

## **Annual medical and sanitary report / Nigeria.**

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NIGERIA.



ANNUAL

MEDICAL AND SANITARY  
REPORT

FOR THE YEAR

1923.

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NIGERIA.

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ANNUAL

MEDICAL AND SANITARY  
REPORT

FOR THE

YEAR 1923.



Donation 582



# MEDICAL AND SANITARY REPORT ON NIGERIA FOR THE YEAR 1923.

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MEMORANDUM FOR THE RECORD  
DATE: 1964

SUBJECT:

- I. Introduction
- II. Background Information
  - (a) General Information
  - (b) Specific Information
  - (c) Other Information
- III. Discussion
  - A. General Discussion
  - (1) General Discussion
  - (2) Specific Discussion
  - (3) Other Discussion
- IV. Conclusion
- V. Recommendations
- VI. Other Information
- VII. Summary
- VIII. Appendix
- IX. References
- X. Other Information

# Annual Medical and Sanitary Report on Nigeria for the year 1923.

## I. ADMINISTRATIVE.

### ESTABLISHMENT (including vacancies).

#### MEDICAL AND SANITARY.

- Director of the Medical and Sanitary Service.
- Deputy Director of Medical and Sanitary Service.
- Deputy Director of Sanitary Service.
- 6 Assistant Directors of Medical Service.
- 1 Assistant Director of Sanitary Service.
- 4 Specialist Medical Officers.
- 3 Senior Sanitary Officers.
- 11 Senior Medical Officers.
- \* 92 Medical Officers—W.A.M.S. — 92
- † 5 Medical Officers of Health.
- 5 Medical Officers (African).



#### RESEARCH.

- 1 Director of Medical Research Institute.
- 1 Assistant Bacteriologist.
- 1 Government Analyst.

#### DENTAL.

- ‡ 2 Government Dental Surgeons. \*

#### TSETSE-FLY INVESTIGATION. (TEMPORARY).

- 1 Investigator (Seconded from Medical Staff).
- 1 Entomologist (Special Service Officer).

#### NURSING STAFF.

- 7 Senior Nursing Sisters.
- § 20 Nursing Sisters.

#### SUBORDINATE MEDICAL AND SANITARY STAFF (EUROPEAN).

- 1 Confidential Clerk.
- 9 Sanitary Inspectors.
- 2 Staff Sergeants.
- 4 Sergeants.
- 1 Male Nurse.
- 1 Hospital Dispenser and Storekeeper.
- 1 Laboratory Assistant.

#### SUBORDINATE MEDICAL AND SANITARY STAFF (AFRICAN).

- 1 Clerk, Higher Division, Grade I.
- 2 Chief Dispensers.
- 2 Clerks, Higher Division, Grade II.
- 1 Assistant Chief Dispenser.
- 1 Registrar of Vital Statistics.
- 12 Clerks, Higher Division, Grade III.
- 1 Medical Storekeeper and Warden.
- 13 First Class Dispensers.

\* Twenty-nine vacancies.

† Four vacancies.

‡ Two Dental Surgeons were provided for, but only one was appointed.

§ There were five vacancies among the Nursing Sisters in 1923.



- 3 First Class Sanitary Inspectors.
- 1 Theatre Assistant.
- 23 Clerks, Lower Division, Grade I.
- 54 Second Class Dispensers.
- 10 Second Class Sanitary Inspectors.
- 1 Deputy Registrar of Vital Statistics.
- 5 Storekeepers.
- 38 First Class Nurses.
- 2 Laboratory Attendants.
- 15 Clerks, Lower Division, Grade II, and Probationers.
- 32 Third Class Sanitary Inspectors.
- 3 Laboratory Assistants.
- 86 Second Class Nurses.
- 19 Dispensers-in-Training.
- 73 Nurses-in-Training.
- 26 Sanitary Inspectors-in-Training.

## FINANCIAL.

(a) Statement of Revenue for the year 1923.

Revenue—Hospital and Medical Receipts £6,138 19s. 9d.

(b) Statement of Expenditure for the year 1923.

Medical Department (including Sanitary).

HEADS 16 AND 17.	£	s.	d.
Personal Emoluments ... ..	167,146	15	1
Other Charges ... ..	92,754	10	8
	£259,901	5	9

## II. PUBLIC HEALTH.

### GENERAL REMARKS.

The Returns for the year under consideration are for the combined Colony and Protectorate of Nigeria, including that portion of the Cameroons now under British Mandate.

There is a slight increase in the number of Europeans treated, and a considerable increase in the number of natives applying for medical treatment.

Total cases treated in Government hospitals and dispensaries.

	1921.	1922.	1923.
Europeans ... ..	5,919	5,930	5,993
Natives ... ..	172,837	161,874	213,326
Total ... ..	178,756	167,804	221,242

Total Deaths.

	1921.	1922.	1923.
Europeans ... ..	34	38	21
Natives ... ..	1,114	953	1,281
Total ... ..	1,148	991	1,302

The general health of the European community may on the whole be considered satisfactory. In dealing with the Native Return it would be incorrect to assume that the increase in numbers treated represented an increase in the amount of sickness occurring. The increase is in part due to the extension of the Eastern Railway into country hitherto seldom visited by Europeans. The labour has been drawn mainly from such country, and many natives have thus for the first time been afforded the advantage of medical treatment. One trusts that the gradual spread of the knowledge of the benefits and superiority of modern medicine has also contributed to this increase.

A glance at the Case Incidence Table below will show that in both Europeans and Natives, but especially in the former, malaria is by far the commonest disease.

No severe epidemic occurred in Nigeria throughout the year. An outbreak of cerebro-spinal fever occurred in the Northern Provinces, but was chiefly confined to Kontagora and Katsina, and was less severe than in previous years.

Influenza of an extremely mild type appeared, but never assumed epidemic form. The cases occurred mainly in the Northern Provinces.

### COMMUNICABLE DISEASES.

*Malaria.*—There was a marked decrease in the incidence of this disease among both Europeans and Natives, although in the latter there was an increase in the actual number of cases presenting themselves for treatment.

As in former years, there was a preponderance of the Aestivo-autumnal type, but it must be remembered that in most cases the diagnosis is based upon clinical rather than microscopical evidence.

*Blackwater Fever.*—Twenty-five cases of blackwater fever with six deaths occurred in Europeans during the year under review. There was a satisfactory decrease in the incidence of the disease as compared with former years; and although the case mortality was somewhat higher than in 1922, the figures compare favourably with former years.

Eleven cases in Natives, with eight deaths, were also reported.

Details of investigation into this disease are to be found in the report of the Medical Research Institute.

*Yellow Fever.*—No case of this disease was reported in Nigeria, although numerous cases occurred in the neighbouring French and Gold Coast territories.

*Trypanosomiasis.*—During the year, sixty-nine cases of trypanosomiasis came under observation and treatment. Thirty-seven cases with eight deaths were reported from the Northern Provinces; twenty-seven native cases with five deaths, and one European case from Railway Construction Headquarters, Enugu; and four cases with one death occurred in Calabar District.

The above numbers do not include the cases which were treated at Sherifuri by the Tsetse Fly Investigators. A report of the work done during the year on the Tsetse Fly Investigation is published separately. This deals in detail with the Trypanosome infection, food, and breeding, of various types of tsetse fly. An account of the results of treatment with "Bayer 205" is given on page 42 of the Appendices.

*Relapsing Fever.*—Seven cases, six of which occurred in Lagos Hospital, were reported towards the end of the year. A more detailed account is to be found in the section dealing with sanitation, and in the report of the Medical Research Institute.



*Small-Pox.*—552 cases of small-pox were reported, two of which occurred in Europeans. This is the smallest return since 1919. Of the 550 natives treated, forty-four died, giving a case mortality of 8%. There has therefore been a decrease in both Incidence Rate and case mortality.

*Leprosy.*—A full report on the treatment of this disease with moogrol is to be found in the Report of the Medical Research Institute.

*Ankylostomiasis.*—No case of this disease was reported as occurring in a European during the year under review.

220 cases in Africans were treated as in-patients with twenty-eight deaths, and 377 cases with no deaths came under treatment as out-patients.

An extended trial of *Oleum Chenopodium* in the treatment of the disease was made at Calabar. The results, so far, have shown that, whilst this is the best drug to employ to eradicate *Ascaridiasis*, it cannot be said to be so efficacious as *Thymol* in the treatment of *Ankylostome Infection*. It has, however, the advantage of being safe, and does not give rise to disagreeable symptoms such as may occur under *Thymol* treatment.

*Case Incidence and Mortality.*—The tables below show the Case Incidence and Mortality Rates in the diseases most prevalent among European and African residents. The Case Incidence is shown as the number of cases of the disease occurring in every 1,000 cases treated.

#### EUROPEANS.

##### CASE INCIDENCE.

Disease.	1919.	1920.	1921.	1922.	1923.
Anæmia ... ..	41.15	34.14	34.74	32.81	39.21
Blackwater Fever ... ..	7.74	5.80	6.94	4.73	4.17
Diarrhœa ... ..	32.59	31.14	23.55	26.89	32.53
Dysentery ... ..	17.53	21.11	11.35	16.23	14.85
Malaria ... ..	238.13	243.35	217.11	218.21	190.05
Pneumonia ... ..	1.02	0.88	4.75	2.03	1.50
Tuberculosis ... ..	1.4	1.4	0.34	1.86	0.83

##### CASE MORTALITY.

Disease.	1919.	1920.	1921.	1922.	1923.
Blackwater Fever ... ..	26.32	24.24	24.39	7.14	24.0
Dysentery ... ..	2.33	0.83	0.0	1.04	0.0
Malaria ... ..	0.59	0.14	0.156	0.465	0.175

#### NATIVES.

##### CASE INCIDENCE.

Disease.	1919.	1920.	1921.	1922.	1923.
Anæmia ... ..	7.46	7.38	9.59	7.31	9.65
Ankylostomiasis ... ..	9.48	6.98	2.24	2.40	2.83
Diarrhœa ... ..	29.66	25.51	21.17	21.93	25.01
Dysentery ... ..	8.43	7.6	7.31	9.21	9.19
Gonorrhœa ... ..	18.22	16.95	19.12	19.69	20.60
Malaria ... ..	84.09	88.36	81.39	77.91	70.70
Pneumonia ... ..	5.21	6.96	6.44	5.57	6.44
Syphilis ... ..	5.64	7.69	7.57	8.30	8.10
Tuberculosis ... ..	1.23	1.74	1.58	1.78	1.39

## CASE MORTALITY.

Disease.	1919.	1920.	1921.	1922.	1923.
Dysentery ... ..	0·179	0·125	0·250	0·365	0·81
Malaria ... ..	18·26	19·22	15·55	12·5	12·15
Pneumonia ... ..	22·87	19·46	22·71	22·65	17·91
Tuberculosis ... ..	6·01	11·19	6·45	5·06	5·20

## EUROPEAN OFFICIALS.

Although there has been an increase in the invalidings and deaths, one may say that the health of European officials during the year has been fairly good.

