G.F.T.C.—5842—(140)

NYASALAND PROTECTORATE

Annual Report of the Department of Game, Fish and Tsetse Control for the year ending 31st December, 1953

A. STAFF AND GENERAL

1. At the beginning of the year the headquarters of the Department were moved to Fort Johnston and this, coupled with the fact that it was some time before proper office accomodation could be found at the new station, caused some disorganization during the early part of the year.

2. The move was designed to place the headquarters organization in closer touch with fishery matters, and to relieve the housing shortage in Blantyre.

3. The regular establishment of the Department remained as in 1953 but Mr. Beauchamp, Tsetse Survey Officer, went on leave pending termination of agreement at the end of the year. He will not be replaced, as the field work of the survey is now completed. The establishment on the fishery side was increased temporarily by the arrival of the five members of the Fishery Research team at Nkata Bay during the latter part of the year. This team is financed jointly by the Colonial Development and Welfare Research Grant and the Governments of Northern Rhodesia and Nyasaland and will spend some two years in Nyasaland before withdrawing to its permanent base in Northern Rhodesia.

4. Mr. Gifkins, Trout Warden, was on leave from April 2nd to September 6th. Mr. Sanson, Fisheries Officer, proceeded on leave on 4th February and returned on 3rd September. Mr. Borley, Director, was on leave from 29th July to the end of the year. Mr. Mitchell, Tsetse Entomologist, was appointed as Acting Director during his absence. Mr. Rickman, Tsetse Ranger, went on leave in mid-December.

5. The staff position as at 31st December is set out in Appendix I.

B. GAME

6. The gradual shift of emphasis of crop protection activities away from control of vermin and towards dangerous game, continued more or less as planned. Armed hunters were further reduced in numbers and tended to be employed more in cordons surrounding and containing game concentrations in Reserves and other such areas, and less on activities within cultivated areas. A larger amount of action by the cultivators themselves was called for and, on the whole, secured, in concurrence with the reduction of armed hunters who may be said to have dealt with the worst of the vermin problem in a good many areas. Local co-operation and initiative still leaves much to be desired but it does seem to be beginning to evolve. Four District netting teams are now in being and private action against vermin, under the stimulus of bounty payments, seems to be on the increase.

7. It was still not possible to station an officer in the Northern Province, owing to housing difficulties, and only small teams could be maintained there, as in the latter half of 1952. As before, they were administered by District Commissioner, Rumpi, and Tsetse Ranger, Karonga. They did useful, if not very decisive work, particularly in the case of the Rumpi team. The local cultivators of Nkata Bay continued to display initiative and vigour in their private attacks on vermin. They accounted for some 2,463 head, for which they received bounty payments.

8. In the Central Province the egress of heavy game from the Kasunga and Kota Kota Reserves was again prevented by small cordons of hunters. The Kota Kota team also carried out attacks against the Domira Bay hippo in special defence of the rice production scheme in that area.

9. The Hill area team, based on Dedza, was less disassociated from vermin control than that of Kota Kota, and continued to make some direct attacks, chiefly in Fort Manning and Kasungu Districts and on the Kasungu–Dowa border. This action was combined with the starting of Native Authority netting teams in Fort Manning and Kasungu. They are not wholly successful in themselves but have the advantage of forming a sort of nucleus for a good deal of private action. Attempts to start a team

in the Bwanji Valley, however, failed dismally, owing to the lack of interest of the local inhabitants, and indeed it may be that previous direct action has so reduced the baboons as to make it no longer a matter of urgency to deal with them. A European estate-owner in the locality has stated that in his opinion baboons have been vey materially reduced since the direct attacks of 1951 and 1952.

10. In the Kota Kota–Dowa Lake-shore areas vermin are now left to private action and the Dowa Lake-shore netting team. This is now financed nearly entirely by the Native Administration and directed by it.

11. There was a good response to the offer of a bounty for vermin destruction, particularly in Kota Kota, Fort Manning and Dowa Districts, where the District Administration gave very strong and practical support to the Game officers' propaganda. A total of 3,451 head were dealt with in the Province as a whole.

12. In the Southern Province the team was very considerably disorganized, firstly, as a delayed effect of the unavoidable gap in supervision, caused by absence of the Game Control Officer on leave during the latter half of 1952, and secondly by the disarming and disbanding of the hunters during the disturbances of September, 1953. The team in fact never got properly into its stride.

