

reopened and in order to save dusting powder, time and labour, gin traps were set at these burrows.

On account of this experience the routine was then changed somewhat. Instead of gassing reopened colonies, traps were set at the warrens that were found to have been reopened, until the animals responsible had been trapped.

Two natives were then detailed to make periodic inspections of the areas, that had been treated and at any warrens, that they found open they had to set traps. If a trap remained unsprung for two days, it was removed and the hole was closed.

On or about the 5th February, 1939, the routine was again changed. Instead of having advance parties, all the natives with the gassing outfit set out together and walked in extended rank formation spaced at from 50 to 150 yards according to the density of the grass. This procedure proved very effective to round up the meercats and so chase them into their warrens, which were then gassed. This procedure had the further advantage in that the work could proceed uninterruptedly. In the area so traversed all colonies were fumigated, unless they were obviously not inhabited, when they were merely closed.

A complete record of each colony was kept, giving the dates of subsequent visits and regassing, whether any warrens were reopened, the number of traps set and the results.

The following is a brief summary of the histories of the colonies found and treated on Beestekraal and Middagson:

- (a) In all, 150 colonies were located.
- (b) 35 colonies were unoccupied, but 6 became occupied later, after the first summer rains.
- (c) 65 colonies of those that were gassed remained

closed until the 2nd of March, 1938, when the operations were completed.

(d) 50 colonies were reopened by meercats subsequent to the initial gassing. Of these, in 13 instances were meercats actually seen to inhabit them again, and eleven of these were regassed. In the other 39 the inhabitants were not seen, but numerous tracks were seen and seven inhabitants were trapped.

(e) 29 colonies were not revisited again until some time afterwards, when they were found to have been reopened.

(f) 21 colonies were still closed on a re-inspection some days after the gassing, but were found reopened at a subsequent inspection.

#### Remarks.

(a) In all, some 150 colonies were found on the two farms. In some instances two to four colonies existed very close to one another, especially in the "Trassiebos" area. These were collectively given one number, but were identified separately with alphabetical letters, e.g. Col. 68: a, b and c.

(b) 35 colonies were marked as uninhabited or abandoned colonies, which were not gassed but closed in; of these, 6 were later found to be inhabited viz. Nos. 32, 66, 81, 98, 150 and 152. No. 32 was found inhabited on 3.1.38. It was then gassed and was still closed on 5.2.38. On the 9th February some holes were reopened and traps were set with the result that 2 squirrels were trapped. The holes were then closed again and were still closed on the 2nd of the following month.

The history of two of these colonies is given in detail, to indicate to what extent they became occupied and how they were treated.

Colony 98.

The colony appeared uninhabited on 11th January, 1938. On the 25th one warren was found reopened, and was closed again as no signs of its being inhabited were seen. On the 1st of February several warrens showed fresh excavations. The colony was gassed and the holes were closed. On the 14th it was still closed, but five warrens were found to have been reopened on the 21st. The colony was again gassed and remained closed until the 28th. On the 1st of March two warrens were reopened and traps were set, but were again removed after two days as they were not sprung.

Colony 150.

On 28.1.38. the colony appeared as if it had been vacated and was visited repeatedly until the 22nd of February, when seven warrens were found open. Numerous fresh spoors were present. The colony was gassed and remained closed until the 2nd of March.

The other two colonies 66 and 152 remained closed when they were gassed.

(c) Out of the total number of colonies that were found inhabited and gassed, 65 remained closed after only one gassing. In 38 instances of these either one or more were yellow mongooses or squirrels and in three instances were both species of animals seen to enter immediately prior to gassing.

(d) Of the total number of colonies gassed 50 were reopened by meercats or other animals subsequent to the gassing. Of this number 21 colonies were closed on re-inspection at different times, while 29 colonies which were not visited for some time were found open at the subsequent inspection.

In 13 cases of the 50 which were reopened, meercats were actually seen to enter and inhabit these, and

eleven of these remained closed on regassing, while the other two had to be regassed several times. In the other colonies traps were set, and in seven instances the new inhabitants were trapped.

In order to indicate the difficulty obtained in some instances to destroy the inhabitants of the colonies, and to show how they became reoccupied, the history in detail of a few colonies is given.

#### Colony 63.

On the 30th December, 1937, two squirrels entered the colony whereupon it was immediately gassed. On the 3rd of January it was still closed. On the morning of the 11th January several warrens were found open, and two squirrels and two mongooses were trapped. On the 13th a further Cynictis was trapped, whereafter the colony remained closed until the 28th February.

