care being taken to fill only so much as will allow free action of the jaws of the trap, thus not coming into contact with the roof or the sides of the hole. This partial filling of the opening prevents the animal from avoiding the trap and compels it to crouch when entering, thus putting more weight on the catch. The trap is set in position and the catch covered with soft paper to prevent the sand with which the whole trap is covered up from getting under the catch and so preventing it from being released. The chain is staked to the side of the entrance. The sand is then smoothed over with the hand and brushed lightly with a twig to obscure signs of human interference.

Selecting of the Burrows at which to set Traps.

As will be described later, traps were set at those colonies which became reoccupied after gassing or in which gassing had failed to kill all the inhabitants. In these cases traps were set at all the burrows, that had been reopened.

The effectiveness and the system of trapping is described more fully later.

By way of demonstration, experiments, to see to what extent the inhabitants of a colony can be exterminated by trapping, were carried out at Sannahspost on the 28th February and 2nd March, 1939. Traps were set at different colonies in the burrows, which were in use. The other openings were closed up with earth and tramped down. In the first case 40 traps were set at seven colonies and 35 meercats were trapped and in the second 31 traps were set and 24 meercats trapped. On both occasions all the inhabitants were caught since no further holes were opened up.

3. Explosives as a Means of Destruction.

When it was decided to undertake experiments to investigate the effect of explosives, the African Explosives and Industries Ltd. of S.A. was approached with a view to obtaining some information regarding the use of explosives to the best advantage on meercat warrens. The Company kindly placed the services of one of its experts, Mr. E.A. Hendry of the Explosives Service Section, at our disposal.

This gentleman personally supervised all the trials, which were conducted, and failure cannot, therefore, be attributed to amateurish and inefficient use of explosives.

(a) In loading up a colony charges varying from ½ to 2 lbs. of explosives were used. The cartridges were pushed as far down each of the burrows as possible, before filling up the holes behind with sand. The electric detonators, with which the charge was to be exploded, were connected up in series and fired with an 80 shot electric exploder through 100 yards of cable. A certain amount of difficulty was experienced in loading as the majority of the burrows twisted considerably and it was only possible to push the charges down for about 2 - 3 feet, although in certain cases the charges could be pushed down three or four feet with a stick.

In all cases the holes, which were not charged, were filled in with soil.

The time of charging up, including making up of primers, varied from ½ hour for small "Trassiebos" colonies to two hours for a large underground colony.

Both 40% dynamite and 40% Ammon. Gelignite were used.

Altogether 11 colonies were blasted for which 150 lbs of explosive and 151 electric detonators were required.

After the explosions had taken place the surface effects were noted before the colony was completely dug up to examine the effect of the blasting.

The results of the trials are summarised in Table X. Refer also to Sketches V and XV.

Table X.

Summary of the Trials with Explosives in Meercat Colonies. 23.11.37.

No. of Colony.	Type of Colony.	Approx. size of Colony.	Total No. of Holes.	No. of Holes Charged.	Amount & Grade of Explosive Used.	Effect of Explosion.	Nature of Soil.	No. of Meercats Chased In.	No. of Meercats Killed.	No. of Meercats Found Alive.	REMARKS.
1. (1)	Under-ground.	20' diam.	16	6	3 lbs. of 40% Dyna-mite.	Slight Upheaval.	Dry Loam.	4	Nil.	11	5 Meercats were found in one blind tunnel 3 ft. underground & 15 ft. away from the surface burrows, and 1 female and 5 young were found in another blind tunnel also 3 ft. underground and about 30ft. away from the central colony.
2. (73)	Under-ground.	24' x 30'	19	9	10½ lbs.of 40% Dyna-mite.	Fairly violent upheaval.	Dry turfy loam.	4	1	3 (escaped during the night)	Here again what appeared to be long blind tunbels were located and digging was stopped.
3. (60)	Under-ground.	90' diam.	68	25	22½ lbs.of 40% Dyna-mite.	Violent upheaval. Stones thrown up.	Sand, rock and gravel.	-	4	-	Digging was not completed. It is surmised that one meercat escaped at night.
4. (45)	"Trassie Bos"	20' diam.	11	11	9 lbs. of 40% Dyna-mite.	Sand thrown into the air and roots of bushes loos-ened.	Sand.	1	4	1	On returning after blasting one meercat was ob-served to crawl out and stagger away.
5. (41)	"Trassie Bos"	12' diam.	Not counted.	1	5 lbs. of 40% Dyna-mite.	Half the mound blown away.	Sand.	1	2	-	It is now known how many meercats were in this Colony. It is possible that one escaped alive.
6. (46)	"Trassie Bos"	21' diam.	Not counted.	10	7 lbs. 40% Ammon. Gel.	Mound in-completely demolished.	Sand.	-	-	-	Indefinite result. An attempt to put down jumper holes was made here but was unsuccessful on ac-count of the sandy nature of the soil.
7. (50)	"Trassie Bos"	35' x 25'	25	18	20½ lbs. 40% Ammon. Gelignite.	Spectacular effect. Roots of bushes well loosened.	Sand.	3	1	2 (es-caped)	Portions of the mound were not affected by the blast.
8. (14)	"Trassie Bos"	18' diam.	12	9	12½ lbs. 40% Ammon. Gelignite.	Sand well scattered and bushes torn up.	Sand.	2	2	-	No evidence was found of any meercats having es-caped between the time of blasting and the time of digging up.
9.(127)	Under-ground.	90' x 45'	50	22	26 lbs. 50% Ammon. Gelignite.	Considerable upheaval especially in rocky portion.	Hard yellow soil & rocks.	-	1	-	The total number of meercats in the colony at the time of the blast is not known. The deepest crater formed was 3 ft. deep.
10.(123)	Under-ground.	60' x 45'	41	15	18 lbs. 40% & 50% Ammon.Gel.	Ground well disturbed near the charges.	Red Soil.	-	3	-	Several portions of the colony away from the charges were left intact.
11. Tromps-burg.	Under-ground.	75' x 45'	Not counted.	25	20 lbs. 50% Ammon. Gel.	Fairly well disturbed.	Very rocky.	-	-	1	Local shattering. The meercat found crawled out after the blast.
									18	18	

