**Annual report of the Medical Department / Tanganyika Territory.**

TANGANYIKA TERRITORY

# Annual Report of the Medical Department

for year ended 31st December

# 1938

including the Annual Report of the Medical Laboratory, Dar es Salaam


1940
DAR ES SALAAM
PRINTED BY THE GOVERNMENT PRINTER
*Price Shs 4/-*

35/5/40

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the Medical Laboratory,
Dar es Salaam

Office of the
Director of Medical Services
Dar es Salaam
Tanganyika Territory
28th December 1939

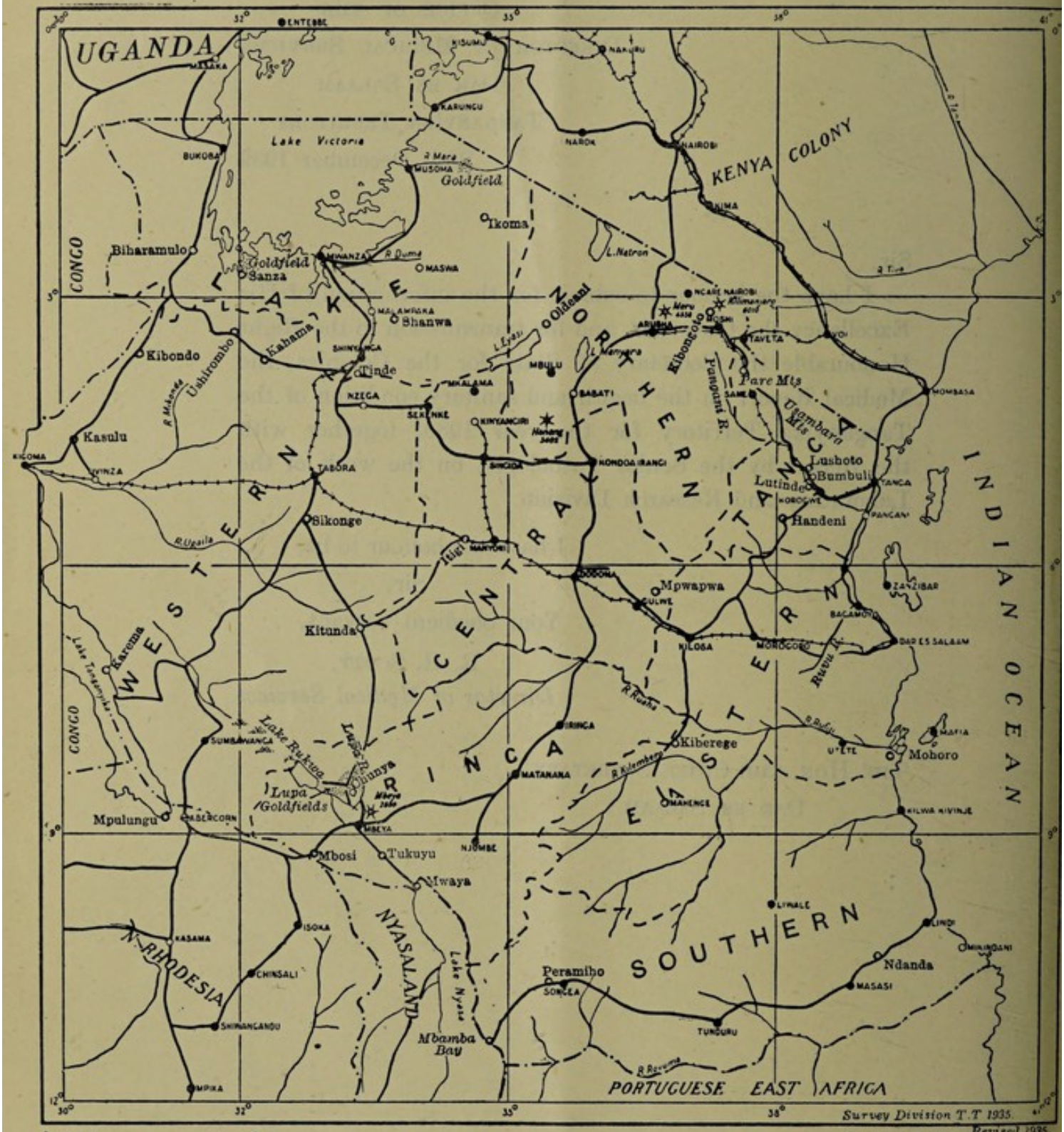
Sir,

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 condition of the Tanganyika Territory for the year 1938, together with the Report by the Senior Pathologist on the work of the Laboratory and Research Division.

I have the honour to be,
Sir,
Your obedient servant,
R. R. Scott,
*Director of Medical Services*

The Hon. the Chief Secretary
Dar es Salaam

# TANGANYIKA TERRITORY



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ANNUAL REPORT OF THE LABORATORY DIVISION

(By Dr H. J. O'D. BURKE-GAFFNEY, *Senior Pathologist*)

# TANGANYIKA TERRITORY

# Annual Medical Report for the Year 1938

## INTRODUCTION

The recurring international crises and the ever-growing threat of war interfered with the normal working of the department; much time had to be given to the preparation of plans for medical arrangements in case of war, of which subsequent events have shown the necessity.

The reorganization of the administration of the department on provincial lines was carried a step further by the application to part of the Southern province of the system of control of the outstations by the medical officer at the provincial headquarters. Arrangements were made for the system to be applied to the Northern and Southern Highlands provinces in 1939, leaving only the Central and Eastern provinces under "direct" control from headquarters.

A useful analysis of the expenditure of the department, divided as fairly as is possible between the different provinces has been prepared by Mr Oldaker, the secretary to the department, and is given at page 31. The expenditure of government funds per head of the population averages eighty-three cents of a shilling, and varies between one shilling thirty-four cents in the Eastern province and fifty-four cents in the Central province.

The policy of Government in regard to medical matters was described in a departmental pamphlet, *Memorandum on Medical Policy*, which was widely issued to all concerned with the social services: copies were also supplied for the members of the Permanent Mandates Commission of the League of Nations.

The assistance the writer has received from the governments and medical organizations in other countries by the grant of facilities for seeing the work of their medical departments, and so obtaining new ideas to help in the formation of long-range policy is most gratefully acknowledged. The Union of South Africa, Uganda, Kenya, the Gold Coast, Nigeria and the Sudan have been particularly helpful in this respect.

The conferences of the Directors of Medical Services of the East African territories and the meetings of the Standing Medical Research Committee of East Africa provide most valuable opportunities for widening one's outlook, and learning what is being accomplished beyond one's own boundaries.

Collaboration with the allied social services has continued as before; and a meeting of the Missionary Medical Committee, attended by fifteen missionaries and by representatives of Government, was held in July at which numerous common problems were discussed and difficulties examined.

In the Dar es Salaam district cooperation with a mission in a local hookworm campaign was undertaken.

The inauguration of systematic voluntary medical work under the auspices of the Order of St John of Jerusalem was an event of no small importance. A visit in March by Colonel Sleeman, Chief Commissioner of the St John

Ambulance Brigade Overseas, during which he addressed meetings of lay and professional workers at Mwanza, Dar es Salaam and Tanga led to the formation of branches of the association and of divisions of the Brigade overseas, which have done invaluable work in training members of all races in first aid and home nursing. His Excellency the Governor graciously accepted the office of President of the branch of the association; and his continued interest and that of Lady Young has provided a great stimulus to its work. Medical practitioners, nursing sisters and certificated first-aiders have given invaluable help in their spare time by providing instruction in first aid and home nursing and in the examination of candidates for certificates. By the end of the year thirty candidates had passed the examination in first aid. The onerous work of organizing the various classes for training in Dar es Salaam and conducting the business of the branch has been carried out by Dr Burke-Gaffney, Senior Pathologist, helped by several other energetic workers, to whom the thanks of the whole community are due. A body of trained lay workers, distributed as they are through the many different communities of the Territory, is gradually providing a leaven of elementary medical knowledge of the utmost value to the people as a whole, whether the knowledge so gained is utilized in peace or war.

The systematic training of African personnel for work in various branches of medical and health work under government, missions and commercial organizations continues to absorb a large share of attention. It is regarded as the foundation of the medical work of the future for it is realized that the ever-increasing demand for western medicine by the African population can only be met by the service of men and women of their own race, the overseas staff gradually taking on more and more supervisory and consultant duties.

In this connection the need for boarding accommodation for both men and women during training is particularly great, since the conditions under which students and probationer nurses must spend their evenings and off-duty time in the absence of residential hostels are not conducive either to study or to healthy recreation.

The further training of African personnel in elementary dental surgery is a branch of work to which sufficient attention has not hitherto been given. The aggregate relief from pain which a skilled extractor can afford in the districts is something worth striving for.

A description of the training given by the department is given at page 19. Systematic training of Africans is also conducted by Dr Gibbons, of the Universities' Mission to Central Africa at St Andrew's College, Minaki, in the Dar es Salaam district, where a four-years' course is given in elementary medicine; and by Sister (Dr) Thecla, of the Benedictine Mission, at Ndanda in the Southern province.

With the increasing attention that has been given to management of the "business" side of the department a more detailed report on the operation of the medical stores has been included this year. The building up of reserve stocks at the stores and the closer control of indents exercised by the provincial staff is gradually putting us in a safer position to meet emergency demands than has been the case for some years past. A year's reserve of essential stores is our aim.

A section has been included for the first time to describe the radiographic and electro-therapeutic work carried out by and with the help of Mr J. E.

Brunnen, Electrical Engineer. Grateful acknowledgment is made of the invaluable assistance he has given us for so many years in this highly technical branch.

The laboratory section of this year's report includes a note on the history of the Dar es Salaam laboratory and its association with Robert Koch and other distinguished workers. The Laboratory Division of the department suffers, in common with other branches, from shortage of staff but, nevertheless, maintains a highly efficient service and trains Africans for duty at hospitals at other stations. The issue of the first number of a quarterly bulletin took place in October and received a chorus of welcome from the medical staff in this and adjoining territories. It contains notes on new methods, technique and recent literature likely to be useful to workers distant from expert laboratory help.

A scheme of domiciliary midwifery worked by native midwives under the immediate supervision of a European health visitor was inaugurated in Tabora town, in conjunction with the native hospital; and associated ante- and post-natal clinics were also conducted.

The need for the organization of systematic medical inspection of school children of all races becomes more and more obvious. With the increasing numbers of young people growing up exposed to all the hazards of life under tropical conditions it is our duty to see that they are given the best possible chance of enjoying a healthy existence and passing on to others the hygienic habits acquired during school days.

The conditions which had so seriously affected the health of estate labour in some areas in 1937 did not recur, and continued efforts are made to impress upon employers the need for better feeding and housing conditions on estates.

The subject of nutrition received close attention during the year; and at the request of the Standing Medical Research Committee for East Africa arrangements were made for the forwarding of an application by the Tanganyika Government to the Colonial Development Committee for a free grant to allow of a survey being undertaken during a period of three years to establish some of the facts of which we are at present ignorant in connection with the nutrition of Africans.

Dr B. S. Platt, who was appointed by the Medical Research Council of the United Kingdom to coordinate nutrition research in East Africa, visited Tanganyika in August and discussed the programme of work which should be followed, and made contact with the East African Agricultural Research Institute at Amani and with the Directors of Agriculture and Veterinary Services and others concerned with native welfare.

Professor (now Sir Wilson) Jameson, Director of the London School of Hygiene and Tropical Medicine, paid a flying visit to Bukoba and Mwanza in January to see the medical schools for training African medical auxiliaries established by the native authorities at those stations and was much interested in what he saw.

The visit of Dr Ernest Muir, Medical Secretary of the British Empire Leprosy Relief Association, who saw most of the large leprosy settlements in the Territory and furnished a valuable report, since issued in *Leprosy Review*,* provided us with useful guidance on future policy in dealing with that disease. There can be no doubt that a medical officer devoting his whole

*Vol. X, No. 1, January 1939, pp. 58-80.

time to the improvement of methods of diagnosis and treatment is most necessary if the best value is to be secured for the present expenditure, which amounts to some £2,700 annually by Government alone. It is hoped that it may be possible later to collaborate with adjoining territories in providing a specialist officer for this work, a generous grant towards the cost having been offered by the British Empire Leprosy Relief Association.

Dr F. Hawking, a Senior Research Fellow of the Medical Research Council, has been carrying out research throughout the year into the efficacy of various drugs in the treatment of human trypanosomiasis and into filariasis.

Dr A. Mozley, of the London School of Hygiene and Tropical Medicine, concluded his research into schistosomiasis and his report has just been issued at the time of writing.

The exchange of views between departmental officers of different territories, so valuable in opening up new lines of approach to common problems, was furthered by the visit of the Deputy Director of the Sleeping Sickness Service, Nigeria, Dr H. M. O. Lester, who saw the sleeping sickness concentrations and the Tsetse Research Department's operations at Shinyanga; and by the interesting and profitable visit which the writer of this report was enabled to pay to the French and British West African colonies, the Anglo-Egyptian Sudan and Uganda on his return from leave. This visit was undertaken primarily to study the methods of training Africans in medical subjects in the different colonies, and the practical methods adopted for the control of yellow fever.

Lastly, in December the first visit of the Chief Medical Adviser to the Secretary of State, Dr A. J. R. O'Brien, during which he saw, with the help of aerial transport, scientific and industrial activities in six of the eight provinces of the Territory, provided a stimulus which it is hoped is only the first of others to come. The value of such a visit in establishing close personal contact with officers in the field and an understanding of our problems acquired from first-hand observation cannot be exaggerated.

The steady increase in the output of work by the hospitals was maintained; the work at the tribal dispensaries maintained by the native authorities showed a very great increase, over three-quarters of a million patients having been treated at them.

No major epidemics occurred during the year, though the peculiar type of smallpox prevalent in the Southern province continued to cause worry and expense. The previous steady downward trend of trypanosomiasis received a check; cerebro-spinal meningitis showed a decrease, unfortunately not maintained during 1939.

The health of European government officials calls for no special comment; the rates of sickness among Asian officials show some improvement (page 53). The proportions of the different groups of diseases to the total cases treated at government hospitals remained almost as before; an increase of 0·73 per cent in the diseases of the digestive system is the only noticeable change. The steady proportions which these groups maintain in relation to each other from year to year in the absence of severe epidemics, are remarkable.

The retirement after sixteen years' service as Nursing Sister, Senior Health Visitor and finally as Matron since 1935, of Miss B. G. Allardes, M.B.E., whose devoted maternity work in Kahama district, where she personally supervised some one thousand confinements annually, will long be remembered; of Dr Meek, Senior Health Officer; Mr Crawley, Medical Instructor;

and Mr Hammond, Laboratory Assistant, must be recorded with regret. The latter officer had longer service in the department than any other member for he came to the Dar es Salaam laboratory with the military forces during the war (1914-18); and with the exception of a short period at the lymph laboratory at Mpwapwa, spent the whole of his service at Dar es Salaam. Evidence of his careful work remains in the museum specimens which he mounted with such care and skill.

The impending retirement of Dr J. F. Corson, O.B.E., whose research into rhodesian sleeping sickness is of international repute, will create a gap which it will be difficult to fill; a summary of the results of his important work is included at page 66.

The invaliding of two medical officers, Drs Sanderson and Wilcocks, and of two sub-assistant surgeons, Messrs Paranjpe and G. A. Mhaiskar, is also recorded with regret. Dr Wilcocks, who is now on the staff of the Tropical Diseases Bureau, remains in close touch with our work.

Transfers on promotion included Dr J. M. Campbell to be Deputy Director of Medical Services, Northern Rhodesia; Dr P. S. Bell to be Senior Medical Officer, Somaliland; and Mr R. M. Jones, Assistant Pharmacist, to be Assistant Storekeeper and Inspecting Chemist in Nigeria. Our good wishes go with them in their new and wider spheres of action.

In concluding these introductory notes I wish most gratefully to acknowledge the hard work and loyal devotion to duty, often under considerable handicaps, of all members of the department and of the medical units of the native authorities; and the assistance of many other people, professional and lay, in our common endeavour to promote the material and moral well-being and the social progress of the inhabitants of the Territory. The results of their work, upon which this report is based, are recorded in the pages which follow.

## I.—ADMINISTRATION

### (A).—General

#### 1.—*Staff*

(a) Tables showing the authorized establishment of the department and details of appointments and casualties are given on pages 68 to 71.

(b) *Courses of instruction attended in Europe and academic distinctions awarded.*—Dr H. N. Davies paid the following visits for the purpose of studying tuberculosis: Papworth Village Settlement, Preston Hall British Legion Village, East Lancashire Tuberculosis Sanatorium and Settlement. He also attended a course on bone and joint tuberculosis at Heatherwood Hospital, Ascot, and a course at the Brompton Hospital.

Dr N. Chilton was awarded the degree of D.M. of Oxford University for a thesis entitled "Clinical Observations in an African District."

Dr G. S. P. Noble obtained the diploma in Ophthalmic Medicine and Surgery.

Dr C. F. Shelton attended a course at the Royal Air Force Central Medical Establishment for the purpose of studying the method of assessing a candidate's physical fitness for flying.

Dr G. Maclean, O.B.E., attended a course in anti-gas measures held at the School of Military Engineering, Chatham, and also studied methods of

administration at various military hospitals and training centres in London and Aldershot.

Dr B. O. Wilkin, during a visit to South Africa, studied health measures in connection with aircraft clearance at Durban and the organization of the health services for natives in the vicinity.

Dr I. C. Middleton obtained the Fellowship of the Royal College of Surgeons of Edinburgh.

Messrs C. E. W. Foster and R. Stewart obtained the Tropical Hygiene Certificate of the Royal Sanitary Institute.

The Director of Medical Services visited many of the British and French West African Colonies, the Sudan and Uganda on his way back from leave and spent two months in the study of medical administration in those territories with special reference to yellow fever prevention and the medical training of Africans.

### 2.—*The Medical Services of the Territory*

The estimated native population of the Territory as recorded in the Blue Book 1938 numbered 5,217,345* spread over an area of 360,000 square miles, and having an average density of 14·49 per square mile. There are, however, many square miles uninhabited. Slight increase in density of population is recorded in the Lake province, which still remains the highest at 29·1.

A sum of £206,041 was provided in the estimates for ordinary recurrent expenditure on the medical services of the Territory for the year in addition to a sum of £4,691 for special expenditure. The actual amount spent was £203,608. In addition to this departmental work a large amount of simple treatment at a cost of £21,228 is undertaken by native authorities through their tribal staff; and much good work is done by the missions on whose staffs there are some twenty-one registered medical practitioners who are almost wholly employed on native work.

Some additional facilities at native hospitals were constructed from funds derived from the unclaimed balances of the former German Savings Bank. They included a new ward at Ngudu dispensary, a mortuary at Mbulu, improvements at Moshi hospital and a paying ward for Africans at Bukoba amounting in all to an expenditure of £1,050.

As it was realized that there was a definite, but limited, demand for private accommodation amongst the wealthier class of natives the paying ward was instituted as an experiment at Bukoba where there are more well-to-do natives than in other parts of the Territory. The wards were equipped for occupation only towards the end of the year and it is too early to say whether the experiment has proved a success.

The following additional works on hospital buildings were undertaken from territorial funds :—

Eastern Province :

(1) Conversion of Health Office store, Dar es Salaam.
(2) Special repairs, European Hospital, Dar es Salaam.
(3) Asian ward, Mafia Hospital.
(4) New hospital at Morogoro (one hundred and twenty beds) not completed at the end of the year.

*The figures in Table B are taken from the 1937 Blue Book.

Western Province :

(1) Semi-permanent accommodation for out-patients, Kigoma Hospital.
(2) Improvements to drainage, Tabora Native Hospital.

Tanga Province :

(1) Improvements to hospital, Lushoto.
(2) New ward, Tanga Hospital.

Northern Province :

(1) Extension of tuberculosis settlement, Kibongoto (suspended).
(2) New electric light plant, Arusha Hospital.

Southern Highlands Province :

(1) Improvements, Chunya Hospital (incomplete).

These works amounted in all to £8,825.

The system of delegating the provincial medical administration to the senior medical officers was extended to two more provinces during the year and five provinces out of a total of eight were at the end of the year in charge of senior medical officers who are responsible to the Director for funds allocated in their provinces and for the discipline of the staff and carrying out the department's policy. A ten-page memorandum on medical policy was widely distributed throughout the Territory.

Government maintained twenty-nine executive medical and health posts at seventeen different stations, and sub-assistant surgeons were in charge of hospitals at twenty other stations. The number of the government medical staff including all specialists and senior officers in the Territory at the end of the year was thirty-five and that of sub-assistant surgeons, including seniors, forty-seven.

In addition to the government staff there were twenty-one registered missionary medical practitioners resident, some thirty-five practitioners actively or part-time engaged in private practice and eight licensed practitioners who with one exception are privately employed by commercial undertakings or charitable organizations serving the needs of the Territory. There are also a number of registered practitioners not resident or not in active practice, for instance, married medical women. The territorial distribution of these doctors, which is subject to change from time to time is shown in table "A"; the numbers given in tables "B" and "C" do not agree in all cases with those in table "A", which includes some persons not actually practising.

Tables "B" and "C" show respectively the numbers of registered and licensed medical practitioners in active or part-time practice compared with the native and non-native population. In table "B" missionary medical practitioners are included as their work is almost entirely for natives and in table "C" the private practitioners are included as being engaged chiefly among non-natives. The services of government medical officers and sub-assistant surgeons are available for all classes of the community and are therefore included in both tables. Table "D" indicates the number and distribution of native authority (tribal) and medical departmental dispensaries together with the average population and area served by each dispensary.

## *Table A.—Distribution of Medical Staff in Government Service and otherwise, on 31st December 1938*

M.O. = Government medical officer.
M.M.P. = Missionary medical practitioner.
P.P. = Medical practitioner not in government or missionary service.
S.A.S. = Sub-assistant surgeon.
Comp. = Asian compounder.
Disp. = African dispenser (only dispensers in charge of stations are shown).

| District or Station | M.O. | M.M.P. | P.P. | S.A.S. | Comp. | Disp. |
|---|---|---|---|---|---|---|
| CENTRAL PROVINCE: | | | | | | |
| Dodoma | 1 | 1 | ... | 1 | ... | ... |
| Kondoa | ... | ... | ... | 1 | ... | ... |
| Manyoni | ... | 1 | ... | ... | ... | 1 |
| Mkalama | ... | 1 | ... | ... | ... | 1 |
| Mpwapwa | *1 | ... | ... | 1 | ... | ... |
| Singida | ... | 1 | ... | 1 | ... | ... |
| EASTERN PROVINCE: | | | | | | |
| Bagamoyo | ... | ... | ... | 1 | ... | ... |
| Dar es Salaam | †11 | 1 | 14 | 5 | 4 | ... |
| Kiberege | ... | ... | ... | ... | ... | 1 |
| Kilosa | ... | ... | 1 | 1 | ... | ... |
| Kimamba | ... | ... | ‡1 | ... | ... | 1 |
| Kisaki | ... | ... | ... | ... | ... | 1 |
| Mafia | ... | ... | ... | 1 | ... | ... |
| Mahenge | ... | 2 | ... | 1 | ... | ... |
| Morogoro | 1 | ... | 2 | 2 | 1 | ... |
| Ngerengere | ... | ... | 1 | ... | ... | ... |
| Ruvu | ... | ... | ... | ... | ... | 1 |
| Utete | ... | ... | ... | 1 | ... | ... |
| LAKE PROVINCE: | | | | | | |
| Biharamulo | ... | ... | ... | 1 | ... | ... |
| Bukoba | 1 | 2 | 1 | 1 | 1 | ... |
| Ikoma | ... | ... | ... | ... | 1 | ... |
| Kwimba | ... | ... | ... | ... | ... | 1 |
| Lukora | ... | ... | ... | ... | ... | 1 |
| Mantare | ... | 1 | ... | ... | ... | ... |
| Maswa | ... | ... | ... | 1 | ... | ... |
| Missenyi | ... | ... | ... | ... | ... | 1 |
| Musoma | 1 | 1 | 1 | 1 | 1 | ... |
| Mwanza | 3 | ... | 2 | 3 | 1 | ... |
| Negezi | ... | ... | ... | ... | ... | 1 |
| Ngara | ... | ... | ... | ... | ... | 1 |
| Nyakahanga | ... | ... | ... | ... | ... | 1 |
| Shinyanga | ... | 1 | ... | 1 | ... | ... |
| Tareme North | ... | ... | ... | ... | ... | 1 |
| Tinde | §1 | ... | ... | ... | ... | ... |
| NORTHERN PROVINCE: | | | | | | |
| Arusha | 1 | ... | 2 | 1 | 1 | ... |
| Babati | ... | ... | ... | ... | ... | 1 |
| Kibongoto | ... | ... | ... | ... | 1 | ... |
| Mbulu | ... | ... | ... | 1 | ... | ... |
| Moshi | 2 | 1 | 1 | 2 | 1 | ... |
| Mwika | ... | ... | ... | ... | ... | 1 |
| Usa River | ... | ... | 1 | ... | ... | 1 |
| Carried forward ... | 23 | 13 | 27 | 28 | 12 | 16 |

*One medical officer in charge Lymph Institute.

†Includes Headquarters Staff, Tutorial Officer, Senior Pathologist and Officer in Charge Malaria Laboratory.

‡Licensed Practitioner.

§Sleeping Sickness Research Officer.

*Table A.—Distribution of Medical Staff in Government Service and otherwise, on 31st December 1938*—contd

M.O. =Government medical officer.
M.M.P. =Missionary medical practitioner.
P.P. =Medical practitioner not in government or missionary service.
S.A.S. =Sub-assistant surgeon.
Comp. =Asian compounder.
Disp. =African dispenser (only dispensers in charge of stations are shown).

| District or Station | M.O. | M.M.P. | P.P. | S.A.S. | Comp. | Disp. |
|---|---|---|---|---|---|---|
| Brought forward ... | 23 | 13 | 27 | 28 | 12 | 16 |
| SOUTHERN PROVINCE: | | | | | | |
| Kilwa ... ... ... ... | ... | 1 | ... | 1 | ... | ... |
| Lindi ... ... ... ... | 1 | 1 | 2 | 1 | 1 | ... |
| Liwale ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Masasi ... ... ... ... | ... | 2 | ... | ... | ... | ... |
| Mikindani ... ... ... ... | ... | ... | ... | 1 | ... | ... |
| Ruponda ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Songea ... ... ... ... | ... | ... | ... | 1 | ... | ... |
| Tunduru ... ... ... ... | ... | ... | ... | ... | 1 | ... |
| SOUTHERN HIGHLANDS PROVINCE: | | | | | | |
| Chunya ... ... ... ... | 2 | ... | ... | ... | ... | ... |
| Iringa ... ... ... ... | 1 | ... | 1 | 1 | 1 | ... |
| Kungutas ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Lupa Market ... ... ... | ... | ... | ... | ... | ... | 1 |
| Makongolosi ... ... ... | ... | ... | ... | ... | ... | 1 |
| Malangali ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Mbeya ... ... ... ... | ... | ... | *2 | ... | ... | ... |
| Mufindi ... ... ... ... | ... | ... | 1 | ... | ... | ... |
| Njombe ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Sengambia ... ... ... | ... | ... | ... | ... | ... | 1 |
| Tukuyu ... ... ... ... | 1 | ... | ... | ... | ... | ... |
| TANGA PROVINCE: | | | | | | |
| Amani ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Handeni ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Korogwe ... ... ... ... | ... | 3 | 1 | 1 | ... | ... |
| Lushoto ... ... ... ... | ... | ... | 2 | 1 | ... | ... |
| Pangani ... ... ... ... | ... | ... | ... | 1 | ... | ... |
| Same ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Tanga ... ... ... ... | 3 | ... | 6 | 4 | 1 | ... |
| Usangi ... ... ... ... | ... | ... | ... | ... | 1 | ... |
| WESTERN PROVINCE: | | | | | | |
| Kafura ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Kahama ... ... ... ... | ... | ... | ... | 1 | ... | ... |
| Kakonko ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Kasulu ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Kibondo ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Kigoma ... ... ... ... | 1 | ... | ... | 2 | ... | ... |
| Makere ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Nyaviyumbu ... ... ... | ... | ... | ... | ... | ... | 1 |
| Nyonga ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Nzega ... ... ... ... | ... | ... | ... | 1 | ... | ... |
| Sumbawanga ... ... ... | ... | ... | ... | 1 | ... | ... |
| Tabora ... ... ... ... | †3 | 1 | 1 | 2 | 1 | ... |
| Ushirombo ... ... ... | ... | ... | ... | ... | ... | 1 |
| Uvinza ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Uyogo ... ... ... ... | ... | ... | ... | ... | ... | 1 |
| Total ... | 35 | 21 | ‡43 | 47 | 18 | 37 |

*One private practitioner employed part time by Government.

†Includes Sleeping Sickness Officer.

‡Does not include seven licensed employees of private concerns.

*Table B.—Natives*

(For abbreviations see table A)

| Province | M.O.* | M.M.P. | S.A.S. | Population† | Population per M.O. | Population per M.O. M.M.P. | Population per M.O. M.M.P. S.A.S. |
|---|---|---|---|---|---|---|---|
| Central ... ... | 2 | 4 | 4 | 545,260 | 272,630 | 90,877 | 54,526 |
| Eastern ... ... | 6 | 3 | 12 | 639,616 | 106,603 | 71,068 | 30,458 |
| Lake ... ... | 5 | 5 | 8 | 1,461,192 | 292,238 | 146,119 | 81,177 |
| Northern ... | 3 | 1 | 4 | 380,816 | 126,939 | 95,204 | 47,602 |
| Southern ... | 1 | 4 | 4 | 601,100 | 601,100 | 120,220 | 66,789 |
| Southern Highlands ... | 4 | — | 1 | 493,372 | 123,343 | 123,343 | 98,674 |
| Tanga ... ... | 3 | 3 | 7 | 352,986 | 117,662 | 58,831 | 27,153 |
| Western ... | 4 | 1 | 7 | 666,026 | 166,506 | 133,205 | 55,502 |
| Territory ... | 28 | 21 | 47 | 5,140,368 | 183,584 | 104,905 | 53,546 |

*Executive Medical and Health Officers only. †Blue Book 1937.

*Table C.—Non-Natives*

(For abbreviations see table A)

| Province | M.O.* | P.P.§ | S.A.S. | Population† | Population per M.O. | Population per M.O. P.P. | Population per M.O. P.P. S.A.S. |
|---|---|---|---|---|---|---|---|
| Central ... ... | 2 | ... | 4 | 2,543 | 1,272 | 1,272 | 212 |
| Eastern ... ... | 6 | 16* | 12 | 14,565 | 2,428 | 662 | 428 |
| Lake ... ... | 5 | 4 | 8 | 5,397 | 1,079 | 600 | 317 |
| Northern ... | 3 | 3 | 4 | 4,378 | 1,459 | 730 | 438 |
| Southern ... | 1 | 1 | 4 | 2,032 | 2,032 | 1,016 | 338 |
| Southern Highlands ... | 4 | 3 | 1 | 2,676 | 669 | 382 | 335 |
| Tanga ... ... | 3 | 7 | 7 | 6,819 | 2,273 | 682 | 401 |
| Western ... | 4 | 1 | 7 | 3,737 | 934 | 747 | 311 |
| Territory ... | 28 | 35 | 47 | 42,147 | 1,505 | 669 | 383 |

*Executive Medical and Health Officers only. †Blue Book 1937.
‡Includes one practitioner licensed under S 10 (b).
§Actively or part time engaged in private practice.

## *Table D.—Native Dispensaries*

| DISTRICT | Area sq. miles | Native population 1931 Census | Tribal Dispensaries | Medical Department Dispensaries | Square miles to each dispensary | Population to each Dispensary |
|---|---|---|---|---|---|---|
| **CENTRAL PROVINCE:** | | | | | | |
| Dodoma ... ... | 23,671 | 208,294* | 14 | 1 | 1,578 | 13,886 |
| Kondoa ... ... ... | 5,750 | 118,151 | 3 | ... | 1,917 | 39,384 |
| Singida ... ... ... | 8,076 | 250,239 | 9 | 1 | 807 | 25,024 |
| Total ... | | | 26 | 2 | | |
| **EASTERN PROVINCE:** | | | | | | |
| Bagamoyo ... ... | 3,910 | 62,057 | 7 | ... | 559 | 8,865 |
| Temeke ... ... ... | 4,080 | 130,127 | 5 | 1 | 680 | 21,688 |
| Kilosa ... ... ... | 6,000 | 68,686 | 8 | 1 | 667 | 7,632 |
| Morogoro ... ... | 7,620 | 149,484* | 10 | 1 | 693 | 13,589 |
| Rufiji ... ... ... | 5,103 | 87,364 | 7 | 3† | 510 | 8,736 |
| Ulanga ... ... ... | 15,570 | 93,152 | 15 | 1 | 973 | 5,822 |
| Total ... | | | 52 | 7 | | |
| **LAKE PROVINCE:** | | | | | | |
| Biharamulo ... ... | 6,556 | 100,208 | 7 | (2) | 728 | 11,134 |
| Bukoba ... ... ... | 7,010 | 275,922* | 21 | 2 | 305 | 11,997 |
| Kwimba ... ... | 1,830 | 200,062 | 9 | 1 | 183 | 20,006 |
| Maswa ... ... ... | 10,870 | 230,126 | 7 | ... | 1,553 | 32,875 |
| Musoma ... ... | 7,250 | 184,128 | 12 | 2‡ | 518 | 13,145 |
| Mwanza ... ... ... | 5,580 | 250,170* | 23 | ... | 243 | 10,877 |
| Shinyanga ... ... | 3,500 | 144,536 | 7 | 1 | 438 | 18,067 |
| Total ... | | | 86 | 8 | | |
| **NORTHERN PROVINCE:** | | | | | | |
| Arusha ... ... ... | 6,250 | 47,414* | 1 | 1 | 3,125 | 23,707 |
| Masai ... ... ... | 18,470 | 32,168 | 8 | ... | 2,309 | 4,021 |
| Mbulu ... ... ... | 5,160 | 98,816 | 11 | 1 | 430 | 8,235 |
| Moshi ... ... ... | 2,120 | 161,558* | 5 | 1 | 353 | 26,926 |
| Total ... | | | 25 | 3 | | |
| **SOUTHERN PROVINCE:** | | | | | | |
| Lindi ... ... ... | 8,100 | 133,742* | ... | 1 | 8,100 | 133,742 |
| Liwale ... ... ... | 10,000 | 24,503 | ... | 1 | 10,000 | 24,503 |
| Songea ... ... ... | 16,200 | 123,807 | 8 | ... | 2,025 | 15,476 |
| Tunduru ... ... | 1,800 | 49,806 | 3 | ... | 600 | 16,620 |
| Total ... | | | 11 | 2 | | |
| **SOUTHERN HIGHLANDS:** | | | | | | |
| Iringa ... ... ... | 11,911 | 86,795 | 8 | 1 | 1,323 | 9,644 |
| Mbeya ... ... ... | 16,540 | 84,591 | 13 | (1) 4 | 919 | 4,699 |
| Njombe ... ... ... | 8,330 | 125,463 | 11 | 1 | 694 | 10,455 |
| Rungwe ... ... ... | 1,750 | 195,062 | 8 | ... | 219 | 24,383 |
| | | | 40 | 7 | | |

*Excluding the Township population. Subsidiary dispensaries not included in Table A are shown in brackets.