There were 146 invalidings, eighty-one in those under new leave regulations and sixty-five in those under the old leave regulations. From the table below, it will be noted that the majority of the invalidings took place after twelve months' residential service.

## RESIDENTIAL SERVICE.

	Under 6 months.		From 6 to 12 months.		From 12 to 18 months.		Total.
Old Regulations ...	10	5	21	7	16	3	65
New Regulations...	8	3	12	6	49	3	81

During the period 1921-1923 the Invaliding and Death Rates of European officials, per thousand of the average number resident, were as follows:—

	1921.	1922.	1923.
Invaliding ... ..	68·4	97·4	104·6
Death ... ..	8·4	5·0	11·5

TABLE SHOWING SICK, INVALIDING AND DEATH RATES,  
EUROPEAN OFFICIALS.

	1921.	1922.	1923.
Total number resident ... ..	2,039	2,110	2,092
Average number resident ... ..	1,302	1,406	1,396
Total number on sick list ... ..	1,801	1,521	1,252
Total number of days on sick list ... ..	13,821	11,204	14,542
Average daily sick ... ..	37·86	30·69	39·84
Percentage of daily sick to average number resident ...	2·9	2·18	2·85
Average number of days to each patient ... ..	7·6	7·37	11·615
Average sick time to each resident ... ..	10·61	9·83	10·42
Total number invalided ... ..	89	137	146
Percentage of invalided to number resident ... ..	4·36	6·49	6·98
Percentage of invalided to average number resident ...	6·84	9·74	10·46
Total number deaths ... ..	11	7	16
Percentage of deaths to number resident ... ..	0·53	0·33	0·76
Percentage of deaths to average number resident ...	0·84	0·50	1·15

Anæmia and neurasthenia were, as in former years, the chief causes of invaliding amongst European officials. During the year 1923, twenty-five European officials were invalided suffering from the former, and twenty-three from the latter disease.



TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—  
EUROPEAN OFFICIALS.

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
INFECTIOUS DISEASES:—						
Dysentery ... ..	1	...	2	...	1	...
Enteric ... ..	2	...	1	...	...	...
Influenza ... ..	...	...	...	...	1	...
Malaria ... ..	5	...	16	2	7	...
Blackwater Fever ... ..	7	3	14	...	5	4
Pneumonia... ..	1	...	...	...	...	...
Pyrexia of uncertain origin ... ..	...	...	1	...	2	...
Rheumatic Fever ... ..	1	...	...	...	1	...
Septicæmia ... ..	...	...	...	...	...	1
Syphilis ... ..	...	...	1	...	1	...
Trypanosomiasis ... ..	...	...	...	...	1	...
Tuberculosis ... ..	2	...	2	...	7	...
Other Diseases ... ..	...	...	...	...	1	...
INTOXICATIONS:—						
Alcoholism ... ..	2	1	3	...	4	2
Sun Trauma ... ..	5	2	1	1	...	...
GENERAL DISEASES:—						
Anæmia ... ..	10	...	14	...	25	...
Diabetes ... ..	...	...	1	...	...	...
Tropical Debility ... ..	6	...	9	...	11	...
Other Diseases ... ..	...	...	...	...	2	...
NERVOUS SYSTEM:—						
Acute Mania ... ..	1	...	...	...	...	...
Apoplexy ... ..	...	1	...	...	...	...
Delusional Insanity ... ..	1	...	1	...	1	...
Encephalitis ... ..	...	...	1	...	...	...
Headache ... ..	...	...	...	...	3	...
Insomnia ... ..	1	...	2	...	...	...
Melancholia ... ..	...	...	1	...	2	...
Neuralgia ... ..	...	...	1	...	...	...
Neurasthenia ... ..	6	...	21	...	23	...
Neuritis ... ..	1	...	2	...	5	...
Paralysis ... ..	...	...	2	...	...	...
Peripheral Neuritis ... ..	1	...	...	...	...	...
Sciatica ... ..	1	...	...	...	...	...
DISEASES OF THE EYE:—						
Cataract ... ..	1	...	...	...	1	...
Defective Vision ... ..	...	...	1	...	...	...
Iritis ... ..	...	...	...	...	1	...
DISEASES OF THE EAR:—						
Inflammation of Ear ... ..	...	...	...	...	1	...
Otitis Media ... ..	...	...	2	...	...	...
DISEASES OF THE NOSE:—						
Coryza ... ..	...	...	1	...	...	...

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN  
OFFICIALS—continued.

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
CIRCULATORY SYSTEM:—						
Angina Pectoris ... ..	1	...	...	...	106. ...	1
Aneurism ... ..	...	...	...	...	1	...
Arterio-Sclerosis ... ..	2	1	1	...	...	1
Cardiac Dilatation ... ..	...	...	1	...	1	...
D. A. H. ... ..	...	...	...	...	1	...
Myocarditis ... ..	1	1	1	...	2	...
Phlebitis ... ..	...	...	...	...	1	...
Syncope ... ..	...	...	...	...	...	1
Thrombosis ... ..	...	...	...	...	1	...
V. D. H. ... ..	1	...	3	...	...	1
Varix ... ..	...	...	...	...	1	...
RESPIRATORY SYSTEM:—						
Asthma ... ..	...	...	1	...	1	...
Broncho-Pneumonia ... ..	1	...	...	...	1	...
Emphysema ... ..	1	...	...	...	...	...
Empyema ... ..	1	...	...	...	...	...
Pleurisy ... ..	...	...	1	1	1	...
DIGESTIVE SYSTEM:—						
Abscess of Liver ... ..	1	...	1	...	...	...
Appendicitis ... ..	2	...	1	...	2	...
Cholecystitis ... ..	2	...	...	...	...	...
Cirrhosis of Liver... ..	...	1	...	...	...	...
Colitis ... ..	...	...	1	...	...	...
Dental Caries ... ..	...	...	...	...	1	...
Dilatation Stomach ... ..	...	...	2	...	1	...
Duodenal Ulcer ... ..	2	...	...	...	...	...
Dyspepsia ... ..	...	...	1	...	1	...
Enteritis ... ..	...	...	...	...	1	...
Gastralgia ... ..	1	...	...	...	...	...
Gastritis ... ..	2	...	4	...	2	...
Gastric Cancer ... ..	1	...	...	...	...	...
Gastric Ulcer ... ..	...	1	...	...	2	...
Hepatitis (Acute) ... ..	2	...	...	...	2	...
Hernia ... ..	...	...	1	...	...	...
Intestinal Stasis ... ..	...	...	...	...	1	...
Jaundice ... ..	1	...	...	...	...	...
Pyorrhoea Alveolaris ... ..	...	...	3	...	2	...
Ulceration Intestines ... ..	...	...	1	...	1	...
LYMPHATIC SYSTEM:—						
Adenitis ... ..	1	...	...	...	...	...
Suppuration Lymph Glands ... ..	...	...	1	...	...	...
URINARY SYSTEM:—						
Bright's Disease ... ..	...	...	1	...	1	...
Diverticulum Bladder ... ..	...	...	1	...	...	...
Hæmaturia ... ..	...	...	...	...	2	...
Renal Calculus ... ..	2	...	...	...	...	...
Renal Colic ... ..	1	...	...	...	...	...
Other Diseases ... ..	...	...	...	...	1	...
GENERATIVE SYSTEM:—						
Stricture Urethra ... ..	...	...	...	...	1	...
ORGANS OF LOCOMOTION:—						
Arthritis ... ..	...	...	2	...	1	...
Necrosis ... ..	...	...	1	...	...	...
Lat. Curv. Spine ... ..	...	...	1	...	...	...

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TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN OFFICIALS—*continued.*

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
Brought forward ...	...	...	...	...	139	...
CONNECTIVE TISSUE:—						
Cellulitis ...	1	...	...	...	...	...
DISEASES OF SKIN:—						
Boils ...	1	...	1	...	1	...
Ulcers ...	2	...	...	...	1	...
INJURIES:—						
General Injuries ...	...	...	...	...	1	1
Local Injury ..	2	...	2	...	2	...
Bite by Rabid dog ...	2	...	1	...	...	...
Drowning (Accidental) ...	...	...	...	...	...	4
Gun Shot Wounds ...	...	...	...	1	...	...
TUMOURS:—						
Malignant ...	...	...	...	1	2	...
PARASITES:—						
Coccidial ...	...	...	1	...	...	...
Filariasis ...	...	...	1	...	...	...
POISONS:—						
Chloroform... ..	...	...	...	1	...	...
Total ...	...	...	...	...	140	...

TABLE SHOWING SICK, INVALIDING AND DEATH RATES,  
NATIVE OFFICIALS.

	1921.	1922.	1923.
Total number resident ...	2,531	2,928	3,050
Average number resident ...	2,451	2,706	2,936
Total number on sick list ...	3,808	3,661	2,525
Total number of days on sick list ...	27,378	26,153	19,454
Average daily sick ...	75·008	71·65	53·3
Percentage of daily sick to average number resident ...	3·06	2·64	1·8
Average number of days to each patient ...	7·18	7·14	7·7
Average sick time to each resident ...	11·1	9·16	6·6
Total number invalided ...	25	24	36
Percentage of invalided to number resident ...	·98	·82	1·18
Percentage of invalided to average number resident ...	1·01	·88	1·23
Total deaths ...	19	26	13
Percentage of deaths to number resident... ..	·79	·88	·426
Percentage of deaths to average number resident ...	·77	·96	·44



TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—NATIVE  
OFFICIALS.

