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Report of the Division of Entomology.

FOR THE YEAR ENDING 31st DECEMBER, 1945.

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MEDICAL AND VETERINARY.

Tsetse Fly Operations. In all the northern areas covered by controlled game elimination operations, satisfactory progress in the control and eradication of the tsetse, *Glossina morsitans*, Westw., can be recorded. Over large areas, amounting in all to some four thousand square miles, the fly has been greatly reduced in density and over the greater part of this area fly has been either eradicated or reduced to the vanishing point. This area is additional to the 6,000 square miles cleared up to 1941 and includes most of the country included within the zone of operations when the line of native hunters was pushed forward in 1940. A very wide fly-free barrier has now been created between any known fly and any areas likely to be required for European settlement in the near future. Native areas in the Bubi, Lomagundi, Hartley and Darwin districts have been given further protection and many hundreds of square miles of additional grazing have been provided. All fears concerning the safety of the Wankie Game Reserve have been dispelled—it is hoped for all time. This great national asset is now secure, its status can be guaranteed in perpetuity and, as many consider desirable, its boundaries could be enlarged.

Along our Eastern border the position is much more difficult. Animal trypanosomiasis in the Chipinga district has been heavier than last year, although nothing like as severe as in 1939 and succeeding years. More farms have been involved, but the actual death rate has been kept low by treatment. Further south the position has deteriorated rapidly. Heavy losses of stock have occurred in the native area all along the border from the Umselezwe river to the junction of the Sabi and Lundi rivers, a distance of about sixty miles. The position is now regarded as grave and as justifying extreme measures. Consequently Government has decided to create a cattle free-game free belt along the border. Steps to implement this decision are being put in hand by the Native Affairs Department.

South of the Sabi river the threat of fly invading the Gono-re-Zhou Game Reserve in the Chibi district has grown closer. Fly has continued to spread westward along the south bank of the Sabi river in Portuguese East Africa and is now within twenty miles of the border.

The position in the Mtoko district has not changed and the threat of invasion in this area remains. One case of trypanosomiasis occurred on the Umtali Commonage.

Visits, Conferences and Investigations. In July a combined investigation of the fly position in Portuguese East Africa was carried out by officials of this Colony, the Union of South Africa and the Colony of Mozambique. The object of the investigation was to ascertain the present distribution of tsetse in Portuguese East Africa south of the Sabi river and to estimate the potential threat to tsetse spreading into the Gono-re-Zhou Game Reserve in Southern Rhodesia and the Kruger National Park in the Union of South Africa. Southern Rhodesia's representatives were Mr. E. J. Kelly Edwards, Conservator of Forests, Mr. D. A. Lawrence, Director of Veterinary Research, Mr. R. R. Staples, Government Ecologist, and the writer. The visit was particularly instructive and the personal contacts made most valuable. The party received

much hospitality while in the Union and in Portuguese East Africa, for which I desire to express my deep gratitude.

In August representatives from the Colony were invited to Nairobi to meet the East African Standing Committee on Tsetse and Trypanosomiasis and also Professor P. A. Buxton, of the London School of Hygiene and Tropical Medicine, and a number of the Colonial Office Committee on Tsetse Fly and Trypanosomiasis. Valuable discussions were held on the organisation of tsetse fly research in East Africa and on the use of D.D.T. against tsetse. Representatives of all the East and South African States were present at the meeting.

On the return journey from Nairobi, on the invitation of the Government of Northern Rhodesia and Mr. T. Vaughan Jones, Acting Director of Game and Tsetse Control, the writer visited Broken Hill and Namwala to inspect the anti-tsetse measures in progress.

In December the writer was invited to visit Maun, Ngamiland, to advise on further measures against tsetse in that area. Mr. H. E. Hornby, a member of the Southern Rhodesia Trypanosomiasis Committee, accompanied the writer on this visit.