#### Colony 87.

On the 11th of January, three Cynictis were seen to enter whereupon the colony was gassed. It remained closed until the 14th, when two warrens were found to have been reopened. The colony was regassed after the other holes were reopened to allow the free circulation of gas.

On the 3rd of March one warren was found reopened, and a trap was set but remained unsprung for two days.

#### Colony 101.

On the 9th November four Cynictis and five Geosciurus entered the burrows. On the 4th December one Cynictis was trapped. On the 4th January four Geosciurus and three Cynictis were seen to enter the colony whereupon it was gassed. On the 12th there were signs of it being inhabited again, and one Cynictis was trapped. The colony then remained closed up to the 28th February.

Colony 110.

On the 10th January, as fresh tracks and faeces were found, the colony was gassed at 12 noon. On the 27th five warrens were found open showing fresh excavations. The colony was again dusted.

On the 21st of February two warrens were opened and fresh tracks were found. The colony was regassed. On the 24th it was still closed, but one warren was reopened on the following day, when a trap was set and a Cynictis was trapped. On 1st March it was still closed.

Colony 131.

On the 12th January a Geosciurus entered the colony when it was gassed. On the 21st it was still closed. On the 7th a Cynictis and a Geosciurus entered and two traps were set. A Geosciurus was trapped on the 10th and a Cynictis on the 15th. On the 21st of February a Myonax was trapped in the same colony. On the 23rd another Cynictis was trapped. The colony then remained closed.

Colony 140.

On the 12th January 4 Suricates, 5 Geosciurus and 4 Cynictis emerged from the colony, but were chased back, whereupon the colony was gassed. On the 28th five warrens were found to have been reopened, fresh tracks and faeces being present.

On the 28th the colony was regassed. On the 9th of February six warrens were found reopened, whereupon the colony received a further gassing. It then remained closed until the 23rd when 3 warrens were once more reopened, and two Cynictis were trapped. It then remained closed until 2nd March.

Philip - Hoopstad District.

On the 10th April, 1938, experiments were arranged

on the farm Philip, to follow up the gassing of colonies, with systematic trapping of the meercats that had escaped gassing, and those which filtrated into the ground already treated and which were responsible for reopening colonies treated. Secondly to repeat some of the hydrogen cyanide concentration experiments in colonies.

#### General Description.

The farm Philip is situated seven miles to the south of Wesselsbron at an altitude of 4350 ft. and is 1400 morgen in extent. The average annual rainfall is 15.20 ins.

The larger part of the farm consists of a sand-bult with numerous small pan-like depressions. The sand-bult slopes down to a large pan, typical of that part of the country. The soil in the bult is of a deep sandy nature, in which mealies are extensively cultivated. The whole bult is devoid of trees, except for a small patch of young Acacia Karroo near the northern boundary.

The sandy soil gradually changes on the slopes near the pan into a brown turf, with lime subsoil. The pan contains water during the rainy season, but soon dries up leaving a level caked bed.

#### Vegetation.

The vegetation consists mainly of a mixed variety of grasses, with Arastida, Themada and Chloris spp., Cynodon and Aristida being dominant on uncultivated lands. The stand of mealies in the different fields was good owing to abundant rains.

#### Fauna.

The majority of the meercat colonies were situated along the slopes of the big pan, and were mostly inhabited by Geosciurus, although Cynictis was fairly prevalent as

well. The owner informed us that a large family of *Suricates* periodically inhabited different colonies along the pan.

The colonies on the bult were usually close to the mealie fields and along the slopes of the panlike depressions. The former were predominantly occupied by *Geosciurus*, while *Cynictis*, which favoured the bult, occupied the colonies along the panlike depressions.

One was struck by the scarcity of Korhaan and other ground birds. Very few springhare (*Pedetes Caffer*) inhabited colonies were seen. The few that did exist were inhabited by individual animals only. This was explained by the owner who stated that a Springhare club existed in the area, aiming at total eradication, by systematic hunts etc., as they cause considerable damage to the mealie crops.

*Hodotermes* were plentiful and very active. An outbreak of rabies occurred on this farm in an ox on the 7th November, 1937, and on the 23rd May while the experiments were in progress a rabid *Cynictis* was found in the same camp, where the ox took sick.

#### Procedure.

As the object of the experiment on Philip was to follow the gassing up with systematic trapping and so to exterminate the meercats on the farm. It was therefore arranged that a definite area be gassed each day. The day following the gassing of a particular area, the area was covered again to set traps at any warrens that had been reopened. This was followed by periodic inspections at short intervals to set fresh traps if necessary. The trapping was continued until no further holes were reopened.

