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NORTHERN RHODESIA.

MEDICAL REPORT

ON

Health and Sanitary Conditions for the Year 1931.

PUBLISHED ON BEHALF OF THE GOVERNMENT OF NORTHERN RHODESIA BY THE CROWN AGENTS FOR THE COLONIES
4 MILLBANK, LONDON, S.W.1.
1932.

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Medical Report of Health and Sanitary Conditions for the Year 1931.

SECTION I.

ADMINISTRATION.

TABLE I.

(a) STAFF (as at 31st December, 1931).

European.

Director of Medical and Sanitary Services.
Deputy Director of Sanitary Services
2 Senior Medical Officers
Senior Health Officer.
Specialist Surgical Officer
16 Medical Officers.
*3 Subsidised Medical Officers.
3 Health Officers.
Pharmacist and Storekeeper.
Pharmacist.
Accountant
5 Clerks.
3 Matrons.
25 Nursing Sisters.
3 Health Inspectors.
4 Subsidised Dental Surgeons.

* Last year 5: Reduction due to termination of railway agreement; 1 at Sakania; 1 at Ndola.

Appointments, Changes, etc., in Staff.

Dr. H. S. de Boer, M.C. was appointed Deputy Director of Sanitary Services 21st March, 1931.
Dr. A. Kinghorn was promoted Senior Medical Officer 28th February, 1931.
Dr. N. M. Maclennan was appointed Senior Health Officer 3rd November, 1931.
Dr. H. T. Flannery was appointed Medical Officer 19th March, 1931.
Dr. J. F. MacDonald was appointed Medical Officer 16th April, 1931.
*Dr. A. T. D. Whitfield was appointed Medical Officer 1st May, 1931.
Dr. E. S. Adderley was appointed Health Officer 6th August, 1931.
Dr. J. Taylor was appointed Health Officer 6th August, 1931.
Dr. A. J. W. Wilkins was appointed Health Officer 8th November, 1931.
Mr. G. Foyster was appointed Clerk 16th April, 1931.
Miss W. M. Dawson was appointed Clerk 3rd January, 1931.
Miss R. le R. Coetzer was appointed Clerk 18th November, 1931.
*Madame H. Choinier was appointed Matron 15th April, 1931.
Miss N. I. Matthews was appointed Nursing Sister 22nd January, 1931.
Mrs. M. Ollerhead was appointed Nursing Sister 5th February, 1931.
Mrs. H. F. Walker was appointed Nursing Sister 1st July, 1931.
Miss K. du Heaume was appointed Nursing Sister 26th September, 1931.
Mr. M. A. Viljoen was appointed Health Inspector 2nd February, 1931.
Mr. G. F. Newbury was appointed Health Inspector 10th October, 1931.
Mr. G. T. Joyce was appointed Health Inspector 1st September, 1931.

* Temporary local appointment.

Resignations, Retirements, etc., in Staff.

Dr. H. Leach, Senior Medical Officer retired on pension 28th February, 1931.
Miss A. Woolley, Nursing Sister resigned on her marriage 25th November, 1931.

Leave.

	From	*To*
Dr. A. F. Wallace	19th June, 1931.	
Dr. W. J. Sheehan	5th November, 1930.	11th April, 1931.
Dr. H. A. Gilkes	26th December, 1930	24th October, 1931.
Dr. R. A. Newson	21st July, 1931.	30th April, 1932.
Mr. E. McPhee	17th March, 1931.	24th August, 1931.
Mrs. M. C. Lewis	23rd October, 1931.	16th March, 1932.
Miss M. Roden	20th April, 1930.	28th January, 1931.
Miss Eastland	27th August, 1930.	21st June, 1931.
Miss S. K. Hanna	28th April, 1931.	10th October, 1931.
Miss F. B. Sedgwick	19th December, 1930.	5th July, 1931.
Miss C. A. Griffiths	5th December, 1930.	20th June, 1931.
Miss D. B. B. Cuming	23rd June, 1931.	15th December, 1931
Miss K. M. Brent	17th April, 1931	11th September, 1931.
Miss M. G. Simmie	14th October, 1931.	21st February, 1932.

Distribution of Staff.

Livingstone	Director of Medical and Sanitary Services. Deputy Director of Sanitary Services. Senior Medical Officer. Specialist Surgical Officer. 1 Medical Officer. Health Officer. 2 Pharmacists. Secretary and Accountant. 4 Clerks. Matron. 7 Nursing Sisters. Health Inspector.
Lusaka	Medical Officer, 4 Nursing Sisters.
Broken Hill	Medical Officer, Matron, 5 Nursing Sisters.
Fort Jameson	Medical Officer, 2 Nursing Sisters.
Mongu	Medical Officer, 1 Nursing Sister.
Kasama	Medical Officer, 2 Nursing Sisters.
Mazabuka	Medical Officer.
Fort Rosebery	Medical Officer.
Abercorn	Medical Officer.
Choma	Medical Officer.
Balovale	Medical Officer.
Great East Road ..	Medical Officer.
Bwana Mkubwa ..	Medical Officer, Matron, 3 Nursing Sisters.
Ndola	Senior Health Officer. Health Officer. 2 Health Inspectors. Clerk.
Anglo-Belgian Boundary Commission	1 Medical Officer.
Solwezi	Subsidised Medical Officer.

African.

4 Native Clerks at Headquarters.
1 Native Clerk and Store Assistant at Headquarters.
2 Laboratory Assistants.
2 Laboratory Assistants.
1 Native Clerk at Broken Hill.
1 Native Clerk at Lusaka.
1 Native Clerk at Fort Jameson.
110 Orderlies and Ward Attendants.
81 Other Servants.
17 Native Porters.
8 Office Boys.
4 Sleeping Sickness Guards.
3 Vaccinators.
37 Labourers.

Staff Postings (Medical Officers), 1931.

Dr. P. H. Ward, Director of Medical and Sanitary Services was stationed at Livingstone throughout the year.

Dr. H. S. de Boer, Deputy Director of Sanitary Services, was stationed at Livingstone from the date of his arrival in the Territory, on 21st March, 1931, until the end of the year.

Dr. A. F. Wallace was stationed at Broken Hill until the 19th June when he proceeded on leave.

Dr. A. Kinghorn was stationed at Abercorn until 3rd November when he was transferred to Livingstone.

Dr. J. D. Harmer was stationed at Livingstone throughout the year.

Dr. N. M. Maclennan arrived at Livingstone on the 7th November on transfer from Palestine, and then proceeded to Ndola, where he was stationed until the end of the year.

Dr. R. R. Murray was stationed at Kasama until the 8th June and was then transferred to Broken Hill.

Dr. W. J. Sheehan returned from vacation leave on the 11th April and then resumed duty at Mongu.

Dr. G. M. C. Powell was stationed at Lusaka throughout the year.

Dr. J. A. Acheson was stationed at Fort Jameson throughout the year.

Dr. H. A. Gilkes returned from vacation leave on the 31st October and was then stationed at Abercorn for the remainder of the year.

Dr. J. A. McGregor was stationed at Mongu until the 1st May, and proceeded from there to Mazabuka where he was posted from the 28th May to the end of the year.

Dr. P. B. Robinson was stationed at Choma until the 17th November when he proceeded on vacation leave.

Dr. N. D. Sanderson was stationed at Livingstone up to April 13th when he proceeded to the coast on a month's sick leave. Returned to Livingstone on the 15th May and proceeded to Bwana Mkubwa where he was stationed until the end of the year.

Dr. T. R. F. Kerby was stationed at Livingstone throughout the year.

Dr. R. A. Newson was stationed at Mazabuka until the 21st July when he proceeded on vacation leave.

Dr. R. B. S. Smith was stationed at Balovale throughout the year.

Dr. E. J. Thomas was stationed at Fort Rosebery throughout the year.

Dr. F. W. Gilbert was attached to the Anglo-Belgian Boundary Commission throughout the year.

Dr. H. T. Flannery arrived in Livingstone on first appointment on 11th April and was stationed there until 9th May, then at Kasempa from 9th to 29th May, and at Kasama from 3rd June to end of year.

Dr. J. F. Macdonald arrived in Livingstone on first appointment on 14th May and was stationed there until the 18th; at Lusaka 18th—24th May; Livingstone 24th—30th May; Mkushi 30th May—8th June; Livingstone 27th October—15th November; Choma 15th November to end of year.

Dr. A. T. D. Whitfield was appointed as a temporary local medical officer on 4th May and was stationed on Great East Road until the end of the year.

Dr. E. S. Adderley arrived at Livingstone on first appointment on the 27th August and was stationed at Ndola for the remainder of the year.

Dr. J. Taylor was stationed at Livingstone from 27th August until 21st November when he proceeded on a tour of the Luangwa Sleeping Sickness Area.

Dr. A. J. W. Wilkins arrived in Livingstone on the 13th November and was stationed there as Health Officer until the end of the year.

The appointment of a Deputy Director of Sanitary Services in March was the most important departmental event of the year. Appointments of Health Officers and Health Inspectors followed, and by the end of the year the organisation of a small Sanitation Branch was complete.

The accomplishment of this Branch, first asked for in 1926, is an important event, not only departmentally, but in the history of Northern Rhodesia.

On the completion of the erection of the new Sisters' Hostel, the old Sisters' Quarters were taken over as Headquarter Offices. These offices provide more adequate accommodation and are more conveniently arranged than the old ones. The vacated offices have been utilized as an additional dispensary and stores. There is now ample accommodation for the department's drugs, equipment and bulk stores, and medical storekeeping can be run on business lines.

Dr. Kinghorn, Senior Medical Officer, was transferred from Abercorn to join in the administration staff at Livingstone in October. His assistance has proved of great value, and will facilitate more frequent inspection of out-stations, the need for which has been apparent in the past.

The temporary appointment of an officer to assist in the accountancy work of the department, especially in connection with old outstanding hospital accounts, has greatly assisted the clerical staff, and has been justified by the financial results.

It is gratifying to report that the re-organisation of the administration work of the department, which commenced on the appointment of Mr. Algar as Accountant in June last year, is now complete. A routine has been established which facilitates the work, and the all-round improvement in efficiency is marked.

(b) LIST OF ORDINANCES AFFECTING PUBLIC HEALTH ENACTED DURING THE YEAR 1931.

Public Health (amendment) Ordinance, 1931. (No. 1 of 1931.)
Public Health (Infectious Diseases) Regulations, 1931.
Mines (Health and Mortality Returns) Regulations, 1931.

(c) FINANCIAL.

Year 1931.

TABLE II.

The following figures have been provided by the Treasury:—

Total Revenue of Colony	£859,488 18 5
Health Vote Revenue.	
Hospital Fees, all sources	£6,969 18 10
Medical Subsidies	3,380 1 0
Sale of Drugs, including Veterinary Department sale of Vaccines ..	518 5 5
	£10,868 5 3
Expenditure.	
Personal Emoluments	£37,086 11 3
Other Charges	30,624 13 5
	£67,711 4 8

Health Vote expenditure = 7·86 per cent. of total revenue of Colony.

SECTION II.

PUBLIC HEALTH.

(a) General Remarks.

The Deputy Director of Sanitary Services has, in his first report under Section III. reviewed very fully the incidence of disease and general health conditions in the various districts throughout the Territory. This report, synchronising with the inauguration of the Sanitation Branch, is valuable, not only because it depicts clearly the public health conditions of to-day and outlines the idea and purpose for which the Sanitation Branch was formed and the duties its officers will perform (a matter in which the public require enlightenment), but because it will serve as a most useful record for reference in future years. It is, in fact, the first chapter of a story yet to be written.

The ground under Public Health having been so fully covered under Section III. few other remarks under this heading will be necessary.

(I.) GENERAL DISEASES.

1,525 in-patients were treated in Government European Hospitals with 44 deaths, against 1,151 patients with 29 deaths in 1930. In this connection it should be noted that Government took over Bwana Mkubwa European Hospital (9 beds) on 16th April.

8,603 in-patients were treated in Government Native Hospitals with 436 deaths against 7,272 in-patients with 471 deaths in 1930. It is gratifying to note that with an increase of 1,331 admissions there was a decrease of 35 in the number of deaths.

The following table shows the number of cases treated in hospital during the years 1928, 1929, 1930, 1931.

	1928		1929	
	In-patients.	Deaths.	In-patients.	Deaths.
Europeans	1,045	31	1,078	21
Natives	8,449	458	8,874	446
	1930		1931	
	In-patients.	Deaths.	In-patients	Deaths
Europeans	1,151	29	1,525	44
Natives	7,272	471	8,603	436

The percentage general case mortality rates of Government Hospitals are shown below:—

	1927	1928	1929	1930	1931
Europeans	2·92	2·97	1·95	2·5	1·5
Natives	5·60	5·42	5·03	6·5	5·06

The following table shows the total cases treated in Native Hospitals with total deaths and mortality rates for 1929, 1930 and 1931:—

Station.	Cases Treated.			Deaths.			Mortality Per cent.		
	1929	1930	1931	1929	1930	1931	1929	1930	1931
Livingstone ..	1,638	1,205	1,268	214	184	145	13·06	15·27	11·43
Choma	772	628	766	14	7	23	1·81	1·115	3·02
Mazabuka ..	605	752	678	24	21	24	3·97	2·74	3·54
Lusaka	489	478	577	29	34	45	5·93	7·113	7·78
Broken Hill ..	1,427	1,359	1,407	75	69	95	5·26	5·077	6·15
Bwana Mkubwa	—	—	551	—	—	34	—	—	6·17
Fort Jameson ..	371	327	452	15	20	26	4·04	6·116	5·75
Kasama	403	397	344	3	9	6	0·74	2·27	1·74
Fort Rosebery ..	420	352	446	6	2	4	1·43	0·568	0·89
Abercorn.. ..	74	111	85	1	1	3	1·35	0·9	3·53
Mongu	524	627	808	10	12	14	1·91	1·913	1·74
Balovale ..	—	209	288	—	8	9	—	3·83	3·12
Solwezi	1,506	221	922	12	4	8	0·79	1·809	0·86

The mortality rate at Livingstone, though lower than that of the preceding two years, still remains high. This hospital serves a very large area, and patients are often admitted after long journeys in a moribund condition.

Natives from the Zambesi Valley, and the Monkoya and Balovale districts are specially prone to contract pneumonia and influenza, and have little resistance to these diseases.

Dr. J. F. MacDonald toured a portion of the Livingstone district in September, visiting fifty villages. He commented on the prevalence of Leprosy, and the amount of Blindness amongst the old, middle-aged and young. "In children dense opacities of the cornea of one or both eyes are comparatively common." Adults gave a history of inflammation in childhood. "I am sure some infection by flies in the young is the cause of the majority of cases of blindness." There can be no doubt that early treatment of inflammatory eye conditions by Native Orderlies, and instruction concerning the danger of the conveyance of infection by flies is one method of conferring a great benefit on the native population at small cost.

The prevalence of simple Goitre was also commented upon, 80% of the patients being women. No signs of toxic or pressure symptoms were observed in any case. The Medical Officer, Fort Rosebery, also comments on the absence of toxic symptoms in the cases of Goitre observed in that district.

Two deaths from Pulmonary Tuberculosis in young native children are reported in the Fort Rosebery district.

The occurrence of fatal Tuberculosis in young native children in villages distant from the settled area is disquietening, and tends to strengthen the impression mentioned in previous reports that the incidence of Tuberculosis is increasing amongst the native races.

Four native cases of Cirrhosis of the Liver (two fatal) with Ascites are reported from Mazabuka.

As a snake bite in a European is unusual, the following case is of interest:—

"The snake, eight feet long, probably a mamba, made an unprovoked attack. The patient for a moment did not realise he had been bitten, as the snake's teeth did not do much more than break the skin over the ankle, and he thought a thorn had scratched him. As an afterthought he looked at the marks, and the natives told him that it was a snake bite. He cut the wound, and applied a very rough tourniquet, walked one-and-a-half miles to his car, and then drove himself four miles to Abercorn.

His symptoms on arrival were:—

Salivation and a sour taste in the mouth;

Pain in the foot;

Nausea, weakness and sweating.

After fifteen minutes, and while under treatment, he developed:—

Violent pain in the abdomen resulting in vomiting and subsequent relief. A succession of agonising cramps in the muscles of both legs, face, chest, and abdomen. These were followed by vomiting. Towards evening cardiac symptoms caused great anxiety.

Fitzsimmons anti-venom serum was administered at 4 p.m. He improved slowly, the violent attacks lessening in frequency and severity."

The report does not mention the time of the bite, but it was during the morning. Convalescence was prolonged owing to painful œdema of the foot and leg.

(II.) COMMUNICABLE DISEASES.

(a) Mosquito or Insect Borne.

Malaria and Blackwater Fever.

There were 22 deaths from Malaria and 19 from Blackwater. These figures based on a larger population show a slight improvement on last year (Malaria 25, Blackwater 20) but still remain unnecessarily high, and in no way represent a true mortality rate under normal conditions. While during the year the Roan and Nkana Mines were nearing the end of the development stage, in the rest of the mining area active development was still proceeding. In the mining area, therefore, while a number of regular employees were living under more settled conditions, there was still a large floating population engaged in development work.

At the Roan and Mufulira the expenditure in anti-malarial work was proving its efficacy, but in other centres, as is usual when rapid development is proceeding, man made anopholene breeding places abounded, and were not yet receiving attention. Towards the end of the year a number of the mines had closed down, and retrenchment everywhere brought about an entirely new aspect, and conditions particularly favourable to the incidence of Malaria.

The distribution of the Malaria and Blackwater deaths is shown below:—

Province.	Deaths from Malaria.	Deaths from Blackwater.
Luangwa (including the Mining Area)	18	13
Batoka (including Livingstone Hospital)	3	3
Kafue	1	3
Rest of Territory	—	—
	22	19

It should be noted that the Livingstone Hospital serves a large area, and patients are received from Southern Rhodesia also.

Kafue is a railway depot, and a number of railway employees including drivers, firemen and guards, whose calling entails special risk of Malaria, reside there.

150 of the total deaths for the Territory, numbering 210, occurred in the Luangwa province.

The following table is of interest, as showing the effect of the conditions alluded to above on the death rate of the Territory:—

Death Rate per Thousand.

Area.	All Causes.	Malaria.	Blackwater.
Whole Territory	15·16	1·59	1·37
Luangwa Province	17·4	2·09	1·5
Whole Territory excluding Luangwa Province	11·5	0·76	1·14

There is another factor explanatory of the high mortality rate from Malaria in the Luangwa Province. To a large extent the regular use of quinine as a prophylactic in this province has been discarded. Experience has proved beyond doubt that in Northern Rhodesia, the settler who adopts the usual precautions against mosquito bites (mosquito nets, mosquito boots, etc.) and takes a regular dose of quinine, has little to fear from Malaria. There should be no deaths from Malaria and Blackwater in this Territory. Yet 41 lives have again been sacrificed to these diseases. The necessity for taking a regular daily dose of quinine has been taught by the Medical Officers of this department for 25 years, and yet the lesson has not been learnt, and during the last two years 86 lives have paid forfeit—many of them young men and women in the prime of life.

A case of Cerebral Malaria in a native child is reported from Mazabuka: before the death the temperature rose to 107 and smears from the spleen were loaded with parasites.

It will be noted that there is a marked increase in the admissions for Malaria over the previous year, of which Bwana Mkubwa accounts for 41.

A heavy rainfall in November followed by a prolonged dry spell favoured the incidence of Malaria during the latter part of the year.

Malaria accounts for 10·47% and Blackwater 9·04% of the total deaths, which gives a combined percentage of 19·5. This compares unfavourably with Southern Rhodesia, as only 8% of the total deaths is due to Malaria and Blackwater. As it has been stated above, the Northern Rhodesia figure is unnecessarily high, and represents abnormal conditions. If the Europeans would take the precautions advised there would be an immediate improvement.

Some of the newer drugs introduced for the treatment of Malaria appear to give promising results especially in chronic cases with frequent recurrences. How far the improved methods of treatment will in the future change the aspect of the Malarial problem is to-day only an interesting speculation.

TABLE SHOWING DEATH RATES PER 1,000 FROM MALARIA, BLACKWATER FEVER, TOTAL CLIMATIC AND TOTAL ALL CAUSES FOR 20 YEARS.

Year.	Total Climatic.	Blackwater Fever.	Malaria.	Total All Causes.
1911-12	10·50	6·60	3·60	25·20
1912-13	10·50	5·70	2·60	23·68
1913-14	8·69	6·08	2·60	18·70
1914-15	6·60	5·70	0·40	20·40
1915-16	9·28	4·64	1·85	18·11
1916-17	5·08	3·23	0·92	18·93
1917-18	3·75	2·80	0·83	17·80
1919	5·20	2·00	2·40	28·40
1920	2·80	2·40	—	12·80
1921	5·80	2·70	1·80	15·40
1922	4·12	2·75	0·82	14·30
1923	5·20	3·40	1·05	13·42
1924	2·70	1·80	0·45	9·04
1925	2·82	1·52	1·30	13·70
1926	2·86	2·14	0·71	11·10
1927	2·88	1·23	1·10	9·89
1928	3·58	2·65	0·53	12·87
1929	1·20	1·00	0·10	9·32
1930	4·00	1·66	2·08	13·58
1931	3·32	1·37	1·59	15·16

MALARIA AND BLACKWATER FEVER (EUROPEAN) IN GOVERNMENT HOSPITALS.

	1927.		1928.		1929.	
	Malaria.	Black-water Fever.	Malaria.	Black-water Fever.	Malaria.	Black-water Fever.
Livingstone	90 (2)	1	107 (2)	6 (3)	166 (1)	2 (1)
Lusaka	76 (2)	8 (4)	74	1 (1)	69	2
Broken Hill	92 (1)	6 (1)	106	9 (1)	87	—
Bwana Mkubwa ..	—	—	—	—	—	—
Fort Jameson	13 (1)	5	17	1	7	1
Kasama	1	—	—	—	1	—
Mongu	—	—	—	—	—	—
TOTALS	272 (6)	20 (5)	304 (2)	17 (5)	330 (1)	5 (1)

	1930.		1931.	
	Malaria.	Black-water Fever.	Malaria.	Black-water Fever.
Livingstone	175 (3)	7 (3)	216 (2)	4 (2)
Lusaka	93 (2)	1	88	5 (2)
Broken Hill	97	1	133 (1)	4 (1)
Bwana Mkubwa ..	—	—	41	1
Fort Jameson	11	—	15	1
Kasama	7	—	6	—
Mongu	—	—	1	—
TOTALS	383 (5)	9 (3)	500 (3)	15 (5)

Bwana Mkubwa was taken over by Government on the 16th April, 1931.

NOTE.—Brackets indicate fatal cases.

Sleeping Sickness. From the information available, it would appear that there had been no material change in the position as regards this disease.

One fatal European case (2.B. mentioned in previous report) was reported from Broken Hill, and three native cases of which two were fatal. These originated in the Kasempa, Mumbwa and Fort Jameson districts respectively.

In addition to the cases in which a definite diagnosis was made microscopically, two suspected cases were reported from the Kasempa and ten from the Petauke districts, but as these were notified by lay observers it is impossible to accept the diagnosis with confidence.

No cases have been reported in recent years from either the Tanganyika or Luapula areas. The Kasempa and Mumbwa cases in all probability are an extension of the Sleeping Sickness area in the south-western portion of the Ndola district, which was delimited in 1920. Unfortunately, through limitations of staff, it has not yet been possible to investigate the conditions in the Kasempa and Mumbwa districts.

In December a Health Officer was detailed to make a complete re-investigation of the position in the Luangwa Valley, but as he resigned from the Service at the end of the year, it has not been possible to complete the work. The results of this survey so far as they extended—in that portion of the Petauke district from which most of the suspected cases were reported—indicate that the position is the same as in former years, *i.e.*, there is no suggestion of any increase in the number of cases, and that these crop up sporadically. It may be repeated here that in general the incidence of this disease in the Luangwa Valley is low and accounts for less than 1% of the deaths. Economically it is not of as great importance as other climatic diseases except in so far as the fact that its incidence in large areas of the Territory acts as a bar to the possible settlement of such parts.

Admittedly, a complete re-survey of both the Luangwa Valley and Ndola-Kasempa-Mumbwa areas is required but as stated earlier, the present financial position and lack of staff will not permit of this being carried out immediately.

Relapsing Fever. Five Europeans, two Asiatics, and 68 native cases were notified by Government Medical Officers during the year.

The distribution of the cases was as follows:—

Station.	European.	Native.	Asiatic.
Fort Jameson	1	44	2
Abercorn	1	1	—
Kasama	1	9	—
Mongu	2	2	—
Livingstone	—	3	—
Bwana Mkubwa	—	9	—
TOTALS	5	68	2

NOTE.—The cases at Bwana Mkubwa were probably contracted on the journey from north-eastern districts to the mines in search of work.

Except in the Fort Jameson district this disease never assumes serious proportions.

It is known that many of the native dwellings in all the settled areas are infested with the Ornithodoros MOUBATA Tick, yet the disease never assumes epidemic proportions.

It is therefore considered that the majority of the native population acquire immunity in youth, and consequently the disease is unlikely to become of economic importance in connection with native labour.

The regulation providing for impervious floors in native quarters in large labour camps gave rise to considerable argument and some opposition, but it is considered that the necessity arises from Tuberculosis and epidemic Pneumonia rather than Relapsing Fever. The native expectorates on the floor and walls of his dwelling, and in close settlements cleansing by flushing or spraying is necessary. Floors of beaten earth provide ideal material for conveying germs to the respiratory organs.

(b) Infectious Diseases.

In the last Annual Report it was pointed out that the whole system of notification and compilation of infectious diseases required organisation. The work of organisation was left until the arrival of the Deputy Director of Sanitary Services.

2. During the year Regulations under the Public Health Ordinance for the notification of infectious diseases received the approval of Government and were brought into force. Medical Officers were notified of the need for keeping Registers of Infectious Diseases and for making regular returns and were provided with these registers. It is hoped, therefore, that in future notifications will be made regularly and that it will be possible to include in the statistical figures of Annual Reports all the cases seen by Medical Practitioners.

3. Government propose during the new year to call upon all District Officers to submit regular Monthly Returns of Infectious Diseases. Such returns will not be altogether reliable as they will include figures submitted by village Headmen and Native District Messengers but will nevertheless be of value as an indication of the incidence of disease in areas which cannot be visited ordinarily by Medical Officers.

4. The following table shows the infectious diseases that have been reported during the year. The cases shown on the list have not all been regularly notified. The list was compiled from all available sources of information including the Monthly Health and Mortality Returns submitted by Mine Managements. The notifications received during the year were mainly made by Government Medical Officers.

Disease.	Europeans.		Natives.	
	Cases.	Deaths.	Cases.	Deaths.
Variola	3	—	149	11
Influenza	88	—	8,812	112
Pneumonia (influenzal)	6	2	328	67
,, (lobar)	9	3	705	163
,, (broncho)	8	1	320	69
Dysentry (amœbic)	40	1	29	9
,, (bacillary)	13	3	115	27
,, (unclassified)	18	—	115	27
Tuberculosis (pulmonary) ..	7	2	38	20
,, (other forms) ..	1	—	8	5
Measles	44	—	354	24
Diphtheria	4	—	2	1
Varicella	1	—	58	—
Cerebro Spinal Meningitis ..	6	4	70	34
Enteric Fever	17	3	75	25
Relapsing Fever	4	—	66	—
Meningitis (pneumococcal and other forms)	—	—	19	18
Trypanosomiasis	—	—	4	2
Mumps	1	—	19	—
Septicæmia	2	—	14	12
Blackwater Fever..	14	5	2	2
Whooping Cough	—	—	4	—
Tropical Typhus	—	—	3	—
Leprosy	—	—	212	—

5. The Deputy Director of Sanitary Services in his Report deals fully with Infectious Diseases occuring in the Territory.

Smallpox. No serious epidemic has occurred during the year. During the epidemic years of 1928 and 1929 when this disease was widespread throughout the Territory most of the native population must have acquired immunity, either through vaccination or the disease, and for financial reasons no routine vaccination has been carried out other than the vaccination of native labour, and for the control of small outbreaks. The majority of native children born during the last two years are therefore unvaccinated. This is a matter which must soon receive attention.

From time to time the argument that Alastrim and Smallpox are different diseases is put forward, and in support of this it is claimed that patients suffering from Alastrim show good vaccination marks. In this connection the following is of interest:—

During a period when a large number of native labourers were kept under observation a considerable proportion displayed wounds on their arms as a proof of recent successful vaccination. These wounds were puzzling as they did not resemble vaccination marks, having a clean punched out appearance. On enquiry it was discovered that the natives were using gunpowder to make wounds in order to deceive the inspecting Officer. It would be quite impossible to distinguish between the healed wound and a vaccination mark.

Dysentery. In the absence of laboratory facilities, the classification of this disease into the group Amœbic and Bacillary by various practitioners who hold different views, must be received with some reserve, and the matter requires investigation. It is possible that the incidence of Amœbic Dysentery is on the increase. It is a matter of experience that whereas formerly treatment by salines quickly brought about recovery, these remedies do not always suffice to-day.

Diphtheria. This disease is a recent importation into the Territory though isolated cases are known to have been introduced from other territories in former years. Four European cases (one fatal) and two native cases were reported during the year, the distribution being as follows:—

Mazabuka: 1
Kafue: .. .. .. 2 European; 2 Native (1 fatal);
Bwana Mkubwa 1 (fatal).

This is the first time the disease is known to have occurred in natives.

Cerebro-Spinal-Meningitis. This disease occurs sporadically, a number of cases being reported from the mines. Six cases in Europeans have been reported, two each from the Nkana and Roan Antelope Mines, and one each from the Government Hospitals at Lusaka and Livingstone respectively. Four of the cases ended fatally.

The number of native cases reported this year from the Roan was 12 as against 29 in 1930. At Nkana 31 cases were recorded as against 32 last year. Nkana throughout 1931 was still in the development stage, while on the Roan during the year production started with a reduction in the labour force. It is hoped that when the Nkana Mine begins to produce, overcrowding will be eliminated and cases of cerebro-spinal-meningitis become fewer.

Enteric Fever. This has been dealt with fully under Section III., a number of cases characterized by pyrexia lasting from ten to fourteen days, slow pulse rate but no other marked symptoms, occur from time to time throughout the Territory and especially in Livingstone. These cases are usually diagnosed as paratyphoid, though the Widal reaction is frequently negative. The disease is of importance, as it results in a marked debility and cardiac weakness necessitating a trip to the coast for convalescence. When laboratory facilities are available it requires investigation.

Influenza. A severe epidemic was reported in Panza's village in the Abercorn district. This village is near the border of Tanganyika Territory, whence the disease is reported to have spread. Two villages were attacked and 19 deaths occurred in two weeks from Influenzal Pneumonia. Outbreaks also occurred in the Fort Jameson, Lundazi, Mpika, Kasama and Isoka districts with considerable mortality.

Measles. In an outbreak at Fort Rosebery, 279 cases were reported with 24 deaths. The deaths were due to chest complications. Usually the type of disease was mild with no sequelæ.

Yaws. A number of cases come under treatment each year, and the drug commonly used is "Sobita". The majority of Medical Officers speak of it favourably, but the Medical Officer, Fort Rosebery, says that the pain caused by its use makes it unpopular. This has not been the experience elsewhere. The incidence of Yaws in the Guimbi is reported to be increasing. It is believed to have made its appearance there only in the last few years. This valley has hitherto been somewhat inaccessible, but new roads are being opened up which will facilitate treatment, and a Missionary Doctor will shortly be stationed there. It is proposed to assist this Missionary Society financially in their efforts to combat the disease.

The Medical Officer, Choma, toured the Guimbi Valley and reported the incidence to be increasing there.

Venereal Disease. Treatment by injection with arsenical preparation is becoming more and more popular with the natives. An increasing number come under treatment at all Government centres each year. This might lead to the conclusion that the incidence of Venereal Disease is on the increase. This is not the case. Natives appreciate the rapid alleviation of their symptoms by treatment, and avail themselves of it.

Leprosy. An experiment at Balovale, in which a number of patients were given light labour about the Boma and paid small wages for their work has been well received by the natives. Under these conditions they appear to be more amenable to the long period of treatment necessary. The experiment is worth repeating on other district stations where the provision of the necessary labour for station upkeep is always a difficulty.

(c) HELMINTHIC DISEASES.

This has been fully dealt with under Section III.

Enteric Group.

HOSPITAL CASES, 1929, 1930 AND 1931.

	1929.				1930.			
	European.		Natives.		European.		Natives.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Livingstone	5	—	5	5	3	1	5	3
Lusaka ..	4	—	1	1	—	—	—	—
Mazabuka ..	—	—	2	1	—	—	—	—
Broken Hill	2	1	1	1	6	2	—	—
Bwana Mkubwa ..	—	—	—	—	—	—	—	—
TOTAL ..	11	1	9	8	9	3	5	3

	1931.			
	European.		Natives.	
	Cases.	Deaths.	Cases.	Deaths.
Livingstone	5	2	8	3
Lusaka ..	3	1	1	1
Mazabuka ..	—	—	1	—
Broken Hill	5	—	12	4
Bwana Mkubwa ..	—	—	1	1
TOTAL ..	13	3	23	9

VITAL STATISTICS.

(I.) General Native Population.

The following statistics are taken from the Annual Report on Native Affairs:—

The total native population for the year is estimated as 1,372,235. The increase on last year's estimate of 1,331,231 is 41,004, or 3·1 per cent. The previous year the increase was 2·5 per cent.

Birth rate calculated on 459 villages with a total population of men, women and children amounting to 47,314 with 2,820 births is 59·6 per thousand inhabitants.

In 1930 the birth rate calculated on 462 villages with a total population of 45,635 and 2,554 births was 60 per thousand. In the last Annual Medical Report the 2,554 births in 1930 appear as the total native births for the Territory, the number of the population on which this figure was based being omitted by a clerical error.

It must be realised that these figures are not easy to collect, and must not be relied upon as definitely accurate.

At Chilonga Mission in the Mpika district 1,626 families were kept under observation. 230 males and 218 females were born during the year. If each family is estimated to contain four souls, which is a higher number than in the average family in the Territory, then the birth rate works out at 68 per thousand.

In the Chinsali district of the Awemba Province the same seven villages were under observation by the District Officer during 1930 and 1931, who carefully kept the statistics, which are as follows:—

	1930.	1931.
Total number of people in villages	598	659
Births during year (male)	12	10
,, ,, ,, (female)	21	11
Birth rate per thousand	55	32

Infantile Mortality. In the 459 villages previously mentioned where 2,820 children were born, the number of deaths of infants under the age of one year was 534, and between the age of one year and two the number was 417, making a total of 951 deaths of children during the first two years of life. The percentage of deaths to births according to these figures is 33·7 per cent.

The infant mortality rate, if the figures can be relied upon, varies extraordinarily. In the Chiengi district it is as high as 67·8 per cent., while in the adjoining district of Kawambwa it is said to be only 10·8 per cent. The lowest figure is in the Serenje district, where the infant death rate is alleged to be 6·2 per cent. in the ten villages under observation.

The general health of the native population is satisfactory. There is an increasing demand for medical services. The attendance at out-patient departments and rural dispensaries is steadily increasing. When the financial circumstances of the Territory admit of improved and increased facilities being offered, there can be no doubt the native population will avail themselves of them. The necessity for extending and improving facilities is fully realised, but unfortunately the financial depression has prevented many schemes coming into being. Much remains to be done in improving the sanitation in native villages, but until the European population are educated to appreciate the benefits that will result from adopting the health measures of all civilised countries, it is hardly likely that the native population will advance much in this respect as the example set by many Europeans is deplorable. When the European sets a higher standard in sanitation matters, the native will appreciate the benefit resulting therefrom, and some improvement can be expected in the methods of ordinary village life.