Trypanosomiasis Committee. Seven meetings of the Trypanosomiasis Committee were attended. The principal matters under discussion were concerned with the tsetse fly position on the Eastern Border and the general policy to be adopted in connection with the creation of game reserves. The Committee was asked to make recommendations on the generous offer of the Beit Railway Trustees to provide two entomologists for work on tsetse fly, particularly on the use of D.D.T., in tsetse control in Southern and Northern Rhodesia. The Committee, with the consent of the two Governments concerned, has undertaken to supervise the work of these men when they are obtained.

One meeting of the Committee was attended by delegates from Northern Rhodesia (Dr. Pielou) and Nyasaland (Mr. Colin Smee).

Three members of the Committee, including the writer, were nominated as members of the Standing Committee on Tsetse Fly and Trypanosomiasis of the Central African Council.

The Committee published an article in the *Rhodesia Agricultural Journal* on "The Scientific Basis of the Control of *Glossina morsitans* by Game Destruction."

Visitors. Dr. de Souza, of the Sleeping Sickness Mission, Zibue, Portuguese East Africa, and Professor Quintanelha, Lourenco Marques, visited the office to discuss tsetse fly control.

Game Destroyed. The number of game destroyed on these operations was twenty eight thousand and eighty six (28,086) for

an expenditure of 58,843 rounds of ammunition, or 2.1 rounds per head. The number of each species killed was:—

Elephant	12	Duiker	7,518
Rhinoceros	25	Steinbuck	165
Buffalo... ..	465	Sharpe's Steinbuck ...	3,177
Zebra	381	Klipspringer	912
Eland	342	Oribi	187
Kudu	3,551	Livingstone's Suni ...	40
Roan	159	Warthog	2,736
Sable	940	Bushpig... ..	506
Wildebeest	5	Lion... ..	2
Hartebeeste	89	Leopard	20
Waterbuck... ..	498	Cheetah	1
Tsessebe	59	Hyaena... ..	17
Reitbuck	761	Baboon	2,029
Impala	1,595	Wild Dog	6
Bushbuck	1,888		

SHORT SURVEY OF THE OPERATIONS BY DISTRICTS.

Darwin. The area covered by tsetse fly operations in the Darwin district comprises the most easterly extension of the great northern fly belt of the Zambesi Valley. The floor of the Valley here, south of the Zambesi river, is some fifty miles wide, half of which lies within the Colony. Since the inception of these operations in 1939 the eastern spread of the fly within the Colony has not only been halted but the fly belt has been driven back some fifty miles, say, from the Masingwa river to the Messingwa Dande river. Incursions of fly south of the escarpment have been stopped. West of the Messingwa Dande fly densities have been very considerably reduced and the main belt broken up into isolated pockets in which fly may persist for some years. These favoured foci are associated with the dense Rukondi and Dokwe thickets in which elephant are fairly numerous, and with the Sowe salt pan and Dambatuli pan, two favourite haunts of game.

Between the Umsengedzi river and the Kadzi river fly is present in any considerable density only close under the escarpment, the lower end of the Kadzi being practically free from fly. Fairly dense fly is found at the junction of the Mkumbura and Umsengedzi rivers just north of the international border.

In Portuguese East Africa fly has continued to spread down the southern banks of the Zambesi river and Umsusa, the terminus of the Uleri lorry service is now heavily infested including a considerable stretch of the road in Portuguese East Africa leading south to Darwin.

Doma. The area covered by these operations lies entirely in the Zambesi Valley north of the escarpment and extends from the Angwa river on the west to the Kadzi river on the east where it joins up with the Darwin area. Fly is mainly confined to the mopani and mixed forest along the Kadzi, Ambi, Dande, Hunyani and Angwa rivers. Some decrease in fly densities have occurred over the whole area except on the western boundary along the Angwa river. Close under the escarpment fly is only to be found

in small numbers. The lower portion of the Kadzi river appears to be now free from fly. Definite results are now beginning to appear after five years of hunting. No tsetse were seen south of the escarpment during the year.

European settlement of the cleared area south of the escarpment, that is in the old fenced Doma area, has begun.

Urungwe. The general position in this area remains satisfactory, although a few cases of animal trypanosomiasis were recorded.