For the purpose of working out a daily programme a survey of the farm was made and the colonies located were

roughly marked on a sketch map. It was then very easy to divide the whole of the farm into areas, special consideration being given to localities where the colonies were more closely situated together, so as uninterruptedly to gas such an area in one day in order to minimize the chances of reinfestation from neighbouring colonies still untreated.

Results and Observations.

(a)

In all 92 colonies were located on the farm, of which 13 were uninhabited and not gassed, but only closed.

(b)

Of the 79 colonies gassed, 45 remained closed until the 26th May, when the operations were completed, i.e. when it was considered that all the meercats on the farm had been exterminated. 34 of the colonies were reopened subsequent to the gassing.

(c)

Eleven colonies were reopened once only.

(d)

Seven colonies were reopened twice.

(e)

Eight colonies were reopened three times or more.

(f)

In 20 instances where colonies had been reopened, no meercats were trapped.

(g)

Only one colony was reopened on the day following gassing.

(h)

In two instances only colonies were reopened on the 2nd day following the gassing.



(i)

In two out of the thirteen colonies regarded as unoccupied at the time of the general survey of the farm, warrens were reopened. In the one case was a Cynictis trapped and while the trap remained unsprung in the others.

(j)

On the 25th and 26th of May, when the final inspection was made, only nine colonies showed meercat activity. In three cases the traps were not sprung, while in four instances meercats were trapped, viz. three Geosciurus, one Cynictis and one Suricate. In the remaining two cases no further observations could be made, owing to departure from the farm.

(k)

In twelve cases the colony was dug open by meercats between the 4th and 10th day after gassing.

Subsequent Inspections on Beestekraal,  
Middagson and Philip.

In order to determine to what extent meercat migration will take place into areas in which meercats have been exterminated, subsequent visits were paid to the farms Beestekraal, Middagson and Philip.

Beestekraal and Middagson.

Visits on the 7th, 8th and 13th April, 1938, i.e.  
33 days after the operations had been suspended. Out of 110 colonies visited, mainly on the area North of the Bloemhof-Hoopstad main road, 31 colonies were reopened, of which 18 only showed signs of being inhabited. The other 13 were abandoned. Colonies 113 and 110 each had 9 warrens reopened, numerous fresh spoor were seen and the usual heap of fresh faeces of Cynictis was present. In colonies 63 and 68, eight and three warrens respectively, were reopened and a Cynictis and a Geosciurus escaped into them.

Visits on 24th to 26th November, 1938,  
i.e. 10 months afterwards.

Some 105 colonies were visited. While 32 colonies showed definite signs of being inhabited, 88 were still closed or partially opened but abandoned. The extent to which the colonies were reopened varied a great deal. In the smaller ones all the holes were reopened, while in the bigger ones only some of the holes on the periphery were reopened and occupied. It was found that the colonies near the boundaries of the farms showed more meercat activities than those near the centre of the farms, although some of the colonies towards the centre of the farms were also well attended.

The only area into which meercats had definitely not migrated was that in the vicinity of the farm-yard.

An attempt was made to take a census of the meercats, but owing to the tall grass this had to be abandoned. Only twenty mongooses and ten suricates were seen. From the activities present at the various colonies, it was estimated that the reoccupation of the colonies was from one to three per colony, so that the total number at a conservative estimate, was from fifty to sixty meercats on the farm.

Visits on 8th June, 1939.

An excursion was made to the farm Beestekraal only some fifteen months after the initial operations. In the sand-bult all the colonies that were encountered had been reopened and showed signs of long habitation judging by the excavations and Cynictis faeces present. In the majority of cases the fresh excavations were on the periphery of the colonies, the rest of the warrens still being closed. The area in the vicinity of the farm-yard showed very little activity. In the area immediately to the South of the Bloemhof-Hoopstad road all the "Trassiebos" mounds were

excavated and inhabited. Except for the small area near the farm-yard, it was considered that meercat activity over the whole area had reached the same stage as before the eradication took place in the beginning of the previous year.

Philip.

Visit on 29th June, 1938,

i.e. 34 days after the meercats on the farm had been eradicated. Some 44 colonies were visited, of which 29 showed signs of being occupied by meercats. Fresh spoor and/or faeces were found at each of the colonies. Several colonies were completely reopened, e.g. No. 105 had 24 warrens reopened and was occupied by squirrels; No. 139 had 12 warrens reopened. Thirteen colonies had been reopened but no spoors or faeces were seen.

Visit on 27-29 November, 1938.