(II.) General European Population.

European Population	13,846
Increase over 1930	1,846
Percentage increase over 1930	15·38
Deaths registered 1930	163
,, ,, 1931	210
Increase in Deaths over 1930	47
Death rate per mille 1931	15·16
,, ,, ,, 1930	13·58
Number of deaths of infants under 1 year of age	28

The causes of deaths of infants were:

Premature Birth	10
Heart Failure	2
Asphyxia	2
Malaria	3
Broncho Pneumonia	2
Diarrhœa	6
Meningitis	1
Convulsions	1
Unknown	1
	28

When a Medical Certificate is not available the cause is supplied by the nearest relative.

TABLE III.

EUROPEAN DEATHS, SHOWING AGE PERIODS.

	0–1	1–5	5–15	15–25	25–35	35–45	45–55
1928	15	2	3	11	14	19	18
1929	21	5	4	12	12	4	13
1930	28	9	6	19	27	27	27
1931	28	21	4	21	31	27	36
The death rates for the different age periods were:	9·21%	2·21%	·23%	·87%	·82%	1·15%	2·21%

	55–65	65–75	75–85	85–95	Unknown.	Total.
1928	9	4	1	—	1	97
1929	13	3	1	1	4	93
1930	11	4	—	—	5	163
1931	24	13	—	—	5	210
The death rates for the different age periods were:	3·65%	11·3%	—	—	55·5%	1·52%

The following table shows the causes of deaths as given in the Registrar's Return:—

TABLE A.

Causes of Deaths—	No.
Typhoid Fever	8
Malaria	22
Blackwater	19
Diphtheria	1
Dysentery	4
Cerebro Spinal Fever	1
Trypanosmiasis	1
Tuberculosis, Pulmonary	6
,, Genito-urinary	1
Syphilis, Brain (gumma)	1
Pyæmia	1
Carcinoma	10
Addison's Disease	1
Goitre	1
Rheumatoid Arthritis	1
Alcoholism	7
Purpura Hæmorrhagica	1
Meningitis	6
Apoplexy	4
Convulsions	3
Cerebral Abscess	1
Heart Failure	14
Angina Pectoris	1
Hæmorrhage	2
Œdema Glottidis	1

TABLE A.—*continued*.

Causes of Deaths—	No.
Broncho Pneumonia	5
Lobar Pneumonia	14
Influenzal Pneumonia	3
Empyema	1
Pulmonary Cirrhosis	1
Summer Diarrhœa	12
Acute Atrophy Liver	1
Cirrhosis Liver	4
Strangulated Hernia	1
Acute Obstruction Intestines	1
Peritonitis	4
Ascites	1
Nephritis	1
Prostrate Hypertrophy	1
Puerperal Septicæmia	2
Premature Birth	10
Asphyxia Neonatorum	2
Senility	2
Suicide	4
Drowning	5
Accidental	8
Burns	1
Gunshot Wounds	1
Sepsis following Lion Bites	1
Heat Stroke	1
Fractured Skull	2
Unknown	3
Total ..	210

The census taken on 5th May showed the European population to be 13,846, the estimated figure for 1930 was 12,000. Before the end of the year, however, owing to retrenchment in the mining area, the European population had fallen considerably below the census figures.

Bwana Mkubwa Mine ceased activities early in the year: this was followed by the closing of other mines, and retrenchment on those which remained working, due to completion of the construction stage or other circumstances. Before the end of the year there was a considerable amount of unemployment, and some actual destitution.

The unemployed included a considerable number of the poor white class, who had been attracted to the mines and found employment as unskilled labourers, handymen, lorry drivers, and the like. These often reverted to primitive conditions.

A number of natives, thrown out of employment, wandered from mine to mine in search of work, living in the bush adjacent to the settled areas under circumstances which admitted of no sanitary control.

In the previous Annual Report a more stabilized population living under settled conditions was anticipated. This anticipation as regards a considerable number of the population of the mining area was not fulfilled.

The poor white class takes no health precautions, and is always liable to contract disease, especially malaria and blackwater. In circumstances such as have been described, the incidence of sickness amongst this class, improperly housed and fed, and living under insanitary conditions, often in the bush, is bound to rise. It is not therefore surprising to find that the death rate has risen to 15·16 per thousand against 13·58 in 1930 and 9·32 in 1929.

The following figures taken from the Registrar General's list of causes of deaths illustrate clearly how abnormal conditions, as described above, are reflected in the

death rate for the year, which can in no way be considered to represent the normal death rate of the Territory:

Malaria	22
Blackwater	19
Heart Failure	14
Alcoholism	7
Summer Diarrhœa	12
Premature Birth	10
Puerperal Septicæmia	2
Unknown	3
Suicide	4

Where there has been no doctor in attendance the relatives of the deceased give information as to the causation of death. Medical aid is often not obtained, or obtained too late, when a section of the community of a not very high standard of intelligence is living in primitive conditions, often in the bush. It is to this class that the greater proportion of the deaths figuring in the above list may be ascribed.

In available records dating back to 1925 puerperal fever does not appear as a cause of death until the present year. During the same period no death has previously been recorded as due to childbirth.

Carcinoma was responsible for 10 deaths, which compares unfavourably with previous years, 4 in 1929 being the previous highest figure recorded over a period of 6 years.

4 deaths are ascribed to apoplexy, 4 to cirrhosis of the liver, and 6 to acute abdominal conditions.

22 deaths were due to violence, including 4 suicides, 5 drowning, and 1 from lion bites. The number of deaths under this heading is abnormally high.

	Europeans.	*Africans.*
Number of inhabitants in 1931	13,846	1,372,235
Number of births during 1931	333	81,785
Number of deaths during 1931	210	—
Number of Immigrants 1931	1,742	—
Number of Emigrants 1931	No figures available.	
Number of inhabitants in 1930	12,000	1,331,229

There were 333 births during the year. The birth-rate of 24·05 per thousand (22·75 in 1930) is higher than that of Southern Rhodesia, which was 23·58 per thousand, and in England and Wales, 16 per thousand.

28 infants died during the first year of life, which gives an infant mortality rate of 8·4 per cent. on the births. The infant mortality rate is lower than in 1930, when there were 273 births with 28 deaths or 10·25 per cent. of the births.

(III.) European Officials.

The table given below compares unfavourably with previous years. The factors mentioned in the last Annual Report are still largely responsible for the increased sickness rate amongst European officials, *viz.*: lack of proper health precautions, especially amongst the junior officers of both sexes, and particularly the neglect of regular prophylactic doses of quinine. The incidence of Malaria amongst Government officials was, in former years, rare, but it has now reached a level which is of economic importance. The number of officials at Ndola has increased considerably during the year, and the health conditions at that station, owing to rapid development, were unfavourable. Early heavy rains followed by a dry spell favoured the incidence of Malaria throughout the Territory during the latter part of the year.

The average number of days on the sick list per patient is 9·72.

There were several cases of paratyphoid. This disease results in marked debility, usually with signs of cardiac weakness and prolonged convalescence and a trip to the coast is usually necessary. Such cases, of course, send up the average number of days sick per patient. The necessity for the investigation of this disease has already been mentioned.

Table Showing the Sick, Invaliding and Death Rates of European Officials.

	1929	1930	1931
Total number of officials resident	515	621	678
Average number resident	429	558	554
Total number on sick list	184	232	343
Total number of days on sick list	1,916	1,964	3,334
Average daily number on sick list	5·25	5·66	9·13
Percentage of sick to average number resident ..	1·22	1·01	1·64
Average number of days on sick list for each patient	10·41	8·89	9·72
Average sick time to each resident	4·47	3·52	6·01
Total number invalided	6	—	2
Percentage of invalidings to total residents ..	1·16	—	0·29
Total deaths	4	1	5
Percentage of deaths to total residents	0·78	0·16	0·73
Percentage of deaths to total average number of residents	0·93	0·18	0·92

SECTION III.

HYGIENE AND SANITATION.

(A) GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

The Annual Health Report for 1930 recorded that Dr. D. Alexander, C.M.G., late Director of Medical and Sanitary Services, Nigeria, arrived in Northern Rhodesia in December, 1929, to organise a Sanitation Department and advise on health matters generally, and left Livingstone in October, 1930, on the termination of his appointment.

2. Dr. Alexander had recommended to Government that a Sanitary Branch of the Department should be created and further made recommendations that the following technical staff should be employed forthwith: a Deputy Director of Sanitary Services, a Senior Health Officer, two Health Officers and two Health Inspectors. The year 1931 saw the fulfilment of the recommendations made, the Sanitation Branch slowly developing by appointments and postings as shown below. At the close of the year the Department consisted of the following European staff:—

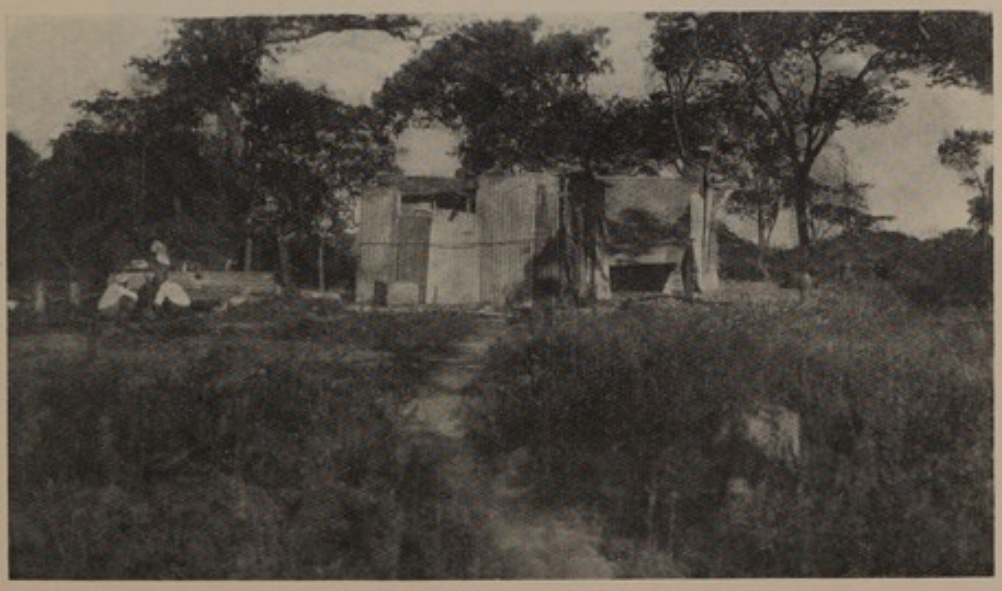
The Deputy Director of Sanitary Services,
The Senior Health Officer,
Three Health Officers,
Three Health Inspectors, and
Two Clerks.

(One Medical Officer of Health had already resigned his appointment and was awaiting his return to Great Britain.)

Name.	Rank.	Date of arrival or appointment.	Postings.
M. A. Viljoen ..	Health Inspector.	2nd February, 1931.	Ndola.
H. S. de Boer	Deputy Director of Sanitary Services.	30th March, 1931.	Headquarters, Livingstone.
W. M. Dawson ..	Clerk.	3rd June, 1931.	Do.
E. S. Adderley ..	Health Officer.	27th August, 1931.	Ndola.
J. Taylor ..	Do.	27th August, 1931.	Livingstone. Luangwa Valley. 21st Nov., 1931.
G. T. Joyce ..	Health Inspector	1st September, 1931.	Livingstone, Ndola. 31st October, 1931.
G. F. Newbury	Do.	10th October, 1931.	Livingstone.
N. M. Maclennan	Senior Health Officer.	7th November, 1931.	Ndola and Copper Belt
A. J. W. Wilkins	Health Officer.	16th November, 1931.	Livingstone.
R. Coetzer ..	Clerk.	21st November, 1931.	Ndola.

EUROPEAN HOUSING.

So-called Flats in Ndola.



Typical Housing of Poor Whites around
Mining Towns and Ndola.

NATIVE HOUSING.

Back to back single-roomed housing rented
by a Local Authority to Natives.

3. Of the technical staff available at the close of the year it will be noted that only two Members, namely, the Deputy Director of Sanitary Services and the Health Inspector, Mr. Viljoen, were effective for more than six months of that year. Throughout the year the effective staff of the Sanitary Branch was concentrated around the two centres of Livingstone and Ndola. Livingstone is not only the seat of Government but is among the oldest established of the townships in the Territory. Ndola, although a township of recent growth, having developed to any size in the last few years, is the Government and business centre for the considerable mining development taking place in that portion of the Territory known as the Copper Belt. Already the biggest concentration of population, both European and African, anywhere in the Territory is to be found in the Copper Belt and for that reason this centre naturally chooses itself as one needing public health control.

4. The need for public health control in Ndola and the Copper Belt was also considered necessary and even urgent owing to the sudden increase in the population both European and African. Much of the development there had been temporary in character and the greater part of that undesirable and insanitary. Mining activities, especially in the early developmental stages, appear to attract to their neighbourhood many persons with no special training and little capital, buoyed up with the hope that big wages will be obtainable. The Copper Mines of Northern Rhodesia had attracted a fair modicum of such persons and these concentrated in shacks and shelters of all kinds around the townships of Ndola and Luanshya and about the various contractors' camps that had sprung up around the mines proper. The conditions under which many such people live are often deplorable and public health control measures are absolutely necessary if epidemics of disease are to be prevented.

5. With staff for the Sanitation Branch of the Health Department only available for the latter part of the year and that staff new to local conditions, it is not possible to record many achievements during that period. The staff was mainly employed in studying local conditions and preparing the ground so as to be able to formulate a policy and plan activities. Some little information has been collected, but what has been learnt has emphasized the grave need that exists in this country for staff to carry out further investigations and collect accurate information regarding the conditions existing affecting the health of the population. The records available are mainly of conditions along the Railway Line, mostly amongst Europeans living in the immediate vicinity of stations to which Government Medical Officers have been posted—officers almost without exception so occupied in the ordinary care of the sick, and unprovided with clerical staff, that they could spare little time for recording observations.

6. Tours of inspection outside stations have been carried out from time to time. Observations made during these tours have been recorded but as these tours must, of necessity, have been hurried, for that reason the information collected has been meagre. One exception, however, stands out for special comment and that is the thorough investigation made by Dr. Kinghorn into the subject of Sleeping Sickness.

7. The Territory of Northern Rhodesia covers some 288,000 square miles and much of the area is difficult of access. Developed areas and centres of population are very scattered and many important districts away from the railway can only be reached either by road or river, by journeys taking many days and, in some cases, even weeks.

8. Since the Sanitation Department of the Health Department was formed as many centres of population as could be reached easily have been visited and reports on conditions found submitted to Government, but as may be expected many parts of the country have not yet been seen. The main areas or townships on which our reports have been based are those along the Railway Line, *viz.*, Ndola and the Copper Belt, Broken Hill, Kapiri Mposhi, Lusaka, Kafue, Mazabuka, Choma and Livingstone, and the following away from the line: Fort Jameson, Petauke and Fort Rosebery.

9. In May a report was submitted to Government making recommendations on the minimum staff necessary for the beginning of active measures of public health control throughout the Territory. The measures recommended received the approval of Government and also that of the Secretary of State for the Colonies. But, unfortunately, the recommendations could not be put into effect as, owing to the general financial depression, funds could not be found for the necessarily increased expenditure, even though it was fully appreciated that the need for such expenditure existed.

10. One recommendation made, however, was given effect to, that being the invitation to Dr. W. H. Kauntze, Deputy Director of Laboratory Services, Kenya Colony, who visited the country and submitted a report on the country's needs with regard to a Medical Laboratory Service and the minimum requirements for the creation of such a Laboratory. Dr. Kauntze carried out his investigations and submitted his report, but it is not possible to foresee to-day when the recommendations made will be given effect. The report, however, is of considerable value and will be of great service to us when the finances of the country are in a stronger position.

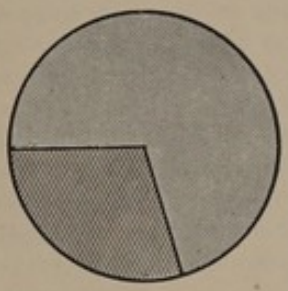
(b) Local Government.

11. Most towns of any size in the Territory enjoy some measures of local government, while one town, *viz.*, Livingstone, has full municipal status. Towns are gazetted municipalities or townships under the Municipal and Township Ordinances respectively. Livingstone Municipality employs a Town Clerk and a Town Engineer, but they have always depended on Government's assistance in providing them with an officer to advise them on public health matters. Until a full-time Health Officer was appointed to Livingstone on the 27th August, 1931, the Livingstone Municipality has had to be satisfied with such assistance as a Government Medical Officer who was already fully occupied in general hospital work, could afford to give them. There is every reason to believe that another town, *viz.*, Ndola, will shortly be granted municipal status. This township already employs a full-time Town Clerk and a local Engineer as a part-time official. Here, too, they continue to depend on Government assistance for public health matters. A full-time Health Officer was available at Ndola from the 27th August, 1931. Municipalities, gazetted as such, have power to levy rates and, with the sanction of Government, to raise loans. Councillors are elected and they choose one of their members as mayor. In townships gazetted as such under the Townships Ordinance local government affairs are generally administered by a Board consisting of members either elected or nominated by the Governor. The Chairman of the Board is invariably the senior Administrative Officer in the township. Township Boards generally provide essential sanitary services and make charges for services rendered. Powers to levy rates up to a certain maximum can also generally be obtained, if required, on application to Government. Regulations for the ordinary administration of townships can be made under the Townships Ordinance, and in most towns regulations of this nature are already in force. Township Boards usually have a part-time Secretary and, in many cases, employ an Officer generally styled "the Sanitary Inspector," to supervise the sanitary services, administer the native compound, and, when time permits, help in the administration of the township regulations.

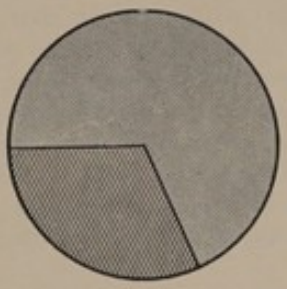
12. In addition to the towns described above there are Mine Towns in this Territory, the most important being Broken Hill, Bwana Mkubwa, the Roan Antelope, Nkana, Mufulira, and Nchanga. These towns, to a large extent, are private townships as they lie on land owned by mining companies and include the buildings used in mining and the production of minerals, and the houses of mine employees. In a few cases to-day in mine townships trading premises are also included, but these are not generally under mine control. Mine townships are administered by the managers of the mining companies, assisted by local Management Boards, consisting of mine officials. Government, however, in its responsibility for the general health of the population, continues to maintain and control public health under powers provided for in the Public Health Ordinance.

13. The larger mine companies developing the mineral resources of this country have, from the day they began development, shown a considerable appreciation of the value of protecting the health of their employees and making them contented. And in some of the mine townships the measures provided for the protection of health are in advance of those existing in any municipality or township elsewhere in the Territory. Considering the amount of money spent in these townships on public health measures it is unfortunate to have to report that since the close of the year two of the mining companies have stopped work owing to the depression in the world's copper market and that public health activities in these areas have necessarily ceased.

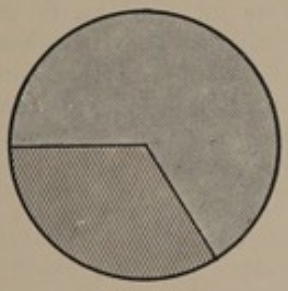
MALARIA AS THE CAUSE OF SICKNESS AMONG EUROPEANS
DURING 1931.
CALCULATED ON ADMISSIONS TO HOSPITAL.



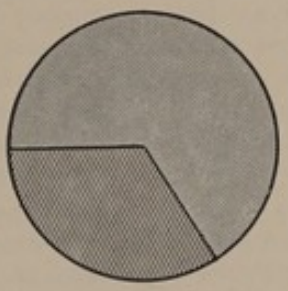
LUSAKA · 108·7°



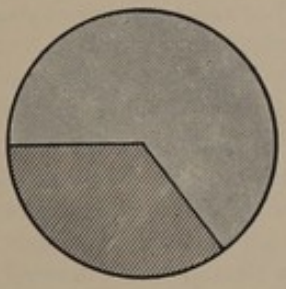
BROKEN HILL · 113°



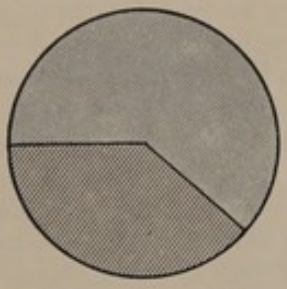
KASAMA 120°



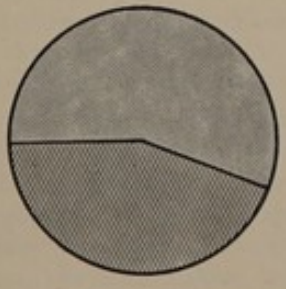
ROAN ANTELOPE · 122° {Total Sickness



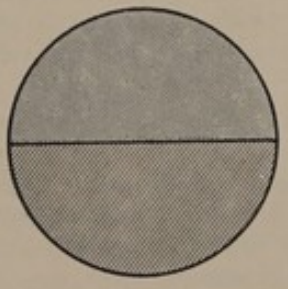
NKANA · 125° {Including Mining Accidents



LIVINGSTONE · EUROPEAN HOSPITAL · 138°



FORT JAMESON · 158°



FORT ROSEBERRY · 180° {Officials only.

(I.) MOSQUITO AND INSECT-BORNE DISEASES.

(a) **Malaria.** It is impossible to-day to arrive at any accurate estimate of the role malaria plays in the health of the people of this Territory. That it is one of the most important factors—if not the most important—in the general ill-health of the population there can be no doubt. No portion of the country can be said to be free from the disease and only in limited areas around the Roan Antelope and the Mufulira Mines have anti-mosquito measures, to any degree of thoroughness, been carried out for more than twelve months. Under existing conditions no person resident in the country, be he European or African, adult or child, can fail to be exposed to the risk of infection year by year. Charts Nos. 1 and 2 respectively show the importance of Malaria as the cause of admission of Europeans into Hospital. Chart No. 1 indicates the percentages over the year for several centres of development, while Chart No. 2 shows the percentages month by month for three important Towns, *viz.*, Livingstone, Lusaka and Broken Hill. With reference to the Roan Antelope in Chart No. 1 the percentages given are of total sickness and not of hospital admissions only.

2. Although no complete entomological survey of the *Anophelines* of this country has been made there is no reason to believe that the species responsible for the spread of Malaria from man to man within our boundaries is different from those incriminated in South or East Africa or that their ordinary breeding habits are in any way different here except in so far as they are affected by local temperatures and seasons. The *Anopheles Gambiæ* and the *Anopheles Funestus* can be found throughout the Territory — both species considered to be Malaria-carriers of primary importance. The *Anopheles Gambiæ* can be found breeding in sunlit pools of clean water, in puddles and water collections of a similar nature, while the larvæ of the *Anopheles Funestus* can be recovered from the edges of streams and from damboes or vleis in slowly moving and shaded water.

3. It is fortunate for this Territory that the rainy period of the year is ordinarily limited to four months—December to March, and, further, that there is a cold period each year beginning in May and extending to August and sometimes even to September, when the mean daily minimum temperature falls to below 60°, causing, so far as can be ascertained to-day, diminished breeding and activity of *Anophelines*. It is unfortunate for Northern Rhodesia that its rainy season coincides with its warm weather when mosquitoes are active and when conditions are suitable for *Anopheles* breeding. With the appearance of the rains in December every pool capable of holding water for a period of ten to twelve days becomes a desirable breeding place for *Anopheles Gambiæ*. As the rains continue the ground water rises, the seepage areas and streams which appear in every vlei or dambo, begin to abound with the larvæ of the *Anopheles Funestus*.

4. From preliminary surveys which the available staff of the Sanitation Branch has been able to make, and from the more prolonged observations made at the Roan Antelope Mine by Dr. Dalzell under the direction of Sir Malcolm Watson, it is possible to suggest to-day that the *Anopheles Gambiæ* is responsible for the Malaria appearing in December and January and that after that period the *Anopheles Funestus* begins to become important, sharing responsibility with the *Anopheles Gambiæ* in February, and becoming the more important factor in March.

5. Collections of *Anopheles* made have shown that many species of *Anopheles*, other than *Gambiæ* and *Funestus*, can be found breeding throughout the Territory, but so far *Anopheles Mauritianus* is the only species outside the two species already referred to that has been found to frequent houses. The *Anopheles Mauritianus* is generally accepted to be a non-malarial carrier.

6. The relative importance of the role of any one of the two species, *Anopheles Gambiæ* and *Anopheles Funestus*, plays in the spread of Malaria in different parts of the Territory is naturally dependent on the conditions existing in the vicinity of each centre of population. In all centres of development the *Anopheles Gambiæ* can find breeding places, more often than not in man-made breeding places, consisting of pits and holes created in brick-making and road construction; also to-day, in the absence of drainage and sound roads, in many ruts and tracks made by wheeled traffic. So that it can be stated with confidence that everywhere in the Territory and chiefly in centres of development the *Anopheles Gambiæ* plays a part in the production of cases of Malaria. As the *Anopheles Funestus* breeds ordinarily in streams or vleis, it might not be expected to

play an important part in settled areas, but in Northern Rhodesia the vlei is a very common geographical feature and very few areas exist where vleis do not abound. Further, as settled populations require a permanent water supply, they are necessarily sited either alongside a river or in juxta-position to a vlei as, during the dry months of the year, water can generally be obtained more readily from these formations than elsewhere by the digging of shallow wells. Conditions being as described in most centres of development, both *Anopheles Funestus* and *Anopheles Gambiæ* play a part so that almost throughout the country fresh Malaria infections occur from December to April and only with the advent of the cooler weather do these infections become fewer.

7. The charts already referred to give some indication of how important a part Malaria plays in filling our European Hospitals and in keeping our Medical Officers well occupied but, unfortunately, we can produce no data which would give a full appreciation of the total economical loss suffered by the European population of this Territory from this scourge. Numbers of people affected never go to a doctor. They treat themselves, or not, knock off work for a day or two, or even carry on steadily, paying toll to the disease in their lack of fitness and to the economical position by a loss of efficiency.

8. It is admitted that the information available with respect to Malaria amongst the European population is meagre, but there is sufficient to show that it plays an important part. In considering our African population there is less to go on and to-day we have to be satisfied with general impressions. Most persons interested in the subject believe that all natives get infected in infancy and continue to be re-infected through life, developing as they grow older, provided they survive, a very considerable immunity, adults very seldom showing any outward signs of the disease such as rigors and enlarged spleens. Where blood examinations have been made a large proportion, however, have been found to harbour the parasite. Owing to staff not being available it has not yet been possible to carry out any considerable surveys amongst the African population, so that no convincing figures can be given of splenic indices or parasite rates amongst native children. Nevertheless, I feel assured that most of our Medical Officers will agree that in very few portions of this Territory would these rates fall very considerably short of 100%. Although with our present knowledge of the morbidity and mortality occurring amongst our general African population it would be unwise to-day to make any definite statement of the importance of Malaria as a factor amongst them, it is comparatively safe to venture the opinion that it must be the cause of serious mortality and, to some extent, the degree of which cannot be estimated, must tend to retard the physical and mental development and the general welfare of those surviving.

9. There being no Bacteriological Department in the Territory no accurate records are available showing the relative incidence of the various species of malaria parasites. Neither can it be stated with confidence what species plays the most important role. Most Medical Officers, however, from their observations believe that much of the Malaria occuring is of the malignant tertian type and that the *plasmodium Falciparium* is the species most commonly met with in their blood examinations.

10. **Blackwater.** No portion of the Territory can be said to be free from the risk of the occurrence of this disease or complication. Every year a number of persons affected with the disease are admitted to the European Hospitals throughout the Territory. During 1931 fifteen such cases were admitted, five of which ended fatally. Our Death Returns show that nineteen Europeans died of this disease during the year. Blackwater was responsible for 9% of the total deaths reported. Cases of blackwater are seldom recorded during the dry months of the year, admissions to Government Hospitals being usually made between February and May.

11. **Preventive Measures.** As stated earlier in this report anti-mosquito measures for the control of Malaria were only carried out with any degree of thoroughness throughout the year at the Roan Antelope Copper Mine and at Mufulira Mine. In both areas the measures taken were those advised by Sir Malcolm Watson, President of the Ross Institute, who made a visit to the Copper Belt in 1929 specially for the purpose of advising the managements of the mines concerned. A full-time Medical Officer, Dr. Dalzell, was employed on the work. He was chosen by the Ross Institute and was a member of the Mine Medical Staff. Dr. Dalzell was stationed at the Roan Antelope Mine but controlled measures at Mufulira by frequent visits. During 1931 the anti-malarial works carried out at the two mines were inspected by Mr. A. Harrison—also

MALARIA CONTROL.

ANOPHELES GAMBIÆ.

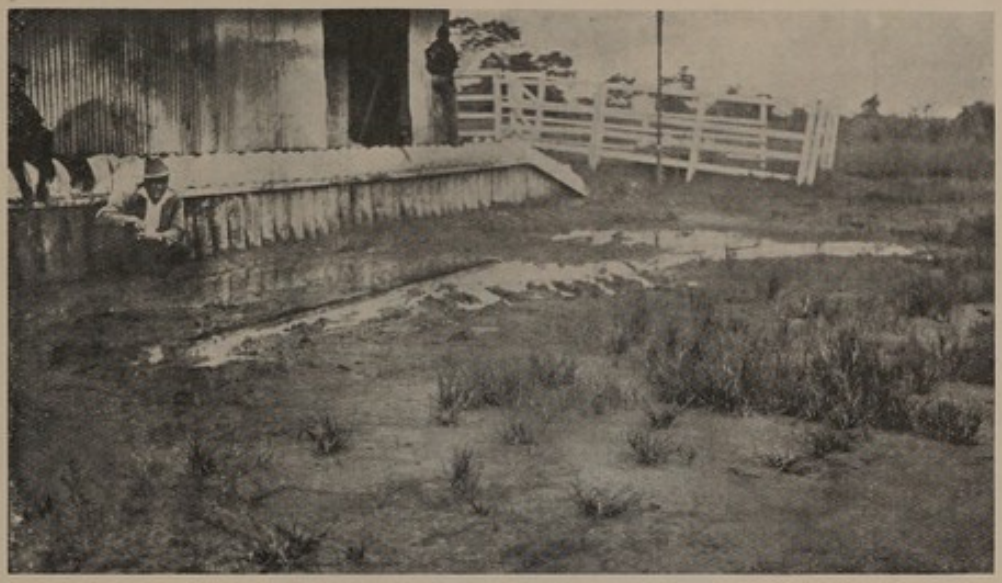
Man-made Breeding Grounds.

Laterite Quarry.

Sand Quarries.

MALARIA CONTROL.

Man made Mosquito Breeding Places.



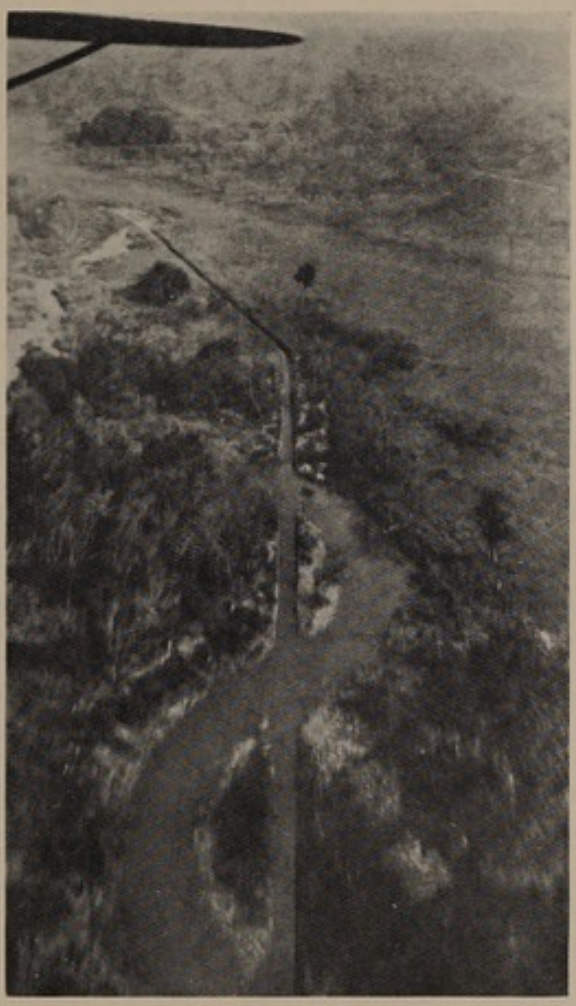
Road near Railway Goods Shed.

Earth Road broken up by traffic.

Similar conditions can be seen around most
Towns during the rains.

MALARIA CONTROL.

Native Staff off to oil Standing Water.



Itawa River Canalised.
(Air View).

Showing loops of old river bed left to silt up with silt.

from the Ross Institute, who advised various measures for the improvement of the drainage provided. At both mine townships the control measures consisted of the canalisation of all streams and the draining of all vleis and damboes by contour drains and central channels. The area kept under control extended to half a mile beyond human habitation. The drainage works were associated with the filling-in of all holes that were likely to hold water and which could be so dealt with economically, and a regular weekly oiling, with a special anti-malarial mixture made by the Shell Company, recommended by Sir Malcolm Watson, of all collections of water including the drains and canals constructed. The efficiency of the measures instituted was checked each week by adult mosquito catchers, collecting at fixed stations within the areas protected and by regular searches for mosquito larvæ.

12. The control measures instituted at the Roan Antelope Mine suffered some slight set-back early in 1931 owing to the unexpected flooding of the river that runs through the camp site. This flooding necessitated a further widening and a straightening out of the channel of the Luanshya River. Certain seepage areas, undiscovered before this period, were also drained by the digging of contour drains. The anti-mosquito measures at the Roan Antelope and Mufulira Mines were paid for by the mining companies. Government, however, assisted the Roan Antelope by paying for the drains dug and the routine control measures carried out by the mine staff in and around the Luanshya Township, which is the Government Town adjacent to the Roan Antelope Mine. Government payments in 1931 averaged over £25 per month.

13. It is to be regretted that with the slump in the Copper Market, development at Mufulira Mine stopped early this year and that routine anti-malarial measures in that area had to cease. Our regret is all the greater because capital had already been expended and the contour drains provided will have to be remade when work is restarted on this mine.

14. The extent of the mosquito control drainage works provided in and around Mufulira Mine was, however, small when compared with that of the Roan Antelope, as the problem at the latter mine was particularly difficult because the mine town is sited adjacent to a winding river liable every year to overflow its banks and, further, is surrounded by a large number of damboes or vleis in which seepage can be found during the greater part of the year.

15. Owing to the nature of the problems that had to be faced the anti-mosquito measures at the Roan are of considerable magnitude and will be found in their thoroughness and in the size of the area controlled to be comparable with the history-making anti-mosquito measures carried out under Colonel Gorgas during the construction of the Panama Canal. The records of the cases of Malaria occurring and of the adult *Anopheles* catches received from the Roan Antelope already indicate that the anti-mosquito measures instituted are proving successful although, owing to the flooding of the River mentioned above, the records for 1931 are not quite as convincing as they might be. The records for the years that follow will, I am sure, show a great improvement.

16. Throughout the Copper Belt the mining companies provide their own hospitals and medical staff. Government, however, still remains responsible for the general health and welfare of the population resident in the areas and in their responsibility take a very keen interest in the conditions existing there, which interest is necessarily great as in these areas are found our biggest concentrations of population both European and African. The mining companies functioning in this Territory are primarily interested in the economical production of copper and it must be expected that their interests in their employees must bear some relation to such economical production. The fact that the Directors of the Roan Antelope Mine have shown that they realised that in Northern Rhodesia to spend money on measures for the prevention of Malaria gives good value and must in time provide good dividends, must give other authorities in this country reason to think.