†Staffed by Hospital Orderlies.

‡One dispensary is staffed by a Compounder.

*Table D.—Native Dispensaries*—contd

| DISTRICT | Area sq. miles | Native population 1931 Census | Tribal Dispensaries | Medical Department Dispensaries | Square miles to each dispensary | Population to each dispensary |
|---|---|---|---|---|---|---|
| TANGA PROVINCE: | | | | | | |
| Korogwe ... ... | 9,554 | 175,707 | 13 | 2 | 637 | 11,713 |
| Pangani ... ... ... | 1,221 | 17,846 | 3 | — | 407 | 5,948 |
| Pare ... ... ... | 3,870 | 57,911 | 5 | 1 | 645 | 9,651 |
| Total ... | | | 21 | 3 | | |
| WESTERN PROVINCE | | | | | | |
| Kahama (Nzega) ... | 14,400 | 192,316 | 13 | 1 | 1,028 | 13,737 |
| Kigoma ... ... ... | 21,010 | 205,926 | 1 | 6 | 3,001 | 29,418 |
| Tabora ... ... ... | 38,600 | 203,491* | 5 | 1 | 6,433 | 33,915 |
| Ufipa ... ... ... | 25,390 | 78,501 | 5 | 2 | 3,627 | 11,214 |
| Total ... | | | 24 | 10 | | |

*Excluding the Township population. Subsidiary dispensaries not included in table A are shown in brackets.

*Hospital Provision.*

*Native.*—Hospital beds total 2,246. This includes 53 beds in infectious disease hospitals at Dar es Salaam and Tanga which were omitted in the 1937 report; the average number of the population per bed was 2,289; the mean provincial population per bed, 2,326; the best provided province (Tanga) per bed, 1,265; the worst provided province (Lake) per bed, 3,699. As stated before, additional bed accommodation, often giving rise to serious overcrowding, is frequently provided when the demand arises.

*Asian.*—Accommodation for Asian patients is available at sixteen hospitals in all provinces.

*European.*—European hospitals exist at ten stations in seven provinces and the provincial European population per government European hospital varies between 429 in the Southern province and 1,981 in the Eastern province.

Detailed information as to the actual accommodation at the different hospitals is given in the Blue Book.

The distribution of the dispensaries (tribal and departmental) by provinces is given in table "D", and may be summarized as follows :—

| Province | Tribal Dispensaries | Departmental Dispensaries |
|---|---|---|
| Central ... ... ... ... | 26 ... | 2 |
| Eastern ... ... ... ... | 52 ... | 7 |
| Lake ... ... ... ... ... | 86 ... | 8 |
| Northern ... ... ... ... | 25 ... | 3 |
| Southern ... ... ... ... | 11 ... | 2 |
| Southern Highlands ... ... | 40 ... | 7 |
| Tanga ... ... ... ... | 21 ... | 3 |
| Western ... ... ... ... | 24 ... | 10 |
| | 285 ... | 42 |

### 3.—*Assistance to Medical Missions*

Cooperation with medical missions was continued as usual and a meeting of the Missionary Medical Committee, attended by fifteen missionaries of all denominations and by representatives of Government, was held in July. At this meeting numerous common problems were discussed and difficulties aired.

Cooperation with a mission in the southern part of Dar es Salaam district in a campaign for the reduction of hookworm in a heavily infected area was undertaken with funds specially provided by Government for such purposes.

In this area, in which cattle do not thrive on account of tsetse infestation, an arrangement has been made for the introduction of slaughter cattle from a government herd which are disposed of at cost price to the native public through the mission, thus providing a source of animal protein for the people who would otherwise obtain little or none. The stock is replaced by means of the money realized from sales. Our gratitude is due to the Veterinary Department for assisting us to achieve this end. Mass treatment and the introduction of bore-hole latrines form the mainstay of the campaign.

Drugs and equipment to the value of £459 were supplied to missionary societies, compared with £409 in 1937; financial assistance amounting to £1,042 compared with £995 was given to certain missions engaged in maternity and child welfare work, and mention should be made of the cooperation which continues year by year between Government and missions in connection with the care and treatment of leprosy cases; £1,734 of the sum at the department's disposal for this work was allotted to missions for the maintenance of leprosy patients.

### 4.—*The Training of African Staff*

The training and supervision of staff for the rural dispensaries forms one of the most important duties of the Medical Department, and it is desirable to review the present position.

The initiation of the tribal medical service is due to the foresight of Dr J. O. Shircore, C.M.G., then Director of Medical Services, who in 1926 foresaw that the Medical Department could never fill the demand for medical aid in the rural areas without vast expenditure on staff and drugs. He accordingly arranged with the district administration for suitable men, selected by their chiefs, to undergo a three months' training in medical and surgical first aid at a government hospital, and to be provided with simple buildings, medicines and equipment at the expense of the communities themselves and to the extent they themselves could afford.

He aimed at providing one such man styled "tribal dresser" per five thousand of the population or a total of one thousand for the Territory, and a dispensary within twenty miles of every village. By the end of 1926, thirty-five men had been trained; at the end of 1927 a total of ninety had been trained and posted; in 1928 the number was increased to 147 and one enterprising and wealthy district paid for a sub-assistant surgeon to supervise their dispensaries and provided a few beds thereat. In 1935 the need for closer supervision by the Medical Department was apparent and an endeavour was made to secure closer coordination of the curative and preventive work of the tribal dressers and district sanitary inspectors.

In 1935 the Mwanza training school, offering an eighteen months' course of training for resident students who had passed standard V at school, was opened. Smaller schools providing a three years' course were opened at Bukoba

and Musoma, also in the comparatively densely-populated Lake province. The Musoma school was closed in 1938 for administrative reasons on completion of the first course of three years' training, twelve students having been trained thereat. All these schools and a new out-patient department at Mwanza, specially designed with a view to the training of students, were provided by the native authorities : a medical officer was posted to Mwanza specially to concern himself with supervision of the teaching.

A school for the Western province has also been provided at Tabora, and one for the Southern Highlands at Tukuyu; and a number of students are being trained at Tanga hospital for service in the Southern province. These men are taught in Swahili and are not required to speak English. The standard of education, medical training and efficiency is rising gradually; and the products of the Lake province schools, who are styled "medical auxiliaries", have a much higher standard than that of the tribal dressers, though there is no administrative difference between them. They are efficient at microscopic diagnosis of the common parasitic diseases and their curriculum was described in the annual report of the Medical Department for 1937 at page 52. Details of the students trained at the various schools are given below.

At the end of 1938 there were 285 dispensaries at which were treated 789,915 new cases equivalent to more than one-seventh of the whole population during the year. The number has risen steadily since 1928, when 141,300 were treated at 147 dispensaries.

The dispensary service provides the furthest outposts of western medicine available to the rural population and furnishes simple treatment annually for more than one-tenth of the total population. Each serves an average area of some eleven hundred square miles; and disregarding districts in which no dispensary yet exists, serves a population of over fourteen thousand.

The distribution of the dispensaries in the provinces is given in table "D" at page 17. A clear distinction must be made between the tribal dispensaries which are entirely financed by the native authorities, and the government dispensaries, which come under the direct control of the Medical Department and whose distribution is shown alongside that of the tribal dispensaries.

These are staffed by Africans styled "dispensers," who are of a higher educational standard and undergo a three years' course of training conducted in English at Dar es Salaam under a medical officer, Dr N. Chilton, whose whole time is devoted to tutorial duties. Students entering for this course are required to have passed standard X which entails two years' secondary education. The curriculum for this course is given at pages 50 to 51 of the 1937 report.

A further nine African students, who qualified for entrance to Makerere College at the end of their schooling, are undergoing the full course of medical training in Uganda, their fees being paid by this Government.

On the laboratory side the Africans trained by the Senior Pathologist are doing most valuable work, the branch laboratories at Tanga and the Sewa Hadji hospital at Dar es Salaam being in charge of two of his pupils and giving great satisfaction; and others are now assisting the medical staff at seventeen hospitals, where twenty-eight laboratory trained dispensers are engaged. Ten other dispensers in charge of small stations have been so trained, together with thirty-three hospital orderlies and dressers.

In all branches of the department's work the imperative need for the systematic training of African assistants becomes more and more obvious.

The limited facilities for teaching, particularly the amount of time which the medical and nursing staff can spare from attendance on the ever-increasing number of sick people attending the hospitals, make the efficient training of adequate numbers to take their share of the burden impossible.

The crying need for trained African women as nurses and midwives, so long impossible to meet because of the lack of literate pupils, shows some prospect of partial solution within the next ten years, with the eager demand for education of their daughters now being made by African parents. But the difficulties of securing candidates for an arduous course of training demand that such a course should be made attractive and interesting, and that involves expenditure on a comfortable nurse's home and suitable personnel for training.

*Details of Training during the year.*

*School of Medicine, Dar es Salaam.*—Six dispensers passed out of the school and have been posted to their respective stations. Six new students completed their first year's training. There were no second year students. Additional students who reached dispenser's rank were two destined for the pathological and malaria laboratories. Two dispensers were attached to the school for five months for revision purposes.

Five probationary urban sanitary inspectors received a year's training in anatomy, physiology, chemistry and physics; they will continue their practical training at Tanga.

The practice of holding voluntary evening classes for hospital orderlies, which had lapsed for many years, was revived by Miss Daye, Acting Assistant Matron. Swahili is spoken at these classes; they are of great value to the regular staff, who are, after all, the backbone of the hospital, and were in danger of being neglected in this school for English-speaking boys.

A course in first aid, organized by the St John Ambulance Association was attended by African clerks and others able to read the association's text book.

*The Teaching of Pharmacy.*—During the latter part of the year Mr Cayzer, Assistant Pharmacist, who arrived at the end of 1937, gave assistance at the Dar es Salaam medical school in the teaching of elementary pharmacy to the dispenser-students. Mr Nicholson, Pharmacist, assisted at the pharmacy examinations on two occasions.

*Training of Staff for Native Authorities.*

*Western Province, Tabora Medical School.*—Three students completed their training and were posted as tribal dressers; three others passed a preliminary examination before proceeding to rural hospitals to work under the supervision of trained men; fifteen are still under instruction at Tabora hospital.

Four girls received a hospital course in maternity and child welfare and are gaining practical experience in domiciliary midwifery in the patients' homes; later they will be posted to various localities as district midwives.

*Lake Province:* (1) *Mwanza.*—Eighteen students of the 1936-37 group remained until April, when they were posted to their own units. Medical auxiliaries of the 1935-36 group were given refresher courses from May to August and from September to December. At these courses particular attention was paid to field emergencies.

(2) *Bukoba.*—Nine pupils completed their three years' course; they were posted to various units in November. A class of twelve new pupils is to begin work in 1939.

(3) *Musoma.*—Twelve pupils completed their three years' course and were posted to various units. It was then found necessary to close down the school on account of uncertainty as to funds for the extension of services in the Musoma district on these lines. In future it is intended that five new students be sent to Mwanza each year, and carry out their training there.

*Southern Highlands Province.*—Instruction, theoretical and practical, was given at Tukuyu to fifteen first-year, five second-year and five third-year students. Four passed out as tribal dressers at the end of their third year; one, who failed, is remaining at the school for further training.

Quarters have been provided by the native treasury for five married and fifteen unmarried pupils, together with a mess, kitchen and out-houses. When more funds are available, it is proposed to add a lecture room and out-patient department, which will afford greater facilities for teaching.

*Eastern Province.*—The establishment of a training centre for tribal dressers is under consideration. One dresser, who had been posted to Morogoro in 1937, continued his training and will be ready for duty early in 1939.

*Southern Province.*—Eleven students continued their training at Tanga for service in the Southern province. Two others were engaged during the year.

Recommendations have been submitted for the provision of schools for the training of personnel for the native authority dispensaries at Moshi for the Northern province and at Tanga, so that more use may be made of the excellent teaching material available at the large hospitals at those centres.

### 5.—*The Control of Medical Practice and Pharmacy*

The tables below show the number of medical practitioners registered in the Territory, and the source of their qualifications, together with alterations effected during the year :—

*Tables showing the numbers of persons registered as medical practitioners and dentists on 31st December 1938*

MEDICAL PRACTITIONERS

| | British | | | Qualifications not registrable in British Register | Total |
|---|---|---|---|---|---|
| | Government Service | Private or Missionary | Not resident | Private or Missionary | |
| British ... | 47* | 19 | 14* | — | 80 |
| British Indian | 4 | 4 | 6 | — | 14 |
| Goan ... ... | — | 7 | 3 | — | 10 |
| German ... | — | 3 | — | 31*† | 34 |
| Swiss ... ... | — | — | — | 3 | 3 |
| United States | — | — | 1 | 5 | 6 |
| Greek ... ... | — | — | — | 2 | 2 |
| Hungarian ... | — | — | — | 2 | 2 |
| Total ... | 51* | 33 | 24* | 43‡ | 151‡ |

DENTISTS

| | British Qualifications | | | Foreign Qualifications | Total |
|---|---|---|---|---|---|
| | Government Service | Private or Missionary | Not resident | Private or Missionary | |
| British ... | 3* | — | 5* | 1 | 9 |
| German ... | — | — | — | 7*‖ | 7 |
| Japanese ... | — | — | — | 1§¶ | 1 |
| Greek ... ... | — | — | — | 1 | 1 |
| Total ... | 3* | — | 5* | 10 | 18** |

*Three Medical Practitioners hold dental qualifications in addition and appear in both lists †Three not resident. ‡Twenty-seven not resident. ‖Two not resident. ¶Registered in Foreign List of British Dentists Register. §Not resident. **Eight not resident.

*Table showing the number of persons whose names were added to, or removed from the register during the year 1938*

| | Added | | Total | Removed | | Total |
|---|---|---|---|---|---|---|
| | Medical | Dental | | Medical | Dental | |
| British ... ... | 8 | — | 8 | 5 | — | 5 |
| British Indian ... | 1 | — | 1 | — | — | — |
| Goan... ... ... | 1 | — | 1 | — | — | — |
| German ... ... | 5 | 2 | 7 | 1 | — | 1 |
| Swiss... ... ... | 2 | — | 2 | — | — | — |
| United States ... | 1 | — | 1 | — | — | — |
| Greek ... ... | — | 1 | 1 | — | — | — |
| Hollander ... ... | — | — | — | — | 1 | 1 |
| Hungarian ... ... | 1 | — | 1 | — | — | — |
| Total ... ... | 19 | 3 | 22 | 6 | 1 | 7 |

In addition to the registered medical practitioners shown in the table above fifty-nine persons are licensed to practise medicine in the Territory under specified conditions; the licences require renewal each year. Of these, fifty-one are in government service, seven are privately employed by commercial undertakings or charities, and one is licensed to practise in a limited area where no other practitioner is resident.

*Pharmacy and Poisons Board*

A Pharmacy and Poisons Board was appointed in 1937 with the following membership: the Director of Medical Services as chairman; the Solicitor-General; Dr S. B. Malik; the Pharmacist (as registrar); and Mr W. Tomlinson, representing a firm of chemists with several branches in the Territory. This board functions in an advisory capacity until the Pharmacy and Poisons Ordinance (No. 1 of 1937) is brought into operation; its duty has been to prepare the poisons list for the approval of the Governor; and it has assisted in the preparation of the Poisons Rules which are under consideration.

The new legislation is designed to modernize and replace the Drugs and Poisons Ordinance of 1920 and to provide more effective control of the profession of pharmacy and the supply and keeping of poisons.

At the end of the year there were eleven licensed druggists on the register, of whom five were government servants.

### 6.—*Aerial Transport*

On twenty-seven occasions air transport was made use of by the Medical Department during the year. They were for the following purposes :—

Once to remove a patient suffering from blackwater fever from a remote place to Dar es Salaam European hospital.

Once to convey a medical officer for an emergency consultation to Iringa, a distance of two hundred and eighty-eight miles from Dar es Salaam.

Once to carry a patient on sick leave from Moshi to Nairobi.

Five times to convey distinguished visitors to stations on their itinerary, including the round tour by the Medical Adviser to the Secretary of State.

Nineteen times for routine visit inspections by officers of the department.

### 7.—*Publications*

The following medical pamphlets were published by Government and distributed to officials, missions and others to whom they might prove to be of value :—

(a) "Scurvy" (Medical Pamphlet No. 24). A four-page pamphlet.

(b) "Notes on the Treatment of Tetanus with Anti-Tetanic Serum" (Medical Pamphlet No. 25). A four-page pamphlet.

(c) "Matamu Matatu Yekoma Mbali Yetu" (Medical Pamphlet No. 26). An eight-page pamphlet in Kishambaa, the language of the people of Usambara. Translated by H. A. H. Persoun from the government pamphlet in Swahili on Venereal Diseases and Alcoholism.

(d) "Memorandum on Medical Policy." A ten-page pamphlet on the aims of Government, and methods of attaining improvement of the public health of the Territory.

## (B).—Legislation

The following legislation affecting public health was promulgated during the year :—

UNDER THE DANGEROUS DRUGS ORDINANCE :

(a) *The Dangerous Drugs (Internal Control) (Amendment) Rules, 1938* (Government Notice No. 49 of 1938). These rules revoke section 19 of Government Notice No. 104 of 1935 and the third schedule thereof which exempted certain preparations from the application of the Dangerous Drugs (Internal Control) Rules, 1935.

(b) *The Dangerous Drugs (Exclusion of Cocaine, Morphine, etc., Preparations) (Declaration) Order, 1938* (Government Notice No. 50 of 1938). Exemption of the preparations in question from the provisions of part V of the Dangerous Drugs Ordinance, 1935.

UNDER THE EXTERMINATION OF MOSQUITOES ORDINANCE :

*The Extermination of Mosquitoes (Application) Order, 1938* (Government Notice No. 119 of 1938). This order applies the Ordinance in the Singida

Minor Settlement up to a distance of half a mile from the minor settlement boundaries.

UNDER THE LUNACY ORDINANCE :

*The Lunacy (Establishment of Asylums) Order, 1938* (Government Notice No. 216 of 1938). By this order the Dodoma mental hospital in the Dodoma district, the Lutindi mental hospital in the Korogwe district and the first class prison established in Dodoma are established to be asylums for the custody and treatment of lunatics and persons of unsound mind.

UNDER THE MARKETS ORDINANCE :

*The Markets (Tabora Township) Rules, 1938* (Government Notice No. 16 of 1938). By these rules the sale or exposure for sale of meat in the township of Tabora and the suburban villages except within the Tabora market are prohibited.

UNDER THE MINOR SETTLEMENTS ORDINANCE :

(a) *The Minor Settlements (Sanitary Rate) Order, 1938* (Government Notice No. 217 of 1938). This order fixes the sanitary rate for Mbulu and Babati minor settlements.

(b) *The Minor Settlements (Meat Inspection Fees) (No. 2) Rules, 1938* (Government Notice No. 229 of 1938). These rules empower the sanitary authority of the minor settlement to inspect the carcasses slaughtered in a public slaughter house or place or if there is no public slaughter house or place in a private slaughter house or place and to prohibit the sale of such carcasses for human consumption until the carcass has been inspected and certified as fit. They also fix the minimum fees for inspection and certificate.

UNDER THE TOWNSHIPS ORDINANCE :

(a) *The Township (Building) (Amendment) Rules, 1938* (Government Notice No. 40 of 1938). These rules provide authority to refuse approval on grounds of unsuitable position and general appearance for the construction of out-buildings, such as servants' quarters, kitchens, etc.

(b) *The Township (Aerated Water and Ice Factories) (Amendment) Rules, 1938* (Government Notice No. 167 of 1938). By this order aerated water and ice factories are prohibited from using water supplies unless approved by the authority. These rules also provide for the filling in of wells on the premises which are not approved sources of supply.

## (C).—Financial

### *Expenditure and Revenue*

A sum of £206,041 was provided in the estimates for ordinary recurrent expenditure on medical services for the year; estimates of expenditure on non-recurrent special items amounted to £4,691; the total estimated expenditure was thus £210,732 which includes sundry small amounts supplementary to the original approved estimates. Actual expenditure against the above figure totalled £203,609, an increase of £2,329 over such expenditure in 1937 and representing a saving of £7,123 on the sum provided.

In addition to the above, sums of £2,843 for sleeping sickness research and £7,256 for anti-malarial works at Dar es Salaam, totalling £10,099 were provided from the Colonial Development Fund, though the actual expenditures were only £2,001 and £4,985 respectively.

The provision included in the estimates under Sleeping Sickness Research for the relief officer and the research officer's passage was not required as the latter extended his tour of service beyond the end of the year, and strains of trypanosomes were not obtained from Zululand resulting in savings under this head.

The reason for not utilizing the full sanctioned amount under anti-malarial works was due to the delay in commencing that portion of the major works scheduled for 1938 and to the absence on leave of the anti-malarial engineer during the latter part of the year with consequent curtailment of operations.

In the approved estimates, the sum provided for ordinary recurrent and special medical expenditure (£210,732) was equal to 10·8 per cent of the territorial estimates for recurrent and special items.

On the revenue side, medical receipts show an increase of £1,156 over the sum estimated, and £9 over the amount collected during 1937.

*Financial Summary*

(For details see table at page 29)

| *Revenue:* | Estimated £ | Actual £ |
|---|---|---|
| Receipts, Medical ... ... | 8,500 | 9,656 |
| Reimbursements by Railways... | 3,000 | 3,000 |
| Total ... | £11,500 | £12,656 |

Revenue for the last five years has been as follows:—

| | £ |
|---|---|
| 1934 ... ... ... ... ... ... ... | 12,614 |
| 1935 ... ... ... ... ... ... ... | 10,271 |
| 1936 ... ... ... ... ... ... ... | 11,400 |
| 1937 ... ... ... ... ... ... ... | 12,647 |
| 1938 ... ... ... ... ... ... ... | 12,656 |

| *Expenditure:* | Approved Estimate £ | Actual £ |
|---|---|---|
| Ordinary recurrent ... ... | 206,041 | 199,249 |
| Non-recurrent ... ... | 4,691 | 4,360 |
| Total ... | £210,732 | £203,609 |

| *Colonial Development Fund:* | Estimated £ | Actual £ |
|---|---|---|
| Sleeping Sickness Research ... | 2,843 | 2,001 |
| Anti-Malarial Works, Dar es Salaam | 7,256 | 4,985 |
| Total ... | £10,099 | £6,986 |

*Medical Stores and Equipment*

Since the efficient functioning of the medical services depends largely on the maintenance and distribution of adequate supplies of drugs, dressings and equipment, some details of the work of this important branch of the department are here included.

For several years past the necessity of building up adequate reserves of stores against times of financial depression, or in case of difficulty in obtaining supplies from overseas as a result of war, has been impressed upon Government during consideration of the estimates. Our hospitals were exceptionally well stocked until the disastrous depression of 1931 befell us, after which provision for medical supplies was drastically curtailed.

For some years we lived largely on our capital, that is, our pre-depression stocks, not replenishing annually the amount of stores actually issued to stations. In 1936 it became necessary to check this race to bankruptcy and a system of "earmarks" was evolved, whereunder every station is provided with a credit for an estimated quantity of stores. By this means greater care is taken in preparing indents in accordance with actual requirements, and wasteful indenting greatly reduced. This system was introduced in 1937 and after certain initial difficulties had been overcome it has been working well. It entails the provision of a priced list of stores to all indenting officers and the issue of costed vouchers which enable an officer to watch his expenditure on stores and to treat them as if they were, as in fact they represent, actual cash.

In view of the long delay which occurs between despatch of indents and landing of goods, I believe it to be necessary to hold in stock a year's supplies of essential drugs and equipment; and in order to allow of again building up a reserve, a sum of £4,000 for the creation of an "unallocated" store of essentials was granted in 1938; this sum is specifically set aside for reserve stocks not to be drawn upon unless an equivalent value of stores has been ordered from recurrent funds. Further increases of £3,000 to build up ordinary reserves, and of £1,000 for recurrent requirements were approved by the Legislative Council for 1939. It was hoped that by the end of 1941 the total reserves would amount to a sum of £22,000 which is the sum I estimate to be necessary in normal times for the supply of our medical units.

The staff of the stores consisted during the greater part of the year of one pharmacist, one assistant pharmacist, one Asian compounder, three Asian clerks, and eighteen packers, messengers and watchmen.

The establishment includes one additional assistant pharmacist, but Mr R. M. Jones who went on leave in January was transferred as assistant storekeeper and inspecting chemist to Nigeria. Mr C. E. Thomas was appointed in his place but his arrival at the end of December did not allow of the inspecting of stores at out-stations which it had been hoped to carry out towards the end of the year.

The values of allocated stocks held at the 31st December for the last three years have been :

| | £ | s | d |
|---|---|---|---|
| 1936 ... ... ... ... ... | 10,056 | 0 | 8 |
| 1937 ... ... ... ... ... | 10,461 | 12 | 0 |
| 1938 ... ... ... ... ... | 13,258 | 12 | 0 |

and the values of the stores issued were :

| | | | |
|---|---|---|---|
| 1936 ... ... ... ... ... | 18,752 | 19 | 9 |
| 1937 ... ... ... ... ... | 18,788 | 15 | 3 |
| 1938 ... ... ... ... ... | 18,368 | 5 | 5 |

The latter figures include the value of quinine tablets, namely £2,214 9s. 11d., £2,315 and £2,280 respectively, supplied to the Post Office for sale to the public.

*Issues.*—The volume of work done in the stores, as shown by the number of issue vouchers made out and packages despatched is as follows:—

| | Vouchers | Packages |
|---|---|---|
| Sanitation stores ... ... ... ... | 186 ... | 676* |
| Drugs and medical and surgical stores ... | 1,351 ... | 2,563* |

*Not including parcels.

A few of the items of which very large quantities are issued are mentioned below:—

*Dressings:*

| | |
|---|---|
| Bandages, two-inch (No.) ... ... ... ... ... | 82,246 |
| Amerikani (yards) ... ... ... ... ... ... | 24,529 |
| Gauze (packets of six yards) ... ... ... ... ... | 21,253 |
| Lint, boric (pounds) ... ... ... ... ... ... | 5,912 |
| ,, plain (pounds) ... ... ... ... ... ... | 9,857 |
| Plasters (No.) ... ... ... ... ... ... ... | 1,332 |
| Wool (pounds) ... ... ... ... ... ... ... | 14,848 |

| *Drugs, etc.:* | Tons | cwt | lb. |
|---|---|---|---|
| Acid, boric ... ... ... ... ... ... | | 6 | 47 |
| Ammonium carbonate ... ... ... ... ... | | 4 | 31 |
| Emetine ampoules ... No. 3,300 | | | |
| Quinine ,, ... No. 5,464 | | | |
| Bismuth sodium tartrate ... ... ... ... | | 2 | 36 |
| Carbon tetrachloride ... ... ... ... ... | | 4 | 92 |
| Iron and ammonium citrate ... ... ... ... | | 4 | 4 |
| Glycerine ... ... ... ... ... ... ... | | 9 | 20 |
| Emetine hydrochloride, Hypo. Tabs. (Tubes 776). | | | |
| Soap liniment ... ... ... ... ... ... | | 6 | 65 |
| Iodine solution (weak) ... ... ... ... ... | 1 | 0 | 77 |
| Lysol ... ... ... ... ... ... ... | | 15 | 68 |
| Magnesium sulphate ... ... ... ... ... | 8 | 13 | 53 |
| Cod liver oil ... ... ... ... ... ... | | 7 | 88 |
| Castor oil ... ... ... ... ... ... ... | | 11 | 52 |
| Medicinal paraffin ... ... ... ... ... | | 5 | 54 |
| Quinine bisulphate ... ... ... ... ... | | 6 | 13 |
| Aspirin tablets ... ... No. 69,600 | | | |
| Quinine tablets ... ... No. 352,200 | | | |
| Camphorated tincture of opium ... ... ... | | 6 | 100 |
| Boric acid ointment ... ... ... ... ... | | 8 | 86 |
| Sulphur ointment ... ... ... ... ... | | 6 | 105 |
| Zinc oxide ointment ... ... ... ... ... | | 10 | 92 |

In addition to the above 1,320,000 tablets of quinine hydrochloride were supplied to the Post Office for sale to the public.

## Table Showing Financial Allocations

*Allocation of Expenditure and Sources of Revenue from the 1st January to the 31st December 1938*

### Details of Expenditure

| *Expenditure:* | Approved Estimates £ | Actual Expenditure £ |
|---|---|---|
| Personal Emoluments ... ... ... ... | 146,385 | 139,465 |
| *Other Charges:* | | |
| Outfit Allowances ... ... ... ... | 150 | 210 |
| Upkeep of Hospitals ... ... ... ... | 6,690 | 8,108 |
| Upkeep of Quarantine and Infectious Diseases Hospitals ... ... ... ... ... | 180 | 180 |
| Tuberculosis Scheme ... ... ... ... | 465 | 390 |
| Upkeep of Laboratory, Dar es Salaam ... | 50 | 106 |
| Upkeep of Lymph Laboratory, Mpwapwa ... | 60 | 40 |
| Maintenance of Leprosy Patients ... ... | 2,500 | 2,368 |
| Maintenance of Mental Patients and Hospitals | 1,600 | 1,603 |
| Epidemic Outbreaks and Special Sanitary Measures ... ... ... ... ... | 200 | 250 |
| Sleeping Sickness Measures ... ... ... | 2,850 | 2,329 |
| Venereal Diseases and Yaws ... ... | 25 | 24 |
| Maternity and Child Welfare ... ... ... | 1,245 | 1,103 |
| Sanitary Stores and Equipment ... ... | 880 | 899 |
| Food and Purchase of Oxen ... ... ... | 50 | 37 |
| Medical and Surgical Stores ... ... ... | 18,000 | 17,873 |
| Repairs and Replacements of Electrical Equipment ... ... ... ... ... | 60 | 55 |
| Microscopes and Accessories ... ... ... | 210 | 249 |
| Vaccines and Sera ... ... ... ... | 300 | 293 |
| Books of Reference ... ... ... ... | 60 | 55 |
| Periodicals ... ... ... ... ... | 115 | 137 |
| Post-mortem Fees ... ... ... ... | 1,000 | 1,095 |
| Electricity ... ... ... ... ... | 1,350 | 1,456 |
| Travelling Allowances ... ... ... | 690 | 870 |
| Transport Allowances ... ... ... ... | 3,550 | 3,475 |
| Transport ... ... ... ... ... | 2,622 | 2,949 |
| Railway Fares and Freight :— | | |
| (a) Departmental Expenditure ... ... | 6,371 | 6,329 |
| (b) Local Leave ... ... ... ... | 690 | 434 |
| Tents and Camp Equipment ... ... ... | 140 | 163 |
| Uniforms ... ... ... ... ... | 350 | 401 |
| Typewriters ... ... ... ... ... | 125 | 119 |
| Allowances to Medical Officers for Dental work ... ... ... ... ... | 60 | 25 |
| Fees, etc., for Courses of Instruction ... | 575 | 312 |
| Medical Attendance by Private Practitioners | 450 | 488 |
| Pauper Burials ... ... ... ... | 5 | 4 |
| Upkeep of Quarantine Station, Zanzibar ... | 825 | 825 |

## Details of Expenditure—*contd*

| | Approved Estimates | Actual Expenditure |
|---|---|---|
| *Other Charges*—contd : | £ | £ |
| Maintenance and Running of Motor Boats ... | 130 | 80 |
| Maintenance and Running of Motor Vehicles | 990 | 969 |
| Stationery ... ... ... ... ... | 230 | 366 |
| Treatment of Ankylostomiasis ... ... | 25 | — |
| Bicycles ... ... ... ... ... ... | 30 | 38 |
| Medical Training of Native Staff outside the Territory ... ... ... ... ... | 158 | 146 |
| Contingencies ... ... ... ... ... | 100 | 101 |
| Quinine for Public Purchase at Post Offices ... | 2,500 | 2,280 |
| Grants-in-aid ... ... ... ... ... | 1,000 | 550 |
| Total Other Charges ... ... | 59,656 | 59,784 |
| Total Personal Emoluments ... | 146,385 | 139,465 |
| Total Departmental ... | £206,041 | £199,249 |
| *Special Expenditure :* | | |
| Equipment of Travelling Laboratory ... | 285 | 219 |
| Dr Connell's Surgical Text Book ... ... | 60 | 60 |
| Reserve Medical Stores ... ... ... | 4,000 | 3,647 |
| Experiment in Manufacture of Humus from Township Refuse ... ... ... | 96 | 86 |
| Grant-in-aid, Oldeani .... ... ... ... | 250 | 250 |
| Printing of Malaria Research Report ... | — | 50 |
| Purchase of X-ray Mobile Unit ... ... | — | 6 |
| Purchase of Refrigerator ... ... ... | — | 42 |
| Total Medical ... | £210,732 | £203,609 |

## Details of Revenue

| | |
|---|---|
| *Revenue :* | |
| From Hospital Fees, Sale of Drugs, etc. ... ... ... | 9,656 |
| Fees collected by Customs and Marine Departments for Bills of Health ... ... ... ... ... ... ... | 1,083 |
| Sale of Vaccine Lymph, etc. (Laboratory) ... ... ... | 239 |
| Fees for Mechanical Dental work ... ... ... ... | 648 |
| Reimbursement by Tanganyika Railways for Medical Service | 3,000 |
| Total | £14,626 |

## A.—Summary of Expenditure on Provincial Medical Services

| | Eastern | Central | Lake | Southern | Southern Highlands | Tanga | Western | Northern | Total |
|---|---|---|---|---|---|---|---|---|---|
| Population (1931 Census) ... ... ... | 619,191 | 579,712 | 1,390,600 | 543,413 | 491,911 | 355,914 | 697,692 | 344,198 | 5,022,640 |
| Hospital beds (as shown in Blue Book) ... | 560 | 229 | 418 | 223 | 212 | 303 | 301 | 213 | 2,459 |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| Medical, Nursing and subordinate personnel | 25,857 | 5,026 | 14,881 | 6,160 | 10,945 | 11,619 | 13,408 | 11,641 | 99,537 |
| Upkeep of institutions, stores and equipment ... ... ... ... | 6,630 | 1,477 | 4,191 | 2,481 | 2,646 | 3,946 | 2,720 | 4,050 | 28,141 |
| Transport, freight and travelling ... ... | 1,813 | 637 | 1,966 | 676 | 1,673 | 1,666 | 1,967 | 1,358 | 11,756 |
| Total departmental ... ... ... ... | 34,300 | 7,140 | 21,038 | 9,317 | 15,264 | 17,231 | 18,095 | 17,049 | 139,434 |
| Total by Native Treasuries... ... ... | 1,956 | 1,413 | 6,670 | 725 | 2,318 | 1,180 | 1,774 | 1,362 | 17,398 |
| Total departmental and Native Treasuries | 36,256 | 8,553 | 27,708 | 10,042 | 17,582 | 18,411 | 19,869 | 18,411 | 156,832 |

## B.—Summary of Expenditure on Non-Provincial Medical Services

| | Headquarters | Laboratory | | Dental | Territorial | Sleeping Sickness | Unallocable | Total |
|---|---|---|---|---|---|---|---|---|
| | | Routine | Research | | | | | |
| | £ | £ | £ | £ | £ | £ | £ | £ |
| Personnel ... ... ... ... ... ... ... | 8,918 | 4,116 | 2,355 | 2,295 | 5,609 | 5,763 | 15,840 | 44,896 |
| Upkeep, Stores, etc. ... ... ... ... ... | 120 | 479 | 4,483 | 147 | 6,950 | 2,495 | 8,838 | 19,177 |
| Transport, freight and travelling ... ... ... | 318 | 271 | 148 | 279 | 1,146 | 590 | — | 7,087 |
| Total ... | 9,356 | 4,866 | 6,986 | 2,721 | 13,705 | 8,848 | 24,678 | 71,160 |

*Total of Summaries*

| | | |
|---|---|---|
| Provincial Medical Services ... ... ... ... ... | £139,434 |
| Non-Provincial Medical Services ... ... ... ... ... | £ 71,160* |
| Total ... | £210,594 |

*Includes £6,986 Colonial Development Fund expenditure.

| | Consolidated Summary (Excluding Native Treasury Expenditure) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Eastern | Central | Lake | Southern | Southern Highlands | Tanga | Western | Northern | Total Territorial |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| 1. Provincial expenditure as above ... | 34,300 | 7,146 | 21,038 | 9,317 | 15,264 | 17,231 | 18,095 | 17,049 | 139,434 |
| 2. Add proportion of Non-Provincial expenditure † ... ... ... ... | 7,403 | 8,667 | 18,539 | 8,050 | 6,170 | 4,319 | 13,693 | 4,319 | 71,160 |
| 3. Total ... ... ... ... ... | 41,703 | 15,807 | 39,577 | 17,367 | 21,434 | 21,550 | 31,788 | 21,368 | 210,594 |
| 4. Average expenditure per head of population ... ... ... ... | Shs 1·34 | Sh 0·54 | Sh 0·57 | Sh 0·64 | Sh 0·87 | Sh 1·21 | Sh 0·91 | Sh 1·24 | Sh 0·83 |
| 5. Average expenditure per bed ... ... | Sh 1,489·39 | 1,380·52 | 1,893·64 | 1,557·58 | 2,022·08 | 1,422·44 | 2,112·16 | 2,006·38 | 1,712·84 |

†Based on population except for sleeping sickness expenditure which is correctly allocated.

