

N Y A S A L A N D



P R O T E C T O R A T E

# Annual Report of the Department of Game, Fish and Tsetse Control for the Year ended 31st December, 1951

## A. STAFF AND GENERAL

1. Rather more settled conditions pertained as regards staff during 1951 than has been the case during previous years, there being no secondments for other duties. There were, however, still some difficulties in the game control side caused by the abrupt departure, without notice, of one officer. His place was, however, filled without great delay.
2. Mr. Llewellyn, Game Control Officer, was on leave from February till June and Mr. Mitchell, Tsetse Entomologist, proceeded on leave on 3rd December. Mr. Rickman, Tsetse Ranger, was on leave from 17th March till 12th August, 1951.
3. The staff of the Tsetse Survey was increased by the addition of a Botanist, Mr. B. Steele, B.Sc., in October.
4. The staff position as at 31st December is set out in Appendix I.

## B. GAME

5. The main emphasis during the year was again on crop protection, but the rather more settled staff position and the progress made in destroying vermin during previous years permitted the payment of some attention to game conservation.
6. In the Northern Province the lack of housing facilities prevented the posting of a Game Control Officer till towards the end of the year and for the first nine months the Game Control Guards were under the part-time supervision of the Rumpi Administration and Tsetse Ranger, Karonga. Naturally, neither officer could spare time to give personal direction in the field and a concentrated effort was not practicable. The two teams were combined under the Game Control Officer after his arrival in October and a concerted effort was made under his direction in the rice and cotton areas of Karonga District. Totals of crop marauding animals destroyed in the Province during the year were 2,298 of which 1,344 were destroyed in the course of the concerted effort under the supervision of the Game Control Officer. Of the total destroyed 2,238 were pig or baboon, 17 were buffalo and eight were hippo.
7. In addition to the above some 2,500 head of vermin were destroyed by private effort, working under the stimulus of a small bounty. Nearly all these were destroyed by the people of Nkata Bay District.
8. In the Central Province the systematic nature of the effort was continued, both the Central Province teams concentrating on the productive Lake-shore plain and low-lying parts of Kota-Kota, Dowa, Dedza and Ncheu Districts with emphasis on the cotton areas. The Lake-shore of Kota-Kota has now reached a stage when the vermin, particularly baboons, are so far reduced that they no longer merit the attention of the armed hunters. A similar result was on the verge of being achieved in the Dowa Lake-shore by the end of the year and decisive protection has been afforded to the low-lying parts of the other two Districts dealt with. An exceptionally valuable step was made by the Game Control Officer, Kota-Kota, who succeeded in establishing district netting teams in both Dowa and Kota-Kota. These teams are at present financed from the general Native Welfare and Development Fund grant for crop protection but are, in the main, directed and supervised by the Native Administrations. That in Dowa District is working particularly well under the stimulus of the interest of the Chiefs and of orders requiring the general public to turn out for vermin drives when called upon. That in Kota-Kota requires a larger measure of attention from the Game Control Officer himself, as the Chiefs have not yet seen fit to make orders compelling a turnout of the general public. The system, at least as it is working in Dowa, points the way to the establishment of a more or less permanent local effort against vermin which can be both financed and supervised by the local authorities. This is badly needed and every effort is being made to apply the system elsewhere.
9. A total of 12,500 head of crop-marauding animals were destroyed by the game control teams in the Province during 1951, of which 12,300 were vermin. A further 2,500 head of vermin were dealt with by private effort under stimulus of bounty payments, mostly by the people of Fort Manning, Dowa and Kota-Kota Districts.