13. The elephant of the Majete were again contained by a cordon of hunters, protecting the cotton lands of the Mwanza River, and there was some general action in the sparsely inhabited area to the south of the river, where it is hoped to encourage increased settlement. In general, however, the local attitude was unco-operative to the point of hostility and it seems that no further action can well be taken in Chikwawa District till the situation improves on this respect.

14. Some successful sorties were made against elephant in the central Shire area and the southern part of Ncheu during the latter part of the year, the last being in defence of the wheat lands.

15. There was little or no major action against baboon, but a District netting team was successfully started in the area of N.A. Tengani in the Port Herald District.

16. The details of African Staff employed and animals dealt with are set out in Appendix II. Inevitably, numbers of kills are less than previously in conformity with the reduction in size of teams and shift of emphasis to the less numerous heavy game.

17. The revenue side of the effort is set out in Appendix III. As previously, considerable quantities of meat were given to Native Administrations for disposal.

18. Crocodile hunting by private enterprise continued and 1,213 reptiles were dealt with. Of these 619 were trapped by Africans with materials supplied by the European licensees.

19 The lessening preoccupation with the problem of vermin control, which, owing to the large teams of hunters involved, demanded continuous supervision by the Game Control Officers, made it a little more possible to pay attention to game conservation.

20. The work of the Game Reserve Guards, as distinct from Game Control Guards, received considerably more attention than in previous years and the Reserves were much better patrolled than before. A number of cases were successfully taken before the courts. Since previously poachers have seldom been even caught, let alone punished, this represents an improvement on the previous situation.

21. Reports on Kasungu, Mwabvi and Kota Kota Reserve suggest that they are all quite well stocked, and the game in Kota Kota Reserve appears to be definitely on the increase. In the course of making a rough Jeep track in the access route to the Lifupa River, in the interior of Kasungu Reserve, the Game Officer reports " The road passes close to two waterholes used by various types of game. Almost every day, while there, I saw zebra and hartebeeste near these waterholes and on a few occasions saw rhino. There was a rhino cow with a small calf which favoured one waterhole and was often seen ". The Mwabvi Reserve also appears to cantain quite a number of resident rhino. Reports from the Nyika grasslands also suggest that the area has benefited very considerably from the prohibition on hunting proclaimed at the beginning of 1952 and roan and zebra are now fairly easily seen in condiserable numbers.

22. During the year a new Game Ordinance was enacted but is not yet in force, pending the settlement of Rules to be made under it. Amendments in the boundary description of Kota-Kota Reserve were still under consideration by Government at the end of the year.

23. The numbers of game licences taken out during the year is set out in Appendix IV.

C. FISHERY

State of the Lake Fish stocks:

24. Records of catch per single haul of net suggest that the stocks of the offshore species of Tilapia maintained the fairly high level reached in 1952, while those of the inshore species appeared to be holding their own though still at only a moderate level.

25. Table II of Appendix V and Table IIB of Appendix VI show observations in respect of ring nets and large meshed seines, which are mainly concerned with the Tilapia fishery. It will be noted that in the case of ring nets, the catches of one firm have declined somewhat but those of the other increased very considerably, so that the overall picture shows a rise.

26. Total landings of Labeo and " Barbel " by non-African firms showed a rise but this seems connected more with increased use of gill nets than with any significant change in stocks. Catches in African-owned nets showed a slight improvement.

27. There is little to report in connection with other species except some return of the true " *Utaka* " (mostly *Haplochromis quadrimaculatus*) to the South-east arm where, in the small meshed seine-net fishery, its place has been temporarily taken over the last two years by *H. phenoclidus*, now apparently in a decline. This small meshed seine fishery used to be primarily for the true " *Utaka* " so there may possibly be some small commercial benefit from the change of dominant in the " *Kambuzi* " group.

28. Immature Tilapia did not figure so largely in these small meshed seine catches as they have done in previous years.

Non-African fisheries:

29. The year opened with five licensees, two in the S.E. arm and the remainder in Central Province waters.

30. Both the firms in the S.E. arm had a satisfactory year's fishing and expanded their efforts quite considerably. New craft were ordered or constructed and one firm introduced mechanical haulage on its fishing boats.

