Annual medical & sanitary report for the year ended.

NYASALAND PROTECTORATE

ANNUAL MEDICAL & SANITARY REPORT

For the year ending 31st December, 1938.

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1939:
PRINTED AND PUBLISHED BY THE GOVERNMENT PRINTER,
ZOMBA, NYASALAND

146 : 320 : 4s. : SMP 49/39.

MEDICAL DEPARTMENT,

ZOMBA,

NYASALAND.

15th July, 1939

SIR,

I have the honour to submit for the information of His Excellency the Governor and for transmission to the Right Honourable the Secretary of State for the Colonies, the Medical Report on the Health and Sanitary Conditions of Nyasaland for the year 1938, together with the Returns, etc., appended thereto.

I have the honour to be,

Sir,

Your obedient servant,

H. DE BOER,

Director of Medical Services.

The Hon. The Chief Secretary to the Government,

Zomba.

CONTENTS.

SECTION I. ADMINISTRATION.

(A) STAFF.

The staff sanctioned for the year 1938 was :—

(a) Europeans.

Director of Medical Services.
2 Senior Medical Officers.
Medical Entomologist.
15 Medical Officers.
Office Superintendent and Medical Storekeeper.
Pathologist
Matron.
11 Nursing Sisters.
2 Sanitary Superintendents.
Junior Clerk.

(b) Asiatic.

10 Sub Assistant Surgeons.

(c) African.

12 Clerks.
1 Laboratory Assistant, 1st Grade.
11 Hospital Assistants, 1st Grade.
5 Hospital Assistants, Junior Grade.
19 Sanitary Inspectors.
36 Vaccinators and Rural Sanitary Inspectors.

A varying number of Dressers, Hospital and Dispensary attendants, Native Nurses and Sanitary Labourers. The average number employed during the year was Dressers 204, Hospital and Dispensary Servants 273, Native Nurses 35, with a varying number of Sanitary Labourers.

Appointments.

(a) Europeans.

Dr. H. S. de Boer, M.C., Director of Medical Services ... ... 12-8-38.
Dr. W. A. Glynn, Medical Officer ... ... 23-8-38.
Miss P. Hutchinson, Nursing Sister ... ... 25-2-38.
Miss K. Scott „ „ ... ... 22-4-38.

(b) Asiatic.

Nil.

(c) African.

Nil.

Promotion.

Dr. T. A. Austin to be Senior Medical Officer prior to his transfer to Tanganyika Territory with effect from 1-1-38.

Transfers.

Nil.

Retirement.

Dr. A. D. J. B. Williams, O.B.E., Director of Medical Services ... ... 11-8-38.

Resignations.

Nil.

Termination of Temporary Appointments.

Mr. E. H. Croghan, Health Inspector ... ... 8-6-38.
Mr. P. D. Jhala, Civil Sub-Assistant Surgeon ... ... 31-1-38.

Deaths.

Nil.

Change of Title.

Sanitary Superintendents are now termed Health Inspectors.
(ORDINANCE, No. 6 of 1938).

(B) LIST OF ORDINANCES ETC., ENACTED DURING 1938 AFFECTING PUBLIC HEALTH.

ORDINANCES.

26-3-1938. No. 6 of 1938. Public Health (Amendment) Ordinance, 1938 (CAP. 73).

RULES, ORDERS, NOTICES, ETC.

6-1-1938. The Public Health Ordinance, Cap. 73: Cerebro-Spinal Meningitis Rules, 1937 revoked.

13-1-1938. The Townships Ordinance, Cap. 21: Blantyre and Limbe Township Bye-Laws.

19-1-1938. The Public Health Ordinance, Cap. 73: Prevention of entry of Infectious Diseases into the Protectorate by Aircraft.

14-2-1938 The Public Health Ordinance, Cap. 73: Pulmonary, or other forms of Tuberculosis made notifiable.

29-4-1938. The Sanitary Boards Ordinance, Cap. 20: Amendment of Sanitary Boards Rules, 1938.

3-5-1938. The Townships Ordinance, Cap. 21: Amendment of Blantyre and Limbe Township Bye-Laws.

12-5-1938. The Sanitary Boards Ordinance, Cap. 20: Amendment to Sanitary Boards Rules, 1938.

28-7-1938. The Townships Ordinance, Cap. 21: Amendment of Zomba Township Bye-Laws, 1934.

12-8-1938. The Public Health Ordinance, Cap. 73: Cerebro-Spinal Meningitis Rules, 1938 applied.

1-9-1938. The Townships Ordinance, Cap. 21: Amendment of Fort Johnston Township Bye-Laws, 1935.

1-9-1938. The Sanitary Boards Ordinance, Cap. 20: Rules made by the Lilongwe Sanitary Board 1938.

1-9-1938. The Public Health Ordinance, Cap. 73: Vaccination Post Rules, 1938.

(C) FINANCIAL.

2. The total expenditure for 1938 was £52,839 0s. 3d. an increase of £1,517 0s. 1d. on that of 1937. The approved expenditure for the Department for 1938 was £53,131. An analysis of the expenditure of the Department for the year revealed the following figures:—

	£	s.	d.
(i) Expenditure on Central Administration, indivisable expenditure, salaries, transport, passages, etc.	15,039	4	0
(ii) Expenditure on native services ...	30,303	18	6
(iii) Expenditure on non-native services ...	7,495	17	9
Total ...	£52,839	0	3

3. The total revenue of the Department was £1,681 8s. 4d. the amount being made up as follows:—

	£	s.	d.
(*a*) Hospital fees	1,236	11	2
(*b*) Sale of stores	381	16	2
(*c*) Pathological fees	27	17	6
(*d*) Radiological fees	35	3	6

4. From the Unallocated Stores, 6,993 bottles of 100 tablets of dihydrochloride of quinine and 2,783 packets of quinine bisulphate were sold to the general public, the amount realised being £1,177 1s. 11d. In 1937 the amount realised from the sale of quinine was £1,027 7s. 8d.

5. The actual details of the expenditure of the Medical Department for 1938 are as follows:—

	£	s.	d.
Approved Expenditure, 1938	53,131	0	0
Actual Expenditure, 1938			
(*a*) Personal Emoluments	33,515	14	0
(*b*) Other Charges	19,311	15	0
(*c*) Special Expenditure: Medical Expenses Incurred outside the Protectorate	11	11	3
Total ...	£52,839	0	3

Of the amount expended through the votes of the Medical Department, the sum of £1,538 5s. 10d was devoted to the maintenance of routine sanitary services under which are included, night soil collection and disposal, refuse collection and disposal and bush and grass cutting in townships, sanitary areas and boma stations. The maintenance of Routine sanitary Services can hardly be considered a fair charge against the votes of the Medical Department and therefore in estimating the expenditure on medical services this amount should be deducted making the total expenditure on medical services over the year £51,300 14s. 5d.

6. Expenditure on medical services was 6.08 per cent. of the total revenue of the Protectorate over the year and 6.35 per cent. of the Total Expenditure.

SECTION II. PUBLIC HEALTH.

(A) GENERAL REMARKS.

7. Dr. A. D. J. Bedward Williams, O.B.E., Director of Medical Services left on home leave on the 23rd February, 1938, and retired from the service on the 11th of August, 1938; Dr. H. S. de Boer, M.C., arrived on October the 15th on transfer from Uganda to take over the direction of the department.

8. Dr. T. A. Austin, who at the close of 1937 had been promoted Senior Medical Officer and posted to Tanganyika Territory, was permitted by the Government of Tanganyika to remain in this country in acting charge of the Medical Department while Dr. Williams was on leave and until Dr. de Boer had arrived and made a preliminary tour of the country. Dr. Austin left for Tanganyika on the 5th of January, 1939.

9. Sir Robert Bell's report on the financial position and future development of Nyasaland was published in the latter half of the year.

Among the recommendations made the following affect directly the work of this department:—

(*a*) An additional Medical Officer, provided for in the 1938 estimates, is necessary.

(*b*) The posts of Assistant to the Director of Medical Services and Medical Officer Blantyre, should not be filled by seniority.

(*c*) The appointment of Medical Entomologist should be abolished; saving £1,200 per annum.

(*d*) The post of Superintendent and Medical Storekeeper should be replaced ultimately by one of Senior Clerk; saving £100 per annum.

(*e*) Maternity and child welfare clinics should be left to Missions, with financial assistance from Government.

(*f*) Two additional Nursing Sisters provided in 1938 estimates are necessary.

(*g*) Supply of medicines free or at cost price to mission and private hospitals is a justifiable form of Government aid.

(*h*) Closer co-ordination through its Chairman of the departments represented on the Native Welfare Committee is desirable.

(*i*) Transfer of the Lunatic Asylum to the Medical Department should take precedence of the re-organization of Prison Services.

The report is now receiving the consideration of the Government, but there are at least two recommendations which it is particularly hoped Government will not take steps to enforce viz. (d) and (e). These recommendations while they might lead to immediate economy would delay the healthy development of this Protectorate.

10. Today in the absence of a trained Pharmacist to undertake the ordering and distribution of medical stores, much Government money is undoubtedly being wasted. The provision of a Pharmacist will therefore be an economy. An Office Superintendent or Chief Clerk cannot combine routine office duties with that of Medical Storekeeper.

11. Government cannot hope to make much progress in improving the health of our African population, unless it takes a direct interest in the care of mothers and infants.

The ante-natal care of women, midwifery and infant welfare must therefore remain responsibilities of Government, which naturally will take advantage of missions or other societies prepared to assist in these activities.

12. The Royal Commission appointed by His Majesty to enquire and report on the desirability of closer union between Southern and Northern Rhodesia and this Protectorate, visited this country in June, 1938, and remained in Nyasaland until July.

At the time of writing, the report of the Commission has been published. The Commission recommends amalgamation of this Territory with Northern Rhodesia and closer co-operation with a view to future amalgamation with Southern Rhodesia, but as yet no indication has been given by the Colonial Office as to the British Government's views on these proposals. Naturally, if amalgamation is to come about in the near future, recommendations made in the past and in this report for the development of the Medical Services of this country, considering it as a separate unit, will need review.

13. In August on the arrival of Dr. B. S. Platt, an officer seconded from the Medical Research Council, a Nutrition Survey of the natives of certain areas in the country was begun. The Survey is being carried out under the direction of Dr. Platt, who is assisted by :—

Dr. H. G. Fitzmaurice. A senior Medical Officer seconded from the Medical Dept.
Mr. R. W. Kettlewell. An Agricultural Officer seconded from the Agricultural Department.
Miss Barker. A Nutritional Investigator, specially appointed by this Government.
Dr. Read. An Anthropologist provided by the African Institute.
Miss Owen. A Botanist and Secretary provided by the Medical Research Council.

14. In December following a rapid survey of the country a report on the Medical and Health Services and on other matters of public health importance was submitted to Government by the newly arrived Director of Medical Services. This report which gave not only a picture of conditions existing, but suggested lines along which improvement is necessary, if progress is to be maintained, is now receiving the consideration of Government and, it is hoped, will be forwarded to the Secretary of State.

15. A cottage hospital of four beds for Europeans was in course of construction at Lilongwe in the Northern Province. Funds to cover costs were provided partly by Government and partly by local subscriptions. To staff this hospital one Nursing Sister will be provided for in the 1939 estimates. With the limited staff available, it will only be desirable to admit to this unit cases not requiring constant or careful nursing. The Nurse, when not occupied at the European Hospital, will be called on to undertake duties at the Lilongwe Native Hospital where, up to the present, no Nursing Sister has been available.

16. The Infant Welfare Centre and Ante-Natal Clinic at the Native Hospital at Zomba is the only unit of this nature under direct Government control in the Protectorate. The figures available indicate that the unit is slowly but steadily gaining the confidence of the people and give hope that when similar units are provided in all district centres and in native areas, very decided progress can be expected.

17. The Government subsidises the Infant Welfare and Maternity work done by the Church of Scotland Missions at Blantyre and Livingstonia and in 1939 proposes with an equal subsidy to encourage the work done by the Dutch Reformed Mission at Mlanda in the Ncheu district. The subsidy paid annually to each unit is £350 and is intended to cover the maintenance of a European nursing sister.

18. Special provision for Maternity cases is made in the Government Hospital, Zomba, and at the Mission units already referred to where a small number of women is undergoing training in midwifery. A few native women trained in the Mission centres have already passed the qualifying examination conducted by the local Medical Council and some are actually practising in native villages, but Government supervision of their work has so far not been attempted. It is thought that the course of training might be improved and it is proposed in 1939 to review the whole syllabus of training for local midwives.

19. The country remained practically free of serious epidemics throughout the year. The epidemic of cerebro-spinal meningitis which was reported in 1937, although continuing during the early part of 1938, rapidly lost its epidemic character.

20. The Government is steadily becoming more concerned at the progressively increasing number of adult male natives that emigrates from the country, for although for many years our natives have crossed our boundaries in search of employment, the number grows steadily with each successive year and fewer and fewer adult males, especially of the ages between 18 and 35, are left to produce the necessary food crops for the maintenance of village populations including the women and children left behind. There is evidence that much of the food cultivation is now in the hands of women who have in addition other domestic duties to perform and cannot be expected to break up new ground.

21. During the year the Witwatersrand Native Labour Association, which in the past had obtained labour for work in South African gold fields in this country through local agencies, decided to recruit direct and obtained a permit to recruit during the 1938-1939 season up to 8,500 natives from the Northern Province. The Association employed their own Medical Officer for examining and passing labour and erected permanent collecting camps in many of the Boma stations. The following figures provided by the W. N. L. A. give some indication of the general fitness of the labour which presented itself for recruitment.

Station	No. examined for recruitment.	No. passed as fit.
Dowa	824	572
Mzimba	609	444
Lilongwe	1,013	705
Fort Manning	230	193
Dedza	959	675
Ncheu	1,701	1,295
Total	5,336	3,884

22. It is estimated by the Labour Commissioner that out of a total population of 1,600,000 that today the undermentioned numbers of Nyasaland male adult natives are engaged as wage earners in adjoining Territories.

Union of South Africa	27,000
Tanganyika Territory	7,000
Northern Rhodesia	4,000
Southern Rhodesia	75,000
	113,000

23. The Labour Commissioner also estimates that 60,000 natives of this Protectorate are engaged in the country in local industries as wage-earners, making a grand total of 173,000.

While a few employers in Southern Rhodesia and a large number locally encourage wives to travel with their husbands, it is possibly true that less than 20 per cent. of employees take their wives with them when they emigrate from their villages.

24. The total number of adult male taxpayers in the country is estimated to be 495,200 of which number 71,000 are exempted from taxes for various reasons, but mostly because they are unfitted to earn a livelihood. A large proportion of this number must be considered to be a burden on the rest of the community.

25. When it is remembered that taxpayers include all males who are not children and, although no accurate data are available as to the population in the various age groups, it would be reasonable to assume that those between the age groups 18 to 35 do not exceed 300,000 and that therefore more than 50 per cent. of the young adult males of this country are withdrawn from ordinary village life and that a large proportion of these left behind are not of the best physique.

26. Various reasons are offered for the growing migration from Nyasaland, many claiming that it is due to the spirit of adventure and not a few that it is a custom of local tribes to travel before settling down. While these reasons may have a bearing on the subject, there can be little doubt that the main factor is the better wages paid for their services in the adjoining Territories. The rates paid for skilled and unskilled labour in Southern Rhodesia are more than double what is offered locally and in South Africa wages are even higher.

The local African's necessities are steadily increasing, many of these can only be bought for cash and the local wage of 6s. per month does not make their purchase possible, for not only has the annual tax to be paid out of this, but food has to be bought invariably to supplement the inadequate diets provided by employers.

27. Government is endeavouring to develop the local growth of economic crops by Africans, but up to the present, no suitable cash crop has has been found that will bring in an annual revenue to the native grower, (not employing labourers himself) of more than 30s. to £2. An annual revenue of £2 cannot be expected to attract young adult natives to stay on the land and therefore the growth of cash crops by local natives is not likely to prevent the increasing disruption of village life.

(B) GENERAL DISEASES.

28. Tabulated returns of Diseases recorded at Government Medical Institutions in 1938 are given in tables on pages 63 to 69 and the incidence of cases in certain disease groups is shown in diagramatic form on pages 22 and 23.

No claim can be made for the accuracy of the figures provided, especially under the heading "outpatients," for the returns are based on those provided by dispensaries and hospitals where outpatient treatment is in the hands of poorly trained African subordinates who only attempt to classify diseases under the main symptom complained of by the patient. For example; "coughs" are invariably recorded as "bronchitis," "abdominal pains" as "indigestion," "muscular pains" as "rheumatism" and "fever" as "malaria." Naturally treatment given by this staff is on equally simple lines. It is unfortunately true that owing to the limited knowledge of our subordinate staff a large percentage of cases treated in our medical units are minor ailments and our hospitals and dispensaries do not yet attract, as they should, the really sick native from villages except when these villages are within walking distance of hospitals, staffed by European Medical Officers.

29. A study of the records will show that a large majority of inpatients at our African hospitals suffered from ulcers, fever, schistosomiasis and hookworm.

30. In the Lake shore districts severe Ankylostomiasis is seen and treated. In many of the other districts the hospital records of cases of Ankylostomiasis include many which showed no clinical signs and in which the hookworm was found on routine examination of stools. The cases recorded under the heading "Schistosomiasis" also are mostly of diagnoses made on laboratory findings, on routine examinations of faeces and urine, for few local adult natives complain of any symptoms which can be related to infestation with this parasite. Children, however, frequently do come to hospital complaining of haematuria.

Deficiency Diseases.

31. Deficiency diseases were reported as follows:—

Scurvy	...	...	6
Beri beri	...	...	4
Pellagra	...	...	43

Although the number totally incapacitated by defective nutrition coming to our attention is comparatively small, evidence is accumulating that a very large proportion of our African population live on a diet that is deficient in some of the essentials for the maintenance of robust health and that our child population especially, but also adults, exhibit early signs of deficiency of vitamins A, B and C. It is difficult to foresee how the conditions found can be remedied for as has already been pointed out in this report, with the rapidly increasing numbers of adult males migrating out of the Protectorate the growing of sufficient foodstuffs around villages is becoming progressively more difficult.

Diseases Caused by Helminths.

32. The District Medical Officer of North Nyasa in his annual report states that hookworm is the commonest cause of disease in that district and that clinical signs of this infestation can be seen in 90 per cent of the local population.

In the district of Kota-Kota which also borders on the Lake the local Medical Officer records that many cases attending hospital have marked anaemia caused by hookworm and so appreciative is the population of this district of the treatment given for hookworm, that frequently whole villages come to his hospital for attention. The Lower Shire district also records serious infestation of the population and many cases of secondary anaemia are reported from the hospital at Port Herald.

33. While bad infestations are reported from Lakeshore districts and other low lying districts adjacent to the River Shire, hookworm infestations are also common elsewhere, but in the highland district clinical signs of infestation are rare. The Zomba Native Hospital which mainly deals with people resident in a highland area reports that 87 per cent. of all patients admitted into the hospital had hookworm ova in their stools.

34. S. haemotobium is almost as universal an infestation as hookworm and in low lying districts is considered to be only second to hookworm as a cause of ill-health. Routine examinations of all patients admitted to hospital show that nearly fifty per cent. are infected. Few cases except children however come to hospital primarily complaining of symptoms directly due to the infestation. Schistosomiasis.

The Medical Officer of Fort Johnston describes a disease known locally in that district as "chinyela" in which cirrhosis of the liver is commonly found and which he considered to be primarily caused by *S. mansoni*. In North Nyasa splenomegaly is reported to be associated with this infection.

35. Infestation with round worms is common, but is not recorded as frequently as hookworm and bilharzia except possibly in the district of Chikwawa where a number of persons received special treatment. As might be expected the infestation is commonest in children. Round Worms.

36. Tapeworm is apparently not common in the country for it has not been especially remarked on by any District Medical Officer. The District Medical Officer, Dedza, however reports the finding of a male child infested with a tapeworm approximating to the *Dibothriocephalus latus*. The child in whom this worm was found came from the Lakeshore, and it must be presumed fed on Lake fish. It is not unlikely that our Lake fish might prove to be a secondary host of a Tapeworm that can live in man. Tapeworm.

Elephantiasis is reported from the low-lying districts and especially the southern end of Lake Nyasa. Filariasis.

(C) COMMUNICABLE DISEASES.

37. Nine cases of small pox were reported during the year. Six cases occurred in the Mlanje district and three, of which one was European, in the Cholo district. In no case was the source of infection traced. All cases were mild in character and there were no deaths. These cases were isolated and vaccination camps set up in the affected areas. It is possible that the infection came from Portuguese East Africa, for large numbers of their natives enter the Cholo and Mlanje districts throughout the year, more particularly in the tea picking season, to work on European estates. Vaccinators are ordinarily maintained on the main roads along which these immigrants enter this country, but it is possible that very large numbers come by native paths avoiding vaccination posts. Smallpox.

38. Cases of tuberculosis were reported from all district hospitals; the total number of cases was, however, small and District Medical Officers suggest that this is due to persons affected not coming to hospital for advice. Most of the cases seen were of the pulmonary type but cases of bone infection do occur. Tuberculosis

Measles.

39. Although very few cases of measles were treated in hospital, epidemics were reported from many native areas. In the Fort Manning area where native vaccinators endeavour to obtain statistics as to the number of births and deaths, 1,419 cases were recorded with 72 deaths. In this area the epidemic ran concurrently with an epidemic of influenza and for a period these diseases interfered with the ordinary life in the villages.

In the Lilongwe district the disease was reported to be epidemic towards the end of the year and deaths from pneumonia were common.

The few cases of measles admitted to our hospitals invariably recovered without serious complications. Deaths from measles outside hospitals are believed to be caused by complications brought on by those affected being kept in smoke laden and unventilated huts, the ordinary living accommodation of our native population.

Mumps.

40. Outbreaks of mumps in rural areas are recorded but only one case received treatment in a Government hospital.

Influenza.

41. Although epidemics of influenza are recorded in all districts there is little information as to their extent or severity; it is believed that the infection was generally mild in character, except in the Fort Manning district were 1,482 cases were recorded with 65 deaths.