West of the Urungwe Native Reserve fly densities have progressively decreased and only a few small pockets of fly remain to be dealt with, principally on the Uranda river, the Chiroti river (Dekete Vlei) and the Nyadara river. In the northern portion of the area heavy concentrations of fly are found in the low veld on the Gachegache, Naodsa and Kasega rivers and also in the vicinity of Chipane and Gota Gota. East of the main Chirundu road to the Angwa river a few fly still persist on the Rekometje and Chewore rivers. Below the escarpment the whole length of the main Chirundu road is lightly infested with fly up to the Zambesi.

Last year authority was given to destroy elephant and rhinoceros in a small area of the Urungwe district in order to give additional protection to the cattle recently introduced into the Urungwe Native Reserve. The area included a very dense fly focus below the escarpment in the vicinity of the Hot Springs on the Sundi river. A number of permits have been issued to Europeans to shoot in this area, but owing to the shortage of heavy calibre rifle ammunition and the restrictions on the use of petrol and tyres very few people have taken advantage of the scheme. Native hunters armed only with Martini-Henry rifles are afraid to shoot elephant, but have no fear of the rhinoceros. Consequently little progress has been made in the eradication of elephant in this area. Continued hunting has, however, disturbed these animals and it is considered probable that they can be driven to seek refuge elsewhere and that the desired results can be obtained without destroying the majority of these animals. The total eradication of rhinoceros from this limited area is probable within the next year as these animals are easy to shoot and are very restricted in their feeding grounds.

Early in the year three test herds of cattle were placed on farms in the area reserved for European settlement known as the Karoi Block. These were composed of native stock purchased outside the Lomagundi district and eight well bred bulls. They were distributed on farms which were considered to be closest to any known fly and in the vicinity of roads coming from known infested areas. Cattle running on these farms would be more likely to pick up any infection than on any of the other farms in the surveyed area. One hundred cows, twenty young tollies, two Sussex bulls and two Hereford bulls were placed on farm K 54 on the eastern boundary of the Urungwe Reserve; fifty cows, one Sussex and one Hereford bull were put on K 82 near the Miami landing ground, and the same number of K 92 on the Rekometje river, opposite Grand Parade Farm. No special provision was made for winter feed excepting a little protein feed for the bulls, which they refused to take. A dip tank was

built on K 54 and regular weekly dipping enforced. The cattle had to live off the veld. It was a severe test both for the cattle and of the area as a cattle country. On the whole the native stock remained in good condition throughout the winter, but all the bulls fell off considerably in condition, particularly the four bulls on K 54. At the end of October these four bulls were removed and placed under the temporary care of the Government supervisor on K 13. The Sussex bull on K 92 developed trypanosomiasis soon after being placed on the farm. It was treated with one dose of Phenanthridinium S 897 and recovered. No other cases of the disease developed in any of the remaining cattle in this herd and none in the herds on K 54 and K 82. The test will be continued until April or May, 1946, when the test animals will have been in the area some fifteen months, including most of two wet seasons. These cattle have been under constant European supervision and blood smears of every animal were taken on two different occasions.

The remaining cattle in the Miami area, some 6,500 head, have been twice inspected by the Cattle Inspector, Sinoia, and except for a few cases on Rekometje Block and amongst some Roads Department cattle which has been working in or near known fly only one other case of animal trypanosomiasis was detected. This beast was at the Valley Mine. Native owned cattle in the Urungwe Native Reserve, some 4,200 head, have remained in good condition. All the dams built by the Irrigation Department filled and good water supplies were maintained throughout the dry season. An additional dam has been constructed on the Badza river. About 160 miles of road were maintained. European settlement of the "B" block of farms has commenced.

Lomagundi S.W. The areas cleared of fly north of the Umfuli river have been kept clear of fly. South of the Umfuli river very good progress has been made in dealing with the small focus of fly at Ruswingo vlel and on the Waka and Mcheke rivers. These should be eradicated very soon. West of the Sanyati river the gains previously made have been held and fly reduced in density over the whole area covered by the operations.