On this date 80 colonies were inspected with the following results: 21 colonies were reinhabited; five mongooses and three squirrels were seen. As in the case of Beestekraal and Middagson the number of warrens reopened varied from one to ten per colony. Colony 66 had ten warrens reopened.

Visit on 9th June, 1939.

The inspection of the colonies was confined to a portion of the bult along the main road, the vicinity of the pan and the Eastern portion of the farm. All the colonies encountered had been reopened and showed signs of having been inhabited for a long time. The colonies in the sand bult, which were inhabited by *Cynictis* had only a few warrens on the periphery reopened, while those inhabited by *Geosciurus* had all the warrens reopened. The distribution of the meercats were more or less even

over the area visited.

Remarks on the Observations Made and Results  
Obtained on the Farms Beestekraal, Middagson  
and Philip.

(1)

In both the areas about half of the number of colonies that were gassed were reopened subsequently to being gassed. The reopening of the colonies was ascribed to the following:

(a) To meercats, that had escaped the gas in the colony and had dug themselves out.

(b) To meercats, that were away at the time of gassing, and had returned to dig themselves in.

(c) By meercats, that wander from colony to colony, probably looking for mates. They usually open a few holes but not being attracted go away again.

(d) By meercats from elsewhere which migrate into new hunting ground where they find suitable shelter by merely opening up and cleaning out existing colonies.

These animals were all trapped.

(2)

If an analysis is made of the results obtained on Philip, where the gassing of the colonies was followed up by repeated inspections, it is seen, that some colonies become reoccupied at different intervals. In some instances this occurred as many as three times, e.g. colonies Nos. 6, 62, 115 etc.

The new inhabitants of a colony do not necessarily consist of the same species as the original ones, but they may consist of a different species of meercat, or by all three species.

Taking into consideration those colonies only, where the new inhabitants were trapped, the analysis shows that nine colonies became reoccupied between the 6th and

10th days, six between the 11th and 15th, six between the 16th and 20th, three between the 21st and 25th, four between the 26th and 30th and three after the 30th day following the gassing.

Migration of meercats therefore takes place to a greater extent soon after an area has been treated, but as the number of meercats available in the neighbourhood is being steadily reduced by gassing and trapping, the rate of migration becomes reduced, until finally a stage is reached when the infiltration becomes negligible.

After the extermination of meercats in any locality by the methods outlined above, it should be a comparatively easy matter if so desired to maintain effective control over such area with very small expenditure of time and money, by making frequent periodic inspections and setting traps at any warrens, that have been reopened.

Especially would this be the case with *Cynictis*, the most important carrier of the disease. This animal, unlike *Geosciurus*, when occupying a new colony only opens and uses a few warrens on the periphery.

## (3)

If, on the other hand, no check is placed on the migration of meercats on to such a farm, it soon becomes reinfected with meercats, as is clearly shown by the observations made on the subsequent visits to Beestekraal, Middagson and Philip. In both instances after an interval of 33 days on the first mentioned farms 18 out of 110 colonies visited, and in the latter 29 out of 44, were reoccupied by meercats, and some months later something near the normal density of population was restored.

## (4)

The migration of meercats into an area in which they have been exterminated does not take place in the form

of a general movement of a section of the population from the adjoining untreated ground, but it occurs in the form of a steady infiltration by individuals looking for new hunting ground. Since the new hunting ground affords adequate shelter by merely opening up and cleaning out existent burrows, the invaders prefer to remain in the new area.

## (5)

The distance to which Cynictis and Geosciurus may migrate, is not known. In the case of Suricata, it is known that it migrates over long distances. But that migration of Cynictis and Geosciurus from colony to colony over short distances, normally occurs is obvious from the fact that colonies left or abandoned by meercats of their own accord become inhabited again later. It seems also that constant movement by individuals or families takes place from colony to colony, even in the same hunting ground, and that migration is not due entirely in the case of Cynictis or Geosciurus of exhausted food supply.

## (6)

During the last visit to the two farms on which the experiments were carried out, seven places where colonies had been dug up and totally destroyed, were visited, and in not one instance were warrens dug again on those sites.

In 1936 Dr. Thomas gassed, dug up and completely destroyed all the colonies in an area about ten morgen in extent, near Odendaalsrust. At subsequent visits by him and myself it was found that the whole area was invaded by meercats and that they have dug their warrens on the sites of the colonies that had been destroyed. The fact that it did not happen on either of the two farms Beestekraal or Philip is that the areas were big and that warrens were available by merely cleaning them out, whereas in the