10. In the Southern Province concerted efforts were made in the Shire Valley of Zomba and Blantyre Districts and in the cotton area of Chikwawa District. The abrupt resignation of the Southern Province Officer and month or two of delay in finding a replacement made a short gap in the field supervision of the teams, but on the whole the effort was more systematic and planned than in previous years. Elephant, coming down from the border hills of Chikwawa District, caused considerable damage in the crops of the Shire plain during March and April. Unfortunately, their arrival coincided with the gap between Game Control Officers, but Mr. R. B. Usher, Honorary Game Warden, undertook to lead the attack in driving them back. He shot two, at considerable personal risk, and the herd forthwith departed for the uninhabited hills from which, up to the end of the year, they did not again emerge. A permanent cordon of four hunters has now been established round the base of these hills to turn back any further sorties during the rains.
11. A total of 3,735 crop-marauding animals were destroyed in the Province of which 3,600 were pig or baboon.
12. A detailed analysis of animals destroyed throughout the Protectorate and staff employed is set out in Appendix II.
13. Appendix III shows the value of ivory collected in the course of crop protection, also revenue to the Native Development and Welfare Fund from sale of meat and value of meat handed over to District Headquarters, Kota-Kota, for distribution to Hospitals, Prisons, etc. In addition considerable quantities were delivered to Native Administrations for their use.
14. Crocodile destruction continued in the Southern Province, under the charge of Mr. Jollyman but work was much hampered in the closing months by the failure of the launch supplied to him and it proved impossible to find another. Nevertheless, some 252 reptiles are known to have been destroyed and the western shore of the S.E. arm has been almost entirely cleared. This represents a very valuable contribution to the effort to foster the gill net fishery. In addition to this Government-sponsored effort, one private operator began the commercial exploitation of crocodiles in the Central and Southern Provinces and another in the North. These two dealt with some 598 reptiles between them in the last six months of the year.
15. Experiments were made with a chemical known as Strigatox which there was reason to believe might have properties of repelling game from fields round which it was sprinkled. It did seem to have some such effect, but of too transient a nature to make it of practical value. The Agricultural Department reported unfavourably on the efficiency of the electric fence unit lent to them for experiment and there has not been time to find a suitable place for further experiment.
16. During the year the progress in vermin control made it possible to pay more attention to the game conservation side of the picture and to take some steps towards the enforcement of Licence Regulations and the safeguarding of Reserves. Appendix IV sets out the number of various types of licences issued during the year. Unfortunately, comparative figures for previous years are not available in most cases, but an increase from £33 worth in 1950 at Kota-Kota to £214 worth in 1951 seems of significance. Nevertheless, the total of 1,492 game licences taken out in 1951, as against 4,331 firearms other than revolvers registered for 1950, suggests that there is a good deal of unlicensed hunting. Nineteen-fifty-one arms registrations are not available, but are unlikely to be below those of 1950. Naturally all firearm-owners do not hunt game but it is considered that the proportion is considerably more than the 30 per cent. indicated by the Game licence figures.
17. In addition to the insistence on the possession of Game licences efforts were made to re-establish the sanctity of Game Reserves, particularly the important Kota-Kota Reserve, which had been heavily poached in preceding years, and concurrently suggestions were put forward to Government for the recession of its eastern and extension of its western boundaries, in order to make a more logical allocation of the land for agricultural and game preservation purposes.
18. In spite of the heavy poaching which has gone on in many of the Reserves during recent years the number of animals remaining appears not too discouraging. Elephant, Buffalo, Sable, Hartebeeste, Waterbuck and Eland seem to be fairly plentiful in most parts of the Kota-Kota Reserve while Zebra and Roan are locally plentiful. Rhinoceros were also seen in many areas. In Kasungu, Elephant, Hartebeeste, Buffalo, Roan and Zebra are quite well represented. In the Lengwe the Nyala are now very numerous and appear undisturbed.
19. A new Reserve on the headwaters of the Mwabvi and Dandi Streams in Port Herald District was proclaimed during the year. This is small in extent but contains a number of Rhinoceros and is reported by Africans to contain Nyala. These last have not yet been seen by a European.
20. The area surrounding Majete Hill in Chikwawa District was closed to hunting during the year, largely with a view to keeping the Elephant in it undisturbed so that they may be encouraged to stay there rather than wander down on to the fertile plains.
21. Proposals to prohibit hunting on the open grassland part of the Nyika Mountain mass, were put before Government towards the end of the year and a Proclamation effecting closure was made early in January, 1952. Game in the area was severely depleted during the interval between the opening of an access road and the closure of the area to hunting, but granted the proper enforcement of the closure, it will certainly recover and the area offers considerable possibilities as a tourist attraction. It is unfortunate that it was necessary to reduce the establishment of Game Control Officers at the same time as this area was proclaimed, as enforcement difficulties were thus increased.
22. Proposals for a new Game Ordinance were put before Government in June of 1951. These are still under consideration and discussion.

## C. FISHERY

### *The State of the Fish Stocks:*

23. Data from the S.E. arm suggest a fairly static position with regard to the offshore *Tilapia* and some slight recovery of the inshore species in that locality.

24. Table I of Appendix V sets out catch per unit effort of a "standard" ring net fished by the same firm for a number of years and gives an indication of the abundance of the off-shore species, which forms the greater part of its catch. The slight fall below the 1950 figure is accounted for by the fact that a larger portion of the 1951 effort was in the colder months, when fish are always scarce. Month by month comparisons with 1950 figure show practically no variations, in spite of the introduction of larger meshed nets during the last quarter.

25. The evidence for increase of the inshore *Tilapia* species is chiefly that of increased efforts by the African fishermen, who do not persist in casting if results are poor. Some stations show variations above or below the 1950 figures for catch per unit effort, but on the whole there seems to be a slight rise, or a uniform figure in spite of a greatly increased effort.

26. In the Central Province, however, there seems to be a drop in abundance of the inshore species at Salima and Domira Bay, particularly the former, and this has been reflected by a decreased effort on the part of the fishermen.

27. Data for the African nets, which catch chiefly the inshore species, are set out at Table II of Appendix VI.

28. The yield from Labeo and Barbel showed a considerable reduction in the case of the non-African fisheries. This is accounted for by a considerable decrease in gill netting by the non-African firms, rather than a depletion of actual abundance, the catch per unit effort being not greatly different from that of 1950.

29. Data from the African fishery show a slight overall reduction in catch per unit effort at some stations and suggest a slight decrease in abundance. The big drop in observed yield, however, which is shown by comparison of Table III in Appendix VI with a similar table for 1950, is in the main merely a reflection of decreased observation, particularly at Kota-Kota, and is not evidence of a decreased actual yield.

30. A remarkable change has appeared in the return of the Utaka (*Haplochromis quadrimaculatus* and related species) to the S.E. arm, a big increase in effort being accompanied by an increased catch per unit effort and a greatly increased yield. There has been a similar recrudescence of the Kambusi fishery (*Haplochromis phenochilus*) at Malindi, but not elsewhere.

### *The non-African Fishery:*

31. The development of non-African fisheries suffered a severe blow with the liquidation of Nyasaland Fisheries Ltd., consisting of a South African firm and Colonial Development Corporation in partnership. This firm was started in 1949, with fishing rights over the whole Lake, and a big part of its projected work was to be extraction of vitamins from barbel livers. Unfortunately, a severe drop in the market price made this part of the project uneconomic and the firm expressed its intention of turning to more general fishing. The attempt, however, failed. Another small firm also surrendered its licence during the year but as it had, in any case, long been inactive, this surrender had no ponderable effect.

32. The major set-back described above was, to some extent, compensated for by increased activity on the part of the smaller of the two remaining firms while, the other continued its high rate of production.

33. The effort of these two firms was concentrated mainly on ring netting for *Tilapia*, while the use of gill nets against Barbel and Labeo declined somewhat. There was only a slight increase in total landings but an increase of 34 per cent. in landings of *Tilapia*. It is to be hoped that the non-African firms do not neglect the gill net in consequence of the slight recovery of the *Tilapia* stocks and the reduction of close season for ring netting.