31. Major emphasis was, as usual on ring netting for Tilapia but there was a 7 per cent. increase in the use of gill nets, psobably dictated largely by the state of the weather.

32. The main groups of fish showed the following increased landings:—Tilapia 6 per cent., Labeo 13 per cent. Barbel 8.3 per cent. This gave a weight increase of some 140 short tons above 1952 and brought total landings to over 2,000 short tons. This seems a very respectable increase over the 398 short tons of 1948.

33. Outside the S.E. arm, progress was disappointing. One firm made an attempt to start a ring-net fishery from a base at Kota-Kota in the Central Province, at the tail end of the 1952/53 season. The early results were not encouraging and trouble with boats prevented the effort being pressed at the opening of the 1953/54 season.

34. The remaining two licensees took no observable steps to start fishing or work on the construction of shore bases.

The African fishery.

35. The rate of African fishing in Lake Nyasa probably remained fairly stable on the whole. There was a considerable decrease in the use of small meshed seines at Malindi, probably as a result of the decline in *H. phenoclidus* referred to above, and there was no compensating effort in other directions. On the other hand a drop in the use of gill nets at Mateweri was offset by increased catches of Tilapia and Labeo in the shore seines.

36. Rising consumption of imported gear reflects a gradually increasing interest in more serious fishing in the part of the African population. A commerical firm has now undertaken import on a considerable scale and several of the older firms now stock some gear as a sideline. All in all there must have been a significant increase in consumption of this better quality material since it was introduced by the Department.

37. It is worth noting that the fishermen now begin to grasp something of the economics of buying good quality gear, even at its higher price. Flax is in better demand than cotton and even quite expensive nylon begins to find a market.

38. Increasing interest was displayed in boats to replace the unstable dug-out canoe and many enquiries were received concerning larger powered craft. The oared boats, produced by the Department, were in fair demand but it is difficult to assess how many of the enquirers after powered craft would put down the money if it came to the point.

39. The dominant element in the African fishery is still the part-time subsistence fishermen, but there is a gradually increasing class of men in the S.E. arm who are making serious attempts to put their effort on a full-time commercial basis, investing capital of £100 or so in boats and gear. There are similar individuals in the Central and Northern Provinces but owing to lack of funds for travelling it has not yet been possible to make much contact with them.

40. Unfortunately, the commitment to fishing for a livelihood, while it should bring considerable profit in the long run, robs them of the flexibility that the part-time fisherman retains by his partial adherence to agriculture. So far the progressives have tended to make a commitment to fishing too big to leave much to spare for agriculture and yet not quite big enough to yield sufficient turnover at present prices. Either capital assistance or enhanced market prices appear to be necessary to help these embryonic businesses through their growing pains.

41. There is, however, no doubt that a largely commercial fishery is the pre-requisite of any really big expansion and improvement. Only the man dependant on fishing for a livelihood can be expected to take full advantage of new methods, support an organized market system and produce a reasonably regular supply.

Fish trade.

42. There were no very significant changes in the trade during the year.

43. The non-African firms continued to find difficulty in disposing of cured fish in ponderable quantities though the prices quoted did not appear out of proportion to what could be obtained for the the uncured product. They therefore continued to put their emphasis on the fresh fish trade.

44. There was little improvement in the standard of handling and presentation on the up-country markets. A tentative attempt was made to introduce a grading system, carrying a small proportion of the fish with special care and offering it at a slightly higher price than the average, for the sake of the discriminating buyer. Unfortunately, the attempt was made without any publicity—or even verbal information to the Department—and it is reported that the graded and ungraded fish was bought with equal readiness. The attempt was therefore discontinued. This is not very surprising. Discriminating consumers, most of whom make their purchases through servants, were simply not advised that there was to be any opportunity to exercise discrimination.

45. It is plain, however, that the market is, in the main undiscriminating, and, as such, not able to stand the prices which the presentation of all fish in first-class condition would entail.

46. The greater part of the African trade remains in the hands of middle-men, who continue to reap the major part of the profits from the African industry. This does not make for expansion and development of the production side but while so much of the production is by casual operators it is not possible to organize any better system.