17. In the remaining mining towns, other than those specially referred to above, the control measures adopted have not reached the same degree of thoroughness. The Chief Medical Officer of the Nkana Mine, in his Annual Report for 1931, stated that "Mosquito measures consist of the cleaning of ditches and damboes of growth, eroded soil, and that weekly oiling has been regularly carried out." The Nkana Mine Authorities have recently added to their staff a European Laboratory Assistant under whom,

I understand, malarial control measures will in future be placed. At Nchanga control measures consist mainly of the regular oiling of ditches and pools; at other mines control measures are even more limited.

Ndola.

18. In 1931 Government expended the sum of £5,200 on a scheme of anti-malarial drainage which had for its object the canalisation of the Itawa River as it flowed past the township, and on a minor scheme for the canalisation of a small stream which had its origin in seepage from the private township adjacent to Ndola, known as *Manners Town*. The anti-malarial schemes, as carried out, were prepared by a firm of consulting engineers, who also supervised the work. At the time the schemes were prepared the Sanitation Branch had not yet been created and the Health Department had, it seemed, not been consulted. The schemes submitted received the consideration of Government and its approval.

19. The scheme for the Itawa Swamp, so far as can be understood, undertook to do the following:—

(*a*) clear the main bed of the river and adjacent swamp of all trees that impeded the flow of water;

(*b*) dig a channel for the river, eliminating all curves, and increasing as much as possible the fall, the old river bed to be used wherever possible; the old river bed, where not included in the new line, to be left to silt up with deposits from the overflow which deposits, it is expected, would be considerable in the wet season.

It was claimed that this scheme would reduce the mosquito breeding areas especially in the dry weather. During the rains, instead of a swamp, a large broad flowing river would result. Further, the silting up of the old river bed and of the low-lying areas would steadily improve conditions.

20. The work was completed in 1931 and so far it is not possible to estimate what benefits have resulted. Mosquito-breeding places were not appreciably reduced during the wet and hot months of the year. The work already carried out has, however, some value if it is to be considered as part of a bigger scheme which will have to be made in the future, when the present financial cloud has lifted and when Ndola, as a town, has grown in size. The scheme of the future, it is hoped, will take in a mile or more of the river, so as to include certain rapids which occur below the town and which, if removed, will permit of the bed of the river being lowered a further five or six feet, thus making a channel deep enough to prevent the river overflowing its banks during the wet season. With the provision of such a channel a more thorough and effective system of contour drainage will need to be provided to carry away the seepage oozing out of the banks.

21. The minor drainage works performed in connection with the Manners Town Dambo were temporary in character and consisted of the clearing of a ravine and the provision of a few contour drains. The work done will need regular maintenance and will have to be extended.

22. There being no technical staff available at Ndola before the latter part of this year, it has only been possible during the last few months to make any examination of the species of *Anopheles* breeding in and around Ndola and of the conditions affecting them. It is hoped that the observations now being made at Ndola will be of value and provide data which will help to guide this Department in advising future control measures.

23. Besides the Itawa River and Swamp there exist around the township of Ndola many vleis and streams which also affect the *Anopheles* and malarial problems. The information already collected indicates that even though funds might not be available for many years to carry out a complete scheme of drainage for the Itawa River, the Malaria menace in Ndola could be considerably alleviated if some of the minor streams and vleis were dealt with. The Health Department at Ndola, soon after the beginning of the rainy season in November 1931, instituted an oiling programme dealing regularly with all, or as many as possible, of the man-made breeding places found within the township proper. The active measures instituted immediately made an impression on the *Anopheles Gambiæ* found in the town, and it is generally admitted to-day at Ndola that the measures taken prevented the occurrence of the malaria wave usually expected in Ndola in December.

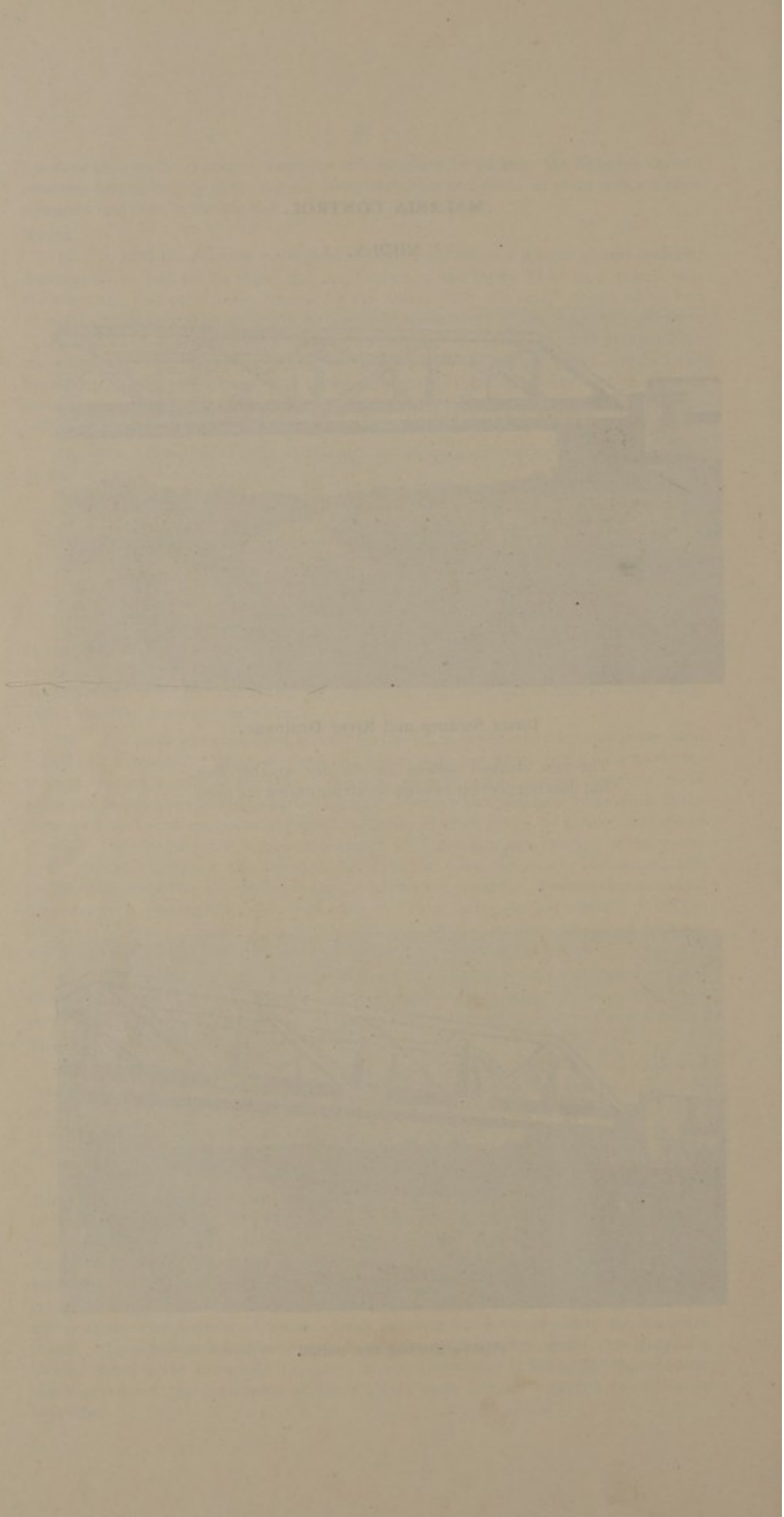
MALARIA CONTROL.

NDOLA.

Itawa Swamp and River Drainage.

The new channel suffices for the dry weather flow, but does not prevent swamps occurring during the rains.

Above during the rains.



MALARIA CONTROL.

LIVINGSTONE.

The Maramba River near the Native Compound.

Waste Water from the Railway Workshops and Compound.

Livingstone.

24. Owing to changes in the staff of the Health Department in Livingstone, and for other reasons, delays occurred in the organisation of anti-malarial control measures for this town and measures for regular oiling were not instituted before December when the rains had already well settled in. Of all the existing towns of any size in the Territory Livingstone appears to offer the best prospects of success as regards mosquito control measures. There is only one stream within a mile of the residential section of the town, *viz.*, the Miramba River, which flows only during the rainy months and for the rest of the year consists of a series of pools. The River lies adjacent to the Native Compound and mosquitoes breeding there must affect the native population. Within the limits of the European residential area the Anopheles problem—mainly *Anopheles Gambiæ*, is associated with the following:—

(*a*) a few low-lying areas of limited extent holding water in the rainy season, the largest of which were found on the Golf Course and in the neighbourhood of the workshops of the Zambesi Saw Mills;

(*b*) man-made breeding places consisting of disused quarries and pits scattered over the area, and

(*c*) a long earth cutting taking waste water from the railway workshops and compounds to the Miramba River.

All known breeding places are capable of being oiled regularly and many can be dealt with by permanent measures when funds are available which would make regular oiling unnecessary. Until funds for permanent measures can be found it is intended that oiling measures should be rigorously enforced. The oiling measures instituted in December already seem to have affected the incidence of Malaria and it is hoped that in next year's report we shall be able to record a considerable improvement. Funds for anti-malarial measures in Livingstone are being provided in the estimates of the Local Municipality and Government has also offered some measure of support.

Other Areas.

25. Many Medical Officers have reported that measures for the control of mosquitoes have been adopted in townships under their control. As a general rule the measures adopted consisted of the clearing of the bush and scrub in the immediate vicinity of townships. The Medical Officer at Fort Jameson reports the cutting of drains and the planting of 35 acres with gums. The Medical Officer at Fort Rosebery reports minor drainage schemes in connection with the river that passes through that township.

26. In this vast Territory of Northern Rhodesia, with its limited resources and scattered developments, with our present knowledge of Malaria and malarial control measures, it would be madness to-day to venture to prophesy when the time will arrive when Malaria, as a disease, will not take heavy toll year by year in sickness and death. Anti-mosquito measures however thoroughly carried out can only hope to protect concentrated populations living in controlled areas provided the inhabitants do not leave those protected areas during the Malaria season between the hours of sunset and sunrise —in these days of motor cars and easy transport an unlikely happening. For the protection of a population such as this country possesses we have to-day nothing better to offer than quinine. Quinine, we know, is inimical to the malaria parasite. We know that it cures the disease when taken regularly and in sufficient quantity. Experience has proved that taken in small doses regularly it is a prophylactic which gives a very considerable measure of protection from infection and where it fails as such, prevents the occurrence of dangerous symptoms. We have admitted that under existing conditions in Northern Rhodesia, and with our present knowledge, we have nothing else to offer to the people for their protection. Malaria in this country, we believe, is a disease of the hot and rainy months—a period covering generally five months of each year. During these months, to keep Malaria under control and to reduce to a minimum the economic wastage that yearly occurs, we advise that quinine needs to be taken regularly in doses of 5 grs., and to advise or suggest otherwise would indicate a lack of knowledge of existing conditions and of the important part that Malaria plays in the economic life of this country.

27. Most houses occupied by Europeans in this country are made mosquito-proof. The protection given by the mosquito-proofing of houses is to-day unfortunately necessary in all parts of the country, though it is hoped that when the mosquito control measures,

now being adopted in and around the various townships in the country, have been more organised, the need for such protection in those limited areas will no longer exist and money now expended on the necessary mosquito gauze will be available for further increasing the areas protected. Where mosquito gauze is not provided to-day it is necessary to use a mosquito net. To fail to use one is to run the risk of infection with Malaria.

(b) Yellow Fever. This disease has never been recorded in Northern Rhodesia and, as far as can be ascertained, has never been reported anywhere nearer to our boundaries than the Port of Boma in the Belgian Congo. Ever since flying became a means of transport Sanitation Officers all the world over have prophesied that unless the strictest precautions are taken Yellow Fever is bound to spread from the present endemic areas on the West Coast of Africa to East Africa and also to Asia with devastating results.

2. During the year under review a regular weekly aviation transport service has been instituted between Croydon in England and Cape Town in South Africa. This service passes through Northern Rhodesia and 'planes make regular landings at Mpika and Broken Hill. The French Aero-Postal Service is, it is known, proposing to establish an air service between France and Madagascar. This service, if instituted, is expected to travel along the West Coast of Africa, cutting across from West to East Africa through Elisabethville. If this route is used Broken Hill in this Territory will probably be used as a place of call. Recently certain aerial navigators demonstrated that the most direct route from Europe to South Africa is via the West Coast Territories. Even if no direct route from Europe to South or East Africa is established via the West Coast it must be expected that feeder aerial services will be instituted from the West Coast, linking up with the East African Service. If such feeder services are instituted it is not unlikely that Broken Hill, or some other station in Northern Rhodesia will develop as the main connecting link.

3. It is generally believed that Yellow Fever was first encountered in the West Indian Islands and from there was carried to the mainland of America. From the West Indian Islands, or it may be from the mainland of America, the disease was transported to the West Coast of Africa. The disease has been established on the West Coast for many years and no satisfactory reasons have so far been given for the disease not spreading across Africa. It may be that climatic conditions in the highlands of Central Africa are not favourable for the propagation of the virus or, on the other hand, it may only be due to the lack of communication in the past between various portions of West and Central Africa, traffic having travelled along the rivers rising in Central Africa and flowing East or West but never directly from the infected areas towards the East.

4. Recent researches in Yellow Fever have proved that the *Aedes Aegypti* (*Stegomya fasciata*) is the commonest transmitter of the disease from man to man, but that many other species of the families *Aedes* and *Mansonia* can also transmit it. *Aedes Aegypti* is a common domestic mosquito to-day in this Territory and we have besides many other species of *Aedes* and *Mansonia*, some of which may prove suitable vehicles for the spread of the infection so that until it can be proved definitely that for climatic or other reasons unknown to-day Yellow Fever, as a disease, cannot be established in this Territory, it would be almost criminal if every possible precaution were not taken to safeguard the populations of this Territory.

5. Northern Rhodesia, owing to its geographical position, situated almost on the frontiers of the infected areas and acting as a buffer state between West Africa and the rest of the world, holds a very responsible position, and it is here that the greatest safeguards need to be taken if East Africa and Asia are to be protected. Many parts of the world have considered the menace so great that Governments have insisted on retaining the right to refuse to have any aerial communication with countries affected with Yellow Fever. Northern Rhodesia, owing to its situation, could only take up that attitude if the adjoining Territories did likewise—an unlikely happening.

6. On the institution of aerial communication between infected areas in the West and this Territory, Yellow Fever could be introduced into Northern Rhodesia by one or more of the following means:—

TRYPANOSOMIASIS.

Warning Notice at entrance to Fly Belt (Luangwa Valley)
on Great East Road.

(*a*) *Infected persons*. Human being infected with Yellow Fever can infect mosquitoes in the first three days of the appearance of the disease and possibly during the later part of their incubation period. Persons affected with the disease may show so few symptoms on occasion as to make the case difficult to diagnose clinically.

(*b*) *Infected mosquitoes*. A mosquito, once infected, remains infected throughout the rest of its life.

(*c*) *Blood or serum from infected persons*. It has been proved that the virus can be transmitted to human beings without the medium of a mosquito. This would be the least likely method of infection, especially if infected blood and serum are not allowed to be introduced for any purpose whatsoever.

7. Public Health Authorities all over the world have in the last few years given the subject of control of traffic by aircraft much consideration, and recently representatives from all Nations have drawn up an International Convention for the sanitary control of aircraft, which lays down special precautions which countries should adopt for their protection from Yellow Fever. The Government of this Territory has considered the text of the Convention but, owing to the present financial depression, has found it difficult to agree that they will be able to conform to all its requirements. There are, however, certain minimum precautions which this Territory will need to take and the following are recommended:—

(1) Inspection of all aircraft and persons arriving thereby from the West Coast of Africa.

(2) Careful searching of all aircraft arriving for mosquitoes harbouring therein and destruction of same. .

(3) Isolation in specially built mosquito-proof buildings of all passengers landing in this Territory from Yellow Fever infected areas for the maximum period of the incubation of the disease, generally considered to be six days.

(4) Isolation of all transit passengers from infected areas during the period the aircraft remains on the ground in this Territory.

(c) **Filariasis.** It is not possible to-day to estimate with any degree of accuracy the importance of this disease in the Territory. The Chief Medical Officer, Nkana Mine, reports that "during the examination of the blood of 211 boys from various parts of the Territory, eight were found to be harbouring Filaria."

2. Elephantiasis is known to occur in several parts of the Territory. It is common in the Luangwa Valley and is reported to be extremely common amongst the Angoni living in the North-Eastern part of the Territory, not far from Lake Nyassa. Culex Fatigans, or closely allied Culicines, are of common occurrence.

(d) **Trypanosomiasis.** Dr. A. Kinghorn was specially employed during the period 1907 to 1925, with a break during the years of the Great War, in investigating Sleeping Sickness and the occurrence of tsetse fly in this Territory. Dr. Kinghorn's report fully describes the conditions existing.

3. Sleeping Sickness, as an epidemic disease, appears to be limited to the Laungwa Valley and, to a much smaller area in the Ndola District around the Lower Luwishi River—a tributary of the Kafue. Dr. Kinghorn, during his long investigations, examined many thousands of natives in the suspected areas, and in the report he submitted in 1925, referring to conditions in the Valley generally, wrote:—"I should be inclined to say that under ordinary circumstances the incidence of the disease is not in excess of 3 or 4 per 1000 of the total population per annum though, of course, it may be exceeded temporarily in those localities in which exacerbations of the infection occur." Another paragraph in the same report is as follows:—"A very striking feature of the infection is the extraordinarily sporadic manner in which it is found. Not only are the cases found in villages widely separated, but they are usually found occurring singly, and cases in the same villages may be separated by an interval of years."

4. The fly occurring in the areas referred to is the *Glossina Morsitans*. The *Glossina Palpalis* is found to occur around the shores of Lakes Tanganyika and Mweru and along the banks of the Luapula River.

5. Four new cases of human Trypanosomiasis were reported during the year—all in natives. The first case reported was that of a postal runner from Kasempa, employed

between Kasempa and Mumbwa. The second case was reported from Lusaka, and it is thought he was also infected in the Kasempa District. It may be possible that a small endemic focus exists in that District. The third and fourth cases were discovered in the Luangwa Valley by Dr. J. Taylor during his short investigations there. Dr. Taylor reported that he considered a further case as suspicious, but he could find no trypanosomes by gland puncture. Dr. Taylor, during his investigations, examined 2,203 natives, so that even if the suspicious case was considered to be positive, only 1·36 per 1,000 natives were found to be infected.

6. No special measures on any large scale for the control of Sleeping Sickness were taken during the year. A Medical Officer was stationed on the site of the bridge now being erected across the Luangwa River, and endeavours were made to keep the area round the bridge head and around the camps free from undergrowth. Europeans travelling through the tsetse fly areas are advised to take every precaution against being bitten, and endeavours are made to prevent persons from travelling unnecessarily through the endemic areas. It is not seriously considered that Trypanosomiasis, as a human disease, is to-day a matter of great economical importance in this Territory, especially in its present state of development.

(e) Relapsing Fever. This disease is generally considered to be endemic in plateau areas of the Territory, and rare or absent in the valleys. Dr. Kinghorn, who has much experience of conditions in the Luangwa Valley, is of the opinion that the disease does not occur there. During the year cases of Relapsing Fever were reported from the following centres:—Mongu, Fort Rosebery, Abercorn, Bwana Mkubwa, Broken Hill, Mwenzo Mission and Fort Jameson. 44 cases in natives and two in Asiatics were reported from the Government Hospital at Fort Jameson.

2. It is commonly believed that natives get infected in infancy or childhood, and that those that recover carry a considerable immunity for the rest of their existence. Adult natives in the infected areas found suffering from the disease are generally visitors from the valleys with no acquired immunity. While it cannot be doubted that the disease is associated with some mortality in native areas, this mortality cannot to-day be estimated.

3. The *Ornithodorus Moubata* can be found in most native huts in the endemic areas. The tick lives in the floors and walls of the huts and does not only occur within native reserves but also in many town compounds along the railway line.

4. In the Regulations covering the Housing of Native Labour, Government has laid down that impervious floors should be provided in all huts used for the housing of labour. Endeavours were made early in the year to have this Regulation complied with, but since most financial concerns in the country have been affected by the depression, it has not been thought wise to press the matter.

5. It is generally found that the floor and walls of huts that are looked after regularly and treated about once a week with mud from vleis or a mixture of cattle manure and mud, are less likely to be infested with ticks.

6. When financial conditions permit of it being done it will be advisable to carry out investigations into the incidence of this disease so that Government might obtain an accurate estimate of its economic importance.

(II.) EPIDEMIC DISEASES.

(a) Plague. So far as is known the last occasion on which Plague appeared in this Territory was in 1917, when a small outbreak occurred in the Luangwa Valley. Intensive rat destruction measures were carried out at the time and there was no recurrence of the disease reported either in man or rodents.

2. Plague is endemic in Kenya, Uganda and parts of Tanganyika, and in South Africa field rodents are frequently found to be infected.

3. No reasons can to-day be given for the apparent freedom of this Territory from the infection of Plague. No survey of small mammals has been made, nor have we any knowledge of the fleas that occur. Such a survey would be of great interest and might throw some light on the epidemiology of the disease. No organised rat destruction campaigns are carried out.

(b) Smallpox. This disease was reported from various parts of the country during the year, but except in the Fort Jameson District, adjacent to Nyasaland, the cases occurring were comparatively few. The cases reported were from the following districts and centres:—

TABLE B.

Disease.	District.	No. of Cases.
Smallpox	Fort Jameson	102
,, ...	Abercorn.	1
,, ...	Balovale.	3
,, ...	Roan Antelope Mine.	4
,, ...	Mufulira Mine.	4
		114
Alastrim	Mongu.	32
,, ...	Fort Rosebery.	6
	GRAND TOTAL	152 cases.

2. For a number of years now Smallpox has been reported in different parts of the Territory, but to get some appreciation of the recent history of the disease as it affects Northern Rhodesia it does not appear necessary to go further back than 1928 when there was an epidemic of the disease in most parts of the Territory, and it was reported in the Annual Report for that year that practically every district had been invaded. The epidemic carried on into 1929 but towards the end of that year it was thought to be abating and in 1930 was, as an epidemic, limited to the Fort Jameson District adjacent to the Portuguese Border, and to the Petauke and Lundazi sub-Districts.

3. With Smallpox, as with most other diseases, it is extremely difficult to-day to get any accurate estimate of the incidence of the disease amongst our African population as the population is widely scattered and there are not enough Medical Officers available to tour the Districts regularly. Information with regard to the occurrence of the disease is generally received through District Officers, who either obtain information on their tours or gather it from the reports of the native messengers or their District headmen. It cannot be expected that the records compiled on reports so obtained can claim to be accurate, but it is the best we can do under the circumstances, and the Health Department owe a debt of gratitude to District Officers for their assistance.

4. The type of Smallpox occurring in this Territory has been mild, with a low mortality, and many cases would appear to be of the Kaffir-pox or Alastrim type. As indicated in Table B. from two Districts all cases reported are shown under the heading "Alastrim." The disease being of this mild type, it is not to be wondered at that the untrained mind confuses the disease with Chicken-pox, and there remains considerable doubt whether all the cases reported as Smallpox are really cases of this disease and whether cases of Chicken-pox have not been included. Where Medical Officers have found it possible to carry out investigations on the receipt of reports of Smallpox, Chicken-pox has not infrequently been discovered as the cause of the report.

Vaccinations.

5. Vaccination campaigns have been carried out regularly, and year after year Annual Health Reports have recorded figures stating the number of vaccinations reported to have been done at various centres.

6. At all Government Stations where Medical Officers examine labour as to their fitness for work on mines, farms, and other fields of labour, those examined are generally vaccinated. On the report of an outbreak of Smallpox anywhere in the Territory, lymph is immediately despatched with instructions that the population in the infected area and surrounding villages be vaccinated. In 1929 and 1930 large supplies of lymph for vaccination were sent out and a large number of persons were reported to have been vaccinated. Unfortunately, vaccination campaigns have frequently to be left to native

medical orderlies and sometimes to the messengers of District Officers—all very superficially trained, and there is seldom any means of checking the methods adopted or the success of the vaccinations done.

7. Lymph used in this Territory is obtained from the Government Vaccine Institute, Rosebank, Cape Town, and despatched from there in flasks by post and, if instructions are so given, sent direct to out-stations. Several stations receive regular weekly supplies. Stations situated on the line receive lymph within a few days of despatch, but many stations in this country are not so fortunately situated and lymph might be three or more weeks in the post before reaching its destination and subjected en route to many varied temperatures. Lymph, on receipt at Provincial or District Stations, might need to be sent on to villages and native areas by messengers on foot and, although in every case care is taken to instruct how best the lymph should be cared for on the journey, there is seldom any guarantee that instructions so given are carried out.

8. Under the circumstances it is not surprising that the lymph is often reported to be inert and that successful vaccination, after one or more trials, cannot be guaranteed; further, one cannot help feeling some sympathy with the African who refuses to believe that vaccination protects against Smallpox or that the operation has any value at all as, owing to the possibly septic methods of the native vaccinator, he might develop a sore arm but get no protection therefrom.

9. During the year 1929 epidemic cases occurred in persons reported to have recently been successfully vaccinated, although in areas where vaccination was carried out under the supervision of a Medical Officer the epidemic was controlled and cases were only found to occur in unvaccinated persons who had either recently arrived or evaded vaccination.

10. Considering the amount of lymph used in the last few years it must be believed that a large number of persons have been given protection, but there must still be a number of persons unprotected, to which number must be added the children born during the last two years.

11. On the occurrence of an epidemic it is always necessary to take steps to combat it and bring it under control. It is, however, more commendable to take steps, wherever possible, to prevent the occurrence of such epidemics and to make panic measures unnecessary. Panic measures for the control of epidemics are generally costly and wasteful of energy, besides often interfering with the regular life of the people controlled. Since vaccination was proved to give protection against Smallpox this disease has been one of the most easily controlled, and wherever Governments have been able to take regular measures for maintaining a population vaccinated, the disease has not been able to make any headway. In Northern Rhodesia, it must be admitted that under present conditions it will not be possible to ensure a 100% vaccination of population without considerable expenditure, but even here much can be done with limited funds to attain a considerable degree of the protection desired.

12. The operation of vaccination does not call for much skill; it only requires an appreciation of the need for cleanliness in the performance of the operation and, in this country, an understanding of the need for the protection of the lymph in transit. I think anyone with any knowledge of the African would not but agree that he could be trained to be a successful vaccinator, given time for the training, with a sympathetic and patient teacher. To-day, with no occasion for urgency in training, it should be possible to produce such vaccinators or teams of vaccinators at all stations. Most stations I believe already possess fully or semi-trained native vaccinators. Districts or Provinces could be divided into areas and the team sent out to one area at a time, with arrangements made ahead for a regular supply of lymph to be despatched to various points in the area on stated days by the most rapid means of transport available. The vaccinating teams will need to be brought back to Headquarters at frequent intervals for refresher courses, and it is suggested this should be done on the completion of work in any one area. District Officers from time to time tour their Districts and it might sometimes be found possible to arrange for the vaccination team to work with them during their tours and thereby ensure a measure of control over the vaccinators.

13. Vaccine lymph is by no means a cheap commodity in Northern Rhodesia. Every tube of lymph received is charged for at the rate of 4½d. a tube, each tube containing about three doses. To this cost must be added that of postage from South Africa, also the cost of postage on the return of the empty flasks. Postage brings the cost of each tube of lymph up to nearly 7d., making the cost of each vaccination 2d. Lymph being such an expensive item it becomes all the more necessary to ensure that it is rightly used.

14. Government has recently made enquiries from Kenya as to the cost of lymph to this Territory from their laboratories, but up to the time of writing no reply has been received to our communication. It would be more satisfactory for this Territory if lymph were manufactured locally at some central station, like Lusaka, thereby reducing very considerably the time the lymph is in transit. Dr. Kauntze, in his report to the Government, recommended that as soon as a Laboratory is opened in this Territory we should consider the manufacture of lymph locally. During 1931 £267 7s. 6d. was paid out to the South African Veterinary Station for lymph. This amount does not include postage.

15. Lymph was supplied during the year to the following stations in amounts as under:—

TABLE C.

Mongu	5,200 tubes.
Fort Jameson	710 ,,
Livingstone	1,570 ,,
Fort Rosebery	2,200 ,,
Abercorn	1,400 ,,
Isoka	1,700 ,,
Chickuni Mission	100 ,,
Kapalala	300 ,,
Kasama	339 ,,
Choma	220 ,,
Broken Hill	318 ,,
Fiwila Mission	20 ,,
Bwana Mkubwa	41 ,,
Lusaka	12 ,,
Mazabuka	60 ,,

The mining companies were not provided with lymph at Government expense.

16. The following Table gives records of vaccinations done during the year, as reported from various stations:—

TABLE D.

Mongu	13,777
Fort Rosebery	12,155
Abercorn	1,231
Kasama	692
Fort Jameson	4,199
Lusaka	42
Broken Hill	621
Choma	631
Mazabuka	412

No records were received from other stations.

(c) Cerebro-Spinal-Meningitis. This disease appeared in sporadic form during the year in various parts of the Territory and as elsewhere in the world it is reported more frequently from the more densely populated areas. From the records available it is calculated that during 1931 the disease was diagnosed in 5 Europeans and in 77 native Africans. The following table shows cases as reported from stations, with the mortality percentage:—

TABLE E.

District.	Europeans. Cases.	Europeans. Deaths.	Mortality. %	Natives. Cases.	Natives. Deaths.	Mortality %
Lusaka	1	—	—	3	3	100
Fort Rosebery ..	—	—	—	1	1	100
Abercorn.. ..	—	—	—	1	—	—
Nkana	2	2	100	29	15	51·79
Roan Antelope ..	2	2	100	10	7	70
Broken Hill Mine	—	—	—	1	1	100
Bwana Mkubwa..	—	—	—	6	5	83·3
Mufulira ..	—	—	—	9	6	66·6
Nchanga ..	—	—	—	4	4	100
Livingstone ..	—	—	—	13	7	53·8

2. In the Annual Report for 1930 it was specially recorded that during that year the disease had been most persistent in the mining areas, and this year's records again show that the largest proportion of cases occurred in this area. The following table permits of a comparison being made between 1930 and 1931 figures in respect of the various centres of population in the mining areas:—

TABLE F.

	1930.			1931.		
	Europeans. Cases.	Natives. Cases.	Total.	Europeans. Cases.	Natives. Cases.	Total.
Broken Hill ..	—	—	—	—	1	1
Roan Antelope ..	2	27	29	2	10	12
Nkana	5	27	32	2	29	31
Bwana Mkubwa..	—	4	4	—	6	6
Nchanga ..	—	11	11	—	4	4
Mufulira ..	1	20	21	—	9	9
TOTAL ..	8	89	97	4	59	63

3. It will be seen that there was a considerable reduction in the number of cases occurring in three of the mines, namely, the Roan Antelope, Nchanga and Mufulira, and that at Nkana and Bwana Mkubwa there was little improvement.

4. The housing conditions for Africans were recently considerably improved at the three mines that show a reduction in the incidence of the disease. There is reason to believe that during 1932, with the conclusion of the developmental period, the conditions at Nkana will also improve.

(d) Dysentery. The Government Medical Service of this Country has functioned since its inception without a Bacteriological Department and it is still impossible to state, with any degree of confidence, what infections cause the various intestinal diseases with symptoms that are usually labelled "dysenteric" that are so common in this Territory.

2. The Roan Antelope and Nkana Mines have this year employed a trained staff for carrying out bacteriological and other laboratory examinations of material from the sick treated at their Hospitals, and some of the records of their findings during the year are available.

3. At the Roan Antelope fourteen specimens of fæces were examined, confirming or excluding Dysentery and were reported upon as follows:—

Vegatative forms of *Entamoeba histolytica* were found in four of the samples received, and in ten cases the samples were reported as "having the typical cell-picture of Bacillary Dysentery." Bacilli of the Meta-Dysentery group were isolated from four cases. The Chief Medical Officer in his report stated that he treated one case of Amœbic Dysentery and seven cases of Bacillary Dysentery in his European Hospitals during the year.

4. The reports obtained from the Nkana Mine do not give such exact information but the cases treated at their Native Hospital are divided up as follows:—

Diarrhœa	37
Amœbisiasis	26
Dysentery	8

while all cases treated in the European Hospital are shown under the terms "Dysentery" and "Diarrhœa" and no cases are shown as due to Amœbæ

5. The report of the Bacteriological Department of the Roan Antelope would appear to offer conclusive proofs that both amœbic and bacillary forms of Dysentery occur in this country and from the report of the Chief Medical Officer one is disposed to form the opinion that in that area at least the bacillary form of the disease is the commoner. This finding is similar to that reported from the Union Miniere Mines in the Katanga Province of the Belgian Congo.

6. All stations in the Territory where a Medical Officer is available report a number of cases of intestinal disorders under the headings "Diarrhœa" and "Enteritis," and from many of the stations Dysentery is also reported. In many cases an endeavour has been made by the Medical Officers reporting to differentiate between Amœbic and Bacillary forms of the disease. The following table gives the records from the various stations. It will be noted that the Medical Officer at Lusaka diagnosed 44 of the 45 cases recorded by him as of the amœbic form, while the Medical Officer at Nchanga reports all his 51 cases as Bacillary, and in many districts both forms are considered to occur, but there is generally a preponderance of the bacillary form of the disease.

TABLE G.

Station.	Europeans.		Dysentery undifferentiated.	Natives.		Dysentery undifferentiated.
	Amœbic Dysentery	Bacill. Dysentery		Amœbic Dysentery	Bacill. Dysentery	
Mongu	—	—	3	—	15	—
Lusaka	32	1	—	12	—	—
Choma	—	—	—	—	—	6
Bwana Mkubwa ..	1	2	—	—	15	—
Broken Hill ..	4	8	5	—	2	19
Solwezi	—	—	—	—	—	18
Sesheke	—	—	—	—	—	17
Mwenzo	—	—	—	—	—	1
Fort Jameson ..	—	—	—	3	—	2
Mufulira Mine ..	—	—	—	—	5	—
Nchanga ..	—	—	—	—	51	—
Livingstone ..	3	7	—	—	—	87
Mazabuka ..	—	—	—	—	14	—
Abercorn	—	—	2	—	—	—
TOTAL ..	40	18	10	15	102	150

7. In spite of the very large number of cases reported from Lusaka and Nchanga it is not considered that any special epidemic of this disease occurred anywhere in the Territory. Under existing conditions in townships and in country areas—European or African—it is to be expected that Dysentery and other intestinal diseases will occur year after year. There are few townships provided with a water supply that should not be labelled "suspicious," and there are few people resident outside townships who are not dependent on a supply that is distinctly dangerous, while under the existing sanitary conditions in most areas during the wet and dry seasons of the year the domestic fly can generally be found in varied degrees of frequency, but usually in numbers, helping to spread infections from unprotected fæces to unprotected food and drinks. Few townships can claim to have attempted fly-proofing of latrines, and in most country areas latrines are not used by the native population and in certain areas even by Europeans. That the disease is not more prevalent amongst Europeans is due to two main reasons:—

The greater portion of the European population only consumes boiled water and in most townships houses are protected by mosquito gauze, the mosquito gauze serving the double purpose of keeping out both mosquitoes and flies.

(e) Enteric Fever Group. Typhoid Fever has this year been reported from some of the mine townships and from Livingstone, Broken Hill, Lusaka and Mazabuka. As general laboratory facilities for diagnosing cases of Typhoid Fever do not exist, it must be surmised that cases occurring elsewhere are not always recognised.