34. The introduction of the 4in. mesh in the last quarter of the year, which might be expected to have depressed catches, does not appear to have had such effect, though the period of its use is too short to allow of firm conclusions being drawn. At least it can be said that fishing in 1951 with 4in. mesh gave precisely the same average catch as did the 2½in. mesh in comparable months of 1950. Measurement and observation have shown the marked increase in the size of fish landed by the larger mesh and even if the number of fish in the catch is reduced the increase of weight of individual specimens is likely to go far to offset this as far as total tonnage is concerned. Unfortunately, present marketing and price arrangements in the Southern Province will not give a compensating monetary advantage to the producer.

35. It must be remarked that there is virtually no improvement on the handling and marketing side of the non-African fisheries and methods remain primitive. There are considerable practical difficulties in the way of improvement but these must be overcome if the territory as whole is to get the full benefit of this natural resource. Here again present price regulations do not encourage competition and improvement of products.

36. General data from non-African records are set out in Appendix V.

### *The African Fishery:*

37. The important feature of the African fishery this year has been the big increase in gill netting. This is probably due, partly to the continued comparative scarcity of the inshore *Tilapia*, which are the object of seine fishing, and partly to the efforts of the Department to encourage the increased use of gill nets.



38. There has been an encouraging increase in the interest of the African fishermen in better equipment and during the year a total of £410 worth of gear was sold to them by the Department. Much of the money to back the original orders was deposited with the Department before orders were lodged and it is thought that this is a good indication of real interest, as distinct from casual opportunism. There is no doubt that considerably more could have been sold had it been available and a Native Development and Welfare loan has been approved for 1952 to finance an expansion of this bulk purchase programme.

39. Unfortunately, the way of the progressive African is not being made easy by his neighbours and it is apparent that envy and suspicion are a considerable obstacle to progress in this field, as in so many others. There have been a distressingly large number of cases in which educated and progressive men have invested quite considerable sums in new fishing equipment and have worked hard to build up a real business, but have found their efforts defeated by the attitude of their fellows. They have either found it impossible to get any labour at all to work their nets, repair the gear or handle the fish or, if they have found labour, it has been at exorbitant rates of pay, sometimes four or five times the local rate demanded for work for a European. It is regrettable to have to record that even some Chiefs have encouraged this hostile attitude on the part of the general public towards the progressive African element. On similar lines was the failure of an attempt by four fishermen to exploit the "utaka" fishery off Cape Maclear by the use of the open water seine or "Chilimila". They were welcomed at first but when they started to land large quantities of *utaka* they became unpopular and were accused of spoiling the local fishing by catching only young Tilapia. In fact they were exploiting a fishery for a species almost untouched in that area and were unpopular solely because of their success. Unless this jealous attitude can be changed it is plain that the African fishery will continue to be small scale, sporadic and primitive for some time to come.

#### *Fish Trade:*

40. Demand in practically all areas continued to exceed supply, and prices paid by consumers in the uncontrolled markets, which are the majority, continued to be high.

41. Supplies to the bulk purchasers in the Southern Province have been poor and it is considered that the present structure of price control has much to do with this. This is because the price of dried or smoked fish in relation to that of fresh is fixed at a point where it pays better to sell the fish fresh than to cure it by these popular methods. Naturally, the emphasis of the non-African firms is on the production of the fresh article, and since there is an unfilled market for fresh fish in the towns and a considerable practical difficulty about getting fresh fish to the bulk purchasers in good condition, the towns have been supplied at the expense of the bulk purchasers. More than this, the fact that the price of European caught fish is controlled in the Southern but not in the Central Province, has led to the development of a trade between the Central Province and the non-African fishing firms of the S.E. arm. In former years these firms cured such proportion of their catch as they were not confident could be got fresh to the Southern Province Town markets. Now it pays better to sell it fresh to itinerant African buyers, several of whom have their own lorries, who cure it and carry it to the Central Province for sale at very high prices. The uneven application of price control to the various types of product is thus directing the production of the type of product least suitable for use by bulk consumers, while the uneven application of control to the Protectorate as a whole is promoting a small but significant leakage of fish from the Southern to the Central Province.

42. A large proportion of such fish as has been cured has been salted and consumers seem rather more willing to accept it than has been the case previously, possibly because a salt fish is considered to be better than no fish at all. General acceptance of this comparatively simply prepared and durable product would make transport and distribution problems far less difficult.

43. In general, export of fish from the territory was prohibited, but early in the year a permit was issued for the export of an isolated accumulation of salt fish which was surplus to market demands and some 9,791 lbs. were exported under this. One firm also produced a quantity of "caviare" made from the roe of *Nchila* (*Labeo mesops*) and some of this was exported.

44. The African fish trade remained almost entirely in the hands of small scale itinerant buyers who bought on the Lake-shore and retailed in the hinterland at high prices. Attempts to foster a more organized trade on a large scale in the S.E. arm, through the medium of African owners of motor transport, continued to be hindered by local price control regulations imposed largely at the instance of the Native Authorities. These are very difficult to enforce with regard to the small scale buyer, who disappears before any complaint can be made to authority, but are to some extent enforceable against the large operator who takes some time to collect his load and must have some sort of a known place of business. The price fixed is very low compared with the market price in the hills, where the regulations do not apply, so that the small operator has plenty of margin with which to outbid the large scale trader and runs less risk of being caught doing so. The result is that those who attempt to deal on a large scale are at a distinct disadvantage and have great difficulty in obtaining fish, except from the European firms, who are permitted to charge a higher price and who now welcome buyers at their Lake-shore depots.

45. Plans were prepared during the year to start a small marketing organization in Port Herald District, financed by loan from the Native Treasuries. Here restrictive local orders will not prevent the organization from out-bidding the individual small scale buyers and there seems a good chance of developing a more organized trade and of passing on a larger share of the consumer price to the actual fishermen. It should be added that in this area most of the fishing is done in a wide marsh and that the catch is already usually brought to a comparatively small number of market sites for sale, so that the problem of collection from innumerable small beaches does not arise in this fishery.