47. A few Native Authorities and Village Headmen have interfered with fishing to a small extent by laying down maximun selling prices and even forbiding fishing, because the fishermen refused to sell at prices which they considered were unreasonably low. This action was quite beyond their legal powers, but fear of reprisals prevented defiance of these arbitrary orders.

Development work.

48. The sale of imported gear to Africans continued through the year and some £450 worth was bought. Sales were mostly in the S.E. arm, to which section departmental activities in this direction were more or less confined. A rather quiet policy was pursued in deference to the commercial interests now entering the field, and, but for this, departmental sales could have been considerably expanded.

49. Not the least of the advantages of this activity has been the contact maintained with the fishermen, which shortage of funds for travelling would otherwise have made difficult.

50. Boat building continued, but with the reduced Fishery Staff supervision, could not be really adequate and only three boats were completed. At the end of the year, however, orders for eight boats were on hand and only the difficulty of persuading sawyers to produce plank timber prevented full activity.

51. As a product of this boat-building scheme, two carpenters initially employed in it have commenced activities on their own account. They built two craft, one 18 feet and the other 22 feet both of which are reported as being successful.

Experimental work.

52. Some test fishing was carried out with large and small meshed shore meshed seines in the effort to determine what effect a seasonal prohibition of the latter would have on the "*Kambuzi*" fishery and the destruction of immature *chambo*, but much more data is required before definite conclusions can be reached.

53. Gill net setting was continued at the Fisheries Station with useful results. This work had two objects, firstly to determine the relative efficiency of nets made with different types of gilling twines and secondly, to gain concrete information on the basic economics of a purely gill net fishery, which, because of the comparatively small labour force involved, appears to be within the reach of those possessed of limited capital.

54. The conclusion reached was that in the locality in which the sets were made, only nylon nets had a long enough life and caught enough fish to give a real commercial return on the outlay. A wider range of possibilities may well exist elsewhere but lack of a launch restricted activities to the vicinity of the Fisheries Station, which does not seem particularly favourable ground.

55. The Fisheries Research Unit arrived at Nkata Bay late in the year and was barely established by the end of it. Nevertheless work on a suvery of the northern half of the Lake commenced immediately. Operations had to be restricted to the immediate vicinity of Nkata Bay as no launch was yet available, though one had been purchased and was on its way out from England at the close of the year.

56. A routine programme of netting, plankton sampling, collection of other fauna and analysis of Lake water was instituted. Identifications of fish and other animals proceeded and a beginning was made on the establishment of a reference collection.

57. With regard to the fisheries of this area it has become apparent that considerable opportunities exist for a fishery for large *Bagrus*, by means of long lines and gill nets. In respect of the latter, catches seem much higher than those in the S.E. arm and it would seem that this opportunity could be put to immediate and practical use by African fishermen.

Trout Fishery.

58. The Trout Warden was on leave over the trout breeding season so no further artificial rearing was attempted this year. Early in the year, however, further distribution of young stock to the Northern Province streams was made, 2,050 fish being placed in the Chelinda, 2,300 in the Northern Rumpi and 100 in the Luwawa dam, though water temperatures and the general nature of the dam do not suggest it is very likely to be suitable for trout.

59. On return from leave the Trout Warden made surveys of some of the streams flowing from the Kirk Range and it would appear that there are reasonable possibilities in at least one of them. At the request of the Northern Rhodesian Government he also carried out a survey of the streams flowing from the section of the Nyika lying in that territory.

60. Some sixty-one licences, valued at £67, were taken out for the Zomba Mountain streams. Unhappily very few licensees submitted returns of catches and it is not possible to make much estimate of the quality of the fishing. Such few returns as have been submitted suggest a rather better season than those of the previous few years.

Fish farming.

61. *Tilapia shirana* from Lake Nyasa were introduced into ponds connected with the Nchenachena trout hatchery after one or two attempts. Data collected during these operations suggest that this fish, when taken from Lake Nyasa, will not stand a temperature lower than 42 C° at time of introduction, though they appear to be able to adapt themselves to it if introduced at rather higher temperatures and given some days in which to acclimatize themselves. They now appear to be well established and are breeding with the profusion commonly found in similar experiments elsewhere.