19 cases of influenza amongst Europeans were treated in Zomba. The Medical Officer in charge records that those affected had gastro-intestinal symptoms with pyrexia and although respiratory symptoms were not apparent at first these commonly developed at a later stage.

Diphtheria

42. Two cases of diphtheria occurred at the Zomba African Hospital, the wife and child of a medical attendant being affected. The infection in the child was so serious that tracheotomy had to be performed. Swabs taken from all members of the African staff and their families showed that three were positive carriers. Schick tests were performed on all the staff but in no case did a positive reaction develop.

Hydrophobia.

43. One human case of hydrophobia was recorded at Zomba African Hospital during the year. This case was admitted on the 21st of September and died on the 24th. Symptoms appeared four days before admission into hospital and consisted of great pain in the legs associated with weakness which became worse and was followed by inability to walk, with pain in the throat and difficulty in swallowing. At the time of admission the patient could not swallow at all. On post mortem examination many Negri bodies were observed in sections prepared from the hippocampus major and the cerebellum.

Typhoid Fever.

44. The cases of typhoid fever recorded are few. A small outbreak of three cases occurred at the Mlanje Catholic Mission, one European case was treated at Blantyre and the Livingstonia and Loudon Mission hospitals each recorded one African case.

Dysentery.

45. Amoebic dysentery occurs throughout the Protectorate but records of the incidence of the disease are scanty. At Mlanje 22 cases in natives and 5 in Europeans were treated as also two natives with hepatic abscesses both of whom recovered, after rupture of their abscesses through their diaphragms.

At Lilongwe the number of Africans coming into the hospital with definite symptoms showed an increase but the Medical Officer suggests that the increase of recorded cases is possibly due to his having on his staff a more experienced African laboratory assistant.

At Blantyre 13 Europeans were treated in the Government hospital compared with 19 in the previous year.

At the Zomba European hospital 28 cases were treated as compared with 23 in 1937. 50 per cent of the Zomba patients were children.

Leprosy

46. There are 12 mission centres in the country which admit lepers. The accommodation and the efficacy of the treatment given is, however, somewhat dependent on the staff maintained. No information is available as to the number of lepers living in native areas but in the Fort Johnston district the Administration recently counted the number of lepers in the areas of five

Native Authorities and reported that the number was 423, of which number only 28 were in receipt of treatment at Mission centres. Government subsidizes this work of Missions and during 1938, £900 was paid out. Payments made to different Missions and average numbers of lepers receiving treatment at such missions during the year are tabulated below:—

	Daily Average In-patients	Admissions	Discharges	Deaths	Contributions paid 1938. £ s. d.
Bandawe	62.2	1	—	5	89 19 0
Likoma	10.8	2	2	—	22 7 0
Likwenu	60.1	26	36	4	82 7 0
Livingstonia	7.3	—	2	—	14 5 0
Loudon	22.5	11	—	—	30 10 0
Malamulo	233.1	100	83	19	284 3 0
Malindi	19.4	2	9	—	36 12 0
Mua	84.0	57	15	8	93 10 0
Mwami	28.5	15	—	—	59 9 0
Utale	137.3	64	17	10	178 18 0
Paid to S. A. S., Port Herald			—	—	8 0 0
					£900 0 0

Yaws.

47. Yaws is now almost wholly limited to the Lakeshore and Shire River districts and even here florid cases are not very common as compared with other East African Territories. Most of the cases seen and treated at hospitals have tertiary symptoms; bone pains and deformities being complained of. Details of records from some stations are as follows:—

Fort Johnston (*South Nyasa*). A few florid cases were seen and some cases complaining of hand lesions.

Dedza. Two males were treated at the District Hospital situated away from the Lakeshore, but at the dispensaries near the Lakeshore and especially at Chipoka, 130 male and 186 female cases were seen.

Karonga. 445 cases were treated at the District Hospital and 491 cases at the Dispensaries.

Dowa. 82 cases were treated at Rural Dispensaries.

Port Herald (Lower Shire). 72 cases were treated.

Ncheu. 7 cases were treated.

Few hospital dressers have been trusted to give intra-muscular or intra-venous injections. Steps are being taken to ensure that all dressers are trained in the simple technique necessary and when Medical Officers are in a position to visit dispensaries regularly injections will become routine treatment at these institutions.

Venereal Diseases.

48. Although the figures available do not show any increase in the incidence of venereal diseases amongst those attending Government hospitals, most Medical Officers believe that syphilis and gonorrhoea are rapidly spreading in our native areas, due mainly to the introduction of new strains of infection by labourers returning to this country after working abroad, where males, separated from village control, are liable to contract infection. A further reason suggested for the supposed increase is the separation of wives from their husbands over long periods, tending to immorality amongst the former especially with the younger men returning from abroad or with strangers passing through their villages.

49. Native Authorities of the Atonga Tribe, West Nyasa District, have expressed their concern at the spread of venereal infections amongst their people and have suggested that every native returning to their areas should be compelled to submit to a medical examination prior to being permitted to enter. Although this is a policy of perfection, the department could not undertake the examinations required, as there is no staff competent to perform them stationed in the area. The desirability of giving effect to this policy therefore does not need immediate consideration.

Syphilis

50. 1,005 males and 831 females were treated for syphilis in district hospitals, cases being tabulated as follows:—

Syphilis		Males		Females
Primary	...	308	...	173
Secondary	...	489	...	458
Tertiary	...	115	...	118
Hereditary	...	82	...	64
Period not indicated		11	...	18
	...	1005	...	831

Even the above figures cannot be vouched for except in the case of those reported by the Zomba African Hospital where laboratory diagnosis is made under the supervision of the Pathologist. Elsewhere diagnosis was made generally on clinical appearances.

Gonorrhoea.

51. Gonorrhoea was found in 510 males and 206 females attending district hospitals. The larger proportion of cases included in the figures given were seen in the bigger hospital centres where European medicine had gained a reputation; elsewhere it is generally believed treatment is obtained from practitioners of native medicine.

52. Most Medical Officers complain that it is difficult to get the native to attend for regular courses of treatment, for patients invariably stop attending when symptoms disappear.

53. At Blantyre, Government has attempted to maintain a special clinic, held twice weekly, for venereal diseases under a Hospital Assistant. The records of the cases treated here have not been included in the figures given above as this is not classified under the district hospitals. What is interesting in the figures submitted from this unit is that although 295 persons were seen with syphilis and 124 with gonorrhoea, the number of re-attendances of all cases only totalled 699.

The average number of attendances, including the first visit, per patient was therefore 2.7.

54. That gonorrhoea once acquired by the African is frequently persistent, is indicated in a report from the Medical Officer, Blantyre, who found 18 young men with active signs of the disease amongst 494 persons looked over by him for certification as to fitness to engage in contracted labour in Southern Rhodesia.

Insect Borne.

Malaria.

55. To what degree malaria is the cause of ill-health amongst the general population is difficult to determine, for in areas like the Lakeshore where climatic conditions do not affect transmission of the disease the year round, the health picture is complicated by a high incidence of helminthic infections and also, here, as elsewhere, by defective nutrition. That the population is highly infected is indicated by the finding of malaria parasites in 54.3 per cent. of all patients admitted to the Zomba Native Hospital where the majority of patients are adults.

56. Nyasaland has only one rainy season, which starts in December and continues until March the following year. During this period rains are heavy and streams run full and are therefore not dangerous, but mosquito breeding is favoured by the creation of pools in low-lying areas, swamps, seepages and artificially made holes.

With the close of the rains, stream beds steadily become the most prolific of breeding places, for pools are formed in the beds as the flow of water grows less.

57. Nyasaland has a cool season which corresponds to the summer months in the northern hemisphere, but it is doubtful whether, except in the highland areas of the country, the cold is severe enough to interfere either with anopheles breeding or the activities of the species that transmit malaria.

58. While the sub-tertian parasite is the commonest form found in most of the country, both the quartan and benign tertian forms are not rare. In the Mlanje district benign tertian malaria is reported as the common type and was found in 277 of 320 positive blood smears examined.

59. Most of the European population take quinine nightly as a prophylactic and except in the townships do not ordinarily consult a Medical Officer when they develop an attack of fever.

European cases are recorded from three main stations as follows :—

Blantyre	74
Zomba	49
Cholo	14

60. Blackwater fever, though not common, does occur and cases are recorded annually amongst both European and Asiatics.

Relapsing Fever.

61. Cases of relapsing fever are recorded from almost every district hospital, the diagnosis being confirmed in each case by microscopical findings.

Lilongwe, Kasungu and Mzimba districts appear to be very badly infested with *O. moubata* and it is by no means rare for Europeans and African Government employees working in these areas, to develop the disease.

Kota-Kota hospital alone treated 31 cases, but it is not clear whether the infection was contracted locally. In the Fort Johnston Hospital no cases were treated but in the district served by this hospital four out of five native rest camps examined were found to be badly infested with ticks.

62. The local African is a great traveller and, as he spends many days on his journey to and from his home in the course of his travelling, he frequently sleeps in strange places and therefore runs considerable risk of acquiring this infection.

Trypanosomiasis.

63. Five cases of trypanosomiasis in natives were recorded from the Kota-Kota district and one European missionary resident in this district was supposed to have contracted the disease in the Dwangwa River area. Two of the Africans found infected had never left the district, the others had, however, only recently returned from Rhodesia and had journeyed through the Luangwa Valley where infections are not rare.

In view of the prevalence of the tsetse fly in large areas of this country, the small number of cases recorded is surprising, but so long as sections of the population have their homes, as at present, in close contact with the fly and wander away from time to time, it will be possible for the disease to appear elsewhere causing areas now apparently free of the infection, although tsetse infested, to become affected.

Onchocerciasis.

65. Infections with *Onchocerca volvulus* have been reported from time to time in this country and as simulidae are a pest in many areas and are common round Zomba, it is possible that human infections are not rare and lesions could be found easily if looked for.

(D). VITAL STATISTICS.

(I). GENERAL AFRICAN POPULATION.

66. No records are available of births and deaths throughout the Protectorate, but this department has continued to attempt to keep records in certain limited areas using native vaccinators, individuals usually of some intelligence but no special training, who in the course of touring villages obtain the necessary data. In submitting these figures it is not claimed that they are very accurate.

67. *Fort Manning District.* The recording of births and deaths has been attempted in this district since May 1933 and although the staff employed has changed over the period, the method of recording has remained comparatively the same.

Total Estimated Population of District 34,070.

Live Births 1938.

	Male	Female	Total
One child	676 ...	680 ...	1,356
Twins	28 ...	26 ...	54
TOTAL ...	704 ...	706 ...	1,410
Still Births	78 ...	68 ...	146
Live Birth rate per 1,000 of the population		...	41.4
Still „ „ „ „ Live Births		...	103.5

	Male	Female	Total
Deaths	391 ...	519 ...	910

Death rate 26.7 per 1,000.

No attempt was made to record deaths in age groups.

CAUSES OF DEATHS.

Disease.	Male	Female	Total
Malaria	139 ...	136 ...	275
Pneumonia	73 ...	110 ...	183
Diarrhoea	54 ...	75 ...	129
Influenza	21 ...	44 ...	65
Measles	45 ...	27 ...	72
Puerperal	— ...	26 ...	26
Other causes	59 ...	101 ...	160
	391	519	910

COMPARISON OF DATA WITH THOSE OF PREVIOUS YEARS.

	1935	1936	1937	1938
Birth rate ...	52.9 ...	46.8 ...	49.4 ...	41.4
Still born rate per 1000 live births	96.0 ...	87.0 ...	63.3 ...	103.5
Death rate ...	21.2 ...	21.8 ...	22.8 ...	26.7

68. The higher death rate recorded might be accounted for by the influenza and measles epidemics already referred to, the declining birth rate might well be associated with the increasing emigration.

69. *Lower Shire District.* The Sub-Assistant Surgeon who instituted the keeping of vital statistics in the Fort Manning District, during 1938 attempted to obtain figures in one Native Authority's area in the Lower Shire district, in which he is now posted. The method of collection of figures adopted is that in force in the Fort Manning District.

ESTIMATED POPULATION 19,100.

	Male	Female	Total
Births	472	445	917

19 mothers had twins, 17 children being males and 21 females

Birth rate per 1,000 population 48.0

Deaths	0—2 yrs		3—10		11—		...	...	...	Total		
	M.	F.	M.	F.	M.	F.				M.	F.	
	196	134	19	16	82	63	...	...	...	297	213	= 510

Death rate 26.7 per 1,000.

70. *North Nyasa District.* The keeping of records of births and deaths amongst the population resident within a five mile radius of Karonga, the Boma station of the North Nyasa district, was attempted during the year.

ESTIMATED POPULATION 3,257.

Births– 214. Birth rate per 1,000 population 65.7
Deaths—92. Death „ „ „ „ 28.2

(II) ASIATICS.

71. It is estimated that the Asiatic population increased from 1,631 in 1937 to 1,748 in 1938.

During the year there were 93 births and 14 deaths.

Birth rate per 1,000 Asiatics 53.2
Death „ „ „ „ 8.0

Recorded causes of deaths were as follows:—

	Male		Female	
	Adults	Infants	Adults	Infants
Accident by lorry	—	—	—	1
Cerebro-spinal meningitis ...	—	1	1	—
Cerebral malaria	—	—	—	1
Cancer of pelvic colon ...	1	—	—	—
Malaria	—	2	—	—
Myocarditis	1	—	—	—
Toxic myocarditis	1	—	—	—
Pneumonia	2	—	—	—
Pain in stomach	—	1	—	—
Acute pneumococcal tonsillitis ...	—	1	—	—
Prematurity	—	—	—	1
	5	5	1	3

(III) EUROPEAN GENERAL POPULATION.

72. The European population is estimated to be 1,847 a decrease of 47 as compared with last year.

During the year 34 births and 13 deaths were recorded.
Birth rate per 1,000 Europeans 18.4
Death „ „ „ „ 7.0

Recorded causes of deaths were as follows:—

	Male		Female	
	Adults	Infants	Adults	Infants
Abscess, Toxic Myocarditis	—	—	1	—
Accident, Motor	1	—	—	—
Angina Pectoris	1	—	—	—
Arterio Sclerosis	1	—	—	—
Cerebro-spinal fever	1	—	—	—
Cerebral malaria	—	—	—	1
Coronary Thrombosis	—	—	1	—
Enteric fever	1	—	—	—
Heart failure	2	—	—	—
Heart failure due to chronic alcoholism ...	1	—	—	—
Pulmonary Tuberculosis	1	—	—	—
Uraemia due to chronic nephritis ...	1	—	—	—
Total	10	—	2	1

(IV) EUROPEAN OFFICIALS.

73. The following tables shows the sick, invaliding and death rates of European officials during the year, with rates for the previous years for comparison:—

	1935	1936	1937	1938
Total number of officials resident ...	266	269	279	290
Average number resident ...	205.3	205.7	225.2	214.9
Total number on sick list ...	113	93	107	94
Total number of days on sick list ...	1,781	2,018	1,168	1,091
Average daily number on sick list ...	4.88	5.51	3.2	2.98
Percentage of sick to average number resident	2.36	2.18	1.42	1.34
Average number of days on sick list ...	15.6	21.7	10.9	11.6
Average sick time to each resident (days)	8.77	9.79	5.18	5.12
Total number invalided	6	4	5	1
Percentage of invaliding to total residents	2.25	1.86	1.78	0.3
Total deaths	0	1	1	1
Percentage of deaths to total residents	0	0.4	0.39	0.3

The cause of the invaliding in 1938:—1. Acute Eczema.

(V) NATIVE OFFICIALS AND NATIVE TROOPS.

74. The native officials numbered 2,989 as compared with 2,752 in 1937 The term "native official" includes police and native troops, but excludes casual labour in receipt of less than ten shillings a month. The common prevailing disabilities and the number of days off duty are compared below with those of previous years.

	1936		1937		1938	
	No. of cases	No. of days off duty	No. of cases	No. of days off duty	No. of cases	No. of days off duty
Malaria	158	1,033	169	930	183	1,096
Influenza	85	392	51	204	107	690
Injuries	55	523	73	713	83	810
Respiratory affections ...	60	592	52	343	93	1,010
Dysentery	30	314	73	527	45	459
Venereal diseases ...	69	2,022	49	1,119	92	2,256

The causes of death were :—

Ankylostomiasis	Ascites
Alcoholic poisoning	Wounds. Lorry accident
Septicaemia	Gastric Ulcer
Asthmatic Bronchitis	Gonorrhoea
Debility	Heart Failure
Gonorrhoea and its complications	Lobar Pneumonia
	Tumour, Cerebral

75. The following table shows the sick, invaliding and death rates of native officials :—

	1935	1936	1937	1938
Total number of native officials ...	2,457	2,603	2,752	2,989
Total number on sick list	933	1,129	906	1,687
Total number of days on sick list ...	10,427	11,880	8,135	11,199
Average daily number on sick list ...	28.50	32.54	22.28	30.68
Percentage of sick to total number of officials ...	1.12	1.25	0.81	1.01
Average sick time to each patient (days)	11.20	10.52	8.97	6.63
Total number of deaths	17	9	12	13
Percentage of deaths amongst native officials ...	0.65	0.34	0.44	0.43

(VI) Incidence of Diseases According to Groups.

		Hospitals.	Dispensaries.
1.	Infectious and Parasitic Diseases	29,447	29,923
2.	Cancer and Other Tumours	234	36
3.	Rheumatism, Diseases of Nutrition and of Endocrine Glands and Other General Diseases	4,705	3,774
4.	Diseases of Blood and Blood forming Organs	85	262
5.	Chronic Poisoning	8	—
6.	Diseases of Nervous System and Sense Organs ...	10,876	33,260
7.	Diseases of Circulatory System	301	112
8.	Diseases of Respiratory System	18,869	54,478
9.	Diseases of Digestive System	20,914	60,693
10.	Non Venereal Diseases of Genito-Urinary System ...	689	291
11.	Diseases of Pregnancy, Childbirth and the Puerperal State	279	—
12.	Diseases of Skin and Cellular Tissues and of Bones and Organs of Locomotion	23,418	81,169
13.	Congenital Malformations and Diseases of Early Infancy	23	—
14.	Senility	20	—
15.	Affections produced by External Causes	19,973	56,352
16.	Ill-defined Diseases	4,020	11,928
		133,861	332,278

Diagram I.

Showing the proportion of infectious, systemic and other diseases treated at Government hospitals (excluding rural dispensaries).

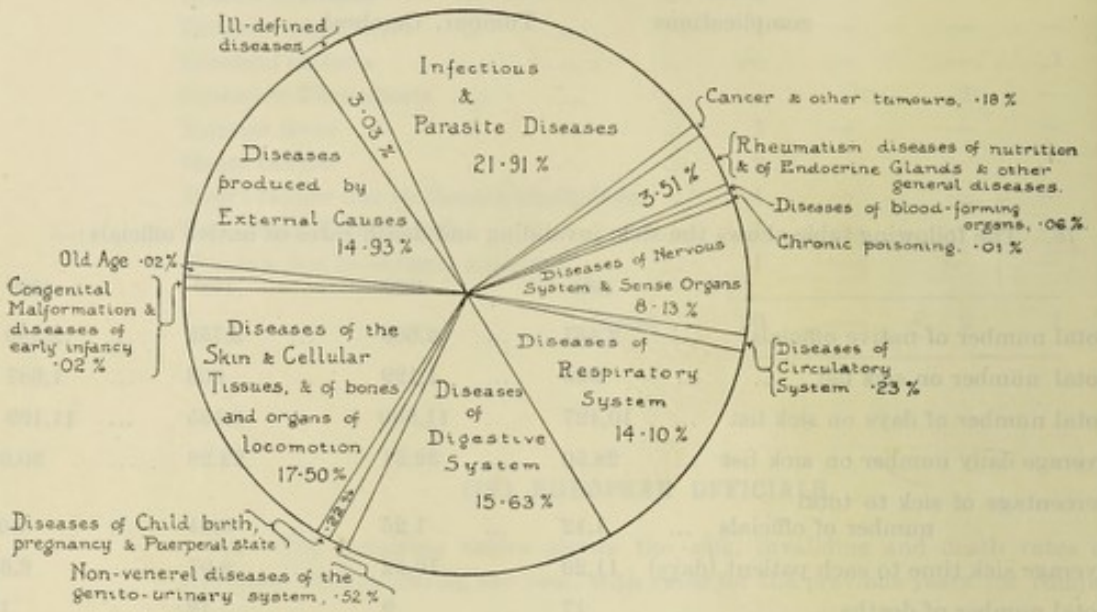


Diagram II.

Showing the proportion of in-patient deaths amongst the Groups of diseases. Total in-patient deaths, 285 (2.40 per cent of all in-patients).

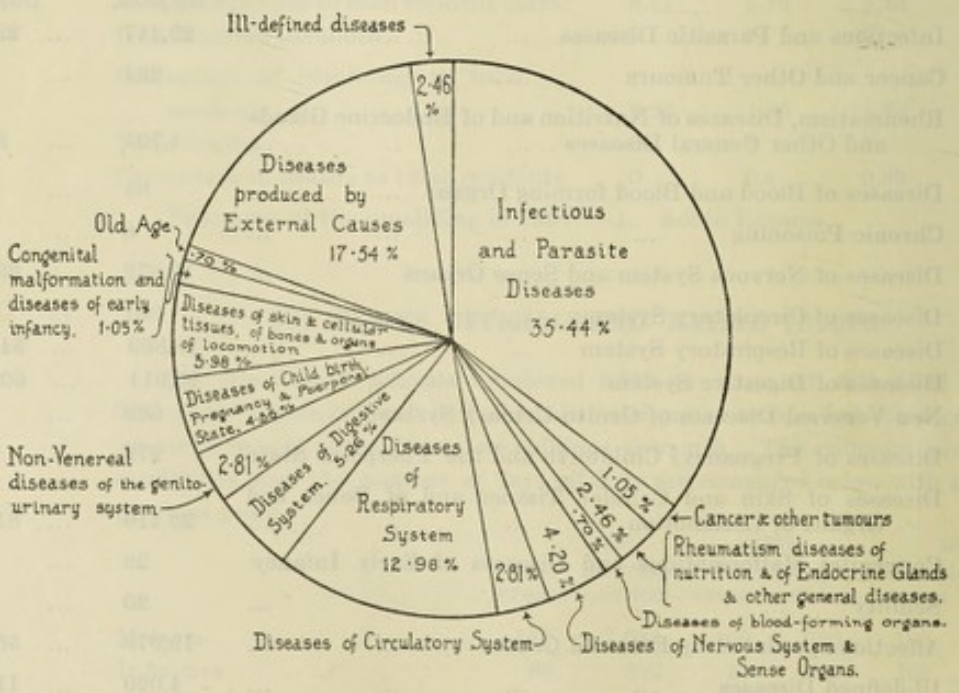


DIAGRAM III.