#### *Experimental and Developmental Work:*

46. The proper establishment of the organization for collection of essential data has permitted a beginning to be made on active development work.

47. The most important activity on this side has been the evolution, by the Fish Ranger, of a simple and practical type of plank boat for use by Africans. The introduction of plank boats, which are more seaworthy and less wasteful of timber than dugout canoes, is an important development, as in many parts of the Lake the shortage of canoe trees is becoming something of a limiting factor on African fishing. Three or four boats of varying type were built, some of which were planked with petrol boxing laid diagonally, in an attempt to overcome the difficulty of obtaining supplies of sawn timber, and by the end of the year a "standard" type was evolved. A loan from the Native Development and Welfare Fund has been approved to finance the building of a number of these boats for resale to Africans and orders for them have been coming forward very satisfactorily. It is hoped that, after a period during which boat building is sponsored by Government in this way, the carpenters who have been engaged in it may be persuaded to proceed independently, running their own small business.

48. The primitive but effective wooden rope-making machine, first demonstrated at Kota-Kota during the Nutrition Unit activities of 1940-43, was resurrected and demonstrated on a practical scale and a considerable quantity of rope, as well as light cord for baboon nets, was produced. Efforts were also made to interest fishermen in the preservation of their nets by tanning, a net dipping tank being constructed and a study of local tanning materials initiated. An experimental smoke house was also built at Kota-Kota in preparation for experiments in curing methods.

49. Experimental gill netting was carried out at Kota-Kota and, apart from the data gathered resulted in about 700 lbs. of fish being supplied to the African hospital. Efforts to carry out comparative fishing experiments with shore seines of different meshes gave little in the way of useful results, owing to the number of fish which were taken at any one time being too small to give adequate samples for comparative measurements.

50. Experimental and development work, indeed all the work of the Fishery section of the Department, continued to be gravely handicapped by the lack of a launch.

#### *Trout Fishing:*

51. A big step forward in the development of Trout fishing was possible with the appointment of a Trout Warden.

52. This officer, after some preliminary work on the Zomba Stream, proceeded to a survey of the Northern Province streams, particularly those of the Nyika and Vipya, with a view to selection of suitable streams for stocking and of a site for a small hatchery.

53. Some five or six streams were selected for first attention and by the end of June a small hatchery at Nehenachena was ready for the reception of rainbow trout ova ordered from the Jonkershoek hatchery. The Trout Warden then paid a short visit to the River Research station in Kenya and having had a most valuable glimpse of trout management methods on the Kenya streams, returned in July with some 3,000 eyed shasta ova from the Kenya stock. These were immediately laid in the hatchery and were shortly joined by a consignment of 10,000 from Jonkershoek. The Kenya ova hatched out very well while the Jonkershoek ova, which had been much longer in transit and which unavoidably had a rather rough passage over the last 100 miles of their journey, did quite well under the circumstances. The Kenya ova produced some 1,700 alevins while the South African stock produced about 3,600. There was some later mortality during rearing and mention should here be made of a tragedy which nearly occurred in the absence of the Trout Warden on survey duty, when bush fires higher up the hatchery stream laid a heavy deposit of ash on the hatching pond and caused very obvious distress amongst the young fish. Fortunately, the situation was saved by the prompt action of the wife of the Trout Warden in transferring them temporarily to the cooler, fresher water of the main stream. By the end of the year there were an estimated number of more than 4,000 healthy young fish in the rearing pond. Growth, as judged by the standard of the Kenya hatchery, seemed very satisfactory.

54. On the Zomba streams the main feature of the improvement work was a very drastic clearance of vegetation overhanging and fringing the stream, with the object of letting in more light for the development of plant organisms and rendering proper casting more practicable. A few more boulder weirs were also erected. A number of young trout were moved from the hatchery stretch to the reservoir stretch of the Mlungusi by the Trout Warden and, with assistance of certain noble volunteers, some 29 young trout were transferred from the Mlungusi Stream to the Domasi River towards the end of the year. It is also believed that, contrary to earlier reports, some of the ova imported from the United Kingdom in 1950 hatched out successfully in this stream, as some young trout were reported from the lower reaches of the Domasi about the middle of the year.

55. Fishing on the Mlungusi remained rather indifferent in the main, though there was perhaps a little improvement in size of fish. A total of 30 licences were taken out, with a value of £32.

#### **D. TSETSE CONTROL**

56. The main preoccupation of the Tsetse section of the Department was the prosecution of the Tsetse Survey, two of the four Tsetse survey officers being posted to the Southern Province and two to the Central Province.

57. In the Southern Province the survey of the lower Shire area, Chikwawa and Port Herald Districts, for *G. morsitans* was completed by the end of the year, a subsidiary survey of the same area for *G. brevipalpis* and *G. palidipes* was also virtually completed, while some preliminary work was done towards the *morsitans* survey of Fort Johnston District. In this Province work was held up for a fortnight or so at the end of the year by the requisitioning of two of the survey vehicles for the Protectorate Cotton drive.

58. In the Central Province the survey of the southern two-thirds of Kasungu District, adjacent to the tobacco areas, was virtually completed and the southern two-thirds of the Lake-shore of Kota-Kota District was also covered.

59. The Department also made a survey of a small area in the neighbourhood of Salima which is a prospective site for a cattle holding camp in connection with the projected movement of cattle from the northern areas to the Southern Province.

60. The map included at the close of the Appendices shows the general position as at 31st December.

61. In general the surveys suggest that the area at present occupied by tsetse is rather less than it was some ten or twelve years ago, the continuance of the survey in Kasungu District in particular supporting the conclusion to this effect which began to emerge at the close of 1950, but it is plain that there is a good deal of land which could be reoccupied should optimum conditions recur.