62. Test fishing carried out on the Luwawa dam during June showed that *Tilapia sparmanni*, introduced in August, 1952, had at least survived its introduction and may well have established itself. Unfortunately no trace was found of the two other larger growing Tilapia introduced at the same time or of the *Serranochromis* introduced as a balancing predator. The remains of snags, ant-hills, etc., however, made close fishing difficult.

63. The casts scarcely gave a fair sample, so they may yet be there. Further test fishing will be carried out during 1954.

D. TSETSE CONTROL

64. The year saw the completion of the Tsetse Survey of the Central and Southern Provinces and the remaining Tsetse Survey Officers left at the end of the year. The Tsetse Botanist remained to make the final observations on the fly rounds and to write the survey report, in conjunction with the Tsetse Entomologist.

65. Unfortunately, time has not permitted a survey of the Northern Province belts, except the *G. brevipalpis* belt in Karonga District, but these are known to be comparatively small and it is hoped that the survey of them can be carried out fairly quickly by the ordinary departmental officers.

66. The greater part of the work in the Southern Province consisted of completing the survey of the Fort Johnston District, where almost the whole of the Cape Maclear Peninsula is found to be fly infested, although admittedly comparatively lightly.

67. In the Central Province the work consisted of a survey of the south-western corner of Kasungu District, south of the fly concentrations found in the Fort Alston Reserve, and of the hill area of Kota-Kota District. Both were found to be fly free.

68. The *G. brevipalpis* belt in the foothills, fringing the Karonga Lake plain, was further attacked, on the drastic lines decided on at the close of 1952.

69. Results were again encouraging rather than absolutely decisive, as although fly density was markedly reduced a few persisted, even in the areas subjected to drastic clearance. This fact must, however, be considered in relation to the astonishing increase of fly in the areas not yet subjected to drastic clearance, and it would appear that the effort is having to cambat a fly population in the ascending trend of its population cycle.

70. Appendix VII endeavours to show the position in tabular form, giving the average number of flies caught per patrol in the various areas from Ngerenge in the south of the fly belt to Yembe North in the north, throughout the various periods of the year.

71. It will be noted that at the start of the year the vegetation in Ngerenge Katumbi and Yembe South (A. section) was still showing some effect of the action taken in 1952, when part of Ngerenge and Yembe South (A. section) were clear-felled and the lower canopy vegetation of Katumbi was removed. In Yembe North area and B. section of Yembe South, which had not been attacked since about May, 1952, the vegetation was more or less back to normal. The remaining parts of Ngerenge and Yembe South (B. section) were clear-felled during the year, while Katumbi and Yembe North were not attacked.

72. These differences in vegetation condition and treatment were closely paralleled by differences in fly density. Thus the fly in Ngerenge was reduced to almost negligible proportions, that in the section of Yembe South, previously clear-felled remained low throughout the year, and that in Katumbi remained fairly constant. The fly on Yembe North and the B. section of Yembe South was, on the other hand, out of all proportion higher than elsewhere or than previous returns from these areas and though there was the usual seasonal drop in the dry season it only fell steeply in the Yembe South B. section after the clear-felling there.

73. It now remains to be seen whether these clear-felled areas will continue to give low returns of any appreciable time.

74. There is nothing particular to report with regard to the sleeping sickness outbreak in Chikwawa. The area became so politically disturbed in the second half of the year that it was difficult to take much action with regard to it, but there does not seem to be any alarming increase in the number of cases.

75. The decontamination posts were maintained as usual, but are now in a sad state of disrepair chiefly with respect to the doors. The method of construction of these has proved unsound and it is found almost impossible to keep them in a reasonably light-tight condition. A new method of hanging is to be adopted during 1954, which should lead to considerably increased efficiency.

76. Appendix VIII gives the usual figures of traffic and flies caught.

APPENDIX I

Staff as at 31st December, 1953

Director	H. J. H. Borley, M.A.
Tsetse Entomologist	B. L. Mitchell, B.SC., A.R.C.S., C.M Z.S.
Fisheries Officer	A. D. Sanson, B.SC.
Game Control Officers	E. T. Llewellyn
	G. D. Muldoon
	O. J. Carey
Trout Warden	A. V. Gifkins
Tsetse Ranger	C. H. E. Rickman
Tsetse Botanist	B. Steele, B.SC., PH.D.