## II.—THE STATE OF THE PUBLIC HEALTH

### 1.—Attendance at Hospitals

I referred in the report for 1936 (at page 28) to a method of estimating the comparative output of work from different hospitals which was under examination from the statistical aspect by Dr R. Mackay, Malaria Research Officer. Further examination of the method has shown that an index obtained by adding the number of new out-patients and in-patients and dividing the total by the figure of 312, representing an average number of working days, provides a figure of significance. This index can be used for comparing the volume of work done at individual hospitals, in provinces, or in the Territory as a whole from year to year.

It has the advantage of taking account both of in-patient work, which is not subject to very wide fluctuations, and out-patient work which varies very considerably at the same station, especially when a change of personnel to whom the local public have become accustomed takes place.

An increased output during the year is again recorded.

In the table below are given the number of patients treated and deaths recorded at the general hospitals during the last five years. These do not include patients treated at maternity clinics, infectious diseases hospitals, sleeping sickness treatment centres or dispensaries in charge of Africans.

| Year | Number of hospital | Total patients treated in hospitals | Deaths in hospitals | Estimated population (Blue Book) | Percentage of general population treated | Output-index (Total patients÷ hospital days |
|---|---|---|---|---|---|---|
| 1934 | 54 | 582,248 | 1,506 | 4,988,338 | 11·7 | 34·559 |
| 1935 | 54 | 597,327 | 1,537 | 5,096,178 | 11·7 | 35·454 |
| 1936 | 54 | 636,193 | 1,504 | 5,105,805 | 12·5 | 37·761 |
| 1937 | 54 | 664,668 | 2,152 | 5,182,515 | 12·8 | 39·416 |
| 1938 | 54 | 683,719 | 2,051 | 5,260,484 | 13·0 | 40·052 |

The output index for the Territory is calculated by dividing the total new in- and out-patients by the product of 312 working days and the number of hospitals for each year.

The highest output of work at an individual hospital is recorded at the Sewa Hadji Hospital, Dar es Salaam, where a daily average of over 121 new out-patients and 12·9 new in-patients were treated during the year. The new out-patients treated at Moshi average 152 daily.

### 2.—Attendance at Tribal Dispensaries

The cases treated during the year at the 285 tribal dispensaries numbered 789,915, an increase of 215,928 over the figures for 1937. The eighty-six dispensaries in the Lake province account for over 313,000 of the total cases treated and the increase may be attributed to the improved standard of training and efficiency of the recently trained medical auxiliaries. Figures for the last five years are as follows:—

| | |
|---|---|
| 1934 ... ... ... ... ... | 451,520 |
| 1935 ... ... ... ... ... | 461,097 |
| 1936 ... ... ... ... ... | 529,954 |
| 1937 ... ... ... ... ... | 573,987 |
| 1938 ... ... ... ... ... | 789,915 |

Twenty-one new dispensaries were opened in the Eastern, Southern Highlands, Lake, Northern, Tanga and Western provinces, but owing to closure of an equivalent number the total (285) remained the same; their distribution is given in table "D" and at page 17. These dispensaries are maintained by the native authorities and provision has been made for the opening of twenty more in the various provinces during 1939.

### 3.—Maternity and Child Welfare

An increase in the number of confinements took place during the year at the twelve special clinics where maternity and child welfare work is carried on by government and missionary societies. Some of those maintained by the Church Missionary Society and the Africa Inland Mission receive financial assistance for the work from the Government or from the native administration. During the year the European health visitor hitherto stationed at Kahama was transferred to Tabora, where a new scheme of domiciliary midwifery was inaugurated by the Sleeping Sickness Officer under her supervision, with the assistance of six native women. Under this arrangement which is new to the Territory and which was started under the enthusiastic guidance of Dr Fairbairn in July, forty-three confinement cases were attended. Twenty-one were delivered at home and five difficult cases sent to hospital; ante- and post-natal clinics are conducted at the centre with home visiting. A gynaecological clinic is conducted at the native hospital.

The figures for the clinics are as follows :—

| | 1934 | 1935 | 1936 | 1937 | 1938 |
|---|---|---|---|---|---|
| Total number of confinements admitted to clinics... ... | 3,809 | 3,396 | 3,614 | 3,800 | 4,927 |
| Total number of confinements attended to elsewhere ... | 33 | 8 | 2 | — | 43 |
| Total number of new cases (in- and out-patients) seen at clinics: Mothers ... | 28,554 | 27,365 | 30,689 | 28,813 | 28,525 |
| Children ... | 41,163 | 40,820 | 38,648 | 49,138 | 43,432 |
| Total number of attendances at clinics: Mothers ... | 269,254 | 204,008 | 177,432 | 201,136 | 203,163 |
| Children ... | 395,648 | 306,537 | 294,174 | 296,815 | 264,281 |

*Distribution of Confinements admitted to Government and Assisted Clinics*

| Central (Church Missionary) Society | | Eastern (Govt) | Lake (Africa Inland) Mission | Tanga (Govt) | Western (Govt) | |
|---|---|---|---|---|---|---|
| Berega... ... | 194 | Dar es | Shinyanga | Tanga | 116 | Kahama 437 |
| Buigiri... ... | 243 | Salaam 103 | 1,701 | | | Nzega 485 |
| Kilimatinde ... | 365 | | | | | |
| Kongwa ... | 149 | | | | | |
| Mpwapwa ... | 321 | | | | | |
| Mvumi ... | 813 | | | | | |
| | 2,085 | 103 | 1,701 | | 116 | 922 |

Total 4,927

## 4.—Mental Hospitals

Dodoma mental hospital was administered by a senior medical officer assisted by a trained European mental hospital superintendent and his wife (also trained). It has accommodation for seventy-one African and six Asian males and for forty-six females. During the year three new rooms were added to the Asian block and two shower baths, one in the male and one in the female section, have been installed. Six water-closets, four in the male and two in the female sides were also constructed. The accommodation on the male side is not equal to the demand, as many instances have occurred where it has not been possible to accept patients for admission through want of accommodation, and further expansion will have to be undertaken as soon as circumstances permit. Separate isolation blocks are also required for treatment of infectious cases both on female and male sides.

Except for a severe outbreak of acute enteritis which broke out amongst the patients during the latter part of December and which accounted for six deaths the general health of the patients throughout the year has been satisfactory.

At Lutindi which serves the Tanga and Northern provinces a portion of the forest in the vicinity of the mental hospital was cut down and seven thousand cinchona trees were planted. No other improvements or alterations have been made to the hospital, but proposals for new accommodation which is sadly needed have been made. This institution which accommodates over one hundred patients is efficiently conducted by an experienced German mental superintendent and his wife under the supervision of the medical officer of the Bethel Mission at Bumbuli.

*Statement of Patients in Mental Institutions*

| | Dodoma | | | Lutindi | | | Prison lunatic asylums | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Males | | Females | | Total | |
| | M. | F. | Total | M. | F. | Total | Civil | Criminal | Civil | Criminal | Civil | Criminal |
| In-patients, 1st Jan. 1938 | 70 | 36 | 106 | 63 | 41 | 104 | 11 | 16 | 1 | — | 12 | 16 |
| Admitted during the year | 38 | 16 | 53 | 46 | 4 | 50 | 129 | 25 | 18 | 5 | 147 | 30 |
| Discharged during the year | 16 | 6 | 22 | 7 | 1 | 8 | 95 | 7 | 10 | — | 105 | 7 |
| Escaped ... ... | 1 | — | 1 | — | — | — | — | — | — | — | — | — |
| Transferred to mental hospitals | — | — | — | — | — | — | 36 | 27 | 9 | 5 | 45 | 32 |
| Died during the year ... | 25 | 11 | 36 | 13 | 8 | 21 | 3 | 1 | — | — | 3 | 1 |
| In-patients, 31st December 1938 | 66 | 34 | 100 | 89 | 36 | 125 | 6 | 6 | — | — | 6 | 6 |

The number of mental patients accommodated in prisons is thus greatly reduced; but we must aim at complete elimination by the expansion of accommodation at the mental hospitals.

Owing to the recurring difficulties we experience from time to time in accommodating non-native patients of the better class approval has been given for the construction during 1939 of a special block containing two self-contained sets of rooms outside the main compound of Dodoma mental hospital.

*Classification of Admissions*

| | | Dodoma | Lutindi |
|---|---|---|---|
| I | Mania | 12 | 15 |
| | Melancholia | 6 | 2 |
| II | Paranoia | — | 1 |
| | Delusional insanity | 7 | 9 |
| III | Dementia praecox | 2 | — |
| IV | Confusional insanity | 6 | 7 |
| V | Epilepsy | 5 | 5 |
| VI | Dementia | 8 | 4 |
| VII | Paralysis | — | 4 |
| Mental defectives | | 3 | 3 |
| For observation | | 4 | — |
| | Total | 53 | 50 |

*Causes of Deaths of Patients dying in Mental Hospitals*

| Cause of Death | Lutindi M | Lutindi F | Dodoma M | Dodoma F | Total |
|---|---|---|---|---|---|
| Diarrhoea | — | — | 6 | — | 6 |
| Inanition | 1 | 3 | 1 | — | 5 |
| Exhaustion | — | 1 | 4 | — | 5 |
| Pulmonary tuberculosis | — | — | 2 | 1 | 3 |
| Epilepsy | — | — | 2 | 1 | 3 |
| Acute dementia | — | — | 1 | — | 1 |
| Heart failure | 1 | 2 | 3 | 3 | 9 |
| Dysentery, amoebic | — | — | 1 | 3 | 4 |
| Ankylostomiasis | — | — | 1 | 1 | 2 |
| Acute mania | — | — | 1 | — | 1 |
| Chronic dementia | — | — | 2 | — | 2 |
| Broncho pneumonia | — | — | 1 | — | 1 |
| Senile dementia | — | — | — | 2 | 2 |
| Debility | 1 | 1 | — | — | 2 |
| Paralysis | 3 | — | — | — | 3 |
| Phthisis | 3 | — | — | — | 3 |
| Apoplexy | 2 | — | — | — | 2 |
| Malaria | 1 | — | — | — | 1 |
| Senility | 1 | 1 | — | — | 2 |
| Totals | 13 | 8 | 25 | 11 | 57 |

The following inspections of the mental hospitals were made :—

| | Dodoma | Lutindi |
|---|---|---|
| His Excellency the Acting Governor | 1 | — |
| The Director of Medical Services | 2 | — |
| The Deputy Director of Medical Services | 1 | — |
| The Pathologist | 2 | — |
| The Provincial Commissioner, Tanga Province | — | 1 |
| The Board of Visitors | 12 | 2 |
| The Senior Medical Officer, Tanga | — | 3 |
| The Senior Medical Officer, Dodoma | 50 | — |
| The Matron | 1 | — |
| The District Officer, Korogwe | — | 4 |
| The Medical Officer, Bumbuli Mission | — | 11 |

## 5.—Dental Treatment

The Senior Dental Surgeon has for many years pointed out the need for greater attention to the dental condition of the African population and the very limited amount of attention that can be paid to them under existing conditions. Especially is this the case with the women and children. A little work is done at Tanga school but nowhere can we say that we have a school dental clinic; and the large numbers of women who attend the new hospital dental clinic at Dar es Salaam provide some indication of the need for care of the mothers of the next generation whose dietary conditions are changed by residence under urban conditions.

It is unlikely that financial conditions will permit of increasing the dental staff of two dental surgeons and one mechanic but with the advent of greater numbers of private practitioners to relieve the government staff of the obligation to attend the non-government population more time should become available for this work.

The first step towards providing the treatment required by the African general population who cannot afford to pay fees appears to lie in the training of those African medical students who show aptitude for surgical work to carry out extractions in a skilful manner and to provide such treatment for the relief of pain as can be taught in the time available. It is hoped that it will later be possible to send students to the new dental school at Kampala for a full course of instruction in dental surgery as is now available for our students in medicine.

The Senior Dental Surgeon was on duty at Dar es Salaam for the whole year. The treatment carried out for officials and their families is summarized in the table below.

The weekly dental clinic for Africans started during the previous year at the Sewa Hadji hospital has proved very popular and the number of patients attending have increased considerably. Only surgical work is undertaken. During the year 724 Africans were treated at the clinic, a large proportion of whom were women. Some seven hundred local anaesthesia have been given and it was noticed that the commonest tooth requiring extraction was the mandibular third molar.

In addition to these, 234 Africans were seen at the dental surgery for urgent attention such as fillings, mandibular fractures and other special treatments.

At the clinic some of the more advanced African medical students have been instructed in the extraction of teeth, a subject in which with more instruction they could render invaluable service to the public in relieving pain. A memorandum on this subject was submitted to the Chief Medical Adviser during his visit in December.

Mr Tatchell, Dental Surgeon, had his headquarters at Tanga during the whole year. He undertook two safaris during the year, visiting ten stations in the Northern, Southern, Western, Lake, Central and Southern Highlands provinces. The treatment given is summarized below.

The government school children at Tanga were also inspected and treated, the bulk of the treatment being extractions. The institution of a school clinic at Tanga is recommended.

*Summary of Dental Treatment*

| | European | | Asian | | African | | |
|---|---|---|---|---|---|---|---|
| | Dsm. | Tanga | Dsm. | Tanga | Dsm. | Tanga | Total |
| Attendances ... | 1,840 | 573 | 610 | 153 | 958 | 339 | 4,475 |
| Fillings ... | 872 | 292 | 102 | 49 | — | 53 | 1,368 |
| Extractions ... | 297 | 93 | 388 | 122 | — | 177 | 1,077 |
| Pulp treatment ... | 43 | 1 | 1 | 4 | — | — | 49 |
| Gum treatment ... | 298 | 85 | 57 | 29 | — | 12 | 481 |
| Radiograms ... | 316 | 81 | * | 10 | — | 6 | 413 |
| Dentures ... | 114 | 6 | * | 5 | — | — | 125 |
| Denture repairs ... | 96 | 10 | * | — | — | — | 106 |

*Included with European

## 6.—Radiography and Electro-therapy

The demand for radiographic assistance in diagnosis by both staff and public is insistent and increasing; and an account of the facilities available is here given for the first time. The department is indebted to Mr J. E. Brunnen, Electrical Engineer to the Government, for uncounted hours of spare time devoted to the improvement of this service during many years, and to him we owe the great proportion of the results achieved. During Mr Brunnen's absence from Dar es Salaam, Mr A. S. Gibson of the Tanganyika Police carries out the radiographic work and his unstinting assistance in this often onerous duty is also gratefully acknowledged.

Electro-therapy in the absence of a radiologist on the staff is confined to diathermy and radiant heat. Occasional cases have received X-ray treatment in the past but this has now been discontinued.

*Existing plant:* (a) *Diagnostic X-ray sets.*—At Dar es Salaam European hospital a single-valve rectified unit; at Tanga, Tabora and Mwanza mobile unrectified units; and at Moshi and Kibongoto there are portable units of the unrectified type designed for field use for which the current is generated from the backwheel of a motor car. A further mobile unit removed from Tanga hospital is in course of installation at Moshi. Of these, the sets at Dar es Salaam, Tanga, Moshi and Kibongoto are modern units with shock-proofed tubes but those at Tabora, Mwanza and the mobile unit for Moshi are not shock-proofed, are of a very limited capacity and are over ten years old. Ritter dental units are in use at the dental surgeries at Dar es Salaam and Tanga and have given excellent service for fourteen and twelve years respectively. The Geita Gold Mining Company have installed a modern set at their Saragura mine in west Mwanza.

(b) A small unit for diathermic treatment is available in Dar es Salaam. It has a very low output and is not used for surgical work.

(c) A radiant heat bath for irradiation with infra-red rays is available in Dar es Salaam.

*Examinations.*—Records of examinations at other stations have not been separately reported, but the following figures show the increase in the number of skiagrams taken in Dar es Salaam during the past few years:—

| | |
|---|---|
| 1928 | between 250 and 300 skiagrams. |
| 1935 ... ... ... ... ... | 661 skiagrams |
| 1936 ... ... ... ... ... | 694 ,, |
| 1937 ... ... ... ... ... | 906 ,, |
| *1938 ... ... ... ... ... | 820 ,, |

*This figure is low on account of the absence of the radiographer on vacation leave and the fact that the officer acting for him was off duty sick for nearly two months. There is every reason to believe that a corresponding increase has been taking place at other stations.

The examinations in 1938 were of the following natures :—

| | |
|---|---|
| (a) Fractures and suspected fractures ... ... ... | 556 |
| (b) Ante-natal examinations ... ... ... ... | 24 |
| (c) Examinations involving differentiators for the alimentary tract, pyelography and cholecystography | 36 |
| (d) Tuberculosis examinations ... ... ... ... | 204 |

*Additional plant required.*—There is a need for increased radiographic facilities at various stations and the question of providing electro-therapeutic treatment will have to be faced before long, though that entails the appointment of a medical radiologist in view of the risks involved.

The development of underground mining with its added accident hazards emphasizes the need for diagnostic plant at Chunya and Musoma; three of the existing plants at Tabora, Mwanza and Moshi need replacement by modern and safer apparatus; portable units for the native hospitals at Dar es Salaam and Tanga are required to avoid the transport of native patients over considerable distances to the European hospitals at those stations; and Kibongoto tuberculosis hospital requires a larger set for use in connection with the surgical treatment of infected lungs which is developing so satisfactorily at that hospital.

On grounds of distance from other places where facilities are available Lindi, Iringa, Arusha and Bukoba will also require diagnostic sets.

## 7.—General Diseases

As in the previous year the greatest number of general diseases treated (106,585) was in the group of those of the skin, cellular tissue, bones and organs of locomotion : these amounted to 15·59 per cent of the total cases treated. Diseases of the digestive system accounted for 15·40 per cent of cases treated and diseases of the respiratory system for 11·74 per cent.

Deaths from diseases of the respiratory system amounted to 19·09 per cent of the total deaths and of the digestive system 12·22 per cent. Edge's classification of the diseases has again been followed.

## 8.—Infectious Diseases

Infectious diseases accounted for 38·40 per cent of the total cases and 36·86 per cent of the total deaths among patients treated in government hospitals and dispensaries as against 38·05 and 39·22 per cent in 1937. The following table shows the incidence of dangerous infectious diseases since 1934. The figures in the table include cases treated in the districts.

| Year | Smallpox | | Cerebro-spinal Meningitis | | Plague | | Influenza | | Diphtheria | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| 1934 ... ... ... | 411 | 37 | 55 | 13 | — | — | 2,600 | 491 | — | — |
| 1935 ... ... ... | 503 | 4 | 153 | 66 | 1 | 1 | 2,819 | 82 | — | — |
| 1936 ... ... ... | 1,649 | 50 | 179 | 114 | 16 | 9 | — | — | 6 | 2 |
| 1937 ... ... ... | 1,462 | 17 | 269 | 125 | 135 | 66 | — | — | 2* | 1 |
| 1938 ... ... ... | 1,095 | 27 | 218 | 82 | — | — | — | — | — | — |

*Treated at the Infectious Diseases Hospital.

## (1) *Blood Inoculation Group*

*Malaria.*—During the year 55,636 cases were treated of which 33,663 were sub-tertian. The figures include cases in which the diagnosis was not microscopically confirmed. The greatest number of cases treated in one hospital (9,272) was at Moshi and the highest relative numbers were at Dar es Salaam and Usangi. A total of eighty-two deaths were recorded as against one hundred and two in 1937.

Final reports on both the survey units financed under the Colonial Development Fund were issued.* Progress has been made, according to plan, with the anti-malarial drainage work at Dar es Salaam, for which funds amounting to £27,000 were provided from the Colonial Development Fund to implement the findings of Dr Mackay's survey. Control by entomological and parasitological methods is being maintained to test the efficacy of the major works in reducing anopheline infestation.

Works on a small scale have also been undertaken at Moshi, and in the vicinity of a group of estates in the Northern province, to implement the recommendations of Dr D. B. Wilson.

Preliminary surveys with a view to further control works were undertaken at other centres of population notably Mwanza, Geita, Bukoba and Dodoma and measures of control at these centres have been suggested. Detailed estimates for control works have been prepared by the anti-malarial engineer for the towns of Mwanza, Korogwe and Iringa; and preliminary estimates, subject to further examination, for works at Tabora, Morogoro, Bukoba and Moshi.

*Blackwater Fever.*—Fifty-two cases with twelve deaths were reported as against fifty-one cases and eighteen deaths in 1937. Seven cases with three deaths occurred at Moshi, six cases with no deaths at Dodoma and five cases with one death at Mwanza.

*African Relapsing Fever.*—One thousand six hundred and forty-four cases with thirteen deaths were reported. The greatest number treated at a single hospital was two hundred and thirty-four at Kigoma and the highest relative numbers were at Tabora and Biharamulo.

*Plague.*—Three suspected cases were reported from a rural district ten miles from Mbulu in the Northern province; sporadic cases occur in this area from time to time. Contacts were inoculated and the patient's house destroyed by fire. The notification of these cases was omitted from the weekly bulletin of infectious diseases as being unconfirmed. Subsequent information leaves no reason to doubt the diagnosis.

*Trypanosomiasis.*—The numbers of cases recorded are as follows:—

| Province | New Cases Diagnosed | | | | | Deaths | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1934 | 1935 | 1936 | 1937 | 1938 | 1934 | 1935 | 1936 | 1937 | 1938 |
| Central ... | 12 | 17 | 8 | 6 | 9 | 9 | 6 | 1 | 9 | 6 |
| Eastern ... | 1 | — | 2 | — | 1 | — | — | — | — | — |
| Lake ... | 381 | 321 | 139 | 51 | 54 | 102 | 92 | 97 | 49 | 20 |
| Southern... | 3 | 4 | 103 | 75 | 79 | 4 | — | 61 | 26 | 42 |
| Western ... | 1,078 | 733 | 284 | 168 | 266 | 282 | 244 | 225 | 244 | 285 |

*Mackay, R., Second (Final) Report of the Malaria Unit, Dar es Salaam, for the period November 1934 to December 1936. Government Printer, Dar es Salaam, Shs 5/-. Wilson D. B., Report of the Malaria Unit, Moshi, 1936. Government Printer, Dar es Salaam, Shs 5/-.

An increase of ninety-eight cases in the Western province has occurred, with an increase of forty-one deaths in the same province. This is attributed to infections acquired by natives leaving their homes. The failure of crops contributed largely to this dispersion to the infected areas for fishing and honey and beeswax, for which 1938 was a good season. The satisfactory previous downward trend has thus received a check; though the number of cases diagnosed in the Western province in 1937 was abnormally low.

It will be seen that the death rate remains high, while the number of new cases diagnosed is tending to fall.

This delayed death rate is due to treatment, which, while not curative, keeps patients alive for several years. At the beginning of an epidemic advanced cases usually come to hospitals for treatment, and with treatment such patients may not die until two, three or more years later. As propaganda becomes effective, patients come for treatment earlier, with a corresponding decrease in the death rate.

This decrease in the number of deaths has already occurred in the Lake province, and it is expected that the Western province figures will soon show a corresponding decrease when once all the incurable cases diagnosed in the years 1931 to 1935 have died.

The small outbreak in the thinly-populated area in the northern part of the Southern province (Liwale district) appears to be under control, though it is necessary to maintain a continuous watch for sporadic cases and there remains the ever present danger of small localized outbreaks.

The disease, considering the large and thinly-populated area involved, may be said to be as fully under control as is practicable with the present resources, but the liability to infection on returning to the bush and infected riverine areas for fishing and honey collecting is not likely to be reduced until animal reservoirs of trypanosomes are diminished or exterminated.

The deficient rainfall necessitated the provision of government assistance in the shape of food to the Bugomba and Uyowa concentrations in the Western province which have not been long enough established to have accumulated reserves of food supplies.

The staff of seven agricultural surveyors, who work under the general direction of the Sleeping Sickness Officer whose headquarters are at Tabora, has continued the consolidation of the concentrations of population in fly-free clearings in the Western and Lake provinces, and has assisted with anti-tsetse clearing work at Singida and in supervising control measures undertaken to deal with the recrudescence of the disease in the Liwale district of the Southern province.

In 1937 the concentration of the people in the Kibondo and Kasulu areas of northern Kigoma in the Western province was completed; similarly in the Kahama district the last of the people are now out of fly bush and settled in clean areas; and the establishment of a new concentration for the Uyowa tribal area in Tabora left natives of that district living scattered in fly bush only in the extreme west, where there is no evidence of the people being infected with sleeping sickness.

Work in 1938 in the concentration areas consisted in the more thorough clearing and extension of existing concentrations.

A brief record of the results of Dr Corson's research work at Tinde is given at page 66.

### (2) *Intestinal and Excremental Group*

*The Enteric group.*—One hundred and thirty-six cases of enteric fever with thirty-five deaths and twenty-one cases of paratyphoid fever with four deaths were reported during the year. The greatest number of enteric cases occurred at Tanga (twenty-four cases with eleven deaths), Chunya (twenty-three cases with ten deaths), Morogoro (twenty-two cases with three deaths).

*Dysentery.*—During the year 1,880 cases, of which 743 were amoebic, 173 bacillary, and 964 unspecified, were treated and forty-four deaths were recorded. The comparative figures for 1937 are 1,918 cases, 783 amoebic, 185 bacillary and 950 unspecified. The highest number of cases were reported from Dodoma where 265 cases of amoebic dysentery were treated.

### *Helminthic Diseases*

*Ankylostomiasis.*—For the third year in succession Kigoma heads the number of cases treated at one single hospital with 2,519. This is to be attributed to the large numbers of labourers who undergo medical examination at this station before proceeding to estates to work. The grand total treated for the year was 15,458. The highest relative numbers were at Mwanza and Tanga where 1,183 and 1,081 cases respectively were treated.

*Schistosomiasis.*—Of 4,258 cases treated 1,031 were at Mwanza, 420 at Shanwa, 312 at Dar es Salaam and 283 at Tabora.

Dr Alan Mozley, Wandsworth Scholar of the London School of Hygiene and Tropical Medicine, completed his biological study of the fresh water mollusca and their relation to human schistosomiasis. His conclusions, intimated verbally before his departure, incriminate *Biomphalaria* (*planorbis*) *pfeifferi* as the intermediate host of *Schistosoma mansoni* and probably *Physopsis globosa* as that of *S. haematobium*; their distribution has been surveyed and methods of control examined. There are grounds for hoping that practical methods of control will be evolved at reasonable cost.

*Taeniasis.*—Of 23,725 cases treated 5,338 were at Moshi, and the highest relative numbers were at Kibongoto and Iringa.

*Ascariasis.*—Of 23,283 cases treated, 9,607 were at Moshi, and the highest relative numbers were at Kibongoto and Usangi.

### (3) *Surface Inoculation, Contact and Droplet Infection Group*

*Gonorrhoea.*—Eleven thousand eight hundred and forty-five cases with three deaths were recorded. The highest numbers treated at single hospitals were 2,023 at Bukoba, 803 at Moshi and 758 at Dar es Salaam.

*Syphilis.*—Twenty-four thousand and fourteen cases of all types were treated and nineteen deaths were recorded. The greatest numbers treated were 2,492 at Bukoba, 2,234 at Mbulu and 2,279 at Nzega.

*Yaws.*—Seventy-three thousand five hundred and seventeen cases with seven deaths were recorded in government institutions. the greatest number treated at a single hospital was 12,047 at Kasulu and the highest relative numbers elsewhere were at Dar es Salaam (8,367) and Lindi (5,195). A special campaign was conducted during the year in the Kibondo area of Uha in the Western province where a total of 22,365 cases were treated. The total cases of syphilis and yaws treated at government institutions, dispensaries in charge

of African dispensers and at missions to which assistance in the form of forms and drugs is given by the Government are as shown below :—

| | Syphilis | Yaws |
|---|---|---|
| 1934 ... ... ... | 33,701 ... | 117,884 |
| 1935 ... ... ... | 34,581 ... | 104,611 |
| 1936 ... ... ... | 39,503 ... | 101,179 |
| 1937 ... ... ... | 31,348 ... | 110,819 |
| 1938 ... ... ... | 29,669 ... | 132,469 |

*Smallpox.*—The atypical smallpox in the Southern province continued throughout the year but with a reduction of 372 in the total number of cases. There were 1,090 cases recorded with twenty-seven deaths. Five non-fatal cases occurred elsewhere in the Territory. Vaccination is being continued in the Southern province.

*Cerebro-spinal Fever.*—The number of cases reported showed a decrease from 1937, from 269 with 125 deaths to 218 with 82 deaths. Cases occurred in all provinces except the Southern, as is shown in the following table :—

| Province | Cases | Deaths |
|---|---|---|
| Central ... ... ... ... | 48 ... | 19 |
| Tanga ... ... ... ... | 77 ... | 22 |
| Northern ... ... ... ... | 36 ... | 21 |
| Eastern ... ... ... ... | 39 ... | 8 |
| Southern Highlands ... ... | 3 ... | 2 |
| Lake ... ... ... ... | 9 ... | 6 |
| Western ... ... ... ... | 6 ... | 4 |
| Total ... | 218 ... | 82 |

Prompt action is invariably taken to prevent further infection as soon as a case is reported, but it is still thought that migrating labourers are responsible for the sporadic incidence, which is therefore difficult to eradicate. My hope that the peak of the wave of infection which has been rising since 1934 had been reached has not been realized. An increase has again occurred during 1939.

*Tuberculosis.*—The final report by Dr Wilcocks on the tuberculosis research carried out between 1930 and 1937 and at a cost of £12,650 provided from the Colonial Development Fund was published.* It has shown the high incidence of infection throughout the areas examined, and particularly in the areas of dense population. A high disease rate is associated with a high positive tuberculin rate; the tuberculin rates thus provide a good index both of infection and actual disease. Contact with sputum positive cases is the most important factor in the spread. This is closest in families, and outside families varies with the density of the population. Living tubercle bacilli were present in the dry dust of the houses of sputum positive cases. Climate has the indirect effect of increasing close contact by inducing settlement on productive land.

Bovine tuberculosis is not at present a factor in the spread of human disease.

*Wilcocks, C., Tuberculosis in Tanganyika Territory. Government Printer, Dar es Salaam, Shs 5/-.

## Table showing incidence of Tuberculosis at the various stations in the Territory during 1936, 1937 and 1938

| | 1936 | | | | 1937 | | | | 1938 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pulmonary | | Non-pulmonary | | Pulmonary | | Non-pulmonary | | Pulmonary | | Non-pulmonary | |
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| *Central Province.* | | | | | | | | | | | | |
| Dodoma ... ... | 6 | 4 | 2 | — | 9 | 5 | 2 | 1 | 11 | 5 | 3 | — |
| Kondoa ... ... | 1 | — | — | — | 1 | — | 2 | — | 4 | — | 3 | — |
| Manyoni ... ... | 5 | — | — | — | 6 | — | — | — | 5 | — | 1 | — |
| Mkalama ... ... | 4 | — | 1 | — | 1 | — | — | — | 3 | — | 10 | — |
| Mpwapwa ... ... | 3 | — | — | — | 1 | — | — | — | 2 | — | — | — |
| Singida ... ... | 13 | 1 | 4 | 1 | 6 | 3 | 4 | — | 16 | — | 4 | — |
| Total ... | 32 | 5 | 7 | 1 | 24 | 8 | 8 | 1 | 41 | 5 | 21 | 0 |
| *Eastern Province.* | | | | | | | | | | | | |
| Bagamoyo ... ... | 10 | — | — | — | 7 | 3 | — | — | 8 | 1 | — | — |
| Dar es Salaam: | | | | | | | | | | | | |
| European Hospital | 1 | — | 2 | 1 | 2 | — | — | — | 2 | — | 2 | 1 |
| Sewa Hadji Hospital | 53 | — | 3 | 1 | 43 | 4 | 5 | — | 47 | 1 | 15 | 1 |
| Health Office ... | 50 | — | — | — | 40 | 18 | — | — | 58 | 24 | — | — |
| Private Practitioners | 6 | — | — | — | 9 | — | — | — | 16 | — | — | — |
| Kilosa ... ... | 12 | — | 2 | — | 6 | 3 | 3 | — | 8 | 2 | 3 | 1 |
| Mafia ... ... ... | — | — | — | — | — | — | — | — | 8 | 1 | 5 | — |
| Mahenge ... ... | 12 | — | — | — | 11 | — | 1 | — | 5 | — | 3 | 1 |
| Morogoro ... ... | 17 | 2 | 9 | 2 | 24 | 7 | 6 | 2 | 32 | 8 | — | — |
| Utete ... ... ... | 10 | — | — | — | 8 | — | 1 | — | 13 | 1 | 1 | — |
| Total ... | 171 | 2 | 16 | 4 | 150 | 35 | 16 | 2 | 195 | 38 | 29 | 4 |
| *Lake Province.* | | | | | | | | | | | | |
| Biharamulo ... ... | 13 | 1 | — | — | 10 | 2 | — | — | 9 | 1 | 4 | 2 |
| Bukoba ... ... | 21 | 3 | 4 | — | 25 | 7 | 4 | 1 | 26 | 6 | 9 | 1 |
| Musoma ... ... | 7 | — | 2 | — | 3 | — | 3 | — | 16 | 2 | 8 | — |
| Mwanza ... ... | 19 | 2 | 1 | 1 | 19 | — | 5 | 1 | 24 | 7 | 3 | — |
| Mwanza Health Office | 7 | — | — | — | 17 | — | — | — | 17 | — | — | — |
| Maswa ... ... | — | — | — | — | — | — | — | — | 6 | — | — | — |
| Shanwa ... ... | 3 | — | 1 | — | — | — | — | — | — | — | — | — |
| Shinyanga ... ... | — | — | — | — | 1 | — | — | — | 7 | 1 | — | — |
| Total ... | 70 | 6 | 8 | 1 | 75 | 9 | 12 | 2 | 105 | 17 | 24 | 3 |
| *Northern Province.* | | | | | | | | | | | | |
| Arusha ... ... | 15 | 2 | 19 | 2 | 7 | 2 | 2 | — | 11 | 6 | 1 | — |
| Mbulu ... ... | 11 | 2 | 1 | 1 | 12 | 6 | 17 | 1 | 9 | 3 | 10 | 1 |
| Moshi ... ... | 83 | 4 | 48 | — | 50 | 7 | 50 | 2 | 36 | 7 | 64 | — |
| ,, Kibongoto* ... | 881 | 10 | 775 | — | 1,301 | 6 | 677 | 1 | 737 | 12 | 617 | 5 |
| ,, District Work | 253 | — | 114 | — | — | — | — | — | — | — | — | — |
| Total ... | 1,243 | 18 | 957 | 3 | 1,370 | 21 | 746 | 4 | 793 | 28 | 692 | 6 |
| *Southern Province.* | | | | | | | | | | | | |
| Kilwa ... ... | 1 | — | — | — | 15 | — | 1 | — | 37 | — | — | — |
| Lindi ... ... ... | 11 | — | — | — | 7 | 2 | — | — | 15 | 1 | 1 | 1 |
| Liwale ... ... | 1 | — | 1 | — | — | — | 4 | — | — | — | — | — |
| Mikindani ... ... | 10 | 1 | — | — | 13 | — | — | — | 13 | 1 | 1 | — |
| Songea ... ... | 2 | 2 | 4 | 1 | 4 | 1 | 3 | 1 | 5 | — | 3 | — |
| Tunduru ... ... | 2 | — | — | — | — | — | 8 | — | 5 | 1 | 41 | — |
| Total ... | 27 | 3 | 5 | 1 | 39 | 3 | 16 | 1 | 75 | 3 | 46 | 1 |

*Including district work in the figures for 1937 and 1938. These figures include both new cases and re-attendance of cases previously diagnosed. New cases seen were: Pulmonary 146; Non-pulmonary 52.