62. The ecology of the tsetse in the Lower River area and Kota-Kota Lake-shore remains somewhat obscure but detailed inspection by the newly-appointed Botanist is expected to reveal the meaning of the pictures drawn by the Survey Officers in these areas. In Kasungu District there seems to be a distinct relationship between the presence of tsetse and of the heavier vegetation of the *Acacia-Combretum* complex which occurs on the better soils and the survey has thus very distinctly pointed the way to reclamation by means of careful direction of human settlement.

63. Valuable information was also produced by the survey on the Kota-Kota Lake-shore, which revealed the presence of *G. brevipalpis* in large numbers in the heavy vegetation fringing the Kaombe River on the outskirts of Kota-Kota Township. It seems probable that this hitherto unknown infestation is responsible for much of the trypanosomiasis which has appeared from time to time in the cattle herds of the Township area.

64. Clearance of tsetse bush in the scarp foothills at the northern end of the Karonga District, in defence of the grazing lands of the Lake plain, was continued. It became apparent that the factor of regeneration in this high rainfall area had been somewhat underestimated, as during the rains of 1951 the vegetation on much of the cleared land reverted nearly to its original state, in respect of density if not toughness, and the fly population made some recovery accordingly.

65. The abandonment in late 1950, at the instance of the Agricultural Department, of the original plan to burn felled bush, may have facilitated this regeneration in some degree. In the dry season of 1951 a plan to control regeneration by repeated reslashing was worked out with the assistance of the Agricultural Department and most of the work done in 1951 was directed to that end. In the southern part of the cleared area efforts seemed very successful and the fly population has declined to negligible proportions. In the northern section there is also a very distinct drop in fly caught by the patrols but the regeneration in the 1951 rains was very prolific in this area and took longer to reduce so that the drop is less decisive. The slower decline in this area may also have been in some degree the result, not of continuance of indigenous fly, but of overflow from the unattacked portion of the belt further up the Songwe Valley.

66. Data of flies caught per patrol, which give some indication of the fluctuation of fly population, are summarized at Appendix VII.

67. No clearance was done at the site of the Shire Valley reclamation scheme of 1950, regeneration of the gallery forest which was removed being negligible. Work was confined to observing the effect of the 1950 clearing, observations being checked against an undisturbed area. The fly density as revealed by patrols certainly showed a marked decline but this was also observable in the case of the control, so it is not possible to attribute the drop solely to the clearances. It must be pointed out, however, that the control area was originally rather less favourable than the reclamation area as a tsetse habitat, firstly that the gallery forest in it being less extensive, secondly, that contrary to what was planned when the control area was chosen, there has been some human settlement of it, and hence disturbance of the vegetation, thirdly that the control area is immediately adjacent to the cleared area and its tsetse population may also have been affected by the clearances.

68. The decontamination posts on the main traffic routes were maintained during the year and data of flies caught at them is given at Appendix VIII.

H. J. H. BORLEY

Director

Game, Fish and Tsetse Control



APPENDIX I

STAFF AS AT 31st DECEMBER, 1951

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 C. C. LINDSAY-SMITH O. J. CAREY
Tsetse Rangers .. .. .	C. H. E. RICKMAN D. G. ARNOLD
Fish Ranger .. .. .	H. DUNLOP
Trout Warden .. .. .	A. V. GIFFKINS
Tsetse Survey Officers .. .. .	I. J. LEWIS, B.SC. P. GRAHAM N. H. F. HARINGTON G. BRAUCHAMP
Tsetse Survey Botanist .. .. .	B. STEELE, B.SC.

APPENDIX II

CROP PROTECTION SCHEME

TABLE OF ANIMALS KILLED AND STAFF EMPLOYED 1st JANUARY-31st DECEMBER, 1951

	<i>Central Province</i>					<i>Totals</i> 1951
	<i>Totals</i> 1950	<i>Northern</i> <i>Province</i> (3)	<i>Kota</i> <i>Kota</i> <i>Teams</i>	<i>Hill</i> <i>Area</i> <i>Teams</i>	<i>Southern</i> <i>Province</i>	
<b>Average No. of armed hunters per month .. .. .</b>	51	12	18	9	10	49
<b>Average No. of netters per month .. .. .</b>	9	—	10	5	3	18
<b>Average No. of poisoners .. .. .</b>	11	—	—	—	—	—
<b>Average total men per month .. .. .</b>	<u>71</u>	<u>12</u>	<u>28</u>	<u>14</u>	<u>13</u>	<u>67</u>
<b>ANIMALS KILLED:</b>						
Elephant .. .. .	28	1	35	18	2	56
Hippo .. .. .	103	8	64	1	32	105
Buffalo .. .. .	53	17	26	—	2	45
Water buck .. .. .	33	1	17	—	—	18
Roan Eland, Kudu .. .. .	46	15	3	1	13	32
Other buck .. .. .	72	16	20	5	14	55
Baboon:						
Shot .. .. .	11,102	2,212	4,557	7,150	3,557	17,476
Netted .. .. .	191	—	986	9	—	995
Poisoned .. .. .	1,917	—	—	—	—	—
		13,210				18,471
Pig:						
Shot .. .. .	215	26	97	12	42	177
Netted .. .. .	—	—	7	—	—	7
Poisoned .. .. .	1	—	—	—	—	—
						184
Vermin killed for bounty by private effort (2) .. .. .	3,951	2,499	1,121	1,038	—	4,658
Carnivora .. .. .	76	2	14	2	65	83
Rounds per beast (1) .. .. .		1.4	2.1	1.3	1.6	
Beasts killed per man employed	191	191	208	514	286	346

NOTES.—(1) Totals of beasts killed in this calculation do not include animals killed for bounty.  
 (2) Numbers deduced from bounties paid out  
 (3) Team without special supervision for seven months.