2. The Bacteriologist at the Roan Antelope Mine reports that during the year he examined 125 different specimens from cases suspected as being Enteric Fever and subjected them to either serological or bacteriological examination. 25 specimens showed the infection to be due to B. Typhosus and from one, B. Fæcalis alkaligenes was isolated. The remaining specimens gave negative results.

3. From the records available the following table has been compiled:—

TABLE H.

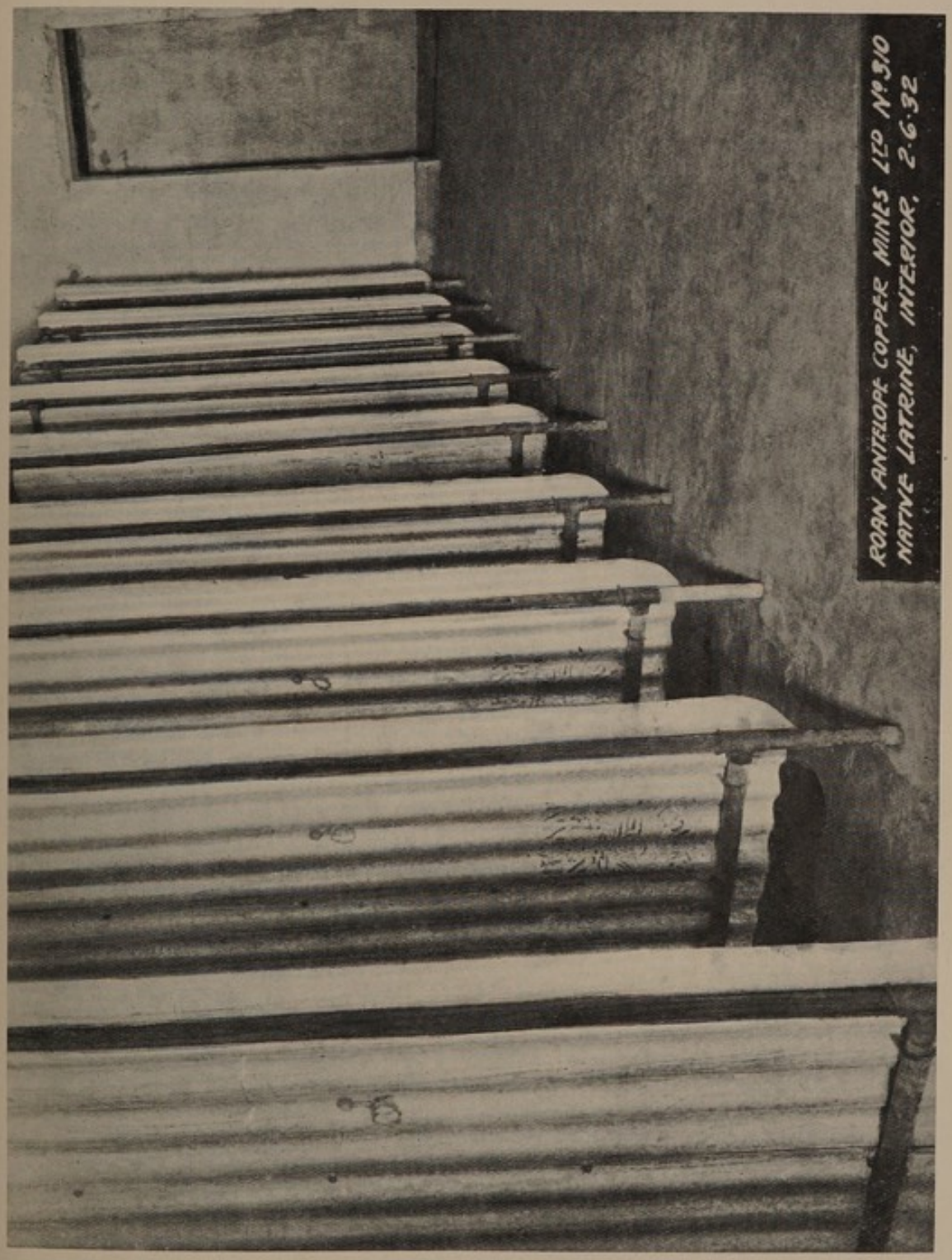
District.	Cases.	Europeans. Deaths.	Mortality %	Cases.	Natives. Deaths.	Mortality %
B. Hill Incl. Mine incl. 1 Paratyph.	8	—	—	12	4	33·3
Roan Antelope .. Mine	—	—	—	15	6	40
Mufulira ..	1	—	23	—	—	—
Nkana	13	3	23	33	7	21·2
Livingstone incl. 2 cases Paratyph.	7	2	28·5	8	3	36·2
Bwana Mkubwa..	—	—	—	1	1	100
Mazabuka ..	—	—	—	1	1	100
Lusaka	2	1	50	—	—	—
TOTAL .. incl. 3 cases of Paratyphoid.	31	6	19·3 %	70	22	31·4 %

4. The 1930 Annual Report had drawn attention to the prevalence of the disease in the mining towns. The following table gives the figures for mines, covering the years 1930 and 1931, so that a comparison can be made:—

TABLE I.

District.	1930.		1931.	
	European Cases.	Native Cases.	European Cases.	Native Cases.
Broken Hill	—	2	—	3
Roan Antelope	12	44	—	15
Mufulira	2	—	1	—
Nkana	26	49	13	33
Bwana Mkubwa	—	—	—	—

It will be noted that during this year no cases were reported amongst the European population at the Roan Antelope Mine and that the cases amongst natives were half the number recorded in 1930. At Nkana the number of cases recorded is also smaller, but the figure still remains unduly high. General sanitary conditions at Nkana are slowly improving and it is possible to look forward to a reduction of the figures in the future.



Water Borne Trough Closet for Native Africans.

Simple and effective. A certain amount of privacy is provided.

5. The Chief Medical Officer of the Roan Antelope, in his Annual Report for 1931, considers that the great improvement in the Typhoid figures at the mine is mainly due to systematic inoculation and annual re-inoculation of the resident population on the mine with T.A.B. Vaccine made locally from organisms recovered by culture from cases that have occurred in the past on that mine. While, undoubtedly, inoculation must give a very considerable measure of protection, it must be stated that the Roan Antelope Mine has a very efficient water supply for their European population, and the whole of the surface area is sewered, the sewage scheme being very effective. The Chief Medical Officer at Nkana, in his Report, also records that preventive inoculation of all new employees is carried out, and that the older employees frequently offer themselves for re-inoculation. (It would appear that re-inoculation is not compulsory.) The T.A.B. Vaccine used has been modified by the addition of local strains. At Nkana the Mine Authorities have during 1931 provided septic tank installations for fæcal disposal through the larger part of their camp. During the earlier months of the year a large number of latrines were still in use as some areas are still so served. The Chief Medical Officer, in commenting on the incidence of Typhoid Fever amongst Europeans, has pointed out that the cases occurred in the first few months of the year. The water supply at Nkana cannot yet be labelled "above suspicion".

6. Outside the mine townships much remains to be done in every centre of population before the incidence of Typhoid can be lowered and as conditions exist to-day it must be feared that serious epidemics of the disease will occur from time to time. The menace of Typhoid will only be a thing of the past when water supplies have been improved, greater control exercised over food supplies, including milk, uncooked vegetables and cooked foods, and stricter care introduced in the measures taken for the collection and disposal of fæcal and domestic waste.

7. Typhoid Fever is to-day a rare disease in Great Britain but it is not many years since it was as serious a menace to health in that part of the world as it is to-day in this Territory. Improvement in England was brought about by public health legislation, the provision of a sanitary staff to enforce that legislation, and, most important of all, by the creation of a public health conscience in the people. In this Territory public health legislation is only in its infancy and even now it is only understood by a small proportion of the population. A start has been made during the year in the provision of staff to enforce public health measures. This staff is, it is hoped, only a nucleus of that which will be available in the future when the period of financial depression has passed. It is believed that a public health conscience is developing in the population, although the growth does not yet appear to be rapid.

8. It might be advisable, under existing conditions, to make protective inoculation compulsory, but compulsory inoculation with the existing staff could not be enforced and would further be a costly measure. To-day anyone desiring to be protected by inoculation can obtain the protection desired by applying to any Government Medical Officer. The Government provide vaccine, as requested, and no one has yet been refused this measure of protection.

(f) Tuberculosis. The information available regarding the incidence of this disease in past and present records, although not considerable, tends to prove that Tuberculosis of the pulmonary type is appearing more frequently amongst the sick treated at the various hospitals in the Territory. A scrutiny of the Returns submitted from the various hospitals during the year shows that amongst Europeans 7 cases of pulmonary and one of spinal Tuberculosis were diagnosed, while amongst natives there were 78 cases of pulmonary, one of bone, one of spinal and one of intestinal Tuberculosis. The Death Returns submitted by the Registrar show that 6 European deaths were attributed to pulmonary Tuberculosis and one to the genito-urinary form of the disease, while of the native cases already referred to, 43 are shown as terminating in death, making 53% of the cases recorded. It is feared that this percentage should be higher as at certain centres the cases reported were diagnosed amongst out-patients and no further record of progress has been made available.

2. From medical literature there appears to be some difference of opinion amongst medical men practising in Africa as to whether Tuberculosis is a new or old disease amongst the native population; it is, however, found that, generally, when the disease

can be diagnosed clinically in an African, the progress of the disease is rapid and death is not long delayed.

3. Most of the African population in this Territory live in small unventilated huts made of poles and mud under conditions which must be most desirable for the spread of the disease, more especially in congested areas, such as locations and compounds around European centres. A rapid spread of the disease in purely native areas would appear to be less likely as here the population is scattered over a large area and only collects in small groups.

4. The climate of Northern Rhodesia during the cold dry months of the year—April to September—must be considered favourable and, generally speaking, the disease should not appear frequently amongst our European population.

5. Bovine Tuberculosis is rare in this Territory, and for that reason cases of Tuberculosis other than pulmonary are not often seen. No special measures for the prevention of the spread of Tuberculosis have yet been taken.

(g) Leprosy. Information as to the incidence of this disease is obtained from the District Administration, District Officers keeping Registers of the lepers in their Districts. The following table gives the number of lepers reported in each Province, together with the estimated population for each Province and the percentage of lepers per 1,000 of the population.

TABLE J.

Province.	Estimated Population Census, 1931.	No. of Cases.	No. of Cases per 1,000.
Awemba	145,876	324	2·2
Barotse	327,617	3,357	10·2
Batoka	150,548	535	3·5
E. Luangwa	209,353	248	1·2
Kafue	49,814	100	2·0
Kasempa	63,331	116	1·8
Luangwa	118,572	275	2·3
Mweru-Luapula	124,961	420	3·3
Tanganyika	105,009	162	1·5
TOTAL	1,295,081	5,537	4·37

The figures given above must be considered approximate for few of the cases were diagnosed by Medical Officers, and it is possible that, while many cases are missed, others with lesions due to disease other than Leprosy are included. Figures for 1931 show a decrease of 106 cases as compared with the figures for 1930. Leprosy appears to be more common in the Barotse Province than elsewhere in the Territory.

2. Lepers are admitted for treatment at most Government Hospital centres. The Seventh Day Adventist Mission at Mwami, and the Dutch Reform Mission at Nsadzu —both in the Fort Jameson District, have leper colonies and provide care and treatment for a number of lepers. The Medical Officer, Abercorn, reports that lepers are treated at the Mission Stations at Kawambwa and Niamkolo, and the Medical Officer at Balovale reports that treatment is given at the Chitokoloki Mission. Besides these Missions lepers are treated at many other Mission Stations.

3. Leprosy is usually treated in this Territory by injections of Alepel, the drug being provided at Mission Stations, through Government, by the British Empire Leprosy Association.

4. While it cannot be stated that Leprosy is receiving some attention, it is not likely that any decrease in the incidence of the disease will be brought about until general measures are taken to improve the standard of living of the African population of the Territory. It is invariably found that with improved conditions amongst the people associated with better housing, better feeding, and proper sanitation, Leprosy as a disease gradually disappears.

Mwami Mission—Leper Colony.

Nsadzu Mission—Leper Colony.

Collection of Lepers at Nsadzu outside Dispensary
with European Nurse in charge.

(h) Anthrax. Anthrax is reported to occur in cattle in the valleys. During the year no human cases of this disease were directly reported, but an outbreak reported from the Mazabuka District as causing a number of deaths on investigation produced evidence of signs and symptoms similar to those occurring with Anthrax in humans.

(j) Rabies. Almost ever since the British occupation of this Territory it has been known that Rabies occurs in the local wild carnivora, and year after year Rabies has been reported amongst dogs from different parts of the country, and in recent years frequently in districts lying along the Railway Line in the Batoka Province.

2. During 1931 rabid dogs were reported at Choma, Livingstone and Mazabuka, and in most cases human beings were stated to have come either into direct contact with the dogs during the incubation period or to have been bitten. Courses of protective inoculations were given to all such persons.

3. Vaccine for anti-rabic treatment is obtained from the Union Health Laboratory at Cape Town, the full course for one person costing our Government £2 2s. 0d.

4. The control of Rabies was discussed in August this year at a Conference of Veterinary Officers at which both the Director of Medical & Sanitary Services, and the Deputy Director of Sanitary Services gave evidence. The Conference, at the termination of their deliberations, submitted that, as the disease constituted a serious menace to human life, in their opinion strong measures of control were necessary. The Conference recommended:—

(*a*) the compulsory registration of all adult dogs, the issue of badges, and the destruction of all dogs not so registered;

(*b*) the carrying out of experiments on the immunization of dogs at the Central Veterinary Research Station;

(*c*) the payment of rewards for the killing of jackals, hyenas and wild dogs, payment being made on the production of the pelt with skull attached;

(*d*) the continuance of existing regulations, whereby all dogs are kept tied up within a given distance of a suspected outbreak, and the destruction of neglected dogs by the Police.

5. Rabies was later in the year also the subject of an enquiry of a Special Committee of the Legislative Council, who submitted a report at the end of the enquiry after which the whole question was debated in Legislative Council, His Excellency allowing official members a free vote. The report of the Special Committee was adopted by a great majority of the members—official as well as elected. The Report recommended that in the Batoka Province more drastic regulations for the control of dogs should be enforced, and suggested increased payments for licences in the settled areas; also the licensing of dogs in the native reserves. The recommendations made are still receiving the consideration of Government.

6. The menace to the human population and the difficulties of carrying out treatment to those possibly infected by rabid dogs in any area, were illustrated in September of this year, on the discovery of rabies, in a dog belonging to a member of the staff of the Beit School for Girls at Choma. It was found that the dog had come in contact during the incubation period with most of the children at the school. The diagnosis of Rabies was only made during the school holidays when the children were scattered, necessitating steps to be taken to communicate with the parents who were, in some cases, not easily accessible, and arranging for the treatment of the children.

7. So far as can be learnt only one case of Hydrophobia in a human being occurred during the year; this single case was reported by a Missionary from the Chikuni Mission, who stated that a native, bitten by a dog at the end of October, had died early in December with all the symptoms of the disease.

(k) Yaws. This disease is believed to be common in all parts of the Territory lying not more than 3,000 feet above sea level. During 1925 and 1926 Dr. J. A. Acheson investigated Yaws in the Kasempa District and at the end of his investigations reported fully on 2,279 cases that he had treated, describing the various lesions met with by him. Since that date rapid tours for the investigation of Yaws have been made in the Zambezi Valley; the disease is reported to be common there and it is even suggested that the area infected is extending.

2. The following table shows the number of cases attending for treatment at various Hospitals in the Territory during the year. It is possible that many cases treated have not been recorded.

TABLE K.

Fort Rosebery	94
Abercorn	7
Choma	478
Bwana Mkubwa	35
Broken Hill	5
Chitambo Mission, Kasempa	844
Balovale	1
Mazabuka	14
Roan Antelope Mine	1
Livingstone	1
Mongu	5
Kasama	2

3. If efforts are to be made to control Yaws in endemic areas it will be necessary to post Medical Officers there and permit them to tour their Districts, travelling from village to village and treating cases as they find them. The initial tours will need to be followed up by the opening of Dispensaries which will be easily accessible to persons requiring treatment. Such Dispensaries could, it is suggested, be staffed with Africans, trained to give the necessary treatment, but such a staff would require frequent and regular supervision from Medical Officers.

4. Bismuth, generally in metallic form, is used locally in the treatment of Yaws and has been found to give spectacular results, a few injections only removing all visible signs of the disease. Although Dr. Acheson's tour, already referred to, and the tours made by other Medical Officers in the infected areas have taught the native population the value of the treatment that is available to them when affected by this disease at Government centres, it cannot be expected that more than a small minority of those affected will travel long distances to obtain treatment, and few will be found in a fit state to undertake such journeys.

(l) Goitre. This disease is reported to be common in the Kasempa and Solwezi Districts of the North-East and also in the Mweru-Luapula Province. It has been suggested that the disease is due to the lack of lime in those Districts, but further investigations will be necessary before any definite statement can be made.

(m) Measles. Measles was reported from most settled areas during the year and epidemics were reported from several native areas. The epidemics in native areas were associated with some mortality. As a general rule Measles is a mild disease in this Territory and the deaths that occur in native reserves must be considered as being mainly due to the bad housing and insanitary conditions existing in those parts. It is the general experience that cases treated in properly lighted and ventilated buildings are rapidly cured.

(n) Whooping Cough. This disease also generally appears in a mild form and few deaths should occur if general living conditions were improved.

(o) Pneumonia and Influenza. Pneumonia continues to be responsible for a large proportion of the deaths reported amongst natives in the mining camps. In Hospitals elsewhere in the Territory Pneumonia is also often a fatal disease. From some centres this year little or no Pneumonia has been recorded, but in such cases Influenza is shown to be associated with a number of deaths. During the year Influenza, of a mild type, occurred in various parts of the Territory and only in some villages near the Tanganyika Border was an epidemic reported with a large number of deaths.

2. The following table shows the cases of Pneumonia and Influenza reported amongst natives from various Stations, giving the number of deaths and the percentage of fatal cases:—

TABLE L.

	Lobar and Broncho-Pneumonia.		Influenza and Influenzal Pneu.		Total.		Mortality %
	Cases	Deaths	Cases	Deaths	No. of Cases	No. of Deaths	
Broken Hill Mine	62	4	156	3	218	7	3·36
Bwana Mkubwa Mine	14	3	36	3	50	6	12·00
Roan Antelope Mine	244	50	316	4	560	54	9·64
Mufulira Mine	161	31	157	5	318	36	11·32
Nkana Mine	382	92	466	30	847	122	14·37
Nchanga Mine	39	11	108	15	147	26	17·00
Livingstone	—	—	229	66	229	66	28·80
Mazabuka	7	4	4	—	11	4	36·36
Broken Hill Hospital	45	23	355	14	400	37	9·25
Bwana Mkubwa	—	—	40	—	40	14	35·00
Fort Rosebery	—	—	4	—	4	—	—
Mongu	12	4	10	—	22	4	18·12
Balovale	6	—	—	—	6	—	—
Choma	10	5	6	—	16	5	31·25
Kasama	6	2	4	—	10	2	20·00
Fort Jameson	13	4	76	—	89	4	4·47
Lusaka	23	8	14	2	37	10	27·02

3. Under the heading "Pneumonia" the Chief Medical Officer of the Roan Antelope Mine, in his Annual Report, records that Dr. Ordman, of the South African Institute of Medical Research, visited that mine to advise the authorities on the control of Pneumonia.

4. Dr. Ordman's investigations covered a large field and included examinations of the conditions under which the natives live, their housing and diet, and the study of the meteorological conditions, investigations into the conditions associated with work and, lastly, into the ætiology, the clinical aspect, and the bacteriology of cases of Pneumonia occurring. Lung punctures were used to establish the bacteriological basis of the disease, and mouse inoculations in the investigation of the virulence of the organisms found.

5. Dr. Ordman found that the Pneumococcus was almost completely absent from the material examined, and that type "B" organisms were found on two occasions only. The principal organism found was the Streptococcus Pyogenes, which was frequently associated with the Micrococcus Catarrhalis. In some instances the hæmolytic staphylococcus Aureus was also recovered. Dr. Ordman came to the conclusion that the really responsible organism was the Streptococcus Pyogenes. The Influenza Bacillus was completely absent.

6. Vaccines from the various organisms recovered have been prepared and from August this year prophylactic inoculation of all employees and staff is being carried out. The work done at the Roan Antelope Mine will be watched with considerable interest and it will be interesting to see if the inoculations will considerably reduce the incidence of Pneumonia in that mine. It must be remembered, however, that the conditions under which labour work and are housed at the Roan Antelope Mine are generally better than those existing elsewhere in the Territory.

7. Prophylactic inoculation against Pneumonia was tried for a number of years on the Rand Mines but from their Report for 1931 it would appear that the Medical Authorities of those mines do not consider inoculations have made any impression on the incidence of Pneumonia. It is possible that the vaccine used there does not include the organisms at present causing Pneumonia, but on this I am not in a position to speak definitely as the Report in question does not give the composition of the vaccine.

8. It is the general experience of Medical Officers in this Territory that Pneumonia is only a serious menace to Africans who have recently left their Reserves and that the disease does not often affect Africans once they have become acclimatized to conditions found in mining camps and township compounds.

(p) Venereal Diseases. All forms of venereal diseases are reported to be common amongst the African population in and around townships and from some Native Reserves it is reported that the diseases are on the increase. Although not usually shown on the records, the diseases are not unknown amongst Europeans, but it is believed that new infections occur less frequently to-day. The following table gives the number of cases in natives reported from various hospital stations:—

TABLE M.

District.	Syphilis.	Gonorrhœa.
Broken Hill Mine	8	—
Bwana Mkubwa Mine	9	—
Roan Antelope Mine	22	1
Mufulira Mine	24	8
Nkana Mine	21	7
Nchanga Mine	15	1
Livingstone	92	24
Mazabuka	130	7
Broken Hill	84	4
Bwana Mkubwa	104	4
Abercorn	14	—
Fort Rosebery	105	31
Mongu	1,151	86
Balovale	67	18
Choma	33	7
Kasama	26	2
Fort Jameson	41	24
Lusaka	493	15
Chitumbi Mission	15	—
Sesheke	79	22

2. The actual incidence of Syphilis in native areas will only be known, and treatment on a large scale will only be possible when Medical Officers are available to carry out systematic tours in such areas. The cases treated in most hospital centres come largely from the population in the immediate vicinity. It will be noted in the table given above that at Mongu a large number of cases were treated, this station being adjacent to a somewhat densely populated native area.

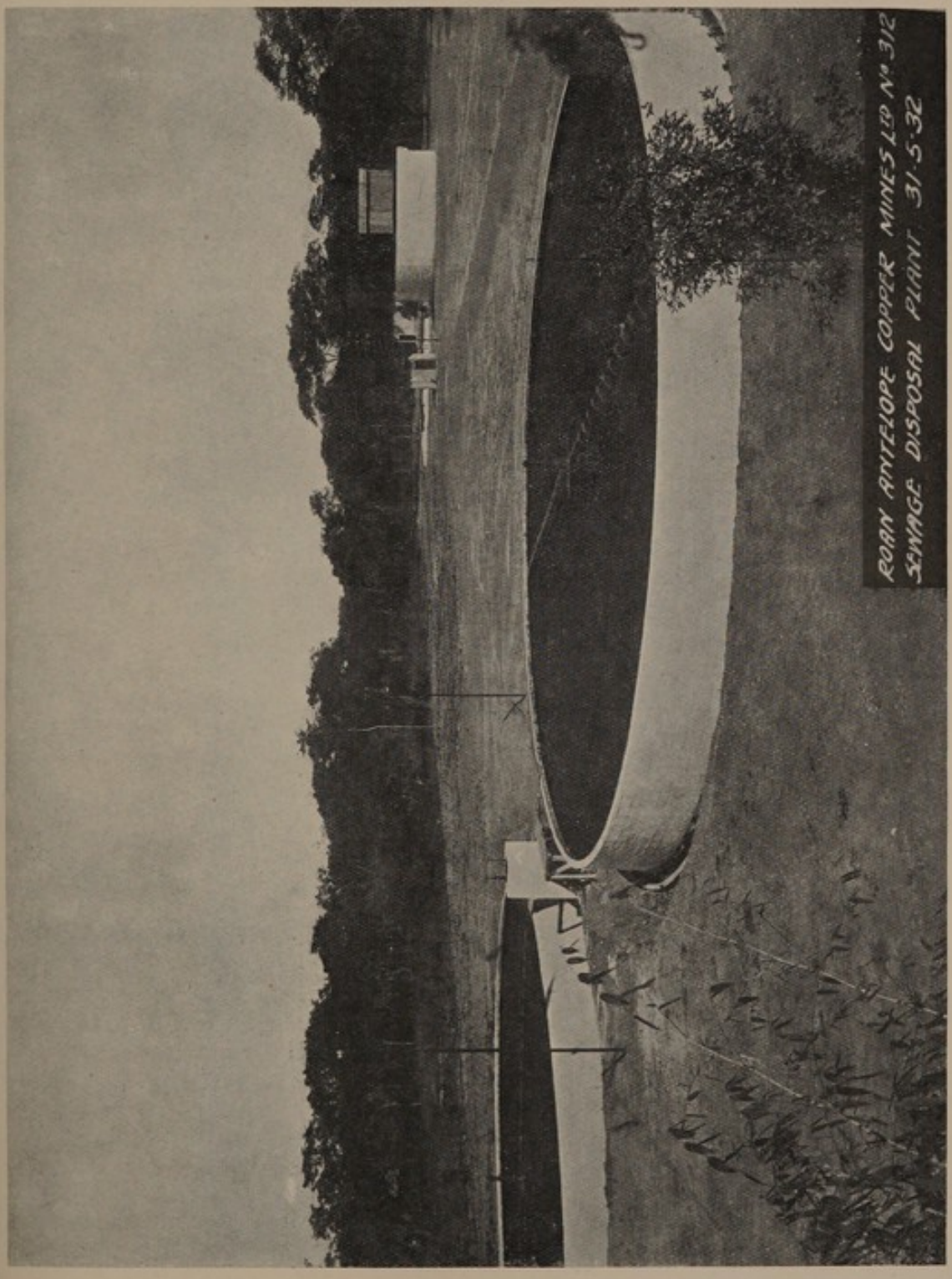
(III.) HELMINTHIC DISEASES.

(a) Ankylostomiasis. Although it is believed that a very large proportion of the native population harbour ankylostomes it has not been possible up to date to estimate the infestation that exists in any one section of the population, and it is not definitely known whether the disease is of any great economic importance to the Territory as a whole, although it is not likely that it plays an important part in predisposing and in lowering resistance to other diseases.

2. The Medical Officer of Livingstone is of the opinion that this parasite plays an important part in the ill-health of the native population around the Capital. An investigation carried out at Balovale showed that 82% of a number of natives examined were found infected.

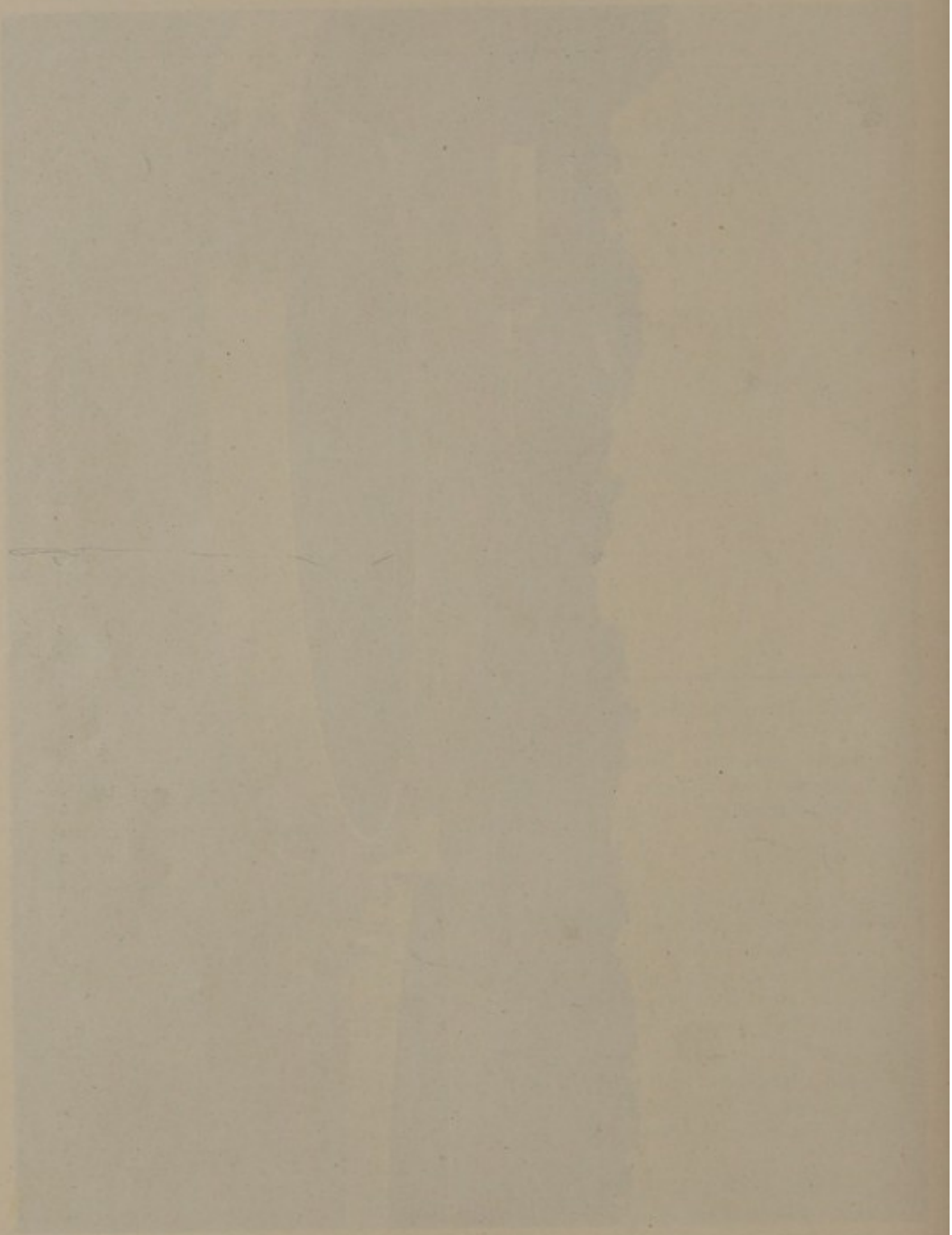
3. Climatic conditions from January to April and during December of each year, when the daily temperature is high and much rain falls all over the Territory, must produce conditions favourable for infestation of the population, while on the other hand conditions during the remainder of the year, when the weather is dry and the daily minimum temperature falls to below 60°, must make such increase difficult.

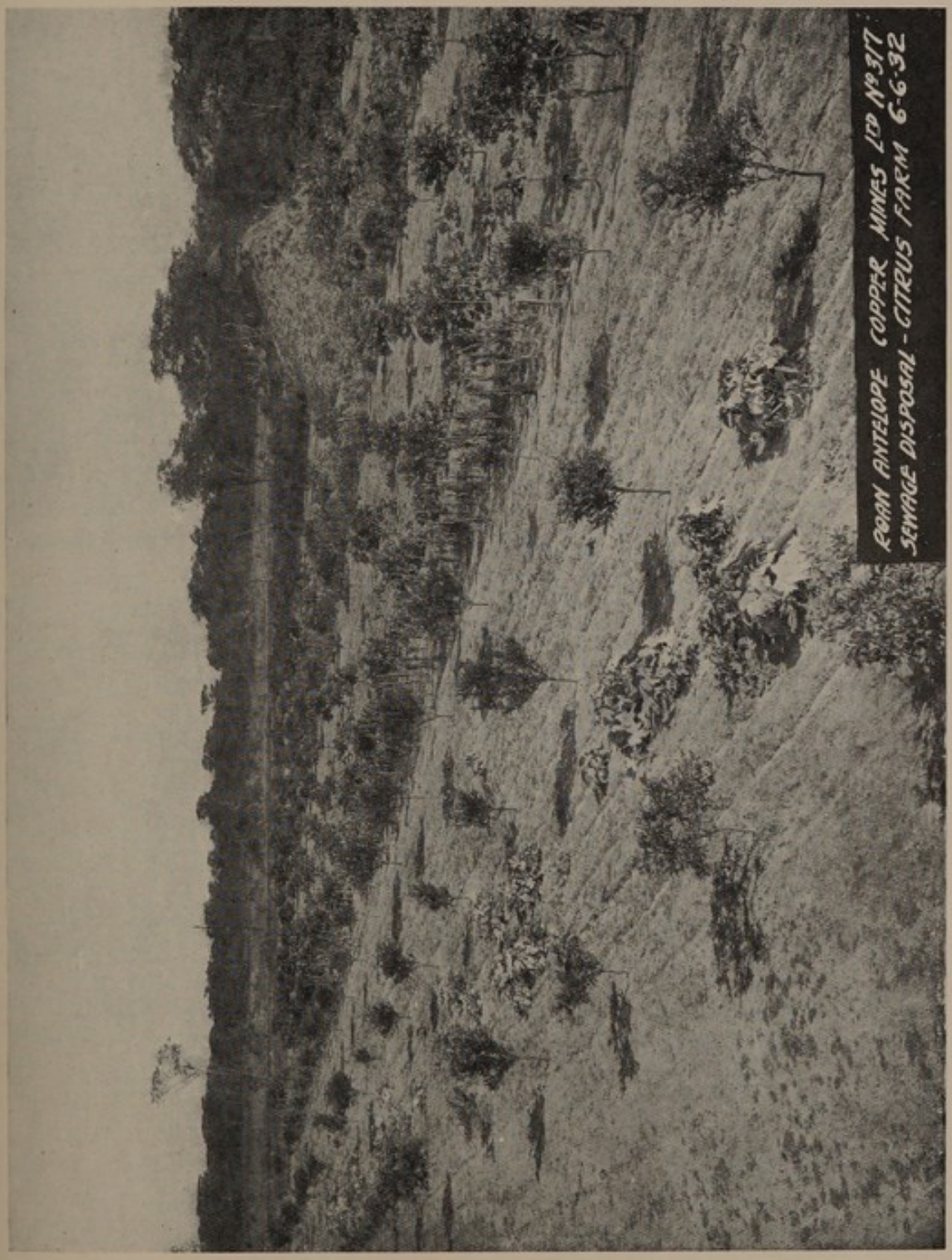
4. The attached table, taken from the Annual Report of the Chief Medical Officer of the Roan Antelope Mine, records infestation found during different months of the year, in natives admitted to hospital:—



Sewage Disposal Plant—Roan Antelope Mine.