## Table showing incidence of Tuberculosis at the various stations in the Territory during 1936, 1937 and 1938—*contd*

| | 1936 | | | | 1937 | | | | 1938 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pulmonary | | Non-pulmonary | | Pulmonary | | Non-pulmonary | | Pulmonary | | Non-pulmonary | |
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| *Southern Highlands.* | | | | | | | | | | | | |
| Chunya ... ... | — | — | 4 | 1 | — | — | 4 | 1 | 2 | 1 | 2 | 1 |
| Iringa ... ... | 6 | 1 | 3 | — | 8 | 4 | 2 | — | 5 | 2 | — | — |
| Malangali ... ... | 2 | — | 1 | — | 1 | — | 1 | — | 1 | — | — | — |
| Mbeya ... ... | 13 | — | 1 | — | 11 | 1 | 1 | — | 10 | — | 1 | — |
| Njombe ... ... | — | — | — | — | 1 | — | — | — | 1 | 1 | 2 | — |
| Tukuyu ... ... | 10 | — | 10 | 2 | 11 | 1 | 3 | — | 15 | — | 4 | — |
| Total ... | 31 | 1 | 19 | 3 | 32 | 6 | 11 | 1 | 34 | 4 | 9 | 1 |
| *Tanga Province.* | | | | | | | | | | | | |
| Korogwe ... ... | 12 | — | 6 | — | 16 | — | 2 | — | 23 | 1 | 2 | 1 |
| Lushoto ... ... | 4 | 1 | 2 | — | 9 | 2 | 2 | — | 7 | 2 | — | — |
| Pangani ... ... | 14 | 3 | — | — | 7 | — | — | — | 18 | — | — | — |
| Tanga ... ... | 102 | 16 | 10 | 2 | 158 | 23 | 18 | 2 | 178 | 27 | 13 | 3 |
| Tanga Health Office | 33 | 18 | — | — | 74 | 41 | — | — | 49 | — | — | — |
| Usangi ... ... | 157 | — | 63 | — | 112 | — | 111 | — | 16 | — | 146 | — |
| Total ... | 322 | 38 | 81 | 2 | 376 | 66 | 133 | 2 | 291 | 30 | 161 | 4 |
| *Western Province.* | | | | | | | | | | | | |
| Kahama ... ... | 6 | 1 | — | — | 5 | — | — | — | 11 | 2 | — | — |
| Kasulu ... ... | 2 | — | 1 | — | 1 | 1 | — | — | 2 | — | — | — |
| Kibondo ... ... | 7 | 2 | 5 | 1 | 7 | — | 3 | 1 | — | — | — | — |
| Kigoma ... ... | 4 | 2 | 4 | 1 | 4 | 2 | — | — | 12 | 1 | 4 | — |
| Nzega ... ... | 3 | 2 | 1 | — | 5 | — | — | — | — | — | — | — |
| Sumbawanga ... | 1 | 1 | 3 | — | 1 | — | — | — | 3 | — | 1 | — |
| Tabora ... ... | 15 | 3 | 3 | 1 | 20 | 1 | 2 | — | 27 | 2 | 9 | — |
| Total ... | 38 | 11 | 17 | 3 | 43 | 4 | 5 | 1 | 55 | 5 | 14 | 0 |
| Territorial Total | 1,934 | 84 | 1,110 | 18 | 2,109 | 152 | 947 | 14 | 1,589 | 130 | 996 | 19 |

## Summary of Tuberculosis reported, by provinces

| Province | Pulmonary | | | | | | Non-pulmonary | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1936 | | 1937 | | 1938 | | 1936 | | 1937 | | 1938 | |
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| Central ... ... | 32 | 5 | 24 | 8 | 41 | 5 | 7 | 1 | 8 | 1 | 21 | 0 |
| Eastern ... ... | 171 | 2 | 150 | 35 | 195 | 38 | 16 | 4 | 16 | 2 | 29 | 4 |
| Lake ... ... ... | 70 | 6 | 75 | 9 | 105 | 17 | 8 | 1 | 12 | 2 | 24 | 3 |
| Northern ... ... | 1,243 | 18 | 1,370 | 21 | 793 | 28 | 957 | 3 | 746 | 4 | 692 | 6 |
| Southern ... ... | 27 | 3 | 39 | 3 | 75 | 3 | 5 | 1 | 16 | 1 | 46 | 1 |
| ,, Highlands | 31 | 1 | 32 | 6 | 34 | 4 | 19 | 3 | 11 | 1 | 9 | 1 |
| Tanga... ... ... | 322 | 38 | 376 | 66 | 291 | 30 | 81 | 2 | 133 | 2 | 161 | 4 |
| Western ... ... | 38 | 11 | 43 | 4 | 55 | 5 | 17 | 3 | 5 | 1 | 14 | 0 |
| Total ... | 1,934 | 84 | 2,109 | 152 | 1,589 | 130 | 1,110 | 18 | 947 | 14 | 996 | 19 |

Treatment by artificial pneumothorax and other modern procedures holds out great hopes. A small nucleus of agricultural holdings on Papworth principles has been established for arrested cases at Kibongoto tuberculosis hospital on Kilimanjaro where the incidence is highest. Work continued on a somewhat reduced scale at this institution during the absence on leave of Dr Davies, its medical officer for a large part of the year; but it was not possible to complete the village settlement for which funds were provided to bring the number of model small-holdings up to ten.

The total pulmonary cases reported during 1938 show a decrease, but this is attributable to the absence on leave of Dr Davies since the reduction of the Northern province cases accounts for the whole of the gross decrease; other provinces show an increased number with the exception of Tanga. There is a net increase of non-pulmonary cases in spite of a reduction in the Northern province; and this was distributed through all other provinces except the Southern Highlands. It is not known whether this general increase of non-pulmonary cases is a true increase, or is due to more cases coming forward and being diagnosed. It is interesting to note that no non-pulmonary cases were reported from Iringa where infection has latterly been found in cattle.

## 9.—Nutrition and Deficiency Diseases

With a view to implementing the recommendations of the Tanganyika Nutrition Committee whose report* was issued in 1937, an application for assistance from the Colonial Development Fund was submitted to the Secretary of State by the Tanganyika Government at the instance of the Standing Committee for Medical Research in East Africa. This was to provide for the secondment of an administrative officer and his wife, both anthropologists, who had collected much information about African nutrition, to carry out, in collaboration with the government analyst, a field survey and examination of African dietaries as actually consumed in different parts of the Territory. It was planned to last three years and the programme of work was prepared in consultation with Dr B. S. Platt, the research worker appointed by the Medical Research Council in London to coordinate nutritional research in East Africa. Dr Platt visited Tanganyika in August and spent some nine days in making contact with officers of the Medical, Agricultural and Veterinary departments and the East African Agricultural Research Station at Amani, with all of which it is intended that the survey should work in close touch. Dr Platt's wide experience and grasp of our problems and enthusiasm for the work in hand provided a great stimulus for this important enquiry.

Attention was focused during the year on the need for increasing the supply of vitamin A for those groups of the population who appear so far as we can judge to receive an insufficient quantity; this applies especially to institution-fed individuals as in hospitals, schools and prisons, and to estate labourers, for whom there is often difficulty in obtaining adequate supplies of green food-stuffs or milk products.

Enquiry revealed that palm oil, the only vegetable oil containing carotene in appreciable amount, was being produced in good quality and commercial quantity at an estate some thirty miles from Tanga; and that supplies of less satisfactory quality and smaller quantity were available in the Western province at Tabora and in the valley of the Luiche river in the neighbourhood

*Preliminary Survey of the Position in regard to Nutrition amongst the Natives of Tanganyika Territory (1937). Government Printer, Dar es Salaam. Price Sh. 1/50.

of Kigoma, the terminus of the Central Railway on Lake Tanganyika. Here the oil is produced by crude native methods and is mainly consumed locally, though small quantities find their way through native trade channels as far as the coast. The Agricultural Department and the district officer have encouraged the planting of more palms in this area and it is hoped to introduce better methods of preparing the oil. Imported native oil is freely sold in the open market at Kasulu, a centre north-east of Kigoma near the boundary of the Belgian mandated territory of Urundi. The palm also grows on Lake Victoria but in no large quantity and even at Tabora in a comparatively dry climate a former German government plantation of some two hundred and fifty palms produces about three hundred and fifty pounds of oil per annum. The palms were found on the eastern side of Lake Tanganyika by Sir John Kirk in the latter part of the last century and were reported to be found wild near Bukoba as long ago as 1891 (Engler: *Die Pflanzenwelt Ostafrikas*, 1895). Generally speaking, it is only natives of the extreme west of the Territory and particularly those whose tribal origins lie in the Congo, who make regular use of the oil when they can get it.

But at a large and long-established plantation in the Eastern Usambara mountains some thirty miles west of Tanga at about longitude 38°40′E. at an altitude of two thousand three hundred feet where there is a rainfall of seventy-eight inches very different conditions exist. This plantation, which is owned by a European company and under a manager who has served in West Africa, produces in a modern factory some thirty to forty tons of oil per annum. From this estate we have been enabled to secure supplies of good quality oil for use in hospitals and prisons and for employers of labour and we are in close touch with the company in the endeavour to increase the proportion of first grade oil rather than let it go as second grade oil for soap manufacture.

To quote from the first report of the Committee on Nutrition in the Colonial Empire, paragraph 151:—

> "From the point of view of nutrition the qualities of the unbleached red palm oil are unique and in our view the governments of those territories where the soil and climate are suitable for the growth of the oil palm should do all they can to increase its use."

But the value of the oil as a source of vitamin A is very easily reduced by lack of care in collection, resulting in bruising of the nuts and fermentation with liberation of free fatty acids. It is essential to destroy, by steam heat immediately after picking, the enzymes which are responsible for this action. If this principle is neglected the oil is broken down and excess of free fatty acid will be formed of which an amount higher than five per cent makes the oil rancid and unpalatable. Similar lack of care in the preparation of clarified butter and ghee results in rancidity.

Measures to popularize the oil among those concerned with feeding Africans on a large scale have been taken and some initial steps to let the general native population know what a valuable food-stuff it is have been taken by means of articles in the vernacular press. (*Mambo Leo*, August and October 1938.)

The departments of Agriculture and of Veterinary Science and Animal Husbandry are both directly concerned with the subject of animal and human nutrition and their efforts to improve the quality of food-crops, stock and dairy produce deserve the highest praise. Not only do they assist the native to a better and more constant supply of food but they enable him to dispose

of a surplus for cash and thus gradually to raise his mode of living to standards which we believe will directly improve his health.

In connection with the increase of protein in the diet it is unfortunate that the considerable efforts made by the Agricultural Department to grow the soya bean, such a valuable source of vegetable protein, have not met with the success they deserved.

I acknowledge the advice and assistance of their Directors and officers in numerous problems with the greatest gratitude.

It may be of interest here to record the appointment, believed to be the first of its kind in East Africa, of an African graduate of the University of South Africa, as assistant to the government analyst. One of the objects in endeavouring to secure an African candidate for this post was to show the educated African population that a member of the Bantu race could acquire the qualification needed for an appointment in the Service demanding a scientific degree. This appointment will allow of the government analyst undertaking some nutritional and vitamin work which the growing demands for routine chemical analysis have hitherto prevented his undertaking.

### *Deficiency Diseases*

*Scurvy in the Lupa.*—A reduction of scurvy cases reported from the Lupa goldmining area is to be recorded. The number of cases for 1938 is 167 as compared with 383 cases in 1937. The establishment of additional government dispensaries and the campaign for the introduction of citrus fruit juice into the Lupa has doubtless helped to bring this about and with the assistance of the Provincial Administration and the Agricultural Department efforts have been made to cultivate citrus trees, though the very dry conditions which prevail make this a difficult problem. Encouragement has also been given to the trade in dried Lake Rukwa fish for it was realized that sufficient advantage was not being taken of a most valuable and cheap source of protein for the community as a whole.

*Nutritional Diarrhoea.*—The serious situation among labourers in the Morogoro plantation area dealt with in 1937 has not recurred. Conditions among estate labourers on the Central Railway have improved as a result of administrative measures taken to ensure a higher standard of health in the recruits and an increased labour inspectorate. There is no doubt that the cheap bulky diet commonly issued on plantations is unsatisfactory and steps have been taken, including the issue of a pamphlet on scurvy, to endeavour to show employers that low output is partly, indeed greatly attributable to low energy due to unsuitable diet, and that they will benefit by adopting more scientifically balanced dietaries.

An appreciable decrease in the deaths from this cause can be attributed to the greater attention paid to conditions of labour and to native diets in plantation areas. The comparative figures are :—

*Deaths attributed to nutritional diarrhoea*

| | 1937 | 1938 |
|---|---|---|
| Tanga ... ... ... | 38 ... | 29 |
| Morogoro ... ... ... | 82 ... | 11 |
| Total ... | 120 ... | 40 |

## 10.—Health of The King's African Rifles

One death among native troops occurred, and ten invalidings. Units were stationed at Dar es Salaam, Tabora, Masoko (near Tukuyu) and Arusha during the year. The mean effective monthly strength in Dar es Salaam was 309 with a sick rate of ·8 per cent, the figures for the Territory as a whole being 1,022 and ·87 per cent.

## 11.—Health of Prisoners

Although the admissions and daily average sick show a slight increase the death rate shows a small reduction. The sickness and death rates for the last five years are as follows :—

| | Daily average number of prisoners | Daily average on sick list | Admissions to hospital | Number of deaths | Deaths per 1,000 prisoners |
|---|---|---|---|---|---|
| 1934 ... ... ... | 2,725·10 | 85·7 | 1,395 | 50 | 18·34 |
| 1935 ... ... ... | 2,602·30 | 85·0 | 1,514 | 67 | 25·74 |
| 1936 ... ... ... | 2,565·50 | 81·7 | 1,423 | 55 | 21·05 |
| 1937 ... ... ... | 2,523·40 | 80·2 | 1,357 | 54 | 21·00 |
| 1938 ... ... ... | 2,818·30 | 85·9 | 1,363 | 54 | 19·16 |

## 12.—Port Health Work and Administration

Routine port health work was carried out as in previous years. The numbers of steamers, dhows and flying boats given pratique during the year at the different ports are as follows :—

| Stations | Steamers | Dhows | Flying boats |
|---|---|---|---|
| Bagamoyo ... ... ... | 22 | 331 | — |
| Bukoba ... ... ... | 52* | 48 | — |
| Dar es Salaam ... ... | 512 | 1,089 | 219 |
| Kigoma ... ... ... | 227 | 3 | — |
| Kilwa ... ... ... | 37† | 265 | — |
| Lindi ... ... ... | 139 | 98 | 211 |
| Mafia ... ... ... | 44 | 323 | — |
| Mikindani ... ... ... | 78 | 68 | — |
| Musoma ... ... ... | 91 | 192 | — |
| Mwanza ... ... ... | 84 | 1,970 | — |
| Pangani ... ... ... | 89 | 165 | — |
| Tanga ... ... ... | 600 | 522 | — |
| Total ... | 1,975 | 5,074 | 430 |

## 13.—Sanitation

The construction of the main sewerage of Tanga continued; other matters referring to sanitation are mentioned in the extracts from provincial reports at pages 56 to 65.

*In addition 33 steam tugs have also been boarded.

†In addition 337 lighters and 3,458 canoes have also been inspected.

## AEDES INDEX

The table includes information in detail regarding the different parts of Dar es Salaam. Here searches were carried out by trained and experienced staff under regular European supervision and the findings may be accepted with some confidence. The figures for the other towns in the Territory are of less value as the type of searcher and the methods employed vary greatly with local conditions. No records of aedes findings on dhows were kept during 1938.

| | January | February | March | April | May | June | July | August | Sept. | Oct. | Nov. | Dec. | Mean Index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arusha ... ... ... ... ... | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Bukoba ... ... ... ... ... | ·18 | ·17 | ·35 | ·48 | ·83 | 1·3 | 1·29 | ·5 | ·25 | ·39 | ·64 | 1·09 | ·62 |
| Dar es Salaam: | 1 | 1·4 | 1·9 | 1·4 | 1·7 | 2 | 2·9 | 1·7 | 1·6 | 1 | 2·2 | ·7 | 1·62 |
| Area 1.—Masakara and Keko. Population mainly African ... ... ... | – | – | – | – | 1 | 1 | 8·5 | 4·8 | – | – | 6·4 | 1·5 | 1·78 |
| Area 2.—K.A.R. cantonment and Kurasini. Population mainly African ... | 3·5 | 3·8 | 1·8 | ·8 | 2·7 | 2·7 | 3·8 | 1 | 2·5 | 1·3 | 4·7 | – | 2·38 |
| Area 3.—Ilala village and Msimbazi Mission. Population mainly African | ·7 | ·8 | 3·3 | 2 | 1·4 | 1·4 | 4·5 | 1·3 | ·5 | ·9 | 2·6 | ·6 | 1·66 |
| Area 4.—Gerezani-Pugu road-Government School. Population mixed European and African and some Asians ... | 2·5 | 3·6 | 2·6 | 2·4 | – | – | 1·5 | 2 | 5 | – | 2 | 1·5 | 1·92 |
| Area 5.—New native town. Population African ... ... ... ... | – | 1 | ·9 | ·7 | 1·3 | 1·3 | 1 | 3 | 1 | 1 | 1·1 | – | 1·03 |
| Area 6.—Central Area. Population mainly Asian with some Africans ... | – | – | 3 | – | 3·4 | 3·4 | 7 | 2·9 | 4·9 | 3·6 | – | 2 | 2·52 |
| Area 7.—Residential Area. Population Europeans with few Asians ... | – | – | – | 2·6 | 1·4 | 1·4 | – | – | – | – | – | – | ·45 |
| Area 8.—Upanga shamba. Population mainly African—few Asians ... | 2·7 | 8 | 3·2 | 1·3 | 1·9 | 2 | 3·3 | 6 | 3·3 | 2·2 | 2·7 | – | 3·05 |
| Area 9.—Cameron Road. Population mainly African ... ... ... | 4·9 | – | – | 2·3 | 1·6 | 1·7 | – | 3·9 | 2·6 | 8·3 | 3·8 | – | 2·43 |
| Area 10.—Kinondoni and Oyster Bay. Population European and African ... | – | – | – | 1·3 | – | – | 1·5 | – | 7·9 | 3 | – | 1·7 | 1·3 |
| Area 11.—Kivukoni Area. Population African ... ... ... ... | ·4 | ·7 | 1·7 | 1·7 | 8·8 | ·8 | 1·7 | 1 | 1·6 | – | ·7 | ·7 | 1·65 |
| Dodoma ... ... ... ... ... | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Iringa ... ... ... ... ... | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Kigoma ... ... ... ... ... | – | – | – | – | ·1 | – | – | – | – | – | – | – | ·008 |
| ,, on ships ... ... ... ... | – | ·3 | – | – | – | – | – | – | – | – | – | – | ·025 |
| Kilosa ... ... ... ... ... | 15·1 | 25·6 | 12·5 | 10 | 35 | 14·5 | 10·3 | 5·3 | 8·3 | 7·1 | 9·4 | 14·9 | 14 |
| Kilwa ... ... ... ... ... | 5·8 | 4·8 | 5 | 2·5 | 5 | 2·9 | 4·2 | 2·3 | 1·7 | 2·1 | 2·2 | 3·2 | 3·48 |
| Lindi ... ... ... ... ... | 2·18 | 1·64 | 1·55 | 1·41 | 1·84 | 1·51 | 1·4 | 1·77 | 2·46 | 2·41 | 1·72 | 2·27 | 1.85 |

AEDES INDEX—*contd*

| | January | February | March | April | May | June | July | August | Sept. | Oct. | Nov. | Dec. | Mean Index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lindi on ships ... ... ... ... | 6·2 | 6·25 | 9·52 | – | – | – | – | – | – | – | – | – | 1·83 |
| Mikindani ... ... ... ... ... | ·5 | ·52 | 1 | ·83 | ·83 | – | – | ·84 | – | ·77 | ·93 | ·83 | ·59 |
| Morogoro ... ... ... ... ... | ·06 | ·36 | ·58 | 1·79 | 1·2 | ·57 | ·95 | ·26 | ·51 | ·5 | ·5 | ·6 | ·66 |
| Moshi ... ... ... ... ... | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Mwanza ... ... ... ... ... | ·4 | ·5 | 1·3 | ·7 | ·8 | ·2 | – | – | · 3 | ·08 | ·4 | ·2 | ·38 |
| Pangani ... ... ... ... ... | 3·6 | 4·3 | 3·3 | 3·4 | 2·9 | 4·6 | 4·7 | 4·66 | 3·93 | 3·55 | 4·2 | 3·4 | 3·96 |
| Shinyanga ... ... ... ... ... | 5·2 | 1·88 | 2·28 | 1·77 | 2·85 | 2·89 | 1·31 | 1·41 | 1·04 | 1·43 | 1·36 | ·57 | 2·02 |
| Songea ... ... ... ... ... | 42·4 | 23·6 | 2·7 | 7·7 | 4·5 | – | 9·9 | 4·3 | 9·9 | – | 5·3 | 4·6 | 9·58 |
| Sumbawanga ... ... ... ... | ·3 | ·6 | – | – | – | – | – | – | ·39 | 8·94 | 2·4 | – | 1·05 |
| Tabora ... ... ... ... ... | ·77 | 2 | 2·07 | 1·9 | 1·3 | 1·25 | 1·16 | ·87 | ·87 | ·8 | ·98 | 1·73 | 1·31 |
| Tanga ... ... ... ... ... | ·39 | ·47 | ·69 | ·78 | 1·2 | ·71 | ·91 | ·92 | 1·03 | ·8 | ·82 | ·94 | ·81 |
| „ on dhows ... ... ... ... | 11·7 | 8 | 8·8 | 6 | 13·7 | 6·2 | 18·1 | 8·5 | 6·6 | 16·2 | 7·1 | 8 | 9·91 |

The Aedes incidence in the towns is still far from satisfactory; but the lack of sufficient inspecting staff to effect sufficiently tight control of domestic breeding in our large native towns to attain an ideal low index is responsible. The health staff have the ideal constantly in view; and the gradual improvement of urban water supplies and sanitation together with such control as is financially possible, while far from satisfactory, is all that can be done at present.

The incineration of domestic refuse is gradually being replaced by controlled tipping in the townships of the Territory, adequate supervision being essential to the prevention of fly breeding. The value of the refuse for manurial purposes, or alternatively as filling for mosquito-breeding depressions is thus secured; and the smoke nuisance from the improvised incinerators formerly in general use has been abolished.

## 14.—Statistics

### (1) *General Native Population*

In the most recent estimate (1938), the native population of the Territory is computed at 5,217,345. No reliable statistics relating to birth, death and infant mortality rates are available at present.

### (2) *General European Population*

Acknowledgment is made to the Registrar-General of Birth and Deaths for a return of the registered deaths, a total of seventy-one, which are summarized as follows:—

*Causes of Deaths of Europeans during 1938*

(Classified according to the Manual of the International List of Causes of Deaths, 1931)

| | |
|---|---|
| Infectious and parasitic diseases ... ... ... ... ... ... | 13 |
| Cancer and other tumours ... ... ... ... ... ... ... | 5 |
| Rheumatism, diseases of nutrition and endocrine glands and other general diseases ... ... ... ... ... ... ... ... | 1 |
| Diseases of the nervous and sense organs ... ... ... ... ... | 4 |
| Diseases of the circulatory system ... ... ... ... ... ... | 12 |
| Diseases of the respiratory system ... ... ... ... ... ... | 5 |
| Diseases of the digestive system ... ... ... ... ... ... | 8 |
| Non-venereal diseases of the genito-urinary system and annexa ... | 1 |
| Diseases of pregnancy, childbirth and the puerperal state ... ... | 1 |
| Diseases of the bones and organs of locomotion ... ... ... ... | 1 |
| Diseases of early infancy ... ... ... ... ... ... ... | 5 |
| Old age ... ... ... ... ... ... ... ... ... ... | 3 |
| Affections produced by external causes ... ... ... ... ... | 8 |
| Ill-defined diseases ... ... ... ... ... ... ... ... | 4 |
| Total ... | 71 |

(3) *European Official Population*

(For table of sick, invaliding and death rates, see opposite page)

*Deaths.*—There were nine deaths among European officials, seven in the Territory and two in England :—

| | 1936 | 1937 | 1938 |
|---|---|---|---|
| Appendicitis | 1 | — | — |
| Aortic aneurysm | 1 | — | — |
| Cerebral malaria | 1 | — | — |
| Septicaemia | 1 | — | — |
| Myocarditis | 1 | 1 | 1 |
| Apoplexy | 1 | — | — |
| Meningo-encephalitis | — | — | 1 |
| Heart failure following chronic myocardial degeneration | — | — | 1 |
| Multiple injuries—aeroplane crash | — | — | 2 |
| Intestinal obstruction | — | — | 1 |
| Suicide by firearms | — | — | 1 |
| Total | 6 | 1 | 7 |

The two deaths which occurred in England have not been included in the above table.

*Invalidings.*—Eight European officials were invalided during the year as compared with twelve and nine during the two preceding years. This table includes all the officers who have been sent home on sick leave before they have completed a tour of twenty months :—

| | 1938 |
|---|---|
| Neurasthenia | 1 |
| Psoriasis (palmar) | 1 |
| Schistosomiasis and haematuria | 1 |
| Myocardial degeneration following enteric fever | 1 |
| Tonsillitis | 1 |
| Pulmonary tuberculosis | 1 |
| Debility following blackwater fever | 1 |
| Pyrexia of unknown origin | 1 |
| Total | 8 |

(4) *Asian Official Population*

*Deaths.*—There was no death among Asian officials during the year.

*Invalidings.*—Nine Asian officials were invalided during the year :—

| | 1938 |
|---|---|
| Neurasthenia | 2 |
| Diabetes | 4 |
| Emphysema and fibrosis | 1 |
| Osteitis of metacarpal and perforated palate | 1 |
| Asthma | 1 |
| Total | 9 |

(5) *Classification of Hospital Cases and Deaths*

Tables showing the classification of hospital cases and deaths by groups are given at page 55 and detailed lists of diseases and deaths classified in groups for all races and for Europeans separately are at pages 73 to 79.

## Sick, Invaliding and Death Rates, European and Asian Officials

| | European | | | Asian | | |
|---|---|---|---|---|---|---|
| | 1936 | 1937 | 1938 | 1936 | 1937 | 1938 |
| 1. Total number of Officials Resident ... ... ... ... | 950 | 986 | 1,017 | 1,178 | 1,225 | 1,238 |
| 2. Average number Resident ... ... ... ... ... | 589 | 611 | 630 | 860 | 898 | 904 |
| 3. Total number on Sick List... ... ... ... ... ... | 641 | 682 | 694 | 1,068 | 1,236 | 938 |
| 4. Total number of days on Sick List ... ... ... ... | 4,655 | 4,502 | 4,528 | 5,247 | 5,797 | 4,458 |
| 5. Average daily number on Sick List ... ... ... ... | 12·75 | 12·33 | 12·41 | 14·38 | 15·88 | 182·21 |
| 6. Percentage of sick to average number Resident ... ... | 2·16 | 2·02 | 1·97 | 1·67 | 1·77 | 1·35 |
| 7. Average number of days on Sick List for each Patient ... | 7·26 | 6·60 | 6·52 | 4·91 | 4·69 | 4·75 |
| 8. Average sick time to each Resident ... ... ... ... | 7·90 | 7·37 | 7·19 | 6·10 | 6·46 | 4·93 |
| 9. Total number invalided ... ... ... ... ... ... | 9 | 12 | 8 | 7 | 11 | 9 |
| 10. Percentage of Invalidings to Total Resident ... ... ... | ·95 | 1·22 | ·79 | ·59 | ·90 | ·76 |
| 11. Total Deaths ... ... ... ... ... ... ... | 5† | 1‡ | 7* | 5 | 1 | — |
| 12. Percentage of Deaths to Total Resident ... ... ... ... | ·53 | ·10 | ·69 | ·42 | ·08 | — |
| 13. Percentage of Deaths to average number Resident ... ... | ·85 | ·16 | 1·11 | ·58 | ·11 | — |
| 14. Number of cases of sickness contracted away from Residence | 2 | 2 | — | 2 | 2 | — |

*Two officials died in England, and are not shown in the above return or table of diseases and deaths (in- and out-patients).
†Two deaths not shown in the table of returns of diseases and deaths (in- and out-patients).
‡This case died out of hospital but in the Territory and is not shown in the table of returns of diseases and deaths (in- and out-patients).

## Cases and Deaths by Groups, 1937 and 1938 (Government institutions only)

| | Cases | | Deaths | | Percentage of group to total cases | | Percentage of deaths to total deaths | |
|---|---|---|---|---|---|---|---|---|
| | 1937 | 1938 | 1937 | 1938 | 1937 | 1938 | 1937 | 1938 |
| I.—Infectious and Parasitic Diseases ... ... | 252,942 | 262,500 | 844 | 756 | 38·05 | 38·40 | 39·22 | 36·86 |
| II.—Cancer and other Tumours ... ... ... | 517 | 558 | 39 | 57 | ·08 | ·08 | 1·81 | 2·78 |
| III.—Rheumatism, Diseases of Nutrition and of Endocrine Glands and other General Diseases | 8,067 | 9,139 | 17 | 20 | 1·21 | 1·34 | ·79 | 1·00 |
| IV.—Diseases of the Blood and Blood-forming Organs ... ... ... ... ... ... | 5,127 | 4,253 | 28 | 25 | ·77 | ·62 | 1·30 | 1·22 |
| V.—Chronic Poisoning ... ... ... ... | 58 | 224 | 2 | 1 | ·01 | ·03 | ·10 | ·05 |
| VI.—Diseases of the Nervous and Sense Organs | 56,308 | 55,154 | 61 | 61 | 8·45 | 8·07 | 2·83 | 2·97 |
| VII.—Diseases of the Circulatory System... ... | 2,382 | 2,488 | 38 | 58 | ·36 | ·36 | 1·77 | 2·83 |
| VIII.—Diseases of the Respiratory System ... | 79,247 | 80,271 | 411 | 408 | 11·92 | 11·74 | 19·09 | 19·89 |
| IX.—Diseases of the Digestive System ... ... | 97,510 | 105,299 | 263 | 190 | 14·67 | 15·40 | 12·22 | 9·26 |
| X.—Non-venereal Diseases of the Genito-urinary System and Annexa | 5,648 | 5,988 | 60 | 63 | ·85 | ·88 | 2·80 | 3·07 |
| XI.—Diseases of Pregnancy, Childbirth and the Puerperal State | 1,223 | 597 | 37 | 47 | ·20 | ·08 | 1·72 | 2·29 |
| XII.—Diseases of the Skin, Cellular Tissue, Bones and Organs of Locomotion | 103,569 | 106,585 | 99 | 107 | 15·60 | 15·59 | 4·60 | 5·22 |
| XIII.—Congenital Malformation and Diseases of Early Infancy | 488 | 119 | 12 | 9 | ·07 | ·02 | ·56 | ·44 |
| XIV.—Old Age ... ... ... ... ... | 170 | 356 | 29 | 28 | ·03 | ·05 | 1·35 | 1·36 |
| XV.—Affections produced by External Causes ... | 45,739 | 45,741 | 163 | 171 | ·88 | 6·69 | 7·57 | 8·33 |
| XVI.—Ill-defined Diseases ... ... ... ... | 5,693 | 4,447 | 49 | 50 | ·85 | ·65 | 2·27 | 2·43 |
| Total ... | 664,688 | 683,719 | 2,152 | 2,051 | 100 | 100 | 100 | 100 |

Note.—The classification is in accordance with the Manual of the International List of Causes of Death, 1931 edition.

## III.—HEALTH CONDITIONS AND MEDICAL WORK IN THE PROVINCES

### Eastern Province

*Dar es Salaam.*—The Medical Officer of Health (Dr Wilkin) took over malaria control from the Malaria Survey Unit from the beginning of the year. Much useful reclamation of depressions and low-lying land within the township area was accomplished by means of tipping with domestic refuse and rice husks; it has been found that rice husks to a depth of nine to twelve inches are effective in preventing fly breeding in the refuse. A warning is sounded of the possibility of anopheline mosquitoes adapting themselves to tree breeding as control of ground breeding places is tightened. Aedes mosquitoes favour holes in trees and leaf joints in palm trees. House gully traps provide the main breeding places for Culex mosquitoes.

The need for adequate storm water drainage for certain areas in the native quarter of Dar es Salaam town is emphasized. Serious damage to native houses occurs every rainy season as a result of flooding of low-lying streets where water stands after heavy rain and floods the mud and wattle houses.