APPENDIX III

REVENUE ACCRUING FROM CROP PROTECTION ACTIVITIES DURING 1951

Value of ivory .. .. .	£1,073
Value of meat sold .. .. .	£41
Value of meat passed to district headquarters for Hospital, etc. .. .. .	£31

APPENDIX IV

GAME LICENCES ISSUED DURING 1951

Type	No.	
	Issued	Value
Residents .. .. .	1,458	£1,458
Protectorate full .. .. .	40	200
"    Temporary .. .. .	2	4
Visitors .. .. .	1	15
Elephant .. .. .	1	10
	<hr/>	<hr/>
	1,502	£1,687
	<hr/>	<hr/>

APPENDIX V

NON-AFRICAN FISHERY

TABLE I. TOTAL HAULS OF EACH TYPE OF NET PER ANNUM

Type of Net	1948	1949	1950	1951
Ring Net. S.E. Arm .. .. .	1,299	1,599	2,175	4,264
"    "    Malombe .. .. .	—	240	—	—
Seine Net. S.E. Arm .. .. .	505	180	36	—
Gill Net. S.E. Arm .. .. .	319	258	609	344
"    "    Malombe .. .. .	—	58	—	—

TABLE II. AVERAGE CATCH PER SINGLE HAUL OF NET BY ONE FIRM THROUGHOUT THE YEAR (NUMBERS REPRESENT DOZENS)

Type of Net	1948	1949	1950	1951
Ring Net S.E. Arm. Tilapia .. .. .	30	50	49	44
"    "    Labeo .. .. .	—	—	—	—
"    "    Catfish .. .. .	—	—	—	—
Gill Net S.E. Arm. Tilapia .. .. .	11	28	18	13
"    "    Labeo .. .. .	63	69	56	86
"    "    Catfish .. .. .	15	16	32	33
Seine net .. .. .	Abandoned by non-African firms since 1949.			

TABLE III. TOTAL CATCHES OF MORE IMPORTANT SPECIES IN S.E. ARM. (NUMBERS REPRESENT DOZENS. WEIGHT ESTIMATED AS SHORT TONS)

Year	Tilapia (Adult)	Tilapia (Immature)	Labeo	Clarias	Other	Wt.
1948 .. .. .	58,544	4,969	20,494	5,051	514	
1949 .. .. .	63,494	823	12,469	3,851	715	
1950 .. .. .	97,880	1,423	18,853	11,149	826	1,137
1951 .. .. .	131,247	—	15,557	6,423	848	1,278

TABLE IV. LANDINGS PER MONTH (SHORT TONS) 1951

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
49.6	115.1	240.8	164.2	170.2	110.8	75.8	29.5	60.8	115.4	96.5	49.5

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

	Number	Average Length	Average Depth	Fees Paid
Ring Net .. .. .	4	308 yds.	114 ft.	£40
Shore Seine .. .. .	1	600 yds.	23 ft.	£20
Gill Net .. .. .	5,000 yds.		18 ft.	£25
				<hr/>
				£85
				<hr/>



APPENDIX VI  
AFRICAN FISHERY

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

Station	Large Meshed Seine			Small Meshed Seine			Gill Nets		
	1949	1950	1951	1949	1950	1951	1949	1950	1951
Malindi ..	8	24	—	5,208	3,752	6,586	12	56	—
Matewari ..	420	168	218	229	168	44	120	175	512
Shire River ..	891	613	1,234	27	78	—	71	—	—
Mpemba ..	47	85	135	501	397	161	—	49	226
Monkey Bay ..	196	139	84	20	67	58	—	52	9
Kota-Kota ..	380	377	34	166	91	6	—	1,230	322
Salima ..	430	200	491	427	170	400	—	—	—
Domira Bay ..	143	568	298	—	—	10	—	575	736
			(5 months)			(5 months)			(5 months)
			(5 months)			(5 months)			(5 months)
			(11 months)			(11 months)			(11 months)

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

A. Small Meshed shore seines.

Period and Station	<i>Tilapia</i> (Adult)	<i>Tilapia</i> * (Immature)	<i>Labeo</i>	<i>Clarias</i>	<i>Haplo-</i> <i>chromids</i> *
<b>MALINDI</b>					
Jan.-Dec. 1949 ..	0.4	5	0.02	.02	1,045
Jan.-Dec. 1950 ..	1.6	115	0.9	5.00	596
Jan.-Dec. 1951 ..	0.3	155	0.09	0.22	871
<b>MATEWARI</b>					
Jan.-Dec. 1949 ..	1.1	110	—	0.03	380
Jan.-Dec. 1950 ..	2.7	45	0.3	0.4	815
Jan.-Dec. 1951 ..	2.5	10	—	0.4	15
<b>MPEMBA</b>					
Jan.-Dec. 1949 ..	0.1	1.5	0.01	0.02	930
Jan.-Dec. 1950 ..	0.3	2.5	—	0.1	400
Jan.-Dec. 1951 ..	0.5	20	—	0.17	355
<b>MONKEY BAY</b>					
Jan.-May and Dec. 1949	15	150	7	1	240
Jan.-Dec. 1950 ..	17	1,350	32	0.5	835
Jan.-Dec. 1951 ..	10.97	25	2.1	3.6	3,760
<b>KOTA-KOTA</b>					
Jan.-Dec. 1949 ..	23	90	8.7	7	135
Jan.-Dec. 1950 ..	23	5	8.0	6.7	135
Jan.-Mar. and Nov.- Dec. 1951 ..	10.7	—	4.2	3.7	—
<b>SALIMA</b>					
Jan.-Dec. 1949 ..	20.6	—	1.5	2.7	4,900
Jan.-Dec. 1950 ..	42.6	—	5.6	2.8	740
Aug.-Dec. 1951 ..	14.8	—	2.29	2.04	355
<b>DOMIRA BAY</b>					
Jan.-Nov. 1951 ..	47.8	—	111.6	2.8	—