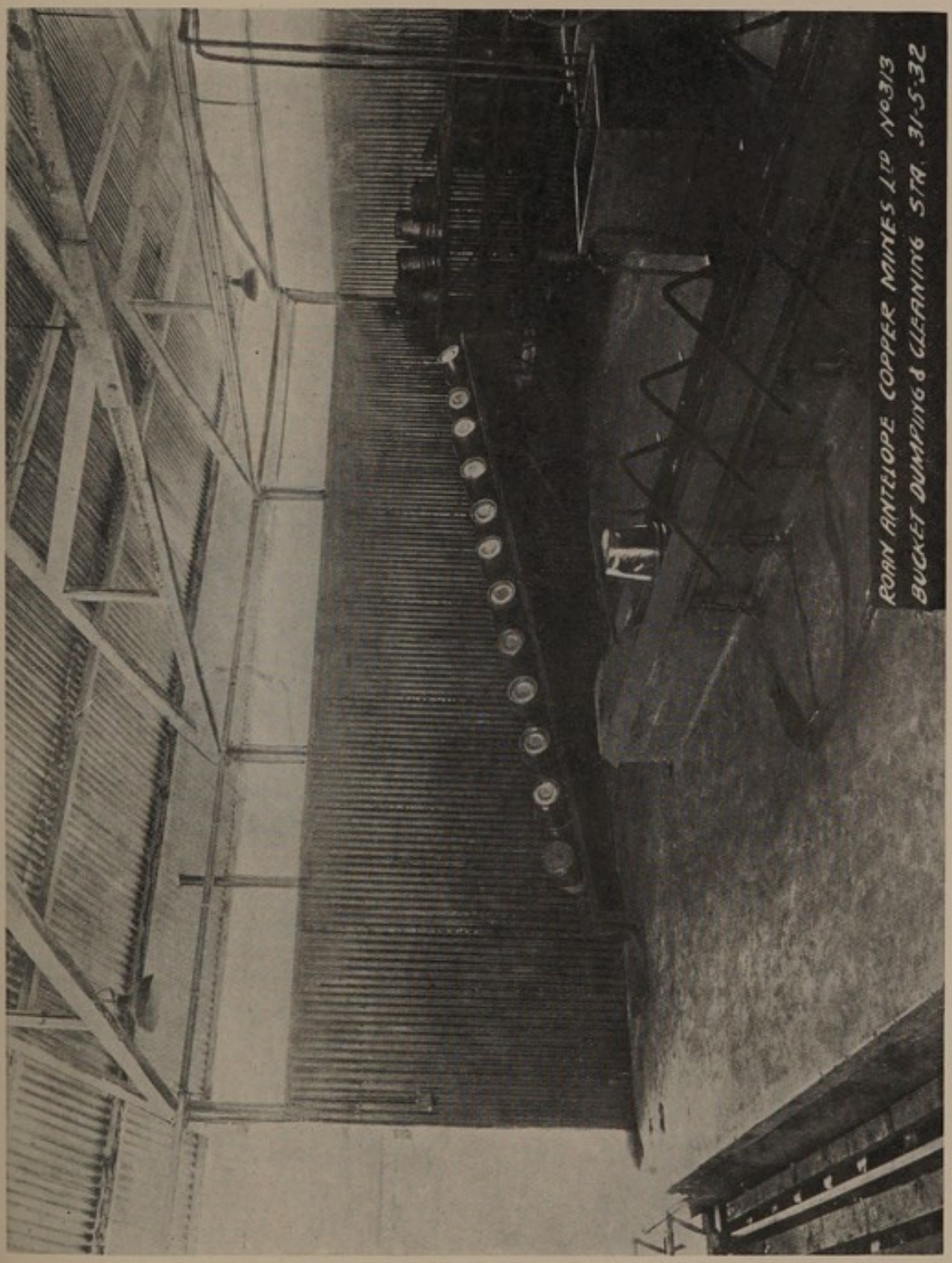
Showing Filters.





Sewage Disposal Farm, Roan Antelope Mine.

The Farm is planted with Citrus.



Station at the Roan Antelope for the disposal of bucket contents brought up from the Mine.

Bucket contents are disposed of in the sewer and the buckets are effectively washed and steamed. The cleansing of the buckets is done by mechanical means.

NIGHT-SOIL DISPOSAL.

Night Soil being removed to Sewage Farm.

TABLE N.

Month.	Number Examined.	No. of Cases in which Hookworm Ova found.	Positive Findings.
April	42	19	45·2
May	4	2	50·0
June	30	16	50·3
July	14	7	50·0
August	96	40	41·6
September	127	23	18·1
October	122	47	38·5
November	116	46	39·7
December	104	52	50·0

5. In most native areas the bush adjacent to the village serves the population as a latrine with the result that the ground around the village is soon heavily infested with hookworm larvæ, making it impossible for any barefooted person to fail to be infected.

6. Sanitary conditions around native compounds in townships are often not much better and even where latrines are provided, sufficient care is not regularly taken to ensure that the latrines are used and, in some cases, the type is so unsatisfactory that the native population served find it cleaner to accommodate themselves elsewhere.

7. Conditions around townships, it is hoped, will improve as better sanitary provision can be made and more supervision exercised. The conditions in native reserves will only improve when the native can be educated to appreciate the need for efficient latrines and the regular use of the same.

(b) Tæniasis. This helminthic infection has not yet been reported as common in any part of this Territory.

(c) Schistosomiasis. This infection is relatively common throughout the Territory, but apparently causes no serious symptoms, except amongst children and does not interfere with the ordinary life of the persons infected. Eight specimens of urine examined at the Laboratory of the Roan Antelope Mine showed ova of Schistosoma Hæmatobium on seven occasions.

2. Medical Officers at Fort Jameson and Balovale reported the disease as common in their Districts. It cannot be expected that any great reduction in the incidence of this disease can be looked for until the population is educated to the danger of fouling water supplies.

(d) Ascariasis. Infection with Ascaris is common but the disease is not often recorded in Returns from hospitals.

2. Prevention of the infection is associated with the satisfactory collection and disposal of human fæcal waste.

(II.) GENERAL MEASURES OF SANITATION.

(a) Sewage Disposal. It is pleasing to be able to record that even in its present stage of development this Territory possesses two centres of concentrated population that are provided with complete water-carriage systems of sewage disposal, although it has to be admitted that both systems are in mine townships and were provided solely from mine capital.

2. The mine townships with sewerage schemes are those of the Roan Antelope and Mufulira. The sewers and sewerage works provided at the Roan Antelope are of sound construction and would do credit to any modern town. The sewage disposal works are situated some distance from the residential part of the camp and the method of treatment is as follows:—

The sewage on arrival at the disposal works is first passed through rough filters and from there run into sedimentation tanks of a converted "Imanhoff" pattern. The liquid drawn off is then filtered in sand and clinker filters, and the sludge deposited is further treated by means of an activated sludge process. Filtered effluent and resulting sludge are disposed of eventually on the land, which is kept under regular cultivation. Mufulira at the end of the year had provided sedimentation tanks at its disposal area, and disposed of its effluent and sludge in the ground.

3. The Nkana Mine Authorities, instead of providing a general sewerage scheme, have placed their faith in septic tank installations, disposing of the effluent by soakage into the ground by means of French drains. The septic tanks provided are large and one tank serves a group of residences. During the year the Nkana Sanitary Engineers met with some difficulty with their septic tanks and had to alter the construction. The tanks are now stated to be working efficiently and the system giving every satisfaction.

4. The sewerage schemes at the Roan and Mufulira Mines were completed during the year and at Nkana, at the time of writing, all but a very small part of the camp is provided with water-borne sewage. At all three mines the compounds for native labour are provided with communal trough water-closets, flushed either automatically or by hand. Now that water-borne sewage is provided at these camps it is possible to hope that fly-borne diseases will either be a rare occurrence, or will not occur at all.

5. Buckets continue to be used in underground workings; they and their contents are brought up carefully to the surface, the contents at the Roan and Mufulira Mines disposed of in the sewers, and at Nkana by burial in the ground.

6. The Authorities at Nkana are providing a septic tank for the disposal of mine fæcal waste and it is hoped that this will soon be completed.

7. Other mine townships, the Municipality of Livingstone and townships generally are still tied to a bucket service, all the buckets being emptied daily or nightly and their contents disposed of in shallow trenches or deep pits and, in a few cases, by incineration.

8. The collection and disposal of night-soil is in most townships a responsibility of the Town Management Board, who provide the service and collect revenue for services rendered. In several townships the revenue so collected constitutes their main revenue and is often expended on measures other than the service for which it is charged. This practice is unfortunate as funds to-day, which rightly should go towards improving this important and essential service, are frittered away on other amenities and in many cases Boards have attempted no improvements in their night-soil service since its inception.

9. It is also to be regretted that, with few exceptions, Township Boards have not yet found it possible to provide their native compounds with a night-soil service of a standard approximating to that provided for Europeans, although in all these townships congested native compounds can be found in fairly close proximity to the European residential areas. In this country, where European and African races come into daily contact and the African generally handles the food of Europeans, it cannot be expected that disease occurring in native areas will not spread to the European and, therefore it becomes all the more necessary to maintain in their native areas the best forms of sanitation for our own protection.

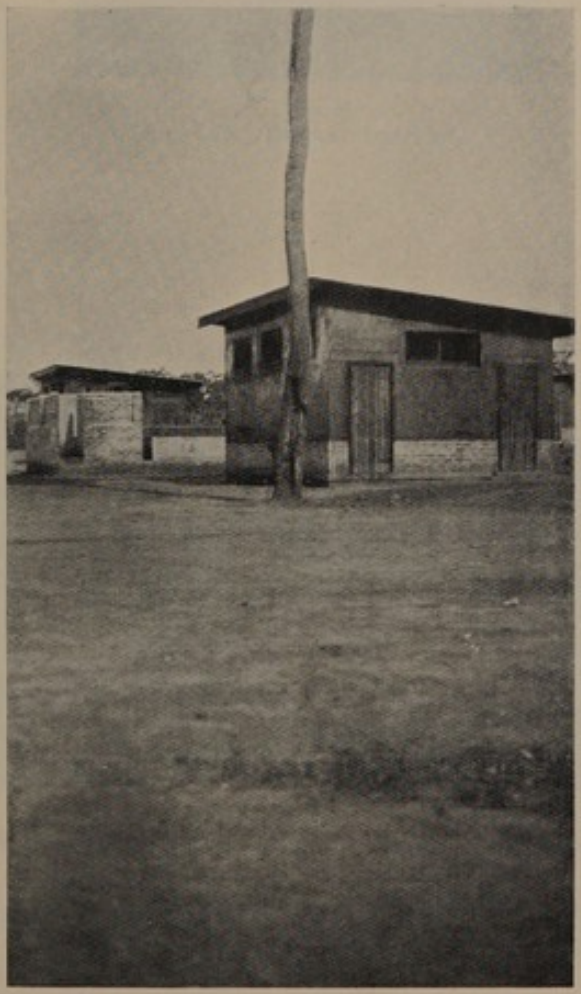
10. In few townships is transport other than human provided for the collection and removal of buckets and contents—a very laborious and expensive method of transportation.

11. Many towns during the year have adopted standard types of latrines approved by this Department and propose to insist, in future, that all new erections be of the type approved. If this is carried out it will be a considerable advance as in most towns the latrine chambers provided in the past were far from being sanitary structures and in most cases were anything but fly-proof. It is hoped that the authorities will shortly be able to see their way to insist that existing latrine chambers are improved and brought up to the newly-approved standard.

12. Government during the year decided that water-borne sewage with septic tanks should be provided in the future for all new Government buildings, provided that a sufficient piped water supply is available, and the soil in the area suitable for the

BUCKET LATRINES.

Latrines not much better can still be seen in the Township.



Latrines erected in new Government Compounds Luanshya and Ndola.

SEWAGE DISPOSAL.

Improved Bucket Latrine.

Sanitation Block, European School, Livingstone.

Water Closets are provided and sewage dealt with in a Septic Tank.

satisfactory disposal of the liquid effluent. Water-borne installations have already been provided on premises at Livingstone, Broken Hill and Ndola; they are also to be provided in all new buildings erected in connection with the New Capital development at Lusaka.

13. The Medical Officer of Health, Livingstone, in his Annual Report, points out that in that town to-day four night-soil disposal areas are in regular use. These surround the town and the number appears necessary as all the buckets are carried by hand for disposal. If one central area were used the labour required would have to be considerably increased.

14. A scheme for the collection of night-soil by mechanical transport is being considered by the Municipality, and the siting of a single disposal area. It is hoped that it will be possible to report that these measures have been instituted during 1932.

15. At Ndola ox-drawn vehicles are used and an effort is being made to develop a double-bucket service, but for various reasons, chiefly owing to insufficient buckets being available, the effort has not yet been wholly successful.

16. During the year a new sanitary farm was laid out and at least one grave nuisance existing in the past at Ndola has been abated. The Medical Officer of Health, Ndola, in his Annual Report, states:—"The efforts of this Department are continually being directed towards the eradication of the insanitary pit latrine throughout the urban area and, until such time as a sewage system is installed, the conservancy service is bound to increase, particularly now that municipal status is aimed at, with a considerable expansion of the municipal controlled area."

17. The following figures are of interest as an indication of how the scope of the bucket service has increased during the year, although the population of Ndola has slightly decreased:—

Number of buckets in use in January, 1931 ..	390	
Number of buckets in use in December, 1931 ..	701	
Night-soil removed in January	800	gall. per day.
Night-soil removed in December	1,600	,, ,, ,,

18. During the early months of the year before the Sanitation Branch was created in the Territory, Ndola adopted a slop water service and provided a vacuum tank with motor transport for the service in question. About one dozen of the larger institutions in the town decided to avail themselves of this service and provided impervious pits and, in some cases, installed water-borne sewage systems, draining into the pits.

19. The Medical Officer of Health, Ndola, comments as follows on the system and its workings:—

"This arrangement, by reason of its unwieldiness, its high cost of running and repairs, and the fact that it can only negotiate permanently-made roads, has been a continuous source of worry and annoyance to this Department during the year, and it is hoped that in the near future a scheme may be devised whereby self-disposing systems may be installed in the premises concerned, and this atrocity may be relegated to the limbo of obscurity."

20. While Ndola can show progress in its bucket disposal service, it must be recorded against this town that the Township Authority has not yet found it possible to provide for its large native compound any night-soil service other than shallow trenches dug daily in and around the area occupied. It is claimed that funds have not been available to make any improvements and it cannot but be agreed that funds are not easily obtained nowadays. The Ndola Native Compound has, however, been in existence for a number of years and Providence, and not the Local Authority, must be thanked that up to the present no serious epidemic has occurred in the area. The Native Compound houses some 5,000 human souls. It is hoped that when Ndola attains municipal status—which should happen early in the new year—and is in a position to levy rates and increase its revenue, this great menace will be one of the first to be removed.

21. The development at Broken Hill is divided into four sections, *viz.*, the Mine, the Township, the Railway and the Government Boma; each provides a separate bucket service, disposing of its night-soil in separate sanitary farms. A fifth sanitary farm

is used by the Police and Prison Departments. It is most desirable here that all services should be combined and one sanitary farm used, but there appear to be almost insuperable difficulties to-day to prevent this desirable policy being carried out.

22. The Lusaka Management Board use a Crawley Cart for the collection of night-soil. Bullock transport is provided and the cart is pulled round the town, the bucket contents being emptied into a tank and the buckets returned. This system makes it difficult to ensure the regular washing of the buckets. It has been recommended to the Lusaka Management Board that they endeavour to adopt a double-bucket system.

23. A bucket service was instituted during the year at Luanshya. The service provided is a double-bucket one and motor transport is used.

24. At Fort Jameson, Fort Rosebery, Mongu, and at small Government Administrative centres, a bucket service is provided for the European population, prisoners being employed as labour, and night-soil, generally, being incinerated.

25. Night-soil disposal at many of the small stations scattered along the Railway Line appears to be a problem difficult to solve. The European population at these stations is small, varying from a dozen to fifty people and mainly composed of Railway staff and Storekeepers. There is always a native population. In some stations pit latrines are in use, but generally speaking sanitary arrangements are crude and not dissociated with nuisance.

26. To improve the conditions in these stations a sanitary staff is required to travel around, inaugurate services, and see that they are effectively maintained.

(b) Scavenging and Refuse Disposal.

While a large number of townships possess some organised night-soil service, only a few have, up to the present, found it possible to inaugurate a refuse collection service. Where no service has been organised householders are expected to dispose of their domestic refuse in pits in their gardens.

2. At the Roan Antelope Mine an incinerator has been in use for some time but has recently been found incapable of dealing with all the refuse collected. It is here proposed to dump refuse in the area used for the deposition of mine tailings and run the tailings over the refuse dumped. The tailings contain chemicals and deposit a large amount of slime, which it is hoped will prevent fly-breeding. The experiment is being watched with interest.

3. In small administrative centres refuse is collected and incinerated. In all other areas where refuse is collected by the Local Authority it is dumped into disused pits, quarries, etc., and during the dry weather endeavours are made to burn it. The conditions existing in all refuse dumps are very unsatisfactory and flies can be found breeding in them freely during the warm and wet months of the year.

4. Several of the larger towns in the Territory should, it is hoped, soon be provided with some more effective means for the satisfactory destruction of their domestic and trade refuse. The amount collected daily in many cases must be considerable.

5. In several townships, local township regulations enforce the provision of a dustbin.

6. The Medical Officer of Health, Livingstone, in his Annual Report, specially complains of the position of the present dump for rubbish in that town. The dump is situated adjacent to the native compound, adding to the general insanitary conditions already existing in that section of the township.

7. Motor transport for the collection of refuse has been provided during the year at Livingstone. This service should make it possible to dump refuse at some greater distance from centres of development until an effective destructor is provided.

8. The Medical Officer of Health, Ndola, draws attention to the difficulties encountered in carrying out an effective refuse collection service in that town, owing to the lack of sanitary access in many areas and the difficulties of transport on unmade roads and sanitary lanes. He, however, states that the work was carried out despite these difficulties in a satisfactory manner and gives special commendation to the Town Foreman.

REFUSE REMOVAL.

LIVINGSTONE.

New Refuse Removal Motor Van.

Dumping Refuse in old disused Pits.

Lighter refuse is blown about and fly breeding occurs in the wet weather.

9. Motor trucks are used at Ndola for refuse collection and an endeavour has been made to standardize refuse bins. The number of bins in use at Ndola in the beginning of 1931 was 100, but the number had gone up to 296 by the end of the year. To cope with the increased service additions to staff will naturally have to be made.

(c) **Drainage.** As pointed out under the heading of "Malaria and Malaria Control," many townships in this territory are situated adjacent to low-lying areas referred to locally as damboes or vleis. The drainage of these damboes by economical measures, especially when adjacent to the smaller towns, is a problem not to be lightly solved.

2. In most townships earth cuttings are provided for the rapid removal of storm-water from the neighbourhood of residences but generally storm-water is carried to the low-lying areas, making the problems naturally associated with those areas more difficult.

3. In the absence of sewers, the disposal of domestic and trade liquid waste is also a problem in most towns and in many the present methods of disposal are not dissociated with serious nuisance. As might be expected the soil in various parts of this Territory varies considerably and while in some Districts the disposal of domestic liquid waste by soakage in the soil is easy, in other areas, owing to the clayey nature of the soil, disposal by such means is difficult and, in some cases, almost impossible. Luckily, so far as is known, the larger townships, except possibly Luanshya, are not situated in areas where soil soakage, even of a limited nature, cannot be obtained.

4. In the past it has been the practice to endeavour to dispose of rain water from roofs, together with domestic waste in common soakage pits. This practice has largely been found productive of nuisances and in newly-erected houses has been discontinued. The rainwater is now allowed to run over the plot, and only sullage water is dealt with by soakage, care being taken to separate grease before allowing the waste water to get into the drain. Disposal in the ground has been made easier by the laying of French drains and agricultural pipes in lieu of the old rubble-filled pit that had usually been provided before.

5. During the year Model Drainage Regulations received the consideration and approval of Government, and, at the time of writing, it is hoped these will be applied to Livingstone and Ndola. Both in Livingstone and Ndola, Offices of the Sanitation Branch have already been successful in having many nuisances connected with premises, due to defective drainage, abated.

(d) Water Supplies. Not many towns in the Territory outside the Mine Towns have a plentiful piped water supply. In a few townships the residents have still to fetch their drinking water from rivers and streams. Some townships, not situated adjacent to rivers, are provided with boreholes, while many of the smaller ones still depend for their supply on shallow wells.

2. Northern Rhodesia is fortunate in that it possesses at least three big rivers, the Zambesi, the Kafue—a tributary of the Zambesi,—and the Luapula, and numerous other not inconsiderable rivers and streams, several of which flow all the year round. There also appears to be throughout a large part of the Territory a dolomite stratum, the depth of which naturally varies, and which presumably holds a plentiful supply of water.

3. Nkana and the Roan Antelope obtain their water supplies from rivers. At the Roan the main drinking supply is first treated with alum, then passed through sedimentation tanks, filtered through sand filters and finally chlorinated, liquid chlorine being used. The water is regularly examined by the Mine Bacteriological Department, and, as might be expected after the treatment to which it is subjected, is reported to be a safe drinking water supply.

4. At Nkana the main drinking water supply is passed through filters and treated with bleaching powder. At the close of the year it was proposed to provide further filter beds so as to permit of periodical cleansing and to substitute bleaching powder with liquid chlorine.

5. The other mine towns obtain their drinking water from the underground dolomite. The use of water from the dolomite stratum for drinking is not altogether free from risk as the dolomite-like chalk is full of fissures and, therefore, is not altogether a satisfactory filtering medium.

6. The Municipality of Livingstone obtains its water from the Zambesi. The water is pumped up from a few feet of the bank and to-day, as many natives live in the vicinity of the Pumping Station, the supply is not altogether free from the risk of contamination. The water is not treated before being delivered to the public.

7. The existing Water Works are old. The pipe main is frequently found to be leaking and, although a new pump has been provided, it is not always considered safe to use it. The service tanks provide a total capacity of 170,000 gallons, but as the daily requirements of the town exceed the storage capacity, the tanks cannot be cleaned too often; they are also old.

8. The Municipality of Livingstone has during the year given consideration to the provision of a new supply and has been advised on the subject by a Consulting Engineer, but as the future of the township is uncertain with the Capital moving to Lusaka, appears to hesitate about proceeding forthwith with the scheme. Unless action is taken soon it is not an impossible contingency that any day in the near future the existing works will break down and the population of Livingstone find itself faced with a water famine and with the inconvenience of having to fetch its own water from the river. At the time of writing it is learnt that the new scheme is to be proceeded with as soon as possible.

9. Ndola, at the close of the year, was still supplied with water pumped from the Kansenji River to a battery of twelve storage tanks, each of about 1,000 gallons capacity, from which it was delivered to the public by a gravity system chiefly thorugh public stand pipes. The intake and catchment area was reported to be remarkably free from human and animal population and endeavours were made to chlorinate the supply at the point of intake. During the year work for providing Ndola with a more plentiful supply was being carried out. The scheme aimed at obtaining water from a deep well, raising it to a high-level reservoir built in two compartments, each capable of holding half a million gallons, and distributing it by gravity throughout the town. The well is situated near the Itawa River and will be about seventy feet deep, reaching the dolomite stratum. The dolomite is protected from local surface contamination by a surface bed of clay, below which is a bed of shale about twenty feet thick. Some sedimentation will be permitted at the storage tank as the outlet pipe is placed eighteen inches above the ground level.

10. At the time of writing samples of water taken from the well at the final depth are being examined both bacteriologically and chemically, but the reports on the findings are not yet available. It is hoped that, beyond chlorination, the water will not require special treatment. Water from the dolomite stratum is, as might be expected, hard and it may therefore be necessary to treat it before using it in boilers.

11. The New Capital site, Lusaka, is being provided with water from a borehole sunk some two hundred feet into the dolomite.

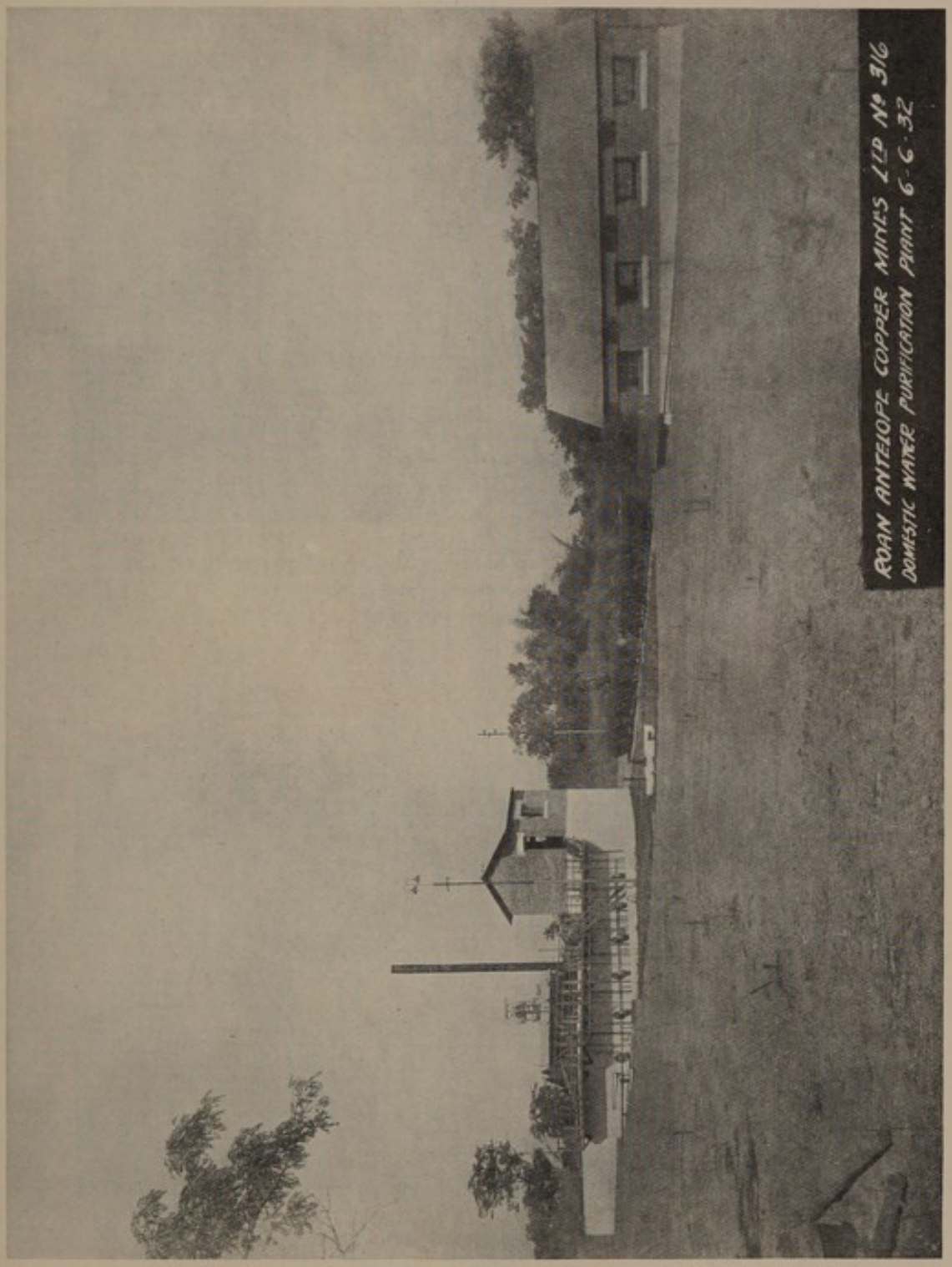
12. The various townships at Broken Hill are provided with water from the dolomite, the Mine pumping the water from there and selling it to the Railway and the Town Management Board.

13. Many of the smaller townships need to be provided with more efficient water supplies, but it is presumed these will have to wait until the financial position has improved.

14. During the year Mr. Hawkins, of Messrs. Hawkins and Partner, toured a large part of the country and submitted a report to Government. He has made recommendations and steps are being taken to carry these out. He strongly advises that the scouring of river beds should be prevented.

(e) Offensive Trades. Development in Northern Rhodesia has not yet made necessary any special measures for the control of Offensive Trades. The Town Planning Department is, however, providing areas in their plans for the future for offensive trade sites so that when such trades develop they can be rightly sited.

2. The curing and drying of hides create some nuisance in most of the larger towns, especially as the work is generally carried out in close proximity to slaughtering booths. As central abattoirs are provided for towns, hide-curing will, it is hoped, be relegated to the Offensive Trade Areas.



Main Domestic Water Purification Plant.
Roan Antelope Mine.

Alum is added to the water. It is then sedimented, filtered and chlorinated.

WATER SUPPLY.

NDOLA.

Shallow well providing water for European household.
Note the absence of a protecting wall to well and the proximity of pit latrine.

Stream running through Native Compound, Ndola.

The water is used for drinking, bathing, washing, etc., and also breeds mosquitoes.

WATER SUPPLIES.

NDOLA.

New Reservoir.

New Borehole and Pumping Station.

3. The natives living in the vicinity of lakes and streams do some fish curing, but the trade, although of many years' standing, is only small and so far has not been specially reported on.

(f) Clearing of Bush and Undergrowth. It is pleasing to be able to record that for years in this Territory much attention has been paid to the clearing of bush and undergrowth around townships. Even in the small centres of Government administration large areas have been cleared and in many townships the areas so cleared have been developed as golf courses, adding very considerably to their amenities.

2. In Africa the clearing of the bush and grass around townships and business areas is an important sanitary measure as it renders the fouling of the ground by the African unlikely, limits the area given over to fly-breeding, reduces the harbourage for mosquitoes, gives less protection to these insects in their flight from the breeding grounds, and, lastly, gives less harbourage to snakes.

3. It is only around the smaller Stations along the Railway Line that to-day can it be stated that bush-cutting is not done regularly; this would be effected if some organised authority functioned.

(g) Sanitary Inspections. The provision of qualified Health Inspectors is a new development in this country, the first being appointed in February, 1931, and two more being added towards the end of the year.

2. Some of the Inspectors appointed by Local Authorities, although primarily employed on such matters as supervision of night-soil and refuse removal and bush clearing, had made attempts to deal with mosquito breeding on premises, and other sanitary nuisances, but, generally speaking, such efforts were sporadic.

3. Conditions being as described, Medical Officers of Health and Health Inspectors had to move tactfully and their early efforts had to be directed mainly to an education of the public to the necessity for regular inspection of trade premises and residential stands, and to the need for such things as Sanitary Notices and the prosecution of persons creating nuisances, or refusing to remedy them when called upon to do so.

4. The Health Inspectors available were primarily employed around Livingstone and Ndola, but some inspection was attempted of the trade premises around the mine towns and at Luanshya by visits from Ndola. It is hoped in 1932 to arrange for other townships, such as Broken Hill and Lusaka, to be visited. It cannot, of course, be expected that much constructive work will be done by such periodical vists but it is hoped that these visits will help to prepare the ground for the staff that will be available when finances permit. The present state of depression cannot last for ever.

5. It is reported from Ndola that during the year 2,291 special and routine inspections were carried out in that town alone. In addition, a number of inspections were made in the mining centres. 526 Sanitary Notices were served in Ndola for nuisances associated with the following:—

In respect of waste-water disposal	29
,, ,, sanitary conveniences	77
,, ,, bush clearing	158
,, ,, dirty premises	59
,, ,, refuse	20
,, ,, excavations	15
,, ,, mosquito breeding	59
,, ,, wells	9
,, ,, native housing	62
,, ,, European housing	21
,, ,, storage of food	9
,, ,, handling of foods	3
,, ,, storm-water drainage	5
TOTAL	526

6. On fifteen separate occasions it was found necessary to prosecute delinquents. The following table gives the reasons for prosecution with results:—

TABLE O.

Reason for Prosecuting.	Number.	Result.
In respect of excavations	3	Fined £1, £3 and £3 respectively.
,, ,, native housing	2	Both cautioned.
,, ,, food storage	1	Fined £5.
,, ,, latrines	4	One fined £2—others cautioned.
,, ,, housing	1	Discharged.
Application for demolition of dwellings	4	Granted in respect of 23 rooms.

7. At Livingstone on ninety-eight occasions persons received letters of intimation for mosquito breeding and only in seven cases were further warnings necessary.

(III.) SCHOOL HYGIENE.

(a) European. Every school is inspected and the scholars attending examined at least once a year by a Government Medical Officer. Arrangements have also been made whereby private dental surgeons visit the schools, in most cases twice a year and, with the consent of the parents, treat children requiring attention at fixed charges. Where a case is proved that parents cannot afford to pay, Government assists.

2. Parents who are able to do so have their children educated either in Southern Rhodesia or the Union of South Africa, while quite a few parents keep their children in Europe during the school age period. The education available to the school children of this Territory is provided almost wholly by Government institutions and schools are sited at almost all big centres of European population. At the close of the year only two schools were provided for boarders, *viz.*, the Beit School for Girls at Choma and the Codrington School for Boys at Mazabuka, the remaining schools catering for day scholars only. Also, in the Lusaka District Government assisted certain scholars by boarding them with private families in the vicinity of the Schools.

3. The condition, physical and mental, of the children attending School varies considerably, the variability being largely due to the divers conditions existing in the homes from which the children emanate. In the mining towns and in other large townships the ordinary amenities, such as a water supply, good housing and some form of sanitation are usually available, while in some of the poorer settled areas even these are lacking. Malaria is not unknown in townships but here medical attention is available and the children affected are more often than not regularly treated with quinine. In the farming areas to obtain medical treatment is by no means easy and is often expensive.

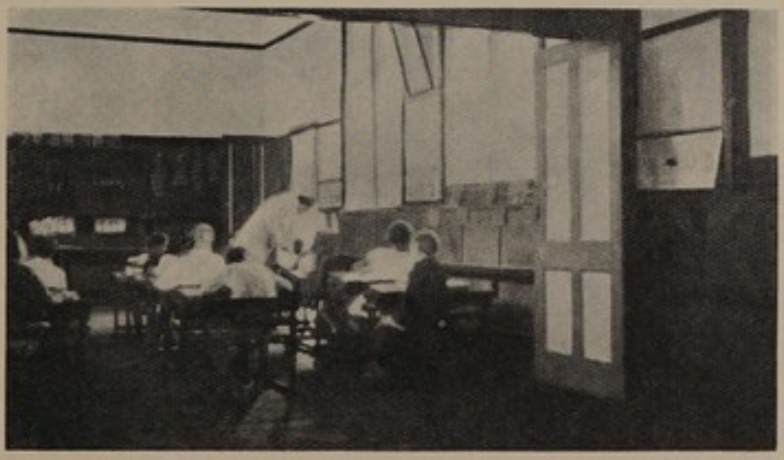
4. The standard of feeding also varies in different households, for while some children have regular well-prepared meals, not a few of them from necessity have been brought up on meals consisting chiefly of mealie meal (maize) porridge which is generally accepted to-day as a poor basis for a diet.

5. With the limited Medical Staff available it has not yet been found possible to appoint one Medical Officer to carry out examinations at all schools, and in the past each Medical Officer has had to make inspections at the school in his district. The records obtained by this system of examination make it difficult to compare results.

6. During 1931 the Sanitation Branch at Ndola took over the examination of schools and school children in Ndola and the Copper Belt and it is proposed, as much as possible, to have school examinations carried out in future by members of this branch of the service. With the present staff only a limited number of schools can be taken over. It would be more satisfactory generally if one officer with training in school medical work and special knowledge in the examination of eyes, ears, throat and nose could be provided solely for this important work. School medical inspections for our European population are even more important in this country than they are in European countries, as here, in order to maintain European prestige, it is vitally necessary to keep European children in good health and permit of their getting full value from the education they receive.

EUROPEAN SCHOOLS.

Livingstone Government School.



Interior of Class Room of above.

7. Unless this is done European children will soon be finding themselves in competition with the African in the unskilled and partly-skilled vocations of life.

8. It has already been indicated that the homes from which some of our school children come are not altogether the most suitable for the right training of the adult of the future. To children from such homes, it is submitted, education could best be given at boarding schools, where discipline could be maintained, early home training corrected where necessary, ailments treated, and satisfactory diets provided.