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
<b>INFECTIVE DISEASES:—</b>						
Dysentery (Amœbic) ... ..	1	...	...	1	...	1
Malaria ... ..	...	...	...	5	...	...
Pneumonia ... ..	1	6	...	3	...	4
Septicæmia ... ..	...	1	...	1	...	...
Tuberculosis ... ..	2	4	2	4	5	1
Rheumatic Fever ... ..	...	...	...	...	...	1
Rheumatism ... ..	...	...	2	...	...	...
Syphilis ... ..	1	...	1	1	...	...
Tetanus ... ..	...	...	...	...	...	1
<b>GENERAL DISEASES:—</b>						
Leukæmia ... ..	1	...	...	...	...	...
Diabetes ... ..	...	...	...	...	1	1
Debility ... ..	1	...	2	...	2	...
Senility ... ..	...	...	3	...	...	...
Other Diseases ... ..	...	...	...	2	...	...
<b>NERVOUS SYSTEM:—</b>						
Hemiplegia ... ..	2	...	1	...	1	...
Apoplexy ... ..	...	...	...	1	...	...
Delusional insanity ... ..	...	...	1	...	1	...
Insanity ... ..	...	...	...	...	2	...
Melancholia ... ..	...	...	2	...	...	...
Meningitis ... ..	...	...	...	...	...	1
Myelitis ... ..	...	...	...	1	...	...
Neurasthenia ... ..	...	...	2	...	1	...
Paraplegia ... ..	...	...	...	1	...	...
Paralysis ... ..	...	...	...	...	1	...
<b>EYE, DISEASES OF:—</b>						
Cataract ... ..	...	...	4	...	...	...
Conjunctivitis ... ..	...	...	1	...	1	...
Defective Vision ... ..	...	...	...	...	3	...
Irido-Cyclitis ... ..	1	...	...	...	...	...
Optic Atrophy ... ..	1	...	...	...	...	...
<b>CIRCULATORY SYSTEM:—</b>						
Arterio-Sclerosis ... ..	1	...	...	...	2	...
Cardiac Dilatation ... ..	1	...	...	...	1	...
Cardiac Incompetence ... ..	...	...	...	...	2	...
Mitral Incompetence ... ..	...	...	...	...	1	...
Myocarditis ... ..	1	...	...	...	...	...
Valvular disease ... ..	6	4	1	2	3	...
Other Diseases ... ..	...	...	...	...	3	...
<b>RESPIRATORY SYSTEM:—</b>						
Chronic Bronchitis ... ..	...	...	...	...	1	..



TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—NATIVE  
OFFICIALS—*continued.*

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
<b>DIGESTIVE SYSTEM:—</b>						
Hepatitis ... ..	...	...	...	1	...	...
Hepatic Abscess ... ..	...	...	...	...	...	1
Malignant Disease Liver ... ..	...	...	1	...	...	...
Other Diseases ... ..	...	...	...	1	...	...
<b>URINARY SYSTEM:—</b>						
Acute Nephritis ... ..	...	1	...	3	...	...
Chronic Nephritis ... ..	1	1	1	...	1	1
Cystitis ... ..	...	...	1	...	...	...
<b>GENERATIVE SYSTEM:—</b>						
Stricture Urethra ... ..	...	...	...	1	...	...
Malignant Disease Prostate ... ..	...	...	...	...	...	1
<b>DISEASES OF LOCOMOTION:—</b>						
Rheumatoid Arthritis ... ..	1	...	...	...	...	...
Arthritis ... ..	...	...	...	...	3	...
<b>TUMOURS:—</b>						
Cancer of Tongue ... ..	1	...	...	...	...	...
Cancer of Uterus... ..	1	...	...	...	...	...
Mediastinal Sarcoma ... ..	...	...	...	...	1	...
Total ... ..						

SOLDIERS—NIGERIA REGIMENT—W.A.F.F.

	1921.	1922.	1923.
Average Strength ... ..	3,885·35	3,461	3,355·68
Sick Rate per 1,000 ... ..	442·47	51·5	134·9
Death Rate per 1,000 ... ..	9	4·91	6·56

POLICE FORCE.

	1921.	1922.	1923.
<b>NORTHERN PROVINCES.</b>			
Average Strength ... ..	1,088	1,182	1,232
Sick Rate per 1,000 ... ..	20·3	43·5	41·5
Death Rate per 1,000 ... ..	9·1	5·92	12·17
<b>SOUTHERN PROVINCES AND COLONY.</b>			
Average Strength ... ..	1,674	1,646	1,641
Sick Rate per 1,000 ... ..	31·47	58·76	75·55
Death Rate per 1,000 ... ..	8·49	8·31	7·79

## (a) PRISON—GOVERNMENT PRISONS.

	1921.	1922.	1923.
NORTHERN PROVINCES:—			
Total Number of Prisoners ...	2,508	2,778	2,579
Daily Average ... ..	838	782	666
Sick Rate per 1,000 ... ..	84	44·2	540·54
Death Rate per 1,000 ... ..	27·4	24·3	25·52
SOUTHERN PROVINCES AND COLONY:—			
Total Number of Prisoners ...	33,064	31,360	35,301
Daily Average ... ..	5,600	6,242	7,316·41
Sick Rate per 1,000 ... ..	8·94	83·3	132·63
Death Rate per 1,000 ... ..	25·35	23·06	30·34

## (b) NATIVE ADMINISTRATION PRISONS.

	1921.	1922.	1923.
Total Number of Prisoners ...	9,412	10,003	9,300
Daily Average ... ..	2,825·36	3,310·95	3,369·98
Total Deaths ... ..	144	203	129
Death Rate ... ..	50·96	60·10	38·27

During the year under review the health of the prisoners under detention in Government prisons may be considered to have been quite satisfactory. The death rate in Southern Provinces prisons shows a small increase as compared to 1922, but 30·34 deaths per thousand cannot be considered an alarming rate when one remembers that many of the prisoners are in a state of chronic disease and ill-health when first admitted to gaol.

Among the prisoners in Native Administration gaols there has been a remarkable decrease in the death rate which is 38·27 per thousand as compared with 60·10 in 1922 and 50·96 per thousand in 1921. There is no doubt that this decrease is mainly due to the stricter supervision exercised during the year. Still further improvement might easily be achieved, were dietaries, similar to those in Government gaols, laid down and strictly adhered to. At present there are no fixed diet scales in Native Administration prisons, and, without weighing machines it is impossible to ensure that all prisoners receive their proper rations.

## NON-OFFICIAL EUROPEAN POPULATION.

As no accurate information is available as to the number of non-official Europeans resident in the country, and returns from private practitioners are incomplete, no comparative table showing Sick, Invaliding and Death Rates, is included in the present report. The table below shows the causes of invalidings and deaths among European non-officials. It will be noted that the number of deaths is considerably lower than in former years; and no doubt, were figures available, one would find that there had also been a corresponding decrease in the percentage of deaths to residents.



TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN  
NON-OFFICIALS.

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
<b>INFECTIVE DISEASES:—</b>						
Dengue ... ..	1	...	...	...	...	...
Dysentery—Amœbic ... ..	2	1	2	1	2	...
"    Bacillary ... ..	...	...	1	...	...	...
Enteric ... ..	...	...	...	...	2	1
Paratyphoid ... ..	1	...	...	...	...	...
Erysipelas .. ..	...	...	...	1	...	...
Influenza ... ..	...	...	...	...	...	1
Malaria ... ..	6	1	8	4	12	1
Black water Fever ... ..	5	7	2	2	8	2
Pneumonia... ..	1	3	...	4	1	...
Pyæmia ... ..	...	...	...	...	1	...
Small-Pox ... ..	...	...	...	...	1	...
Syphilis .. ..	1	1	2	...	...	...
Trypanosomiasis ... ..	3	...	...	...	...	...
Tuberculosis ... ..	...	...	3	2	2	2
Yellow Fever ... ..	...	...	...	1	...	...
Hyperpyrexia ... ..	...	...	...	...	...	1
<b>INTOXICATIONS:—</b>						
Alcoholism ... ..	...	...	...	...	1	...
Drug Habit ... ..	1	...	...	...	...	...
<b>GENERAL DISEASES:—</b>						
Anæmia ... ..	1	...	3	...	1	...
Debility ... ..	1	...	...	...	1	...
Diabetes ... ..	...	...	...	1	...	1
<b>NERVOUS SYSTEM:—</b>						
Cerebral Hæmorrhage ... ..	...	...	1	1	...	...
Melancholia ... ..	...	...	...	1	...	...
Meningitis ... ..	...	...	...	1	...	...
Neurasthenia ... ..	8	...	3	...	2	...
Neuritis ... ..	2	...	...	...	...	...
Peripheral Neuritis ... ..	...	...	...	...	1	...
Polio: Encephalitis ... ..	...	...	...	...	1	...
Other diseases ... ..	...	...	2	...	...	...
<b>DISEASES OF EAR:—</b>						
Otitis media' ... ..	...	...	1	...	...	...
<b>CIRCULATORY SYSTEM:—</b>						
Arteria-Sclerosis ... ..	...	1	...	...	...	...
D. A. H. ... ..	...	...	...	...	1	...
Myocarditis ... ..	1	1	...	...	...	...
V. D. H. ... ..	1	2	2	1	1	...
<b>RESPIRATORY SYSTEM:—</b>						
Asthma ... ..	...	...	...	...	1	...
Bronchitis ... ..	...	1	...	...	...	...
Congestion Lungs ... ..	...	...	...	1	...	...
Empyema ... ..	1	...	...	...	...	...
Hæmoptysis ... ..	1	...	...	...	...	...
Pleurisy ... ..	...	...	1	...	2	...
<b>DIGESTIVE SYSTEM:—</b>						
Appendicitis ... ..	1	...	3	2	1	1
Cirrhosis of Liver ... ..	...	1	...	...	...	...
Duodenal Ulcer ... ..	...	...	...	1	...	...
Gallstones ... ..	...	...	...	...	1	...
Gastritis ... ..	4	...	3	...	3	...
Hepatitis ... ..	3	...	2	...	2	...

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN  
NON-OFFICIALS—continued.

Disease.	1921.		1922.		1923.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
<b>DIGESTIVE SYSTEM CONTD:—</b>						
Intestinal Inflammation...	...	...	...	1	...	...
Pyorrhœa Alveolaris ...	...	...	...	...	1	...
Tonsillitis .. ...	...	...	...	...	1	...
<b>URINARY SYSTEM:—</b>						
Cystitis ... ..	...	...	...	...	1	...
Hæmoglobinuria ... ..	1	...	...	...	...	...
Nephritis ... ..	...	...	...	...	1	1
Ureteral Calculus ... ..	...	...	...	...	1	...
<b>GENERATIVE SYSTEM:—</b>						
Ovaritis ... ..	...	...	...	...	1	...
Pregnancy ... ..	...	...	...	1	...	...
Premature Birth ... ..	...	...	...	1	...	...
Salpingitis ... ..	1	...	...	...	...	...
<b>LOCOMOTION:—</b>						
Arthritis ... ..	...	...	...	...	1	...
<b>LYMPHATIC SYSTEM:—</b>						
Suppuration Lymphatic Gland...	...	...	...	...	...	...
<b>CONNECTIVE TISSUE:—</b>						
Abscess ... ..	1	...	...	...	...	...
Septic Fingers ... ..	1	...	...	...	...	...
<b>SKIN:—</b>						
Boils ... ..	...	...	1	...	...	...
Carbuncle ... ..	...	...	...	1	...	...
Dermatitis ... ..	...	...	...	...	1	...
Eczema ... ..	1	...	...	...	...	...
<b>INJURIES:—</b>						
Drowning ... ..	...	1	...	...	...	...
Gun Shot Wound ... ..	...	...	...	...	...	1
General Injury ... ..	...	1	...	1	...	1
Local Injury ... ..	...	...	1	...	...	...
<b>OTHER CAUSES:—</b>						
Sunstroke ... ..	...	1	...	1	...	...
Violent Fright ... ..	...	1	...	...	...	...
Unknown ... ..	...	...	...	1	...	...
Total ... ..	50	23	41	31	57	13



## VITAL STATISTICS—TOWNSHIP—LAGOS AND EBUTE METTA.

	1921.	1922.	1923.
Estimated Population ... ..	98,625	102,260	104,530
Total Births ... ..	3,002	3,263	3,420
Birth Rate per 1,000 ... ..	30·43	36·41	32·7
Total Deaths ... ..	2,472	2,628	2,492
Death Rate per 1,000 ... ..	25·06	24·73	23·8
Deaths—Infants under 1 year...	855	948	904
Infantile Mortality per 1,000 ...	284·8	290·5	264·09
Still Births ... ..	168	163	172

The Vital Statistics of Lagos and Ebute Metta are given in fuller detail in the section dealing with Sanitation. There is, as in former years, a strikingly high infantile mortality shown; but as one cannot at present ensure that all births are registered, the figure cannot be regarded as accurate.