Showing the proportion of the diseases in Group I. treated at Government hospitals (excluding rural dispensaries).

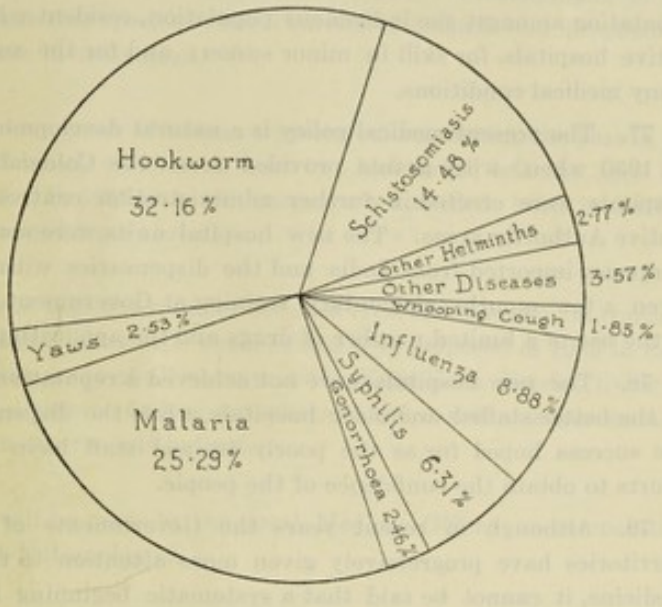
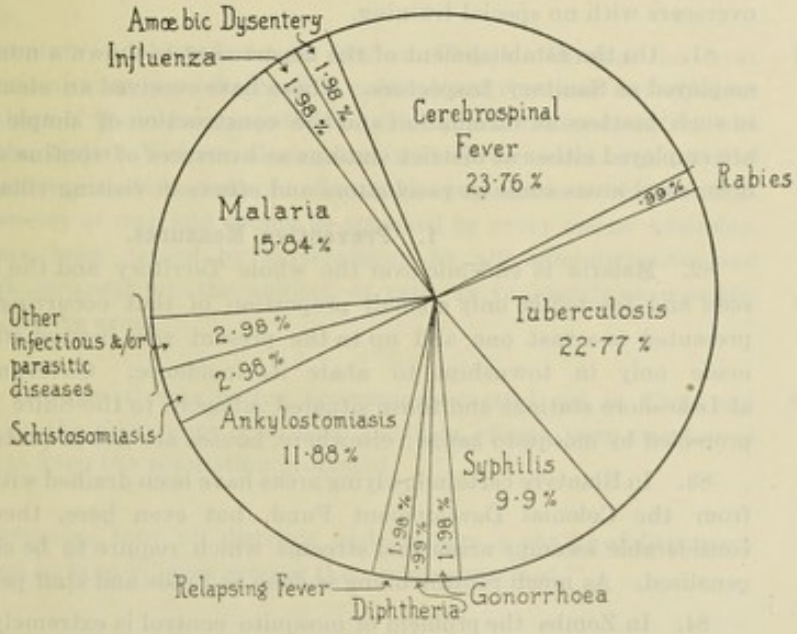


DIAGRAM IV.

Showing the proportion of deaths, from diseases in Group I. occurring at Government hospitals. Total in-patient deaths due to epidemic, endemic and infectious diseases, 101.



SECTION III. HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

76. The Medical Officers of the Department are engaged in doctoring the European population and in administering African hospitals and have deservedly earned not only the confidence of the immigrant population but a reputation amongst the indigenous population, resident within a short radius of native hospitals, for skill in minor surgery and for the successful treatment of many medical conditions.

77. The present medical policy is a natural development and was confirmed in 1930 when, with grants provided from the Colonial Development Fund, hospitals were erected in further administration centres and dispensaries in Native Authority areas. The new hospital units were staffed by Sub-Assistant Surgeons imported from India and the dispensaries with native subordinates given a few months elementary training at Government or Mission hospitals in the use of a limited number of drugs and the application of dressings.

78. The new hospitals have not achieved a reputation equal to that gained by the better staffed and older hospitals, while the dispensaries have not been the success hoped for as the poorly trained staff have failed badly in their efforts to obtain the confidence of the people.

79. Although in recent years the Governments of other East African Territories have progressively given more attention to the preventive side of medicine, it cannot be said that a systematic beginning has yet been made in this field in this Protectorate, for, although most Medical Officers have in their stations directed the provision of improved sanitary conditions, they have not been able to make any serious impression on the general rural population, mainly because they were not able to travel around such areas and had to leave the village populations to the unsupervised care of incompetent, because poorly trained, subordinate staff.

80. There is no Medical Officer in the service of the Government who can be said to be engaged primarily on the preventive side and we have only two European Health Inspectors. These two last mentioned officers comprise the whole of our Health Department; one is employed at Zomba and the other at Limbe and Blantyre. Both spend their time directing and supervising township sanitary services, duties which could be performed equally well by intelligent overseers with no special training.

81. On the establishment of the department is shown a number of Africans employed as Sanitary Inspectors. These have received an elementary training in such matters as vaccination and the construction of simple pit latrines and are employed either at district stations as overseers of routine sanitary services or in rural areas some as vaccinators and others in visiting villages.

1. Preventive Measures.

Malaria and Malaria prevention

82. Malaria is endemic over the whole Territory and the number of cases seen and treated is only a small proportion of that occurring. The problem presented is a vast one and up to the present very limited efforts have been made only in townships to abate its incidence. Government residences at Lakeshore stations and those situated adjacent to the Shire River have been protected by mosquito gauze; elsewhere, houses are not so protected.

83. In Blantyre certain lowlying areas have been drained with funds provided from the Colonial Development Fund, but even here, there still remain considerable swampy areas and streams which require to be either drained or canalised. As much routine oiling is done as funds and staff permit.

84. In Zomba the problem of mosquito control is extremely difficult owing to the considerable number of streams and seepages which issue from the mountain on the slopes of which the town is built. Some efforts have been made to canalise streams and ditches, but as most of the work done is of a temporary character maintenance taxes severely the available staff and funds.

85. Elsewhere, malaria control measures are limited to the filling in of borrow pits and the routine oiling, over limited areas, of stagnant water. Work of this nature is directed by African Sanitary Inspectors.

86. The common malaria carriers are *Anopheles gambiae* and *Anopheles funestus*, but in the colder part of the year *Anopheles rhodesiensis* can frequently be found in the houses and Dr. Lamborn, the Medical Entomologist is not altogether satisfied that this species is not a carrier of malaria and proposes in the future to undertake investigation.

Trypanosomiasis.

87 The finding of six cases of human trypanosomiasis during the year in the Kota-Kota district, of which number, at least two had never left the area has already been recorded. In 1937 only two cases were recorded, both in natives who had recently returned from abroad.

88. While it is true that the number of cases recorded is small, its continued appearance is a matter of no little concern and it is proposed in 1939 to have a thorough examination made of all natives in the Kota-Kota district living in proximity to fly with a view to finding out whether there are a larger number of cases occuring than our records indicate.

89. This survey will be made by the local Medical Officer in co-operation with the Government Entomologist.

90. During the year the Government Entomologist carried out tsetse fly surveys in the Kasungu district and along the Lake shore areas, these surveys are described in his annual report which is included as an appendix.

Relapsing Fever.

91. To rid native huts from ticks is by no means easy but much could be done by educating the native to give regular attention to floors and walls. The practice of daubing floors with mud taken from swamps and applied either on its own or mixed with cattle manure will need to be fostered, for these applications make mud floors and walls hard and reduce the breeding places of this vermin. The daubing of floors in the manner indicated above is practised in certain areas and well maintained floors and walls may, in these areas, be taken as an indication of efficient housewives.

Plague.

92. This territory continued to be free of Plague. During the year reports were received from some districts of unusual activity and an apparent increase in numbers of the rodent population. The question of rat control was considered by the Native Welfare Committee and Government was advised that every endeavour should be made to educate the population to the fact that the rat was an enemy of man and should be attacked by every means available. Instructions have been issued by Government to all administrative and technical officers to speak on the subject of rats, as frequently as possible, when on tour in native areas.

Small Pox.

93. Besides the special vaccination programmes carried out in Cholo and Mlanje districts on the occurrence of cases of smallpox, efforts were maintained during the year to keep the population protected.

African vaccinators tour all districts and dressers in charge of dispensary units are required to keep villages around their posts protected.

It is not unlikely that many of the persons reported done had been previously protected and therefore that much lymph is wasted, but under the circumstances this cannot be avoided. Details of numbers vaccinated during the year at various stations are as follows :—

No.	Name of District	Successful	Modified	Unsuccessful	Not seen	Total
1.	Blantyre and Neno	2,529	15	1,019	13	3,576
2.	Chikwawa	4,248	—	1,668	66	5,982
3.	Chinteche	1,729	504	1,129	391	3,753
4.	Chiradzulu	3,447	516	753	267	4,983
5.	Cholo	11,097	3,676	1,812	—	16,585
6.	Dedza	4,949	1,719	477	55	7,200
7.	Dowa	1,179	60	199	246	1,684
8.	Ft. Johnston	5,639	—	253	156	6,048
9.	Ft. Manning	2,377	1,379	680	84	4,520
10.	Karonga	6,602	1,105	1,281	-	8,988
11.	Kasungu	1,964	203	276	121	2,564
12.	Kota-Kota	2,272	1,501	902	—	4,675
13.	Lilongwe	3,589	892	368	110	4,959
14.	Liwonde	1,948	—	1,356	—	3,304
15.	Mlanje	9,928	5,140	1,848	18,427	35,343
16.	Mzimba	5,392	1,132	2,299	411	9,234
17.	Ncheu	6,324	2,046	1,898	1,054	11,322
18.	Port Herald	7,952	2,372	1,685	9	12,018
19.	Zomba	1,589	513	330	630	3,062
	TOTAL	84,754	22,773	20,233	22,040	149,800

HELMINTHIC DISEASES.

Hookworm.

94. The almost universal infestation of our native population with hookworm has already been stressed as also has been the occurrence of clinical symptoms due to the infestation amongst those resident in the lower lying areas.

The value of vermifuges in the treatment of the disease is appreciated by the people and from the Kota-Kota district it has been recorded that complete villages come for treatment to the local district hospital.

95. The need for the universal provision of pit latrines in native villages is one of the sanitary provisions that has been much emphasised in the past years and many native authorities have made their provision compulsory for their villages.

While there are reports of the existence of a large number of latrines in many villages and it is today unusual to find a village without at least one latrine, it is unfortunately still true that in many cases latrines are provided by the population mainly to conform with regulations and not for use.

The communal latrine is not popular with the African and it is now necessary to educate him to provide a pit latrine for his own household within easy access; for, where family pit latrines are available, they are not only found to be in regular use but maintained in a sanitary condition.

In any campaign for the eradication of hookworm, the propensity of the local African to travel must be taken into consideration and pit latrines will need to be provided at all recognised and known halting and camping places.

96. No systematic campaign for the treatment of the whole population of an area has been attempted. Work of this nature will be begun when routine touring of native areas by Medical Officers can be arranged for, and the provision of the family latrine becomes a habit.

Schistosomiasis.

97. Schistosomiasis, accepted as being only less universal than hookworm is going to prove one of our most difficult problems for, in the absence of accurate information, no slow flowing rivers could be considered safe.

The infection is found to be commoner in women than in men for the former go down more regularly to the streams to obtain domestic water supplies.

Until an accurate survey has been made and fuller information is available as to the snails existing in our streams and their habits, attempts to reduce the disease might be directed to the provision of protected water supplies more conveniently placed to villages than streams, making frequent visits to the latter unnecessary.

The provision of bore holes and wells by the Geological Department referred to later should reduce risks of infestation for sections of the population.

98. Treatment with antimony tartrate is given at all district hospitals but the native does not frequently attend hospitals for the condition, nor can he be induced when found affected to attend for a full course of injections.

Treatment of the infection at dispensaries has not yet been started for few members of the native staff have been trained in giving intravenous injections; an endeavour is to be made to train all staff in this necessary technique.

Rabies.

99. The unfortunate occurrence of a death from rabies has been recorded. The patient had received a course of anti-rabic vaccine, but it would appear that the vaccine used was not of recent importation.

The number of rabid domestic animals recorded during the year from various parts of the country was high and Government appointed a Committee to consider what action should be taken to reduce risks.

The Committee's report was accepted by Government and it is proposed in the new year to formulate legislation taxing all dogs kept both in town and rural areas, increasing the tax in geometrical progression when more dogs than one are kept by any person.

Supplies of anti-rabic vaccine are obtained from Salisbury by air mail as necessary, only a small stock for use in case of emergency being kept in the local store.

A total of 53 persons were given special protective treatment for rabies during the year.

2. General Measures of Sanitation.

Sewage and Night Soil Disposal.

100. No town in Nyasaland has a system of sewers, but in Zomba, Government has provided septic tank systems for a large number of houses occupied by officials; the service was not extended to all such houses because the piped water supply was not sufficient to serve the whole area. Houses within the town not served with septic tanks, which includes those in the Asiatic bazaar, are served by a bucket system, while most of the native residential area has pit latrines.

101. It is unfortunate that when providing septic tank systems for European residences provision was not made for individual closets on plots for the African staff employed at these residences. The African staff is today served by public latrines which are not always conveniently accessible to the persons required to use them.

102. The need for the provision of water-borne sanitation throughout the town has been brought to the notice of Government and it is hoped that shortly, on the provision of an increased water supply, which measure is under consideration, the septic tank system or this system plus a small sewerage scheme will serve the whole township and the adjacent native residential district.

103. Blantyre and Limbe are served by buckets with septic tank systems in a few private houses. Blantyre possesses a piped water supply and therefore the provision of sewers or septic tanks for a greater part of the town should not be difficult, provided the water supply could stand the extra strain that would be put on it.

The African residential areas in and around these townships are served by pit latrines, which are frequently shallow; numbers of their dwellings still have no latrine accommodation.

104. In other townships bucket services are provided almost invariably for European residents and sometimes for Asiatics. Where bucket services are not provided for Asiatics they provide pit latrines for themselves.

African populations in these places, except at Kota-Kota are served by communal pit latrines.

105. At Kota-Kota all African houses have their individual pit latrines and these are also provided for African staffs on plots occupied by Europeans and Asiatics.

106. Throughout the rural areas Native Authorities have endeavoured, some more enthusiastically than others, to insist on the provision of pit latrines for village populations and in almost every district there are one or more Native Authority Areas that are fairly satisfactorily served, but generally speaking the village African population still prefers to defaecate in the "bush".

107. On farms and plantations in European occupation the provision of pit latrines for African employees has been steadily fostered by the Government and today most labour compounds are provided with pit latrines of some sort although not necessarily sufficient in number or well maintained.

Drainage.

108. The absence of township drains even in the larger townships of Zomba, Limbe and Blantyre, is the cause of much nuisance, for even when short lengths of concrete or burnt brick drains are provided to carry away waste water from individual premises, nuisance is caused at the point where drains end.

109. In European residences soak-pits are ordinarily installed, but their efficacy is very much dependent on the nature of the ground and its suitability for soakage. The problems associated with anti-malarial drainage have already been referred to.

Water Supplies.

110. Zomba, Blantyre, Lilongwe and Mlanje have piped water supplies.

111. At Zomba water is piped from a reservoir on Zomba plateau but the available piping is insufficient to serve more than a limited part of the town; both the native town and military cantonment are excepted. The water piped has been found to be unsafe for drinking for the collecting area is liable to pollution. Government is considering the provision of larger pipes, to extend the area supplied and the purification of the water prior to distribution.

112. At Blantyre the available supply is limited and the local Township Engineer has reported to his Water Board that, unless action is taken without delay to provide new sources of supply, further demands could not be met. The present supply is sedimented, filtered and chlorinated prior to distribution.

113. At Lilongwe the piped supply is small and insufficient to serve all sections of the population. The water is taken from the Lilongwe river, which is liable to considerable pollution. No attempt has been made either to filter or sterilize the water and it therefore serves the European section of the population only for bathing and the watering of gardens. For many months of the year the water piped is so discoloured with suspended mud as to be even unattractive for bathing. Drinking water is obtained by the European section from boreholes at the tobacco buying sheds on the outskirts of the town.

114. Limbe depends for its supply on bore holes. A small number of public bore holes are provided to serve the general population but most of the larger business concerns have sunk boreholes for themselves and at least two concerns have piped these private supplies to their residences.

115. At Mlanje, water from a spring issuing from the mountain is piped to the houses of European government officials and the native hospital. The supply available should be sufficient to serve the whole township and a scheme should not be expensive for the population is small and not very scattered.

116. In other towns, sanitary areas and boma stations residents are dependent for their supplies on bore holes, wells, streams or lakes. Where bore holes or deep wells exist the supply might be considered to be safe, but the use of other supplies is associated with risks to health.

117. The Geological Department has in recent years been engaged in providing bore holes and wells in native areas where permanent water supplies have not been available. Many of the wells and bore holes provided are fitted with pumps or other mechanical contrivances for lifting the water and a European officer is maintained by the Government to tour these wells ensuring the effective maintenance of the mechanical contrivances installed.

118. Where special provision has not yet been made, rural water supplies are generally unsatisfactory and much work needs to be done to improve and protect the existing water supplies of the general population.

European Housing.

119. Europeans are, comparatively speaking, well housed in the Protectorate. Soil suitable for the making of bricks appears to be easily found and fuel being still fairly readily available most of the houses are built of burnt brick. Cement and roofing materials which need to be imported are by no means cheap and are therefore sparingly used. Most of the houses in townships have roofs of galvanised iron but on plantations, roofs of thatch are common. At many of the Mission stations, houses have tiled roofs, the tiles being made locally.

It is difficult to understand why tiles are not used more universally.

120. Owing to limited finances most Government and even many privately owned houses are, as a rule, not well finished off and many show signs of dampness in walls and not a few infestation by termites and even bats. Local African carpenters make fairly useful furniture and therefore houses are ordinarily well furnished with chairs, tables and cupboards, but frequently lack such essentials as long baths and stoves, etc., articles that have to be imported.

121. While European housing is satisfactory there is much room for improvement in the outhouses provided for African staff residing on these premises. Outhouses for Africans are invariably small in size and lack windows and ventilation openings. Lime for whitewashing is not easily obtainable locally and is, therefore, not cheap. It is not in frequent use for white washing.

122. While no area of the country is free of termites, in certain districts they are a very serious pest and, if houses are not specially protected, all woodwork is rapidly destroyed.

Asiatic Housing.

123. Asiatics either congregate in the townships or live in rural areas individually or in small groups on trading sites. With few exceptions they are all engaged in the retail trade of native goods. Although the Asiatic population is not large, there has already grown up in the older townships of Blantyre and Limbe, Asiatic housing areas which can be only classed as "slums". In these areas dwellings originally built for one family, now house several and plots are so overbuilt that lighting and ventilation of individual rooms are interfered with.

In Blantyre the bazaar area could only be satisfactorily dealt with by a redevelopment scheme under which a number of buildings would have to be demolished.

124. While Asiatics in town live under conditions that are far from satisfactory their African employees live under even worse conditions, in outhouses that one should hesitate to house domestic animals.

125. In trading areas outside the townships Asiatics live frequently in temporary buildings under uncomfortable conditions with little or no attention to sanitary principles.

126. The existence of an immigrant population resident in native areas under conditions that set a bad example to the local inhabitant is to be deplored.

Government African Housing.

127. With the limited Government funds available, the question of the housing of its African employees remains a problem not easy of solution. African civil servants are generally drawn from the more educated classes and have not only a knowledge of hygiene and sanitation but a desire to live under sanitary conditions. It is unfortunate, therefore, that Government has not always found it possible to accommodate them in buildings that comply with even the most elementary rules of sanitation.

138. The housing provided for African civil servants in out stations is comparatively more satisfactory than that provided in the larger townships such as Zomba and Blantyre. In the smaller stations most of the houses are built of daub and are fairly well lighted and ventilated. Being built of temporary material these houses cost a lot to maintain and frequently show evidence of need of repairs and renovation.

129. In Zomba and Blantyre although a few of the houses are of recent construction and of fair type, the majority consist of badly constructed, poorly lighted and unventilated rooms, some of which are back to back. Even where better housing exists, kitchens and latrines are not provided, presumably for reasons of economy and employees have, therefore, been forced to provide these for themselves, in temporary materials. Government is aware of this need of improved housing for their African staff and is endeavouring to find money for this purpose with the best speed possible.

Housing for African labour.

130. The Africans living on European estates etc. may be divided into three classes (1) semi-skilled labour, (2) squatters, (3) casual labour.

Semi-skilled labour.

131. Classed as semi-skilled labour are headmen or artisans who are in permanent employ and, if not provided with satisfactory housing by their employer, frequently erect good temporary dwellings for themselves. They are comparatively speaking better paid than unskilled labour.

Squatters.

132. The squatters live on European owned land under conditions very similar to those generally existing in native villages. The walls of their houses are usually of daub and wattle and the roofs of grass. These houses are built by the natives themselves and as they are their permanent homes are kept in a satisfactory state of repair. Sanitation is not always of the best, the standard being dependent on the interest taken by the employer or the local Native Authority

Casual labour.