Gatooma. The hoped-for final eradication of fly from the Hartley district was not achieved despite intensive efforts to deal with the few remaining pockets of light fly which persist north of the Sakugwe river. The density of fly in these areas is now so low that on some days no flies can be picked up even after prolonged and intensive search.

West of the Umniati steady progress has been made and fly driven further back from the Umniati river. More native cattle have been introduced into the cleared areas east of the Sanyati reserve.

Sebungwe (late Wankie). The very large area south of the Mkulugusi ridge previously reported as having been cleared of fly has remained clear. Many new herds of cattle have moved into the old fly area between the Gwaai and Shangani rivers and a number of new cattle dips have been built along the Shangani river west of the Shangani Native Reserve.

A new Native Department Station has been created at Lupani and considerable development of this old fly area is taking place.

Game is returning to, and increasing in numbers in, the old cleared area.

North of the Mkulugusi belt fly densities have been further reduced over a very large area. In many parts fly has been exterminated and in the remainder exists only as single individuals. All classes of game, including elephant and rhinoceros which are protected, are still present in the area but, apart from elephant and rhinoceros which have increased, are very much reduced in numbers. These animals are very wild and difficult to hunt.

A geological survey of the area was carried out in June by Mr. A. M. Macgregor, of the Geological Survey, who fixed the main topographical features on the map. Some interesting fossils of the Karoo age were discovered in the Madumabisa shales of the Busi river basin.

North of the line of operations heavy fly densities associated with numerous and fairly large herds of game are to be found. Some losses of stock from trypanosomiasis again occurred on the Zambezi river south of Binga's.

About one hundred miles of veld roads were maintained.

Eastern Border (Chipinga). One hundred and thirty-two positive smears were recorded from the area involving twenty-three farms. Nearly half the total recorded cases occurred on two farms, namely, Mount Silinda where there were fifty cases, and Woodbine with thirteen. Generally the infection was light, most farms having only one or two cases, though the disease was widespread.

A total of 167 tsetse were caught on or near the border clearing comprising 137 *G. pallidipes*, 13 *G. brevipalpis* and 17 *G. morsitans*. Of these, 24 were caught in Southern Rhodesia, namely, 14 *G. pallidipes*, 9 *G. brevipalpis* and 1 *G. morsitans*. All these flies were caught in the Cherdza and Inyamadzi valleys. The majority of the flies (137) were caught in traps of which 165 were in use.

A considerable area of partial clearing was carried out on the farms Mayfield and Ferncreek and the subsidiary clearing on Grampians, Farfell, Gungunyana and Stirling was widened. Slashing back of regrowth over the whole of the main and subsidiary clearings and over the partial clearings on Southdown, Eastleigh, Helvetia, and Sherwood was carried out. Owing to early rains it was difficult to organise a burn over the whole area at one time and the clearings had to be burnt off section by section. On the whole a very good burn was obtained over most of the area. Native labour was again difficult to obtain.

Sabi Valley. Heavy losses of stock have occurred in the low veld below Chikore. About 600 head of cattle died from animal trypanosomiasis at various points along the Border on a front of about sixty miles, i.e., from the Umselezwe river to the Sabi-Lundi junction. The majority of these deaths occurred in the vicinity of the Hondi where 326 head died and at Mangazi dip where there were 130 deaths. The herd belonging to Chief Mahenya has been reduced over the past four years from over 600 to 94. At one time it was considered that this herd would

have been exterminated entirely, but as the herd became reduced in size the percentage of deaths decreased. This herd now consists almost entirely of young stock.

The position has deteriorated during the year to such an extent that it became evident that unless drastic measures were taken at an early date all the cattle along the Border would eventually die. These animals now form an additional source of food for tsetse invading the Colony from Portuguese East Africa and may also act as a stepping stone by means of which fly would eventually reach the Sabi river. In consequence the Government, on the urgent representation of the Trypanosomiasis Committee, has decided to create a game free-cattle free belt along the Border from Beacon 98 to Beacon 107. Active steps are now being taken by the Native Affairs Department to remove these cattle from the danger zone.