Remarks.

In one instance three holes were put down with a jumper in a "Trassiebos" colony, but owing to the dry, sandy nature of the soil, on withdrawing the jumper the holes became partly filled with sand. An attempt was also made to chamber one of the holes, but on firing one ⅞" x 4" cartridge in it, it became completely filled up with sand.

It was suggested, that holes should be put down in underground colonies by means of jumpers, to increase the blasting effect but even if the difficulty of sand filling the holes was overcome, this method was regarded as impracticable, as a very large number of holes would be required to cover a colony and even then there would be no certainty of the explosion reaching meercats in long blind tunnels.

From the table it will be seen that, in spite of the large amount of explosives used in some colonies, the results were very disappointing. As many meercats survived the explosion as were killed. Even in cases where half the sand mound was blown away, live meercats were found.

The following reasons for the disappointing results were deduced.

In underground colonies, charges cannot be pushed down to any depth owing to the winding of the tunnels and consequently only local shattering results.

The explosion does not appear effectively to penetrate into the lower levels of the burrows and it would appear that meercats in the ends of blind tunnels about 3 feet underground and well away from the surface burrows are practically immune from the effects of the blast.

Other factors tending to reduce the efficacy of the blasts are that charges cannot be properly tamped in the burrows owing to the size of the latter and that sand in the burrows has a damping effect on the explosion. In rocky ground where concussion should be greater, it was

found that quite large cavities exist under the boulders and also that burrows are more widely spaced, tending to reduce the effect of the blast. See sketch XV.

In "Trassiebos" colonies a good deal of the sand is scraped out, which, combined with the fact that the mounds are composed of sand, would have the effect of reducing the concussion to a very great degree. It was thought, that in those colonies where meercats were found dead, that they had been partly stunned and then suffocated by the fallen sand and explosive fumes.

Conclusion.

Owing to the amount of explosives necessary to blast a colony and the time required to charge up, coupled with expense and poor results, it is concluded, that the use of explosives for the destruction of meercats and their burrows is not a practical proposition.

4. Poisoning with Bait.

One of the commonest methods of eradicating vermin is by means of poisoned bait.

On preliminary trials it was found that the yellow mongoose would devour the fresh carcasses of birds, which were shot and placed near their warrens. Experiments were then carried out to test the efficacy of Strychnine sulphate.

Experiment 1.

⅛ grain of strychnine sulphate was fed in a piece of meat to Cynictis (juvenile) at 2.48 p.m. At 6.40 p.m. the animal showed signs of incoordination of movements and died during the night.

Experiment 2.

¼ grain of Strychnine sulphate dissolved in 5 c.cs. of water was injected subcutaneously into the left thigh of a Geosciurus. The animal died after two minutes,

showing violent convulsions and arching of the back.

Remarks.

Poisoning the yellow mongoose on a large scale is not recommended, owing to the danger of large stock getting access to the bait, especially in pica areas.

The danger towards native piccanins is even more real, as piccanins may pick up and eat the bait if birds are used.

On a small scale where an owner wishes to kill off a few chicken thieving mongooses, poisoning may be practicable, but the method is obviously involved, uncertain and dangerous for general use.