133. Casual labourers with very few exceptions are poorly and inadequately housed. A few employers have very recently begun to appreciate that the maintenance of contented labour is very much dependent on their housing, but many still make no attempt to house such labour beyond giving them a day or two on their estates to provide themselves with some form of shelter, with poles and grass which they are permitted to collect off the employer's land. Not infrequently labour of this class can be found living in grass shacks a few feet in height with no ventilation apart from the entrance and with no sanitary conveniences or those of the crudest type.

General African Housing.

134. Almost all Nyasaland natives live in villages some of which are comparatively large while others are merely groups of huts housing not more than one or two families. Villagers cultivate the land around their homes, but when the

village is large some of the land cultivated may be a mile or two away from residences. A family frequently cultivates a number of small plots not necessarily adjacent one to the other. From time to time villages are moved; the move being necessitated by the land around becoming used up and no longer fit to produce good crops. The practice of moving villages is, however, slowly growing less common especially in densely populated areas.

135. In established villages most of the people live in well constructed daub and wattle huts but lacking lighting and ventilation. While huts are arranged on some principle, layouts are not always convenient for the provision of sanitary conveniences in close proximity to dwellings. In certain cases, however, progressive chiefs have endveavoured to layout villages on more satisfactory lines.

136. Although, as has been stated ventilation and lighting of native huts is not good as a rule, in almost every village it is possible today to see one or more comparatively well constructed huts, with windows and ventilation openings, which are occupied by educated natives who have learnt better conditions in their travels in this and adjoining territories. The existence of these better huts gives hope that with improved prosperity and more intensive propaganda by this department, the administration and other technical departments, greatly improved conditions could be brought about in the housing of our African villagers.

3. School Hygiene.

137. Government maintains a Director of Education and a small number of education officials the majority of whom are engaged at the Jeanes School which is a Government institution. African education, however, is left to mission enterprise, grants being paid out of Government funds, according to the number and standard of the schools maintained. At present Africans cannot obtain any secondary education, but the provision of a secondary school is promised at an early date.

138. Systematic medical inspections of schools and scholars by members of the medical department has not yet been instituted, but from time to time individual Medical Officers have examined school children at a few schools. During the year, at Mlanje, a survey was carried out of children attending the Providence Girls' School. 174 girls between the ages of 8 to 18 were examined and the following data were collected :—

69	were	found	to	have	malarial parasites.
58	„	„	„	„	Palpable spleens.
108	„	„	„	„	*S. haematobium* ova in their urine.
95	„	„	„	„	ascaris ova in their stools.
34	„	„	„	„	hookworm ova in their stools.

139. The Medical Officer, Lilongwe, began a milk experiment amongst the boys attending the Catholic Mission School at Likuni. Twenty boys chosen at random were given 1 pint of milk daily while twenty others who were also picked in the same way and from the same age group, were kept under observation as a control; otherwise both sets received the same diet. The experiment was only started in December and therefore no observation can yet be submitted. The Medical Officer reports that a very large number of the children attending the school show signs of vitamin deficiency on first attending but that improvement in their condition is evident after two or three years residence as boarders. The Mission has its own vegetable garden and feeds the children on vegetables as long as these are available. Vegetables are, however, scarce in the dry season.

140. The Medical Officer, Dedza, carried out a survey of three boys' schools and one girls' school in that district and submitted the following data :—

		Boys 220	Girls 103
Nutrition	good ...	52.2 per cent.	75.7 per cent.
	fair ...	43.6 „ „	21.4 „ „
	poor ...	4.2 „ „	2.9 „ „
Skin clear	...	56.8 „ „	85.5 „ „
Dental caries	...	8.7 „ „	21.4 „ „
Malarial parasites	...	34.7 „ „	20.9 „ „
S. haemotobium ova	...	17.2 „ „	31.0 „ „
Hookworm ova	...	24. „ „	29. „ „
Ascaris ova	...	10. „ „	14.5 „ „
S. mansoni ova	...	4.2 „ „	0.9 „ „
S. haemotobium and *S. mansoni* ova	...	2.7 „ „	— „ „
Scabies	...	43.2 „ „	14.5 „ „

141. Most Medical Officers describe conditions existing in schools as unsatisfactory and in many cases report that latrine accommodation is insufficient and sometimes absent altogether.

142. Draft regulations to be issued under the Public Health Ordinance for the better control of schools have been prepared by this department and submitted to the Director of Education who has circulated them amongst education authorities with a view to obtaining their comments prior to submission to Government for approval and introduction.

4. Labour Conditions.

143. The average rate of pay for unskilled labour throughout the Protectorate does not exceed 6s. to 8s. per 28 to 30 day ticket, which may take 5 weeks or longer to complete. Most employers also issue rations consisting of maize meal, beans and salt or 3d. to 6d. per week in lieu thereof. Housing conditions provided for labour are as already described.

144. 60,000 local natives are engaged in work for wages in the country but the number working outside our boundaries is estimated to be 113,000 of which 75,000 are at present in Southern Rhodesia and 27,000 in the Union of South Africa.

This Government is not satisfied with the conditions provided for our labour in Southern Rhodesia and by some local employers and proposes to take steps to have matters improved.

145. The majority of natives employed in Southern Rhodesia leave this country on their own; only a small percentage goes out on definite contracts. The local African does not take kindly to contracting his labour in advance, for he prefers to choose his own employer and the kind of work he will undertake.

5. Food in Relation to Health and Disease.

146. A very comprehensive nutritional survey of the natives resident in certain areas in this country was begun in August. The personnel seconded for the survey was as follows :—

Dr. Fitzmaurice, Senior Medical Officer.

Mr. R. W. Kettlewell, Agricultural Officer.

Miss J. Barker, Investigator with training in dietetics especially engaged in Great Britain.

Dr. M. Read, Anthropologist lent to this Government by the African Institute.

147. Funds for the payment of this staff and to cover the cost of the survey were provided from the Colonial Development Fund. It was agreed that Dr. B. S. Platt appointed by the Research Sub-Committee of the Economic Advisory Council Committee on Nutrition as Director of Research on Nutrition in the Colonial Territories and an assistant Miss Owen should spend the greater part of twelve months in this Protectorate to work out the technique of carrying out such surveys. Dr. Platt arrived in this country in August and has directed the work of the survey.

148. The survey party started work first in a suburban area not far from Blantyre, where comparatively well-to-do Africans live and work. This area is typical of a transition from village life to life in close contact with Europeans ; no true urban area of any importance exists in Nyasaland.

In this area a study was made of the health of members of representative households, of their food and food habits and of their sociological background.

149. Early in November the survey party moved to Kota-Kota District and started systematic investigations in three villages which were specially chosen as representing people having different types of foodstuffs and to some extent contrasting features relating to climate, geographical situation and organisation. One village was situated in the Highlands, a second on the Lakeshore and the third between the first two.

150. In each village the survey party is collecting data, directly and by arrangement, over several months on signs in the body of defective nutrition, on the kinds and amounts of food consumed and method of food preparation, on land utilisation, on labour expenditure in food production and yields of food obtained from the land and on certain sociological matters related to nutrition such as land tenure, migration of labour and etc.

151. Already considerable valuable information has been collected and there is little doubt that the survey when completed will throw light on many problems not properly understood previously and cause a new outlook on African development to be taken not only in this Protectorate but throughout a larger part of the African continent.

152. The survey party is already satisfied that deficiency diseases are of common occurrence and that a community on an ample and varied diet may be fitter than one on a poor diet, even though the former is badly affected by parasitic diseases.

153. The findings also indicate that there is much that can be done by means within the power of the African with the help of technical departments, if the natural wealth in land and labour is conserved and used to better advantage.

154. At the close of the year the survey party suggested to Government that the lines along which they think improvement might be made, might be submitted to a practical test immediately, to be carried out under their supervision concurrently with the survey but on a site which will not interfere with the villages under investigation. The party hope that their practical experiments will serve as a demonstration to Government and the people of what can be done and how this can be achieved. They also hope that in experiments plants and other materials could be collected and propagated so that similar works could be put into effect without delay on the completion of the survey in the villages which have been under investigation and where they feel sure a good start may be made as the population appreciates as a result of their association with the survey team that efforts are being made to improve their lot.

155. Although before the arrival of the survey party Medical Officers had continuously emphasised the fact that the native population showed signs of deficient nutrition, more attention is now being given to the subject and it would appear that defective nutrition is more widespread than was originally believed and especially the appearance of conditions which are due to the lack of vitamins.

156. Meat inspection following the slaughter of cattle for local markets is carried out by the Health Inspectors at Zomba, Blantyre and Limbe and elsewhere by Medical Officers, Sub-Assistant Surgeons and Hospital Assistants. The commonest cause of the condemnation of meat is infection with *Cysticercus bovis*. Livers are frequently condemned for infestation with flukes.

157. The keeping of pigs by natives is steadily increasing and as these are permitted to wander round the villages, etc. it is possible that the pig tape worm might in time become a commoner parasite of our population than it is today.

158. The sale of smoked and dried fish in areas away from the Lake is steadily increasing and this trade should be fostered. What is required is the introduction of better methods of fish preservation, for by the present methods the fish only remain consumable for a few weeks.

159. Although certain tribes like the Angoni have numbers of cattle the consumption of milk as a food is still, not general. The habit of eating meat is steadily developing and meat is usually sold at the regular weekly markets held at various centres throughout the country.

(B). MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

160. This department staged exhibits at the annual agricultural shows held at Limbe and Lilongwe in the Southern and Northern Provinces respectively, which attempted to show the advantages offered at our hospitals for the care of the sick and with models of houses, pit latrines, village layouts and etc. to demonstrate that it was not difficult or expensive to improve the conditions under which a large section of the population still exists.

161. 500 copies of each of three coloured posters dealing with housing, water supplies and the care of the sick, originally prepared for use in Uganda were received from the Colonial Office and after the addition of suitable captions in Chinyanja by the Government Printer were distributed to hospitals, dispensaries, schools and district offices. The lessons taught by these posters were explained to all members of the African staff and the posters are now being used by them as occasion offers for lecturing on.

(C). THE TRAINING OF PERSONNEL FOR EMPLOYMENT BY THE DEPARTMENT.

162. The training of Africans for employment in the Medical Department has not yet been put on a satisfactory basis and therefore the Medical Department has not been able to staff suitably their hospitals and dispensaries or to make much advance in the improvement of rural conditions.

163. The training of Hospital Assistants, a term used locally for Africans passing examination tests set by our Medical Council has for many years been in the hands of the Blantyre Church of Scotland Mission, which maintains a large native hospital in that town, staffed by one and at times two European doctors. The training given at this institution has produced a type of person fitted to undertake routine nursing in a hospital, but not uncommonly employed for lack of better trained personnel in direct charge of small hospital units.

164. At the Zomba African Hospital, classes for the training of medical subordinates, to a lower standard than that attempted at the Blantyre Mission have been maintained during the last two years.

165. At other Government hospitals, Africans, both male and female, are engaged as probationers and though not given any systematic training, are expected to gain medical experience fitting them in time to be placed on the permanent staff as nurses or dressers in charge of dispensary units.

166. The salaries offered by Government for Hospital Assistants have not been sufficient to attract to Government employment all persons trained by the Blantyre Mission, for better pay and conditions are easily obtainable by our Africans with medical training in the adjoining territories of South Africa, the Rhodesias and Tanganyika.

167. Training of Sanitary Inspectors is attempted by the Health Inspector Zomba, who gives suitable candidates a short course of lectures and demonstrations prior to their admission on his recommendation to the permanent staff of the department.

168. The Medical Officer, Zomba, assisted by the Health Inspector undertakes a course of lectures and demonstrations to teachers and chiefs under training at the Jeanes School, in the hope that they will not only themselves practise the lessons taught but guide by precept and example the village populations they will either work amongst or direct.

(D). RECOMMENDATIONS FOR FUTURE WORK.

169. The most urgent need of the Medical Department of this country is a competent African staff, paid sufficiently to satisfy it to remain in the service of this Government.

170. Neither the Blantyre Mission Hospital nor the Government African Hospital at Zomba have the teaching staff necessary to train Africans to the standard that is essential if they are to be usefully employed in gaining the confidence of the people and are to take a real share in the future activities of the Medical Department.

171. Detailed recommendations for the provision of a grouped hospital unit at Blantyre, with necessary staff for teachers, have been submitted to Government and, it is hoped, will soon be submitted to the Secretary of State. The future of the Medical Department is very dependent on the outcome of the scheme proposed.

172. Next to the training school suitably staffed our most urgent need is the provision of European Nursing Sisters at our African hospitals to ensure that cases admitted are properly nursed and to gain the confidence of women and children by developing ante-natal, infant welfare and maternity services.

173. Following the provision of Nursing Sisters, Health Inspectors should be provided also for each district to assist Medical Officers in their campaigns to improve living conditions in native villages.

174. The Medical Officers are at present too much tied to their hospitals. They should be provided with sufficient funds to travel round their districts and with competent clerical staff to relieve them of their office routine.

SECTION IV. PORT AND HEALTH ADMINISTRATION.

175. A quarantine camp is maintained at Port Herald, the first Nyasaland administrative centre arrived at when entering the country by the Beira-Nyasaland Railway. At this camp persons who are suffering from or who have been in contact with infectious diseases may be detained and any individuals unable to produce a certificate of vaccination are liable to similar detention.

During the year the number detained was as follows :—

	Men	Women	Children
Africans	28	18	26

176. African labourers in transit by road from the Sena Sugar Estates, Marromeu, Portuguese East Africa to Angonia in the same Territory were examined when passing through Port Herald.

The numbers examined were as follows :—

Men	Women	Children
733	231	10

177. The main air port of the country is at Chileka about 10 miles from Blantyre. A regular air mail service is maintained twice weekly by aeroplanes belonging to The Rhodesia and Nyasaland Airways, which fly from Salisbury to Fort Jameson and back calling at Chileka and Lilongwe *en route*.

178. Sanitary conditions at Chileka are maintained under the supervision of the Medical Officer, Blantyre and regular visits are paid to the aerodrome by The Health Inspector, Blantyre. The Senior Medical Officer, Lilongwe, is in medical charge of the aerodrome at Lilongwe.

SECTION V. MATERNITY AND CHILD WELFARE.

179. Ante-natal and child welfare clinics are held weekly at the Zomba African Hospital by the European sisters posted there and, although the number attending is still not great, progress is being maintained and each year a larger number of women voluntarily enter this hospital for normal confinements. The following figures show the progress made :—

	1935	1936	1937	1938
Number of confinements in hospital ...	17	30	35	72
First attendances at child welfare centre ...	204	219	225	246
Subsequent attendances	819	1,117	1,375	1,411

180. The wife of the Hospital Assistant at Liwonde, who is a midwife registered under our local regulations, conducted child welfare clinics and administered a small ward specially provided for the admission of maternity cases. For a part of the year this work had to be discontinued while she was on local leave.

The progress made by this unit up to the present is small for only 12 admissions were made during the year.

181. The two Mistresses on the staff of the Jeanes school, who are qualified nursing sisters, maintained during the year regular ante-natal and child welfare clinics at the school for the families resident and for the village population around and admitted into their hospital a number of maternity cases. A dispensary for general medical cases, provided within the school area and staffed by the Medical Department, functions in co-operation with the activities first mentioned.

The wives of men under training at the school assist in the work of the welfare centre and in the maternity ward and attend a course of lectures in child management. The training they are given fits them not only to care for their own children, but to assist their husbands in village improvement schemes by working amongst the female population. Details of the work done at the Jeanes School clinics during the year are as follows :—

Ante-natal clinic cases...	92
Revisits of clinic cases	464
Maternity cases attending at clinic	27
Maternity cases attended at villages	49
Children on welfare clinic roll	125
Women attending at out-patient clinic (new cases)	2,876
Men do. do. ...	5,851

182. The staff of the Church of Scotland Mission Hospital at Blantyre continued during the year to admit maternity cases to the special section maintained for this work and continued the supervision of the ante-natal and child welfare centres they have started in the district around.

Dr. Janet Welch, who has been primarily responsible for this work, was absent from the country during the latter end of the year, but the work was continued by a Nursing Sister under the supervision of the Medical Officer in charge of the Mission's medical work. Government subsidises the work of the Mission by the payment of £350 per year.

The following data give some idea of the work that has been done:—

I.	Total No. of attendances at clinics for treatment (outpatients)	1,331
II.	(*a*) Infants admitted on roll at infant welfare centre at Hospital	196
	(*b*) Infants admitted on rolls at infant welfare centres at district clinics	320
	(*c*) Total number of attendances of infants at hospital clinics ...	7,902
	(*d*) Total number of attendances of infants at district clinics ...	4,331

III. Mothers Admitted to Hospital.

(*a*) Ante-natal conditions

1.	Abortions	8
2.	Premature labour	4
3.	Other causes	27

(*b*) Confinements

1.	Normal	132
2.	Abnormal	43

(*c*) Post-natal conditions.

1.	Retained placenta	5
2.	Puerperal sepsis	4
3.	Other conditions	13

IV.	Number of still births at hospital	31
,,	,, maternal deaths at hospital	9
,,	,, still births in district	40
,,	,, maternal deaths in district	2

183. Dr. Pauline Murray of the Dutch Reformed Church Mission remained during the year in charge of the maternity hospital at the mission station at Mlanda and with the assistance of a Nursing Sister conducted welfare and ante-natal clinics at the hospital and supervised the work of native midwives in the district around.

Government proposes to pay a subsidy of £350 next year to this Mission for maintaining this work.

The following data of work done have been submitted.

I.	(*a*) Infants admitted on roll at infant welfare centre at hospital	208
	(*b*) Infants admitted on rolls of infant welfare centres in districts	324
	(*c*) Total number of attendances of infants at infant welfare clinic at hospital	1,493
	(*d*) Total number of attendances of infants at district welfare clinics	1,891

II. MOTHERS ADMITTED TO HOSPITAL.

(*a*) Ante-natal conditions		
	1. Abortions	8
	2. Premature labour	2
	3. Other causes	4
(*b*) Confinements		
	1. Normal	32
	2. Abnormal	5
(*c*) Post-natal conditions		
	1. Retained placenta	5
	2. Puerperal sepsis	nil
	3. Other causes	3
III. Mothers confined in district under supervision		66

184. The Church of Scotland Mission at Livingstonia in the North also receives a subsidy of £350 per year for the maintenance of a maternity hospital and ante-natal and child welfare clinics. During the year the hospital admitted 45 women in labour and the welfare centres connected with the hospital and district dealt with nearly 200 infants weekly.

185. At Government hospitals other than Zomba, it is still unusual to admit women for normal confinements, but every unit is called on from time to time to deal with abnormal cases, frequently at the end of prolonged labours and after interference by the old women in the villages.

186. The provision of European nursing sisters for posting to all African hospitals is necessary if headway is to be made in welfare work amongst women and children and for the maintenance of female African nursing staff at our units. The better classes of African females do not yet take kindly to male direction.

SECTION VI. HOSPITALS AND DISPENSARIES.

European Hospitals

187. The Government maintains hospitals for Europeans at Blantyre and Zomba and a small hospital is in the course of erection at Lilongwe. The hospital buildings at Blantyre and Zomba were erected many years ago and are in many respects far from satisfactory.

The erection of a more modern hospital centrally placed to replace these existing hospitals has been under consideration for many years and its provision has been approved by the Secretary of State. The final decision as to site was left over until the new Director of Medical Services arrived in October. Government has now been advised that this hospital should be erected in Blantyre as part of a group of hospitals catering for all sections of the population, European, Asiatic and African; the hospital group to be associated with a medical school for the training of African subordinate staff.

188. The Lilongwe hospital is to be staffed with one nursing sister and therefore will not be able to undertake the care of persons requiring continuous skilled nursing.

189. A small hospital for Europeans is provided and maintained by the Seventh Day Adventist Mission at Malamulo in the Cholo District.

Asiatic Hospitals

190. In most Government African hospitals accommodation can be made available for the admission of Asiatics and from time to time they are admitted to these hospitals. The Church of Scotland Mission at Blantyre have special accommodation for sick Asiatics and this today remains our main Asiatic hospital in the country.

Government pays a small subsidy to the Mission for providing and maintaining this unit.

191. Most of the existing African hospitals have been built out of Colonial Development Funds and are of sound construction. Certain parts of the Northern Province, however, as for example the West Nyasa and the Northern section of Mzimba, are insufficiently provided for, but the further provision of hospitals, even in those areas mentioned, is not recommended until the training of subordinate staff is placed on a sound basis, for at present it is found difficult to obtain enough trained African staff to maintain existing units as they should. African Hospitals

192. 93 Dispensaries are maintained by the department and are staffed with African dressers trained locally. The standard of training of these dressers is poor and therefore the standard of treatment given at these units is not very high. There is, however, a persistent demand for further dispensaries from Native Authorities in whose areas no dispensaries have so far been provided, but again it is not proposed to approve of the opening of further units of this nature until more than sufficient staff is available for posting to existing units.