Fishery Research Organization

Senior Scientific Officer and Officer in Charge	P. B. N. Jackson, M.SC.
Scientific Officers	D. Harding, B.SC.
	G. Fryer, B.SC.
	T. D. Iles, B.SC.
Technical Assistant	M. P. Gilbert

APPENDIX II

Crop Protection Scheme

Table of Animals Killed and Staff Employed 1st January, 1953, to 31st December, 1953

	Totals 1953		*Northern Province*	*Central Province*	*Southern Province*	*Totals*	
Average No. of armed hunters per month	41		6.5	17	7.3	31	
Average No. of netters per month	10		—	6.4	3	10	
Average No. of poisoners	1		—	.4	—	—	
Average total men per month	52		6.5	23.8	10.3	41	
Animals Killed:							
Elephant	125		13	36	14	63	
Hippo	33		5	44	9	58	
Buffalo	6		15	2	2	19	
Water buck	4		1	—	—	1	
Roan, eland, kudu	13		—	—	—	—	
Other buck	58		48	7	7	62	
Baboon:							
Shot	6,253	7,777	554	2,119	198	2,871	3,908
Netted	1,329		—	720	279	999	
Poisoned	195		—	38	—	38	
Pig:							
Shot	150		127	45	3	175	
Netted	—		—	—	—	—	
Poisoned	—		—	—	—	—	
Vermin killed for bounty by private effort	5,411		2,463	3,451	1,142	7,056	
Carnivora	64		3	36	1	40	
Rounds per beast	—		?	1.7	?	—	
Beasts killed per man employed	158		127	124	52	107	

APPENDIX III

Revenue accruing from Crop Protection Activities

Value of ivory	£1,489
Value of meat sold	£178

APPENDIX IV

Game Licences issued during 1953

Type	*No. Issued*	*Value*
Residents'	1,811	£1,811
Protectorate	41	205
Visitors' Full	10	150
Temporary	3	6
Elephant	5	50
	1,870	£2,222

APPENDIX V

Non-African Fishery

TABLE I. TOTAL HAULS OF EACH TYPE OF NET PER ANNUM S.E. ARM

Type of Net	1950	1951	1952	1953
Ring Net. S.E. Arm	2,175	4,264	3,926	3,755
Seine Net. S.E. Arm	36	—	—	—
Gill Net S.E. Arm	609	344	560	600

TABLE II. AVERAGE CATCH PER SINGLE HAUL OF NET

(*Numbers Represent Dozens*)

Firm Type of Net		1950	1951	1952	1953
No. 1 Ring Net S.E. Arm	Tilapia	49	44	66	60
	Labeo	—	—	0.3	0.7
	Catfish	—	—	—	—
Gill Net S.E. Arm	Tilapia	18	13	2	2
	Labeo	56	86	40	36
	Catfish	32	33	6	6
No. 2 Ring Net S.E. Arm	Tilapia	—	26	42	62
	Labeo	—	—	—	0.95
Catfish		—	—	—	—

TABLE III. TOTAL CATCHES OF MORE IMPORTANT SPECIES IN S.E. ARM.

(*Number Represent Dozens. Weight estimated as Short Tons*)

Year	*Tilapia (adult)*	*Tilapia (immature)*	*Labeo*	*Catfish*	*Other*	*Wt.*
1950	97,880	1,423	18,853	11,149	826	1,137
1951	131,247	—	15,557	6,423	848	1,278
1952	214,854	—	25,418	4,659	36	1,978
1953	228,120	—	28,818	5,044	5	2,118

TABLE IV. LANDINGS PER MONTH (*Short Tons*)

Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
256	331	261	262	252	167	107	75	65	91	186	65

TABLE V. NUMBER OF NETS REGISTERED BY NON-AFRICAN FIRMS

	Number	*Average Length*	*Average Depth*	*Fees paid*
Ring Net	4	400 yds	120 ft.	£40
Shore Seine	—	—	—	—
Gill Net	8,000 yds	—	16 ft.	£40

APPENDIX VI

African Fishery

TABLE I. TOTAL NUMBER OF HAULS OF MAIN TYPES OF NET OBSERVED AT RECORDING STATION.