A single case of smallpox, origin not traced, caused an expenditure of £43 exclusive of supervision; and 43,775 persons were vaccinated.

The occurrence of a number of cases (ninety-nine) of trachoma, not yet a notifiable disease, was reported for the first time.

The Medical Officer of Health justifiably comments on some of the difficulties of housing government servants. Many of the quarters compare unfavourably as regards accommodation with that provided under municipal schemes for working class houses in England. This is particularly noticeable in the case of junior married officers with one or more children, where conditions do not admit of quiet or privacy for the parents until the children are asleep. Such quarters normally consist of one bedroom, one sitting-dining-room, a small veranda-lounge and a small mosquito-proofed portion of the veranda used as an extra bed- or dressing-room, with the usual offices.

Housing in the commercial area continues to improve in construction though the three-storeyed buildings which are replacing the old single-storeyed veranda *duka* (shop) throughout the bazaar soon tend to be overcrowded, and the difficulty of disposing of the sewage emphasizes the serious need for the sewering of this area in particular.

The housing of the native population in large five- or six-roomed houses of mud and wattle again calls for comment on the grounds of their unsuitability for family life or privacy; such dwellings are in fact single-storeyed tenements with all their attendant evils.

The bare subsistence level on which so many of the town native population live is a bad feature. A man, wife and child are estimated to require thirty shillings a month to enable them to live decently in the town. An average labourer earns seventy-seven cents a day, which even working thirty-one days a month yield only twenty-three shillings eighty-seven cents. Large numbers of native labourers are ready to accept casual labour for from fifteen to twenty shillings a month.

As recorded in the laboratory section of this report (page 90) the chlorination of the bore-hole water supply by the Public Works Department

was undertaken with satisfactory results. A further number of polluted private wells in the township were closed.

Recommendations for the improvement of labour camps in the Ruvu, Soga, Kimamba, Sadani and Bagamoyo districts were acted upon, and conditions are reported to be improving.

Some very valuable work was carried out in the Uzaramo sub-district of Dar es Salaam in the reduction of hookworm by mass treatment of the infested people and improvement of sanitation. Collaboration with a German mission was effected, and the work was concentrated round Masaki and was initiated by Dr G. Maclean, Deputy Director of Medical Services. Dr D. E. Wilson, Pathologist, spent several months in the area carrying out a detailed survey of the population, after its objects had been explained to the people by the Deputy Provincial Commissioner. Householders were card indexed to the number of 2,399, representing a population of 7,610, and all members of each family examined and treated for hookworm, yaws, syphilis, bilharzia, ulcers and acute inflammatory conditions of the eye. Persons over two years of age and those not "very aged" having a haemoglobin index over 65 received vermifuge; those with a lower index received an intensive course of iron and calcium until the index rose to 70 per cent; 5,399 persons were so treated. The following figures showing the prevalence of anaemia are of interest :—

| | |
|---|---|
| Haemoglobin under 56 per cent ... ... ... | 866 |
| ,, 56-69 per cent ... ... | 1,787 |
| ,, 70-80 ,, ... ... | 2,696 |
| ,, over 80 per cent ... ... ... | 50 |
| | 5,399 |

An intensive campaign was instituted for the construction of bore-hole latrines, and many free concrete squatting plates as demonstrations were provided. Cooperation with the native authority was effected. A supply of slaughter cattle was organized with the assistance of the Berlin Mission and the Veterinary Department, whereby replacements were sent as payment was made for cattle slaughtered, the mission undertaking the supervision of the cattle and payments. Some of the initial difficulties of latrine construction were overcome but much more remains to be done in this direction before the object aimed at can be attained, that is to secure a consolidated latrined area for comparison of the ankylostome infestation rate with that of a non-latrined area after a lapse of time. Further reference to this work is made in the laboratory section of the report at page 100.

*Morogoro.*—The medical officer, Dr A. McKenzie, reports an unusually healthy year as reflected in the returns of native and European sick, possibly due to the very light rains which occurred.

There was a striking decrease in the non-specific dysentery group from one hundred and nine to twenty-eight cases and eighty-two to eleven deaths as compared with 1937. The problem of making these patients put on weight in hospital is very difficult ; unless a rapid and substantial gain can be attained in hospital a patient cannot be considered out of danger and, even after many months of hospitalization, still runs the risk that some dietetic indiscretion may provoke the last fatal stage of the condition.

Over ninety per cent of these cases, which are referred to as "nutritional diarrhoea," come from the sisal estates and, though other factors such as better climatic conditions in 1938, a more stabilized labour force with more careful

medical examination before engagement of recruits, and cessation of recruitment among tribes who reacted badly to local conditions, enter into the improvement, the results are some indication of the increased care of labour on the estates. Two medical officers are now employed by estates and increased hospital accommodation is available thereon; some improvement has been effected in the housing of labour and many experiments with the object of finding a satisfactory roofing material have been made; but no progress could be reported in the efforts to induce estates to supply cooked food to bachelor labour.

Dr McKenzie considers the estate managements understaffed and stresses the need for full-time compound managers not burdened with other duties.

The estimated number of labourers on sisal plantations in the district was: contract labour, 2,500; uncontracted labour, 8,000. The number of deaths notified among the force during the year was 133 compared with 254 in 1937; of these 56 died in hospital. 79 deaths occurred in contracted labourers.

### Tanga Province

The Acting Senior Medical Officer, Tanga, Dr W. K. Connell, has furnished an extremely full and valuable report on matters affecting the medical administration of the province. He has divided it into two parts. Part I dealing with the physical characteristics and economic resources of the Tanga province and including sections on topography, geography, soils, forests, soil erosion, climate, population, chief economic factors, agricultural and veterinary matters, and trade and traffic reports. This part of the report furnishes a most useful summary of conditions for other medical officers who follow in Dr Connell's footsteps. His Part II deals with the medical administration of the province.

There are five government hospitals which treated 1,719 in-patients and 23,742 out-patients in addition to the Tanga hospital which treated 4,543 in-patients and 16,180 out-patients. Descriptions of the hospitals and recommendations for their improvement are included and an account is given of the medical work performed by the missions, especially the Bethel Lutheran Mission and the Universities' Mission to Central Africa.

The Bethel Mission maintains the Lutindi mental hospital in the western Usambaras where there is accommodation for one hundred and twenty patients. This institution is maintained by means of a *per capita* subsidy from Government and is very efficiently run by a German superintendent and his wife, and lay workers of the mission, who have been in charge for very many years. Unfortunately, it is only possible to arrange eight to ten visits a year by the doctor owing to the distance of this institution from the mission hospital at Bumbuli, where he resides. At this hospital there are one hundred and thirty-five beds including fifteen for Europeans and it is supplied with electricity from a hydro-electric plant. The staff includes two doctors and three European nurses. Leprosy work is also undertaken and proposals have been put forward for assisting the mission to make this more effective. The Bethel Mission maintains six small outside units in addition to Lutindi mental hospital and treated some 1,376 in-patients and 2,294 out-patients during the year. A definite increase in bilharzia infection is reported by the doctor in charge.

The Universities' Mission maintains a hospital at Magila near Muheza staffed by one lady doctor and two sisters, and a good deal of maternity work and training of African midwives is carried out. The hospital contains twenty-five general female beds, sixteen maternity beds and fifty male beds in a new

building. Another hospital at Korogwe contains thirty-five male and fifteen female beds and is looked after by two European sisters under the supervision of the doctor at Magila some thirty miles away. A number of dispensaries under European sisters are also maintained in the district. At the U.M.C.A. hospitals and dispensaries 1,749 in-patients and 23,950 out-patients, including 688 confinements, were treated. Popularity of the mission hospitals among the women is very marked and there is no question that the value of the work would be greatly increased if it were possible to provide a second doctor.

The conditions particularly noted by the doctor in charge were the general bilharzia infection among the children, almost universal hookworm, and an increasing incidence of pulmonary tuberculosis. It is stated that secondary yaws has almost disappeared in the eastern Usambaras.

It is interesting to note that the superintendent of the Lutindi mental hospital who carries on a good deal of medical work among the local population also reports the increase of bilharzia and pulmonary tuberculosis. An increase in malaria among the mountain population where it was formerly rare has also been noted and is seasonal. It is not established that there has been a spread of carrying anophelines from the lower malarious areas but that seems very probable since the people have long been in the habit of visiting the lower valleys for trading purposes. But no part of the province is free from malaria and that probably explains the low incidence of blackwater fever of which only four cases occurred, and these in Indians, in the whole province. Were the African population living in malaria-free areas one would expect a certain number of cases of blackwater among them as occurs on Kilimanjaro.

The Senior Medical Officer estimates that some twenty-eight per cent of the African population of the province received treatment during the year. The prevalent diseases at government hospitals in order of frequency were as follows : Acute and chronic infections of the lungs, ulcers, malaria, constipation, injuries, ankylostomiasis, and yaws. Each of these conditions yielded more than fifteen hundred cases, but the position of ankylostomiasis in the order of frequency does not represent the true position since it is believed that at least eighty per cent of the population are infected. The Senior Medical Officer hopes to reduce the serious incidence of this disease by a campaign for encouraging the use of cheap shoes. The six commonest infections for which in-patient treatment was given were : malaria, ulcers, injuries, acute infections of the lungs, ankylostomiasis, abscesses and cellulitis.

African relapsing fever appears to be rare in the province, only eleven cases having been reported.

It is also of interest to note that *ascaris* infestation is much commoner in the hills than in the plains. This has also been noted on Kilimanjaro.

Seventy-nine cases of cerebro-spinal meningitis occurred with twenty-eight deaths. The present outbreak is thought to have been introduced by estate labourers coming from the extreme west of the Territory bordering on the Belgian Congo, but it is now endemic. The mortality was highest, 53 per cent, at Tanga, lowest, 22·8 per cent, at Bumbuli where extensive Prontosil treatment was undertaken, and intermediate at Korogwe, 35 per cent.

The increasing incidence of pulmonary tuberculosis is everywhere reported and improved facilities for treatment including modern surgical procedure are imperative. The accommodation at Tanga hospital for infectious tuberculous cases is entirely inadequate. In government hospitals 7·3 per cent of 346 deaths were due to this disease and at Bumbuli mission hospital it provided the commonest cause of death, twenty per cent.

One fatal case of diphtheria, clinically diagnosed, in a European child was recorded at Tanga.

There are twenty-four dispensaries maintained by the native authorities of the province, of these five are in the Same district and are supervised by the Senior Medical Officer, Northern province. The Senior Medical Officer's comments on these small units are favourable in general but he puts his finger on the need which they share, in common with the majority of others in the Territory, for a better standard of dresser in charge, more attention to the essentials of rural sanitation, and careful siting in relation to other medical institutions, for instance mission dispensaries. Some improvement of the training of tribal dressers at Tanga hospital has been effected but proper residential accommodation for their training is badly needed at Tanga.

The Senior Medical Officer has given particular attention to hospital diets and has provided a varied diet yielding 2,794 calories at Tanga; that in which the main carbohydrate element was maize meal cost sixteen cents and when meal was replaced by rice, twenty-two cents. Both diets included one ounce of palm oil, which is produced commercially on an estate in the district. The Senior Medical Officer is also experimenting with the production of tomatoes within the hospital grounds for augmenting the protective elements in the dietary.

Considerable attention was given to the condition of labourers on the numerous estates in the area. Of the total African population of 363,437 no less than 82,333 are employed as labourers on the various estates, which mainly produce sisal; of these 12,877 were on contract, and some 35,000 were immigrants. Hookworm, venereal disease, malnutrition and vitamin A deficiency are stated to be prevalent.

### Northern Province

The Provincial Commissioner in his annual report has referred to the dense population in certain areas; on parts of Kilimanjaro there are four hundred and fifty persons to the square mile; and congestion also occurs in the Mbulu district. The progressive Chagga tribe in the former area are anxious for improved social services but the high cost of personal emoluments and heavy recurrent charges of the existing native administration prevent extension or provision of new ones.

Some improvement of conditions under which meat is sold in the rural areas has been planned by the erection of hygienic butcher's shops.

A scheme for settling natives from the congested areas in an area of twelve thousand acres at the foot of the mountain is in hand; malaria prevention among these largely non-immune natives is an important feature of the scheme; and the control of tsetse fly must also be undertaken.

The need for a local course of training for tribal dressers for the province has become obvious and proposals for the establishment of a school in connection with Moshi hospital are in preparation.

Medical arrangements in the province were not under unified control until the 1st January 1939 but the Senior Medical Officer, Dr T. A. Austin, has forwarded his impressions. He comments adversely on the crowding and poor condition of the hospitals and the inadequate supplies of hospital clothing, linen and uniforms, and poor standard of training of African nursing staff.

Three African "health visitors" who have had some training at the Tanga maternity clinic are doing useful work in Upare, a district of the Tanga

province whose medical arrangements are more conveniently supervised from Moshi.

Seven African cases of blackwater fever are reported from Arusha, Usangi and Same. The excessive prevalence of roundworm and tapeworm infections was even more marked than before, ascariasis accounting for most of the increase; the infection is believed to arise largely from the use of polluted furrow water. At Usangi in Upare hookworm, less prevalent in Moshi and Arusha districts, appears to be on the increase. Venereal disease is especially prevalent at Mbulu and among the Masai.

Kibongoto continued to do good work for tuberculosis which is so prevalent on Kilimanjaro; the medical officer was absent for a large part of the year.

A battalion of the King's African Rifles was installed at Moshi during the year. It is regrettable that owing to financial considerations it was found necessary to provide pit latrine sanitation; and the back-to-back type of barracks also called for unfavourable comment from the Chief Medical Adviser at the time of his visit.

Overcrowding of the prisons at Moshi, Arusha and Mbulu is also reported.

The disposal of sewage in Moshi bazaar is becoming increasingly difficult owing to the poor absorption of the ground.

The standard of housing of government servants here also calls for unfavourable comment; insufficient width of verandas, lack of a room screened by gauze to protect from mosquitoes and flying insects, and inadequate storage room are noted. Lack of latrines for domestic servants and employees at government offices provides a poor example for natives to follow in their homes. The housing of the police and prison warders in Moshi also affords a bad example to the men who should be housed under conditions which will lead them to wish to raise the standard of their homes when they retire to their villages.

The reinstitution of school medical work is advised for all races within range of a district medical officer.

Among the changes that are gradually having their effect on the condition of estate labour is the transport of labourers from the recruiting areas by motor lorry instead of their performing the journey, sometimes of several weeks' duration on foot, and inadequately supplied with food; while mention should also be made of the dispensaries attached to the camps maintained by the Provincial Administration for travelling natives on main labour routes. At eleven such camps 29,496 native patients were treated in the dispensaries including 10,600 at Usa, 4,100 at Kalenga and 3,100 at Kilosa. Some 176,000 natives passed through these camps so that sixteen per cent were treated at the dispensaries, not counting numbers of others treated at five camps where the labourers attend the station hospital, separate camp dispensaries not being maintained.

### Southern Province

Medical facilities in this province are largely assisted by the Universities' Mission to Central Africa and the Benedictine Mission at Ndanda, both of which do much good work with doctors and trained nurses in the southern half of the province. Since June 1937 Government has hitherto only been able to provide one medical officer in the province; and the stations of Kilwa, Mikindani and the distant district of Songea are all staffed by sub-assistant surgeons; a second medical officer is greatly needed to allow of adequate supervision of the sub-stations.

Leprosy is particularly prevalent and valuable work is done by the missions in treating and caring for the patients.

Smallpox of a type unusual in this Territory, having an often virulent exanthem but a low mortality, continues to cause anxiety; and the people recognizing its non-fatal nature are not frightened of it and are less ready to seek vaccination. Nevertheless, 155,410 vaccinations were performed and infection limited to the country districts. One thousand and ninety cases with twenty-seven deaths were recorded.

Seventy-nine new cases of sleeping sickness with forty-two deaths were recorded. Sporadic cases come from the Liwale district: where treatment is available a watch is kept on the villages; and sporadic cases occur in the south of the province along the Rovuma river. Concentration of the very scattered population would doubtless reduce the incidence to negligible proportions but conditions for close agricultural settlement are less favourable than in the Western province.

The Provincial Commissioner in his annual report attributes much of the inertia and apathy of the natives in the coastal areas to the absence of meat and milk; and he points to the need for the improvement of water supplies in the Newala and Masasi districts. The propagation and distribution of fruit trees has been undertaken in the Masasi district, and it is proposed to establish an orchard at every court-house.

Songea is one of the most important sources of supply of labour for plantations; and it is recorded that motor transport has now gone far to eliminate the foot journeys hitherto necessary for labour seeking work, thus contributing to a much better state of health on arrival at the plantation than was formerly the case.

### Southern Highlands Province

The Provincial Commissioner refers in his report to the improved medical facilities which have been effected by the provision of a school and hostel for the training of tribal dressers for the province at Tukuyu, a new government dispensary in the Lupa controlled area, and the completion of the new non-native hospital at Chunya.

The native quarter at Chunya has also been greatly improved and a good standard of building, with a large number of iron roofs has been attained largely due to the interest and care taken by Mr Hume, Sanitary Superintendent, during construction.

Labour camps on the Nyasaland and Northern Rhodesian labour routes have become popular and show a remarkable increase in use.

A senior medical officer, Dr G. M. C. Powell, was appointed to the province in September and was stationed at Chunya. He also carried out the duties of medical officer of health for the townships of Mbeya and Chunya.

Enteric fever continues to occur sporadically in the Mbeya and Rungwe districts. About half of the thirty-five known cases contracted the disease in the Lupa area.

Deficiency diseases still occur among African labourers and the strengthening of the labour legislation in respect of housing and feeding is strongly recommended. One hundred and thirty-four cases of scurvy with one death were reported; but a definite improvement is slowly taking place, employers being more alive to the occurrence and recognition of the disease and its prevention. Examination of the labour force of one enlightened "digger" who

had improved the diet of his employees by the addition of meat, vegetables and fresh fruit revealed a labour force second to none, even as compared with the copper belt of Northern Rhodesia.

### Central Province

It has not yet been possible to bring this province under the reorganized system of medical control by a senior officer at provincial headquarters; and adequate supervision of the district staff has not been possible, particularly in the case of the tribal dispensaries.

The Provincial Commissioner instituted, in 1937, the experiment of arranging for tribal dressers in the Kondoa district to attend the boys' circumcision camps in order to attempt to improve the surgical conditions under which the operation is performed and provide after treatment. The experiment appears to have been popular with the chief and elders and the Provincial Commissioner is to be congratulated on the success which his original idea, intended to ameliorate the suffering of some of the boys, has already achieved.

The work of the Church Missionary Society and the Augustana (American) Lutheran Mission, each of which maintains two doctors and a staff of trained nurses, is highly spoken of: and the training of midwives and nurses by these bodies is of very great value.

Three Europeans and one native received prophylactic treatment for rabies at Mpwapwa, but no case of human infection occurred. The Director of Veterinary Services reports two cases confirmed in dogs in the Central province and a suspected case in a donkey which showed symptoms of madness and attacked and killed several sheep; a case was also confirmed in a dog in the Lake province. Suspected cases were also reported from the Northern and Southern Highlands provinces, but in these the diagnosis was extremely doubtful. The Director concludes: "There seems little doubt that this disease is enzootic in the wild carnivora, especially jackal and such animals, so that the control and eradication of the disease is a problem presenting almost insurmountable difficulties."

### Western Province

The Provincial Commissioner reports important measures to improve the food supply. Manuring, the use of transport oxen, stall feeding of cattle, crop rotation and anti-erosion measures are all playing their part. Banana planting to combat erosion in the mountains of Uha, increased rice production in Kigoma and the stimulation of the oil palm industry in the same district; wheat growing in Ufipa and extension of the clarified butter industry in Kahama are likely to have far-reaching effects on the economy of the province and the Territory. The dried fish industry, worked from the rivers and Lake Tanganyika, forms an important item in native economy and no less than one thousand and twenty-two tons of dried white-bait (*dagaa*), which is believed to be a valuable source of calcium, was recorded to have been traded on the lake, apart from quantities carried by motor lorry.

The demand for medical treatment is beyond the resources of the people in this huge but thinly populated province. There is some difficulty in obtaining suitable candidates for medical training, because the attractions of the occupation are still below the ambitions of the boys leaving the Central school. Gradual improvement of the district dispensaries is being effected.

The Sleeping Sickness Officer (Dr Fairbairn) is responsible for the medical administration of the province. Although there was an increase of ninety-eight in the number of cases of sleeping sickness recorded in the province ascribed to natives leaving their homes to obtain honey and fish in the infected areas, the facilities for treatment are considered adequate though with a reduced staff of medical officers there is a tendency for cases to come too late to hospital for diagnosis, so greatly reducing the chances of complete cure. The high mortality shown in the tables does not accurately represent the position. All cases of sleeping sickness diagnosed are given a case number and any death of a native so registered is included in the total deaths ; but many of them relate to persons who have been cured of their infection and have died from some entirely different cause such as pneumonia ; under the conditions obtaining it is not possible to ascertain the actual cause of death. The importance of securing treatment within a month of infection cannot be too strongly urged.

The concentrations continue to make progress and there are thirty-five such aggregations of persons in the Western province, containing some 39,246 taxpayers or 129,511 persons. The Provincial Commissioner writes : "That the policy adopted in combating this fell disease is fully justifying itself is supported by figures, covering fifteen years, for new cases of sleeping sickness . . . ." The figures cited are :—

| | | | Kahama epidemic | | Kibondo epidemic | |
|---|---|---|---|---|---|---|
| 1924 | ... | 73 | | | | |
| 1925* | ... | 276 | 1928 | ... 1,554 | 1931 | ... 1,285 |
| 1926 | ... | 237 | 1929† | ... 3,111 | 1932 | ... 2,210 |
| 1927 | ... | 180 | 1930 | ... 1,495 | 1933‡ | ... 1,610 |
| | | | | | 1934 | ... 1,076 |
| 1935 | ... | 751 | | | | |
| 1936 | ... | 284 | | | | |
| 1937 | ... | 168 | | | | |
| 1938 | ... | 266 | | | | |

*1925 concentrations started in southern area.
†1929 Kahama concentrated.
‡1933 Kibondo and Kasulu concentrated.

Maternity and child welfare work, which was begun in this province in 1925, has been reorganized to some extent. Dr Fairbairn has opened a clinic in Tabora town from which native midwives are sent out to conduct normal confinements in the people's homes. The midwives continue to receive obstretic training at Nzega clinic, where 485 confinements were conducted. This innovation, if as successful as it promises to be, will be capable of extended application in other towns where the women are not very partial to having their confinement in a maternity clinic.

Anthrax caused by the consumption of the meat of infected cattle has given some trouble particularly in the Kahama district where thirty-five cases, of which six were fatal, were admitted to hospital.

### Lake Province

The Provincial Commissioner reports the increasing use of manure to re-establish the fertility of the soil in the densely populated Sukuma-land and progressive improvement of native farming and food supplies is taking place. Similarly, water supplies are being improved by the construction of dams, with the object of spreading the human and cattle populations. The latest count of the native population shows Usukuma to carry 842,308 more than the total population of any other province of the Territory ; Musoma 208,962, Bukoba 317,789, Biharamulo 116,747 ; a total for the province of 1,485,806, or more than double the population of any other province. The native

treasuries' expenditure is more than three times that of any other province and they devote 10·7 per cent of this to medical services, or eleven cents per head, Government contributing a further sum of fifty-three cents per head based on the above population. Although this is a low figure compared with other less densely populated provinces the medical services are relatively more advanced. The training of tribal "medical auxiliaries" is advancing rapidly, there being now fifty-one as compared with eighteen in 1937 ; and the increased output of work at the eighty-six tribal dispensaries at which over 313,000 cases were treated is some measure of the confidence they enjoy. There are five government and five missionary doctors in the province.

The medical administration of the province is carried out by the Senior Medical Officer, Dr McElroy. He considers that with existing facilities for curative medicine throughout the province more consideration should be given to the preventive aspect of disease, instancing hookworm and schistosomiasis in Sukuma and part of Musoma and high infantile mortality due to syphilis and other causes in Bukoba. Relapsing fever is common in Biharamulo district. There is no government maternity clinic in the province though maternity and child welfare work is carried out at Mwanza and Bukoba hospitals where nursing sisters are available and at several missions. The need for special measures against venereal disease in Bukoba is becoming more and more evident and information is being collected on this score.

Reef mining for gold in west Mwanza and Musoma provides a source of income for many natives, and much is done for the welfare of labour on the larger concerns. The care of the labour force on the Geita Gold Mining Company's properties is an example to East Africa. On the other hand conditions on the tin workings in western Bukoba are not satisfactory in respect of housing, feeding and the treatment of the sick.

The replacement of dilapidated buildings in the Mwanza bazaar following the plague outbreak of 1937 continued with good results and the rat-proofing of warehouses in Bukoba was successfully carried out. Disposal of nightsoil in the towns of Mwanza and Musoma causes some difficulty.

Reclamation of swampy ground in Bukoba and Musoma continued with some success.

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## IV.—EDUCATION OF THE PUBLIC IN HYGIENE

A list of publications issued by the department is given at page 24; contributions to the press on medical and health matters were made as usual.

## V.—SPECIAL RESEARCH

### 1.—Schistosomiasis

Dr Alan Mozley, Ph.D., with the assistance of a Wandsworth Scholarship of the London School of Hygiene and Tropical Medicine, concluded his research in this Territory and Zanzibar into the relation of the fresh water mollusca to human schistosomiasis. He was good enough to inform me before his departure that his work suggested that *Physopsis globosa* was probably the host of *S. haematobium*; and that the host of *S. mansoni* was *Biomphalaria (planorbis) pfeifferi*. His work has shown that practical control of snail breeding places, together with public education, may be found. His report, published in 1939, will be referred to in greater detail in next year's report.

### 2.—Malaria

The final reports on malaria research by the medical officers in charge of the survey units at Dar es Salaam and in the Northern province were issued (*see* page 40), and the research work and survey financed by the Colonial Development Fund has ceased. The appointment of Dr Mackay, who was in charge of the Dar es Salaam unit throughout, as a Specialist (for mosquito-borne diseases) will ensure that the scientific aspect of malaria control continues to receive attention.

### 3.—Trypanosomiasis

The retirement early in 1939 of Dr J. F. Corson, O.B.E., makes it desirable briefly to record the results to date of his nine years' work on trypanosomiasis research, financed by the Colonial Development Fund.

1. *Trypanosoma rhodesiense* from a human case of sleeping sickness has been maintained and has retained its infectivity for man by cyclical transmission through sheep and antelopes by means of *G. morsitans* for four years under what were essentially natural conditions.

2. It is difficult to show a decrease and practically impossible to show complete loss of infectivity to man of a strain of *T. rhodesiense*.

3. A strain of *T. gambiense* isolated from man in Uganda was maintained by cyclical passages through *G. morsitans* in *Cercopithecus* monkeys, and seemed to undergo no change in morphology and virulence during more than four years.

4. A prophylactic dose of 0·03g. of Germanin (Bayer 205) per kilogram of body weight failed to protect white rats from infection with *T. rhodesiense* *G. morsitans* after forty days.

5. Domestic fowls, ducks, francolins and guinea fowl retained for some months infections of trypanosomes transmitted by inoculation and by *G. morsitans* without sign of illness and without apparent alteration in virulence. Thereafter the infection seemed to die out.

6. Hyrax were found to be very susceptible to infection with *T. rhodesiense* both by inoculation and by *G. morsitans*, and died with infection of the cerebro-spinal fluid.

7. Dikdiks, whose blood in no case showed infection when caught, were found to be susceptible to experimental infection.

8. A human volunteer susceptible to *T. rhodesiense* both before and after the experiment did not become infected by a strain of *T. brucei* brought from Zululand and transmitted by *G. morsitans*. This strain closely resembled *T. rhodesiense* in its effects on laboratory animals.

# ADDENDA

## List of Scientific Publications by Members of the Staff


Campbell, J. M. "An outbreak of Plague in Mwanza, February to June 1937." *Jl. Trop. Med. and Hyg.*, 1938, 41, 10, 157-168.

Connell, W. K. "Surgical Handbook for Hospital Assistants in the Tropics." 1938, xv 440, 177 figs. John Bale Med. Publications, London W.1.

Corson, J. F. "A third note on the infectivity to man of a strain of *Trypanosoma rhodesiense* : two further passages through antelopes and tests on volunteers." *Jl. Trop. Med. and Hyg.*, 1938, 41, 8, 125-128.

Corson, J. F. "A fourth note on the infectivity to man of a strain of *Trypanosoma rhodesiense*." *Jl. Trop. Med. and Hyg.*, 1938, 41, 16, 262-265.

Corson, J. F. "The cerebro-spinal fluid of monkeys (*cercopithecus* sp.) infected with a strain of *Trypanosoma rhodesiense*." *Ann. Trop. Med. and Parasit.*, 1938, 32, 2, 197-199.

Corson, J. F. "Observations on the pathogenicity for white rats of a strain of *Trypanosoma rhodesiense*." *Trans. Roy. Soc. Trop. Med. and Hyg.*, 1938, xxxii, 3, 343-345.

Corson, J. F. "A third note on a strain of *Trypanosoma gambiense* transmitted by *Glossina morsitans*." *Ann. Trop. Med. and Parasit.*, 1938, 32, 3, 245,248.

Corson, J. F. "A record of some complications which occurred in the course of experimental infections of African volunteers with *Trypanosoma rhodesiense*." *Ann. Trop. Med. and Parasit.*, 1938, 32, 4, 437-443.

Davies, H. N. "The treatment of pulmonary tuberculosis by direct injection of the lungs." *E. Afr. Med. Jl.*, 1938, xv, 5, 135-141.

Davies, H. N. "The work of a Tuberculosis Unit in East Africa." *Tubercle*, 1938, November.

Harkness, J. and Bell, F. "A clinical note on extra uterine intra-abdominal pregnancy." *Brit. Med. Jl.*, 1938, ii, 1044.

Mackay, R. "Second (Final) Report of the Malaria Unit, Dar es Salaam, for the period November 1934 to December 1936." 1938, Government Printer, Dar es Salaam.

McKenzie, A. "Night blindness and vitamin A in African schoolboys : a preliminary note." *E. Afr. Med. Jl.*, 1938, xv, 5, 143-148.

Raymond, W. D. "Notes on some native Ecbolic drugs." *E. Afr. Med. Jl.*, 1938, xv, 9, 304-307.

Raymond, W. D. "The detection and estimation of ouabain and strophanthin." *Analyst*, 1938, 63, 478-482.

Raymond, W. D. "Native Materia Medica, The Deliriants." *Tanganyika Notes and Records*, iii, 1938, March, 72,75.

Wilcocks, C. "Tuberculosis in Tanganyika Territory. Final report on Investigations carried out between 1930 and 1936 under the auspices of the Colonial Development Fund." 1938, Government Printer, Dar es Salaam.

Wilson, D. B. "Report of the Malaria Unit, Moshi, 1936." 1938, Government Printer, Dar es Salaam.

Young, W. A. and Hawking, F. "A case of idiosyncrasy to acriflavine." *Lancet*, 1938, i, 1275-1276.

Young, W. A. and Brown, M. H. S. "A case of Esthiomene at the Sewa Hadji Hospital, Dar es Salaam." *E. Afr. Med. Jl.*, 1938, xv, 8, 262.

## AUTHORIZED ESTABLISHMENT OF THE DEPARTMENT

*European*

Administrative and Headquarters :—

Director of Medical Services.
Deputy Director of Medical Services.
Assistant Director of Medcal Services.
7 Senior Medical Officers.
1 Sleeping Sickness Officer.
Secretary (seconded from Provincial Administration).
1 Chief Clerk.
1 European Clerk.
1 Lady Stenographer.

Executive :—

3 Specialists.
33 Medical Officers.
1 Senior Pathologist.
1 Pathologist.
1 Laboratory Assistant.
1 Senior Dental Surgeon.
1 Dental Surgeon.
1 Dental Mechanic.
1 Government Analyst.
1 Anti-Malarial Engineer.
1 Pharmacist.
2 Assistant Pharmacists.
1 Assistant Medical Instructor.
1 Secretary-Dispenser.
1 Senior Sanitary Superintendent.
19 Sanitary Superintendents.
1 Field Officer.
7 Agricultural Surveyors (sleeping sickness duties).

Nursing and Health Visiting :—

1 Matron.
1 Assistant Matron.
3 Senior Nursing Sisters.
1 Senior Health Visitor.
5 Sisters and Health Visitors.
29 Nursing Sisters.
1 Superintendent, Mental Hospital.
1 Supervisor of female patients.

*Asian*

1 Assistant Surgeon.
3 Senior Sub-Assistant Surgeons.
51 Sub-Assistant Surgeons.
27 Compounders.
12 Non-European Assistant Nurses.
1 Special Grade Clerk.
2 First Grade Clerks.

8 Second Grade Clerks.
9 Third Grade Clerks.
1 Fourth Grade Clerk.
1 Grade II Clerk (Local Civil Service).
1 Grade III Clerk (Local Civil Service).

*African*

1 Assistant to Government Analyst.
17 Clerks.
117 Dispensers.
140 Sanitary Inspectors.
Hospital orderlies, nurses and menials: average number employed 1,000.
Sanitary labourers: average number employed 1,050.
19 Motor drivers.

APPOINTMENTS: *European*

Senior Medical Officers:
Dr T. A. Austin from 1st January on promotion from Nyasaland.
Dr R. S. McElroy from 21st July on promotion from Uganda.
Dr G. M. C. Powell from 25th September on promotion from Northern Rhodesia.

Medical Officers:
Dr A. H. Morley from 27th February (on transfer from Somaliland).
Dr G. A. MacGregor from 6th October.

Lady Medical Officers:
Dr (Mrs) M. S. Brown from 1st May to 31st August (temporary).
Dr (Mrs) A. Lockhart from 1st September to 18th December (temporary).
Dr (Mrs) M. A. C. John from 19th December (temporary).

Secretary: Mr A. A. Oldaker from 20th January (seconded from Provincial Administration).

Assistant Pharmacist: Mr C. E. Thomas from 24th November.

Assistant Medical Instructor: Mr A. E. Stringman (clerk) from 11th January.

Secretary-Dispenser: Miss B. C. Purgold from 15th October.

Lady Stenographer: Miss E. A. H. Morrison from 1st November.

Matron: Miss K. P. Heckford (Assistant Matron) from 29th October on promotion.

Senior Nursing Sisters:
Miss J. L. Vaux (Nursing Sister) from 1st October on promotion.
Miss B. Eager (Nursing Sister) from 1st January on promotion.

Nursing Sisters:
Miss E. M. Hall from 20th January.
Mrs M. L. Hawkes from 2nd April.
Miss A. W. Sydney Smith from 23rd July.
Miss E. M. Phillipson from 5th August.
Miss M. E. Roberts from 27th October.

Sisters and Health Visitors:
Miss C. W. Rhodes from 20th January.
Miss A. Sampson from 5th February.

*Asian*

Sub-Assistant Surgeons :
Mr K. S. Damani from 19th February.
Mr M. A. Carpenter from 5th March.
Compounder : Mr M. A. Amin from 21st April.

*African*

Assistant to Government Analyst : Mr W. L. Jojo, B.Sc., 26th December.