193. Details of populations in districts and of attendances of patients at the medical units provided in such districts are tabulated below:—

	1937			1938					
	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Area in sq. miles	Rank of officer in charge	Density per square mile, 1931 Census
	In-Pts.	Out-Pts.	Out-Pts.	In-Pts.	Out-Pts.	Out-Pts.			
Blantyre and Neno ...	—	6,057	33,503	—	—	37,611	1,801	M.O.	85.64
Chikwawa	235	3,566	19,173	202	3,414	14,853	1,897	S.A.S.	18.92
Chiradzulu ...	505	5,009	12,559	522	5,060	14,987	270	S.A.S.	296.77
Cholo	759	3,950	3,878	757	4,688	6,555	624	M.O. or S.A.S.	94.79
Chinteche	483	8,035	10,328	434	8,164	12,355	1,925	Hosp. Asst.	23.06
Dowa	356	2,525	11,031	360	2,838	14,743	1,802	S.A.S. or H. A.	64.41
Dedza	504	6,793	16,482	471	6,548	19,425	1,818	M.O.	76.06
Fort Johnston ...	778	9,364	5,335	717	10,114	6,420	2,518	M.O.	29.79
Fort Manning ...	359	3,961	13,217	396	5,669	13,780	1,453	S.A.S.	23.47
Karonga	739	8,858	23,499	805	9,309	18,697	3,004	M.O.	12.79
Kasungu	247	3,985	6,035	373	3,538	8,155	3,330	S.A.S.	10.95
Kota Kota	651	14,904	21,812	933	13,332	22,785	2,430	M.O.	47.17
Lilongwe	521	4,964	8,623	549	7,029	9,044	2,677	M.O.	51.90
Liwonde	189	3,528	12,966	257	3,793	15,166	2,045	Hosp. Asst.	16.29
Mlanje	750	6,369	15,531	754	6,199	18,608	1,531	M.O.	27.89
Mzimba	215	4,156	13,128	262	6,029	19,404	5,729	S.A.S.	30.73
Neheu	475	6,338	15,288	443	7,791	18,913	1,092	Hosp. Asst.	69.22
Port Herald ...	644	3,620	15,440	696	4,182	19,734	749	S.A.S.	108.98
Zomba African Hospital	1,949	15,072	39,360	2,671	13,021	35,337	903	M.O.	—
,, C. Prison Hospital	236	3,210	—	248	5,497	—	—	M.O.	—
,, Lunatic Asylum	—	—	—	—	6,001	—	—	M.O.	—
,, Jeanes T. Centre	—	—	5,130	—	—	5,706	—	A. Mistress	—
Total ...	10,595	124,264	302,318	11,850	132,216	332,278	—	—	—

NOTE.—In the above table all patients attending for treatment are recorded in the first instance as out-patients whether or not they are subsequently admitted to hospital; to obtain the total of those who obtained out-patient treatment only the in-patient figures should be subtracted from the combined total.

SECTION VII. PRISONS AND ASYLUMS.

Prisons

194. The Central Prison which admits all long term prisoners is sited in Zomba. The available accommodation is good but from time to time there occurs some overcrowding. Government proposes to take steps to remedy this.

District prisons are maintained at all stations to which District Commissioners are posted. Most of the existing districts prisons are built of permanent material and generally speaking prisoners are not unsatisfactorily housed. No serious epidemics amongst prisoners were recorded during the year.

Central Lunatic Asylum

195. This institution is also sited in Zomba and is administered by the Chief Commissioner of Police with officers of the prison department and little difference exists between the treatment given to prisoners and to those persons detained in the mental asylum. Sir Robert Bell, in his report already referred to, has recommended that the Medical Department should take over the administration of the existing mental institution, but, as the accommodation available is by no means suitable for the proper care of persons mentally affected, this recommendation is not approved of by this department for it would be unfair on Medical Officers to ask them to take responsibility for this class of work under the conditions that exist.

SECTION VIII. SCIENTIFIC.

ANNUAL REPORT OF THE MEDICAL ENTOMOLOGIST FOR 1938.

I. Surveys for Tsetse Flies.

I carried out two in the course of the year, one in the Dowa District in the region formerly proclaimed on account of sleeping sickness, the second in the Kasungu District.

A. Survey in Dowa District.

2. This was undertaken with the especial object of ascertaining what effect the economic development of this area, which has been considerable of recent years, has had on the fly. Since the history of this particular area, as concerns the insect, is better known than that of other fly areas in the country, except the one in the Lilongwe and Fort Manning Districts, it being indeed the area in which Sir David Bruce and his collaborators conducted their researches into human trypanosomiasis, it may be advantageous to try to compare past conditions with the present ones.

3. It would seem that up till about 1905 tsetses were not existent in it, for until about then large numbers of cattle collected by European dealers from various parts of Angoniland for eventual sale in Rhodesia were collected together in various localities, particularly at the Lake shore in the vicinity of Domira Bay, at Lingadzi about ten miles inland and in the neighbourhood of Nyansata about six miles inland, where they were got into condition preparatory to their long walk to Fort Jameson. By about 1907, however, according to one of these dealers, the keeping of cattle in the region became impossible owing to the advent of tsetses with heavy losses from trypanosomiasis, leading to the gradual abandonment of the practice.

4. It was not till 1908 that the presence of tsetse in the area became the concern of Government, for in that year a medical officer stationed in the district contracted sleeping sickness and there occurred the epidemic that led to the Sleeping Sickness Commission of the Royal Society.

5. That Commission aided by Dr. J. B. Davey, one of the Medical Officers seconded from the local medical department, as Entomologist mapped out the fly area, finding it to extend from the Chilwa in the north to the Lintipe in the south and from the Lake shore to the foot hills of Angoniland on the west.

6. On the departure of the Commission another departmental medical officer, Dr. J. O. Shircore, who was stationed in the area to deal with the outbreak of sleeping sickness, spent four months in constant travel within it and in 1914 published a paper which aroused considerable interest, for he drew attention, being the first observer to do so, to the concentrations of fly that take place in the dry season, specifying four localities in the Proclaimed Area namely Lingadzi, Nyansata, Kuti and Patsanjoka, where these occurred. These he termed "Primary Fly Centres"

7. In his paper Dr. Shircore expressed the view that the flies massed in these areas in the late dry season, when few or none existed elsewhere in the area and that in all probability the insects bred in these localities and from them extended in due course into the surrounding regions as soon as conditions became more favourable for them. The reasons he gave for the concentrations were that only localities where in the dry season water is actually above the surface of the earth or at no great distance below it, that fresh grass springs up and trees put on their foliage much earlier in these places than elsewhere and that it is in these situations the insects can best feed during the long period of drought since the natural conditions of shade, grazing and the presence of water serve to attract the game animals on which they depend.

8. Dr. Shircore then suggested the possibility of attack on the fly by the delimitation of these centres in the late dry season, the felling of the timber within them and wholesale and extensive burning.

9. On my arrival in the country in 1914, Dr. Shircore having left, I was instructed to study the position in the light of his paper, but while agreeing with him that such foci did exist, came to the conclusion that they were not absolute, for tsetses could be found over the greater part of the area even towards the end of the dry season and that the centres were far too extensive to make any attempt, to eliminate them by clearing, practical. I did not find, moreover, that Shircore's supposition that breeding was limited to these centres was correct, for the puparia of the fly were readily obtainable over the whole area at all seasons. No action was accordingly taken.

10. The position as regards fly in the area up to 1922 remained as it had been in 1914 when three estates were opened up in the area for cotton, one on the Domira Bay road about two miles from the Lake, the second at Nyansata (one of Dr. Shircore's primary centres) and the third on the road about six miles further west towards the foothills.

11. As a result of this development the game moved away and two years later fly had become exceedingly scarce all along the road and in its immediate vicinity and appeared to be non-existent at the former primary centre, Nyansata, where indeed, a small herd of cattle was then installed.

12. Although the enterprise fell through after about three years, the estates lapsing, followed within a year or two by the tsetse becoming as numerous as before at Nyansata and along the road, it had served a good purpose, for it had proved that in this country quite limited development may have a marked effect in causing the withdrawal of fly.

13. In 1929 there came to Domira Bay the Empire Cotton Growing Corporation with schemes not only for the establishment of a large experimental station but for the development of the whole of the fly infested area under cotton; their schemes have very largely materialized. Lands of potential value for the crop have been made available for settlement by the provision of water supplies from wells and bore-holes and natives are settling on them.

14. From the point of view of tsetse control there could hardly have been a more fortunate selection of locality for these developments. Two of Shircores primary centres have now been opened up, there being five of such supplies of water in the neighbourhood of Nyansata and six in the vicinity of Kuti, all having attracted settlement; furthermore his third centre, Lingadzi—now called Chikwawa—an estate of 15,500 acres has been opened up very considerably indeed in the last four or five years, while between the Chirua and Lintipe rivers fifteen other wells and boreholes in country previously unoccupied have all attracted settlers.

15. The enterprise of the Empire Cotton Growing Corporation has moreover achieved a considerable measure of success and according to figures supplied by the District Agricultural Officer, no fewer than 2,250 natives in the area were engaged in the cultivation of cotton during last season, each averaging an acre in scattered patches on Trust Lands, while there have been considerable acreages under cotton on private estates—Chikwawa Estate alone having 1,000 native tenants with the greater part of its 15,500 acres opened up, Kasache Estate of 2,000 acres with 500 under cotton, Chikombe Estate of 1,000 acres with 550 under cotton, Nkondwe Estate of 2,000 acres, for the most part under cotton.

16. The position as concerns fly, as I found it in the course of my recent survey, is that the insects have diminished very greatly in numbers over the whole area, doubtless as a result of these developments, although one may still encounter a stray fly here and there. Fly seemed to be non-existent in the three primary centres where they used previously to congregate in the late dry season—the time when my visit was made—but still occurred sparingly in the fourth, Patsanjoka, where I took them at the rate of two or three per hour. Nowhere was I assailed by swarms such as were formerly present in the area.

17. The improvement in the situation is therefore very definite and is confirmed by the re-introduction of stock that is now taking place, having been impossible owing to fly for many years. According to figures supplied by the District Commissioner there were over 200 head in Makanjilas area in 1934 when the last census was taken and according to my own rough estimate there must now be at least 500 head between Kajuru and Makanjila in small herds of ten to fifteen. There seemed to be very little game remaining in the area: what there was being the dambo-frequenting species reedbuck and oribi.

18. The only recommendation I have now made, apart from stressing the need for continued development, particularly in the neighbourhood of Patsanjoka, is that the elimination of the game might be speeded up by the suspension of the operation of the Game Laws, from the Lintipe south to the Nkhumbeleza "the limit of good soil" as defined by the Manager of the Empire Cotton Growing Corporation, north of which is the recently constituted Kota-Kota Game Reserve.

B. Survey in Kasungu District.

19. The second survey, that in the Kasungu District, was undertaken for the purpose of ascertaining what is the real position as regards fly on the Kasungu Plain, for, according to the report of the District Commissioner for 1937, "there seems reason to believe that forest preservation and protection is resulting in the spread of tsetse-fly in the district. Residents who have been in the district for a considerable number of years have observed the gradual disappearance of cattle from the area round Kasungu. Long ago this area was very bare and supported a number of cattle, but in recent years there has been considerable forest regeneration and presumably as the result the fly has gradually advanced nearer Kasungu."

20. Before proceeding on my survey I took occasion to see the Native Authority, Mwase, who spoke of the gradual reversion of the pasturage to bush and expressed the opinion, which he said was shared by his people, that of recent years tsetses had spread across the plain from the reserve in consequence of the movement of the game out of it, buffalo in particular and that there had been very serious losses in cattle, 500 in the course of the last three years and many more previously, leaving a present total of about 500 head only.

21. According to figures supplied by the Chief Veterinary Officer, the cattle in the Kasungu District (most of which are on the plain) had dwindled from 3,635 in 1927 to 1,687 in 1936; the outcome, presumably of trypanosomiasis, since a recent report by his department refers to the widespread incidence of trypanosomiasis among the survivors.

22. The Kasungu Plain borders the Forest Reserve which is also a Game Reserve that was constituted in 1922 not only for the purpose of affording sanctuary to the game but as a region in which, for the time being at all events, fly would be secure from the disturbing influences that may have had some effect, in accelerating the widespread movement southwards that had been taking place over a considerable number of years. There then seemed to be little likelihood of the insects spreading on to the plain, for it was for the most part destitute of trees of any size and there seemed to be cattle enough to maintain the pasturage, though even then some reafforestation was taking place, particularly to the northwest from which the population had been withdrawn in 1923.

23. In the course of the survey I found fly, in accordance with expectation, in considerable numbers within the game reserve. I took them, furthermore, outlying from the reserve, though in no great numbers, in several localities on the plain as far distant from the reserve as six or seven miles. There was abundant evidence, also, of the existence of game, buffalo in particular, at a still greater distance from it, elephant having indeed crossed the mainroad twelve miles distant while I was in the vicinity.

24 The factors that have conduced to the presence of fly on the plain would seem to be:—

1. The gradual reversion of the open country to bush sufficient to provide shade conditions for the flies. The fundamental cause for this has been in all probability the gradual depopulation of the plain that has taken place since the advent of British rule, prior to which a large community of Achewa now scattered were banded together on the plain for the purpose of defence. The process of afforestation is necessarily being a very slow one from the poor quality of the soil.

2. The existence of the larger wild mammalia.

25. The measures that I recommended were :—

(*a*) Deforestation particularly in the vicinity of villages where stock is still maintained. It seemed to me that the scheme which has proved so effectual in Tanganyika, whereby there is an annual turn out of voluntary workers for a few days to slash back the bush in the interests of their stock might well be put into practice here. Such work would not be heavy on the plain since the trees are thinly scattered in many places and tend to be stunted.

(*b*) Suspension of the Game Laws over the whole of the Kasungu Plain from the eastern boundary of the reserve to the main road about twelve miles east, in the first instance, with the Dwangwa and Bua rivers as the northern and southern limits respectively.

(*c*) More effective control of elephants, on the lines recommended by a member of the Game Department of Tanganyika Territory who visited this country in an advisory capacity on the subject in 1928.

(*d*) Greater effort towards the conservation of the existing stock.

(*e*) Some greater measure of supervision of the reserve, especially to ensure that the game laws are being observed by the natives in the vicinity (which seemed to me to be rather doubtful).

(*f*) The settlement of native immigrants in localities where deforestation is especially needed.

(*g*) Consideration of the possibilities of the greater economic development of the plain.

C. Lilongwe—Fort Manning Area.

26. I did not undertake a survey of the Lilongwe—Fort Manning fly area that I usually carry out in the course of the year, being assured both by the District Commissioner, Fort Manning, and by Mr. West manager of an estate in Lilongwe District in the region formely fly infested, that in their opinion the improvement in the situation continues to be maintained, that is, the gradual withdrawal of the fly towards the reserve.

II. Transmission of Tuberculosis by Musca Sorbens.

27. I endeavoured to ascertain if the fly *Musca sorbens* Wd. is concerned in the transmission of *Mycobacterium tuberculosis*, an investigation that I initiated towards the close of 1937.

28. Bred flies were fed on tubercular sputum, both when fresh and dried out; their vomit drops were examined, the length of time they may deposit the organisms subsequent to regurgitation was studied and their faeces were examined day by day, up to three and four weeks in some instances.

29. When flies had fed on fresh sputum, which is among their normal articles of diet, it was found that the causal organisms may be passed as bacillary forms, coccoid forms and intermediates apparently unchanged up to about fifteen days from the infecting meal and in numbers considerably greater than in the original medium, the result perhaps of its digestion and absorption by fly. After about the fifteenth day coccoid forms only, which stain more intensely than the other forms, could be found.

30. When bred flies were fed on similar sputum that had been dried out for varying periods in the laboratory it was found that they passed the organisms, apparently unchanged, over an equal period of time, coccoid forms being recognisable for some days after the disappearance of the bacillary forms. Such results were obtained in the last experiment conducted in which sputum seventy-nine days old was utilized.

31. In a further series of experiments flies were fed on sputum that had been dried out and had then been kept in a moist atmosphere (in an endeavour to reproduce conditions to which it would naturally be subjected as the outcome of seasonal change). In the last of such experiments in which flies were fed on sputum dried for sixty-two days and then kept moist for another fifteen days their faeces contained coccoids only which were definitely recognisable over a period of five days, these being the only forms of the organism present in the original material.

These coccoid forms and these only, which are more readily made out when the counter stain has not been employed, could still be made out in this sputum thirty six-days later, though it had been kept in a constantly moist atmosphere.

32. It would be difficult to fix an approximate time limit up to which such coccoid forms may be passed by the flies owing to the difficulty of being absolutely certain of their nature when they are devoid of every particle of the lightly staining acid fast material by which they often seem to be enveloped, for other acid-fast matter, often in the form of irregular masses varying greatly in size, some apparently encapsuled, may be commonly found in the faeces of flies as well as granules closely resembling the coccoids though not taking the stain as deeply. I believe, however, that the coccoid forms are actually present for longer periods than those given.

33. The observation that these bodies outlast the bacillary forms within the flies (for they were found in the alimentary tract in dissections) suggests speculation whether they can be immature or resistant forms of the mycobacterium. Some light on the question is possibly shed by some work described by Topley and Wilson (1936) according to whom "the micromotion pictures obtained by Wyckoff (1934) and Wyckoff and Smithburn (1933) show that the young bacilli increase in size before dividing, but that, as the culture ages, division continues without previous enlargement. The resulting organisms, therefore, become shorter and shorter, till true coccoid forms, staining intensely fast, appear. Translated into a fresh medium, these short forms again give rise to typical bacilli."

34. But, whatever the nature of the coccoid bodies, it would seem certain that, if the viability of the organisms is not impaired by their passage through the flies, the insects must play a highly important part in their dissemination through the faeces and in other ways, for, while it is true that the insect does not habitually intrude into human habitations, it lurks in their vicinity, where, in this country at all events, it must find abundant opportunity of regaling itself on tubercle-infected sputum and settling on foodstuffs exposed in the open, particularly those of animal origin, must undoubtedly discharge its tubercle-laden faeces on them.

35. If indeed the view of Von Behring, Calmette and their colleagues that infection with pulmonary tuberculosis occurs primarily through the mucosa of the alimentary tract is correct, these haematophagous flies may play a part as transmitting agents of tropical tuberculosis unrealized as yet in medical philosophy. The habit on the part of these flies of feeding on open sores and any other breach of the skin opens up, moreover, the possibility of cutaneous transmission, in connection with which it may not be without significance that in Baghdad, a city in which there is much tubercular disease and in which such flies swarm, lupus, a common condition, is said frequently to develop in the scars remaining after oriental sore, particulary those on the face.

36. In an endeavour to determine the viability or otherwise of the organisms, food, on which such flies had fed subsequent to a meal on tubercular material and which had been fouled by them, was given to experimental animals—guineapigs—while the contents of the crop and gut of infected insects was inoculated into others intraperitoneally at various intervals after such a meal, so far without result though four different strains of *M. tuberculosis* were employed. No result, however, has so far attended control experiments in which a considerable amount of the tubercular material, about 2 c.c. in normal saline, was inoculated into similar animals. The first of such experiments was conducted almost a year ago, the last about two months. Work on similar lines was in progress at the end of the year in the hope of securing a strain pathogenic to these animals.

37. In the course of the investigation sausage-shaped acid-fast bodies about the average length of the mycobacterium but usually very considerably thicker (measuring apparatus has not been available) were discovered in the faeces of each of fifteen bred flies that had fed on fresh tubercular sputum at about the 11th day, and thereafter in great abundance, in one instance up to 29 days when the particular fly died and though it seemed in the highest degree improbable that those could be connected in any way with the organism, it seemed desirable to endeavour to ascertain their nature and so finally to rule out such a possibility. To this end several further series of flies were fed on tbe sputum, these bodies appearing in due course in their faeces and eventually fragments of a minute mycelium, just descernible under a half inch objective when one knew what to look for, were discovered. Among the hyphae were the bodies referred to, possibly spore capsules, their vivid colouration in scarlet providing a marked contrast to the blue stained mycelium, the slides having been stained by the Ziehl-Neelsen process. On dissection of the flies this mycelium was then found in the alimentary tract.

38. Two faecal drops out of fifty passed by twenty captured flies had in the meantime proved positive for these structures. A series of five bred flies were then fed on bronchitic

sputum free from acid fast organisms and a further series of five on blood serum as a control experiment. The faeces of the former set of flies remained negative as to these bodies, but they appeared in the faeces of the latter on about the twelfth day. The fungus would seem, therefore, to have no pathological interest.

39. Every effort was made but without result to ascertain how the flies acquire the infection—examination of scrapings from their cages and of their food material proving negative.

40. Most of the slides prepared in the wet season early in the year were ruined by the growth of moulds, while other preparations, mounted under a coverslip to prevent this, were rapidly decolourized by the mountant (a patent preparation vaunted as preventing this). However two slides were submitted to Dr. P. Tate, of the Molteno Institute at Cambridge, who was good enough to make suggestions towards the further study of the organisms. This was in progress again towards the end of the year accordingly, when an ample supply of material again became available.

III. Possibility of M. Sorbens transmitting Mycobacterium Leprae.

41. Concurrently with this investigation I resumed my study of the possibility that these flies may be responsible for the transmission of *Mycobacterium leprae*, utilizing dry leprous material, my previous work having been concerned with this in a fresh state only.

42. In the first instance I made a study of flies that had fed on discharge, from a sore on the finger of a leper, dried out on plain lint; a smear showed bacillary forms, mostly massed as globi, in great abundance with granules among them and a few free coccoid forms. I need not here set forth the mass of data accumulated in the course of this study which extended over several months during which batches of flies were fed at intervals on this material. I may state however that the flies fed on it invariably deposited the organisms when feeding after regurgitation, discharging them in their faeces for an equal period as when fed on fresh material in the last experiment after a meal on the material kept dry for 167 days. Similar results were obtained with flies that had fed on a crust, removed from a sore on the ear of a leprous girl, dried for an equal period of time, the insects detaching small fragments and rolling these over and over on their mouth parts till dissolved and swallowed.

43. In this experiment coccoid forms, definitely recognisable by the attachment of a particle of acid-fast material, sometimes filamentous, could be seen in some numbers—often eight to ten in each field—on about the twelfth day and could be made out up to about the nineteenth. Certain of the faecal drops, which as in other experiments retained the stain so definitely that the colouration could be seen with the unaided eye, were found to owe the property to a considerable degree to the presence of granules much smaller than the coccoid bodies, uniform in size and occurring in vast abundance.

44. Disintegration of the organisms in the leprous material kept dry for 147 days not having taken place, a study of the effect of moisture on them was in progress towards the end of the year for the especial purposes of ascertaining whether, as in the fly, bacillary forms eventually disappear, leaving coccoid forms only.

45. The fungus to which I have already alluded in connection with *M. tuberculosis* was similarly found in the flies utilized for this work and in their faeces.

IV. Attempt to Transmit Leprosy to Baboons.

46. Leprous material kept under conditions of dryness and of moisture and the contents of the gut of flies that had fed on it, their faeces and food fouled by them were in due course inoculated into baboons—*Cynocephalus pruinosos*—with a view to trying to test the viability of the organisms, not with any real hope of success, however, since these animals are not considered by zoologists as being near to man (though the chances might be greater if one of the anthropoids, in particular the chimpanzee were employed, a suggestion I venture to put forward to those who may be working on the subject on the West Coast.)