9. The school buildings at Luanshya, Livingstone, Ndola and Broken Hill, have only been recently erected and provide excellent accommodation. At Nkana new accommodation is being provided early in the new year. Water-borne sewage is provided at almost all the schools mentioned. The existing accommodation at Mufulira and Bwana Mkubwa is reported on adversely. The two boarding schools are sited in somewhat older buildings and conditions existing there are not altogether satisfactory. The accommodation for boarders at Choma is somewhat older, hence there occurs some overcrowding. Conditions at the Codrington School at Mazabuka are, however, even worse and the buildings used as a school and as accommodation for boarders have been adversely reported on on many occasions. The accommodation there must be considered decidedly unsatisfactory. It is proposed to build a new school for boys at Chilanga and it is hoped that the work of building will be started on immediately, so that the present Codrington School buildings need be used not longer than is necessary. Extensions at the Beit School at Choma are also contemplated.

10. A study of the School Reports shows that Malaria is by far the most common disease amongst the children. In Livingstone a history of having had malaria at some time or other was obtained from 64% of the children, while 20% had tender or palpable spleens. At Mazabuka five out of 24 boarders and 11 out of 34 day scholars had enlarged spleens. At Ndola 15% of the children had enlarged spleens and at Nkana the rate was 9·5%.

11. The standard of teeth was reported to be good at Ndola and the mine towns and many children showed signs of having received treatment. At Mazabuka 17 out of 58 children were reported to have carious teeth. At Livingstone the teeth were reported to be bad.

12. The Medical Officer inspecting at Mazabuka makes special reference to the nutrition of the children and classes 17 out of 58 children as poorly or only fairly nourished: he further states that he found only 17 of the remaining children really fit.

(b) The Native African. It has not yet been found possible to carry out routine inspections of African children attending schools. The education of the African in this Territory is still largely in the hands of Missions but Government keeps control of education by giving grants to schools recognised by them.

2. Mazabuka is the centre of native education and at this station are provided a Jeanes School for training Native Teachers, a Normal School and an Elementary School. The latter is a boarding school for the sons of chiefs and the more educated Africans, including clerks in Government employ.

3. Much attention has been paid to the schools at Mazabuka and endeavours are being made to educate the men and their wives at the Jeanes School in sanitation matters and in improved standards of living, so that when they return to their various districts, besides teaching the three "R's," they will be able to act as teachers in other matters which bear on native welfare.

4. The boys and children attending the Normal School and the Elementary School are well housed and cared for. The diets provided are being revised and endeavours made to educate them to a more balanced diet than is usually partaken by the native. A Native School has during the year been provided at Ndola and the Medical Officer of Health hopes to make a beginning in routine medical examination of native school children at that centre.

(IV). LABOUR CONDITIONS.

(a) General Industrial Conditions. The year closed on a period of depression followed soon after by a cessation of the development that was proceeding at the mines at Nchanga, Chambishi and Mufulira. This closure not only affected the people employed at these centres but had repercussions throughout the Territory and affected several commercial firms. Minerals figure largely in the exports of Northern Rhodesia.

2. Farmers in the Territory are mainly employed in the raising of cattle and the cultivation of maize for home consumption. Tobacco is grown in the Fort Jameson District and coffee is being tried in the Tanganyika Province, around Abercorn.

3. The African native population either work for Europeans as personal seryants or as labourers on farms, mines etc., or is employed in raising crops for its own personal consumption, or in fishing, if living near the lakes or rivers.

4. Natives leaving their homes to go out to work are slowly settling around the townships and, although efforts are regularly being made to get unemployed Africans to return to their home reserves, the resident population around townships is steadily increasing.

(b) Recruitment. For a number of years the labour forces for work in Southern Rhodesia and the Belgian Congo were recruited from this Territory, but with the development of copper mining within our own boundaries the number available for work elsewhere slowly decreased and in 1931 the mines in the Katanga Province of the Belgian Congo ceased direct recruiting from our areas, and, with the depression in Southern Rhodesia, the demand for labour in that Territory has also almost ceased.

2. When mining first started in this Territory large labour forces were required and the mines, to obtain the numbers required, created a special organization for recruiting. At the beginning of 1931, however, numbers of native Africans had developed the habit of coming direct to the mines in search of work and, as at the same time the demand for labour decreased with the completion of development and the beginning of production, the need for special recruiting became less.

3. Recruited labour is generally engaged on contracts covering a period of six months of thirty working days, the recruiters being responsible for transport to the place of employment and the return of the natives to their villages on completion of the contract. The growing practice of natives finding work on their own account reduces the cost to the employer and appears to be preferred by the natives as they can choose their place of work, are not tied to a regular contract, except for a month at a time, and are generally more independent. At the end of 1931 very little work by professional recruiters was being done.

(c) Housing. At most of the compounds belonging to the copper mine concerns operating in this country the housing provided for labour is being very rapidly improved upon and even to-day it has to be admitted that, although there is still room for improvement, African labour on most of the mines is provided with better housing than can be found elsewhere in the country.

2. On some mines there is still a tendency to overcrowd but the necessity for this should grow less as production begins and the resident population becomes stable.

3. The floors, lighting and ventilation provided in most of the huts erected in the early days of mining development are far from satisfactory, but it is hoped that with the improvement in the financial position these buildings will be demolished and replaced by newer and better accommodation.

4. The Broken Hill Mine Management have during the year submitted a scheme for the erection of a number of new huts for their labour, and state it is their intention to carry on with the scheme year by year until their old compound is totally demolished.

5. The General Manager of the Railway has had his attention drawn to the unsatisfactory condition of much of the housing provided for African railway employees and at the end of the year it was hoped that during the coming year we should see much improvement carried out. The financial slump, however, has made such a policy unlikely in the immediate future although efforts, it is stated, will still be made to do as much as possible.

NATIVE HOUSING.

1931. Housing for Railway Employees at Ndola.

This has been demolished but is not unlike housing provided for Contractors' labour forces elsewhere in the Country.

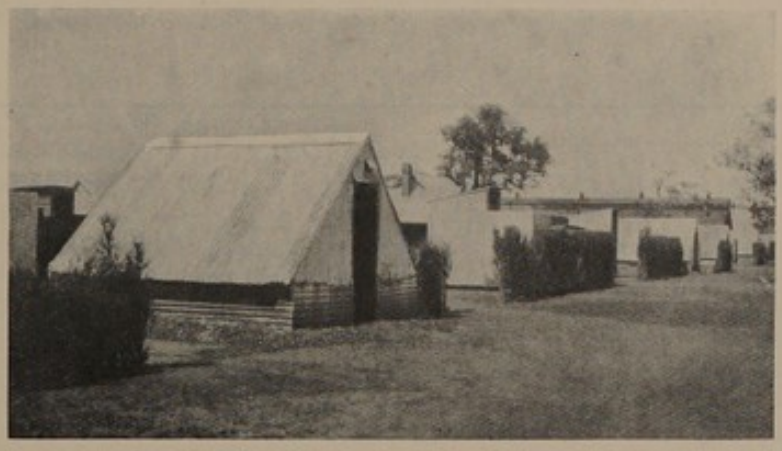
NATIVE HOUSING.

New Native Government Compound—Luanshya and Ndola.

Back view of same.

NATIVE HOUSING.

Personal Servants' Quarters built of galvanised iron
with walls of 1 ft. to 1 ft. 6 ins.



Similar accommodation in Railway Compound.
The temperature of the Town where this was taken
can be as much as 105° in the shade.

6. With the limited staff available the Sanitation Branch has not found it possible to improve the very unsatisfactory conditions under which African labour is generally housed by contractors and others. The accommodation provided in such cases often consists of low huts made of grass or mud and poles with earth floors. The shelters more often than not are not even rainproof. Sanitation of any sort is seldom provided and where provision is made it is of the crudest. It is feared that before an improvement can be brought about further staff will need to be provided to tour camps and farms, etc. regularly with instructions that improved accommodation and proper sanitation should be insisted on.

7. Reference has already been made in various parts of this Report to conditions existing in the compounds Africans for in townships. Much improvement in these compounds could be effected if the authorities responsible could instruct their compound staff to assist and advise natives erecting new huts in their compounds as to how best improvements could be made without very considerable expenditure. In some compounds such advice and assistance have already been given, with good results.

8. Government has during the year set an example to private persons in the matter of housing of Africans by having agreed to, and, in a few cases, by having provided very much improved accommodation for their African servants in the new residential buildings erected.

9. During the year two large compounds providing good permanent housing with many sanitary amenities have been erected at Ndola and Luanshya. The new housing provided has emphasized the unsatisfactory nature of much of that erected in the past, but it is feared that for the present demolition and re-erection will have to proceed very slowly.

(d) Welfare and Medical Care of Native Labour. African labour employed by Europeans, either as personal servants or in commercial undertakings, is almost invariably rationed, the rations varying from a daily issue of 2 lbs. of mealie meal with salt to a much more assorted and complete diet. The Employment of Natives Regulations, which came into force in February of this year, set down the minimum scale of rations to be issued to all African employees in mines and works. This scale of rations does not apply to labour employed on farms, nor to works employing less than 300 labourers. This scale of rations is as follows:—

TABLE P.

1.	Mealie meal, kaffir corn or rice	1½ lbs. per day.
2.	Bread (underground labour only)	6 ozs. per day.
3.	Beans or Peas	4 ozs. per day.
4.	Meat:	
	(*a*) dressed and containing not more than 25% of bone ..	2 lbs. per week.
	(*b*) Soup meat (head, heels, etc.)	¾ lb. per week
5.	Fresh Vegetables	5 ozs. per day.
6.	Peanuts (shelled)	7 ozs. per week.
7.	Animal Fat or Palm Oil	4 ozs. per week.
8.	Cocoa (underground and night labour)	As necessary.
9.	Salt	½ oz. per day.
10.	Sugar	As necessary.

2. In this Territory the practice of Africans leaving their reserves accompanied by their wives when in search of work, appears to be becoming rapidly more popular. This practice has much to commend it as it ensures that the labourers' food is properly cooked and that they retain many home comforts. Many employers now prefer to engage labourers accompanied by their wives as they consider they keep fitter and more contented. In a few cases employers issue half-rations to the wives and in many cases give them a small issue of meal.

3. Africans employed on the larger mines are very satisfactorily cared for when sick, and, in several cases, special efforts are directed towards the maintenance of the African employee in good health, mine managers, being fully aware of the fact that it costs less to keep persons fit than to care for them when they are sick.

4. The hospitals at some of the mine camps are better in many respects than any found elsewhere in the Territory. They are well staffed and equipped. All the mines are fitted with first-aid outfits at various points underground and care is taken to see that the equipment is kept in first-class order.

5. The existing arrangements for the medical care of African labour outside the mines and away from Government hospital centres, cannot yet be described as satisfactory although most employers keep a certain amount of dressings and a few of the more commonly used drugs in stock. Tropical ulcers are still far too frequently seen in and around labour camps. The occurrence and frequency of such ulcers is often an indication of the degree of general medical care exercised by the employers.

6. The railways during the year provided full-time Medical Officers at Livingstone and Broken Hill and part-time officers at Kafue and Ndola to care for their own sick; they, however, still use Government hospital accommodation. A Medical Officer is also employed by the Zambezi Saw Mills, at Livingstone, and the labour employed by this undertaking in the Zambezi Forests is regularly visited.

(e) Effects of Industrial Conditions and Development. It has already been pointed out that the African is learning to leave his village and to seek employment on the mines and in townships and, further, that in his exodus he is often accompanied by his wife and children. Having obtained work and established themselves a number of Africans tends to remain and in the absence of regular and easy means of communication with their tribal leaders and village associations, they become largely detribalised. The children, growing up around towns, naturally know no other existence. Some native parents, in their desire to keep tribal contact, send their children back to their villages as they grow older.

2. At the Belgian Congo Mines the mine authorities with, I believe, the sanction of their Government, are endeavouring to induce the African mine employees to settle permanently in their mine compounds, and are taking every possible care of the children with a view to developing their own labour supply. Children born on the mines are educated, the education being directed to the turning out of useful mine employees. In this Territory, although such settlement of natives in mine compounds is not a recognised policy, there can be no doubt that the practice will grow.

3. In native villages women and children are usually fully occupied, the women on cultivation, etc., and the children on such matters as herding cattle and goats. Life in compounds does not generally provide for women and children many opportunities for regular employment and, unless action is taken to provide occupation for these sections, *i.e.*, the women in sewing, etc., and the children by education in schools, etc., the next generation is apt to grow up lazy and indigent.

4. At the Roan Antelope Mine the authorities have permitted a large area outside the boundaries of their compound but easily accessible thereto, to be cultivated, and here, by the efforts of the women a large tract of land is kept under cultivation. The women thus find occupation and by their work provide extra comforts for their men-folk. At the Roan, again, a beginning is being made by the provision of regular instruction for the children in a school. No effort, however, has yet been made to compel children to attend school, but the numbers are steadily increasing. Some of the other mines also provide areas for cultivation and it is hoped the practice will develop.

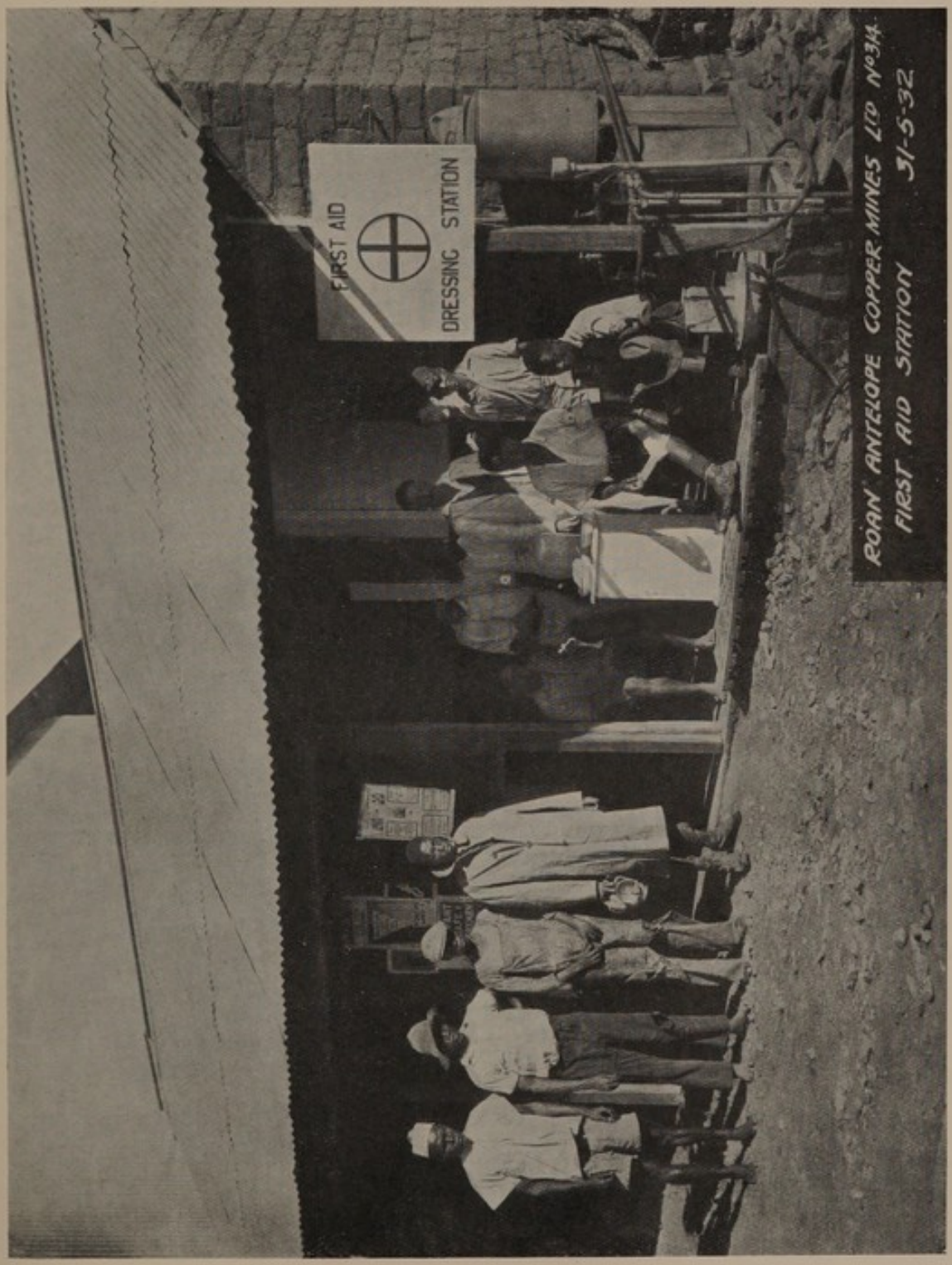
5. Government has also given consideration to the need of employment for women at Livingstone, Broken Hill and Ndola, and is providing garden plots outside the township areas to be leased to the natives. At Ndola a school has even been provided adjacent to the compound.

NOTE.—The Health and Mortality tables of the principal mines appear in the appendix.

(V.) HOUSING AND TOWN PLANNING.

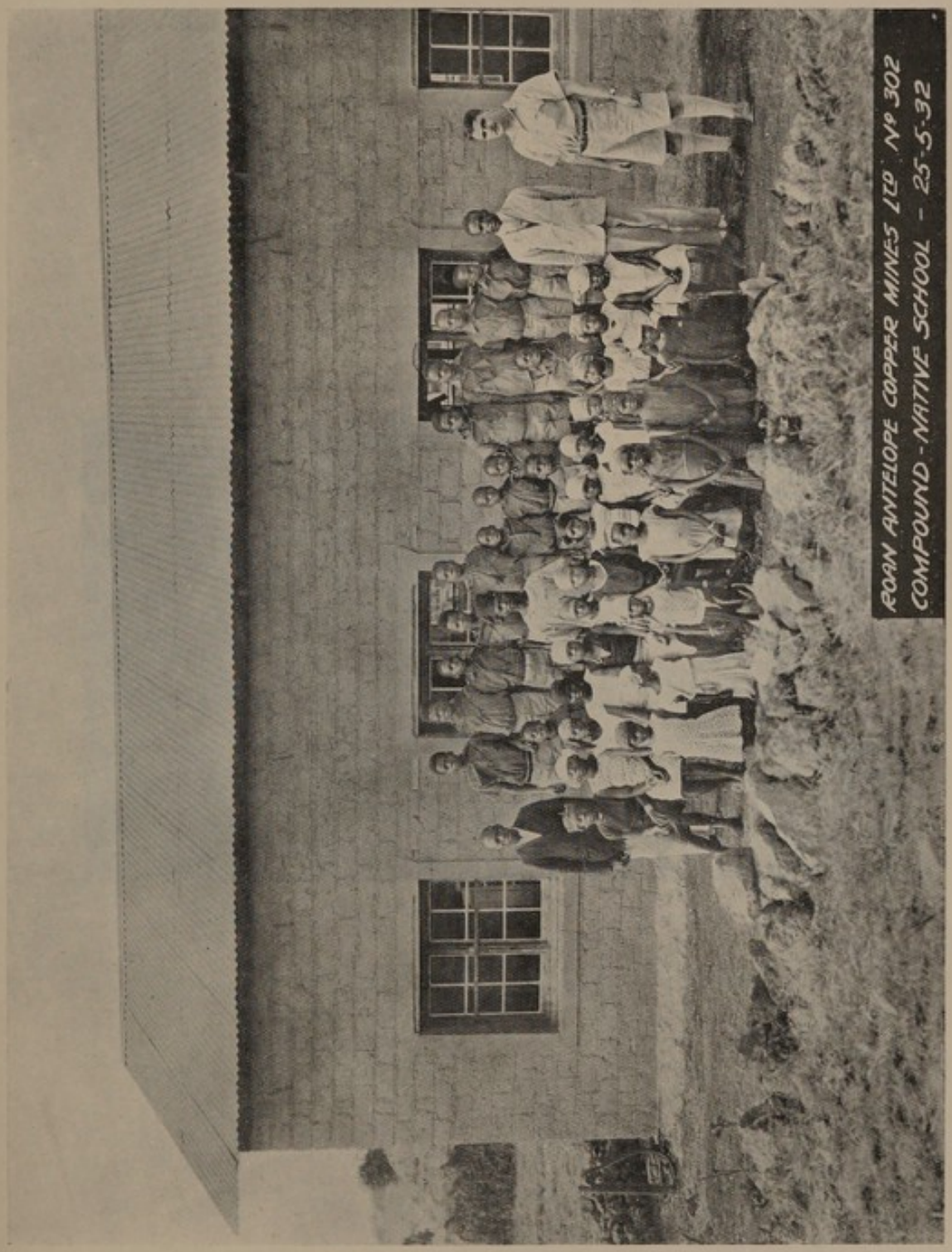
1. This Territory is fortunate in that there are no towns within its boundaries that are not of comparatively recent growth. While it must be admitted that in some of the existing townships there are small developed areas that still require re-planning, the sum total does not amount to much.

Native Hospital at the Roan Antelope Mine.



Dressing Station at the Roan.

At most of the Mines labour coming off work is examined and all cuts, abrasions and sores are cleaned and dressed. Tropical ulcers, previously common, are now rare.



School at the Roan Antelope Mine and some of the scholars.

AFRICAN WELFARE.

The New Native Government School, at Ndola.

2. A Town Planning and Development Department was created in 1930 and to-day functions as a branch of the Secretariat.

3. Existing legislation controlling the development of land as township sites does not give all the powers that should be available to control such development and it is understood that the Town Planning Department, in conjunction with the Legal Department is giving consideration to the matter and will soon be advising the Government on the necessary amendments.

4. There are also at present no effective means of preventing or controlling subdivisions of plots in townships. Powers, however, exist whereby the Governor in Council can instruct that town planning schemes be prepared in respect of any area.

5. The Town Planning Department is engaged on the preparation of plans for most of the existing towns. During the year reports and plans prepared by Professor S. D. Adshead and Messrs. Sir Alexander Binnie, Son & Deacon, on the site and layout of a new Capital for Northern Rhodesia were submitted to Government and considered by this and other Government Departments. Professor Adshead and Mr. E. C. Bartlett had arrived in Livingstone on the 18th August, 1930, and spent some six weeks in investigating possible sites. In their reports they recommended a site lying to the East of Lusaka as being the most suitable for the purpose. At the close of the year no definite decision on the removal of the Capital had yet been arrived at, but at the time of writing a decision has been reached and the Capital will gradually be transferred to the site recommended. Work on the site has already begun.

6. During the year the Town Planning Department prepared layouts for native compounds. The layouts made were for two different forms of development, viz:—

(*a*) for the erection of buildings by Government or some authority for the housing of African natives;

(*b*) for the erection of buildings by natives.

The new buildings at Ndola for Government employees and those for the compound at Luanshya were erected in accordance with item (*a*) above and provided many amenities to compound life that are lacking in the older compounds. The layouts have proved very popular with the native population.

7. Layouts in accordance with item (*b*) mentioned above have received the consideration of the township authorities at Broken Hill and Ndola, and both authorities have decided to work on this layout in their future developments.

8. It is now necessary that consideration be given to the layout of native villages away from townships. There can be no doubt that administrative officers in their interest in the welfare of village populations would welcome assistance and would help in every way to interest headmen, etc., in improving living conditions. There is to-day considerable scope for such improvement.

9. Consideration has been given this year to the matter of housing and, although generally speaking, Europeans resident in townships and on some of the mines are well housed, there appears to be a general impression that many of the houses erected are not altogether suitable for the varying climate of the Territory. In some of the poorer farming areas and around the mines the conditions under which Europeans are housed must be described as bad, but even where the houses themselves are not satisfactory, it is possible to find that efforts are made to keep the interiors clean, though essential sanitation is often lacking.

10. The African native is still largely tied to the round hut and, except when specially trained or guided, appears unable to provide for himself any other form of building. While a number of people believe that even for the future this type of construction must be retained for the African, it is difficult to say how, if improved living conditions are to be aimed at, the round hut is to be retained as it does not easily permit of partition or extension except by the erection of a further round hut. The round hut, with its overhanging roof, does not make good lighting and ventilation easy.

11. There is already evidence that the more educated of the Africans desire better accommodation than can be obtained by the round hut. Government has provided, and is still providing, small cottages for their better-paid African employees, and artisans

not in Government employment are also providing similar accommodation for themselves. Under the guidance of the Town Superintendent at Luanshya a couple of natives have built themselves two cottages each with separate kitchen and latrine. Around some of the native administrative Bomas it is possible to find cottages built of sun-dried bricks erected by natives who have retired from work in European areas. Many of these huts, although fairly well built lack sufficient lighting and ventilation, nevertheless show a desire for better housing and indicate the need for guidance.

(VI). FOOD IN RELATION TO HEALTH AND DISEASE.

(a) General. The European population resident in towns and on the mines is well catered for in the variety of foodstuffs available, but living even only on essentials is not cheap.

2. Owing to the occurrence of foot and mouth disease in Southern Rhodesia during the year the importation of certain products, which were generally imported in quantities from that Territory, was prohibited.

3. During the year, owing to the failure of the crops, there was famine in certain native districts and Government had to organise relief measures.

4. At the end of the year locusts were reported to have appeared in many districts and were stated to be laying eggs. It is feared that the menace might develop into a serious fact during the new year.

(b) Inspection and Control. It has not yet been found possible to undertake any systematic inspection of foodstuffs in any of the towns in the Territory. Efforts, however, have been made both at Ndola and Livingstone to improve the conditions existing on trade premises dealing with the production and sale of foodstuffs.

2. During the year regulations for the control of the following trades were prepared by this department, presented to the Central Board of Health and approved by that authority. The proposed regulations now await the sanction of Government. The new regulations will deal with the following matters:—

(*a*) Abattoirs and Transport of Meat;

(*b*) Sale of Meat;

(*c*) Bakeries;

(*d*) Aerated Water Factories;

(*e*) Teashops, Restaurants and Hotels.

3. It is hoped that, with the passing of these regulations under which it will become necessary for the persons engaged in the trades controlled to have a certificate from a Medical Officer of Health, stating that their premises are suitable, before being licensed, much improvement will be brought about.

4. With the erection of the new Abattoir at Ndola it is proposed that a regular inspection of meat will be made by the available sanitary staff. When a new Abattoir is provided at Livingstone such inspections will also be carried out there.

5. The Medical Officer of Health, Ndola, reports that the following foodstuffs were condemned as unfit for human consumption in that township:—

(1)	6 cases	each	containing	12	tins	of	24	Dutch Salted Herrings.
(2)	4 ,,	,,	,,	12	,,	24	,,	,, ,,
(3)	2 tins	,,	,,	—		24	,,	,, ,,
(4)	3 ,,	,,	,,	—		24	,,	,, ,,
(5)	1 ,,	—	,,	—		12	,,	,, ,,
(6)	1 keg	—	,,	—		35/40	,,	,, ,,
(7)	4 cases	each	,,	42	tins	mixed	vegetables.	
(8)	1 glass jar containing Honey.							
(9)	14 bottles of Cow's Milk.							

Playground for Native Children.

NATIVE HOUSING.

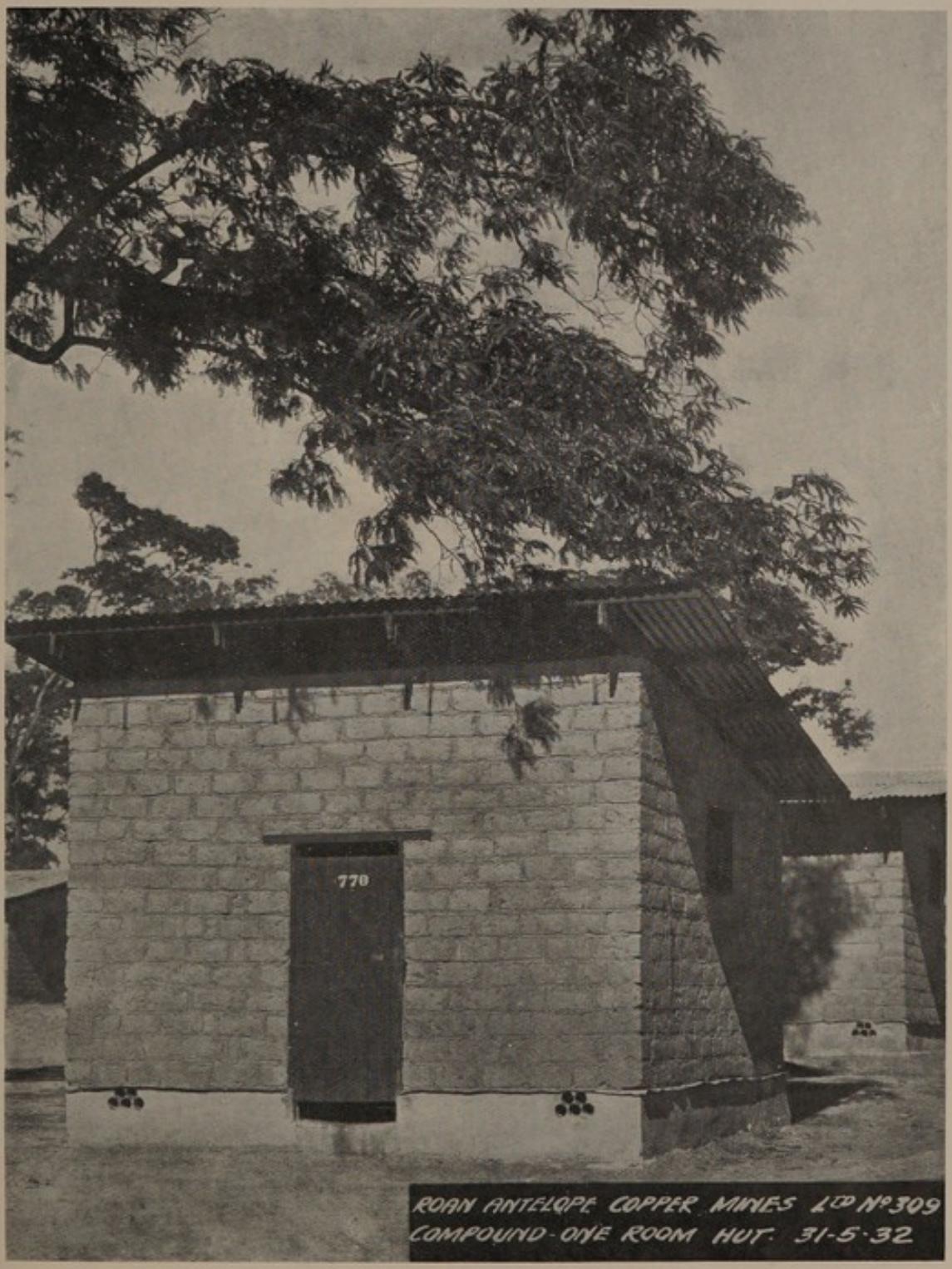
TOWN COMPOUNDS.

Livingstone.

Ndola.

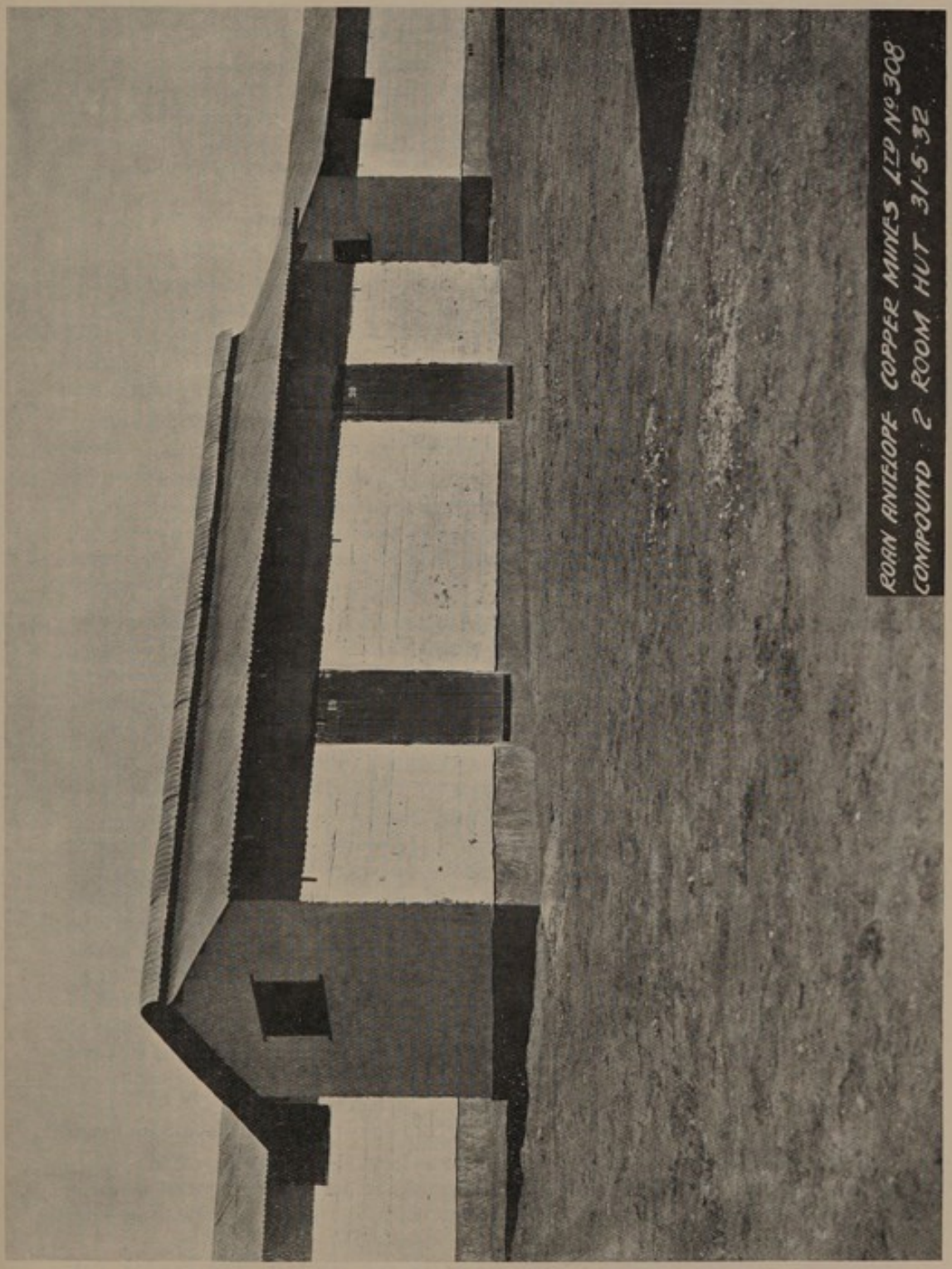
NATIVE COMPOUND.

Hut built by a Native for himself in a Luanshya Compound.