ACTING APPOINTMENTS : *European*

Director of Medical Services :
Dr G. Maclean from 1st January to 13th May.
Deputy Director of Medical Services :
Dr R. Nixon from 1st January to 13th May ; 7th August to 11th November.
Dr F. R. Lockhart from 12th November to 31st December.
Assistant Director of Medical Services :
Dr C. F. Shelton from 1st January to 26th March.
Dr F. R. Lockhart from 27th March to 13th May.
Dr R. Mackay from 7th August to 17th September.
Dr F. R. Lockhart from 18th September to 11th November.
Dr R. Mackay from 12th November to 31st December.
Senior Pathologist : Dr D. E. Wilson from 1st January to 20th January.
Senior Medical Officers :
Dr F. R. Lockhart from 27th June to 31st December.
Dr R. Mackay from 20th June to 18th September.
Dr B. O. Wilkin from 7th August to 31st December.
Dr W. H. Smith from 1st January to 26th June.
Dr W. J. Aitken from 1st January to 19th June.
Dr J. Harkness from 14th June to 3rd October.
Matron : Miss K. P. Heckford from 25th July to 29th October.
Assistant Matron : Miss R. V. G. Daye from 22nd August to 31st December.
Chief Clerk : Mr W. A. Hughes from 9th September to 31st December (seconded from Railways).
Superintendent, Mental Hospital : Mr J. H. Stafford from 1st January to 29th September.
Supervisor of Female Patients : Mrs A. L. Stafford from 18th January to 29th September.

RETIREMENTS : *European*

Mr J. E. Crawley, Medical Instructor, 1st January.
Dr A. I. Meek, Senior Health Officer, 30th April.
Mr H. Hammond, Laboratory Assistant, 27th October.
Miss B. G. Allardes, M.B.E., Matron, 28th October.

*Asian*

Mr J. de Souza, First Grade Clerk, 12th May.

RESIGNATIONS : *European*

Dr A. C. de B. Helme, Medical Officer, 7th July.
Miss O. M. Cox, Senior Health Visitor, 4th February.
Miss E. McNab, Nursing Sister, 3rd April.
Miss S. M. Jowsey, Nursing Sister, 10th September.
Miss A. Smith, Nursing Sister, 5th October.

APPOINTMENT TERMINATED : *Asian*

Mr S. P. M. Gomes, Compounder, 13th May.

INVALIDINGS : *European*

Dr I. Sanderson, Medical Officer, 27th April.
Dr C. Wilcocks, Medical Officer, 11th May.

*Asian*

Mr P. S. Paranjpe, Sub-Assistant Surgeon, 19th February.
Mr G. A. Mhaiskar, Sub-Assistant Surgeon, 5th March.

DEATHS : *European*

Mr M. Beattie, temporary Labour Supervisor (anti-malaria works), 18th June.

TRANSFERS TO OTHER DEPENDENCIES

Dr P. S. Bell, Medical Officer, transferred to Somaliland as Senior Medical Officer, as from 28th January.

Dr J. M. Campbell, Senior Medical Officer, transferred to Northern Rhodesia as Deputy Director of Medical Services as from 21st July.

Mr R. M. Jones, Assistant Pharmacist, transferred to Nigeria as Assistant Storekeeper and Inspecting Chemist as from 14th September.

# RAINFALL

Total rainfall in millimetres by stations, from information kindly furnished by the Director, British East African Meteorological Service, Nairobi.

*1938*

| DISTRICTS | Stations | Feet above sea level | Rainfall in Millimetres |
|---|---|---|---|
| CENTRAL LINE AREA: | | | |
| Dar es Salaam ... ... | Dar es Salaam ... | 30 | 1118·5 |
| Morogoro ... ... ... | Morogoro ... ... | 1,628 | 838·7 |
| Kilosa ... ... ... | Kilosa ... ... | 1,606 | 847·8 |
| Dodoma ... ... ... | Dodoma ... ... | 3,675 | 628·8 |
| | Manyoni ... ... | 4,096 | 633·7 |
| Singida ... ... ... | Singida ... ... | 5,233 | 635·0 |
| Tabora ... ... ... | Tabora ... ... | 4,150 | 795·0 |
| Kahama ... ... ... | Kahama ... ... | 4,000 | 622·1 |
| | Nzega ... ... | 4,000 | 489·9 |
| Kigoma ... ... ... | Kigoma ... ... | 2,562 | 818·7 |
| | Kasulu ... ... | 4,530 | 1047·6 |
| COASTAL AREA, SOUTH: | | | |
| Lindi ... ... ... | Lindi ... ... | S.L. | 1071·4 |
| Tunduru ... ... ... | Tunduru ... ... | 2,300 | 613·7 |
| Masasi ... ... ... | Masasi Mission ... | 1,500 | 785·3 |
| Mikindani ... ... ... | Mikindani ... ... | 60 | 901·2 |
| Kilwa ... ... ... | Kilwa ... ... | S.L. | 1111·7 |
| Liwale ... ... ... | Liwale ... ... | 1,500 | 682·7 |
| Rufiji ... ... ... | Utete ... ... | 170 | 998·1 |
| COASTAL AREA, NORTH: | | | |
| Tanga ... ... ... | Tanga ... ... | S.L. | 1659·4 |
| Usambara ... ... ... | Amani ... ... | 2,834 | 2169·8 |
| NORTHERN HINTERLAND: | | | |
| Moshi ... ... ... | Moshi ... ... | 2,649 | 1275·0 |
| Arusha ... ... ... | Arusha ... ... | 4,416 | 1248·6 |
| Mbulu ... ... ... | Mbulu ... ... | 5,715 | 705·3 |
| Mwanza ... ... ... | Mwanza ... ... | 3,709 | 870·0 |
| Musoma ... ... ... | Musoma ... ... | 3,760 | 623·6 |
| Bukoba ... ... ... | Bukoba ... ... | 3,726 | 1892·1 |
| Biharamulo ... ... | Biharamulo ... | 4,850 | 970·2 |
| Kondoa ... ... ... | Kondoa-Irangi ... | 4,615 | 615·0 |
| SOUTHERN HINTERLAND: | | | |
| Iringa ... ... ... | Iringa ... ... | 5,365 | 658·8 |
| Njombe ... ... ... | Njombe ... ... | 6,400 | 768·7 |
| Ufipa ... ... ... | Sumbawanga ... | 5,650 | 804·0 |
| | Rungwe ... ... | 2,900 | 876·0 |
| Mbeya ... ... ... | Mbeya ... ... | 5,995 | 700·6 |
| Rungwe ... ... ... | Tukuyu ... ... | 5,300 | 1535·5 |
| Songea ... ... ... | Songea ... ... | 3,826 | 657·2 |

## Return of Diseases and Deaths (In-Patients) and Diseases (Out-Patients) for the year 1938

### All Races

Note.—*Cases of infectious diseases which were admitted directly to the Infectious Diseases Hospitals, Dar es Salaam and Tanga, are not included in this Return*

| DISEASES | In-Patients | | | | Out-patients | |
|---|---|---|---|---|---|---|
| | Remaining in Hospitals at end of 1937 | Total Yearly | | Total Cases Treated | Remaining in Hospitals at end of 1938 | Out-patients treated male and female | Total Cases In- and Out-Patients |
| | | Admissions | Deaths | | | | |
| 1. (a) Typhoid fever | 11 | 119 | 35 | 130 | 4 | 6 | 136 |
| (b) Paratyphoid fever | ... | 16 | 4 | 16 | 1 | 5 | 21 |
| 2. Typhus fever | ... | 13 | ... | 13 | ... | 1 | 14 |
| 3. Relapsing fever | 12 | 496 | 13 | 508 | 5 | 1,136 | 1,644 |
| 4. Undulant fever | ... | 3 | ... | 3 | ... | ... | 3 |
| 5. Smallpox | ... | 5 | ... | 5 | ... | 252 | 257 |
| 6. Measles | 1 | 95 | 1 | 96 | 4 | 584 | 680 |
| 7. Scarlet fever | ... | ... | ... | ... | ... | ... | ... |
| 8. Whooping-cough | ... | 17 | ... | 17 | ... | 635 | 652 |
| 9. Diphtheria | ... | 5 | 2 | 5 | ... | ... | 5 |
| 10. Influenza: | | | | | | | |
| (a) With respiratory complications | ... | ... | ... | ... | ... | ... | ... |
| (b) Without respiratory complications | 4 | 622 | 3 | 626 | 5 | 5,293 | 5,919 |
| 11. Cholera | ... | ... | ... | ... | ... | ... | ... |
| 12. Dysentery: | | | | | | | |
| (a) Amœbic | 10 | 371 | 22 | 381 | 11 | 362 | 743 |
| (b) Bacillary | 6 | 83 | 11 | 89 | 1 | 84 | 173 |
| (c) Unclassified | 4 | 182 | 11 | 186 | 5 | 778 | 964 |
| 13. Plague: | | | | | | | |
| (a) Bubonic | ... | ... | ... | ... | ... | ... | ... |
| (b) Pneumonic | ... | ... | ... | ... | ... | ... | ... |
| (c) Septicæmic | ... | ... | ... | ... | ... | ... | ... |
| 14. Acute poliomyelitis | ... | 7 | 1 | 7 | 1 | ... | 7 |
| 15. Encephalitis lethargica | ... | 2 | 1 | 2 | ... | ... | 2 |
| 16. Cerebro-spinal fever | 6 | 198 | 108 | 204 | 10 | 5 | 209 |
| 17. Rabies | ... | 2 | 1 | 2 | ... | 2 | 4 |
| 18. Tetanus | ... | 31 | 20 | 31 | 3 | 5 | 36 |
| 19. Tuberculosis of the respiratory system | 42 | 491 | 108 | 533 | 45 | 921 | 1,454 |
| 20. Other tuberculous diseases | 44 | 203 | 20 | 247 | 34 | 749 | 996 |
| 21. Leprosy | 12 | 61 | 7 | 73 | 4 | 116 | 189 |

## Diseases and Deaths (All Races)—*contd*

| DISEASES | In-Patients: Remaining in Hospitals at end of 1937 | In-Patients: Total Yearly: Admissions | In-Patients: Total Yearly: Deaths | In-Patients: Total Cases Treated | Remaining in Hospitals at end of 1938 | Out-patients treated male and female | Total Cases In- and out-patients |
|---|---|---|---|---|---|---|---|
| 22. Venereal diseases: | | | | | | | |
| (a) Syphilis | 56 | 1,158 | 19 | 1,214 | 46 | 22,800 | 24,014 |
| (b) Gonorrhœa | 42 | 1,003 | 3 | 1,045 | 42 | 10,800 | 11,845 |
| (c) Other venereal diseases | 14 | 141 | 3 | 155 | 11 | 1,306 | 1,461 |
| 23. Yellow fever | ... | ... | ... | ... | ... | ... | ... |
| 24. Malaria: | | | | | | | |
| (a) Benign tertian | ... | ... | ... | ... | ... | 211 | 211 |
| (b) Sub-tertian | 71 | 3,920 | 74 | 3,991 | 50 | 29,672 | 33,663 |
| (c) Quartan | ... | 49 | ... | 49 | 2 | 390 | 439 |
| (d) Unclassified | 20 | 1,290 | 8 | 1,310 | 24 | 20,013 | 21,323 |
| 25. Blackwater fever | 1 | 44 | 12 | 45 | ... | 7 | 52 |
| 26. Kala-azar | ... | ... | ... | ... | ... | ... | ... |
| 27. Trypanosomiasis | 3 | 184 | 25 | 187 | 17 | 12 | 199 |
| 28. Yaws | 55 | 948 | 7 | 1,003 | 42 | 72,514 | 73,517 |
| 29. Other protozoal diseases | ... | 3 | ... | 3 | ... | 183 | 186 |
| 30. Ankylostomiasis | 132 | 2,007 | 177 | 2,139 | 105 | 13,319 | 15,458 |
| 31. Schistosomiasis | 17 | 567 | 4 | 584 | 21 | 3,674 | 4,258 |
| 32. Other helminthic diseases | 56 | 805 | 19 | 861 | 27 | 44,390 | 45,251 |
| 33. Other infectious and/or parasitic diseases | 17 | 349 | 37 | 366 | 7 | 16,149 | 16,515 |
| 34. Cancer and other tumours: | | | | | | | |
| (a) Malignant | 3 | 99 | 39 | 102 | 2 | 18 | 120 |
| (b) Non-malignant | 10 | 239 | 13 | 249 | 5 | 109 | 358 |
| (c) Undetermined | 3 | 63 | 5 | 66 | 4 | 14 | 80 |
| 35. Rheumatic conditions | 8 | 246 | 4 | 254 | 9 | 7,945 | 8,199 |
| 36. Diabetes | 2 | 33 | 4 | 35 | 1 | 23 | 58 |
| 37. Scurvy | 5 | 123 | 1 | 128 | 5 | 66 | 194 |
| 38. Beri-beri | 3 | 27 | 2 | 30 | 2 | 61 | 91 |
| 39. Pellagra | ... | 4 | ... | 4 | ... | 10 | 14 |
| 40. Other diseases: | | | | | | | |
| (a) Nutritional | 1 | 77 | 9 | 78 | 2 | 31 | 109 |
| (b) Endocrine glands and general | 3 | ... | ... | 3 | ... | 471 | 474 |
| 41. Diseases of the blood and blood-forming organs | 21 | 320 | 25 | 341 | 15 | 3,912 | 4,253 |
| 42. Acute and chronic poisoning | ... | 15 | 1 | 15 | ... | 209 | 224 |
| 43. Cerebral hæmorrhage | ... | 17 | 10 | 17 | ... | 1 | 18 |
| 44. Other diseases of the nervous system | 20 | 525 | 48 | 545 | 24 | 11,133 | 11,678 |
| 45. Trachoma | 2 | 81 | ... | 83 | 4 | 600 | 683 |
| 46. Other diseases of the eye and annexa | 25 | 735 | 1 | 760 | 28 | 32,074 | 32,834 |

| DISEASES | In-Patients | | | | Remaining in Hospitals at end of 1938 | Out-Patients Treated male and female | Total Cases In- and Out-Patients |
|---|---|---|---|---|---|---|---|
| | Remaining in Hospitals at end of 1937 | Yearly Total | | Total Cases Treated | | | |
| | | Admissions | Deaths | | | | |
| 47. Diseases of ear and mastoid sinus | 5 | 103 | 2 | 108 | 1 | 9,833 | 9,941 |
| 48. Diseases of the circulatory system— | | | | | | | |
| (a) Heart diseases | 5 | 138 | 36 | 143 | 8 | 318 | 461 |
| (b) Other circulatory diseases | 16 | 325 | 22 | 341 | 12 | 1,686 | 2,027 |
| 49. Bronchitis | 24 | 846 | 11 | 870 | 13 | 65,807 | 66,677 |
| 50. Pneumonia: | | | | | | | |
| (a) Broncho-pneumonia | 9 | 364 | 78 | 373 | 11 | 414 | 787 |
| (b) Lobar pneumonia | 45 | 1,128 | 264 | 1,173 | 35 | 230 | 1,403 |
| (c) Not otherwise defined | 3 | 62 | 22 | 65 | 2 | 58 | 123 |
| 51. Other diseases of the respiratory system | 10 | 468 | 33 | 478 | 8 | 10,803 | 11,281 |
| 52. Diarrhœa and enteritis: | | | | | | | |
| (a) Under 2 years of age | 4 | 224 | 17 | 228 | 2 | 6,984 | 7,212 |
| (b) Over 2 years of age | 20 | 753 | 69 | 773 | 26 | 10,392 | 11,165 |
| 53. Appendicitis | 2 | 81 | 3 | 83 | 1 | 24 | 107 |
| 54. Hernia, intestinal obstruction | 32 | 890 | 22 | 922 | 41 | 242 | 1,164 |
| 55. Cirrhosis of the liver | 2 | 48 | 14 | 50 | 2 | 81 | 131 |
| 56. Other diseases of the liver and biliary passages | 10 | 195 | 17 | 205 | 9 | 681 | 886 |
| 57. Other diseases of the digestive system | 11 | 970 | 48 | 981 | 24 | 83,653 | 84,634 |
| 58. Nephritis (all forms): | | | | | | | |
| (a) Acute | 1 | 30 | 6 | 31 | 1 | 13 | 44 |
| (b) Chronic | 1 | 45 | 6 | 46 | 4 | 42 | 88 |
| 59. Other non-venereal diseases of the genito-urinary system | 80 | 2,309 | 51 | 2,389 | 104 | 3,467 | 5,856 |
| 60. Diseases of pregnancy, childbirth and the puerperal state: | | | | | | | |
| (a) Abortion | 1 | 94 | ... | 95 | 1 | 34 | 129 |
| (b) Ectopic gestation | 1 | 1 | 1 | 2 | ... | 1 | 3 |
| (c) Toxæmias of pregnancy | ... | 5 | 2 | 5 | ... | 41 | 46 |
| (d) Other conditions of pregnancy and the puerperal state | 2 | 266 | 44 | 268 | 7 | 151 | 419 |
| 61. Diseases of the skin, cellular tissue, bones and organs of locomotion | 549 | 7,261 | 107 | 7,810 | 522 | 98,775 | 106,585 |
| 62. Congenital malformations and diseases of early infancy: | | | | | | | |
| (a) Congenital debility (children under 1 year) | 1 | 22 | 3 | 23 | ... | 61 | 84 |
| (b) Premature birth (children under 1 year) | ... | 27 | 6 | 27 | ... | 4 | 31 |
| (c) Injury at birth (children under 1 year) | ... | 2 | ... | 2 | ... | 2 | 4 |
| 63. Senility | 3 | 97 | 28 | 100 | 6 | 256 | 356 |
| 64. External causes: | | | | | | | |
| (a) Suicide | ... | ... | ... | ... | ... | ... | ... |
| (b) Other forms of violence | 253 | 4,402 | 171 | 4,655 | 243 | 41,086 | 45,741 |

## Diseases and Deaths (All Races)—*contd*

| DISEASES | In-Patients: Remaining in Hospitals at end of 1937 | In-Patients: Total Yearly: Admissions | In-Patients: Total Yearly: Deaths | In-Patients: Total Cases Treated | Remaining in Hospital at end of 1938 | Out-patients treated male and female | Total Cases In-and Out-Patients |
|---|---|---|---|---|---|---|---|
| 65. Ill-defined causes ... ... ... ... ... ... ... ... | 18 | 718 | 43 | 736 | 13 | 2,965 | 3,701 |
| 66. Normal labour ... ... ... ... ... ... ... ... | 7 | 701 | 7 | 708 | 11 | 38 | 746 |
| Total ... | 1,857 | 40,669 | 2,051 | 42,526 | 1,735 | 641,193 | 683,719 |
| Total cases treated by African Dispensers ... ... ... ... | 50 | 1,075 | 35 | 1,125 | 50 | 160,298 | 161,423 |
| Total cases treated by Missionaries supplied with Government drugs and equipment ... ... ... ... ... ... ... ... | ... | 4,522 | 12 | 4,522 | 11 | 78,012 | 82,534 |
| Grand Total ... | 1,907 | 46,266 | 2,098 | 48,173 | 1,796 | 879,503 | 927,676 |

## Return of In-patients treated at the Infectious Diseases Hospitals, Dar es Salaam and Tanga, not included in above return.

| Disease | In-patients: Remaining in hospitals at end of 1937 | Admissions | Deaths | Total Cases Treated | Remaining in hospitals at end of 1938 |
|---|---|---|---|---|---|
| 1. Anthrax ... ... ... ... | — | 2 | — | 2 | 1 |
| 2. Cerebro-spinal meningitis (16) ... | 2 | 10 | 2 | 12 | — |
| 3. Varicella ... ... ... ... | 1 | 88 | — | 89 | 4 |
| 4. Diphtheria (9) ... ... ... | — | 1 | — | 1 | — |
| 5. Typhoid fever (1) ... ... ... | — | 1 | — | 1 | 1 |
| 6. Leprosy (21) ... ... ... | 32 | 39 | 4 | 71 | 25 |
| 7. Measles (6) ... ... ... ... | — | 36 | 1 | 36 | — |
| 8. Mumps ... ... ... ... | — | 116 | — | 116 | 2 |
| 9. Tuberculosis (pulmonary) (19) ... | 28 | 105 | 58 | 133 | 15 |
| Total ... | 63 | 398 | 65 | 461 | 48 |

Number in brackets refers to the serial number of the disease in the Return of Diseases and Deaths above. Government maternity and child welfare clinics (not included in above returns).

Admissions for confinements ... ... ... ... ... ... 1,141

Out-patients (women and children) treated for other conditions ... 8,705

## Return of Diseases and Deaths (In-Patients) and of Diseases (Out-Patients) for the year 1938

### Europeans (Official and Non-Official)

| DISEASES | In-Patients | | | | Remaining in Hospitals at end of 1938 | Out-Patients Treated male and female | Total Cases In- and Out-Patients |
|---|---|---|---|---|---|---|---|
| | Remaining in Hospitals at end of 1937 | Total Yearly | | Total Cases Treated | | | |
| | | Admissions | Deaths | | | | |
| 1. (a) Typhoid fever | ... | 10 | ... | 10 | ... | 6 | 16 |
| (b) Paratyphoid fever | ... | 5 | 1 | 5 | ... | 3 | 8 |
| 2. Typhus fever | ... | 2 | ... | 2 | ... | 1 | 3 |
| 3. Relapsing fever | ... | 5 | ... | 5 | ... | 1 | 6 |
| 4. Undulant fever | ... | ... | ... | ... | ... | ... | ... |
| 5. Smallpox | ... | ... | ... | ... | ... | ... | ... |
| 6. Measles | ... | 12 | ... | 12 | ... | 16 | 28 |
| 7. Scarlet fever | ... | ... | ... | ... | ... | ... | ... |
| 8. Whooping-cough | ... | ... | ... | ... | ... | ... | ... |
| 9. Diphtheria | ... | 1 | 1 | 1 | ... | ... | 1 |
| 10. Influenza: | | | | | | | |
| (a) With respiratory complications | ... | ... | ... | ... | ... | ... | ... |
| (b) Without respiratory complications | 1 | 114 | ... | 115 | ... | 100 | 215 |
| 11. Cholera | ... | ... | ... | ... | ... | ... | ... |
| 12. Dysentery: | | | | | | | |
| (a) Amœbic | ... | 25 | ... | 25 | ... | 16 | 41 |
| (b) Bacillary | 1 | 1 | ... | 2 | ... | 2 | 4 |
| (c) Unclassified | ... | 11 | ... | 11 | ... | 15 | 26 |
| 13. Plague: | | | | | | | |
| (a) Bubonic | ... | ... | ... | ... | ... | ... | ... |
| (b) Pneumonic | ... | ... | ... | ... | ... | ... | ... |
| (c) Septicæmic | ... | ... | ... | ... | ... | ... | ... |
| 14. Acute poliomyelitis | ... | ... | ... | ... | ... | ... | ... |
| 15. Encephalitis lethargica | ... | ... | ... | ... | ... | ... | ... |
| 16. Cerebro-spinal fever | ... | ... | ... | ... | ... | ... | ... |
| 17. Rabies | ... | ... | ... | ... | ... | ... | ... |
| 18. Tetanus | ... | ... | ... | ... | ... | ... | ... |
| 19. Tuberculosis of the respiratory system | 1 | 2 | 1 | 3 | ... | 2 | 5 |
| 20. Other tuberculous diseases | ... | 4 | 1 | 4 | ... | 2 | 6 |
| 21. Leprosy | ... | ... | ... | ... | ... | ... | ... |
| 22. Venereal diseases: | | | | | | | |
| (a) Syphilis | ... | 9 | ... | 9 | ... | 17 | 26 |
| (b) Gonorrhœa | ... | 1 | ... | 1 | ... | 19 | 20 |
| (c) Other venereal diseases | ... | ... | ... | ... | ... | 3 | 3 |

## Diseases and Deaths (Europeans)—*contd*

| DISEASES | In-Patients | | | | Remaining in Hospitals at end of 1938 | Out-Patients Treated male and female | Total Cases In- and Out-Patients |
|---|---|---|---|---|---|---|---|
| | Remaining in Hospitals at end of 1937 | Total Yearly | | Total Cases Treated | | | |
| | | Admissions | Deaths | | | | |
| 23. Yellow fever | ... | ... | ... | ... | ... | ... | ... |
| 24. Malaria: | | | | | | | |
| (a) Benign tertian | ... | ... | ... | ... | ... | 3 | 3 |
| (b) Sub-tertian | 7 | 439 | ... | 446 | 1 | 247 | 693 |
| (c) Quartan | ... | ... | ... | ... | ... | ... | ... |
| (d) Unclassified | 1 | 88 | ... | 89 | ... | 91 | 180 |
| 25. Blackwater fever | ... | 4 | 1 | 4 | ... | 2 | 6 |
| 26. Kala-azar | ... | ... | ... | ... | ... | ... | ... |
| 27. Trypanosomiasis | ... | 1 | ... | 1 | ... | ... | 1 |
| 28. Yaws | ... | ... | ... | ... | ... | ... | ... |
| 29. Other protozoal diseases | ... | ... | ... | ... | ... | ... | ... |
| 30. Ankylostomiasis | ... | 3 | ... | 3 | ... | 5 | 8 |
| 31. Schistosomiasis | ... | ... | ... | ... | ... | ... | ... |
| 32. Other helminthic diseases | ... | 6 | ... | 6 | ... | 19 | 25 |
| 33. Other infectious and/or parasitic diseases | ... | 11 | 1 | 11 | 1 | 48 | 59 |
| 34. Cancer and other tumours: | | | | | | | |
| (a) Malignant | ... | 8 | 2 | 8 | ... | 2 | 10 |
| (b) Non-malignant | ... | 3 | ... | 3 | ... | 7 | 10 |
| (c) Undetermined | ... | ... | ... | ... | ... | ... | ... |
| 35. Rheumatic conditions | ... | 6 | ... | 6 | ... | 56 | 62 |
| 36. Diabetes | ... | 9 | ... | 9 | ... | 16 | 25 |
| 37. Scurvy | ... | ... | ... | ... | ... | ... | ... |
| 38. Beri-beri | ... | ... | ... | ... | ... | ... | ... |
| 39. Pellagra | ... | ... | ... | ... | ... | ... | ... |
| 40. Other diseases: | | | | | | | |
| (a) Nutritional | ... | 2 | ... | 2 | ... | 3 | 5 |
| (b) Endocrine glands and general | ... | ... | ... | ... | ... | ... | ... |
| 41. Diseases of the blood and blood-forming organs | ... | 10 | ... | 10 | 1 | 30 | 40 |
| 42. Acute and chronic poisoning | ... | 5 | ... | 5 | ... | 3 | 8 |
| 43. Cerebral hæmorrhage | ... | ... | ... | ... | ... | 1 | 1 |
| 44. Other diseases of the nervous system | 1 | 39 | 3 | 40 | 1 | 90 | 130 |
| 45. Trachoma | ... | 1 | ... | 1 | ... | 5 | 6 |
| 46. Other diseases of the eye and annexa | ... | 10 | ... | 10 | ... | 122 | 132 |
| 47. Diseases of ear and mastoid sinus | 1 | 7 | ... | 8 | ... | 195 | 203 |
| 48. Diseases of the circulatory system: | | | | | | | |
| (a) Heart diseases | ... | 11 | ... | 11 | 2 | 30 | 41 |
| (b) Other circulatory diseases | ... | 19 | ... | 19 | ... | 64 | 83 |

| DISEASES | In-Patients | | | | Remaining in hospital at end of 1938 | Out-patients treated male and female | Total Cases In- and out-patients |
|---|---|---|---|---|---|---|---|
| | Remaining in hospitals at end of 1937 | Total Yearly | | Total Cases Treated | | | |
| | | Admission | Deaths | | | | |
| 49. Bronchitis ... | ... | 24 | ... | 24 | 1 | 78 | 102 |
| 50. Pneumonia: | | | | | | | |
| (a) Broncho-pneumonia | ... | ... | ... | ... | ... | ... | ... |
| (b) Lobar pneumonia ... | ... | 10 | ... | 10 | ... | ... | 10 |
| (c) Not otherwise defined | ... | 3 | ... | 3 | ... | ... | 3 |
| 51. Other diseases of the respiratory system | ... | 31 | ... | 31 | ... | 149 | 180 |
| 52. Diarrhœa and enteritis: | | | | | | | |
| (a) Under 2 years of age | ... | 22 | 1 | 22 | 1 | 18 | 40 |
| (b) Over 2 years of age | ... | 70 | 1 | 70 | 1 | 96 | 166 |
| 53. Appendicitis | 1 | 32 | 1 | 33 | 1 | 10 | 43 |
| 54. Hernia, intestinal obstruction | ... | 1 | ... | 1 | ... | 3 | 4 |
| 55. Cirrhosis of the liver | ... | 2 | ... | 2 | ... | ... | 2 |
| 56. Other diseases of the liver and biliary passages | ... | 11 | 1 | 11 | 1 | 16 | 27 |
| 57. Other diseases of the digestive system ... | ... | 126 | 3 | 126 | 2 | 444 | 570 |
| 58. Nephritis (all forms): | | | | | | | |
| (a) Acute | ... | 1 | ... | 1 | ... | ... | 1 |
| (b) Chronic | ... | ... | ... | ... | ... | 1 | 1 |
| 59. Other non-venereal diseases of the genito-urinary system | 1 | 78 | 1 | 79 | 1 | 175 | 254 |
| 60. Diseases of pregnancy, childbirth and the puerperal state: | | | | | | | |
| (a) Abortion | ... | 13 | ... | 13 | ... | 4 | 17 |
| (b) Ectopic gestation ... | ... | ... | ... | ... | ... | ... | ... |
| (c) Toxæmias of pregnancy | ... | ... | ... | ... | ... | ... | ... |
| (d) Other conditions of pregnancy and the puerperal state | ... | 13 | ... | 13 | ... | 47 | 60 |
| 61. Diseases of the skin, cellular tissue, bones and organs of locomotion | 3 | 112 | ... | 115 | 5 | 540 | 655 |
| 62. Congenital malformations and diseases of early infancy: | | | | | | | |
| (a) Congenital debility (children under 1 year) | ... | 6 | 1 | 6 | ... | 12 | 18 |
| (b) Premature birth (children under 1 year) | ... | ... | ... | ... | ... | ... | ... |
| (c) Injury at birth (children under 1 year) ... | ... | ... | ... | ... | ... | ... | ... |
| 63. Senility | ... | 2 | ... | 2 | ... | 7 | 9 |
| 64. External causes: | | | | | | | |
| (a) Suicide | ... | ... | ... | ... | ... | ... | ... |
| (b) Other forms of violence | 2 | 64 | ... | 66 | 3 | 285 | 351 |
| 65. Ill-defined causes ... | 1 | 55 | ... | 56 | 1 | 155 | 211 |
| 66. Normal labour | 1 | 95 | ... | 96 | 3 | 10 | 106 |
| Total Cases and Deaths ... | 22 | 1,655 | 20 | 1,677 | 26 | 3,292 | 4,969 |

# Annual Report of the Laboratory and Research Division for the year 1938

## INTRODUCTION

Within a few weeks of writing, the laboratory will have completed twenty years under the civil administration and dealt with more than one-third of a million specimens.

It might not, therefore, be inappropriate to review briefly the history of the laboratory so far as it is known up to the present time. Available records do not indicate when the laboratory was built or for how long it has carried on its work. It is certain that it had been actively functioning as a laboratory prior to 1897, for a brass tablet on the wall of one of our present research rooms pays tribute in German to the work carried out by no less a scientist than Dr Robert Koch, one of the founders of modern bacteriology. The wording of this tablet runs as follows in its English translation :—

"In this Laboratory
in the years 1897-98
Medical Privy Councillor
Prof. Dr. Robert Koch
commenced his fundamental
researches on Malaria.
As a memorial of the deepest gratitude for the invaluable services which he rendered to the Colony, this tablet was inscribed to his honour at the command of the Imperial German Governor."

Another link with the distinguished professor is an autographed photograph now reposing in the Senior Pathologist's room, where it has remained for at least thirty years. Other celebrated scientists to work in the laboratory were the late Professor Fülleborn, one of the outstanding helminthologists of his time, and Professor Kleine, still happily with us, who needs no introduction to Tanganyika medical men. Amongst the permanent staff of the laboratory were principally Dr Manteufel and Dr Ollwig, who worked chiefly in connection with malaria.

During the East African campaign, when the medical service was taken over by the British military authorities, the laboratory was in the charge of Major Semple, and later Captain Garrow the originator of the well-known "Garrow's agglutinometer." In the intermediate period between the assumption of charge by the civil administration and the appointment of a Director of Laboratory, that is, from March 1919 to March 1920, the laboratory work was conducted by Mr Hammond who had been attached thereto in a military capacity during the campaign and was subsequently appointed laboratory assistant.

With the appointment in 1920 of Dr G. G. Butler as Director of Laboratory, the laboratory was recognized as a distinct and essential working unit within the department. Some six years later the principle that the laboratory served

a territorial rather than a local function was further extended by the creation of the post of Deputy Director of Laboratory Service, to which the then Director of the Laboratory, Dr P. A. Clearkin, was appointed. The first step in the new organization took the form of the Vaccine Lymph Institute (now Medical Laboratory and Lymph Institute) at Mpwapwa, which Dr Clearkin built up as a practically self-supporting source of supply for all the Territory's needs as regards pure and potent lymph. Unfortunately, when further extensions to the laboratory service were under consideration, a period of financial depression occurred. The European staff was reduced and has not yet returned to its former level. Thereafter, research on anything but a very modest scale became impossible and activities generally were restricted. In 1933 the office of Deputy Director of Laboratory Service was abolished, to be replaced in 1936 by that of Senior Pathologist.

It now became apparent that so long as a limited qualified staff made it impossible to extend either the routine or the research services, the policy of the laboratory division should be to increase laboratory facilities throughout the Territory through the medium of an increasing number of trained Africans. This envisaged some increase in the facilities—and where this was impossible, the activities—of the main laboratory so as to embrace a wider field in which to train the African personnel. Accordingly, the officers in the pathological and chemical sides took part in the formal teaching work of the medical school, inaugurated periods of practical instruction for students in the main laboratories, instituted refresher courses for the existing African staff and trained suitable Africans for ultimate appointment to the permanent laboratory staff. There are now seven such Africans of dispenser status trained or in training as laboratory assistants, five on the pathological and two on the chemical side. Branch sub-laboratories have been instituted in Mpwapwa, Tanga and the Sewa Hadji hospital, with Africans conducting the routine work with a considerable measure of success. Already these laboratories, in which such skilled work as the Kahn and Widal tests are performed, have dealt with more than twenty-five thousand specimens per annum.

It is fitting that in the twentieth year of the laboratory service, further extensions can be recorded. Two Africans are now in training with a view to opening clinical sub-laboratories in the Lake and Northern provinces. A travelling laboratory has been built and equipped, and has already undertaken an investigational survey in the field. A completely new departure was made at the close of the year by the appointment as assistant to the Government Analyst of an African holding the qualification of a B.Sc. of the University of South Africa. The Government Analyst has made plans for the training, on his return from leave, of Africans in biochemical methods who will take their place in the sub-laboratories with their colleagues on the pathological side.