Annual reports from the Director Medical Research Institute, the Dental Surgeon and the Government Analyst will be found in the Appendices.

D. ALEXANDER.

*Director of Medical and Sanitary Service.*

### III. SANITATION.

#### (A).—GENERAL REVIEW OF WORK DONE, LAWS PASSED AND PROGRESS MADE.

##### (I).—ADMINISTRATIVE.

*Staff.*—During the year considerable changes took place in the European personnel.

The Deputy Director Dr. Cameron Blair went on leave in June and was absent until the end of the year.

In March, Dr. Inness, Senior Sanitary Officer was transferred to the Medical side on promotion. Dr. Pirie, Senior Sanitary Officer, was transferred to the Gold Coast on promotion in July, Dr. Orpen, Senior Sanitary Officer was seconded as Medical Officer of Health to the Lagos Town Council from April until the end of the year and Dr. Clark, Senior Sanitary Officer, was absent on leave from April until November. For the greater part of the year therefore the Assistant Director of Sanitary Service had to manage as best as he could with the help of Dr. Moiser lent by the Medical branch who acted as Senior Sanitary Officer in the Northern Provinces from July until the end of the year.

The staff of six European Sanitary Inspectors remained the same. Dr. Allan, Medical Officer of Health, Sierra Leone, was appointed a Senior Sanitary Officer in April but is not expected in Nigeria until May, 1924.



In the Clerical Staff there was little change apart from the promotion of Mr. Beckley to the grade of Assistant Chief Clerk. Twelve African Sanitary Inspectors in training passed the qualifying examination in the Southern Provinces and were posted to various out-stations. Six Hausa youths were also trained for sanitary work during the year, four for townships and two for Native Administrations.

*Travelling.*—The Deputy Director of Sanitary Service on tour inspected the following places:—Ibadan, Oyo, Iseyin, Ogbomosho, Oshogbo, Zungeru, Kano, Kontagora, Yelwa and Katsina; also Port Harcourt, Calabar and Victoria.

The Assistant Director of Sanitary Service visited Bonny, Port Harcourt, Enugu, Makurdi and Aba whilst the Acting Senior Sanitary Officer, Northern Provinces, visited Awai, Kano, Keffi, Makurdi, Lafia, Jemaa, Jos and Chafe.

These visits of inspection dealt mainly with town planning and outbreaks of infectious disease particularly cerebro-spinal fever.

Owing to the depleted condition of the staff over so large a portion of the year the bulk of the routine travelling had to be left alone and only hurried visits made to places when urgency demanded. It has not been possible to visit some areas for years, particularly that part of the Southern Provinces immediately west of the Niger.

*Town Planning.*—As mentioned in the last report a Central town planning Committee has been formed to which the town planning schemes of local committees are submitted before sanction. In the case of the planning of new townships the machinery is not yet sufficiently developed to bring together a local committee of sufficient standing to put up a fully considered scheme to the Central Committee.

The present system whereby the layout of a new township is first considered by a Sanitary and a Survey Officer together with the Local Authority is too often ineffective particularly where the Railway is considered. Such a local committee is only suitable for determining the suitability of the proposed site in a general way. When this has been done the results might be submitted to a permanent local town planning committee established respectively for the Northern and Southern Provinces.

*General Health.*—The general health of the Colony and Protectorate has been good and the outbreaks of epidemic disease relatively small compared with previous years.

*Europeans.*—Statistics of non-official Europeans are not available. There is a rise in the death-rate of officials and a further rise in the invalidings especially after twelve months residence. This is to be expected as year by year a larger proportion serves the longer tour of the new regulations.

*Africans.*—Out of 1,073 deaths recorded, at Government hospitals 79 were recorded as due to Respiratory disease, malaria 130; dysentery 102 and diarrhoea fifty-four.

*Cerebro-spinal fever* which prevailed in the Kontagora (now Nupe) Province during 1922 again appeared in the same Province in February to a limited extent. A few cases were reported in March and April at Katsina, Daura, Kano, Zaria and Jebba; the epidemic died down in the rainy season but there was a recrudescence towards the end of the year when a few cases occurred at Jos and Kaduna.

*Small-pox* was reported from almost every province but no considerable outbreak occurred.



*Relapsing Fever.*—An outbreak of an obscure disease previously quite unknown to the inhabitants was reported as prevalent in Kontagora (now Nupe) Province during the last quarter of 1923. A Medical Officer was deputed to investigate the disease which was eventually diagnosed as relapsing fever. In all thirty-six cases were reported with a case mortality of 41·7%. Six cases also occurred in Lagos mainly during the month of September in the native town. One case was reported from Kaduna also.

Twenty-five cases of yellow fever were reported from various places in the Gold Coast, particularly Cape Coast, Saltpond and Tarquah during the year. The usual precautions were taken at Nigerian ports and a special intensive campaign against domestic mosquitoes was instituted in Lagos. No case of this disease was reported in Nigeria.

*Legislation.*—The following legislation was enacted bearing on Public Health matters:—

#### ORDERS IN COUNCIL.

(1) Under the Dogs Ordinance, 1915.

Order No. 3. Application of the Dogs Ordinance to certain stations in the Northern Provinces, *viz.* Ilorin, Abinsi, Ankpa, Baro, Bauchi, Bida, Bode Sadu, Ibi, Jebba, Kontagora, Maidugari, Offa, Sokoto and Zungeru.

(2) Under the Vaccination Ordinance, 1917.

Order No. 6. Authorising the vaccination of adults and children in certain areas in the Northern Provinces, *viz.*, Ilorin, Abinsi, Ankpa, Baro, Bauchi, Bida, Bode Sadu, Ibi, Jebba, Kontagora, Maidugari, Offa, Sokoto and Zungeru.

(3) Under the Townships Ordinance, 1917.

Order No. 8. Declaring certain trades to be offensive under the Ordinance.

(4) Order No. 10. Idah and Okwoga cease to be townships.

(5) Under the Vaccination Ordinance, 1917.

Order No. 11. Authorising the vaccination of adults and children in Idah in the Northern Provinces.

The following Rule was passed:—

No. 1. Under the Public Health Ordinance, 1917.

Making provision for the exemption of any area or place from the operation of the Public Health Ordinance, by the Governor.

#### BYE-LAWS.

Amendment of the bye-laws for plans of buildings in Lagos Township.

#### PROGRESS MADE IN 1923.

There is nothing outstanding to report; the work done being mainly routine. The planting of dhub grass is being encouraged in townships wherever possible so as to gradually reduce the area where bush and grass clearing is constantly required.

At Kano a number of new public dustbins were constructed; a large saucer-shaped depression, said to be an old railway borrow pit and a prolific source of mosquito breeding, was drained and the spillway of the dam lowered for a similar reason.

At Zaria where numerous wells and an old disused dam caused a great deal of mosquito breeding, funds were provided for the demolition of the dam and for erecting well copings and covers. A new concrete slaughter slab was also provided for.



The water supply of Zaria is very inadequate and arrangements are being made by the Public Works in conjunction with the Railway with a view to the augmentation of the Railway pipe-borne water supply for the supply of the town also.

At Bauchi well covers were provided.

At Keffi well parapets and a slaughter house.

At Kaduna salgas.

At Aba a nightsoil incinerator was erected.

At Port Harcourt and Enugu refuse incinerators, nightsoil incinerators and also a slaughter house at both places.

Many other smaller works were carried out at various stations.

*Offensive Trades.*—Order in Council No. 8 under the Townships Ordinance declaring certain trades to be offensive is to be noted in this connection.

Bye-laws regulating offensive trades have also been drawn up for the Lagos Town Council but have not yet been adopted. With regard to other townships no further progress can be recorded.

*Reclamation.*—About thirteen acres of land were raised by sand pumped by the Marine Department at Iddo Island in connection with the Iddo Wharf and the new Public Works Department site. Reclamation of small areas in the town of Lagos constantly goes on under the direction of the Town Engineer.

#### VITAL STATISTICS, LAGOS TOWNSHIP.

The Deputy Director of Sanitary Service is also the Principal Registrar under the Births, Deaths and Burials Ordinance. Except within the Township of Lagos the registration of births and deaths of natives is not compulsory. The statistics for Lagos may be taken to be as accurate as those of many European towns. No burial can take place without a burial certificate. With regard to births, a few may escape registration but it is believed not in sufficient number to affect the value of the statistics seriously. A table giving a summary of the vital statistics of Lagos Township is included in the appendix.

#### (II).—PREVENTIVE MEASURES.

##### (1) MOSQUITO AND OTHER INSECT-BORNE DISEASES.

The usual routine measures—clearing, draining, oiling, etc., were carried out at most townships. Many old borrow-pits are being gradually filled up or drained but new borrow-pits are continually being made often in situations where they cannot be drained. Legal action can be taken at once against private persons but it is otherwise with borrow-pits made by the Public Works or Railway. Where there is no liability to penalty the law has little terror.

*Malaria.*—Quinine prophylaxis. So many doubts have been raised as to the efficacy of quinine for prophylaxis that one may be excused for again discussing this aspect of malaria prevention. On the West Coast of Africa where malignant tertian malaria vastly predominates (probably over 95% of all types) the usual daily five grain dose appears to have a very definite protective value if taken regularly. Cases are known to the writer, of men including medical men newly arrived in the country who claimed to have an open mind on the question and did not take prophylactic quinine; after undergoing one, two or three attacks of malaria the effect of the small dose of quinine daily was tried with the result that no further attacks occurred. Blackwater fever which may be looked upon as a complication of malaria hardly if ever occurs, so far as West Africa is concerned, amongst those who take prophylactic quinine regularly. It is of course to be understood that the protection given by a prophylactic dose is only relative.