B. Attempts at Large Scale Eradication of Meercats.

Having determined the best method of destroying the yellow mongoose, experiments were planned to investigate the possibilities and the technique to exterminate it in large areas, and to see the extent to which migration back into the areas of the yellow mongoose would take place.

For this purpose, two adjoining farms Beestekraal and Middagson, in the Hoopstad District, were chosen on account of (a) being infected with rabies, an outbreak in a dog having occurred there on the 27th March, 1937, and (b) being situated in typical mongoose country.

General Description of the Farms Beestekraal and Middagson.

The two farms mentioned are rectangular in shape, about 1¾ miles wide by four miles long, bordering on the Vetriver on the South.

From the Vetriver, on which they have about three miles frontage, they stretch northward into a sandbult for approximately three miles. Both farms are ring fenced, and subdivided into several fenced camps. The farms Beeste-

kraal and Middagson are about 1,400 and 1,000 morgen respectively in extent. On Beestekraal about 400 head of cattle, including a few horses have been kept for the previous three years, while there were 100 head of cattle running on Middagson.

Topographically both farms can be divided into two distinct parts, viz. a low lying area adjoining the Vetriver, and the higher part in the sandbult. The Bloemhof-Hoopstad main road running from East to West, incidentally corresponds to a line separating these two parts.

That part of the low lying area immediately adjoining the Vetriver is flooded with water in the rainy season, when the river overflows its banks. The water disappears soon after the river has subsided. The soil, which becomes very hard when dry, is a black clay. This area is marked by tall trees, mostly Acacia Karroo. From the low land the ground rises very gradually up to the main road, where it merges into the sand-bult by a sharp rise. The soil here consists of clay in the deeper layers and sand in the superficial layers. The vegetation is sparse, but characterized by "Trassiebos" mounds (Acacia Stolonifers) which average 10-20 yards in diameter and are spaced from 20 to 100 yards, with an occasional Acacia Karroo in between.

The sand-bult portion starts with a sharp rise from the main road, and rises steadily until the northern boundary is reached. The soil is of a very loose sandy nature and easily blown away when dry. The vegetation consists of various species of tall grasses and Camel-thorn trees (Acacia Giraffae) which forms the climax stage.

The altitude of the farms is 4,100 feet.

Observations Made.

The two farms together were treated as one area,

and to facilitate plotting as well as systematic covering of the ground, was paced off and marked into squares of approximately 400 yard sides.

After tracing the outer boundaries on squared paper, the flagged squares were also marked on it.

Each flagged area was carefully searched for meercat colonies, which were marked and numbered for identification purposes, and the site recorded with a corresponding number on the sketch plan. Detailed remarks, as to the size of the colony, whether there were signs of it being inhabited and the probable or known numbers of inhabitants, were made. The latter observations were made as meercats, when disturbed, usually rushed back into their colonies to take refuge.

It was generally possible to determine the species of meercat inhabiting a colony by the spoors and the fact that Cynictis usually selects a spot near its colony to the leeward of some bush, stone or in a hollow to defecate, and fresh faeces in such a spot near the colony indicates the presence of Cynictis.

During the excursions to locate the colonies, notes were made on the nature of the soil on which the colonies are located, the habits of the meercats, the occurence of food. A general survey of the flora and fauna was also done at the same time. The diet of the different species of animals and birds, that were found in the area was established by examination of the stomach contents of those shot or trapped.

It was realised at the outset that in order to exterminate the yellow mongoose and the suricate, that those colonies occupied by the squirrels had to be gassed as well, as these animals live in very close association and often congregate in the same colonies. It was also obvious that,

unless all colonies were closed, one would not be able to judge whether all the mongooses and suricates had been destroyed. In any case the squirrel is regarded as vermin on account of the destruction to mealie fields and one thus felt quite justified in including it in the campaign against the other two species.

As soon as the locating and flagging of the colonies was completed, a task which took about a month of fairly continuous work, gassing operations were started.

The technique of gassing a colony with Calcium Cyanide dust has been described already.

The routine adopted at the commencement of the operations was shortly as follows: Early in the morning before the meercats had dispersed, natives were sent out to watch the inhabited colonies in a given area. They were instructed to chase back into their warrens any meercats seen to emerge and then to keep guard pending the arrival of the gang armed with the gassing apparatus.

All the natives including those of the advance party carried spades with which to close all uninhabited colonies and to fill in any stray holes they came across in the veld.

This was continued until about 11 a.m. as it was found that after that time and until late in the afternoon very few meercats were seen. The operations were resumed at about 4 p.m. and continued until dusk.

Periodic inspections were made of the colonies that were gassed, and any that were found reopened were regassed.

It was soon found that several colonies had to be gassed repeadedly, e.g. Colony 61, inhabited by Geosciurus, was gassed five times without any conclusive results. It was found in many instances that only a single warren was