The advisory services of the laboratory division have also been extended during the year. Bi-weekly visits by the Senior Pathologist to the Sewa Hadji hospital are now made for consulting work, two hours weekly are reserved for this purpose in the main laboratory, and a second "Wassermann day" has been included in the week, to cope with increasing specimens. A quarterly bulletin has been instituted in order to keep medical officers and others in touch with up-to-date advances to which they might not otherwise have access.

Finally, much-needed extensions have been made to existing accommodation. The Government Analyst has now taken over three rooms in the former

Malaria Research Laboratory and the pathological section has extended into his former laboratories. After this move it was agreed that the administration of the main and malaria laboratories could now best be undertaken as a single unit, and so during the year they become amalgamated for administrative purposes. The union is, however, an unstable one and cannot be completed until the future of the malaria laboratory is definitely decided.

The animal houses have been completely rebuilt and the animals are now given an improved and carefully controlled diet. The results of these improvements have been quite remarkable. The animals have thriven and bred to an extent never encountered hitherto. It is of interest to note that as a result of better living conditions, the complement titre of guinea-pig serum has risen during the year from an average of one in thirty to that of one in sixty and that rabbits have been bred in the laboratory for the first time.

It may be said, therefore, that despite continued staff shortage the year has been one of progress which, apart from these advances not capable of measurement, has manifested itself as far as routine work is concerned in the total of over forty-eight thousand specimens or more than twice the number dealt with in 1935.

In recording the progress of our twentieth year, however, it is necessary, on the other hand, to record a regretted break with the past. During the year, the division lost by retirement the services of Mr H. Hammond, who had held the post of laboratory assistant for no less than twenty-two years, firstly in a military capacity and later in the civil administration. Mr Hammond was the first British official to serve in the laboratory. The present writer has served with him for thirteen years and can testify to the manner in which Mr Hammond devoted a degree of experience, knowledge and loyalty which will not readily be replaced. In referring to this link with the past, a review of the laboratory's history would not be complete without a reference to our head laboratory attendant, Hassan bin Seleman, still a hale and active worker after an unbroken service of over forty years in the laboratory. Indeed the laboratory would appear to lend itself to longevity, for there are two other African attendants with over thirty and twenty years' service respectively; so that it may be said that these three loyal employees, with Mr Hammond and the present writer have contributed to the laboratory a combined service of one hundred and twenty-six years. Since Mr Hammond's departure the work of the laboratory assistant has been carried on ably and most conscientiously by Mr G. V. Sakrikar, whose work has been of great value.

A survey of this nature cannot be brought to a close without a reference to the unfailing loyalty and cheerfulness of those workers "behind the scenes"—the subordinate African staff. Upon them naturally depends a great deal of the smooth working of the laboratory and it is gratifying to be able to record that their work throughout the long period during which most of them have served has been uniformly good.

### Staff

*Main Laboratory, Dar es Salaam*

Senior Pathologist: H. J. O'D. Burke-Gaffney, B.A., M.D.
Government Analyst: W. D. Raymond, B.SC., A.I.C.
Laboratory Assistants: H. Hammond; G. V. Sakrikar, L.C.P. & S. (Bombay), (Acting).
Assistant to Government Analyst: W. L. Jojo, B.SC. (U. South Africa).

Clerk : Maharage Juma.

Laboratory Attendants : Yohana Mkande; Zebron Nicodemus; Bumbura Jumbe.

Probationer Laboratory Attendant : Petri Kikari.

Microscopists : Samuel Kilimali and seven subordinates.

*Malaria Unit, Dar es Salaam*

Research Medical Officer : R. Mackay, M.D., D.P.H.

Sanitary Superintendent : H. J. Rance.

Clerk : Amar Singh.

Laboratory Attendants : Fabiano Mzoo; Nasibu Hija and two subordinates

*Medical Laboratory and Lymph Institute, Mpwapwa*

Pathologist : D. E. Wilson, M.D.

Laboratory Attendant : John Robert and six subordinates.

*Clinical Laboratory, Sewa Hadji Hospital, Dar es Salaam*

Laboratory Attendant : Augustine Sendeu and two hospital orderlies (Sewa Hadji hospital staff).

*Clinical Laboratory, Tanga*

Laboratory Attendant : Alexander Kanyamala and one hospital orderly (Tanga hospital staff).

*Travelling Laboratory*

One driver; other staff as required.

Dr H. J. O'D. Burke-Gaffney, Senior Pathologist, returned from leave on the 21st January 1938.

Dr D. E. Wilson acted as Senior Pathologist until the 20th January 1938.

Dr D. A. Skan was in charge of the Medical Laboratory, Mpwapwa, until the 24th January 1938.

Mr H. Hammond left on retirement on the 20th June 1938.

Mr G. V. Sakrikar was seconded to the laboratory on the 9th May 1938.

Mr W. L. Jojo arrived on first appointment on the 26th December 1938.

## Financial

| *Expenditure :* | Shs | Cts |
|---|---|---|
| Upkeep of Laboratory ... ... ... ... ... | 1,827 | 98 |
| Upkeep of Lymph Institute ... ... ... ... | 802 | 85 |
| Total Shs | 2,630 | 83 |

| *Revenue :* | Shs | Cts |
|---|---|---|
| Laboratory fees ... ... ... ... ... ... | 3,822 | 00 |
| Sale of lymph to other governments ... ... ... | 900 | 00 |
| Sale of vaccines and sera ... ... ... ... ... | 55 | 00 |
| Total Shs | 4,777 | 00 |

This is not a full statement of expenditure, other sums being shown under departmental accounts.

## Buildings and Equipment

The redistribution of space referred to in the introduction took place in May. The Government Analyst has transferred his laboratory to two large rooms and an office in the Malaria Research Laboratory. His former two rooms in the main laboratory are now used as a pathological and a research room. The new animal houses were completed early in the year and were responsible for an immediate improvement in the living conditions of the animals.

## Instructional Courses for African Assistants

These have now become a regular feature of the work of the division and include formal teaching in the medical school, practical instruction of the students at the main laboratory and refresher courses for African members of the department from outstations.

## Microscopes

The whole microscope position was surveyed during the year and recommendations made regarding purchase, upkeep and repair of the instruments. It was possible as a result of this survey to ensure that every medical station, including dispenser stations, would possess at least one efficient miscroscope, and further steps are being taken to ensure that adequate supplies of suitable stains and reagents are being maintained.

## Laboratory Bulletin

A small quarterly bulletin was introduced in October, the object being to increase the service of the division to medical practitioners. The bulletin contains notes and information on practical laboratory problems, derived either from our own experience in the laboratory or from literature to which the busy practitioner in an outstation would not have ready access.

## Mobile Laboratory

The mobile laboratory was nearly completed and fitted by the end of the year. In July-August the laboratory, without all its fittings, travelled in the Uzaramo district and was of great assistance to Dr D. E. Wilson, Pathologist, who used it extensively in conducting a health survey there.

## Visitors

A number of visitors were received in the laboratory during the year, some of whom worked there for varying periods. The visitors included His Excellency Sir Mark Young, Governor and Commander-in-Chief of Tanganyika Territory; Dr A. J. R. O'Brien, C.M.G., Chief Medical Adviser, Colonial Office; Dr Robert Muir; Dr B. S. Platt; Dr Alan Mozley; Dr Frank Hawking, Senior Research Fellow of the Medical Research Council; Dr H. M. O. Lester, Deputy Director of Sleeping Sickness Service, Nigeria; Dr W. H. Kauntze, C.M.G., Director of Medical Services, Uganda.

Drs Mozley and Hawking worked in the laboratory at different periods and grateful acknowledgments are made to the latter whose advice and assistance in several directions was generously given. A number of missionary doctors, including Dr Paul White and Drs Alois and Maria Gabathuler also worked in the laboratory for short periods.

Burke-Gaffney, H. J. O'D. "Laboratory Bulletin No. 1, October, 1938." Government Printer, Dar es Salaam.

Raymond, W. D. "Detection and Estimation of Ouabain and Strophanthin." *Analyst*, July 1938, No. 748, page 478.

Raymond, W. D. "Notes on some Native Ecbolic Drugs." *East African Medical Journal*, December 1938, page 304.

Raymond, W. D. "Native Materia Medica." *Tanganyika Notes and Records*, III.

## Work of the Division

There was again an increase in the work of the division, despite restrictions in staff at certain periods. The total number of specimens examined amount to 48,348 as compared with 38,881 in 1937, an increase of 9,467. This does not include the routine specimens examined in the malaria unit as these investigations cannot be regarded as part of the routine work of the division at this stage. A report of that unit is, however, attached.

The report is divided into the following sections :—

Part I.—Pathological Unit : (a) Main laboratory; (b) Clinical laboratory, Sewa Hadji hospital; (c) Medical laboratory, Mpwapwa; (d) Clinical laboratory, Tanga; (e) Mobile laboratory.
Part II.—Lymph Production.
Part III.—Chemical Unit.
Part IV.—Malaria Unit.
Part V.—Special Investigations.
Part VI.—Appendices.

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# Part I

## Pathological Unit

### (a) main laboratory, dar es salaam

Thirteen thousand one hundred and ninety-seven examinations were undertaken, an increase of one thousand six hundred and nine over 1937.

1. Parasitological Examinations.—Three thousand four hundred and thirty-two were undertaken.

(a) *Blood films.*—Two thousand seven hundred and two were examined.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| *Plasmodium* ... ... | 162 | 182 | 204 | 548 |
| *Mf. bancrofti* ... ... | — | — | 12 | 12 |
| *B. duttoni* ... ... | — | 4 | — | 4 |
| Trypanosomes ... ... | — | — | 1 | 1 |
| Total positive ... | 162 | 186 | 217 | 565 |
| Total negative ... | 595 | 1,088 | 454 | 2,137 |
| Total films ... | 757 | 1,274 | 671 | 2,702 |

(b) *Faeces.*—Six hundred and sixty-five were examined.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| *E. histolytica* ... ... | 2 | — | — | 2 |
| Flagellates ... ... | 4 | 1 | 6 | 11 |
| Ova of *Ankylostoma* ... | 10 | 7 | 265 | 282 |
| ,, *Ascaris* ... ... | — | — | 8 | 8 |
| ,, *Trichuris* ... | 1 | 1 | 6 | 8 |
| ,, *Taenia* ... ... | — | — | 1 | 1 |
| Larvae of *Strongyloides* ... | — | 1 | 30 | 31 |
| Total positive ... | 17 | 10 | 316 | 343 |
| Total negative ... | 198 | 29 | 95 | 322 |
| Total films ... | 215 | 39 | 411 | 665 |

(c) *Urine.*—Sixty-five specimens were examined for ova of *Sch. haematobium.* Forty-one specimens all from Africans were positive.

2. Serological Examinations.—Two thousand seven hundred and sixty serological tests were undertaken.

(a) *The Wassermann Test.*—One thousand two hundred and sixty-one were performed.

| *Blood sera.* | Europeans | Asians | Africans | Tota |
|---|---|---|---|---|
| Positive ... ... ... | 16 | 11 | 538 | 565 |
| Doubtful ... ... ... | 6 | 4 | 84 | 94 |
| Negative ... ... ... | 74 | 74 | 438 | 586 |
| Anti-complementary or contaminated | 2 | 3 | 11 | 16 |
| Total ... | 98 | 92 | 1,071 | 1,261 |

*Cerebro-spinal fluid.*—Nineteen were performed.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| Positive ... ... ... | 1 | — | 2 | 3 |
| Doubtful ... ... ... | — | — | 1 | 1 |
| Negative ... ... ... | 1 | 4 | 10 | 15 |
| Total ... | 2 | 4 | 13 | 19 |

(b) *The Kahn Test.*—One thousand one hundred and thirteen were performed.

| | Europeans | Asians | Africans | Tota |
|---|---|---|---|---|
| Positive ... ... ... | 15 | 7 | 387 | 409 |
| Doubtful ... ... ... | 3 | 1 | 102 | 106 |
| Negative ... ... ... | 82 | 52 | 453 | 587 |
| Contaminated ... ... | 3 | 2 | 6 | 11 |
| Total ... | 103 | 62 | 948 | 1,113 |

(c) *Agglutination Tests.*—Three hundred and sixty-seven macroscopic agglutinations (Dreyer's method) were performed. *Bact. typhosum* "H" and "O", *Bact. paratyphosum A* and *B* and *Br. melitensis* and *Br. abortus* antigens were used as a routine measure in every case.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| *Bact. typhosum* "H" ... ... | 7 | 6 | 20 | 33 |
| ,, ,, "O" ... ... | 2 | 1 | 29 | 32 |
| ,, ,, "H" & "O" ... | 11 | 10 | 54 | 75 |
| *Bact. paratyphosum A* ... ... | — | 1 | 5 | 6 |
| *Bact. paratyphosum B* ... ... | — | — | 2 | 2 |
| *Bact. typhosum* "H" + *Bact. paratyphosum A* ... ... | — | 1 | 1 | 2 |
| *Bact. typhosum* "H" + *Bact. paratyphosum B* ... ... | 2 | — | 1 | 3 |
| *Bact. typhosum* "H" & "O" + *Bact. paratyphosum A* ... | 5 | 1 | 4 | 10 |
| *Bact. typhosum* "H" & "O" + *Bact. paratyphosum B* ... | 2 | 1 | 6 | 9 |
| *Bact. typhosum* "H" & "O" + *Bact. paratyphosum A & B* ... | 8 | 2 | 9 | 19 |
| *Bact. typhosum* "O" + *Bact. paratyphosum A & B* ... | 2 | — | — | 2 |
| *Br. melitensis* ... ... ... | 1 | — | 1 | 2 |
| *Br. abortus* ... ... ... ... | — | — | 1 | 1 |
| *Br. melitensis* and *abortus* ... | 1 | — | 4 | 5 |
| *Br. abortus* ... ... + *Bact. typhosum* "O" ... ... | — | — | 1 | 1 |
| *Br. melitensis* and *abortus* + *Bact. typhosum* "O" ... | 1 | — | 4 | 5 |
| *Br. melitensis* and *abortus* + *Bact. typhosum* "H" ... | 1 | — | 1 | 2 |
| *Br. abortus* ... ... ... + *Bact. typhosum* "H" & "O" ... | 1 | — | — | 1 |
| *Br. melitensis* and *abortus* + *Bact. typhosum* "H" & "O" ... | — | — | 3 | 3 |
| *Br. melitensis* and *abortus* + *Bact. typhosum* "O" ... + *Bact. paratyphosum A* ... | — | — | 1 | 1 |
| *Br. melitensis* and *abortus* + *Bact. paratyphosum B* ... | — | — | 1 | 1 |
| *Br. melitensis* ... ... + *Bact. typhosum* "H" & "O" + *Bact. paratyphosum A & B* | — | — | 2 | 2 |
| *Br. melitensis* and *abortus* + *Bact. typhosum* "H" & "O" + *Bact. paratyphosum A & B* ... | 1 | — | 2 | 3 |
| Total positive ... | 45 | 23 | 152 | 220 |
| Total negative ... | 27 | 17 | 103 | 147 |
| Total ... ... | 72 | 40 | 255 | 367 |

3. Other Blood Examinations.—One hundred and seventy were undertaken.

(a) *Blood cultures.*—Thirty-five were made.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| *Bact. typhosum* ... ... ... | 2 | — | 1 | 3 |
| *Bact. coli* ... ... ... ... | — | — | 2 | 2 |
| Total positive ... | 2 | — | 3 | 5 |
| Total negative ... | 5 | 5 | 20 | 30 |
| Total ... ... | 7 | 5 | 23 | 35 |

(b) *Blood counts.*—Twenty-two complete counts were made. Nothing of special note was encountered.

(c) *Differential counts.*—Eighty-seven differential and eight polynuclear counts were made.

(d) *Blood grouping.*—Fifteen bloods were grouped.

(e) *Sedimentation tests.*—Three sedimentation tests were performed.

4. General Examinations.—One thousand five hundred and seven were undertaken.

(a) *Faeces.*—Six hundred and seventy-five specimens of faeces were examined. Nothing of special interest was noted. "Occult" blood was detected in three instances.

(b) *Urine.*—Eight hundred and thirty-two specimens were examined. Albumin was found in eighty-five, glucose in seventy-six and casts in nine.

5. Bacteriological Examinations.—One thousand five hundred were undertaken.

(a) *Faeces.*—Seventy-five stools were examined bacteriologically. Nothing of special interest was encountered.

(b) *Urine.*—One hundred and eighty-one specimens were cultured with the following results :—

| | Europeans | Asians | Africans | Tota |
|---|---|---|---|---|
| *Bact. coli* ... ... ... | 44 | 10 | 2 | 56 |
| *Bact. aerogenes* ... ... | 6 | 3 | 2 | 11 |
| *P. pyocyaneus* ... ... | 1 | — | 1 | 2 |
| *Alkaligenes faecalis* ... ... | 7 | 1 | — | 8 |
| Staphylococci ... ... ... | 15 | 3 | 5 | 23 |
| Total positive ... | 73 | 17 | 10 | 100 |
| Total negative ... | 65 | 13 | 3 | 81 |
| Total ... ... | 138 | 30 | 13 | 181 |

(c) *Sputum.*—Six hundred and six sputa were examined.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| *M. tuberculosis* ... ... | 1 | 30 | 308 | 339 |
| Other bacteria ... ... ... | 7 | 7 | 4 | 18 |
| Total positive ... | 8 | 37 | 312 | 357 |
| Total negative... | 28 | 125 | 96 | 249 |
| Total ... ... | 36 | 162 | 408 | 606 |

(d) *Nasal and skin smears.*—One hundred and eighty-two were examined for the presence of *M. leprae*. All were from Africans. Sixty-nine were positive.

(e) *Throat swabs.*—Forty-eight were examined. *C. diphtheriae* was found in the case of one Asian, but the strain was not virulent.

(f) *Urethral and vaginal smears.*—Two hundred and thirty-three were examined.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| Gonococci present ... ... | 2 ... | 2 ... | 50 ... | 54 |
| Negative ... ... ... | 20 ... | 7 ... | 152 ... | 179 |
| Total ... | 22 ... | 9 ... | 202 ... | 233 |

(g) *Scrapings from penile sores.*—Seventeen were examined by dark-ground illumination. Two were from Europeans and one was positive. One from an Asian and fourteen from Africans were negative.

(h) *Pus from abscesses, etc.*—Forty-two pus-smears were examined for pyogenic bacteria. There is nothing of special interest to report under this heading.

(i) *Body fluids.*—Forty specimens of pathological fluids were examined. Twenty-three were cerebrospinal fluids, and meningococci were found in four (three from Bagamoyo and one from Mafia). The remaining fluids were pleural, ascitic and synovial and nothing of note was found.

(j) *Vaccines.*—Twelve autogenous vaccines were prepared. Three were for *Bact. coli*, six staphylococci, one *Alkaligenes faecalis* and two *P. pyocyaneus*.

Six batches of Frei antigen were also prepared from inguinal glands but no specific results were obtained from their use.

The following quantities of stock vaccines and sera were issued during the year :—

| | |
|---|---|
| Anti-meningococcal serum (25c.c.) ... ... ... | 12 phials |
| Anti-streptococcal serum (25c.c.) ... ... ... | 1 ,, |
| Diphtheria antitoxin (4000 units) ... ... ... | 4 ,, |
| Diphtheria antitoxin (8000 units) ... ... ... | 7 ,, |
| Plague vaccine (25c.c.) ... ... ... ... | 4 bottles |
| T.A.B. vaccine (25c.c.) ... ... ... ... | 77 ,, |
| T.A.B. vaccine (sets) ... ... ... ... | 27½ sets |
| T.A.B. vaccine tablets for oral use ... ... ... | 1 set |
| Tetanus antitoxin (1500 units) ... ... ... | 96 phials |
| Tetanus antitoxin (8000 units) ... ... ... | 20 ,, |
| Anti-rabic vaccine ... ... ... ... ... | 12 bottles |
| Pertussis vaccine (10c.c.) ... ... ... ... | 1 phial |
| Anti-dysenteric serum (25c.c.) ... ... ... | 1 ,, |
| Anti-gas gangrene serum ... ... ... ... | 19 phials |
| Anti-venene serum (10c.c.) ... ... ... ... | 4 ,, |
| Anti-typhoid serum (20c.c.) ... ... ... ... | 11 ,, |
| Diphtheria antitoxin—Ramon (10c.c.) ... ... | 9 ,, |
| Mixed grasses pollen extracts for treatment of hay fever | 5 ,, |

(k) *Miscellaneous.*—Fifty-eight were examined.

| | | |
|---|---|---|
| Scrapings for fungi ... ... ... ... ... | 4 | |
| Examination of sterilizers ... ... ... ... | 2 | |
| Biological test of drugs ... ... ... ... | 1 | |
| Helminths for identification ... ... ... ... | 5 | (ascaris) |
| Fleas for identification ... ... ... ... | 10 | |
| Snails for cercariae ... ... ... ... ... | 30 | (all negative) |
| Crabs for lethal test with paris green ... ... | 2 | |
| Veterinary specimens, various ... ... ... | 4 | |
| | 58 | |

6. Public Health Examinations.—Three thousand four hundred and sixty-six were made.

(a) *Bacteriological Analysis of Water Supplies.*—Two hundred and fifty-three bacteriological analyses of water samples were made from the following sources :—

(i) Two hundred and fourteen weekly and special examinations from the Dar es Salaam pumping station and reticulation system.

(ii) Twenty samples from shallow wells in the township.

(iii) Nineteen samples from outside stations, principally Tabora.

(i) *Dar es Salaam Supply.*—A disturbing increase in the findings of coliform bacteria was noted in the early part of the year. In May and June these results reached alarming proportions, when true *Bact. coli* (already reported in 1936 and 1937) appeared in undesirably small quantities of water in different parts of the system. Whilst no reason existed for suspecting recent or dangerous pollution, the frequency of unfavourable results, together with a significant increase in the number of samples showing the presence of lactose-fermenting bacteria, hitherto not remarkable, suggested at least some remote or intermittent source of undesirable contamination. This was suspected to have been due to a weakness in the geological strata, accompanied by the increased pumping which the demand for water required. After consultation with the Medical Officer of Health, Government Analyst and Engineers, several samples were examined (see also report of the Government Analyst in this report). A temporary chlorination plant was installed and the results thereafter were uniformly good.

It became more than ever evident following this occurrence that frequent consultation and discussion between all those concerned in the production of a pure water supply was essential; and in order to clarify the bacteriological basis of standardization, a memorandum based on the writer's bacteriological survey of local waters undertaken between 1928 and 1933 was circulated to those concerned. An extract from the memorandum is contained in appendix 1 of this report.

(ii) *Shallow wells in Dar es Salaam Township.*—These examinations were continued as part of the municipal policy of closing those wells which could be shown to be a source of dangerous pollution. Twenty samples were examined. The majority showed the presence of lactose fermenters in 1c.c., in many cases 0·1c.c., and the proportion containing true *Bact. coli* was large.

(iii) *Tabora Water Supply.*—The Medical Officer of Health, Tabora, Dr A. H. Morley, was anxious to obtain assistance in making bacteriological examinations of water samples with a view to testing the efficacy of filter plants. Owing to the absence of facilities for bacteriological culture and of knowledge of the local bacterial flora of the soil and water, the subject presented many difficulties, particularly as the supplying of the necessary liquid media for preliminary tests was impracticable owing to considerations of communication.

Eventually it was decided to provide large tubes of solid MacConkey's medium and large sterile Petri dishes. The tubes were inoculated with quantities of the water to be tested—the medium having first been liquefied—and plates were poured. Appropriate pink colonies were picked off from plates representing different volumes of water and subcultured on agar plates overnight. These stock cultures were then sent to Dar es Salaam for further identification. On receipt, the agar culture tubes were filled with MacConkey broth and replated, when it was found that identifiable lactose-fermenters could be readily obtained. This shows every promise of being a useful method of examining samples from outstations.

Nineteen samples were examined and *Bact. coli* was isolated from 1c.c. of raw water before entering the filtration plant in July. Subsequent samples of treated water showed no evidence of pollution.

(b) *Rats.*—Two thousand nine hundred and nine rats were examined for the presence of *P. pestis*. All were negative.

(c) *Katathermometer.*—Wet Katathermometer readings were taken on three hundred and four days. An analysis of the results is set out in appendix 2.

7. Medico-legal Examinations.—One hundred and five examinations were made.

| | | |
|---|---|---|
| Clothing for seminal stains ... ... | 16 | All negative. |
| Urethral smears ... ... ... ... | 10 | Two showed gonococci and two spermatozoa. |
| Vaginal smears ... ... ... ... | 10 | Two showed gonococci. |
| Anal smears ... ... ... ... | 6 | All negative. |
| Organs for medico-legal examination, other than poisoning ... ... ... | 9 | |
| Clothing for bloodstains ... ... | 20 | Fourteen showed blood and eleven were human blood. |
| Weapons for bloodstains ... ... | 14 | Six showed blood and five were human blood. |
| Sand, grass, etc., for bloodstains ... | 5 | All showed blood and two were human blood. |
| Bones for identification ... ... ... | 12 | |
| Miscellaneous exhibits ... ... ... | 3 | |
| | 105 | |

8. Pathological Examinations.—Two hundred and fifty seven were made.

(a) *Autopsies.*—Thirty-two were made.

| | |
|---|---|
| **Europeans:** | |
| Drowning (accidental) | 1 |
| Meningo-encephalitis | 2 |
| Rifle-wound of head | 2 |
| Asians: | |
| Burning | 1 |
| Cyanide poisoning | 1 |
| Drowning | 1 |
| Multiple injuries (motor accident) | 1 |
| Africans: | |
| Septicaemia | 1 |
| Portal pyaemia | 1 |
| Pericarditis | 1 |
| Pneumonia, lobar | 1 |
| Pneumonia, broncho- | 1 |
| Peritonitis | 1 |
| Meningo-encephalitis | 1 |
| Meningitis, tuberculous | 1 |
| Asphyxia | 1 |
| Osteomyelitis of spine | 1 |
| Ruptured aneurysm | 1 |
| Drowning | 1 |
| Crushing (motor accident) | 1 |
| Fractured skull (homicidal) | 4 |
| Gunshot wounds (homicidal): | |
| Abdomen | 2 |
| Face | 2 |
| Poisoning by kerosene | 1 |
| Unknown | 1 |
| | 32 |

The three cases of meningo-encephalitis, all acute, rapid and with few symptoms, were suggestive of a virus disease and are being investigated further.

(b) *Morbid Histology.*—Two hundred and twenty-five pieces of tissue were examined.

(1) Europeans: (a) *Neoplasms.*

| | |
|---|---|
| Benign— | |
| Parotid tumour | 1 |
| Papilloma, jaw | 1 |
| Papilloma, ear | 1 |
| Fibromyoma uterus | 2 |
| Malignant— | |
| Carcinoma simplex, breast | 1 |
| Squamous carcinoma, skin | 1 |
| Squamous carcinoma, cervix uteri | 1 |

| | | |
|---|---|---|
| Carcinoma, prostate ... ... ... ... ... | 1 | |
| Basal-celled carcinoma, neck ... ... ... ... | 1 | |
| Rodent ulcer, face ... ... ... ... ... | 1 | |
| | —— | 11 |
| (b) *Other conditions.* | | |
| Normal tissue ... ... ... ... ... ... | 7 | |
| Appendicitis ... ... . . ... ... ... | 7 | |
| Meningo-encephalitis ... ... ... ... ... | 2 | |
| Calcified gland ... ... ... ... ... ... | 1 | |
| Bronchitis ... ... ... ... ... ... | 1 | |
| Inflammations ... ... ... ... ... ... | 2 | |
| | —— | |
| | 20 | 31 |
| (2) ASIANS : (a) *Neoplasms.* | | |
| Carcinoma, breast ... ... ... ... ... | 1 | |
| (b) *Other conditions.* | | |
| Normal tissue ... ... ... ... ... ... | 2 | |
| Appendicitis ... ... ... ... ... ... | 1 | |
| Tuberculous gland ... ... ... ... ... | 1 | |
| Inflammations ... ... ... ... ... ... | 1 | |
| | —— | |
| | 6 | 37 |
| (3) AFRICANS : (a) *Neoplasms.* | | |
| Benign— | | |
| Lipoma, chest ... ... ... ... ... ... | 1 | |
| Papilloma, anus ... ... ... ... ... ... | 1 | |
| ,, leg ... ... ... ... ... ... | 1 | |
| ,, scrotum ... ... ... ... ... | 1 | |
| ,, foot ... ... ... ... ... ... | 1 | |
| Fibroma, buttock ... ... ... ... ... | 1 | |
| ,, arm ... ... ... ... ... ... | 1 | |
| ,, face ... ... ... ... ... ... | 1 | |
| ,, wrist ... ... ... ... ... ... | 1 | |
| ,, forehead ... ... ... ... ... | 1 | |
| ,, hand ... ... ... ... ... ... | 2 | |
| ,, skin ... ... ... ... ... ... | 1 | |
| ,, unknown site ... ... ... ... ... | 2 | |
| Fibrolipoma, forehead ... ... ... ... ... | 1 | |
| ,, mesentery ... ... ... ... ... | 1 | |
| Dermoid cyst, skull ... ... ... ... ... | 1 | |
| ,, ,, elbow ... ... ... ... ... | 1 | |
| ,, ,, spleen ... ... ... ... ... | 1 | |
| Adenoma, thyroid ... ... ... ... ... | 1 | |
| Sebaceous cyst ... ... ... ... ... ... | 2 | |
| Lymphatic naevus, finger ... ... ... ... | 1 | |
| Ovarian cyst ... ... ... ... ... ... | 1 | |
| Fibromyoma, uterus ... ... ... ... ... | 1 | |
| Simple cyst ... ... ... ... ... ... | 1 | |
| | —— | |
| | 27 | 64 |

| | | |
|---|---|---|
| Malignant— | | |
| Epidermoid carcinoma, foot | 1 | |
| Adenocarcinoma, cervical glands | 2 | |
| ,, uterus | 1 | |
| ,, abdominal wall | 1 | |
| Squamous carcinoma, penis | 1 | |
| ,, ,, neck | 1 | |
| ,, ,, axilla | 2 | |
| ,, ,, nose | 1 | |
| ,, ,, leg ulcer | 1 | |
| ,, ,, unknown site | 1 | |
| Secondary carcinoma, salivary gland | 1 | |
| ,, ,, pancreas | 1 | |
| ,, ,, chest | 1 | |
| ,, ,, groin glands | 1 | |
| ,, ,, stomach glands | 1 | |
| ,, ,, thyroid muscle | 1 | |
| Mixed sarcoma, jaw | 2 | |
| ,, ,, testis | 1 | |
| ,, ,, brachialis muscle | 1 | |
| Round-celled sarcoma, flank | 1 | |
| ,, ,, face | 1 | |
| ,, ,, muscle | 1 | |
| ,, ,, leg | 1 | |
| ,, ,, kidney | 2 | |
| ,, ,, sigmoid | 1 | |
| ,, ,, groin | 1 | |
| ,, ,, abdominal wall | 1 | |
| ,, ,, jaw | 1 | |
| ,, ,, cheek | 2 | |
| ,, ,, nose | 1 | |
| Fibrosarcoma, thigh | 1 | |
| ,, chest | 1 | |
| ,, hand | 1 | |
| Myeloma, mandible | 1 | |
| ,, tibia | 1 | |
| Melanoma, foot | 2 | |
| ,, penis | 1 | |
| | 43 | 107 |
| Other neoplasma— | | |
| Neurofibroma, back | 1 | |
| ,, pituitary | 1 | |
| Adamantinoma, chin | 1 | |
| Teratoma, abdomen | 1 | |
| ,, testis | 1 | |
| Mixed parotid tumour | 2 | |
| Embryoma, kidney | 1 | |
| Round cell sarcoma, penis (dog) | 1 | |
| | 9 | 116 |

(b) *Other conditions*

| | | |
|---|---|---|
| Normal tissue | | 25 |
| Inflammations, simple | | 18 |
| Yaws | | 2 |
| Leukaemia, lymphatic | | 1 |
| Adenitis, simple | | 7 |
| Adenitis, tuberculous | | 3 |
| Pneumonia, lobar | | 1 |
| Perisplenitis | | 1 |
| Onchocerciasis, head | | 1 |
| Strongylosis | | 1 |
| Ascariasis, liver | | 1 |
| Diphyllobothriosis | | 1 |
| Schistosomiasis, bladder | | 3 |
| ,, liver | | 1 |
| ,, intestine | | 1 |
| Ulcers, simple | | 4 |
| ,, tuberculous | | 3 |
| ,, typhoid | | 3 |
| Tuberculosis, generalized | | 1 |
| Pancreatitis | | 1 |
| Encephalitis | | 2 |
| Appendicitis | | 1 |
| Sepsis | | 3 |
| Cystitis | | 1 |
| Osteitis fibrosa | | 1 |
| Orchitis, syphilitic | | 2 |
| Ileus | | 1 |
| Splenomogaly | | 1 |
| Vitamin A deficiency, skin | | 2 |
| Toxaemia | | 5 |
| Gumma, cheek | | 1 |
| Fungus diseases, skin | | 2 |
| Cirrhosis, liver | | 4 |
| Lymphadenoma | | 4 |
| | 109 | 225 |

*Summary of Examinations*

| | |
|---|---|
| Parasitological | 3,432 |
| Serological | 2,760 |
| Other blood examinations | 170 |
| General examinations | 1,507 |
| Bacteriological | 1,500 |
| Public health | 3,466 |
| Medico-legal | 105 |
| Pathological | 257 |
| Total | 13,197 |

## (b) CLINICAL LABORATORY, SEWA HADJI HOSPITAL, DAR ES SALAAM

Twelve thousand eight hundred and seventy-two examinations were undertaken, a decrease of six hundred and seventy below 1937.

African dispenser Augustine Sendeu was in charge for the greater part of the year, and was then transferred to the main laboratory and relieved by African dispenser Petri Kikari.

1. PARASITOLOGICAL EXAMINATIONS.—Nine thousand six hundred and fifty-seven were undertaken.

(a) *Blood films.*—Six thousand seven hundred and sixty-four were examined.

| | |
|---|---|
| *Plasmodium* ... ... ... ... ... ... | 696 |
| *Mf. bancrofti* ... ... ... ... ... | 970 |
| *B. duttoni* ... ... ... ... ... ... | 2 |
| Total positive ... | 1,668 |
| Total negative ... | 5,096 |
| Total ... ... | 6,764 |

(b) *Faeces.*—Two thousand two hundred and sixty-three were examined.

| | |
|---|---|
| Ova of *Ankylostoma* ... ... ... ... | 898 |
| ,, *Ascaris* ... ... ... ... ... | 15 |
| ,, *Trichuris* ... ... ... ... ... | 19 |
| ,, *Taenia* ... ... ... ... ... | 24 |
| ,, *Sch. mansoni* ... ... ... ... | 7 |
| Larvae of *Strongyloides* ... ... ... ... | 102 |
| Flagellates ... ... ... ... ... ... | 25 |
| Total positive ... | 1,090 |
| Total negative ... | 1,173 |
| Total ... ... | 2,263 |

(c) *Urine.*—Six hundred and thirty were examined. Ova of *Sch. haematobium* were found in three hundred and eighty-three specimens.