Experiments have been adduced to prove that quinine directly has no prophylactic effect and that a dose given before the experimental inoculation of malaria does not prevent an attack, but if the five grain daily dose be continued regularly the development of infection is prevented. How the indirect action of the quinine produces this result is not known but from the practical point of view the main point is that the regular daily dose produces a resistance in the body which prevents or arrests the development of malaria.

In countries where benign tertian is common it is stated that the alkaloid quinine has less curative value in this type than in the malignant tertian and this diminished efficacy may be reflected in the prophylaxis of benign tertian and so lead to a disbelief in its protective power in these countries. Assuming that malignant tertian malaria is produced by the same species of parasite in all countries in which it occurs there is still room for a modification of the virus when transmitted by different species of mosquitoes. It is well known that some species of anophelines are better carriers of malaria than others.

It has been stated that the regular taking of prophylactic quinine is harmful to European women in West Africa but although cases of idiosyncrasy do occur there is no definite evidence that it is any more harmful to them than to men. The dress of women in the evenings and frequently at other times particularly lays them open to the attacks of mosquitoes and the infection thus acquired may be greater than the ordinary prophylactic dose can protect against.

*Mosquito proofing of houses.*—This preventive measure has practically been given up altogether, mainly on account of expense but also partly because many occupants of completely mosquito-proofed bungalows complained of the diminished ventilation. Later a single mosquito-proof room was provided but even this is becoming increasingly difficult to obtain. A proofed room to which one may retire in the evenings when mosquito and other flies are numerous is a great comfort.

In Lagos, a large and overcrowded town with numerous swampy or low-lying water-logged areas, strenuous attempts are being continuously made to keep down mosquito breeding and a great amount of excellent work has been done during the year in the construction of masonry drains and raising of street levels. The one drawback is that the occupiers of low-lying compounds are unable to bring them up to street level and these compounds become miniature ponds in the rainy season and prolific mosquito breeding places. House to house inspections are carried out, all houses in the town being visited once weekly and all breeding places of mosquitoes which cannot otherwise be dealt with are oiled. Similar action is taken at other ports and large stations. The summary of the routine sanitary work done during the year is shown in the Appendix for the towns of Lagos and Calabar. No case of yellow fever was reported during the year and there is nothing special to report on trypanosomiasis.

## (2) OTHER GENERAL DISEASES.

(a) *Epidemic diseases.*—Plague was reported at the Canary Islands but no confirmation was received other than notices in the Ministry of Health weekly reports on Infectious Disease. The only preventive measures taken were rat destruction in the vicinity of wharves.

*Cerebro-spinal Fever.*—170 cases with 154 deaths were notified in the Northern Provinces. 150 of these occurred in the months of February, March and April; with the onset of the rains the epidemic died down but cases were notified again in October, November and December, the beginning of what has proved to be a widespread epidemic. The only preventive measures feasible were the prevention of overcrowding and isolation of the sick wherever possible.



*Relapsing Fever.*—Forty-three cases were reported. It appeared in Nupe Province in September and thirty-six cases with a case mortality of 41·7% are known to have occurred. One case from Kaduna and six from Lagos were also reported during the last quarter of the year. No special preventive measures could be applied.

This is the first record of an outbreak of relapsing fever in Nigeria and since the end of the year a considerable epidemic with a high mortality has developed.

*Influenza.*—A few small isolated epidemic outbreaks were reported but there is reason to believe that it was widespread and varied in its clinical symptoms.

*Small-pox.*—Small outbreaks were reported from practically every part of Nigeria and 1,222 cases with 189 deaths notified; 609 of these cases with 119 deaths occurred in the Cameroons Province. These figures however do not represent the actual number of cases or the case mortality.

#### VACCINATIONS.

##### *Southern Provinces.*

	1921.	1922.	1923.
Total number vaccinated ...	297,823	218,097	225,021
Number successful ...	150,364	106,474	115,840
Percentage successful ...	50·48%	48%	51·4%

##### *Northern Provinces.*

	1921.	1922.	1923.
Total number vaccinated ...	15,731	15,278	20,334
Number successful ...	3,203	4,880	10,754
Percentage successful ...	20·3%	31·9%	52·8%

The vaccine used is lanolinated lymph supplied by the Lister Institute in small screw cap collapsable tubes each containing sufficient to vaccinate ten persons. Owing to the rapid deterioration of the lymph when removed from cold storage, experiments were carried out to ascertain how the activity might best be preserved whilst in transit to outstations and whilst being used. Special experimental vaccinations were carried out at Lagos, Ibadan, Kaduna, Kano and Katsina under the following conditions:—

- (1) The lymph on receipt from England in steamer cold storage is kept in cold storage at Lagos until issued for use in Lagos when it is placed in a small cylindrical tin box which is then wrapped up in cotton wool, placed in a wire bacteriological test tube basket with a handle for hand transport. The whole is dipped in water occasionally to keep the cotton wool moist.
- (2) The lymph for Ibadan and Kaduna was transported in an ice box to these places by railway and issued for use in the moist baskets as stated above.
- (3) In the case of Kano and Katsina, the lymph was transported in the moist baskets from Kaduna to Kano by rail and to Katsina by runner, instructions being given to the runner to wet the cotton wool on each available occasion during the journey and to hang the basket in the shade and if possible in a breeze during the rest periods. The Postmaster-General promised every assistance in the transport of lymph by mail carriers and runners.
- (4) Vaccinators carried their supply of lymph in similar moist baskets.



- (5) After the day's work the baskets were hung up in a shady place, *e.g.* open verandah until required next day.
- (6) All vaccinations to be done in the shade.
- (7) A group of vaccinations was carried out with the same batch of lymph at intervals of two, three, six and ten days where possible, that is to say, a number was done:—
- (a) At intervals of two days—1st, 3rd, 5th, 7th, and 9th days.
- (b) „ „ „ three „ —12th to 24th day.
- (c) „ „ „ six „ —20th to 54th „
- (d) „ „ „ ten „ —64th to 84th „
- (8) A record of the lymph used was kept from its issue from cold storage.
- (9) As frequently a considerable number of those vaccinated cannot be found for inspection the percentage of success was calculated as a percentage of those actually inspected.

The following table shows some of the results:—

Kaduna.	No. vaccinated.	No. Successful.	No. Failed.	No. not known.	Date lymph off ice.	Percentage of Success.
						%
11/7/23 ... ..	9	9	...	...	1	100
15 „ ... ..	10	10	...	...	3	100
17 „ ... ..	10	10	...	...	5	100
19 „ ... ..	10	9	...	1	7	100
21 „ ... ..	12	11	1	...	9	91·6
24 „ ... ..	10	9	1	...	12	90
27 „ ... ..	10	9	...	1	15	100
30 „ ... ..	10	9	1	...	18	90
2/8/23 ... ..	10	10	...	...	21	100
5 „ ... ..	10	9	...	1	24	100
11 „ ... ..	10	10	...	...	30	100
17 „ ... ..	10	10	...	...	36	100

LAGOS.—CONSIGNMENT NO. 3105.

						%
30/6/23 ... ..	19	19	...	...	2	100
2/7/23 ... ..	16	12	2	2	4	85·7
6 „ ... ..	8	5	3	...	8	62·5
9 „ ... ..	12	10	2	...	11	83·3
11 „ ... ..	14	12	2	...	13	85·7
13 „ ... ..	15	12	3	...	15	80·0
16 „ ... ..	10	8	2	...	18	80·0
18 „ ... ..	11	8	2	1	20	80·0
20 „ ... ..	10	5	5	...	22	50·0
23 „ ... ..	6	5	...	1	25	100·0
27 „ ... ..	21	4	8	9	29	33·3
1/8/23 ... ..	7	2	5	...	31	28·5
3 „ ... ..	9	3	6	...	33	33·3
7 „ ... ..	10	7	2	1	37	77·7
9 „ ... ..	10	4	4	2	39	50·0
27 „ ... ..	10	9	1	...	59	90·0

## KATSINA.

Katsina.	No. Vaccinated.	No. Successful.	No. failed.	No. not known.	Date lymph off ice.	Percentage of Success.
	19	8	8	3	8	50
	8	6	2	—	15	75
21.7.23	16	12	4	—	22	75
to	11	3	5	3	29	37.5
21.8.23	25	19	5	1	32	79.1
	44	20	19	5	39	51.2

Where these baskets can be effectively used the result is an appreciable increase in the success rate especially in the Northern areas where the air is much drier.

A good deal depends on how the mail runner carries out his instructions: one instance was reported where the runner came in with the lymph basket lying dry on the top of his head load, it had been exposed to the blazing sun for several days journey and the lymph was inert.

The general success rate in the Northern Provinces has risen from 32% in 1922 to nearly 53% in 1923, although the new conditions only operated in a few of the more important centres. From the financial point of view the increased number of successful cases is equivalent to a saving of over £100, for the amount of vaccine supplied was the same as in 1922.

In the Southern Provinces the results have not shown so noticeable an improvement.

The expenditure on lymph for the year was about £3,500 which with £468 for the same purpose expended by the Ibadan Native Administration gives a total of nearly £4,000 for the whole of Nigeria.

The question of a local vaccine institute has been under consideration but for financial reasons had to be postponed.

*Chicken-pox* is general throughout the country and no notice is taken regarding it except during epidemics of small-pox.

(b) *Non-epidemic diseases.*—*Venereal Disease.*—The recorded figures of cases treated at hospitals and dispensaries give no idea of the extent of syphilis and gonorrhœa in the country and all that can be said is that they are very common everywhere. No anti-venereal campaign has yet been undertaken. The figures for cases treated at Government hospitals for the three last years are:—

	1921.	1922.	1923.
Syphilis ... ..	1,302	1,335	1,727
Gonorrhœa ... ..	3,286	3,167	4,396

*Dysentery* is one of the most widely spread of endemic diseases and occurs also in small epidemic outbreaks. The majority of cases are attributed to the *Entamoeba histolytica* but no investigation has been made into the cause of the many cases which are clinically of the bacillary type and which usually constitute the majority of cases in the epidemic outbreaks. In Lagos a form of dysentery is common amongst Europeans, a dozen or more cases being reported about the same time sometimes scattered and with no apparent connection with each other; at other times a number of cases occur in the same neighbourhood or in the same premises. These cases vary from a



sharp diarrhoea to a more or less severe dysenteric enteritis with a temperature of 101 to 103 or higher and tenesmus. If the amœba or its cysts are found the case is usually labelled amœbic.

The effect of malaria as a cause of dysentery especially in children also requires investigation. The amœbic form is widely distributed but it is difficult to get even approximate information of the morbidity caused by it amongst the general population.