B. Large Meshed Seines.

Period and Station	<i>Tilapia</i> (Adult)	<i>Tilapia</i> * (Immature)	<i>Labeo</i>	<i>Clarias</i>	<i>Haplo-</i> <i>chromids</i> *
<b>MATEWARI</b>					
Jan.-Dec. 1949 ..	266	15	3	1.5	11
Jan.-Dec. 1950 ..	51	—	9	0.3	—
Jan.-Dec. 1951 ..	64.5	—	11.9	0.9	—
<b>MPEMBA</b>					
Jan.-Dec. 1949 ..	58	45	15	7.0	—
Jan.-Dec. 1950 ..	139	55	26	3.0	—
Jan.-Dec. 1951 ..	82.42	—	7.1	2.7	—
<b>SHIRE RIVER</b>					
April-Dec. 1949 ..	28	5	2.0	1.2	—
Jan.-Dec. 1950 ..	25	—	2.6	1.5	—
Jan.-Dec. 1951 ..	24.3	—	2.4	0.74	—
<b>MONKEY BAY</b>					
Jan.-May and Dec. 1949	18	120	7.0	0.1	15
Jan.-Dec. 1950 ..	33	20	4.0	0.8	10
Jan.-Dec. 1951 ..	100.56	25	10.4	5.07	—

KOTA-KOTA											
Jan.-Dec.	1949	..	65	..	—	..	38	..	16	..	—
Jan.-Dec.	1950	..	76	..	—	..	48	..	14	..	—
Jan.-Mar.	and Nov.-										
Dec.	1951	..	116	..	—	..	109.32	..	21	..	—
SALIMA											
Jan.-Dec.	1949	..	34	..	—	..	7	..	6	..	—
Jan.-Nov.	1950	..	133	..	—	..	6	..	4	..	15
Aug.-Dec.	1951	..	43	..	—	..	5	..	0.8	..	6
DOMIRA BAY											
Jan.-Mar. and Dec.	1949		137	..	10	..	10	..	12	..	—
Jan.-Dec.	1950	..	194	..	—	..	41	..	9	..	—
Jan.-Nov.	1951	..	171	..	—	..	53	..	8.2	..	—
C. Open Water Small Meshed Seines.											
MPEMBA											
Jan.-Dec.	1949	..	0.2	..	—	..	—	..	0.1	..	320
Jan.-Dec.	1950	..	0.1	..	—	..	—	..	0.1	..	185
Jan.-Dec.	1951	..	0.6	..	—	..	—	..	0.8	..	1,020

TABLES III. SUMMARY OF CATCHES BY ALL METHODS OBSERVED AT RECORDING STATIONS (ACTUAL NUMBERS OF FISH)

Station	<i>Tilapia</i> (Adult)	<i>Tilapia*</i> (Immature)	<i>Labeo</i>	<i>Clarias</i> etc.	<i>Haplo-</i> <i>chromids*</i>	Other
Malindi	2,032	7,000	576	1,507	5,721,400	7,569
Mateveri	15,452	5,900	14,977	824	78,600	5,970
Shire River	39,332	—	2,967	1,891	—	6,228
Mpamba	11,609	3,100	3,673	1,128	397,800	14,139
Monkey Bay	9,137	1,700	1,021	3,926	218,200	20,531
Kota-Kota (5 months)	4,582	—	4,934	2,861	—	3,303
Salima (5 months)	27,029	—	3,380	1,290	148,900	3,884
Domira Bay	52,130	—	24,357	6,421	—	52,448

\*Small fish not counted individually but measured in four gallon tins. Number of tins converted to numbers of fish on basis of average number per tin round figures only.

#### APPENDIX VII

#### KARONGA RECLAMATION SCHEME

Variations in fly density in the cleared areas as reflected by number of flies caught per patrol. Tables read from S to N of the eastern section of the belt.

Month and Section	1950		1951	
	No flies per single patrol	First Clearance	No flies per single patrol	Re-slashing
<b>NGERENGE</b>				
January	Nil		Nil	
February	3.0		Nil	
March	6.0		16.0	
April	5.0	Started	18.0	Started
May	4.0		2.0	
June	3.0		7.0	
July	1.0	Finished	Nil	
August	Nil		2.0	
September	Nil		Nil	
October	Nil		Nil	
November	Nil		Nil	
December	Nil		Nil	
<b>YEMBE, KATUMBI</b>				
January	10.0		2.25	
February	6.75		2.5	
March	4.75		3.0	
April	2.75		3.0	Started
May	6.0	Started	2.5	
June	No record		3.0	
July	3.0	Finished	3.25	
August	3.25		2.5	
September	3.25		2.5	
October	1.5		2.25	
November	1.25		2.25	
December	1.75		2.75	

YEMBE HILL, SOUTH

January	..	..	..	12.5	..	..	..	3.0	
February	..	..	..	9.0	..	..	..	2.5	
March	..	..	..	6.0	..	..	..	3.5	
April	..	..	..	7.0	..	..	..	3.0	
May	..	..	..	7.0	..	..	..	2.0	.. Started
June	..	..	..	No record	..	Started	..	2.9	
July	..	..	..	"	..	Finished	..	3.0	
August	..	..	..	6.5	..	..	..	2.5	
September	..	..	..	No record	..	..	..	2.5	
October	..	..	..	"	..	..	..	1.5	
November	..	..	..	"	..	..	..	2.5	
December	..	..	..	"	..	..	..		