2. SEROLOGICAL EXAMINATIONS.—These were all undertaken in the main laboratory.

3. OTHER BLOOD EXAMINATIONS.—Fifty-three were examined.

| | |
|---|---|
| Complete counts ... ... ... | 19 |
| Red cells ... ... ... ... | 16 |
| Haemoglobin ... ... ... | 1 |
| Differential count ... ... ... | 17 |
| Total ... | 53 |

4. GENERAL EXAMINATIONS : Urine.—Two thousand three hundred and twelve were examined. Albumin was found in 398, sugar in 82, pus and blood cells in 684, casts in 76 and bile in 6 specimens.

5. BACTERIOLOGICAL EXAMINATIONS.—Eight hundred and fifty were undertaken.

(a) *Urine.*—Gonococci were found in four specimens and pyogenic bacteria in seven.

(b) *Sputum.*—Four hundred and ninety-seven were examined. Tubercle bacilli were found in forty-seven.

(c) *Nasal smears.*—Thirty-one were examined. *M. leprae* was found in seven.

(d) *Urethral smears.*—Two hundred and fifty-eight were examined. Gonococci were found in sixty-nine.

(e) *Eye smears.*—Twenty were examined. Gonococci were found in two.

(f) *Pus smears.*—Twenty-seven were examined. Nothing of note was found.

(g) *Fluids.*—Six were examined. Nothing of note was found.

*Summary of Examinations*

| | |
|---|---|
| Parasitological ... ... ... ... ... | 9,657 |
| Other blood examinations ... ... ... ... | 53 |
| General examinations ... ... ... ... | 2,312 |
| Bacteriological examinations ... ... ... | 850 |
| Total ... | 12,872 |

(c) MEDICAL LABORATORY, MPWAPWA

Two thousand four hundred and eight examinations were undertaken, an increase of four hundred and ninety-seven over 1937.

Dr D. A. Skan, Medical Officer, was in charge until the 24th January when he was relieved by Dr D. E. Wilson, Pathologist, until the end of the year.

The following general examinations were undertaken :—

1. PARASITOLOGICAL EXAMINATIONS.—Two thousand were made.

(a) *Blood films.*—One thousand seven hundred and eighty-seven were examined.

| | Europeans | Asians | Africans | Tota |
|---|---|---|---|---|
| *Plasmodium* ... ... ... | 2 | 18 | 600 | 620 |
| *B. duttoni* ... ... ... | 1 | 1 | 157 | 159 |
| Total positive ... | 3 | 19 | 757 | 779 |
| Total negative ... | 5 | 21 | 982 | 1,008 |
| Total ... ... | 8 | 40 | 1,739 | 1,787 |

(b) *Faeces.*—One hundred and eighty-five were examined.

| | Europeans | Asians | Africans | Tota |
|---|---|---|---|---|
| Ova of *Ankylostoma* ... ... | — | — | 43 | 43 |
| ,, *Ascaris* ... ... | — | — | 8 | 8 |
| ,, *Sch. mansoni* ... ... | — | — | 7 | 7 |
| Larvae of *Strongyloides* ... | — | — | 1 | 1 |
| Total positive ... | — | — | 59 | 59 |
| Total negative ... | — | 2 | 124 | 126 |
| Total ... ... | — | 2 | 183 | 185 |

(c) *Urine.*—Twenty-eight were examined. Ova of *Sch. haematobium* were found in thirteen.

2. Serological Examinations.—One hundred and forty-three were made.

(a) *Kahn test.*—One hundred and thirty-five were performed, one hundred and twenty of which were from African schoolboys.

| | Europeans | Asians | Africans | Total |
|---|---|---|---|---|
| Positive | — | — | 10 | 10 |
| Doubtful | — | — | 6 | 6 |
| Negative | 2 | 1 | 116 | 119 |
| Total | 2 | 1 | 132 | 135 |

(b) *Agglutination tests.*—Eight sera were examined. All were negative.

3. Other Blood Examinations.—Six were performed.

| | |
|---|---|
| Total | 2 |
| Differential | 4 |

4. General Examinations.—One hundred and ninety-four were made.

*Urine.*—One hundred and ninety-four specimens were tested. Nothing of note was found.

5. Bacteriological Examinations.—Sixty-five were made.

(a) *Urine.*—*B. coli* was found in one specimen.

(b) *Sputum.*—Twenty-one were examined. *M. tuberculosis* was found in four and pneumococci in one.

(c) *Nasal smears.*—Four were examined for *M. leprae* and all were negative.

(d) *Urethral smears.*—Thirty-seven were examined. Fourteen showed gonococci.

(e) *Throat swabs.*—One showed streptococci.

(f) *Fluids.*—Fluid from a cyst was sterile.

*Summary of Examinations*

| | |
|---|---|
| Parasitological | 2,000 |
| Serological | 143 |
| Other blood examinations | 6 |
| General examinations | 194 |
| Bacteriological | 65 |
| Total | 2,408 |

### (d) Clinical Laboratory, Tanga

African dispenser Alexander Kanyamala was in charge of the routine work during the year.

Twelve thousand three hundred and seventy-two specimens were examined, an increase of two thousand two hundred and forty-six over 1937.

1. Parasitological Examinations.—Seven thousand six hundred and ninety-four were made.

(a) *Blood films.*—Four thousand three hundred and ninety-five were examined.

| | |
|---|---|
| *Plasmodium* ... ... ... ... ... ... | 1,648 |
| *Microfilariae* ... ... ... ... ... ... | 14 |
| *Spirillum* ... ... ... ... ... ... | 7 |
| Total positive ... | 1,669 |
| Total negative ... | 2,726 |
| Total ... ... | 4,395 |

(b) *Faeces.*—Two thousand eight hundred and eighty-four were examined.

| | |
|---|---|
| *E. histolytica* ... ... ... ... ... | 2 |
| ,, cysts ... ... ... ... ... | 24 |
| Ova of *Ankylostoma* ... ... ... ... | 1,568 |
| ,, *Ascaris* ... ... ... ... ... | 94 |
| ,, *Trichuris* ... ... ... ... ... | 101 |
| ,, *Taenia* ... ... ... ... ... | 41 |
| ,, *Schistosoma* ... ... ... ... | 5 |
| Larvae of *Strongyloides* ... ... ... ... | 181 |
| Flagellates ... ... ... ... ... ... | 116 |
| Total positive ... | 2,132 |
| Total negative ... | 752 |
| Total ... ... | 2,884 |

(c) *Urine.*—Ova of *Sch. haematobium* was found in four hundred and fifteen specimens of urine from Africans.

2. Serological Examinations.—Three hundred and five were undertaken.

*Kahn test.*—Two hundred and forty-four sera were examined. One hundred and six were positive.

*Widal test.*—Sixty-one were performed.

| | |
|---|---|
| Positive *Bact. typhosum* ... ... ... | 13 |
| Positive *Bact. para A & B* ... ... ... | 5 |
| Negative ... ... ... ... ... | 43 |

3. Other Blood Examinations.—Ninety-two were undertaken.

| | |
|---|---|
| Red cell counts ... ... ... ... | 22 |
| White cell counts ... ... ... ... | 14 |
| Differential counts ... ... ... ... | 34 |
| Haemoglobin estimations ... ... ... | 22 |

4. General Examinations.—Two thousand nine hundred and eighty-three were undertaken.

(a) *Faeces.*—Pus and blood were found in one hundred and five specimens.

(b) *Urine.*—Two thousand eight hundred and seventy-eight were examined. Albumin was found in 563, pus and blood in 562, casts in 44, and sugar in 32.

5. Bacteriological Examinations.—One thousand two hundred and ninety-eight were performed.

(a) *Urine.—Bact. coli* was found in fifty-nine specimens and *M. tuberculosis* in one.

(b) *Sputum.*—Nine hundred and forty-eight specimens were examined. One hundred and forty-two showed *M. tuberculosis.*

(c) *Throat swabs.*—Two were examined, both being negative.

(d) *Urethral smears.*—Two hundred and forty were examined. One hundred and thirty-three contained gonococci, and thirty one *Bact. coli.*

(e) *Fluids.*—Forty-eight were examined. Meningococci were found in sixteen specimens of cerebo-spinal fluid, and Friedländer's pneumobacillus in one.

*Summary of Examinations*

| | |
|---|---|
| Parasitological ... ... ... ... ... | 7,694 |
| Serological ... ... ... ... ... ... | 305 |
| Other blood examinations ... ... ... ... | 92 |
| General examinations ... ... ... ... | 2,983 |
| Bacteriological ... ... ... ... ... | 1,298 |
| Total ... | 12,372 |

(e) MOBILE LABORATORY

The body was built locally on a two-ton Bedford chassis. It is now fully equipped. During June, July and August it was used by Dr D. E. Wilson, Pathologist, to carry out a health campaign amongst a section of the Wazaramo in the south of Dar es Salaam district. The people of this tribe are infested with hookworm and an endeavour was made to find out the severity of the infestation as determined by the haemoglobin index. Five thousand four hundred people were examined with the following results:—

| | | | |
|---|---|---|---|
| Haemoglobin ... | over 80 per cent = | 50 or 0·9 | per cent |
| Haemoglobin ... | 70—80 per cent = | 2,696 or 49·9 | per cent |
| Haemoglobin ... | 56—65 per cent = | 1,788 or 33 | per cent |
| Haemoglobin ... | under 56 per cent = | 866 or 16 | per cent |

Other laboratory examinations undertaken were as follows:—

Four hundred and eighty faeces were examined and eighty-six per cent were found to contain ova of *Ankylostoma.* This was without any special concentration methods. Blood films were collected from each village and sent to the Malaria Research Laboratory.

A record of the haemoglobin of each person was recorded. All had mass treatment with carbon tetrachloride or tetrachlorethylene for hookworm and were treated for other ailments. Numerous sanitary improvements were carried out and the campaign is to be repeated in 1939 and a haemoglobin comparison made, in addition to a general survey of the improvement or otherwise in the health of this section of the tribe.

This is a very short summary of what has been done, as the two years' campaign will form the subject of a special report.

*Total Examinations, Pathological Unit*

| | |
|---|---|
| Main Laboratory ... ... ... ... ... ... ... | 13,197 |
| Clinical Laboratory, Sewa Hadji Hospital ... ... ... ... | 12,872 |
| Medical Laboratory, Mpwapwa ... ... ... ... ... | 2,408 |
| Clinical Laboratory, Tanga ... ... ... ... ... ... | 12,372 |
| Mobile Laboratory ... ... ... ... ... ... ... | 5,880 |
| Total ... | 46,729 |

## Part II

### Lymph Production

### Medical Laboratory, Mpwapwa

#### STAFF

Dr D. A. Skan, Medical Officer, was in charge of the laboratory from the beginning of the year until the 24th January, when he was relieved by Dr D. E. Wilson, Pathologist. This officer was virtually in charge of the laboratory during the remainder of the year, although he was absent on other duties for about four months. While he was away manufacture ceased but sufficient lymph was left tested and ready for distribution, which was supervised by the Sub-Assistant Surgeon, Mpwapwa. The African staff consisted of an African dispenser assisted by three orderlies and three labourers.

#### LYMPH PRODUCTION

| | 1935 | 1936 | 1937 | 1938 |
|---|---|---|---|---|
| Calves vaccinated ... | 56 | 129 | 123 | 48 |
| Total pulp in grammes ... | 1,657 | 4,843 | 3,707·4 | 1,562·2 |
| Average yield per calf ... | 29·6 | 37·5 | 30·1 | 32·5 |

#### ISSUES AND DISTRIBUTION

During 1938, 898,774 doses were issued as compared with 810,450 in 1937 and 939,950 in 1936. On the 31st December 1938 there were 458,750 undiluted doses in cold storage.

Provincial distribution was as follows :—

| | |
|---|---|
| Central ... ... ... ... ... | 36,700 |
| Western ... ... ... ... ... | 62,224 |
| Eastern ... ... ... ... ... | 38,400 |
| Southern ... ... ... ... ... | 36,000 |
| Lake ... ... ... ... ... | 120,800 |
| Southern Highlands ... ... ... | 176,900 |

A total of 427,750 doses were issued to Dar es Salaam for distribution to the Tanga and Southern provinces, 315,000 of these were issued to the Southern province.

## Part III

### Chemical Unit

Mr W. D. Raymond, Government Analyst, was on duty throughout the year.

Mr W. L. Jojo, Assistant to the Government Analyst, arrived on first appointment on the 26th December 1938.

Zebron Nicodemus and Bumbura Jumbe were on duty throughout the year.

In the middle of the year the chemical section moved into part of the Malaria Laboratory and the added accommodation and comfort obtained thereby was considerable.

The total number of specimens examined amounted to 1,619, a decrease of 95 below the figure for 1937. This is partly accounted for by the request

circulated to various quarters asking for the heavy burden of work to be reduced pending the arrival of the assistant to the Government Analyst, and also by the fact that for several weeks the Government Analyst was engaged on anti-gas instruction.

The samples may be classified as follows :—

| | |
|---|---|
| Milks ... ... ... ... ... ... ... | 721 |
| Condensed milks ... ... ... ... ... | 71 |
| Alcoholic liquids ... ... ... ... ... | 82 |
| Waters ... ... ... ... ... ... ... | 214 |
| Viscera ... ... ... ... ... ... ... | 14 |
| Materials supposed poisonous ... ... ... ... | 17 |
| Arrow poisons ... ... ... ... ... ... | 24 |
| Urines (biochemical) ... ... ... ... ... | 134 |
| Bloods ,, ... ... ... ... ... | 81 |
| Bloodstains ... ... ... ... ... ... | 3 |
| Ghees ... ... ... ... ... ... ... | 110 |
| Fractional test meals ... ... ... ... ... | 13 |
| Native medicines ... ... ... ... ... | 25 |
| Non-poisonous materials—oils, clothes, native beer, mealie meal, etc. ... ... ... ... ... | 110 |
| Total ... | 1,619 |

### STAFF

With the arrival of the assistant, it is hoped to extend the work considerably. The existing African staff has made satisfactory progress during the year and their efficiency has been increased by the introduction of automatic apparatus, for instance, pipettes and burettes.

### FOOD-STUFFS

Specifications for food-stuffs in the tenders accepted by the Central Tender Board were introduced as a result of recommendations made by the Government Analyst.

Three hundred and fifty-two samples of milk purchased in Dar es Salaam township were examined. Three contained less than three per cent of fat and thirty-two contained less than 8·5 per cent of non-fatty solids.

Fifty-four samples were received from Tabora, of which thirteen contained less than three per cent of fat, and twenty-five contained less than 8·5 per cent of non-fatty solids.

### WATERS

The Dar es Salaam supply has been under further study during the year. The gradual increase in the chlorides to which reference has been made in previous reports continued and in July the results from the bacteriological section commenced to indicate the presence of undesirable pollution. On further chemical investigation those bore-holes of the supply near the outfall of Gerezani creek were found to be especially rich in chlorides and to contain large quantities of nitrites. It was assumed that a fault in the strata was allowing pollution from the creek to occur under the increased demands of the pumping station. Accordingly on consultation with the Water Engineer a temporary chlorinating plant was devised and for some time the bore-holes nearer the creek were cut off from the pump-house. Experiments with

fluorescein were not entirely conclusive partly owing to the tidal nature of the creek. But traces of the indicator were found in one of the bore-holes near the creek after a massive dose was placed in a small shallow bore-hole cut in the banks of the creek.

It is hoped that permanent apparatus for the chlorination of the supply will be in operation early next year.

A number of analyses of water from various other parts of the Territory were made and do not call for special comment. Seven samples of water were examined in connection with the special investigations of Dr A. Mozley and two samples were submitted by the Water Consultant with a view to determining whether they were polluted with sisal waste.

## POISONING CASES

Satisfaction can be expressed at the absence of any cases in which arsenic was found to be the cause of death.

Material from cases covering sixteen deaths was received during the year. Seven of these cases were examined with negative results. Probable causes of deaths were established in seven of the remaining cases as follows: Bismuth (given intravenously) one, cyanide one, commercial paraffin one, alcohol one, *Courbonia camporum* one, arrow poison prepared from a species of Acocanthera (that is, cardiac glycoside poisoning) two. In one of the remaining cases the cause of death might have been due to a strong native purgative drug since an anthraquinone derivative was detected and the last remaining case concerned the use of a member of the Euphorbiaceae.

Reference to the poisonous action of local species of Euphorbia has already been made in the *East African Medical Journal* (March 1936). *Courbonia camporum* was discussed in the annual report for 1935. The active toxic principle of both of these plants is unknown.

A number of specimens connected with non-fatal poisoning cases were received during the year. One case concerned an outbreak of poisoning among rye-bread eaters in the Tanga district and although definite chemical evidence was not forthcoming the symptoms exhibited and other data suggested that the cause was Datura seed. The matter was taken up with the manufacturers who reported the occurrence of Datura seed in the grain received at the factory and although all foreign seed was normally removed it is almost certain that Datura seed was the cause of the reported outbreak. A vigorous campaign was undertaken by the manufacturers to ensure that cleaner grain would be received in future and a small but valuable pamphlet was issued by them (free) on the dangers of Datura seed. As many as four million and a half seeds of *Datura stramonium* were found in seven bags of wheat alone on their arrival at the factory. A very frank and helpful attitude was adopted by the firm concerned in investigating the outbreak.

A non-fatal case of supposed mushroom poisoning was reported but no muscarine was found in the mushroom submitted for examination.

An interesting case where a woman attempted to poison her husband with arrow poison introduced into his food was investigated. The amount taken by the man, who vomited and recovered, was not known, but 215 milligrams of the poison found in the food contained 15·8 per cent by weight of glycoside calculated as crystalline ouabain. According to recent work ouabain is about thirty times more toxic given intravenously than when administered orally.

Several reports from native sources affirm that the local Acocanthera arrow poison is non-toxic when taken by mouth.

A case of attempted homicide concerned the administration of a mixture of powdered glass and sugar.

An outbreak of supposed food poisoning with some deaths was reported from an estate near Tanga and the medical officer concerned considered *Phaseolus vulgaris* to be the cause. This finding was not supported by laboratory examination. No viscera from the fatal cases were submitted.

### NATIVE POISONS AND MEDICINES

Work on Tanganyika arrow poisons carried out during the past four years has now reached a stage where it can be conveniently summarized.

Information from native sources, accompanied in most cases by material, has been received from many officers in the service. New chemical reactions suitable for the qualitative and quantitative examination of material containing the cardiac glycosides have been worked out and one of these (a reaction with meta-dinitrobenzene) has been found to give results agreeing with physiological assays made by a modification of the method described in the *British Pharmacopoeia*, 1932. Crystalline material isolated from Acocanthera poison has been analysed and the results of the analysis as well as optical and microchemical data show the material to be ouabain. A complete study of the histology of the leaf and stem of the tree species of Acocanthera known to occur in Tanganyika has been completed by Mr R. Cayzer, M.P.S., Assistant Pharmacist. Material from local species of Urginea, Strophanthus, and Dioscorea has been studied in lesser detail. The histological study of the fragments of insoluble matter found in arrow poisons is believed to open up a fresh approach to the examination of native arrow poisons.

In this work of investigating the arrow poisons valuable assistance has been given by the Botanist of the East African Agricultural Research Station, Amani, in the identification of botanical material, by Mr R. Cayzer in extensive histological work carried out in his own time, and by other officers in the service who collected detailed reports and specimens from native sources.

The common arrow poison of the Territory is made from one of the three species of Acocanthera, namely *Ac. Friesiorum*, *Ac. venenata* and *Ac. longiflora*. Generally the woody portion of the trees, with or without the addition of supplementary substances is boiled for several hours over a fire and the resultant extract decanted and concentrated to a thick sticky mass. This mass is packed in containers for sale over a wide area, sometimes of about two hundred miles radius. The main centres of manufacture are situated near Liwale, from Musoma along the Kenya-Tanganyika border down to the Usambara mountains, near Bagamoyo and Kilosa and near Biharamulo. The prepared poisons contain about ten per cent by weight of a cardiac glycoside calculated as ouabain. The active principle would appear to be ouabain although it does not crystallize well owing to the presence of some foreign material. Its colour reactions (*cf. Analyst* 63 (1938), 478-82) are, however, those of ouabain. Since a single arrow may carry five grammes of crude poison this is sufficient to kill two hundred and fifty adults. In a few cases notably the Kamba poison prepared near Bagamoyo, histological examination showed the presence of much material not Acocanthera but in most cases examination of individual arrows showed the presence of wood fibres and other woody material derived from Acocanthera. No evidence was obtained of any appreciable deterioration in the activity of the Acocanthera poison on storage although it

dried up in some cases and would probably be less easily absorbed into the blood stream. Two cases of arrow poisoning which occurred near Dar es Salaam did not reveal any characteristic symptoms or post-mortem signs. One case, where the poison was administered orally, suggested that the poison is far less toxic orally than when administered through a wound. This suggestion is supported by native reports as well as by the literature.

Quantitative assays have been completed of the various parts of the Acocanthera plant and these indicate that the poison occurs most abundantly in the seed and is absent from the fruit flesh. Various reports affirm that the fruit is edible and thus support this finding. Of the other parts of the plant, the root and wood seem to be moderately rich in the glycoside although all parts, except the fruit, contain the poison.

The Tindiga tribe prepare their poison from other ingredients and the close resemblance between the report sent in by the District Officer, Singida, and that given by Stuhlmann (*Mit Emin Pasha ins herz von Afrika*, page 88) suggests that the description obtained on Emin Pasha's journey through Tabora refers to Tindiga poison. Although these reports refer to the roots of *Strophanthus eminii* and a species of Adenium, histological examination of the poison submitted with the district officer's report as well as of several poisoned arrows collected in the district showed that the poison was prepared almost entirely from the seeds of *Strophanthus eminii*. This type of arrow poison was found to be less toxic, both by chemical and physiological assay, than the Acocanthera poison (two to three per cent equivalent of ouabain). Its use appears to be circumscribed. Its active principle is a strophanthin very closely related to the strophanthin official in the *B.P.*

In the Ufipa area the arrow poison is prepared shortly before use from a bulb known as *Sungwe*. This bulb was cultivated and the resulting botanical specimen has not yet been fully identificated. It is, however, a species of Urginea near *Urginea sanguinea* Schinz. Further material is under cultivation at Amani. Chemical methods suitable for the identification of scillaren, the active glycoside present in European species of Urginea, are few and not very definite. Such reactions as are described were given by material removed from a poisoned arrow collected in this area. Histological methods of examination also show material resembling the official powdered squill bulb. The active principle of this poison would thus appear to be closely related to scillaren. As the active principle does not give the meta-dinitrobenzene reaction no chemical method of assay is available. Physiological assay on frogs indicates that its strength is much lower than the Acocanthera poison being equivalent to one per cent ouabain.

Mention may be made here of the local antidotes available for treating arrow poisoning. The exact nature of these varies from district to district and although no exhaustive investigation of them has been made they would appear to have no specific action. Possibly the mechanical details of the treatment, if promptly applied, may be responsible for their effective action. Death in humans from Acocanthera poisons occurs usually from within a quarter of an hour to two hours after the person is struck.

The famed native cure for gonorrhoea, *Randia vestita*, was examined and found to contain a saponin. Later it was tried out clinically in the Sewa Hadji hospital. As was predicted from the chemical examination it acted as a diuretic but had no specific action in curing the disease.

From the several native medicines examined during the past four years it may be concluded that although many of them are of some value they are

usually inferior to available European drugs and although there still remains the possibility of discovering some native medicament sufficiently effective for introduction into European pharmacopoeias this possibility would appear to be remote. A large number of native poisons still await investigation but the value of such investigations probably lies mainly in their chemico-legal application.

### NUTRITION

Progress under this head has been hampered by lack of staff, and only urgent work has been done. A sample of maize meal was examined on request from the Medical Research Laboratory, Nairobi, and some samples of sweet potatoes for the Director of Medical Services, Uganda. The sweet potatoes showed considerable variation in carotene content and it is hoped to make a special study of the methods available for the chemical estimation of vitamins during the Government Analyst's leave. Equipped thus with better knowledge and with the increase of staff it should be possible to attack this subject next year.

### BIOCHEMICAL WORK

Hitherto biochemical work has been limited to the simpler and more useful determinations such as blood sugar, blood urea, van den Bergh reactions, blood calcium and similar determinations. In general these facilities have only been available to medical officers stationed at Dar es Salaam.

With the newer methods, using permanent colour standards, sufficiently accurate for clinical purposes, it is now possible to place many of these estimations in the hands of trained Africans. It is proposed to start a course of training for the more intelligent qualified African dispensers and to equip a number of the main stations of the Territory with trained staff and equipment for the simpler biochemical tests.

At the same time it is hoped to increase the range of facilities available to practitioners in Dar es Salaam. Modern clinical methods have shown the increasing value of biochemical tests in the investigation of disease and it is believed that medical practitioners will welcome this increase in chemical facilities.

One interesting case was investigated during the year. A patient in hospital with a curious intermittent mental condition was found to have during his mental disturbances 285·6 and 250 milligrams per cent of alcohol in the blood serum and urine respectively.

### ANTI-GAS TRAINING

Two classes for instructors (L.A.G.C.) were held during the year, one at Dar es Salaam and one at Tanga. The classes were well attended in spite of the fact that it was difficult for some of the students to find the time in addition to performing their normal duties. A number of other lectures were given to the medical staff.

### MISCELLANEOUS

During a visit to Nairobi in connection with the combined East African meeting of the local branches of the British Medical Association, the Government Analyst read a paper on native poisons to the local Rotary Club.

A course of lectures on elementary science was given to student dispensers. Queries of several government departments were answered and advice given to the Uganda Sugar Factory regarding the preparation and yield of caoutchoucine from vulcanized rubber.

## Part IV.—Report of the Malaria Unit, Dar es Salaam

This has remained a separate unit under the charge of Dr Mackay and its epidemiological returns are submitted to the Director of Medical Services and are included in the general Medical Department Report but since the amalgamation of the laboratories it is considered fitting to include the records of routine examinations for the information of readers.

The principal routine examinations were the following :—

*Detailed findings in Anopheline Mosquitoes Dissected*

| | *A. gambiae* | | | *A. funestus* | | |
|---|---|---|---|---|---|---|
| | Number dissected | Number positive Stomach | Glands | Number dissected | Number positive Stomach | Glands |
| April ... ... | 10 | — | — ... | 6 | — | — |
| | 36 | 2 | — ... | 49 | 1 | — |
| | 83 | 1 | — ... | 58 | — | — |
| | 118 | — | — ... | 46 | — | — |
| May ... ... | 11 | — | — ... | 3 | — | — |
| | 30 | — | — ... | 20 | — | 1 |
| | 100 | — | 2 ... | 59 | — | — |
| | 155 | 2 | 3 ... | 60 | 1 | 3 |
| June ... ... | 5 | — | — ... | — | — | — |
| | 46 | 1 | 1 ... | 32 | 1 | — |
| | 71 | 2 | 2 ... | 37 | — | 1 |
| | 138 | 2 | 1 ... | 58 | — | — |
| July ... ... | 8 | — | — ... | 6 | — | — |
| | 14 | — | — ... | 33 | 1 | 3 |
| | 34 | — | 1 ... | 70 | — | — |
| | 61 | 1 | 2 ... | 56 | — | — |
| August ... ... | — | — | — ... | — | — | — |
| | 8 | — | — ... | 33 | — | — |
| | 25 | — | 1 ... | 76 | — | 2 |
| | 69 | — | 1 ... | 40 | — | 1 |
| September ... | — | — | — ... | — | — | — |
| | 8 | — | — ... | 30 | — | — |
| | 25 | — | — ... | 72 | — | — |
| | 31 | 1 | — ... | 30 | — | — |
| October ... ... | — | — | — ... | — | — | — |
| | 7 | — | — ... | 42 | — | — |
| | 33 | 1 | — ... | 69 | — | — |
| | 96 | — | 1 ... | 49 | — | — |
| November ... ... | — | — | — ... | — | — | — |
| | 18 | — | — ... | 33 | — | — |
| | 33 | — | 1 ... | 58 | — | — |
| | 71 | 2 | 2 ... | 47 | — | — |
| December ... ... | 5 | — | — ... | 1 | — | — |
| | 16 | — | — ... | 23 | — | — |
| | 41 | — | — ... | 57 | — | — |
| | 64 | — | — ... | 29 | — | — |

| Seasonal Variation in Parasite Index | | | | Seasonal Variation *Anopheles infection Index | |
|---|---|---|---|---|---|
| Month | Period | Mean of each 10-day period | Monthly Index | *A. gambiae* | *A. funestus* |
| April ... | 4-4-38–14-4-38 | 554 | 898 | 1·5 | 1 |
| | 18-4-38–28-4-38 | 1,300 | | | |
| May ... ... | 2-5-38–12-5-38 | 1,507 | 3,377 | 2·3 | 1·7 |
| | 16-5-38–26-5-38 | 5,913 | | | |
| June ... ... | 30-5-38– 9-6-38 | 5,253 | 3,831 | 1·3 | 1 |
| | 13-6-38–23-6-38 | 2,304 | | | |
| July ... ... | 27-6-38– 7-7-38 | 1,888 | 2,486 | 1·3 | 2 |
| | 11-7-38–21-7-38 | 3,073 | | | |
| August ... | 25-7-38– 4-8-38 | 2,116 | | | |
| | 8-8-38–18-8-38 | 1,745 | 1,882 | 1 | 1·5 |
| | 22-8-38– 1-9-38 | 1,757 | | | |
| September ... | 5-9-38–15-9-38 | 2,090 | 2,312 | 1 | 1 |
| | 19-9-38–29-9-38 | 2,656 | | | |
| October ... | 3-10-38–13-10-38 | 1,762 | 2,154 | 2 | 1 |
| | 17-10-38–27-10-38 | 2,526 | | | |
| November ... | 31-10-38–10-11-38 | 1,057 | 1,748 | 1·7 | — |
| | 14-11-38–24-11-38 | 2,624 | | | |
| December ... | 28-11-38– 8-12-38 | 2,129 | 1,926 | — | — |
| | 12-12-38–22-12-38 | 1,722 | | | |

*Expressed as a monthly index, being the mean of the stomach and gland infections for ten-day periods.

## Part V.—Special Investigations

These are mostly dealt with under the various special reports, or in contributions to the scientific literature.

On the pathological side preliminary work on the typing of local strains of pneumococci by the Neufeld reaction was begun.

The work carried out by Dr Wilson in the Uzaramo district with the Mobile laboratory was primarily a health survey, but the laboratory investigational work is included in part I of this report. Similarly, the routine investigations of the malaria unit are recorded under a special heading.

Mr Raymond's work on native medicines and more particularly on arrow poisons was continued and is discussed in his report.

It is, however, evident from the mass of routine work that large scale research is still impossible but despite staff limitations, some useful problems connected with routine examinations have been investigated.

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## Part VI.—Appendices

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## APPENDIX I

### Bateriological Examination of Water Supplies

Extract from a letter from the Senior Pathologist to the Medical Officer of Health, with copies to the Director of Medical Services, the Director of Public Works and the Divisional Engineer, Public Works Department, dated the 16th August 1938:

"It is suggested, and indeed demonstrated, that the adverse changes in the water were related to the increased pumping necessitated by increasing demands for water. This, however valuable as an explanation, cannot be regarded altogether with complacence. Such a situation, even though accompanied for a time by satisfactory bacteriological results affords no assurance that dangerous pollution will not and cannot occur in the future.

"The function of the water bacteriologist is not merely to detect the presence of faecal pollution; it is more particularly to pronounce as to its absence. This it is not always possible to do so long as the so-called "harmless" bacteria are present in sufficient quantities to mask the appearance of the more delicate faecal organisms which may also be present. It is for that reason that a completely clear 25cc. specimen is aimed at, and hence every effort should be made to ensure that accumulations of bacterial growths, however innocuous in themselves, in the reticulation system be prevented. It cannot be claimed that the bacteriological standards outlined above are based on immutable rules. They are merely indications to be interpreted in relation to the biological and seasonal considerations. It is important to realize that the most which bacteriological tests can prove is that at the time of examination certain bacteria did or did not grow from the water samples under laboratory conditions. The inevitable overgrowth of some bacterial cultures by others in artificial media introduces a difficulty which it would only be possible to overcome by studying the bacteria *in vivo* in water—a process so far impracticable.

"In his annual report (Metropolitan Water Board) for 1925, the late Sir Alexander Houston wrote:

> 'The writer ventures to think that bacteriologists should think first of epidemiology. It would be too much to ask epidemiologists to reverse the position. In striving after commonsense both schools have a common playground.'

"The sanitary bacteriologist cannot predict with certainty at what point pathogenic bacteria will appear in water supplied for public consumption. The most that he can do in advance is to indicate when the 'minimum point of risk' has been reached. It is for this reason that when water is supplied for human consumption in the tropics no matter how pure it may have appeared to be in the past, adequate means for treating it at short notice should be

constantly available. In my view, the permanent provision of a means to combat the sudden appearance of pathogenic bacteria in a water supply is no less important, as a preventive measure, than the permanent provision of a means to combat the sudden appearance of pathogenic bacteria in man.

"It is most desirable that the standard of water purity in Dar es Salaam previously obtained and now re-established should be maintained. It is equally desirable that any departure from that standard should call for the closest cooperation in action between those engaged in maintaining it. No one aspect, bacteriological, chemical, hygienic or engineering can alone contribute the information necessary for keeping a sufficiently close watch on the safety of the public water supply.

"I have offered the foregoing observations with a desire to contribute from the bacteriological angle to the elucidation of our local water problems. I venture to express the hope that a contribution from other sources, which would be of the greatest value to the bacteriologist, will also be forthcoming."

# APPENDIX 2

KATATHERMOMETER READINGS, DAR ES SALAAM. *Taken daily at 9 a.m. in a laboratory room under constant conditions*

| MONTH | Highest Kata | Air Temp. °C. | DAY | Lowest Kata | Air Temp. °C. | DAY | Mean Kata | Mean Air Temp. °C. |
|---|---|---|---|---|---|---|---|---|
| January ... ... ... | 9 | 30 | 27th | 6·4 | 30 | 20th | 7·2 | 30 |
| February ... ... ... | 9 | 29 | 4th | 5·9 | 30·5 | 19th | 6·8 | 30·4 |
| March ... ... ... | 9 | 27 | 17th | 6 | 30 | 19th | 7·2 | 28·12 |
| April ... ... ... | 10·2 | 28 | 28th | 6·5 | 29 | 7th | 6·8 | 27·8 |
| May ... ... ... | 15·4 | 27 | 21st | 8·7 | 28 | 5th | 10·1 | 27·8 |
| June ... ... ... | 13·2 | 26 | 24th | 9 | 26·5 | 7th | 10·9 | 26 |
| July ... ... ... ... | 13·2 | 25 | 13th | 9·4 | 26 | 30th | 11·5 | 25·2 |
| August ... ... ... | 14·4 | 24·5 | 6th | 9·4 | 26 | 16th | 11·1 | 25 |
| September ... ... ... | 13·6 | 26 | 26th | 8·1 | 27 | 16th | 10·2 | 26·1 |
| October ... ... ... | 14·4 | 26·5 | 4th | 8·1 | 26·5 | 18th | 10·7 | 27 |
| November ... ... ... | 12·5 | 27 | 8th | 7·5 | 28 | 11th | 9·4 | 27 |
| December ... ... ... | 12·5 | 26 | 5th | 6·8 | 29 | 19th | 8·4 | 28·7 |

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