V. Culicines in Leprosy Transmission.

47. I endeavoured to ascertain if a common day-biting Culicine, *Mansonioides uniformis* can ingest *M. leprae*, for the data concerning such insects in relation to leprosy appear to be meagre, 4 out of 631 mosquitos, only, having proved positive, according to Rogers (1925) on examination by various observers after being fed or caught on lepers.

48. For this purpose ten were allowed to feed to repletion on a nodule, seemingly about to break down, on the arm of a leper. The organisms were duly found among the stomach contents of all the insects four hours later, isolated bacillary forms occuring, as I thought, to a greater extent than in smears from open sores in the same subject in which globi predominated.

49. The organisms were not apparent in the few faecal drops that I was able to secure and examine up to 24 hours.

50. This work was discontinued for the time being owing to the refusal of the leper to allow any more of the insects to be fed on him.

VI. Anopheles funestus.

51. In view of the recent discovery that the name *Anopheles funestus* covers several varieties and the importance of ascertaining which of these exist in the country I took steps to obtain material for study, which has most kindly been undertaken by Mr. H. S. Leeson, of the Department of Entomology at the London School of Hygiene and Tropical Medicine, an authority on the subject. The material provided consisted of fifty female parents and their ova, five families with their female parents and collections which must have totalled 500. These are still in process of study by him.

VII. Transmission of Malaria by A. rhodesiensis.

52. I commenced an attempt to determine the infectibility of *A. rhodesiensis* with malaria parasites, a problem of some considerable local importance since the insects are restricted in this country to the plateaus, breeding by preference in the mountain streams and in seepages, and are most in evidence in the cool season when there tends to be a general tendency towards the relaxation of precautions against the bites of mosquitoes. Their attack is moreover insidious since they enter habitations by day, leaving as a rule after a meal, a habit which makes it difficult to capture specimens for examination.

53. For the purposes of the enquiry large numbers of imagos were bred out but to little purpose since I was unable to persuade any one of the gametocyte carriers whose blood I had examined to allow me at that time to feed a sufficiency of the mosquitoes on them. In one instance I fed ten, however, on a small boy, a carrier of quartan malaria, dissecting the insects between the tenth and thirteenth day, but without result.

54. In the course of my examination of breeding places I made the interesting observation that the males of this species swarm in the immediate vicinity in the late afternoon, rising and falling on the wing after the manner of other male Nematocera, e.g. Tipulids, while probably waiting for the emerging females or females coming to attack, for I observed pairing in the air on numerous occasions, the pair flying away in copula. The males moved as I moved, flying just above me and so presumably adopt this course as being sure sooner or later to provide them with a partner.

55. I might here note, though I have not previously recorded the observation that I have previously observed such swarming of male mosquitos, in the case of *Culex fatigans* in Dar-es-Salaam many years ago well after dark and by electric light, the insects conspicuous above the bald head of a colleague and frequently in this country in the case of *Mansonioides uniformis* in the late afternoon and in the swamps in which they breed.

VIII. Observation on Anopheles fed on case of Blackwater fever.

56. I was able, through the very kind collaboration of my colleague Dr. C. H. Howat, to avail myself of an opportunity of trying to obtain some light on the question whether or not blackwater fever may be a disease *sui generis*; for a European patient of Dr. Howat's most sportingly agreed to allow the feeding of some anophelines on him and I was able to feed these again in due course on two volunteers, small African boys and finally to dissect the insects.

57. The following is a summary of the notes of the case supplied by Dr. Howat:—

"*W. McC.* Admitted to European Hospital, Zomba, 1/6/38.

Condition on admission. Temp: 97. Pulse 106. Resp: 16. Complexion sallow, conjunctivae icteric, tongue furred, complained of persistent headache. Neither liver nor spleen enlarged. Urine passed shortly after admission, 4 oz. porter colour, acid in reaction. The usual treatment was commenced. *Progress.* During the 2nd and 3rd June progress was satisfactory. Fluid intake and output were balanced; urine gradually became lighter in colour until in the afternoon of the 3rd it was normal in appearance. Temp: remained subnormal.

On the 3rd at 6-30 p.m. the patient suddenly had a rigor; temp. rose to 103 and bilious symptoms appeared. Pains in the loins were complained of.

At 10.30 that evening 3 oz. of dark coloured urine were passed and for the next 24 hours urinary output was small and porter coloured.

During the evening of the 4th the fever, bilious vomiting and general distress, which had continued unabated for 24 hours, gradually subsided and with the improvements in the general conditions the urinary output gradually increased in amount and the colouration grew less.

The patient reached a normal state on the 5th, although weak and exhausted. This improvement was maintained until his discharge from hospital. No further lysis occurred.

Mosquito feeding. The insects were received at 4.30 p.m. on the 3rd and were fed on the patient the same evening from 5.45 to 6.15 p.m. (Rigor occurred fifteen minutes after the mosquitoes had been removed). Irritation at the site of feeding on the outer side of the right leg was so extreme that the patient requested removal of the insects. Inspection of this area showed several large wheals in which multiple petechial haemorrhages were observed. The irritation subsided about two hours after the removal of the insects and wheals disappeared in about twelve hours.

The insects were afforded subsequent chances of feeding on the 4th from 10.20 a.m. and 6 to 6.45 p.m., on the 5th from 10 to 10.30 a.m. and from 6 to 6.30 p.m., and on the 6th from 8 to 8.30 a.m. As could be judged from their appearance all the insects fed at one time or another, several more than once. Only on one occasion (noted above) was any gross change noted at their feeding place which was changed on each occasion."

58. A total of one hundred mosquitoes—50 bred *A. gambiae* and 50 *A. funestus* had been supplied to Dr. Howat. Of these a total of 43 (29 of the former and 14 of the latter) were subsequently fed on the first volunteer, a boy of about ten, between the 7th and 17th days from their feed on the blackwater case and a total of 35 (24 of the former species, 11 of the latter) on the second volunteer, a boy of about the same age, between the 18th and 32nd days. There were no reactions in either case, both boys having been kept under occasional observation over a period of about four months.

59. I dissected 17 of the *A. gambiae* and 14 of the *A. funestus* in due course without finding parasites in any, either in the stomach or the salivary glands.

IX. Trial of a new Treatment for Malaria.

60. I collaborated with Dr. Howat again in his endeavour to test out a new drug treatment for malaria which he considered had given promising results in the African Hospital, Zomba.

61. His scheme was to select three groups of volunteers (carefully tested to see if they were free of clinical malaria) to infect all with the disease and then to give one group no treatment, the next group quinine and the third his new treatment, studying the clinical course of the infections he hoped to produce and carrying out frequent blood examinations. The possible fallacies in the utilization of subjects who must be possessed of a high degree of immunity were fully realized by him but such experiment in default of European volunteers seemed to be the only possibility.

62. In due course I sent Dr. Howat 132 anophelines (75 *A. gambiae* and 57 *A. funestus*) that had been fed, more than once in many instances, on a gametocyte carrier (quartan) and these were fed by him in turn on volunteers whose blood had been found on repeated examination to be free of parasites.

63. Infection did not show up in any of them, so the enquiry is still *sub judice*.

X. Observations on Ornithodorus and Relapsing Fever.

64. I commenced an enquiry into the topographical distribution of Ornithodorus in the Territory, endeavouring to ascertain to what degree these ticks are carriers of the spirillum of relapsing fever.

65. Many collections were received as the result of a circular letter addressed by the Director of Medical Services to the Medical Officers at Fort Manning, 4,200 ft.; Lilongwe, 3,000 ft.; Mzimba, 3,500 ft.; Dowa, 3,000 ft.; Kota-Kota, 1,550 ft.; S. Nyasa, 1,550 ft.; Cholo, 3,100 ft.; and Mlanje, 4,000 ft.; all proving to be *O. moubata*.

66. I examined the coelomic fluid of 175 of these without result, finding the spirilla, however, in fluid exuding after the removal of the mouth parts in 2 out of 123. The examination of the fluid exuded after feeding from the anus and coxal glands of 22 others was negative (this work being tedious from the necessity of testing a series of the creatures, one by one, day after day, until it suits them to feed).

67. It is proposed to extend this investigation to lice since many natives now harbour these creatures as the result of their adoption of European garb which is rapidly becoming general.

XI. Control of Rats.

68. I submitted a scheme towards the control of rats, drawing attention to the ever-growing necessity for controlling the pests on medical as on economic grounds and pointing out that a recurrence of an epizootic, such as occurred in 1917-9 among the field rats and culminating in cases of human plague in N. Nyasa District, might take place at any time and drawing attention to the heavy losses that must be incurred from their depredations. To quote from the annual report of the District Agricultural Officer in that district for 1931:—

> "It was ascertained that a loss of 6½ per cent. occurred in stored seed cotton during a period of six months. Losses in the field from these pests must be even higher when it is realized that, using four traps to the acre, 2,640 rats were caught amongst the crop (on the experimental station) in one month of trapping operations and 273 in the cotton store during the same period."

69. The black rat, *Rattus rattus alexandrinus*, swarms in most villages, to an extent in the S. Nyasa district that catches of four or five together in newly introduced cage traps are not infrequent, while, as I have recorded in a previous report, the species that are affected in the epizootics that are widespread in the territories to the south occur here and in some localities in very considerable numbers. The economic developments now taking place, with the greatly increased production of foodstuffs acceptable to rats are likely, of course, to lead to their increase still further.

70. I suggested, *inter alia*, the desirability of trying to discover if it would be possible to cultivate *Scilla maritima*, the red squill, in this country, since from it is prepared a poison that is highly effective against rodents and, being at the same time non-toxic to all intents and purposes against domestic animals, could in consequence be safely employed in the conditions obtaining here; the cost of proprietary preparations of the squill, which in the case of one particular brand, works out at about one halfpenny per rat, being prohibitive under existing financial conditions.

71. Failing success in this direction it seemed to me that other Liliaceae, of which many species exist in this country, might be tried out against rats, particularly those nearly related to the squill and other plants definitely known to be poisonous.

72. My own attempts to obtain bulbs of *S. maritima* from several English bulb growers for trial did not meet with success. I tried out, however, bulbs of 14 species of Liliaceae, dried, ground up and mixed with food given to white rats, but to no purpose. It would seem highly probable, nevertheless, that bulbs possessed of the requisite qualities must be existent in this country.

74. The following paper by myself was published during the year :—

" Some Features in the Life History of Tabanidae in Nyasaland "

East Africa Medical Journal, May 1938.

References.

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W. A. S. LAMBORN,
Medical Entomologist.

ANNUAL REPORT OF THE GOVERNMENT PATHOLOGIST, ZOMBA, FOR THE YEAR 1938.

Staff.

The Government Pathologist: Dr. Horace M. Shelley, F.R.F.P.S., M.R.C.P.
African Laboratory Assistant: Rabson German.
Junior Laboratory Assistant: Damson Baloweza.
Labourers: Two.
Night watchman: One.

Section 1. General Review of the year.

During the year over nine thousand specimens were received for examination and all requests for laboratory assistance were fulfilled, but not without a great amount of extra labour for the small and inadequate staff employed.

Most of the year was occupied in routine work, but time was found for several investigations of interest to be completed, details of which are mentioned at the end of this report.

By arrangement with the Medical Officer at the African Hospital, Zomba, a "medico-pathological unit" was established at the hospital with the object of investigating obscure cases of disease. This measure has proved productive of excellent results and it is the desire of the officers concerned to continue the arrangement.

It is not appreciated that there exists a great amount of routine clerical work in this laboratory. Details of each specimen must be entered into a ledger and reports issued concerning the results of the examination of same, thus the receipt of 9,000 specimens indicates 9,000 separate entries in the ledger, 9,000 reports and 9,000 addressed envelopes. It must therefore be evident that either the Pathologist or his assistant is occupied for a large part of each working day with duties of a purely clerical nature. The employment of an efficient African clerk would ease the burden and avoid waste of time for technical officers and enable them to give undivided attention to their special work.

Pathological investigations have increased in accuracy and delicacy during the past decade, so much so in fact, that one investigation may take many hours, mention need only be made of the requirements of a complete blood investigation ten years ago and today, to realize the complexity of modern diagnostic procedures.

Blood exam. 10 years ago.	Blood exam. to-day.
Red and white cell count.	Red and white cell count.
Haemoglobin estimation.	Haemoglobin estimation.
Differential count.	Differential count.
Occasionally platelet count.	Reticulocyte count.
	Measurement of size of red cells.
	Sedimentation rate.
	Volume index.
	Fragility.
	Arneth count.

In addition of the actual examination of specimens, the preparation of media, reagents and apparatus occupies still more time. It is our sincere desire to give efficient service, but from the aforementioned it will be understood that it is difficult to do this with the present skeleton staff.

Reference to the "Annual Report, Medical and Health Department, Mauritius" for the year 1934, Laboratory Section, reveals that a technical staff of six Europeans with one European clerical assistant dealt with just over 4,000 specimens during the year in question.

The minimum staff required for the efficient working of the laboratory service, especially if any extension of the said service is anticipated, would be as undermentioned:—

1. Pathologist.
1. European laboratory assistant.
1. African laboratory assistant (senior)
3. African laboratory assistants (junior).
1. African clerk.
2. Labourers.
1. Night watchman.

Section 2. Buildings.

The laboratory is housed in buildings, provided adjacent to the Zomba African Hospital, which are of poor construction and altogether unsuitable for continued use as a laboratory.

The need for better accommodation has been brought to the notice of Government and at the time of writing arrangements have been made to move the laboratory to more suitable buildings elsewhere in the town of Zomba. Unfortunately the laboratory will not now be so suitably sited to the African Hospital. The present arrangement must be considered to be temporary.

Section 3. Centres from which Specimens were Received.

Specimens were received from the undermentioned centres:—

Zomba	6,682
Dedza	1,733
Fort Johnston	688
Cholo	673
Mlanje	220
Blantyre	177
Mkhoma	68
Mvera	24
Dowa	12
Likoma	3
Kota Kota	1
Fort Jameson	1

Section 4. Pathological and Bacteriological Specimens.

(A) Blood Specimens.

Total number of blood examinations	5,477
Modified Kahn-Sachs Georgi tests	791
Films for parasites	4,390
Aldehyde tests	4
Blood cultures	1
Blood inoculation of animals	2
Blood counts	72
Reticulocyte counts	35
Haemoglobin estimations	38
Arneth counts	35
Differential counts	38
Bleeding time	2
Clotting time	10
Sedimentation rate	8
Oxydase reaction	8
Agglutination tests	21
Blood urea estimation	8
Blood sugar estimation	4
Blood groupings	5
Van den Bergh test	1
Modified Bendien test	4
Bone marrow examinations	1

1. Malaria etc. Out of a total of 4,390 blood films examined 1,214 were found to contain parasites as detailed below:—

P. falciparum	987
P. malariae	178
P. vivax	4
Gametes	29
T. duttoni	14
Polymorphic trypanosome	1
Loa Loa	1

2. Modified Sachs-Georgi Test for Haemospirochaetosis. 303 tests out of a total of 791 proved positive. The antigen used in this test has proved very stable and results are clear cut and accurate.

3. Agglutination tests. Formalised broth cultures were used in all tests and as a routine sera were put up against E. typhosus, E. paratyphosus A., E. paratyphosus B., Br. melitensis, Br. abortus, B. Proteus X19. Twenty separate tests were carried out, of which number 8 were positive for the undermentioned organisms :—

E. typhosus	3
E. paratyphosus A	3
Br. melitensis	2

4. Several interesting blood dyscrasias were observed, details of which are given later in this report.

(B) Faecal Specimens.

Total number of specimens examined	1,449
Total number of specimens containing parasites ...	617

The undermentioned were found in the positive specimens :—

Hookworm	468
S. mansoni	20
Enterobius	4
Ascaris	25
Strongyloides	11
Hymenolepis	1
Taenia	3
Trichuris	1
E. histolytica	77
Giardia	2
Charcot-Leyden crystals	3
Mycobact. tuberculosis	2

(C) Urine Specimens.

Total number of specimens examined	1,188
General examinations	1,188
Number of specimens containing ova of S. haematobium	192
Albumin estimations	6
Urea estimations	6
Glucose estimations	2
Urea clearance tests	4
Tests for indican	1
Cultures	1
Tests for urobilin	10

It should be noted that as a routine each specimen is examined chemically, cytologically and smears are searched for the presence of micro-organisms.

(D) Examination of Sputa.

Total number of specimens examined ...	244
Number positive for Myco. Tuberculosis ...	30
Cultures	15

The specimens which contained Myco. tuberculosis were taken from African patients.

(E) Examination of Cerebro-Spinal Fluid.

Total number of specimens examined	34
Number positive for meningococci	9
Number positive for pneumococci	3
Cell counts	34
Nonne-Apelt tests	20
Colloidal gold tests	4
Cultures	12

Owing to the absence of facilities only one culture of meningococci was typed. This particular culture was obtained from a European male who had felt "off colour" for some months and only requested medical attention when diplopia developed. A suspension of this culture was sent to the South African Institute for Medical Research where an attempt was made to type the organism with the undermentioned result:—

Negative agglutination reactions were given with the following sera,

Group 1 (Types 1 & 3)
Group 2 (Other types)
Types 1, 2, 3 & 4.

The specimen of meningococcus thus belongs to an "unclassified type".

(F) Examination of Throat Swabs and Smears.

Total number Swabs examined	51
Number of cultures	42
Number of smears examined	184
Number positive for Corynebact. diphtheriae ...	5
Number positive for meningococci	3
Vincent's fusiform organisms	1

(G) Examination of Pus Smears, Discharges and Scrapings.

Number of urethral smears examined	109
Number of urethral smears positive for N. gonorrhoeae ...	66
Number of sore smears examined	194
Number of sore smears positive for T. pallidum ...	85
Number of scrapings examined for Myco. leprae ...	19
Number of scrapings examined for Myco. leprae positive ...	8
Number of cervical smears examined	23
Number of pus smears examined	69
Number of exudate fluids examined	5

(H) Miscllaneous Examination and Tests.

Water analyses	16
Gastric analyses	4
Identification of helminths	10
Bacteriological cultures	26
Dogs' brains for rabies	3
Scrapings for fungus elements	4

(I) Manufacture of Vaccines.

Total number manufactured	20
Anti-staphylococcal	400 c. cm.
Anti-catarrhal	500 c. cm.
Coliform	400 c. cm.
Anti-gonococcal	300 c. cm.
Anti-asthma	1,000 c. cm.

The anti-asthma vaccine was prepared by the extraction of the pollens of local grasses and has proved of value in several cases.

(J) Manufacture of Media Reagents.

Nutrient broth	5,000 c. cm.
Pettroff's medium	500 c. cm.
Blood serum medium	1,000 c. cm.
Agar-agar	800 c. cm.
Benedict's solution	5,000 c. cm.

During the year experiments have been conducted in an attempt to manufacture a suitable antigen for use in syphilitic tests. Details of these attempts are mentioned later in this report.

(K). Histological Examinations of Tissues.

49 tissues were examined during the year, consisting of the following:—

Lymphangioma	1
Papillomata	2
Fibromata	3
Cervical polypus	1
Filarial tumour	1
Myxo-lipoma	1
Cervical cancer	1
Melanotic carcinoma	6
Lymphosarcoma	1
Mixed cell tumours	4
Rodent ulcer	1
Epitheliomata	1
Bilhartzial appendix	1
Appendicitis	5
Leprosy nodules	2
Chronic adenitis	7
Chronic cervicitis	1
Cholecystitis	1
Endometritis	1
Granulation tissue	2
Rabid brains	2
Normal tissues	4

(L) Autopsies.

(Excluding those of a medico-legal nature).

Six non-medico-legal autopsies were performed, as undermentioned.

Cause of death	Number
Pellagra	1
Pericarditis	1
Ac. dilatation of stomach	1
Lobar pneumonia	1
Miliary tuberculosis	1
Subphrenic abscess	1

Section 5. The Medical Museum.

Numerous additions have been made to the museum during the year, including a complete regalia obtained from a witch doctor and two special pipes for smoking Indian hemp.

It is unfortunate that, up to date, visitors to the museum have been very few, though everything possible has been done to stimulate interest and to render the exhibits of much practical value. In particular, mention should be made of plaster models arranged by Mr. L. F. Chapman, which serve to illustrate various sanitary schemes and details of village hygiene.

Section 6. Medico-Legal Examinations.

The following examinations and tests were carried out during the year:—

Complete analyses of viscera for poisons	37
Examinations for presence of blood	42
Precipitin tests for human blood	15
Blood groupings of stains	15
Chemical examination of writing material	2
Autopsies	7

The causes of death in the seven cases which came to autopsy were:—

Poisoning	1
Drowning	1
Suicidal hanging	2
Tuberculosis	1
Homicide	1
Shock due to injuries	1

In addition to the above the Legal Department has requested advice on various medical questions, all of which were answered with much pleasure.

Section 7. Special Investigations.

Modified Ide Test for Syphilis.

Thirty years ago Wassermann introduced his test for syphilis, and since that time many modifications of the original technique have been made, in fact each laboratory seems to follow its own method, but up to date the test still remains complicated and energy-consuming and requires the skill of an expert and apparatus which is only likely to be found in a well equipped laboratory. Of recent years the so called flocculation tests for syphilis have come into general use, by virtue of their relative simplicity and accuracy, thus the Sachs-Georgi, the Sigma, the Kahn, the Meinicke and the Verners tests have all been tried with more or less, satisfactory results. In all these tests colloidal precipitation is the factor observed and the sensitivity of this to impurities in the reagents or glassware, is very considerable and thus special caution is necessary in the arrangement of apparatus and the manufacture of the various agents. The antigen used in the above mentioned tests is a lipoid substance and the reaction between it and the reacting agent in the sera from syphilitics remains unknown, beyond the fact that alteration in the physical state of the antigen occurs causing absorption of complement. By using special antigens, such a change can be observed with the naked eye, for an agglomeration of colloidal particles occurs so producing visible floccules which after a time undergo sedimentation. During 1936, Sabei Ide and Tamao Ide, introduced a colour test for syphilis of such simplicity that it could be carried out by any competent practitioner who was in possession of the special antigen and the necessary apparatus. This test has proved reliable and reasonably accurate and can be carried out using whole blood, serum, or spinal fluid.