	Large Meshed Seines			*Small Meshed Seines*			*Gill Nets*		
	1951	1952	1953	1951	1952	1953	1951	1952	1953
Malindi ..	—	—	—	6,586	3,323	1,617	—	12	36
Mateweri ..	218	199	186	44	33	13	512	242	30
Shire River ..	1,234	1,476	1,930	—	—	22	—	—	—
Mpemba ..	135	124	64	161	267	155	226	321	219
Monkey Bay ..	84	35	123	72	52	215	9	10	37
Kota Kota ..	34	48	211	6	11	81	322	841	2,185
	(5 *months*)			(5 *months*)			(5 *months*)		
Salima ..	491	625	585	400	170	167	—	3	78
	(5 *months*)			(5 *months*)					
Domira Bay ..	298	153	169	10	20	34	736	574	671
	(11 *months*)			(11 *months*)			(11 *months*)		
Chia Lagoon ..	*Not observed*	722	1,110	*Not observed*	—	—	*Not observed*	31	2
Lake Chilwa ..	*Not observed*		—	*Not observed*		—	*Not observed*		5,575

TABLE II. AVERAGE CATCH PER SINGLE HAUL OF NET AT RECORDING STATIONS.

(*Figures Represent Actual Number of Fish*)

A. Small Meshed Shore Seines.

Period and Station	*Tilapia (Adult)*	*Tilapia (Immature)*	*Labeo*	*Clarias*	*Haplochromids*
MALINDI					
Jan.–Dec. 1951	.3	115	0.09	22.0	596
Jan.–Dec. 1952	.3	—	0.44	0.17	570
Jan.–Dec. 1953	.46	.05	0.47	0.53	455
MATEWERI					
Jan.–Dec. 1951	2.5	10	—	0.4	15
Jan.–Dec. 1952	1.6	460	0.3	0.3	1,250
Jan.–Dec. 1953	1.23	—	—	0.53	905
MPEMBA					
Jan.–Dec. 1951	0.50	20	—	0.17	355
Jan.–Dec. 1952	0.40	10	0.03	0.1	220
Jan.–Dec. 1953	0.72	70	0.34	0.09	310
MONKEY BAY					
Jan.–Dec. 1951	10.97	25	2.10	3.60	3,760
Jan.–Dec. 1952	23.74	30	7.17	1.56	840
Jan.–Dec. 1953	4.08	20	13.14	1.56	1,345
KOTA KOTA					
Jan.–March and Nov.–Dec. 1951	10.7	—	8.00	6.70	135
Jan.–Dec. 1952	40.0	—	4.73	4.36	—
Jan.–Dec. 1953	15.4	90	2.17	4.64	490
SALIMA					
Aug.–Dec. 1951	14.80	—	2.29	2.04	355
Jan.–Dec. 1952	23.28	—	4.73	2.67	80
Jan.–Dec. 1953	20.64	—	6.92	2.60	535
DOMIRA BAY					
Jan.–Nov. 1951	47.80	—	111.60	2.80	—
Jan.–Dec. 1952	6.50	—	1.50	2.50	—
Jan.–Dec. 1953	161.26	—	31.73	11.53	25

B. Large Meshed Seines.

Period and Station	*Tilapia (Adult)*	*Tilapia (Immature*	*Labeo*	*Catfish*	*Haplochromids*
MATEWERI					
Jan.–Dec. 1951	64.50	—	11.9	0.90	—
Jan.–Dec. 1952	102.19	—	1.6	1.40	—
Jan.–Dec. 1953	110.45	—	5.28	0.73	—
MPEMBA					
Jan.–Dec. 1951	82.42	—	7.10	2.70	—
Jan.–Dec. 1952	40.93	—	7.90	2.15	—
Jan.–Dec. 1953	17.38	—	3.56	0.37	—
SHIRE RIVER					
Jan.–Dec. 1951	24.30	—	2.40	0.74	—
Jan.–Dec. 1952	27.53	—	2.84	0.45	—
Jan.–Dec. 1953	31.3	—	2.09	0.23	—
MONKEY BAY					
Jan.–Dec. 1951	100	25	10.40	5.07	—
Jan.–Dec. 1952	38	15	13.89	.63	—
Jan.–Dec. 1953	4	.25	0.89	.37	—
KOTA KOTA					
Jan.–March and Nov.–Dec. 1951	116.0	—	108.32	21.0	—
Jan.–Dec. 1952	69.17	—	91.90	9.44	—
Jan.–Dec. 1953	64.55	3.5	97.17	16.16	—
SALIMA					
Aug.–Dec. 1951	43.00	—	5.0	0.80	—
Jan.–Dec. 1952	59.58	—	8.07	2.85	—
Jan.–Dec. 1953	74.30	—	11.98	3.78	—
DOMIRA BAY					
Jan.–Nov. 1951	171	—	53.00	8.20	—
Jan.–Dec. 1952	159	55	39.76	3.67	—
Jan.–Dec. 1953	127	—	20.58	3.32	—
CHIA LAGOON					
Jan.–Dec. 1951	25.00	—	1.30	8.00	—
Jan.–Dec. 1953	31.1	—	1.56	7.62	—