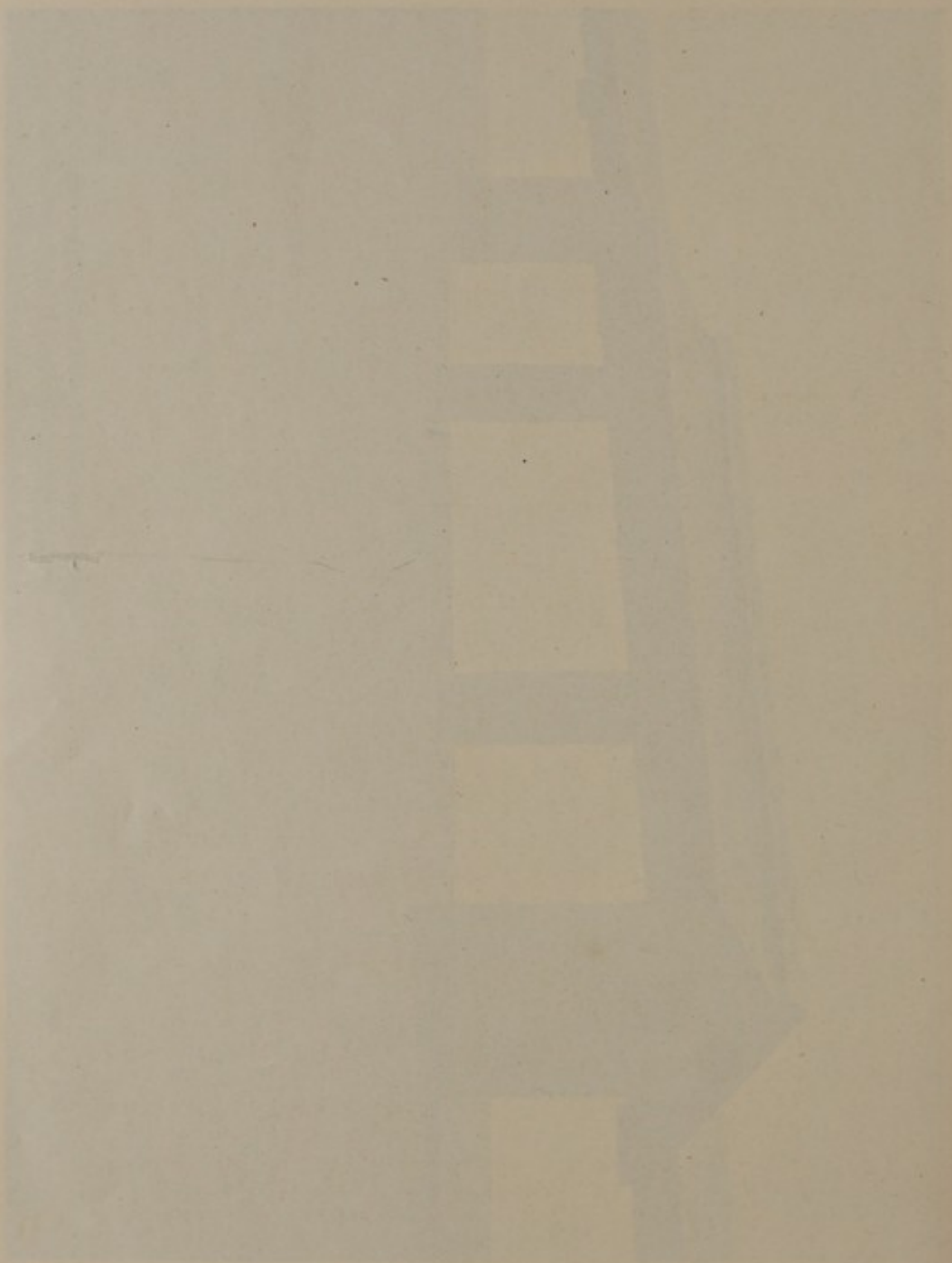
One-room Hut.

Well lighted and ventilated.



Two-Roomed Block.

Permanent ventilation under the door and by roof. Good-sized windows placed high above ground to ensure privacy to occupants. These Huts are proving popular.



The fact that tinned foodstuffs found at Ndola had to be condemned indicates the need there is for the regular inspection of such foodstuffs in all the other parts of the Territory.

(c) Deficiency Diseases. Scurvy was reported from many centres during the year, the largest number of cases being reported from Nkana. For a part of the year sufficient vegetables were not easily obtained and many employers of large labour forces found difficulty in providing this important item of diet for their employees.

2. It is commonly believed that tropical ulcers are to some extent associated with faulty diet. Small cuts and abrasions which would in the ordinary way rapidly heal up in healthy and well-nourished persons often lead to large fulminating ulcers in persons not so well cared for. The Medical Officer of Health, Livingstone, finds that cases of tropical ulcer admitted to his hospital react better to local treatment if given a nourishing diet.

3. Pellagra has been reported to occur in the Territory but during this year no cases have been reported.

(d) Dairies. As cattle raising is one of the main activities of the European farmer, it might be expected that the population would be well supplied with milk and dairy products. This, unfortunately, is not the case and butter is largely imported from Southern Rhodesia. There is insufficient milk on the market to meet local requirements and a large percentage of the population have to be satisfied with tinned or dried milk.

2. During the year a dairy at Lusaka was pasteurising milk but it has now closed down. It is, however, understood that another business of a similar nature will shortly be opening in the same district.

3. There are a small number of well-conducted dairies around Ndola and the mines, but generally the conditions under which our limited milk supply is produced, leave much to be desired, and improved conditions will only become general when the regular inspection of dairies is made possible.

(e) Slaughter Houses. At the close of the year there was only one slaughter house in the Territory, that at Luanshya, which could be considered altogether satisfactory. This slaughter house was erected by Government this year and provides accommodation for the slaughtering of animals to meet the needs of that town and the Roan Antelope Copper Mine.

2. At Nchanga the Mine Authorities have provided themselves with a slaughter house which was, in comparison with many others in the Territory, working satisfactorily.

3. Elsewhere in the Territory cattle slaughtering is done at slaughter poles provided by the butchers concerned. These shelters, usually built of poles, carry a roof and, in a number of cases, are provided with impervious floors. Most of these temporary slaughter houses are associated with nuisance, the degree varying with the attention given by the local Sanitary Inspector, the Administration or the Medical Officer.

4. Wherever slaughter houses are well conducted and controlled they can usually be made to produce revenue or at least pay for the cost of construction and supervision. It is hoped that in the near future it will be found possible to record that several Town Management Boards have decided to provide well constructed slaughter houses for themselves.

5. At Ndola the new slaughter house is being erected by the Town Management Board and should be ready for use early in the new year.

6. At Livingstone the Municipal Council considered the provision of a municipal slaughter house and plans for its erection have been prepared by the engineers; up to the time of writing, however, it is not known when the work of construction will begin.

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

Hygiene is taught in all the schools in the Territory but up to the present the Health Department has not yet been able to take much part in the teaching given.

2. While the theoretical teaching of hygiene is undoubtedly of value, practical demonstrations would, it is suggested, produce more lasting effects.

3. During the year copies of a small publication entitled: "Notes on the Prevention of Malaria," by Major Cuthbert Christy, late R.A.M.C., were circulated and all Administrative and Police Officers were provided with copies.

(C.) TRAINING OF SANITARY PERSONNEL.

Two native overseers of the Native Clerk Grade have been engaged by the Sanitation Branch and posted to Livingstone and Ndola respectively. It is hoped to train these overseers as native sanitary inspectors and if the experiment is successful, to train others.

2. In the Isoka District six native sanitary orderlies, trained by Dr. Chisholm, of the Mission there, are employed in touring villages in the district and instructing the villagers in improved sanitation. It has not yet been possible for any member of the Sanitation Branch to visit the District so that it is not possible to state the measure of the training given or the value of the work done.

3. A scheme for the education of African natives as orderlies and dressers of a grade superior to that available to-day has been prepared, and it is hoped to make a beginning as soon as the financial position improves. An improved native medical staff is required for work in station hospitals and dispensaries in native areas and for spreading the knowledge of preventive medicine. Dispensaries in reserves should be the centre of the public health education of the area dealt with. The provision of dispensaries and health centres in native areas will require increased European staff so that regular tours could be made and the work done supervised.

(D.) RECOMMENDATIONS FOR FUTURE WORK.

Many recommendations for the future have been made in the body of this Report, and the following are again specially emphasized:—

1. **Increased Staff.** The Sanitation Department with its available staff has shown the need for public health control. For this purpose the following additional staff is necessary:—

(*a*) Medical Officers of Health are required at Broken Hill and Lusaka, and one for touring the smaller townships and stations along the Railway Line.

(*b*) Health Inspectors are required to assist the Medical Officers of Health and to be stationed at mine towns.

(*c*) A School Medical Officer is necessary. (An active policy for the improvement of health conditions amongst the rising population of the Territory is to-day necessary.)

(*d*) Health or Medical Officers are required to investigate conditions in native areas so that with a definite knowledge of the conditions existing a policy could be formulated for improving the general welfare of our native population. The Officers, after completion of their investigation, should be available for carrying out the scheme decided on.

(*e*) A Central Laboratory is essential with a Bacteriologist and staff. Government Medical Officers should have a local centre available for bacteriological and other examinations. Lymph for vaccination, anti-rabic inoculation and other prophylactic vaccines should be locally prepared.

2. Townships of any size should be provided with safe and plentiful water supplies.

3. Improvements should be made to night-soil and refuse disposal services.

4. Housing in native compounds should be improved.

5. Some organisation should be provided for a more frequent and regular inspection of conditions under which African labour is housed and fed, and a more regular campaign carried out, insisting on the conditions of the existing legislation being adhered to.

6. Maternity and child welfare work should be started in all the larger native areas and amongst the poorer sections of our European population.

SLAUGHTER HOUSES.

LUANSHYA.

Old Slaughter Poles, Luanshya, now demolished.
Similar conditions can still be seen elsewhere.

LIVINGSTONE.
Conditions much improved by soap and water and liberal use of whitewash.

LIVINGSTONE.
Rough timber shed with earth floor used for hanging meat.

SLAUGHTER HOUSES.

NDOLA.

Old
and
New.

7. More intensive Anopheles and other mosquito control measures should be carried out around townships.

8. Control measures are required for aircraft calling at this Territory, especially if communication is made with West Africa.

9. Lastly, improved hospital accommodation for Africans is necessary and, in many cases, the provision of new hospitals is urgently required. The present accommodation is woefully inadequate and very unsatisfactory. The hospital is often the nucleus of public health activity and, if the life centre is not satisfactory, preventive measures can make but slow progress.

Section IV.

PORT HEALTH WORK AND ADMINISTRATION.

The only township that can be classed as a Port in the Territory is Mpulungu on the shores of Lake Tanganyika. The "S.S. Liemba" which makes trips on the Lake, calls fortnightly at Mpulungu.

2. During the year the Medical Officer stationed at Abercorn travelled to Mpulungu to inspect the "S.S. Liemba" on arrival and gave pratique and reported that no cases of infectious diseases had occurred.

3. The need for some organisation for preventing the importation of infectious diseases by aircraft landing in this Territory has already been referred to under "Yellow Fever".

Section V.

MATERNITY AND CHILD WELFARE.

A beginning has been made in maternity and child welfare work amongst Europeans of this Territory at Livingstone.

2. The work was begun by the personal enthusiasm of Miss Buck, at that time a Nursing Sister in the employment of Government and stationed at the Livingstone Hospital. Miss Buck's efforts proved popular and she was soon assisted by a number of local people who eventually formed themselves into a definite Committee under the chairmanship of the Hon. R. S. W. Dickinson, D.S.O.

3. With the departure of Miss Buck to other fields the work was continued with the assistance of another Government Nursing Sister, who was seconded by Government for part-time only.

4. Clinics for mothers and babies were held twice weekly on premises that were kindly lent for the purpose by the Railway.

5. The Committee for Child Welfare made such progress that during the year under review, Government decided to assist further in the work and promised to provide a full time Nursing Sister trained in Welfare Work, on condition that the scope of the Committee was extended to include the native population. Government further offered to provide a centre for the native work in proximity to the native compound if its condition was agreed to.

6. The Committee for Welfare Work agreed to Government's proposals.

7. Funds for expenditure in connection with the welfare work of the Committee were mainly provided by donations from the Beit Trustees, the Government, and the Railways. During the year under review, with considerable assistance from the Beit Trustees, the Committee made a start by erecting a building for European child welfare. This building should be completed early in the new year, when it is expected the new Nursing Sister will be available.

8. Another committee in Livingstone during the year has been engaged in raising funds by voluntary donations to provide a District Nurse for this town, and it is expected that that Nurse will soon be available. It is intended that the District Nurse will visit homes in cases of maternity and sickness.

9. The Mufulira Mine Authorities employed Miss Buck, already referred to, during the year on child welfare work amongst the European and African women and children in their camp. At the time the mine closed down the work in question was reported to be progressing very satisfactorily.

10. Welfare work amongst African women and children was carried out by Government Nursing Sisters at Mongu and Kasama. From Mongu it is reported that lectures were given twice weekly and 719 attendances were recorded. A large number of women were treated for syphilis with injections of Bismuth and cases are recorded where women, having had repeated miscarriages before treatment, produced live and apparently healthy babies afterwards.

11. At Kasama it is stated 62 classes were held and there were 3,338 attendances at clinics and 2,108 treatments given. 319 visits were made to villages in the vicinity of the Station and 13 births attended. 6 pupils are being trained in welfare work.

12. Many Mission Stations throughout the Territory carry out welfare work among the women and children around their Stations and in certain cases Government assists by financial grants.

13. The Missions specially reported on as doing child welfare and maternity work are the following:—

(*a*) Mbereshi;

(*b*) Mwenzo;

(*c*) Kawambi;

(*d*) Chitambo.

Section VI.

HOSPITALS, DISPENSARIES AND VENEREAL CLINICS.

European Hospitals. A new block was added to the Livingstone Hospital comprising operating theatre, surgeon's dressing-room, sterilizing and anæsthetic rooms, X-ray room and dark room.

Suitable equipment was provided, and it may now be stated that the departments mentioned have suitable accommodation and modern equipment.

A laundry block was also erected, and structural alterations carried out in the hospital itself, which have been much appreciated both by patients and staff.

A considerable amount of hospital furniture and equipment was purchased during the year, and distributed to the various European and native hospitals. It is possible to report definite progress in this respect, though much remains to be done.

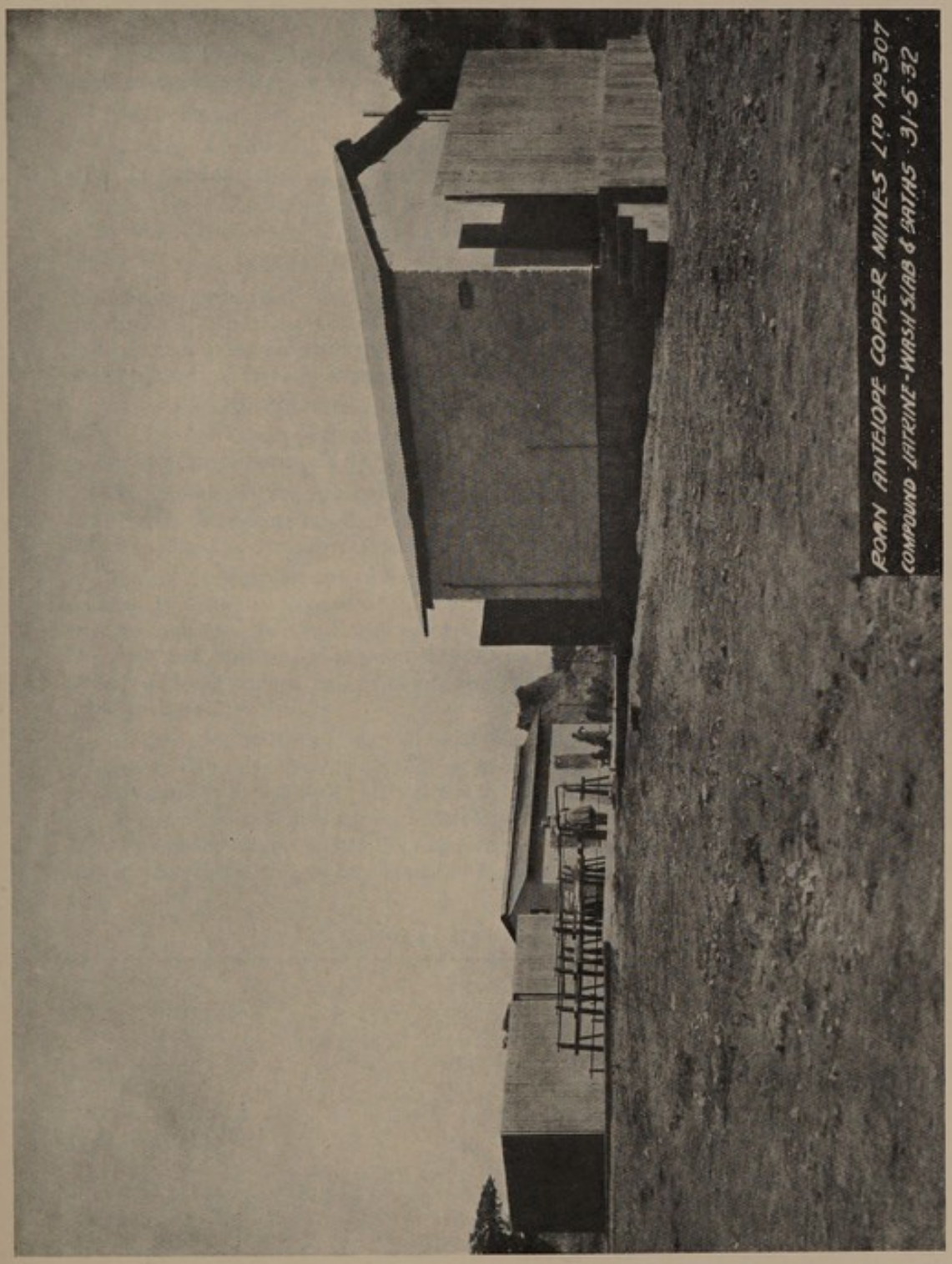
Native Hospitals. It is regretted that it is not possible to report any further development or much improvement in this direction. The need for better hospitals is great. The work, however, of the Livingstone Native Hospital has commenced and the building will be completed next year.

It is gratifying to mention that with the assistance of the Provincial Commissioner two female wards of four beds have been erected at Mazabuka, and though no building has been done at Lusaka, with the exception of the erection of a kitchen, improvement in the general conditions was noticeable. The Medical Officers at these stations were evidently making the most of the material available and doing good work under adverse conditions.

It unfortunately has not been possible to improve the conditions of the native hospitals at Abercorn and Fort Jameson, which are admittedly bad. Kasama and Mongu hospitals also require additional and better accommodation. As, owing to the financial depression, it is unlikely that money will be available for new hospitals at these centres, it is considered that it would be a wise policy to abandon some of the old buildings and erect new thatched buildings in Kimberley brick. More suitable buildings could be erected at no very great cost, and as there seems no prospect of permanent buildings it is proposed to proceed on these lines.

CHILD WELFARE.

The Livingstone European Child Welfare Centre.



Roan Antelope Mine.

Latrines water flushed, Baths (Shower), Wash Places.

Medical Officers become despondent when the expected buildings do not materialise; experience shows that where expenditure of small sums is sanctioned, and there is co-operation between the District and Medical Officers, the money is well spent, and temporary hospital buildings could be erected in this way, which would serve well through the lean years. The policy of *laissez-faire* until brick buildings can be built is no longer possible.

Kasama Welfare Centre. The buildings for the Kasama Welfare Clinic and a small thatched cottage for the Sister-in-Charge were erected during the year.

The following cases are of interest:—

A native admitted to the Livingstone Hospital suffering from tetanus recovered after the administration of 200,000 units of anti-tetanic serum.

A native was admitted to the Mazabuka Hospital suffering from diabetic gangrene of the foot. Diabetes as a cause of gangrene in natives may previously have escaped notice.

Native Orderlies. Orderlies are being trained at Livingstone, Balovale and Broken Hill. The delay in the erection of the new Livingstone Hospital caused the postponement of the proposed training school, and unfortunately the financial condition of the territory at the end of the year has necessitated its further postponement.

There was some difficulty in securing Orderlies of the right type to fill the existing posts. Two were engaged from the Livingstone Mission in Nyasaland, and were posted to the rural dispensaries in the Fort Jameson District.

Native Orderlies are now stationed at nearly every Boma, and are utilized, not only in attending the sick suffering with minor ailments, but they also are responsible to the District Officer for the general cleanliness of the station.

During the year several Orderlies who were not competent were discharged and replaced by Orderlies trained at Livingstone, or brought to the nearest hospital for refresher courses. As a rule they are well spoken of by the District Officers. It may be stated that distinct progress in this direction has been made. A better type of Orderly is being trained, and it is intended to open new rural dispensaries as soon as more are available.

The Director of Medical and Sanitary Services attended the Missionary Conference at Broken Hill. A Medical Committee was formed, and Missionary Medical Work was discussed at some length. It was felt by the Missionary Societies that co-operation was necessary to avoid overlapping in Medical work. The Committee drew up a scheme involving further grants in aid from Government. It is unfortunate that for financial reasons the scheme had to be abandoned for the present.

EUROPEAN HOSPITALS (1931).

Hospital.	Year.	Daily Average.	Admissions.	Deaths.
Livingstone	1930	11·31	471	11
	1931	14·41	572	16
Broken Hill	1930	8·9	401	7
	1931	10·70	420	9
Lusaka	1930	5·8	225	8
	1931	9·18	308	14
Bwana Mkubwa	1930	—	—	—
	1931	5·19	127	5
Fort Jameson	1930	0·78	33	1
	1931	0·98	41	—

EUROPEAN HOSPITALS (1931)—*contd.*

Hospital.	Year.	Daily Average.	Admissions.	Deaths.
Kasama	1930	0·37	15	1
	1931	0·84	18	—
Mongu	1930	0·216	6	—
	1931	0·10	9	—

NATIVE HOSPITALS.

Station.	Year.	Admissions.	Deaths.
Livingstone	1930	1,205	184
	1931	1,171	145
Broken Hill	1930	1,359	69
	1931	1,316	95
Fort Jameson	1930	309	20
	1931	434	26
Kasama	1930	383	9
	1931	344	6
Mongu	1930	627	12
	1931	763	14
Mazabuka	1930	752	21
	1931	613	24
Fort Rosebery	1930	339	2
	1931	433	4
Ndola .. .. }	1930	854	104
Bwana Mkubwa }	1931	551	34
Solwezi	1930	221	4
	1931	922	8
Abercorn	1930	104	1
	1931	85	3
Choma	1930	628	7
	1931	748	23
Lusaka	1930	478	34
	1931	542	45

Native Out-Patients.

The following table shows the number of attendances of out-patients at various stations during the year:—

Livingstone	6,729
Choma	3,115
Mazabuka	5,004
Lusaka	—
Broken Hill	13,013
Bwana Mkubwa	—
Abercorn	9,285
Fort Rosebery	7,413
Kasama	5,091
Fort Jameson	9,460
Mongu	23,336
Balovale	3,808
Chinsali	3,348
Luwingu	3,243
Mpika	6,847
Chambeshi Rural Dispensary	973
Mangonji	14,837
Njobe	7,987
Magodi	4,835

Section VII.

PRISONS AND ASYLUMS.

The health of the prisoners remains satisfactory.

The average number of prisoners and the average daily number of sick for the different prisons are shown below:—

Prison.	Daily Average No. of Prisoners.	Average No. Sick Daily.	Deaths.
Livingstone	167·2	6·6	2
Mazabuka	22·7	4·0	—
Broken Hill	117·0	8·6	5
Ndola	30·9	1·12	—
Fort Jameson	44·2	0·9	1
Balovale	Not available.	1·48	2
Fort Rosebery	4·0	0·4	—
Mongu	63·0	3·4	—
Bwana Mkubwa	30·9	1·12	—

In no prison was a deficiency disease observed.

Broken Hill has the highest daily average of sick. From this prison 43 Influenza, 23 Syphilis, and 10 Pneumonia cases were admitted to hospital.

During the year a new gaol was opened at Lusaka. This is an excellent building providing ample accommodation and ventilation.

No structural alterations have been made in the other prisons. A new gaol at Ndola is in the course of erection.

SECTION VIII.

METEOROLOGY.

ZAMBESI VALLEY 1931.

Station:	Balovale.			Mongu.			Mwinilunga.		
	Mean.			Mean.			Mean.		
Month.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
January	82·3	63·8	73·1	88·5	67·1	77·8	81·2	62·4	71·8
February	86·6	65·3	75·9	91·2	69·1	75·2	84·6	63·6	74·1
March	85·5	64·5	75·0	89·0	67·3	78·2	82·2	62·5	72·3
April	85·9	63·0	74·5	85·7	63·9	74·8	83·3	60·3	71·7
May	88·3	58·4	73·3	86·9	59·1	73·0	84·2	52·6	68·4
June	81·5	47·5	64·5	81·5	49·4	65·4	79·9	43·9	61·9
July	89·1	48·6	68·8	82·5	49·8	66·2	83·6	42·0	62·8
August	91.2	52·6	71·9	90·6	54·7	72·6	No Record.		
September	94·7	60·2	77·5	99·2	61·3	80·2	90·8	54·5	72·7
October	92·5	64·7	78·6	95·9	65·0	80·5	89·7	60·7	75·2
November	85·0	63·6	74·3	87·1	64·1	75·6	82·2	61·6	71·9
December	81·1	63·2	72·2	87·1	65·2	76·1	79·7	61·2	70·5

Station:	Kalobo.			Mankoya.			Sesheke.		
	Mean.			Mean.			Mean.		
Month.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
January	91·9	67·7	79·9	84·0	68·6	76·3	84·5	66·6	75·5
February	95·3	68·6	81·9	85·1	69·3	77·2	87·5	68·3	77·9
March	91·4	67·8	79·6	87·3	69·7	78·5	89·2	65·8	77·5
April	90·1	65·2	77·6	87·6	65·6	71·6	83·8	59·3	71·5
May	91·0	56·0	73·5	86·8	60·1	73·4	82·7	52·7	67·7
June	83·1	43·7	63·4	79·0	48·7	63·3	75·5	39·3	57·4
July	86·8	43·8	65·3	82·6	48·3	65·4	78·8	36·8	57·8
August	94·0	48·7	71·4	87·5	54·1	70·8	85·4	40·6	63·0
September	98·8	55·8	77·3	91·0	56·9	73·9	91·2	49·1	70·2
October	99·6	65·5	82·5	95·1	66·8	80·9	93·3	64·1	78·7
November	94·3	65·3	79·8	87·9	66·8	77·3	84·2	63·2	73·7
December	88·5	65·2	76·9	79·8	64·7	72·3	83·1	65·0	74·1

LIVINGSTONE OBSERVATORY YEAR, 1931.

1931. Month.	Max.	Min.	Range.	Mean.	Rainfall Ins.	Humidity %
January ..	90·3	67·6	22·7	78·9	4·70	74
February ..	93·9	69·5	24·4	81·7	1·89	59
March	91·9	68·4	23·5	80·1	4·00	58
April	89·0	62·0	27·0	75·5	0·23	49
May	87·2	55·9	31·3	71·5	–	43
June	78·0	46·6	31·4	62·3	–	45
July	81·8	46·5	35·3	64·1	–	45
August ..	87·5	51·4	36·1	69·9	–	33
September ..	93·4	59·8	33·6	76·6		27
October ..	97·5	69·1	28·4	83·3	0·15	32
November ..	88·5	63·4	25·1	75·9	9·53	59
December ..	86·6	64·5	22·1	75·5	2·16	61

1931. Month.	Mean 8 a.m.		Mean 6 p.m.		Mean.	
	Dir.	Force.	Dir.	Force.	Dir.	Force.
January ..	E. by N	1·1	E. N. E.	1·1	E. N. E.	1·1
February ..	E. by N.	1·1	N.E.	1·0	N.E. by E.	1·1
March	E. by N.	1·1	N.E. by E.	1·1	E. N. E.	1·1
April	E. by S.	1·1	E. by S.	0·9	E. by S.	1·0
May	E.	0·8	E.	0·9	E.	0·9
June	E.	0·9	E. S. E.	1·0	E. by S.	0·9
July	E. by S.	0·7	E. by S.	0·9	E. by S.	0·8
August ..	E. S. E.	0·8	E. S. E.	1·1	E. S. E.	0·9
September ..	E. S. E.	1·1	E. by S.	1·1	E. S. E.	1·1
October ..	E.	1·8	E.	1·3	E.	1·5
November ..	E. by S.	1·7	N. E.	1·5	E. by N.	1·6
December ..	E. N. E.	1·9	N.E. by E.	1·5	E. N. E.	1·5

PLATEAU STATIONS 1931.

Station:	Abercorn.			Kasama.			Mpika.		
Month.	Mean.			Mean.			Mean.		
	Max	Min	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
January	77·1	60·0	68·5	79·8	63·1	71·4	75·2	64·3	69·7
February	80·4	61·1	70·7	84·3	63·3	73·8	76·3	65·9	71·1
March	78·9	60·1	69·5	81·6	63·0	72·3	77·4	65·0	71·2
April	78·8	59·6	69·2	80·8	61·9	71·3	74·6	62·9	68·7
May	80·0	55·8	67·9	80·8	57·6	69·2	72·6	60·4	71·5
June	77·3	50·8	64·0	78·0	51·4	64·7	65·6	52·7	59·1
July	80·5	54·4	67·4	81·4	54·3	67·8	**71·1**	**57·0**	**64·1**
August	86·0	56·2	71·1	84·1	54·4	69·3	74·0	57·4	65·7
September	87·1	61·4	74·3	89·2	57·9	73·5	78·8	61·3	70·1
October	90·4	65·4	77·9	94·3	62·7	78·5	85·1	67·4	76·2
November	84·8	64·7	74·7	80·1	62·4	71·3	79·8	65·5	72·7
December	74·6	61·8	68·2	84·0	62·5	73·3	74·4	63·6	69·0

Station:	Serenje			Chinsali.			Mporokoso.		
Month.	Mean.			Mean.			Mean.		
	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
January	76·0	64·0	70·0	78·3	61·3	69·8	78·7	64·2	71·4
February	77·9	64·8	71·3	81·9	62·2	72·1	81·1	63·5	72·3
March	79·5	63·1	71·3	80·0	63·3	71·6	79·2	64·2	71·6
April	76·5	61·5	69·0	81·2	60·3	70·8	78·8	61·8	70·3
May	75·5	57·6	66·6	80·2	56·3	68·2	79·6	58·1	68·8
June	67·7	49·2	58·4	74·5	48·3	61·4	75·8	48·9	62·3
July	73·5	52·2	62·8	78·7	51·9	65·3	80·6	49·5	65·1
August	76·4	53·8	65·1	80·7	54·1	67·4	83·2	50·1	66·6
September	82·1	58·2	70·1	83·9	56·5	70·2	86·9	55·6	71·3
October	83·0	62·0	72·5	89·6	62·4	76·0	89·4	62·1	75·8
November	80·2	64·0	72·1	83·5	63·0	73·3	83·1	62·7	72·9
December	75·4	62·4	68·9	76·0	61·3	68·7	74·5	62·5	68·5

N.B.—Figures in bold type are unreliable.

TABLE V.

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL EUROPEAN HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
I. Epidemic, Endemic and Infectious Diseases.						
1a. Typhoid	1	14	3	15	–	
b. Paratyphoid	–	3	–	3	–	
3. Relapsing Fever	–	2	–	2	–	
5. Malaria	–	1	1	1	–	
5a. Malaria Tertian						
c. Malaria Æstivo Autumnal ..	11	494	2	505	12	
e. Blackwater Fever	–	17	5	17	–	
7. Measles	–	2	–	2	–	
10. Diphtheria	–	4	–	4	–	
11. Influenza	–	27	–	27	–	
13. Mumps	–	1	–	1	–	
16. Dysentry						
a. Amœbic	–	38	1	38	–	
b. Bacillary	–	14	3	14	2	
c. Undefined	1	5	–	6	–	
21. Erysipelas	–	1	–	1	–	
24. Cerebro-spinal Meningitis ..	–	2	1	2	–	
25b. Varicella	–	1	–	1	–	
h. Trypanosomiasis	–	1	1	1	–	
31. Tuberculosis (pulmonary) ..	–	6	2	6	–	
34. ,, (spinal column)	–	1	–	1	–	
38c. Syphilis (Gumma brain) ..	–	1	1	1	–	
40a. Gonorrhœa	–	3	–	3	–	
41. Septicæmia	–	2	1	2	–	
II. General Diseases not mentioned above.						
45. Carcinoma coli	–	1	–	1	–	
47. Cancer of breast	–	1	–	1	–	
49. Malignant tumour of Org. not specified	–	3	–	3	–	
50. Tumours non-malignant ..	–	2	1	2	–	
51. Lumbago	–	3	–	3	–	
Rheumatic Fever ..	–	1	–	1	–	
57. Diabetes	–	2	–	2	–	
58b. Anæmia	–	4	–	4	–	
65. Lymphatic Leukæmia ..	–	1	–	1	–	
66. Alcoholism	–	5	1	5	–	
68. Poisoning Chronic	–	1	–	1	–	
69. Puerperal Hæmorrhagica ..	–	1	1	1	–	
III. Affections of the Nervous System and Organs of the Senses.						
77. Other forms of mental alienation	–	1	–	1	–	
81. Chorea	–	2	–	2	–	
Carried forward ..	13	663	24	681	14	

TABLE V.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL EUROPEAN HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
Brought forward ..	13	668	24	681	14	
III. Affections of the Nervous System and Organs of the Senses (*contd.*)						
82a. Hysteria	–	2	–	2	–	
b. Sciatica	–	3	–	3	–	
c. Neurasthenia	2	8	–	10	–	
85a. Iritis	–	3	–	3	–	
b. Conjunctivitis	–	9	–	9	–	
e. Other affections of the Eye ..	–	3	–	3	–	
86. Other affections of the Ear ..	–	2	–	2	–	
IV. Affections of the Circulatory System.						
87. Pericarditis	–	1	1	1	–	
90. Mitral Regurgitation	–	2	–	2	–	
91a. Aortic Regurgitation	–	1	1	1	–	
91b. Arteriosclerosis	–	1	–	1	–	
c. Angioneurotic Œdema ..	–	1	–	1	–	
93. Varicose Veins	–	4	–	4	–	
Phlebitis..	–	4	–	4	–	
95. Hæmorrhage of undetermined cause	–	2	–	2	–	
96. Other affections of the C. system	–	3	–	3	–	
V. Affections of the Respiratory System.						
97. Coryza	–	3	–	3	–	
98. Laryngitis (œdema Glottidis Death)	–	1	1	1	–	
99a. Bronchitis Acute	–	12	–	12		
100. Broncho Pneumonia	1	8	–	9	–	
101a. Lobar Pneumonia	–	9	3	9	1	
b. Influenzal Pneumonia ..	1	7	2	8	–	
102. Pleurisy	–	5	–	5	1	
105. Asthma	–	11	–	11	–	
VI. Diseases of the Digestive System.						
108. Vincents Angina	–	1	–	1	–	
108a. Edentulation	–	67	–	67	–	
109. Tonsillitis	–	43	–	43	–	
Pharyngitis	–	1	–	1	–	
111a. Gastric Ulcer	–	4	1	4	–	
b. Duodenal Ulcer	–	2	–	2	1	
112. Gastritis..	-	8	-	8	1	
Dyspepsia	–	3	–	3	–	
113. Diarrhœa/Enteritis under 2 yrs.	–	3	–	3	–	
Carried forward ..	17	905	33	922	18	

TABLE V.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL EUROPEAN HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
Brought forward ..	17	905	33	922	18	
VI. Diseases of the Digestive System. (*contd.*)						
114. Enteritis	1	14	–	15	–	
116. Cestoda	–	2	–	2	–	
117. Appendicitis	–	60	–	60	3	
118. Hernia	–	7	–	7	–	
119a. Fistula	1	7	–	8	–	
119b. Constipation	1	10	–	11	–	
Diverticulitis	–	1	1	1	–	
122. Cirrhosis	–	2	2	2	–	
123. Biliary Calculus	–	4	–	4	–	
124. Jaundice	–	6	–	6	–	
126. Peritonitis	–	2	–	2	–	
VII. Diseases of the Genito Urinary System (non Venereal).						
129. Nephritis	–	7	1	7	–	
131. Pyelitis	–	3	–	3	–	
Nephroptosis	–	2	–	2	–	
132. Calculus	–	3	–	3	–	
133. Cystitis	–	4	–	4	1	
134a. Diseases of Urethra	–	1	–	1	–	
b. Colic Infection of Urethra ..	–	1	–	1	–	
135. Prostatitis	–	1	–	1	–	
136. Diseases non-venereal of Genital Organs, male ..	–	2	–	2	–	
Orchitis	–	1	–	1	–	
Hydrocele	–	1	–	1	–	
Circumcision	–	5	–	5	–	
138. Salpingitis	–	2	–	2	1	
139. Fibroid	–	1	–	1	–	
140. Metorrhagia	–	11	–	11	1	
141a. Metritis	–	12	–	12	–	
Cervicitis	–	2	–	2	1	
Vulvitis	–	1	–	1	–	
Bartholiman Cyst.	–	2	–	2	–	
Endometritis	–	11	–	11	1	
Dysmenorrhœa	–	2	–	2	–	
141b. Other affections of the female Genital Organs	–	3	–	3	–	
Displacements Uterus ..	–	2	–	2	–	
142. Mammary Cyst.	–	1	–	1	–	
VIII. Pueperal State.						
143a. Normal labour	2	129	–	131	2	
False labour	–	3	–	3	–	
143b. Abortion	–	20	–	20	–	
Ectopic Gestation	–	2	–	2	–	
143c. Other accidents of pregnancy..	–	14	–	14	–	
Carried forward ..	22	1,269	37	1,291	28	

TABLE V.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL EUROPEAN HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
Brought forward ..	22	1,269	37	1,291	28	
IX. Affections of the Skin and Cellular Tissues.						
152. Boil	1	6	–	7	–	
. Carbuncle	–	2	–	2	–	
153. Whitlow	–	8	–	8	–	
. Cellulitis	5	36	–	41	–	
. Abcesses and Ulcer	–	10	–	10	–	
155. Dermatitis	–	1	–	1	–	
. Urticaria	–	1	–	1	–	
Tropical Ulcer	–	7	1	7	–	
Eczema	–	2	–	2	–	
V. Diseases of Bones and Organs of Locomotion other than T.B.						
156. Osteomyelitis	–	6	–	6	–	
157. Arthritis and Synovitis ..	–	10	–	10	–	
XII. Diseases of Infancy.						
162. Infantile Convulsions, etc. ..	–	26	1	26	–	
. Premature Birth	–	5	2	5	–	
163. Malnutrition	–	1	–	1	1	
XIV. Affections produced by External Causes.						
170. Suicide by firearms	–	1	1	1	–	
176. Snake bite	–	1	–	1	–	
177. Accidental Poisonings ..	–	1	–	1	–	
178. Burns by fire	–	6	–	6	–	
183. Wounds by firearms	1	2	–	3	–	
184. Wounds	–	8	–	8	–	
185. Wounds by fall	–	6	–	6	–	
187. Wounds by machinery ..	–	4	–	4	–	
188. Wounds (Railway)	–	2	–	2	–	
189. Injuries inflicted by animals, bites, etc.	–	5	–	5	–	
201a. Dislocation	–	4	–	4	–	
b. Sprain	–	4	–	4	–	
c. Fracture	1	21	1	22	–	
202. Other external injuries ..	–	18	–	18	–	
XV. Ill-defined Diseases.						
Ruptured Urethra	–	1	–	1	–	
205. Pyrexia of uncertain origin ..	–	2	–	2	–	
Observation	–	14	–	14	2	
Debility	–	1		1	–	
Laparatomy	–	1		1	1	
Asthenia	–	1	–	1	–	
TOTALS	30	1,493	43	1,523	32	

TABLE Va.