It was decided to attempt the routine use of the test in this laboratory and to control the results by a modified Kahn test. During the initial stage of experimentation it was found possible to simplify further the test without detriment to its accuracy and to manufacture an antigen which seemed to be more satisfactory than the original.

Method of preparing Antigen. Ide and Ide used beef heart for this purpose, but it was found locally that sheep heart gave rise to a more sensitive antigen, thus sheep heart is obtained and all fat, fibrous tissue and blood vessels removed from it; the muscle is then ground up by passage through a mincer and the grindings are placed in 95 per cent. alcohol in the proportion of 20 grammes of muscle to 100 c.cm., of alcohol, which mixture is kept in a clean, sterile, well stoppered bottle, in the incubator at 37 degrees centigrade, for eight weeks, during which period the contents are shaken with vigour once each morning. At the termination of the time required the contents are filtered and the filtrate kept in a dark cool place as stock solution.

To each 100 c.cm., of stock solution, 0.2. gramme of cholesterin is added and dissolved by keeping the container in water at 56 degrees centigrade for 15 minutes, with periodical shaking. A 5 per cent. solution of gum benzoin in stock solution is now prepared. Separate 1 per cent.

solutions in alcohol, of crystal violet and Azur 2, are made up and then to each 100 c.cm., of cholesterinized stock solution are added 5 c.cm. of gum benzoin solution and the mixture shaken, after which 1 c.cm. of a mixture of equal parts of the dye solutions is added, the result being a blue fluid, which is ready for use when diluted with 2.5 per cent. solution of sodium chloride in the proportion of 1 to 3 and well shaken.

Requirements for Test.

(*a*) Diluted antigen. (Dilution should be made immediately previous to use).

(*b*) Patient's blood, serum, or spinal fluid.

(*c*) 3.5 per cent. solution of sodium chloride for diluting whole blood.

(*d*) Two glass pipettes graduated to contain 0.2 c.cm. of fluid. (One pipette for blood, the other for saline and antigen).

(*e*) Glass chamber on a microscope slide. (Made by taking an ordinary test tube 10 mm. in diameter and cutting into lengths, each length being approximately 5 mm. One length is then fixed to an ordinary clean microscope slide by ringing with canada balsam).

Procedure of Test.

(1) Obtain by ear or finger prick, one pipette full of blood and expel into chamber.

(2) Add an equal volume of 3.5 per cent. saline and mix thoroughly.

(3) With antigen pipette add 0.2 c.cm. to mixture in chamber. Mix thoroughly by tilting slide in a rotatory manner for 5 minutes, then allow to stand with occasional agitation for 14 minutes.

(4) Examine under low power of microscope for flocculation, using daylight as the illuminant. If positive, masses of black-blue floccules are observed floating between the blood cells.

NOTE :—(*a*) If spinal fluid or serum is used 3.5 per cent. saline is not added.
(*b*) Diluted antigen should not be used after an interval of thirty minutes.
(*c*) The diluted antigen may contain suspended particles, but these disappear in the presence of a negative blood or serum.

Results. The test has been used in this laboratory on nearly two hundred occasions, and up to date the results obtained have been in agreement with those of the modified Kahn used as control. It is too early to state whether or not, the test will prove of sufficient accuracy to warrant its use to the exclusion of the older more complicated tests but there is no doubt that it is of very great value.

Conclusions. Sabei and Tabao Ide have invented a test which renders possible the serological diagnosis of syphilis by the general practitioner. Some modifications in the test have been made in this laboratory and the apparatus required for the performance of same has been simplified. Practitioners who wish to use the test as a diagnostic measure will be able to obtain concentrated antigen from the laboratory.

The writer is greatly indebted to Dr. B. S. Platt for the supply of literary references.

REFERENCES.

(1) Ide Sabei, Ide Tamao. "Ide test — The new Colour test for Syphilis." J. Lab. and Clin. Med. 1936. 21. 1,190-1,193.

(2) Dible, J. H. "Recent Advances in Bacteriology." 3rd., edit., 1935., Churchill, London.

THE SENSITIVITY OF ROUTINE TESTS FOR BILE IN THE URINE.

It was decided to investigate the relative sensitivity of two common tests for bile in the urine and for this purpose human bile was used and mixed with normal urine in the concentrations mentioned below.

Test	Concentration of Bile.				
	1%	0.5%	0.10%	0.01%	+ = positive
Gmelin's.	+	—	—	—	strongly
Alcoholic Iodine	++	+	—	—	++ = positive.

It will be noted that the test with alcoholic iodine solution gave more sensitive results, in addition to which, the reading of the test was rendered more clear cut.

Using a hand direct vision spectroscope, the characteristic spectrum for bile was not obtained with any concentration of less than 1%.

It is thus apparent that ordinary tests for bile in the urine give negative results if the concentration of bile is less than 0.50%. The alcoholic iodine test by virtue of its superior sensitivity and more clear cut result, appears to be the most satisfactory test for ordinary routine work.

An Investigation Concerning a Reputed Disease of Nyasaland Natives. "Kasipa Disease."

For a period of nearly fifteen years the writer has been constantly reminded by natives, that there exists a definite disease in Nyasaland, which is caused by the bite of the *kasipa* worm.

One year ago it was decided to investigate this condition and ascertain whether or not, such a disease existed and if found to be a real entity, then to pursue the inquiries further in the hope of discovering the aetiological agent.

History and features of the conditions. The natives state that *kasipa* disease has existed for many years and was present long before the Europeans came to this country. The disease attacks man, woman or child and results from the bite of a *kasipa* worm. This worm lives in fresh water streams and pools and it attacks any subject who happens to be bathing, washing, or wading in the stream. The actual bite of the worm is not painful, but after an interval of two or three days the part bitten becomes very swollen, hot, tender and may go gangrenous and thus cause death. Not all people bitten die however, for in some the resultant swelling gradually subsides and they make an uninterrupted recovery.

It should now be stated, that not one of the numerous natives interrogated by the writer, had ever himself seen an actual case of the disease, in fact the whole of the information given by them was hearsay, handed down from father to son, possibly generations.

A reward of two pounds was offered to any native who would produce a case of this disease for clinical examination, but there was no response.

It was later decided to obtain specimens of living *kasipa* worms and to conduct controlled experiments in the laboratory. The Sanitary Superintendent, Zomba, kindly agreed to obtain the helminths and a liberal supply was soon forthcoming.

The "Kasipa" Worm. The adult female worm is fine and thread like in structure. It is 17-18 cm. long and 0.5 mm. in diameter. It is flesh coloured. The male worm has been up to date unprocurable.

The worm lives in streams, usually on the mud at the bottom, but it also swims about. When at rest it lies coiled up in spiral fashion, but if disturbed it erects a portion of its body in an attitude not unlike that of a cobra immediately previous to striking. Its anatomical structure is extremely simple. The anterior extremity is rounded with no visible mouth parts, there does however, appear to be a rudimentary oesophagus. The whole length of the helminth, with the exception of the extremities is occupied by a large uterine sac containing thousands of minute ova, each approximately 1/3000 of an inch in diameter. The cuticle has very fine striations and invaginations are observed at intervals. No anus, genital pore, nor spicules could be observed. The posterior extremity was blunt.

The worm apparently feeds on organic debris in the water. It lives in captivity without difficulty. The exact family to which the helminth belongs is difficult to ascertain, beyond the fact that it is a Nematode with certain "dracunculus" like features.

Experiments Conducted to Ascertain any Disease Producing Activity.

Supplies of the helminths were obtained and kept in a living state, in a large glass container. They were constantly immersed in water obtained from the region of their true habitat. It was decided to carry out tests with a view to proving or disproving the idea held by the natives, that the worm attacks and bites the human subject and so causes disease.

PERIMENT 1.

No food was supplied to the helminths with the object of stimulating hunger. A pieceof fresh meat was then dangled in the water and the worms came near to it but there was no sign of any "attack". This experiment was repeated on several occasions.

EXPERIMENT 2.

Human flesh obtained at autopsy was now tried as a bait, but with entirely negative results.

EXPERIMENT 3.

Finally the writer immersed his own arm in the water. One of the worms approached and seemed to just flick against the skin, but no puncture resulted. The experiment was repeated but again with a negative result.

In addition to the above, it is of interest to note that one worm did definitely attack a fly and so imbedded its anterior extremity in the anus of the fly that it was impossible to produce separation without destruction of tissue.

CONCLUSIONS.

One is fully aware that the investigation conducted, was carried out in a rather crude and elementary manner, but it has brought three important facts to light.

(*a*) The natives have described a condition known as *kasipa* disease.

(*b*) Though a reward was offered, not one native could produce a clinical example of the disease.

(*c*) Laboratory experiments do not appear to support the idea that the *kasipa* worm is dangerous.

In conclusion, it would appear that the disease does not exist and that the whole idea is based on superstition, a superstition possibly with foundation due to the fact that "guinea worm disease" occurs in other East African territories and a travelled native may have stated in years gone by that the *kasipa* worm resembles the "Guinea worm" with which he had been infested elsewhere, *kasipa* is thus a worm to be regarded with fear and suspicion and consequently avoided.

Section 9. The Work of the Medico-Pathological Unit.

During the year, through the courtesy of the Officer in Charge, the African Hospital, Zomba, a medico-pathological unit was formed for the investigation of special cases. Three beds were allocated to the unit, which worked under the direction of the Pathologist. The scheme proved successful and several cases of rare and interesting diseases were observed. Cases of special interest are reported herein.

CASE 1. Native male. Age 32 years. Born in Nyasaland. Admitted 26/10/38. Discharged 13/11/38. Diagnosis: Onyalai.

The patient was a repatriate from Southern Rhodesia where he had been a mine worker for six years. From May 1938, until his arrival at Zomba, he had been in Gatooma native hospital as a patient, though the nature of his illness remains unknown. On arrival at the Zomba hospital on 26/10/38 he complained of mild abdominal pain and cough.

Physical Examination: The patient is an intelligent African male of poor physique and rather emaciated. Over the mucosae of the cheeks, soft palate and under the epithelium of the tongue haemorrhagic vesicles are present. At the tip of the tongue is a recent area of haemorrhage, ½ x 1 inch in extent. The gums are soft and spongy, but the teeth, with the exception of a few carious spots, are quite normal.

Chest: There was evidence of some bilateral pulmonary fibrosis.

Other systems normal.

Laboratory Investigations:

Faeces and urine normal.

Sputum free from acid fast bacilli.

Blood: R. B. C. 3,460,000 per cu.mm.

W. B. C. 6,000 „ „ „

Platelets 170,000 „ „ „

Reticulocytes 1½%

Differential count:	Polys.	56	per cent.
	Lymphos.	37	„ „
	L. Monos.	5	„ „
	Eosin.	1	„ „
	Mast.	1	„ „

HB. 65%. C. I. 0.9
Bleeding time 9½ minutes (normal 2-5)
Clotting time 4 „ „ 2-8
Arneth Count: 1 lobe 12 per cent.
2 „ 55 „ „
3 „ 26 „ „
4 „ 5 „ „
Films: Some anisocytosis. A few normoblasts.

Treatment: Intramuscular injection of 10 c.cm. of whole blood of which patient was the donor. Full diet.

Result: All haemorrhagic vesicles had disappeard after an interval of four days from the time of intramuscular injection of whole blood. The patient's general condition had much improved, and he left hospital on the 13/11/38 in good health.

Conclusions: The above is the first case of onyalai recorded in this country.

CASE 2. Native male. Age 40 years. Born in Nyasaland. Admitted 5/7/38. Discharged 10/8/38. Diagnosis: Aleukaemic Lymphadenosis.

In January, 1937, the patient felt a dull pain over left lower ribs, which was of such severity that it sometimes prevented sleep. This pain could be relieved temporarily by walking about. In March 1937, he noticed that his belly was gradually enlarging and that he could feel his spleen.

In March, 1938, his belly was much larger than a year previously and he had a dull aching pain in the bones of each leg and over the left lower ribs. He lost weight and strength and felt his condition becoming worse. Previous and family histories indicate no fact of importance.

Examination: An intelligent subject who has obviously lost much weight. Spleen enlarged to 4 fingers below umbilicus and 2 fingers to right. Not enlarged upwards. Edge sharp and regular. Not tender. Freely movable.

No enlargement of liver.
A few slightly enlarged glands in axillae and groins.
Palate and conjunctivae blanched.
Other systems normal.

Laboratory Investigations.
R. B. C. 4,030,000 per cu. mm.
W. B. C. 13,500 „ „ „
Platelets 120,000 „ „ „

Reticulocytes	... ...	2	per cent.
Differential count:	Polys.	11	„ „
	L. Monos.	2	„ „
	Lymphos.	85	„ „
	Eosin.	—	
	Mast.	2	„ „

HB. 45 per cent. C. I. 0.5.
Arneth count: 1 lobe 8 per cent.
2 „ 48 „ „
3 „ 28 „ „
4 „ 12 „ „
5 „ 1 „ „
Clotting time 3 minutes.
Bleeding time 1 minute.

Oxydase reaction negative.
Van den Bergh. Direct negative. Indirect 0. 2 mm bilirubin per cent.
Modified Kahn test negative.
Films: Anisocytosis, some poikilocytosis, some polychromasia. Small lymphocytes Predominate with a considerable number of prelymphocytic cells.
Bone marrow: Many mature red cells and many small lymphocytes. A few megloblasts and megakaryocytes. Normoblasts, myeloblasts and myelocytes were not observed. Urine and fæces normal.

Progress: Under usual methods of treatment an improvement occurred in the patient's condition and he was discharged from hospital, to attend the out patient department. Within three months his blood possessed the characteristics of a frank leukaemia, having lost the aleukaemic picture.

Conclusions: The above is the first case of aleukaemic lymphadenosis recorded in this country.

CASE 3. Native male child. Age 18 months. Born in Nyasaland. Admitted 20/9/38. Died 24/9/38.
Diagnosis: Spasmophilia (infantile tetany).

The child was taken ill with diarrhoea and vomiting on 17/9/38 which continued until 20/9/38, when convulsions developed and the infant was brought to hospital.

Examination: Blood film negative for malarial parasites.

Child lies in bed in dorsal decubitus. Sufficiently conscious to swallow. Pupils react normally. Well marked carpo-pedal spasms associated with the presence of Chvostek's sign. Pressure on limb caused spasm to appear within 1 minute.

Early signs of rickets. Bossing of skull, wide open fontanelle, thickening of epiphyses. Blood serum calcium 5 mgm.

Treatment: The usual measures were adopted, but the condition was too far advanced to respond to treatment and the patient died.

CASE 4. Native male. Age 23 years. Born in Nyasaland. Admitted 18/10/38. Died 27/10/38
Diagnosis: Possible case of "Shoo-Shin," vitamin B deficiency.

The patient appeared a strong, well nourished individual. He complained of pain over the heart and liver, associated with cough. The pain over the heart had commenced suddenly and was associated with much breathlessness.

Examination. Lies in dorsal decubitus. Respiration laboured, crepitations at both lung bases.

Heart: C. I. in 6th., left space 7 inches from M. S. L. C. I. diffuse. No thrill, Rt. heart extends 2 inches from R. S. M. Well marked loud systolic murmur heard all over precordium. Pulse regular, but rapid -120. B. P. Sys. 110. Diast. 70. Liver enlarged five fingers below costal margin. Edge smooth and rounded, slightly tender. Reflexes absent in legs. Marked hyperæsthesia on squeezing calves. Sensation normal. Power diminished. Fæces, urine and blood were normal.

Treatment: Concentrated vitamin B was administered by injection. The usual cardiac stimulants were given.

Result: Death.

Returns.

TABLE I. STAFF.

EUROPEAN.

H. S. de Boer, M.C., ...	...	Director of Medical Services. (Appointed with effect from 12. 8. 38).
A. D. J. B. Williams, O.B.E., ...	...	Director of Medical Services. (Retired from service with effect from 11. 8. 38).
W. A. S. Lamborn, O.B.E., ...	...	Medical Entomologist.
R. Calleja	...	Senior Medical Officer.
T. A. Austin	...	" "
H. M. Shelley	...	Pathologist.
H. G. FitzMaurice ...	...	Medical Officer.
W. H. Watson ...	...	" "
W. L. Gopsill	...	" "
R. Nicklin	...	" "
F. O. W. A. Mahon-Daly ...	...	" "
P. J. Bourke	...	" "
L. C. Mayne	...	" "
R. N. Wilcox	...	" "
D. P. Turner ...	...	" "
H. D. Cronyn	...	" "
C. H. Howat	...	" "
A. T. D. Whitfield ...	...	" "
W. T. C. Berry ...	...	" "
W. A. Glynn, ...	...	" " With effect from 14. 4. 38.
Miss N. M. Cremen, M.B.E., ...	...	Matron.
Miss H. M. Phillips ...	...	Nursing Sister.
Mrs. N. K. Clemence ...	...	" "
Miss M. E. S. Cumming ...	...	" "
Miss E. M. R. D. Davies ...	...	" "
Miss R. P. Harrison ...	...	" "
Miss E. Irving ...	...	" "
Miss S. Barber ...	...	" "
Miss M. Arnot ...	...	" "
Miss P. Hutchinson, ...	...	" " With effect from 27. 1. 38
Miss K. Scott ...	...	" " 7. 3. 38
R. W. G. Pegg ...	...	Office Superintendent and Medical Storekeeper.
V. T. Smithyman ...	...	Junior Clerk (Temporary).
W. A. Willox	...	Sanitary Superintendent.
F. L. Chapman ...	...	" "
E. H. Croghan ...	...	" " Terminated temporary appointment on 8. 6. 38.

ASIATIC.

B .T. Lele ...	...	...	Civil Sub-Assistant Surgeon.
Lakhpat Singh	...	...	" " " "
S. S. Kokari ...	...	...	" " " "
G. K. Joshi ...	...	...	" " " "
Badri Prasad M.B.E.,	...	...	" " " "
P. D. Jhala ...	...	...	" " " " Terminated appointment 31. 1. 38.
G. D. Kashap ...	...	...	Subadar. I.M.D., Sub.Assistant Surgeon.
Bansi Lal ...	...	...	Jemadar I.M.D., " " "
Sohan Singh Pannum	...	...	" " " " "
Lachhman Das	...	...	" " " " "

AFRICAN.

*Leonard Makolera	...	...	Hospital Assistant, First Grade.
Moses Kaunde ...	...	...	" " " "
*Godwin Maulidi	...	...	" " " "
Elliott Taumbe ...	...	...	" " " "
Dyson David ...	...	...	" " " "
*Fred Nyirenda ...	...	...	" " " "
E. G. Hoare ...	...	...	" " " "
Harry M. Thomson	...	...	" " " "
Radford Botha ...	...	...	" " " "
*Dan Ngurube ...	...	...	" " " "
J. B. Wachepa ...	...	...	" " Junior Grade.
G. Ndovi ...	...	...	" " " "
R. C. Undi ...	...	...	" " " "
Kenan W. Mkandawire	...	...	" " " "
Aliyefu T. M. Mkisi	...	...	" " " "
Hudson B. Chamba	...	...	Clerk, Super Grade.
Isaiah M. Jere ...	...	...	" First Grade.
E. E. Mothello ...	...	...	" " "
James F. Sangala	...	...	" " "
P. W. Mlanga	...	...	" " " with effect from 15. 5. 38.
MacAuslin Chemboga	...	...	Sanitary Inspector, First Grade.

* Passed examination for Senior Hospital Assistant.

TABLE II.—FINANCIAL.

(See Section I. C.).

TABLE III.

RETURN OF STATISTICS OF POPULATION FOR THE YEAR 1938.

	Europeans and Whites	Africans	Asiatics
Number of Inhabitants 1938	1,847	1,671,637	1,748
Number of Births "	34	—	93
Number of Deaths "	13	—	14
Number of Immigrants "	—	—	—
Number of Inhabitants 1937 ...	1,894	1,635,804	1,631
Increase of population	—	35,833	117
Decrease of population	17	—	

TABLE IV.

Showing the Maximum, Minimum, and Mean Temperatures (Fahr.) and Total Rainfall in Various District During the Year 1938.

District.	Station.	Height above Sea Level.	Air Temperature.							Rain.			
			Means of		Means of	Absolute Max. and Min.				Number of Days.	Total Fall Inches.	Maximum Fall in a Day.	
			A Max.	B Min.	A & B	Max	Date.	Min.	Date.			Inches.	Date.
		Feet.											
Lower Shire	Port Herald	115	87.7	71.8	78.9	105	18 Oct.	57	23 June	65	45.87	5.00	7 Jan.
„ „	Port Herald Experimental Station	130	91.5	68.0	79.8	111	18 „	50	15 May	94	46.98	4.86	11 March
Chikwawa	Chikwawa	127	93.8	75.6	84.7	108	20 „	58	15 „	52	23.11	1.62	28 Feb.
Cholo	Cholo	3,000	—	52.0	—	—	—	41	23 June	110	56.79	2.85	3 Jan.
Mlanje	Mlanje	2,400	—	—	—	—	—	—	—	91	59.42	2.50	8 Dec.
Blantyre	Blantyre	3,500	77.3	60.7	69·0	86	26 Nov.	50	16 July	84	48.25	3·16	26 Dec.
Zomba	Zomba	3,020	78·7	61.4	70·1	94	11 „	50	4 „	116	68.00	3.90	23 Feb.
Upper Shire	Liwonde	1,600	82.3	50.0	66.2	97	7 „	38	11 „	72	42.00	2.67	29. Dec.
Ncheu	Ncheu	3,700	79.6	57.5	68.6	96	6 „	46	18 „	90	42.44	2.71	10 April
South Nyasa	Fort Johnston	1,700	—	—	—	—	—	—	—	47	31.80	2.28	27 Jan.
Dedza	Dedza	5,250	75.9	55.9	65.9	85	17 Nov.	43	18 July	60	49.18	2.37	11 „
Lilongwe	Lilongwe	3,400	81.5	49.5	65.5	96	11 „	34	19 June	60	37.73	2·75	29 „
Fort Manning	Fort Manning	4,228	84.0	56.9	70.5	99	20 Oct.	42	20 May	75	43.73	2·70	1 „
Dowa	Dowa	4,400	78.5	63.1	70·8	—	—	40	15 June	64	24.39	1.72	29 „
Kota Kota	Kota-Kota	1,800	89.5	64.6	77.1	102	10 Nov.	52	18 „	72	43.00	3.85	10 April
Kasungu	Kasungu	3,500	—	55.5	—	—	—	40	15 „	64	24.39	1.72	29 Jan.
Momberas	Mzimba	4,500	78.4	49.9	62.4	89	24 Oct.	36	11 July	42	31.29	2.65	12 March
Domira Bay	Domira Bay	2,000	83.8	62.3	73.1	97	11 Nov.	46	6 Aug.	80	30.73	2.41	29 Dec.
West Nyasa	Chinteche	1,800	94.0	—	—	106	13 Oct.	—	—	73	55.41	2.94	20 Jan.
North Nyasa	Karonga	1,800	—	—	..	—	—	—	—	52	37.50	2.75	18 „

TABLE V.