TABLE III. SUMMARY OF CATCHES BY ALL METHODS OBSERVED AT RECORDING STATIONS

(*Actual Numbers of Fish*)

Station	*Tilapia* (*Adult*)	*Tilapia* (*Immature*)	*Labeo*	*Catfish*	*Haplo-chromids*
Malindi	774	125	770	963	1,059,875
Mateweri ..	22,337	125	1,970	386	22,875
Shire River ..	69,278	937	4,043	1,905	3,875
Mpemba ..	1,884	10,870	2,515	1,387	480,300
Monkey Bay ..	4,700	4,900	3,084	1,619	256,625
Kota Kota ..	15,805	8,250	40,823	9,852	39,500
Salima	52,460	4,875	13,069	3,592	117,450
Domira Bay ..	27,187	3,000	9,827	2,261	875
Chia Lagoon ..	40,289	—	1,723	9,045	—
Lake Chilwa ..	37,388	—	4	10,142	—
Mpamba	2,601	8,250	4,162	2,419	—

APPENDIX VII

Karonga Reclamation Scheme

Period	*Position with regard to vegetation*	*Ngerenge section*	*Katumbi section*	*Yembe S. A section*	*Yembe S. B section*	*Yembe N.*
1st Quarter	No action any section. Yembe N. & Yembe S. (B section) virtually regenerated to natural state Ngerenge and Yembe S. (A section) partly clear felled 1952 Katumbi section lower canopy still showing some effects 1952 clearance	No regular rounds	2.4	2.3	7.1	10.4
2nd Quarter	Clear felling on remainder of Ngerenge *No action elsewhere*	.3	2.7	2.3	8.7	13.4
3rd Quarter	Clear felling on Yembe S. (B section)	.2	1.9	1.7	3.8	7.1
4th Quarter	*No action elsewhere*	.06	2.4	0.9	0.9	9.1

APPENDIX VIII

Summary of Traffic and Flies caught at Decontamination Posts 1953

Post	*Position*	*Number Motor Vehicles*	*Flies Caught*	*Number Cycles*	*Flies Caught*	*Number Pedestrians*	*Flies Caught*	*Total Flies*
Kota Kota ..	Outskirts Kota Kota township (N) ..	1,457 ..	— ..	711 ..	30 ..	31,668 ..	4 ..	34
Chota	Outskirts Kota Kota township (S) ..	— ..	— ..	18,911 ..	5 ..	72,371 ..	11 ..	16
Mbobo ..	Approach to C.P. Highlands Kota Kota–Lilongwe Rd. ..	819 ..	26 ..	8,246 ..	15 ..	21,767 ..	4 ..	45
Mvera ..	Approach to C.P. Highlands Salima–Lilongwe Rd.	6,503 ..	1 ..	3,769 ..	6 ..	4,809 ..	— ..	7
Fort Johnston ..	Outskirts Ft. Johnston township East of Ferry crossing	1,680 ..	297 ..	75,285 ..	4,819 ..	110,919 ..	6,634 ..	11,750
Kasupe ..	Approach to Zomba Highlands Liwonde–Zomba Rd.	4,444 ..	6 ..	14,610 ..	68 ..	14,535 ..	14 ..	88
Lirangwe ..	Approach to Shire Highlands .. From Shire Valley. Matope Rd. ..	4,866 ..	7 ..	10,543 ..	24 ..	12,192 ..	1 ..	32

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