In prisons where the food supply is defective dysentery is common. It is also common in tribes where the food available is deficient over a considerable portion of the year. On the other hand it is rare amongst the well fed.

*Tuberculosis.*—Statistics are not available except for Lagos, the disease however is widely spread throughout Nigeria. The following table gives the available statistics over a number of years for Lagos:—

	1919.	1920.	1921.	1922.	1923.
Tuberculosis of lungs ... ..	53	48	57	74	85
Tuberculosis other parts ... ..	10	8	8	4	6
Totals ... ..	63	56	65	78	91
Total certified deaths of Africans .. ..	823	1,002	1,060	1,196	1,081
Percentage of certified deaths ...	7·6	5·6	6·1	6·5	8·4

The total deaths registered in Lagos during 1923 was 2,492 and since out of 1,081 certified deaths there were 91 deaths from tuberculosis it may be assumed that a proportionate number occurred amongst the uncertified which would mean that possibly over 200 deaths from tuberculosis occurred. Lagos is grossly overcrowded however, and the tuberculosis rate cannot be taken as an index of the extent of the disease generally.

When a death from tuberculosis is registered the occurrence is notified to the Medical Officer of Health who inspects the premises and offers to disinfect the part occupied by the deceased, an offer which is rarely refused. The opportunity is taken to explain the nature of the disease and how it is spread whilst steps are also taken to improve the sanitary condition of the premises. Leaflets on the disease in Yoruba language are distributed at the same time.

*Leprosy.*—There is no progress to record in the control of this disease beyond that mentioned in previous reports.

*Yaws.*—This disease is relatively uncommon in Nigeria and no special measures are taken against it.

*Enteric Fever.*—Three cases with one death were reported in Lagos.

### (3) HELMINTHIC DISEASES.

Worm infestation is extremely common among the indigenous population and considering the number and variety of the parasites which may be present, seems to cause remarkably little inconvenience to those affected. Ascaris infections are most common and are almost universal.



Hookworm infection is at least a good second and the degree of infestation varies greatly in different areas and in the opinion of different observers but may be taken to be from 30% in some areas to over 90% in others. As a rule the infestation is light amongst the peoples where food conditions are good, e.g. Yorubas and much heavier where the opposite is the case, e.g. Ibibios.

No hookworm campaign has been undertaken in Nigeria and the sole measures against this wide-spread infection is such sanitary improvements as can be introduced through the Native Administrations such as the salga system (deep cesspit) introduced in some towns which has replaced the general use of a piece of "bush" ground as a latrine.

*Taenia Saginata* is common amongst the meat eating Hausas who only partially cook their meat but is uncommon amongst the Yorubas who cook their meat well.

*Bilharzia* is not common but occurs at various places along the Niger, both *Schistosoma haematobium* and *S. mansoni*.

Guinea Worm is very common in almost all the dry areas and particularly where water holes are dug in the dry season about the beds of dried-up streams. No case amongst Europeans was reported. Amongst Africans attended at Government hospitals 1,663 cases occurred in 213,326 admissions.

### (III).—GENERAL MEASURES.

In all townships and areas to which the Townships Ordinance or any part of the Public Health Ordinance applies some attempt is made at dealing with the disposal of nightsoil and refuse. So far as possible care is also taken of the water supply.

In Native Administration areas much depends on the Native Authority, some make quite a reasonable attempt especially where assisted by the advice of sanitary inspectors from an adjacent township.

The tendency politically is however for the complete separation of sanitation in townships and Native Administration areas. In the Northern Provinces sanitary inspectors for some Native Administrations receive a short course of practical sanitation and are then returned to their respective Native Authorities. In the few Native Administration areas in the Southern Provinces which have attempted to imitate the Northern methods nothing has been done in this respect. In these days of rapid transport both by rail and motor the importance of effective sanitation in large towns like Abeokuta, Ibadan, etc., within a few hours by motor from the port of Lagos, can be realised.

*Refuse Disposal.*—As mentioned under "progress made" the number of public dustbins and refuse incinerators has been added to. The refuse disposal of Lagos is still a difficult problem and fly breeding dumps are still too prominent in attempts at raising low-lying areas.

*Nightsoil Disposal.*—With the exception of the construction of faecal incinerators at Port Harcourt and Enugu, there is no change worthy of note.

*Drainage.*—Apart from Lagos no drainage works have been carried out. In Lagos over 6,000 yards have been added to the permanent masonry drains of the town and with most excellent results on the Sanitary surroundings. This work has been carried out by the Lagos Town Council.



*Bush clearing and grass cutting.*—This is carried out at each station so far as means allow.

*Water Supply.*—Many new water supplies are proposed, e.g. for Kano, Zaria, Ijebu Ode, Enugu and Port Harcourt but have not yet materialised.

*Food Supply.*—At all stations at which slaughtering of animals takes place and at which there is a Medical Officer or a sanitary inspector, inspection of meat takes place. In the larger townships supervision is exercised over bakeries, aerated water factories and the general food stuffs exposed for sale. Over a considerable area of the country there is usually a food shortage between January and July. This is more noticeable in the populous areas east of the Niger inhabited by the Ibo and Ibibio tribes and deficiency œdema can be found amongst them before the new crops are available. The physique of these peoples is also inferior to that of the Yoruba for example. The storage of yams is a much more difficult problem than with maize, guinea corn or rice. Encouragement might be given in suitable areas where the yam is the staple article of food for the introduction of cereal crops as has been tried in the case of rice at Ogoja in the Southern Provinces. Except in a few favoured localities most Europeans in Nigeria lack a sufficiency of green vegetables and the variety in foodstuffs necessary to ensure that the requirements of the body are met. This deficiency may contribute, more than we are aware, to general ill-health and lowered resistance to disease.

*Prisons.*—The health of the convict prisons has been fairly good except at Enugu where the mortality rate per 1,000 of daily average rose from 23·3 in 1922 to 63·2 in 1923 the predominating cause being diarrhoea and dysentery. This would raise the suspicion that the food supply was defective but the Medical Officer reported the food as being adequate. The difficulty however, is to be certain that the prisoners actually got the food provided.

*Native Administration Prisons.*—There is very little information available regarding health conditions. The Kano prison with a daily average population of about 650 is reported to have had a death rate of 12 per 1,000 of daily average in 1923 as compared with 51 in 1922.

A table showing Prison Statistics is appended as usual. It is necessary to state that owing to lack of accommodation in prisons the standard cubic capacity has been temporarily lowered from 600 to 400 cubic feet per prisoner provided the health remained good. Comparison of columns 1 and 2 will therefore show how great the overcrowding in certain prisons still is even with the reduced standard.

#### (B).—MEASURES TO SPREAD KNOWLEDGE OF HYGIENE AND SANITATION.

As has been mentioned in previous reports hygiene is taught in all Government and Government aided schools. Many pupils show a surprisingly good knowledge of the subject but in very few instances would they ever think of putting into practice what they have been taught. To some extent this may be due to the fact that they do not see the principles inculcated practised in the schools themselves. Hygiene and sanitation is not included as a qualifying subject in public examinations such as the clerical entrance examinations, it is only exacted as a qualifying subject from pupil teachers. The African is quick to apprise the status of things official and hygiene is accordingly not taken very seriously.



At present the most widespread and effective means is through the regular sanitary organisation in townships and Native Administration areas, especially the latter if properly advised and assisted and with European supervision where possible.

The main defect in Native Administration Areas is the want of trained sanitary inspectors. To some extent this difficulty is being met in the Northern Provinces by training suitable men for the Native Administrations but in the Southern Provinces nothing has been done so far. Some inducement should be given to make it worth while for young men of standing to qualify as sanitary inspectors for their own towns. One such man would probably be worth many of the type we are at present compelled to accept as candidates for sanitary inspectorships.

A special effort has been made in Lagos to arouse interest in health matters by means of the organisation of a "Health Week." The first was held in 1922 and the second in the year under review. As the keynote of health week is "self help" the organisation and carrying out of the programme in 1923 was left to the people themselves of whom many had experience as members of the central or local committees in 1922. It cannot be said that the attempt was a success, few of the prominent citizens took any part or showed any interest in it. The programme adopted was a faithful copy of that of the previous year and the only item which was a real success was the visit to the Town water supply station when over a 1,000 individuals availed themselves of the opportunity of seeing how the water was purified. The Railway provided a special train and granted cheap fares and the applications for tickets greatly exceeded the carrying capacity. This success was mainly due to the energy of one or two men in one district of the town. It may be that the keynote "self help" has been understood too literally and that "help of others" might indicate better what is desired.

*Maternity and Child Welfare.*—No organisation has yet been developed.

#### (C).—RECOMMENDATIONS FOR FUTURE WORK.

- (1) The need for greatly increased touring is again put forward. The initiation of sanitary improvements is a duty of the Sanitary Officer but this is not possible without knowledge of the local conditions.
- (2) The machinery for town planning requires re-construction. At present it appears to be no one's duty to take the initial steps. This defect is most noticeable at present in connection with railway construction where the authorities wish to build permanent houses near stations at places which may or may not be possible townships. The first indication is a telegram that sites are wanted urgently, a hurried town plan is prepared and the results are not satisfactory and necessitate frequent changes. Permanent local town planning committees for the Northern and Southern Provinces are required, whose duty it would be to show that foresight and initiative without which town planning cannot be a success. These local committees after consulting all interests concerned should submit a fully considered layout of the proposed township to the Central Town Planning Committee for final sanction.
- (3) Registration of births and deaths of Natives should be made compulsory in all townships.



- (4) Native Administrations should be invited to initiate registration of births and deaths in all their principal towns.
- (5) More attention should be directed to the sanitation of large Native Administration towns near railways and main roads and the training of a sanitary staff for them.
- (6) The sanitary condition of railway trains requires closer supervision.
- (7) The development of anti-venereal disease organisation.
- (8) More definite action for the segregation of lepers.
- (9) An inquiry into the causes of dysentery in Nigeria.

The following tables, etc., are attached to this report:—

1. Table I (Table IV of the Model Report).
2. Table of Statistics in reference to Prisons.
3. Table showing returns of Anti-mosquito work and Rainfall.
4. Summary of Vital Statistics for 1923.

WILLIAM S. CLARK,

*Acting Deputy Director of Sanitary Service.*

#### IV.—METEOROLOGY.

For Meteorological Returns *see* under Table V.