TABLE Va.—ZOMBA AND BLANTYRE EUROPEAN HOSPITALS. RETURN OF DISEASES AND DEATHS (EUROPEAN IN-PATIENTS) FOR THE YEAR 1938.

Diseases.	Remaining at the end of 1937	Admissions during 1938		Total Cases Treated	Deaths	Remaining at the end of 1938
		Zomba	Blantyre			
I. *Infections and Parasitic Diseases*:						
1. (*a*) Typhoid fever ...	—	—	1	1	—	—
10. Influenza ...	—	1	3	4	—	—
12. Dysentery :—						
(*a*) Amoebic ...	1	3	7	11	—	—
16. Cerebrospinal fever ...	—	—	1	1	1	—
20. Other tuberculous diseases ...	—	1	—	1	—	—
24. Malaria :—						
(*a*) Benign tertian ...	—	—	2	2	—	—
(*b*) Subtertian ...	1	6	4	11	1	—
(*c*) Quartan ...	—	4	—	4	—	—
(*d*) Unclassified ...	—	4	29	33	—	2
25 Blackwater fever ...	—	1	1	2	—	—
27 Trypanosomiasis ...	—	1	—	1	—	—
33 Other infectious and/or parasitic diseases ...	—	—	1	1	—	—
III. *Rheumatism, Diseases of Nutrition and of Endocrine glands and other general diseases*:						
40 (*a*) Endocrine glands and general	—	—	1	1	—	—
V. *Acute and chronic poisoning*:						
42 Acute and chronic poisoning ...	—	—	2	2	—	—
VI. *Diseases of nervous System and Sense organs*:						
44 Other diseases of the nervous system ...	—	4	11	15	—	—
46. Other diseases of the eye and adnexa ...	—	1	—	1	—	—
47. Diseases of the ear and mastoid sinus ...	—	—	2	2	—	—
VII. *Diseases of the Circulatory System*:						
(*a*) Heart diseases ...	—	2	2	4	—	—
(*b*) Other circulatory diseases	—	3	7	10	—	1
VIII. *Diseases of the respiratory system*:						
49. Bronchitis ...	2	1	—	3	—	—
50 Pneumonia :—						
(*a*) Broncho-pneumonia ...	—	—	1	1	—	—
(*b*) Lobar-pneumonia ...	—	1	2	3	—	—
51. Other disease of the respiratory system ...	1	—	2	3	—	—
IX. *Diseases of the Digestive System*:						
52. Diarrhoea and enteritis :—						
(*a*) Over 2 years age ...	—	2	1	3	—	—
53. Appendicitis ...	—	5	12	17	—	1
54. Hernia, intestinal obstruction	—	1	1	2	—	—
55. Cirrhosis of the liver ...	—	—	1	1	—	—
56. Other diseases of liver and biliary passage ...	—	2	2	4	—	—
57. Other diseases of the digestive system ...	—	7	4	11	—	—
Carried forward	5	50	100	155	2	4

TABLE Va—Continued.

Diseases.	Remaining at the end of 1937	Admissions during 1938		Total Cases Treated	Deaths	Remaining at the end of 1938
		Zomba	Blantyre			
Brought forward ...	5	50	100	155	2	4
X. *Non-Venereal Diseases of the Genito-urinary System*:						
58. Nephritis (all forms)— (*a*) Chronic ...	—	—	2	2	1	—
59 Other non-venereal diseases of the genito-urinary system ...	1	7	10	18	—	1
XI. *Diseases of pregnancy, childbirth, and the puerperal state*						
60. Diseases of pregnancy, childbirth, and the puerperal state ...	—	3	6	9	—	—
(*a*) Abortion ...	1	—	1	2	—	—
(*b*) Other conditions of the puerperal state ...	—	5	20	25	—	—
XII *Diseases of the skin, cellular tissue, bones and organs of locomotion*:						
61. Diseases of the skin, cellular tissue, bones and organs of locomotion ...	—	2	2	4	—	—
XIV. *Congenital malformations and diseases of early infancy*:						
62. Congenital malformations and diseases of early infancy— (*a*) Congenital debility (children under 1 year) ...	—	—	1	1	—	—
XVII. *Affections produced by External Causes*:						
64. External causes— (*b*) Other forms of violence	1	11	5	17	—	2
XVIII. *Ill-defined Diseases*:						
65. Ill-defined Diseases ...	—	7	—	7	—	—
Total ...	8	85	147	240	3	7

TABLE V.

Table Vb. Return of Diseases and Deaths (Native In-Patients) for the Year 1938.

(Including Asiatics, Native Officials, K. A. R. Native Ranks, Native General Population, Asiatic and Native Convicts).

Diseases.	Remaining at the end of 1937	Admissions during 1938	Total Cases Treated	Deaths	Remaining at the end of 1938
I. *Infectious and Parasitic Diseases*:					
1. Infectious and Parasitic Diseases—					
(*a*) Typhoid fever ...	—	2	2	—	1
3. Relapsing fever ...	3	126	129	2	5
5. Smallpox ...	—	1	1	—	—
6. Measles ...	—	24	24	—	1
8. Whooping-cough ...	—	9	9	—	—
9. Diphtheria ...	—	2	2	1	—
10. Influenza ...	1	200	201	2	1
12. Dysentery—					
(*a*) Amoebic ...	3	108	111	2	5
(*b*) Bacillary ...	—	1	1	—	—
(*c*) Unclassified ...	—	12	12	—	—
14. Acute poliomyelitis ...	—	3	3	—	—
16. Cerebrospinal fever ...	2	75	77	24	3
17. Rabies ...	—	1	1	1	—
18. Tetanus ...	—	4	4	—	—
19. Tuberculosis of the respiratory system ...	12	101	113	16	12
20. Other tuberculous diseases ...	3	60	63	7	11
21. Leprosy ...	3	26	29	—	2
22. Venereal Diseases—					
(*a*) Syphilis ...	43	989	1,032	10	72
(*b*) Gonorrhoea ...	11	311	322	2	13
(*c*) Other Venereal Diseases ...	6	63	69	—	—
24. Malaria :—					
(*a*) Benign tertian ...	3	110	113	1	7
(*b*) Subtertian ...	17	645	662	13	13
(*c*) Quartan ...	1	25	26	—	2
(*d*) Unclassified ...	10	311	321	2	15
27. Trypanosomiasis ...	—	5	5	—	3
28. Yaws ...	10	195	205	—	14
30. Ankylostomiasis ...	62	1,577	1,639	12	64
31. Schistosomiasis ...	26	420	446	3	21
32. Other helminthic diseases ...	2	72	74	—	—
33. Other infectious and/or parasitic diseases ...	1	38	39	3	7
II. *Cancer and other tumours*:					
34. Cancer and other tumours—					
(*a*) Malignant ...	3	13	16	1	2
(*b*) Non-malignant ...	4	78	82	—	3
(*c*) Undetermined ...	2	12	14	2	1
III. *Rheumatism, Diseases of Malnutirtion and of Endocrine glands and other general diseases*:					
35. Rheumatic conditions ...	7	164	171	1	8
36. Diabetes ...	—	2	2	—	—
37. Scurvy ...	—	1	1	—	—
38. Beri-beri ...	1	4	5	1	—
39. Pellagra ...	4	25	29	3	3
40. Other diseases—					
(*a*) Nutritional ...	—	2	2	2	—
(*b*) Endocrine glands and general ...	—	18	18	1	—
41. Diseases of the blood and bloodforming organs	—	24	24	1	4
V. *Acute and chronic poisoning*:					
42. Acute and chronic poisoning ...	—	3	3	—	—
Carried forward	240	5,862	6,102	113	293

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1937	Admissions during 1938	Total Cases Treated	Deaths	Remaining at the end of 1938
Brought forward	240	5,862	6,102	113	293
VI. *Diseases of the Nervous system and Sense organs*:					
43. Cerebral haemorrhage ...	3	30	33	2	3
44. Other diseases of the nervous system ...	10	100	110	9	3
45. Trachoma ...	—	5	5	—	2
46. Other diseases of the eye and adnexa ...	12	401	413	—	21
47. Diseases of the ear and mastoid sinus ...	—	38	38	1	2
VII. *Diseases of the circulatory system*:					
48. Diseases of the circulatory system—					
(*a*) Heart diseases ...	2	27	29	8	3
(*b*) Other circulatory diseases ...	3	50	53	—	3
VIII. *Diseases of the respiratory system*:					
49. Bronchitis ...	3	225	228	1	6
50. Pneumonia—					
(*a*) Broncho-pneumonia ...	1	63	64	11	4
(*b*) Lobar-pneumonia ...	3	167	170	23	6
(*c*) Otherwise defined ...	—	5	5	1	1
51. Other diseases of the respiratory system ...	2	150	152	1	3
IX. *Diseases of the Digestive system*:					
52. Diarrhoea and enteritis—					
(*a*) Under 2 years of age ..	—	22	22	2	—
(*b*) Over 2 „ „ „ ...	1	25	26	3	—
53. Appendicitis ...	1	18	19	—	2
54. Hernia, intestinal obstruction ...	2	57	59	1	3
55. Cirrhosis of the liver ...	2	5	7	1	—
56. Other diseases of the liver and biliary passage ...	3	53	56	1	1
57. Other diseases of the digestive system ...	5	271	276	7	5
X. *Non-Venereal diseases of the Genito-urinary system*:					
58. Nephritis (all forms)—					
(*a*) Acute ...	—	9	9	3	2
(*b*) Chronic	—	11	11	2	1
59. Other non-venereal diseases of the genito-urinary system ..	11	193	204	3	7
XI. *Diseases of pregnancy, childbirth, and the puerperal state*:					
60. Diseases of pregnancy, childbirth, and the puerperal state ...					
(*a*) Abortion ...	1	19	20	—	—
(*c*) Toxaemias of Pregnancy ...	—	3	3	—	1
(*d*) Other conditions of the puerperal state ...	2	142	144	13	4
XII. *Diseases of the skin, cellular tissue, bones and organs of locomotion*:					
61. Diseases of the skin, cellular tissue, bones and organs of locomotion ...	83	1,848	1,931	17	97
XIV. *Congenital malformations and diseases of early infancy*:					
62. Congenital malformations and diseases of early infancy—					
(*a*) Congenital debility (children under 1 year)	1	16	17	3	—
XVI. *Senility*:					
63. Senility ...	—	3	3	2	—
XVII. *Affections produced by External Causes*:					
64. External causes—					
(*b*) Other forms of violence ...	71	1,323	1,394	50	56
XVIII. *Ill-defined Diseases*:					
65. *Ill*-defined ...	5	242	247	7	8
TOTAL ...	467	11,383	11,850	285	537

TABLE VI.

TABLE VIa.—RETURN OF DISEASES (EUROPEAN OUT-PATIENTS) FOR THE YEAR 1938.

Diseases	M.	F.
I. Infectious and Parasitic Diseases		
1. (*a*) Typhoid fever ...	1	—
(*c*) Type undefined ...	1	—
3. Relapsing fever ...	1	—
5. Smallpox	1	2
6. Measles	1	—
8. Whooping cough ...	1	2
9. Diphtheria	1	—
10. Influenza	38	24
12. Dysentery—		
(*a*) Amoebic	28	24
(*b*) Bacillary	1	1
(*c*) Unclassified ...	1	—
16. Cerebrospinal fever ...	2	—
20. Other tuberculous diseases ...	—	1
22. Venereal Diseases—		
(*a*) Syphilis	7	—
(*b*) Gonorrhoea ...	7	—
(*c*) Other Venereal Diseases	1	—
24. Malaria—		
(*a*) Benign tertian ...	6	5
(*b*) Subtertian ...	27	18
(*c*) Quartan ...	2	4
(*d*) Unclassfied ...	82	43
25. Blackwater fever ...	4	—
27. Trypanosomiasis ...	2	—
32. Other helminthic diseases ...	2	2
33. Other infectious and/or parasitic	2	11
II. *Cancer and other tumours.*		
34. Cancer and other tumours—		
(*a*) Malignant ...	—	3
(*b*) Non-malignant ...	5	7
III. *Rheumatic conditions.*		
35. Rheumatic conditions ...	5	4
36. Diabetes	5	—
40. Other diseases—		
(*a*) Nutritional ...	1	2
(*b*) Endocrine glands and general	2	3
IV. *Diseases of the blood and blood-forming organs.*		
41. Diseases of the blood and blood-forming organs ...	9	31
V. *Acute and chronic poisoning.*		
42. Acute and chronic poisoning	5	—
VI. *Cerebral haemorrhage.*		
43. Cerebral haemorrhage ...	2	—
44. Other diseases of the nervous system	22	19
46. Other diseases of the eye and adnexa	21	17
47. Diseases of the ear and mastoid sinus	58	31
Carried forward	354	254

Diseases	M.	F.
Brought forward	354	254
VII. *Diseases of the circulatory system—*		
48. Diseases of the circulatory system—		
(*a*) Heart diseases ...	10	11
(*b*) Other circulatory diseases	23	15
VIII. Bronchitis.		
49. Bronchitis	17	—
50. Pneumonia—		
(*a*) Broncho-pneumonia ...	1	—
(*b*) Lobar-pneumonia ...	4	—
51. Other diseases of the respiratory system	43	43
IX. Diarrhoea and enteritis—		
52. Diarrhoea and enteritis—		
(*a*) Under 2 years of age ...	3	5
(*b*) Over 2 „ „ „ ...	26	15
53. Appendicitis	16	4
54. Hernia, intestinal obstruction	4	1
55. Cirrhosis of the liver ...	3	—
56. Other diseases of the liver and biliary passage ...	5	7
57. Other diseases of the digestive system	114	88
X. Nephritis (all forms)		
58. Nephritis (all forms)—		
(*b*) Chronic	5	1
59. Other non-venereal diseases of the genito-urinary system ...	27	74
XI. *Diseases of pregnancy, childbirth, and the puerperal state.*		
60. Diseases of pregnancy, childbirth, and the puerperal state ...	—	40
(*a*) Abortion	—	3
XII. *Diseases of the skin, cellular tissue, bones and organs of locomotion.*		
61. Diseases of the skin, cellular tissue, bones and organs of locomotion	126	71
XIV. *Congenital malformations and diseases of early infancy—*		
62. Congenital malformations and diseases of early infancy—		
(*a*) Congenital debility (children under 1 year)	2	3
XVII. *External causes—*		
64. External causes—		
(*a*) Other forms of violence	86	51
XVIII. *Ill-defined.*		
65. Ill-defined	41	49
Total ...	910	735

TABLE VI.

TABLE VIb. RETURN OF DISEASES (NATIVE OUT-PATIENTS) FOR THE YEAR 1938. (INCLUDING ASIATICS, NATIVE OFFICIALS, K.A.R. NATIVE RANKS, NATIVE GENERAL POPULATION, ASIATIC AND NATIVE CONVICTS).

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
I. *Epidemic, Endemic and Infectious Diseases :*				
1 Epidemic, Endemic and Infectious Diseases—				
(*a*) Typhoid fever	3	—	—	—
(*c*) Type undefined	1	1	—	—
3. Relapsing fever	144	33	2	5
5. Smallpox	2	—	1	—
6. Measles	30	20	334	298
8. Whooping cough	199	240	575	628
9. Diphtheria	—	2	—	—
10. Influenza	1,532	1,056	2,097	1,706
12. Dysentery :—				
(*a*) Amoebic	116	37	—	—
(*b*) Bacillary	4	2	—	—
(*c*) Unclassified	59	43	690	468
14. Acute poliomyelitis	1	2	—	—
16. Cerebrospinal fever	40	31	23	9
17. Rabies	1	—	—	—
18. Tetanus ...	2	1	—	—
19. Tuberculosis of the respiratory system ...	94	32	1	3
20. Other tuberculous diseases ...	61	13	—	—
21. Leprosy	73	40	19	11
22. Venereal diseases—				
(*a*) Syphilis ...	1,005	831	158	172
(*b*) Gonorrhoea	510	206	105	64
(*c*) Other Venereal Diseases ...	27	40	—	—
24. Malaria—				
(*a*) Benign tertian	215	121	—	—
(*b*) Subtertian	1,345	790	—	—
(*c*) Quartan	59	54	—	—
(*d*) Unclassified	3,037	1,736	6,532	4,392
25. Blackwater fever	1	1	—	—
27. Trypanosomiasis	5	—	—	—
28. Yaws	379	361	864	936
30. Ankylostomiasis	6,572	2783	2,787	2,752
31. Schistosomiasis	3,101	1,109	1,859	760
32. Other helminthic diseases ...	492	315	728	542
33. Other infectious and/or parasitic diseases ...	58	23	218	184
II. *Cancer and other tumours.*				
34. Cancer and other tumours—				
(*a*) Malignant	19	8	—	—
(*b*) Non-malignant	108	79	24	12
(*c*) Undetermined ...	—	5	—	—
III. *Rheumatism, Diseases of Nutrition and of Endocrine glands and other general Diseases :*				
35. Rheumatic conditions	3,116	1,477	2,282	1,492
36. Diabetes ...	2	—	—	—
37. Scurvy	3	3	—	—
38. Beriberi	4	—	—	—
39. Pellagra	35	8	—	—
40. Other diseases—				—
(*a*) Nutritional	2	1	—	—
(*b*) Endocrine glands and general ...	17	18	—	—
IV. *Diseases of the blood and blood-forming organs.*				
41. Diseases of the blood and blood-forming organs	25	17	131	131
V. *Acute and chronic poisoning.*				
42. Acute and chronic poisoning ...	3	—	—	—
Carried forward	22,502	11,539	19,430	14,565

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
Brought forward	22,502	11,539	19,430	14,565
VI. *Diseases of nervous System and sense organs*:				
43. Cerebral haemorrhage ...	32	7	—	—
44. Other diseases of the nervous system ...	275	134	23	28
45. Trachoma ...	5	—	—	—
46. Other diseases of the eye and adnexa ...	4,061	3,702	11,578	16,433
47. Diseases of the ear and mastoid sinus ...	1,569	921	5,105	93
VII. *Diseases of the Circulatory System*:				
48. Diseases of the circulatory system—				
(*a*) Heart diseases ...	43	30	28	25
(*b*) Other circulatory diseases ...	129	40	40	19
VIII. *Diseases of the respiratory system*:				
49. Bronchitis ...	6,051	3,448	19,990	12,119
50. Pneumonia—				
(*a*) Broncho-pneumonia ...	48	40	—	—
(*b*) Lobar-pneumonia ...	145	51	—	—
(*c*) Otherwise defined ...	4	5	322	262
51. Other diseases of the respiratory system	6,495	2,564	13,188	8,597
IX. *Diseases of the Digestive System*:				
52. Diarrhoea and enteritis—				
(*a*) Under 2 years of age ...	355	351	2,527	2,120
(*b*) Over 2 „ „ „ ...	625	343	2,932	2,154
53. Appendicitis ...	19	3	—	—
54. Hernia, intestinal obstruction ...	67	1	4	—
55. Cirrhosis of the liver ...	5	1	—	—
56. Other diseases of the liver and biliary passage ...	47	39	44	33
57. Other diseases of the digestive system ...	12,076	6,691	31,543	19,336
X. *Non-Venereal Diseases of the Genito-urinary system*:				
58. Nephritis (all forms)—				
(*a*) Acute ...	8	3	—	—
(*b*) Chronic ...	9	4	—	—
59. Other non-venereal diseases of the genito-urinary system ...	297	261	31	260
XI. *Diseases of pregnancy, childbirth, and the puerperal state*:				
60. Diseases of pregnancy, childbirth, and the puerperal state—				
(*a*) Abortion ...	—	28	—	—
(*c*) Toxaemias of Pregnancy ...	—	11	—	—
(*d*) Other conditions of the puerperal state ...	—	197	—	—
XII Diseases of the skin, cellular tissue, bones and organs of locomotion:				
61 Diseases of the skin, cellular tissue, bones and organs of locomotion ...	16,055	7,166	50,298	30,871
XIV Congenital malformations and diseases of early infancy:				
62 Congenital malformations and diseases of early infancy—				
(*a*) Congenital debility (children under 1 year) ...	14	4	—	—
XVI Senility:				
63 Senility ...	17	3	—	—
XVII External causes:				
64 External causes—				
(*a*) Suicide ...	2	—	—	—
(*b*) Other forms of violence ...	16,149	3,685	40,781	15,571
XVIII Ill-defined:				
65 Ill-defined ...	2,986	944	8,008	3,920
TOTAL ...	90,000	42,216	205,872	126,406


NYASALAND
TANGANYIKA TERRITORY
NORTHERN RHODESIA
PORTUGUESE EAST AFRICA
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LAKE NYASA
NORTH NYASA
SOUTH NYASA
LILONGWE
BLANTYRE
LOWER SHIRE