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL NATIVE HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
I. Epidemic, Endemic and Infectious Diseases.						
1a. Typhoid	–	23	9	23	–	
3. Relapsing Fever	8	39	–	47	–	
5. Malaria	14	681	19	695	14	
6. Smallpox	1	11	–	12	–	
7. Measles	–	57	–	57	1	
9. Whooping Cough	–	5	–	5	–	
10. Diphtheria	–	2	1	2	–	
11. Influenza	31	719	83	750	8	
13. Mumps	–	16	–	16	–	
15. Diarrhœa	–	5	–	5	–	
16a. Dysentery Amœbic	3	127	25	130	2	
b. Dysentery Bacillary	–	30	5	30	1	
c. Dysentery undefined	–	10	–	10	1	
19. Ictero Hæm Jaundice ..	–	1	–	1	–	
20. Leprosy	21	101	2	122	32	
24. Cerebro-spinal Meningitis ..	–	19	11	19	–	
25a. Rubella	3	1	–	4	–	
b. Varicella..	–	31	–	31	–	
g. Yaws	10	610	–	620	26	
n. Trypanosomiasis	1	3	1	4	1	
28. Rabies	–	1	1	1	–	
29. Tetanus	–	2	1	2	–	
31. Tuberculosis, Pulmonary ..	5	44	29	49	3	
32. Tuberculosis of Meninges ..	–	1	1	1	–	
33. Tuberculosis of Intestines ..	–	1	1	1	–	
34. Tuberculosis of Spine	–	3	1	3	1	
35. Tuberculosis of Bones	1	1	–	2	–	
38a. Syphilis, Primary	12	116	–	128	15	
b. Syphilis, Secondary	28	180	–	208	58	
c. Syphilis, Tertiary	–	8	1	8	–	
d. Syphilis, Hereditary	–	23	7	23	–	
e. Syphilis, undefined	35	482	4	517	58	
39. Soft Chancre	–	12	–	12	–	
40. Gonorrhœa	1	276	–	277	10	
41. Septicæmia	–	20	17	20	–	
II. General Diseases not mentioned above.						
44. Carcinoma Liver	–	4	3	4	–	
49. Cancer—Malignant Tumours	2	–	2	2	–	
50. Tumours—Non-malignant ..	3	24	–	27	1	
52. Rheumatism	1	149	2	150	4	
53. Scurvy	16	116	3	132	3	
57. Diabetic Gangrene	–	1	–	1	–	
Carried forward ..	196	3,955	229	4,151	239	

TABLE Va.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL NATIVE HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
Brought forward ..	196	3,955	229	4,151	239	
II. General Diseases not mentioned above.—(*contd.*)						
58. Anæmia	1	30	1	31	–	
59. Hypopituitarism	–	1	–	1	–	
60b. Thyro-adenoa	–	1	–	1	1	
64. Splenic Abscess	2	7	3	9	1	
69. Purpura Hæmorrhagica ..	–	1	1	1	–	
. Onyalai	–	1	1	1	–	
III. Affections of the Nervous System and Organs of the Senses.						
71. Pneumococcal Meningitis ..	–	6	5	6	–	
72. Locomotor Ataxia	1	1	1	2	–	
73. Contusion Spinal Cord ..	–	1	1	1	–	
74a. Central Hæmorrhage	–	1	1	1	–	
75a. Hemiplegia	–	6	1	6	–	
77. Mental Alienation	–	23	1	23	–	
78. Epilepsy	1	33	4	34	–	
79. Eclampsia	–	1	1	1	–	
82b. Neuritis	1	12	–	13	–	
c. Neurosis	2	7	–	9	–	
85a. Diseases of the Eye	–	13	–	13	1	
b. Conjunctivitis	2	194	–	196	5	
c. Other affections of the Eye ..	–	16	–	16	–	
86. Otitis media	–	15	–	15	1	
IV. Affections of the Circulatory System.						
87. Pericarditis	–	1	1	1	–	
88. Endocarditis	–	2	–	2	–	
90a. Valvular Disease of the Heart	–	10	2	10	–	
90b. Myocarditis	1	3	2	4	–	
91a. Aneurysom	–	1	–	1	1	
92. Embolism	–	4	3	4	–	
93. Hæmorrhoids	1	2	–	3	–	
Varicose Veins	1	–	–	1	–	
Phlebitis..	–	4	–	4	–	
94. Lymphadenitis	1	17	–	18	1	
95. Hæmorrhage of undetermined cause	–	–	–	–	–	
V. Affections of the Respiratory System.						
97. Rhinitis	–	2	–	2	–	
98. Laryngitis	–	1	–	1	–	
Carried forward ..	210	4,372	258	4,582	250	

TABLE Va.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL NATIVE HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
Brought forward ..	210	4,372	258	4,882	250	
V. Affections of the Respiratory System.—(*contd.*)						
99. Bronchitis	–	20	1	20	–	
a. Bronchitis Acute	1	86	4	87	2	
100. Broncho Pneumonia	10	87	27	97	–	
101. Lobar Pneumonia	–	27	11	27	1	
a. Influenzal Pneumonia ..	1	44	14	45	2	
b. Unclassified Pneumonia ..	–	24	12	24	2	
102. Pleurisy	–	8	–	8	1	
105. Asthma	–	4	2	4	–	
107. Abscess of Lung	–	1	1	1	–	
VI. Diseases of the Digestive System.						
108a. Dental Caries	–	3	–	3	–	
Gingivitis	–	3	–	3	–	
Alveolar Abscess	–	4	–	4	1	
Pyorrhœa	–	3	–	3	–	
b. Stomatitis	–	3	–	3	–	
109. Tonsilitis	–	13	–	13	–	
Pharyngitis	–	2	–	2	–	
111b. Duodenal Ulcer	–	2	–	2	–	
112. Hæmatemesis	–	2	–	2	–	
c. Gastritis	–	4	–	4	–	
113. Diarrhœa and Enteritis under two years	–	15	5	15	–	
114. Diarrhœa and Enteritis—two years and over ..	1	122	5	123	7	
115. Ankylostomiasis	–	34	2	34	–	
116a. Cestoda	–	5	–	5	1	
117. Appendicitis	1	1	–	2	–	
118. Hernia	–	18	3	18	2	
119b. Constipation	–	60	–	60	–	
Obstruction	–	5	1	5	–	
119a. Prolapsus ani	–	2	–	2	–	
122b. Cirrhosis of Liver	2	8	5	10	2	
124. Abscess of Liver	–	2	2	2	–	
Acute Hepatitis	–	3	1	3	–	
125. Pancreatitis	1	2	3	3	–	
126. Peritonitis	–	6	6	6	–	
129. Nephritis	–	10	6	10	–	
VII. Diseases of the Genito-Urinary System (Non-Venereal).						
130b. Schistosomiasis	3	30	3	33	2	
c. Bilharzia	–	7	–	7	–	
Carried forward ..	230	5,042	372	5,272	273	

TABLE Va.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL NATIVE HOSPITALS.

	Diseases.	R. ending 1930.	Yearly Total. Adms.	Yearly Total. Deaths.	Total Cases Treated.	R. ending 1931.	Remarks.
	Brought forward ..	230	5,042	372	5,272	273	
	VII. Diseases of the Genito-Urinary System (Non-Venereal).—(*contd.*)						
131.	Pyonephrosis	–	1	–	1	–	
	Uræmia	–	3	3	3	–	
	Hæmaturia	–	2	–	2	–	
133.	Cystitis	–	7	–	7	2	
134b.	Urethral Fistula	–	1	–	1	–	
136.	Orchitis	–	5	–	5	1	
	Hydrocele	–	2	–	2	–	
	Undescended Testicle	–	1	–	1	–	
138.	Salpingitis	–	3	–	3	–	
141b.	Vestigo-vaginal Fistula ..	–	2	–	2	–	
	Menorrhagia	–	4	–	4	–	
	Displacement of Uterus ..	–	1	–	1	–	
	Dysmenorrhœa	–	2	–	2	–	
142.	Mastitis	–	5	–	5	–	
	Abscess—Breast	–	1	–	1	–	
	Mammary Abscess	–	2	–	2	–	
	VIII. Puerperal State.						
143a.	Normal Labour..	1	34	2	35	–	
b.	(*a*) Abortion	1	5	–	6	–	
	(*b*) Accidents of pregnancy ..	–	5	1	5	–	
	(*c*) Retained Placenta ..	–	3	–	3	–	
144.	Post-partum Hæmorrhage ..	–	1	–	1	–	
145.	Other accidents of parturition	–	3	1	3	–	
	Inversion Uterus	–	1	–	1	–	
146	Puerperal Septicæmia	–	2	1	2	–	
150	Puerperal affections of the breast	–	1	–	1	–	
	IX. Affections of the Skin, etc.						
151	Gangrene	–	3	1	3	1	
152	Boils	–	10	1	10	1	
153	Abscess	10	155	–	165	13	
	Whitlow	1	7	–	8	–	
	Cellulitis	18	179	3	197	24	
154a	Tinea	–	2	–	2	–	
b	Scabies	1	28	–	29	2	
155	Filariasis	–	6	–	6	–	
	Chigoes	1	25	–	26	–	
	Tropical Ulcers	54	424	–	478	22	
	Ulcers	7	67	–	74	5	
	Urticaria	–	4	–	4	–	
	Herpes	–	1	–	1	–	
	Pemphigus	–	2	–	2	–	
	Carried forward.. ..	324	6,052	385	6,376	344	

TABLE Va.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL NATIVE HOSPITALS.

	Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
			Adms.	Deaths.			
	Brought forward ..	324	6,052	385	6,376	344	
IX.	**Affections of the Skin, etc.**–*(contd.)*						
	Pityriasis pilaris	–	2	–	2	–	
	Dermatitis	–	7	–	7	–	
	Elephantiasis	–	5	–	5	–	
	Impetigo	–	5	–	5	–	
	Planter Keratosis	–	4	–	4	–	
X.	**Diseases of the bones, etc.**						
156	Osteitis	2	10	–	12	1	
	Osteomyelitis	5	6	2	11	1	
157	Synovitis	2	20	–	22	2	
	Arthritis	1	8	1	9	–	
	Bursitis	–	1	–	1	–	
XI.	**Diseases of Infancy.**						
163	Marasmus	–	5	5	5	–	
160	Congenital Debility	–	5	4	5	–	
161	Premature Birth	–	2	2	2	–	
XII.	**Affections of old age.**						
164	Senility	–	5	3	5	2	
XIII.	**Affections produced by External causes.**						
171	Suicide, cut throat	–	3	1	3	–	
	Attempted suicide by cutting instrument.						
174	Other attempted suicides ..	–	1	–	1	–	
175	Food poisoning	–	6	2	6	–	
176	Snake bite	–	29	–	29	–	
177	Vegetable poisonings	–	1	–	1	–	
178	Burns	3	86	6	89	6	
179	Burns other than by fire ..	–	2	–	2	–	
183	Wounds by firearms	4	6	–	10	1	
184	Wounds by cutting or stabbing instruments	1	73	4	74	4	
185	Wounds by fall	2	30	–	32	2	
186	Wounds in mines, etc. ..	–	8	–	8	–	
188	Wounds by crushing or railway accident	–	27	1	27	2	
189	Injuries inflicted, animal bites, etc.	3	46	2	49	4	
201a	Dislocation	–	6	–	6	–	
b	Sprain	2	45	–	47	–	
c	Fracture	4	42	7	46	2	
202	Other external injuries ..	56	507	–	563	26	
	Carried forward ..	409	7,055	425	7,464	397	

TABLE Va.—*continued.*

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1931.

ALL NATIVE HOSPITALS.

Diseases.	R. ending 1930.	Yearly Total.		Total Cases Treated.	R. ending 1931.	Remarks.
		Adms.	Deaths.			
Brought forward ..	409	7,055	425	7,464	397	
XIV. Ill-defined Diseases.						
205 Shock	–	1	1	1	–	
a Ascites	1	6	–	7	–	
Asthenia	–	3	–	3	1	
Œdema	–	2	–	2	1	
Unclassified	–	92	2	92	26	
b Malingering	1	7	–	8	–	
Observation Cases	–	2	–	2	–	
XV. Diseases, the total of which has not caused 10 deaths.	5	100	–	105	8	
TOTALS	416	7,268	428	7,684	433	

OUT-PATIENTS.

The following tables shew the number of out-patients treated at different stations during the year:—

TABLE VI.

EUROPEANS.

Station.	Cases.	Deaths.
Choma	186	2
Mazabuka	309	3
Lusaka	933	–
Bwana Mkubwa	224	–
Abercorn	88	–
Fort Jameson	30	–
Kasama	51	–
Mongu	107	–
TOTALS	1928	5

TABLE VIa.

NATIVES.

Station.	Cases.	Deaths.
Livingstone	1161	–
Choma	570	–
Mazabuka	3393	–
Lusaka	1236	2
Broken Hill	2089	–
Bwana Mkubwa	473	–
Abercorn	3057	–
Kasama	5291	–
Fort Rosebery	2309	–
Fort Jameson	2123	–
Mongu	5918	–
Balovale	661	–
TOTALS	28281	2

APPENDIX.

BROKEN HILL MINE.

DAILY AVERAGE NATIVES EMPLOYED 1,221 (Including Contractor's Labour).

Disease.	Cases Treated.	Deaths	Mortality Cases %	Sickness Incidence Rate Per Mille Employed	Death Rate Per Mille Employed.
Malaria	15	–	–	12·27	–
Cerebro-spinal Meningitis	1	1	100·00	·81	·81
Typhoid Fever	3	1	33·33	2·45	·81
Diarrhœa	2	–	–	1·63	–
Dysentery (Bacillary)	2	1	50·00	1·63	·81
Phthisis	1	1	100·00	·81	·81
Pneumonia (Broncho)	11	1	9·09	9·09	·81
,, (Lobar)	51	3	5·88	41·76	2·45
,, (Influenzal)	2	2	100·00	1·63	1·63
Influenza	154	1	·64	126·13	·81
Pleurisy	1	–	–	·81	–
Diseases of Heart	1	–	–	·81	–
Syphilis	8	–	–	6·55	–
Tropical Ulcers	23	–	–	18·84	–
Splenic Abscess	1	1	100·00	·81	·81
Accidents					
(*a*) arising out of employment	116	–	–	95·04	–
(*b*) not ,, ,,	3	–	–	2·45	–
Diseases of the Eye	6	–	–	4·91	–
Leprosy	5	–	–	4·09	–
Phlebitis	2	–	–	1·63	–
Epilepsy	5	1	20·00	4·09	·81
Paraphymosis	1	–	–	·81	–
Mesenteric Thrombosis	1	1	100·00	·81	·81
Intestinal ,,	1	1	100·00	·81	·81
Minor Ailments	35	–	–	28·66	–
Other Surgical	11	–	–	9·09	–
TOTALS	462	15	3·24	378·37	12·27

BWANA MKUBWA MINE.

DAILY AVERAGE NATIVES EMPLOYED 667 (Including Contractor's Labour).

Disease.	Cases Treated.	Deaths.	Mortality Cases %	Sickness Incidence Rate Per Mille Employed.	Death Rate Per Mille Employed.
Malaria	53	2	3·77	79·46	2·99
Cerebro-spinal Meningitis	5	4	80·00	7·49	5·99
Scurvy	6	–	–	8·99	–
Varicella	9	–	–	13·49	–
Diarrhœa	4	–	–	5·99	–
Dysentery (Bacillary)	7	–	–	10.49	–
Other forms of T.B.	1	1	100·00	1·49	1·49
Pneumonia (Broncho)	8	1	12·50	11·99	1·49
,, (Lobar)	6	2	33·3	8·99	2·99
,, (Influenzal)	17	3	17·65	25·48	4·49
Influenza	19	–	–	28·48	–
Other diseases of Chest	2	–	–	2·99	–
Diseases of the Heart	14	1	7·14	20·99	1·49
Syphilis	9	–	–	13·49	–
Tropical Ulcer	9	–	–	13·49	–
Accidents					
(*a*) arising out of employment ..	129	–	–	192·49	–
(*b*) not ,, ,, ,, ..	18	–	–	26·99	–
Bronchitis	1	–	–	1·49	–
Conjunctivitis	5	–	–	7·49	–
Debility	2	–	–	2·99	–
Minor Ailments	46	–	–	68.96	–
Other Surgical	2	–	–	2·99	–
TOTALS	372	14	3·76	557·72	20·99

NKANA MINE.

DAILY AVERAGE NATIVES EMPLOYED 5,499 (Including Contractor's Labour).

Disease.	Cases Treated.	Deaths.	Mortality Cases %	Sickness Incidence Rate Per Mille Employed.	Death Rate Per Mille Employed.
Malaria	108	–	–	19·64	–
Cerebro-spinal Meningitis	30	18	60·00	5·45	3·27
Typhoid	33	9	27·27	6·00	1·64
Relapsing Fever	1	–	–	·18	–
Typhus Fever	3	–	–	·54	–
Scurvy	18	3	16·66	3·27	·54
Varicella	11	–	–	2·00	–
Diarrhœa	37	1	2·70	6·72	·18
Amœbiasis	26	9	34·61	4·72	1·64
Dysentery (Bacillary)	8	3	37·5	1·45	·54
Tuberculosis (Pulmonary)	1	1	100·00	·18	·18
Pneumonia (Broncho)	20	5	25·00	3·63	·909
,, (Lobar)	363	87	23·96	66·01	15·81
,, (Influenzal)	211	27	12·79	38·37	4·91
Influenza	255	3	1·16	46·37	·54
Pleurisy	9	1	11·11	1·63	·18
Other diseases of the Chest	133	1	·75	24·18	·18
Diseases of the Heart	5	5	100·00	·909	·909
Syphilis	21	–	–	3·81	–
Gonorrhœa	7	–	–	1·27	–
Yaws	2	–	–	·36	–
Tropical Ulcers	122	–	–	22·18	–
Accidents					
(*a*) arising out of employment	1,102	18	1·63	200·40	3·27
(*b*) not ,, ,, ,,	753	1	·13	136·92	·18
Minor Ailments	303	–	–	55·10	–
Diseases of the Eye	41	–	–	7·45	–
Epilepsy	10	4	40·00	1·82	·72
Bilharzia	3	1	33·33	·54	·18
Nephritis	1	–	–	·18	–
Debility	24	2	8·33	4·36	·36
Pneumococcal Meningitis	11	11	100·00	2·00	2·00
Empyema	1	1	100·00	·18	·18
Pulmonary Hæmorrhage	1	1	100·00	·18	·18
Ankylostomiasis	3	–	–	·54	–
Poisoning	1	1	100·00	·18	·18
Minor Surgical	89	–	–	16·18	–
Unknown	1	1	100·00	·18	·18
TOTALS	3,764	214	5·68	684·48	38·91

ROAN ANTELOPE MINE.

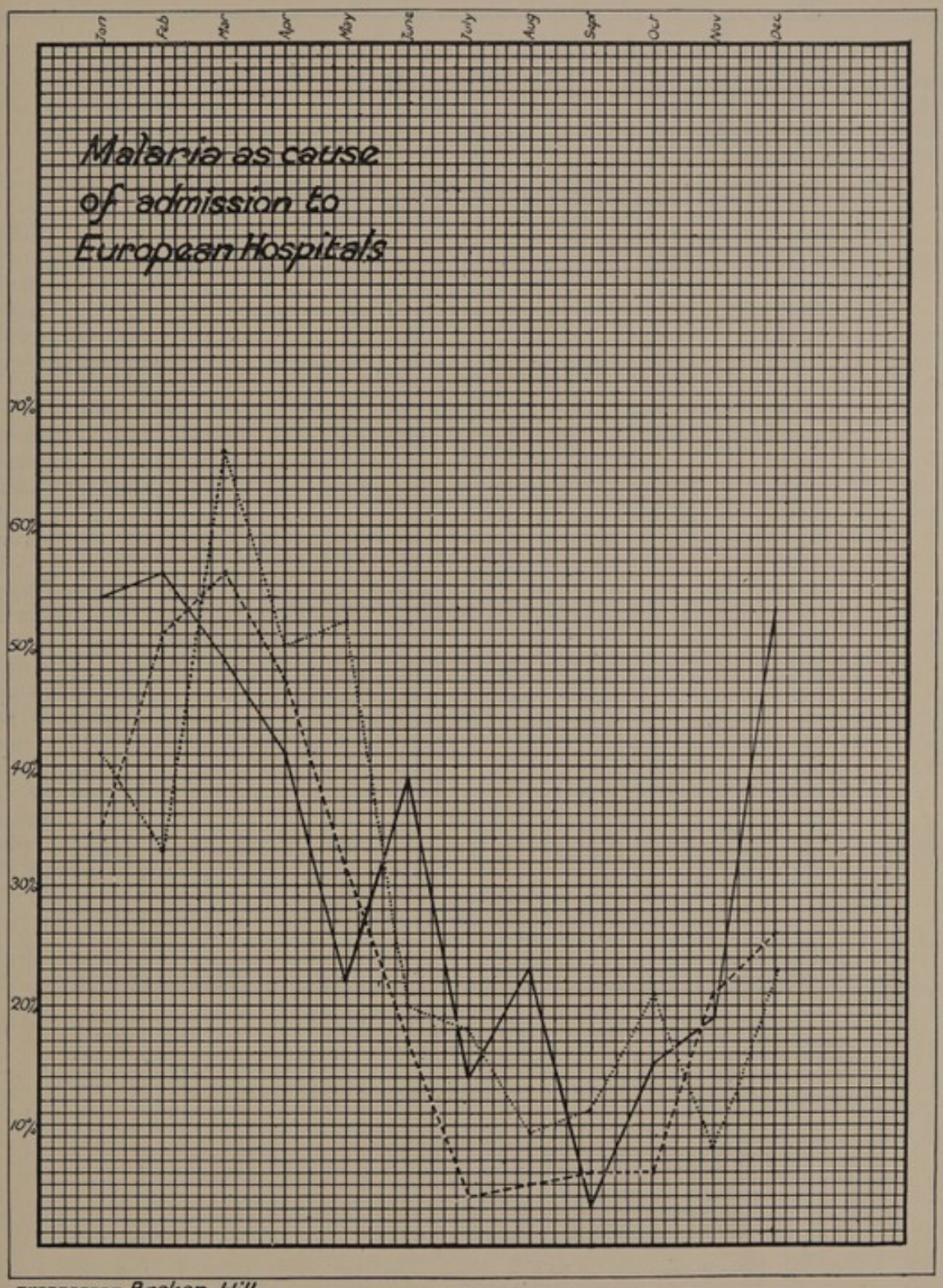
DAILY AVERAGE NATIVES EMPLOYED 5,823 (Including Contractor's Labour).

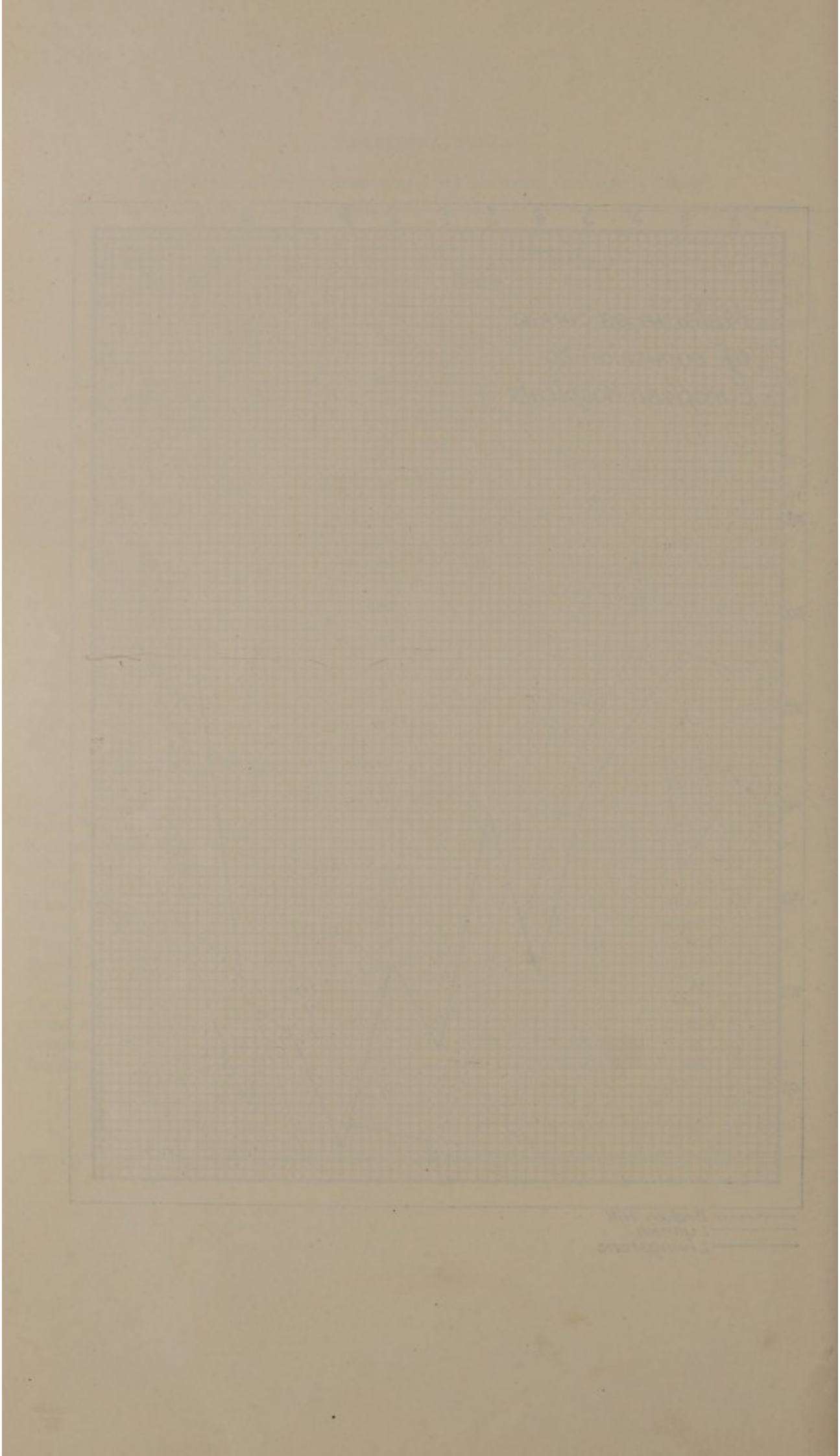
Disease.	Cases Treated.	Deaths	Mortality Cases %	Sickness Incidence Rate Per Mille Employed.	Death Rate Per Mille Employed.
Malaria	13	3	23·07	2·23	·52
Blackwater	2	2	100·00	·34	·34
Cerebro-spinal Meningitis	6	4	66·66	1·03	·68
Typhoid Fever	17	6	35·29	2·91	1·03
Scurvy	13	–	–	2·23	–
Variola	4	–	–	·68	–
Diarrhœa	12	–	–	2·06	–
Dysentery (Bacillary)	12	1	8·33	2·06	·17
Phthisis	1	1	100·00	·17	·17
Tuberculosis (Pulmonary)	4	2	50·00	·68	·34
Pneumonia (Broncho)	84	20	23·80	14·42	3·43
,, (Lobar)	160	30	18·75	27·37	5·15
,, (Influenzal)	4	4	100·00	·68	·68
Influenza	312	–	–	53·58	–
Pleurisy	10	–	–	1·72	–
Other diseases of the Chest	220	2	·909	34·30	·34
Syphilis	22	–	–	3·77	–
Gonorrhœa	1	–	–	·17	–
Yaws	1	–	–	·17	–
Tropical Ulcers	46	–	–	7·89	–
Accidents					
(*a*) arising out of employment	1,109	14	1·26	190·45	2·40
(*b*) not ,, ,, ,,	432	–	–	74·18	–
Homicide	1	1	100·00	·17	·17
Diseases of the Eye	63	–	–	10·82	–
Septic Wounds	1,262	–	–	216·72	–
Pneumococcal Meningitis	4	4	100·00	·68	·68
Leprosy	1	–	–	·17	–
Minor Ailments	456	–	–	78·31	–
Assault	1	1	100·00	·17	·17
Hodgkins Disease	1	1	100·00	·17	·17
Morbilli	16	–	–	2·74	–
Streptococcal Meningitis	1	1	100·00	·17	·17
Supia Renal Tumour	1	1	100·00	·17	·17
Unknown	1	1	100·00	·17	·17
TOTALS	4,293	99	2·31	737·24	17·00

MUFULIRA MINE.

DAILY AVERAGE NATIVES EMPLOYED 2,813 (Including Contractor's Labour).

Disease.	Cases Treated.	Deaths.	Mortality Cases %	Sickness Incidence Rate Per Mille Employed.	Death Rate Per Mille Employed.
Malaria	68	1	1·47	24·17	·36
Cerebro-spinal Meningitis	9	6	66·6	3·19	2·13
Scurvy	6	–	–	2·13	–
Varicella	3	–	–	1·07	–
Variola	4	1	25·00	1·42	·36
Diarrhœa	23	–	–	8·17	–
Dysentery (Bacillary)	5	2	40·00	1·78	·71
Phthisis	2	1	50·00	·71	·36
Pneumonia (Broncho)	100	14	14·00	35·55	4·97
,, (Lobar)	61	17	27·87	21·68	6·04
,, (Influenzal)	13	5	38·46	4·62	1·78
Influenza	144	–	–	51·19	–
Pleurisy	3	–	–	1·07	–
Other diseases of the Chest	74	–	–	26·31	–
Syphilis	24	–	–	8·53	–
Gonorrhœa	8	–	–	2·85	–
Nephritis	2	1	50·00	·71	·36
Tropical Ulcers	27	–	–	9·59	–
Accidents					
(*a*) arising out of employment	805	1	·12	286·17	·36
(*b*) not ,, ,, ,,	203	–	–	72·16	–
Conjunctivitis	37	–	–	13·15	–
Septic Wounds	110	–	–	39·10	–
Malignant growth of Liver	1	1	100·00	·36	·36
Debility	3	–	–	1·07	–
Leprosy	7	–	–	2·48	–
Minor Ailments	132	1	·76	46·88	·36
Chigoes	22	–	–	7·82	–
Minor Surgical	59	1	1·69	20·97	·36
Measles	19	–	–	6·75	–
Synovitis	1	–	–	·36	–
Dermatitis	3	–	–	1·07	–
Ankylostomiasis	1	–	–	·36	–
Peritonitis	1	1	100·00	·36	·36
Sarcoma	1	1	100·00	·36	·36
TOTALS	1,981	54	2·72	704·23	19·19


Jan
Feb
Mar
Apr
May
June
July
Aug
Sept
Oct
Nov
Dec
Malaria as cause of admission to European Hospitals
70%
60%
50%
40%
30%
20%
10%
Broken Hill
Lusaka
Livingstone



NCHANGA MINE, 1931.

DAILY AVERAGE NATIVES EMPLOYED 2,184 (Including Contractor's Labour).

Disease.	Cases Treated.	Deaths.	Mortality Cases %	Sickness Incidence Rate Per Mille Employed.	Death Rate Per Mille Employed.
Malaria	3	–	–	1·37	–
Cerebro-spinal Meningitis	4	4	100·00	1·83	1·83
Varicella	14	–	–	6·41	–
Diarrhœa	4	–	–	1·83	–
Dysentery (Bacillary)	51	16	31·37	23·35	7·33
Pneumonia (Broncho)	11	3	27·27	5·04	1·37
,, (Lobar)	28	8	28·57	12·82	3·66
,, (Influenzal)	52	15	28·85	23·76	6·86
Influenza	56	–	–	25·64	–
Other diseases of the Chest	28	–	–	12·82	–
Diseases of the Heart	1	1	100·00	·46	·46
Syphilis	15	1	6·66	6·86	·46
Gonorrhœa	1	–	–	·46	–
Yaws	15	–	–	6·86	–
Tropical Ulcers	347	–	–	158·89	–
Accidents					
(*a*) arising out of employment ..	382	3	·78	174·91	1·37
(*b*) not ,, ,, ,, ..	19	–	–	8·69	–
Diseases of the Eye	19	–	–	8·69	–
Mental Deficiency	1	–	–	·46	–
Chigoes	29	–	–	13·27	–
Ankylostomiasis	2	1	50·00	·92	·46
Minor Ailments	52	–	–	23·76	–
Synovitis	3	–	–	1·37	–
Senility	1	1	100·00	·46	·46
Other Surgical	3	–	–	1·37	–
TOTALS	1,141	53	4·64	522·42	24·26

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