YEMBE HILL, NORTH

January	..	..	..	8.5	..	..	..	4.0	
February	..	..	..	7.5	..	..	..	3.5	
March	..	..	..	5.5	..	..	..	5.9	
April	..	..	..	5.0	..	..	..	3.75	
May	..	..	..	5.5	..	..	..	2.75	
June	..	..	..	No record	..	..	..	3.75	
July	..	..	..	"	..	..	..	4.25	
August	..	..	..	"	..	Started	..	4.5	.. Started
September	..	..	..	"	..	..	..	3.75	
October	..	..	..	"	..	Finished	..	2.75	
November	..	..	..	"	..	..	..	2.75	
December	..	..	..	3.5	..	..	..	2.0	

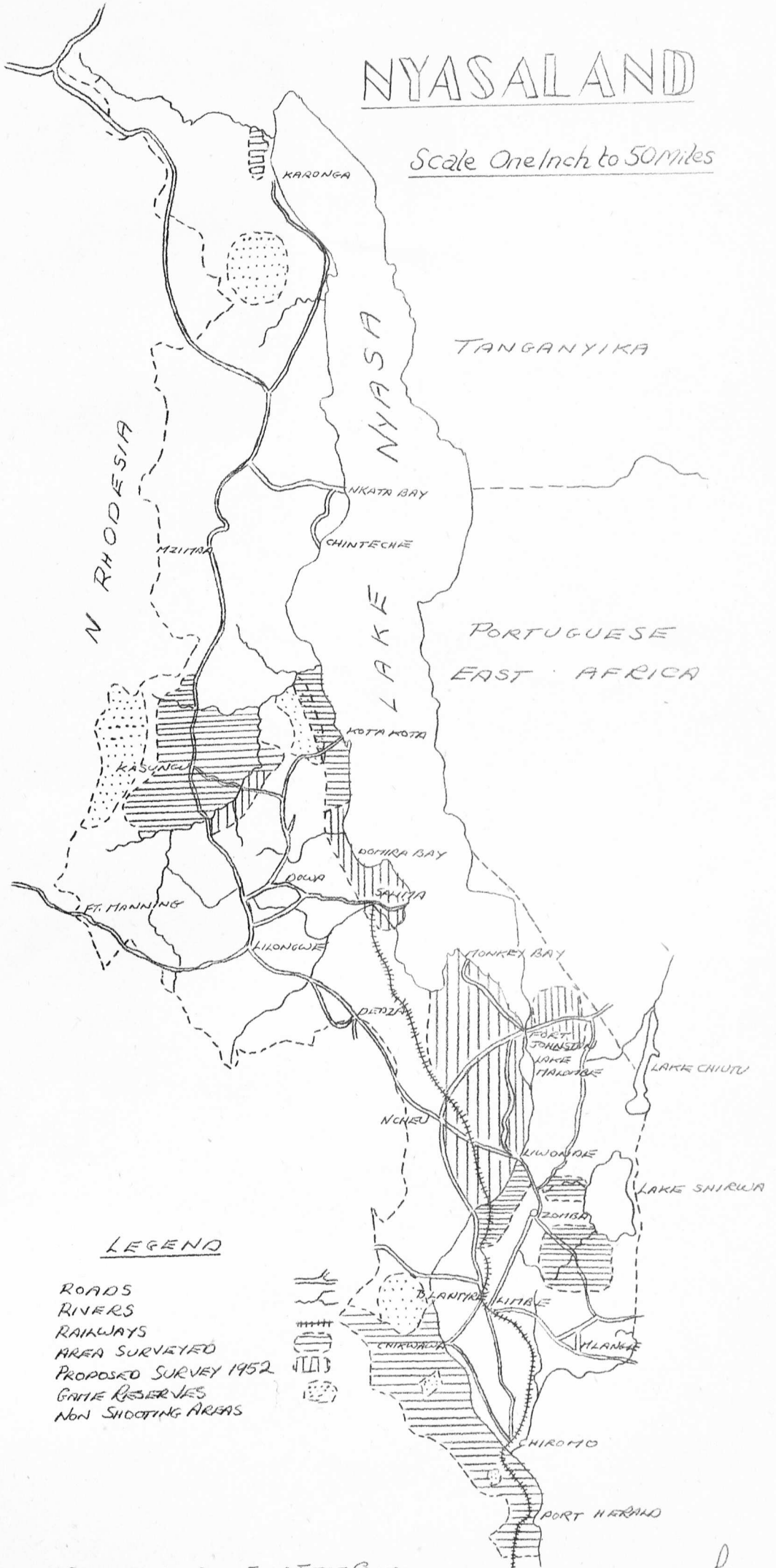


APPENDIX VIII  
SUMMARY OF TRAFFIC AND FLIES CAUGHT AT DECONTAMINATION POSTS 1951

<i>Post</i>	<i>Position</i>	<i>Number Motor Vehicles</i>	<i>Flies Caught</i>	<i>Number Cycles</i>	<i>Flies Caught</i>	<i>Number Pedestrians</i>	<i>Flies Caught</i>	<i>Total Flies</i>
Kota-Kota	Outskirts Kota-Kota Township (N)	1,390	26	3,704	49	33,338	38	113
Chota	Outskirts Kota-Kota Township (S)	—	—	6,904	21	22,586	13	34
Mbobo	Approach to C.P. Highlands. Kota-Kota-Lilongwe Rd.	922	73	2,090	50	27,021	56	179
Mvera	Approach to C.P. Highlands. Salima-Lilongwe Rd.	5,910	11	5,362	245	8,032	34	290
Fort Johnston	Outskirts Ft. Johnston Township. East of Ferry crossing	1,246	38	28,992	2,551	90,800	11,932	14,521
Kasupe	Approach to Zomba Highlands. Liwonde-Zomba Rd.	4,325	5	30,963	162	27,269	40	207
Chamatwa	Approach to Zomba Highlands. Namweras-Zomba Rd.	1,278	2	12,967	7	16,818	7	16
Lirangwe	Approach to Shire Highlands. From Shire Valley. Matope Rd.	3,918	4	10,319	81	12,066	8	93

# NYASALAND

Scale One Inch to 50 Miles



## LEGEND

- ROADS
- RIVERS
- RAILWAYS
- AREA SURVEYED
- PROPOSED SURVEY 1952
- GAME RESERVES
- NON SHOOTING AREAS

Compiled by GAME FISH & TSSETSE CONTROL

*Handwritten initials*