## V.—HOSPITALS AND DISPENSARIES.

Station.	Nature of building.	Mosquito proofing.	No. of Beds.		Remarks.
			M.	F.	
Lagos—E. Hospital ...	Brick and Wood	Completely	13	1	Prison has its own E. and N. Hospitals.
Native Hospital ...	Wood and Iron...	Partially ...	53	14	
I. D. Hospital—European	Brick ...	Completely	6	4	
Native ...	" ...	" ...	25	13	
Massey St. Dispensary ...	" ...	None ...	...	...	
Ereko " ...	" ...	" ...	...	...	
Ebute-Metta " E. ...	" ...	" ...	...	...	
" " N. ...	" ...	" ...	...	...	
E. Prison Hos. and Disp. N. ...	" ...	" ...	...	...	
Yaba—L. Asylum, N. ...	" ...	" ...	24	24	
Leper " N. ...	Mud and Thatch	" ...	21	12	
Ibadan—E. Hos. and Disp.	Wood on Iron Pillars	Completely	5	...	
Native " ...	Brick ...	" ...	16	4	
Abeokuta—E. Hospital ...	None ...	" ...	...	...	
Native " ...	Mud, Iron Roof...	None ...	8	4	
Warri—E. Hospital ...	Concrete	Completely	6	...	
Native " ...	Brick ...	Partially ...	24	6	
I. D. Hospital ...	" ...	" ...	20	...	
Sapele—E. Hospital ...	" ...	Completely	4	...	
Native " ...	" ...	Partially ...	16	2	
I. D. Hospital ...	" ...	" ...	8	...	
Onitsha—E. Hospital ...	Brick and Wood	Completely	3	1	
Native " ...	Concrete & Wood	" ...	19	5	
Forcados—E. Hospital ...	Concrete	" ...	4	...	
Native " ...	Brick ...	" ...	12	4	
Agbor—E. Hospital ...	None ...	" ...	...	...	
Native " ...	Brick ...	None ...	6	...	
Benin City—E. Hospital...	None ...	" ...	...	...	
Native " ...	Brick ...	Partially ...	8	...	
Enugu—E. Hospital ...	" ...	None ...	6	...	Railway Construction Hospital, Station Hospital, Construction Hospital, Railway.
Native " ...	" ...	" ...	8	...	
" " ...	Mud and Pan and Grass roof	" ...	22	...	
Calabar—E. Hospital ...	Wood ...	Completely	6	2	Lunatic Asylum—Brick and Iron roof—30 beds 15 Males, 15 Females. Prison has its own E. and N. Hospitals.
Native " ...	Brick ...	" ...	46	11	
I. D. Hospital ...	" ...	None ...	50	16	
Bonny—N. Hospital ...	Brick ...	Partially ...	9	4	
I. D. Hospital ...	" ...	None ...	8	4	
Brass—N. Hospital ...	" ...	" ...	8	...	
Degema—N. Hospital ...	" ...	" ...	28	6	
Ikot-Ekpene—N. Hospital	" ...	" ...	16	3	
Opobo—E. Hospital ...	" ...	Completely	4	...	Closed at present.
Native " ...	Iron ...	None ...	6	2	
Owerri—N. Hospital ...	Bush ...	" ...	...	...	
P. Harcourt—E. Hospital	Wood and Iron...	Completely	6	...	
Native " ...	" ...	Partially ...	...	...	
I. D. Hospital ...	Bush ...	None ...	...	...	
Obubra—N. Hospital ...	Brick ...	" ...	8	2	
Ikom " " ...	Bush ...	" ...	10	...	
Obudu " " ...	" ...	" ...	10	...	
Okigwi " " ...	" ...	" ...	10	...	
Ogoja " " ...	" ...	" ...	10	...	
Abakaliki—N. Hospital ...	" ...	" ...	10	...	
Victoria—E. Hospital ...	Brick ...	" ...	6	...	
Native " (16)	" ...	1 Completely	401	...	15 N. Hospital plantations.
I. D. Hospital ...	Iron ...	None ...	99	...	
Buea—N. Hospital ...	" ...	" ...	10	...	
Bamenda—N. Hospital ...	Bush ...	" ...	20	4	
Mamfe " " ...	Iron ...	" ...	4	...	
Afikpo " " ...	Bush ...	" ...	8	...	



## V.—HOSPITALS AND DISPENSARIES—continued.

Station.	Nature of building.	Mosquito proofing.	No. of Beds.		Remarks.
			M.	F.	
Kaduna—E. Hospital	Brick	Completely	12	...	
Native	"	Partially	36	4	
Kano—E. Hospital	Concrete	None	5	...	
Native	Brick	Partially	26	2	
I. D. Hospital	Mud and Thatch	None	19	...	
Lokoja—E. Hospital	Wood	Partially	10	...	
Native	Brick	"	48	4	
Sokoto—N. Hospital	Mud and Thatch	None	12	...	
Ilorin	Iron	"	6	...	
Offa	Bush	Partially	6	...	
Ibi	Brick	"	6	...	
Yola	Stone	None	10	...	
Bauchi	Brick	"	6	...	
Zaria	Brick and Mud...	Partially	16	...	
I. D. Hospital	Thatch	None	12	...	
Naraguta—N. Hospital	Grass	"	20	...	
Keffi	Mud and Thatch	"	10	...	
Zungeru	Brick	"	10	...	
Minna	Mud and Thatch	"	14	...	
Ankpa	"	"	12	...	
Maiduguri	Brick	"	12	...	

## VI.—SCIENTIFIC.

1. "Appendicitis and Abnormalities of the Appendix"—by H. R. M. Ferguson, M.D., CH.B., etc.
  2. "A case of Blackwater Fever in an African Child"—by H. R. M. Ferguson, M.D., CH.B., etc.
  3. "A rare case of Brow Presentation"—by H. R. M. Ferguson, M.D., CH.B., etc.
  4. "A case of Cutaneous Blastomycosis"—by E. W. Adcock, M.B., CH.B. (Edin.), etc.
  5. "Four cases of Carcinomata in Africans"—by E. C. Braithwaite, F.R.C.S. (Edin.), etc.
  6. "Case of Epithelioma of Vulva with secondary growths in Bladder and Rectum"—by H. R. M. Ferguson, M.D., CH.B., etc.
  7. "A case of Odontoma of Mandible"—by W. R. Parkinson, F.R.C.S., etc.
  8. "Case of (suspected) Haemophilia"—by H. R. M. Ferguson, M.D., CH.B., etc.
  9. "Myositis Ossificans"—by N. A. Dyce-Sharp, M.R.C.S. (Eng.), M.R.C.P. (Lond.)
  10. "Three cases of Uterine Displacement"—by W. R. Parkinson, F.R.C.S., etc.
  11. "Notes on the treatment of Human Trypanosomiasis by Bayer 205"—by John Hanington, M.R.C.S. (Eng.), L.R.C.P. (Lond.), etc.
- The above papers are given in Appendix IV.

## RETURNS.

For Tables I and II *see* under I, Administrative.

Table III given in (2) on Table IV.





TABLE IV.

## (1).—TOWN AREA AND OPEN SPACES.

Year.	LAGOS.		CALABAR.	
	Approximate Area in Acres.	Number of Proclaimed Open Spaces.	Approximate Area in Acres.	Number of Proclaimed Open Spaces.
1921	1,152	3	9.2 sq. miles	3
1922	1,152	3	9.2 " "	3
1923	1,152	3	9.2 " "	3

## (2).—POPULATION.

Year.	LAGOS.			CALABAR.		
	Number of Europeans.	Number of Natives.	Total.	Number of Europeans.	Number of Natives.	Total.
1921	1,186	98,504	99,690	—	—	—
1922	—	—	102,260	118	16,450	16,568
1923	—	—	104,530	152	16,499	16,651

## (3).—HOUSING.

Year.		LAGOS.				CALABAR.			
		Houses.		Huts.		Houses.		Huts.	
		Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.
1921	...	293	4,292	39	5,500	65	57	—	2,329
1922	...	376	4,466	58	6,020	65	57	—	2,354
1923	...	477	8,814	38	6,200	65	58	—	2,405



TABLE IV—continued.

(4).—ERECTION OF NEW BUILDINGS DURING THE YEAR.

Year.	LAGOS.		CALABAR.	
	Number of houses built without sanction.	Number of huts built without sanction.	Number of houses built without sanction.	Number of huts built without sanction.
1921	—	—	—	—
1922	5	4	—	—
1923	3	18	—	40

## ACTION TAKEN.

Year.	LAGOS.		CALABAR.	
	Number of prosecutions.		Number of prosecutions.	
	Houses.	Huts.	Houses.	Huts.
1921	—	—	—	18
1922	5	4	—	133
1923	3	18	—	40

TABLE IV—continued.—(5).—LATRINES—PUBLIC.

Year.	LAGOS.										CALABAR.					
	Number of Latrines.					No. erected during the year.					Number of Latrines.			No. erected during the year.		
	Male.		Female.		Number of seats.	Male.		Female.		Number of seats.	Male.		Female.		Male.	
	Number.	Number of seats.	Number.	Number of seats.		Number.	Number of seats.	Number.	Number of seats.		Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.
1921	37	248	35	218	...	1	...	...	5	...	19	145	18	132	...	...
1922	38	253	36	223	...	1	...	...	5	...	19	145	18	132	...	...
1923	34	250	32	225	...	...	...	...	...	...	19	145	18	132	...	...

LATRINES—continued. (PRIVATE).

Year.	LAGOS.								CALABAR.							
	No. of private latrines.	Average No. of pails of nightsoil removed daily.	Average No. of clean pails substituted for soiled pails.	No. of nightsoil men employed.	No. of cesspools.	No. of cesspools cleaned.	No. of new cesspools constructed during the year.	No. of old cesspools abolished.	No. of private latrines.	Average No. of pails of nightsoil removed daily.	Average No. of clean pails substituted for soiled pails.	No. of nightsoil men employed.	No. of cesspools.	No. of cesspools cleaned.	No. of new cesspools constructed during the year.	No. of old cesspools abolished.
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921	6,958	785	785	45	...	...	...	...	515	343·6	859	72	103	...	8	18
1922	7,569	973	973	46	...	...	...	...	534	385	731	78	126	126	59	36
1923	8,309	924	924	48	...	...	...	...	480	308·38	528	81	137	137	17	6





TABLE IV—continued.

8. Average daily number of cartloads of tin cans, bottles, broken crockery, and other incombustible materials removed from houses, huts, and compounds.

YEAR.	LAGOS.	CALABAR.
1921 ... ..	...	245 Public spaces and streets.
1922 ... ..	...	581 " " " "
1923 ... ..	...	258 " " " "

## (9).—WATER SUPPLY.

## PIPE-BORNE WATER.

Year.	LAGOS.			CALABAR.		
	Source (river, lake or spring).	No. of public standpipes.	No. of private standpipes.	Source (river, lake or spring).	No. of public standpipes.	No. of private standpipes.
1921 ... ..	River	174	1,423	Spring	6	102
1922 ... ..	"	182	1,563	"	6	102
1923 ... ..	"	185	1,757	"	6	102

## WELLS.

Year.	LAGOS.				CALABAR.			
	Public.		Private.		Public.		Private.	
	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.
1921 ... ..	5	...	2,677	6	...	...	3	...
1922 ... ..	5	...	2,526	6	...	...	3	...
1923 ... ..	6	1	2,462	5	...	...	3	...