As a temporary measure, and to assist the Veterinary Department in controlling an outbreak of foot and mouth disease, all hunters were removed from the Ndanga district. These rifles have been re-distributed along the Lundi and Sabi rivers.

South of the Sabi river, in Portuguese East Africa, fly has continued to spread up the river and is now within twenty miles of the Border.

Traffic Control. Three stations are maintained in the Miami area to examine all south bound traffic for tsetse. A fourth station is maintained at Chirundu to de-fly all traffic proceeding north into Northern Rhodesia. The numbers of motor vehicles using the main Chirundu road has remained fairly constant during the war, but a great increase is expected when the restrictions on motor tyres and petrol are removed; at the moment the traffic is composed chiefly of Government vehicles. Motor traffic on the road leading to the mica mines west of the main Chirundu road is more numerous than traffic using the main north road.

The number of tsetse caught at these stations shows no marked change.

The following traffic was examined at these stations:—

(a) *Vuti Chamber*: 488 motor cars bringing 17 flies (9 males, 8 females); 1,963 pedestrians, 403 cyclists (858 parties) bringing 12 flies (5 males, 7 females); total 29 flies (14 males 15 females).

Compared with 1932 (106), 1933 (94), 1934 (178), 1935 (454), 1936 (519), 1937 (241), 1938 (162), 1939 (62), 1940 (25), 1941 (67), 1942 (49); 1943 (56), 1944 (27).

(b) *Catkin Chamber*: 578 motor cars bringing 34 flies (23 males, 11 females); 1,565 pedestrians, 390 cyclists (1,147 parties) bringing 27 flies (19 males, 8 females); total 61 flies (42 males, 19 females).

Compared with 1944 (15) (five months only).

(c) *Makute Gate*: 365 motor cars bringing 222 flies (156 males, 66 females); 1,410 pedestrians, 147 cyclists (425 parties) bringing 340 flies (262 males, 78 females); total 562 flies (418 males, 144 females).

Compared with 1944 (100) (four months only).

(d) *Chirundu Gate*: 214 motor cars bringing 84 flies; 1,026 pedestrians, 121 cyclists (421 parties) bringing 401 flies; total 485 flies (sex unknown).

Compared with 1940 (360), 1941 (119), 1942 (276), 1943 (746), 1944 (473).

Other Medical and Veterinary Insects. Some further reports of mass occurrence of the Sepsid fly, *Paratopopoda* sp., referred to in my report for 1944, were received. The cause of these occurrences has not been investigated.

For the first time in the Colony, leopard has been recorded as a host of the Bont Leg Tick, *Hyalomma impressum transiens*, Schulze.

ADMINISTRATIVE.

Plant Regulatory Board. Six meetings of the Plant Regulatory Board were held. Matters discussed included:—

1. Regulations which exclude Bacterial Canker of Tomatoes (*Aplanobacter michiganense*). It was decided that the existing regulations should be rigorously enforced.
2. The influence of the local cotton spinning and weaving industries on the importation of cotton lint from other African territories and the danger of importing the Pink Bollworm, *Platyedra gossypiella*, Saund.
3. The grading of deciduous fruit from the Union of South Africa.
4. The illegal sale of nursery stock.
5. The carriage of pests by air.
6. Proposed Seed Act.
7. Localised outbreak of Late or Irish Blight in potatoes (*Phytophthora infestans*).
8. Export of seed potatoes.
9. Countering the threat of importing Ring Rot of potatoes caused by *Bacterium solanacearum*.
10. Reports of the spread of Citrus Black Spot (*Phoma citricarpa*) in Natal.
11. South African restrictions on the introduction of Elm and Zelkova timbers.
12. Proposals of Pest Control, Ltd., Cambridge, England, for demonstrational experiment in field spraying of tobacco.
13. The regulations restricting the importation of sugar cane from Portuguese East Africa.
14. Import from carnation nurseries in the Union of South Africa.

Plant Protection Act, 1942. No new regulations nor amendments were made.

Plant Import Regulations, 1943. The number of consignments and packages of plants, fruit, etc., dealt with at the ports