## TANKS (PUBLIC).

Year.	LAGOS.			CALABAR.		
	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.
1921 ... ..	...	...	...	...	2	1
1922 ... ..	...	...	...	...	2	1
1923 ... ..	...	...	...	...	2	1



TABLE IV—(continued.)

## TANKS (PRIVATE).

Year.	LAGOS.						CALABAR.					
	Number under ground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	No. of 400 galls. capacity or less.	Number above 400 galls.	Number under ground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	No. of 400 galls. capacity or less.	Number above 400 galls.
1921 ...	...	...	340	329	269	71	...	...	55	48	26	29
1922 ...	...	...	314	302	258	56	...	...	58	50	29	29
1923 ...	...	...	280	269	242	38	...	...	58	50	29	29

## NATURE OF TANKS.

Year.	LAGOS.			CALABAR.		
	Wood.	Iron.	Concrete.	Wood.	Iron.	Concrete.
1921 ...	...	187	153	...	55	...
1922 ...	...	172	142	...	58	...
1923 ...	...	221	59	...	58	...

## BARRELS.

Year.	LAGOS.		CALABAR.	
	Number.	Number mosquito protected.	Number.	Number mosquito protected.
1921 ...	382	187	335	1
1922 ...	367	172	350	1
1923 ...	811	66	353	1

## (10).—DRAINAGE.

## (MASONRY DRAINS) PUBLIC DRAINS.

Year.	LAGOS.			CALABAR.		
	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.
1921 ...	35,640	...	...	13,740	...	40
1922 ...	40,480	473	100	13,740	...	...
1923 ...	46,640	400	200	13,924	...	210

TABLE IV—(continued.)

## PRIVATE DRAINS (MASONRY DRAINS).

Year.	LAGOS.			CALABAR.		
	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.
1921 ...	...	...	...	16,669	...	...
1922 ...	...	...	...	16,669	...	...
1923 ...	...	...	...	16,669	...	...

## PUBLIC DRAINS—continued. EARTH DRAINS OR DITCHES.

Year.	LAGOS.			CALABAR.		
	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.
1921 ...	3,160	1,780	About every three months.	15,836	...	Approx. once every two months.
1922 ...	4,500	1,340	do.	15,836	...	Approximate monthly.
1923 ...	...	500	do.	16,267	431	do.

## PRIVATE DRAINS—continued. EARTH DRAINS OR DITCHES.

Year.	LAGOS.			CALABAR.		
	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.
1921 ...	...	...	...	1,100	...	Approx. once every two months.
1922 ..	...	...	...	4,724	1,000	Approximate monthly.
1923 ...	...	...	...	5,112	388	do.



TABLE IV—(continued.) II. INSPECTIONS AND PROSECUTIONS.

Year.	LAGOS.								CALABAR.							
	No. of Inspectors employed.	No. of houses inspected.	No. of houses where larvae were found.	No. of notices served to remove conditions causing breeding larvae.	No. of persons fined for having mosquito larvae on premises.	No. of notices served to remove insanitary condition of premises.	No. of persons fined for not removing insanitary conditions after notice.	No. of Soda and Aerated factories inspected.	No. of Inspectors employed.	No. of houses inspected.	No. of houses where larvae were found.	No. of notices served to remove insanitary conditions causing breeding of larvae.	No. of persons fined for having mosquito larvae on premises.	No. of notices served to remove insanitary conditions on premises.	No. of persons fined for not removing insanitary conditions after notice.	No. of Soda and Aerated factories inspected.
1921 ...	33	652,616	12,724	495	1,444	1,550	107	3	5	98,014	75	...	69	449	16	1
1922 ...	33	652,273	11,753	272	1,359	1,842	78	3	6	100,243	212	...	160	614	9	1
1923 ...	38	586,912	13,817	454	2181	1,732	115	3	8	103,794	316	...	295	1,096	42	1

**TABLE IV—(continued.)**  
**SUMMARY OF SANITARY STATISTICS—PRISONS 1923.**

STATION.			Temporarily Authorised accommodation available according to sanitary standard scale. 1	Average No. of prisoners per night. 2	Site area in square yards per prisoner. 3	Percentage of area prison compounds covered by buildings. 4	Average cell space in cubic feet per prisoner. 5	Average ventilation area in square feet per prisoner. 6	Total number of prisoners medically treated. 7	Total number of prisoners unfit for duty. 8	Average number of days off duty of prisoners unfit. 9	Death rate per 1,000. 10
Abeokuta ...	...	...	159	129.98	67.1	11.5	545	5.4	597	133	3.99	23.25
Agbor ...	...	...	56	105.50	46.4	17.18	241	4	320	62	2.11	38.09
Afikpo ...	...	...	97	133.39	28.3	24.4	328	9.9	271	49	4.35	67.67
Aba... ..	...	...	209	208.29	...	...	...	...	431	69	48.22	33.65
Abakaliki ...	...	...	65	173.64	28.2	13.1	196	2.2	717	151	4.15	46.24
Benin-City ...	...	...	108	107.52	37.7	15.5	451	6.2	314	53	96.1	0.0
Brass ... ..	...	...	53	38.82	70.1	14.5	618	5.9	114	58	13	52.63
Bonny ... ..	...	...	184	39.58	74.6	30.1	2164	19.0	57	20	85	51.28
Calabar ... ..	...	...	500	502.50	24.0	18.9	341	4.7	608	413	132.43	13.94
Degema ... ..	...	...	181	130.01	57.1	24.2	622	10.2	167	94	3.00	15.38
Enugu ... ..	...	...	317	569.54	33.8	17.5	248	7.7	538	256	282.61	63.27
Forcados ... ..	...	...	72	55.57	159.	7.3	580	4.5	178	12	5.79	0.0
Ibadan ... ..	...	...	64	28.52	148.	24.3	1012	12.4	70	16	34	35.70
Ifon... ..	...	...	29	46.27	43.1	7.5	294	1.3	88	36	38	43.47
Ikot-Ekpene ...	...	...	227	329.26	67.6	10.8	306	6.1	798	381	11.13	36.47
Kwale ... ..	...	...	97	103.11	45.0	21.6	424	5.1	76	9	6.22	19.41
Lagos ... ..	...	...	404	554.53	25.1	25.8	1012	3.0	907	455	6.91	16.24
Obubra ... ..	...	...	59	91.60	149.	9.3	350	6.5	199	39	1.20	43.95
Ogoja ... ..	...	...	131	172.89	387.	14.0	338	4.3	428	34	8.27	11.63
Okigwi ... ..	...	...	136	161.61	42.8	...	376	8.0	542	293	4.80	105.59
Ogwashi-Uku ...	...	...	66	108.96	10.0	31.9	213	...	50	2	19.74	27.78
Opobo ... ..	...	...	209	188.33	20.0	35.6	497	6.9	727	327	4.08	5.32
Onitsha ... ..	...	...	163	211.14	55.2	27.6	344	5.7	923	296	6.71	61.61
Owerri ... ..	...	...	201	184.71	61.1	21.4	487	8.2	675	235	28.59	16.30
Port Harcourt ...	...	...	584	552.55	90.1	10.3	471	...	836	92	9.89	34.42
Sapele ... ..	...	...	245	99.79	99.4	11.5	1095	14.4	295	71	1.59	10.10
Ubiaja ... ..	...	...	59	143.08	21.5	19.3	183	...	378	81	17.26	41.96
Warri ... ..	...	...	232	276.93	62.2	5.6	374	7.2	1,264	384	4.37	14.49



TABLE IV—(continued.)

## MOSQUITO INDEX.

Station.	Houses Inspected 1923.	Houses with larvae 1923.	Rainfall 1923.	Rainfall 1922.	Mosquito Index 1923.	Mosquito Index 1922.
Lagos ... ..	586,912	13,817	71·56	84·37	2·3	2·0
Abeokuta ... ..	77,468	2,677	41·74	39·93	3·4	3·2
Ibadan ... ..	24,971	798	47·27	44·86	3·2	·7
Ondo ... ..	5,631	28	26·43	40·95	·4	·2
Badagry ... ..	11,120	173	...	...	1·5	·9
Epe ... ..	38,822	1,516	...	...	3·9	1·5
Ijebu-Ode ... ..	23,684	1,024	...	...	4·3	4·0
Ado-Ekiti ... ..	4,672	...	...	...	...	5·2
Warri ... ..	51,143	36	84·35	102·86	·07	·1
Forcados ... ..	11,681	79	106·29	136·51	·6	·6
Sapele ... ..	5,202	58	73·46	75·27	1·1	·2
Koko ... ..	1,276	12	...	...	·9	6·5
Benin-City ... ..	9,381	32	75·27	51·47	·3	·5
Onitsha ... ..	22,473	40	...	22·25	·1	·02
Siluko ... ..	5,129	31	...	...	·6	·4
Asaba ... ..	4,106	83	57·04	52·97	2·0	1·5
Enugu ... ..	38,530	171	62·74	36·30	·4	·4
Agbor ... ..	11,125	42	65·11	70·37	·3	·10
Calabar ... ..	103,794	316	106·92	91·14	·3	·2
Bonny ... ..	8,854	107	150·99	139·52	·2	2·0
Brass ... ..	19,599	50	131·17	29·22	·2	·2
Opobo ... ..	16,398	49	124·32	118·63	·2	·3
Owerri ... ..	11,729	68	88·38	91·09	·5	·7
Degema ... ..	8,191	61	73·96	76·25	·7	1·7
Ikot-Ekpene ... ..	9,141	17	92·91	82·80	·1	·2
Ogoja ... ..	3,948	27	...	...	·6	·2
Abakaliki ... ..	2,361	...	75·58	94·38	...	·4
Obubra ... ..	3,622	7	77·56	120·78	·1	2·1
Afikpo ... ..	1,221	...	79·78	81·00	...	·6
Port Harcourt ... ..	70,340	375	80·04	79·30	·5	·7
Ikom ... ..	5,895	49	82·97	88·76	·8	1·1
Awka ... ..	8,432	73	...	...	·8	1·3
Aba ... ..	17,181	106	...	...	·6	·1

## SUMMARY OF VITAL STATISTICS FOR 1923.

	Lagos Township.
Estimated Population (Lagos and Ebute Metta) ... ..	104,530
Total Births ... ..	3,420
Birth Rate per 1,000 Population ... ..	32·7
Total Deaths ... ..	2,492
Death Rate per 1,000 Population ... ..	23·8
Deaths—Causation of—Certified by Medical Practitioners—number	1,081
Deaths—Causation of—Certified by Medical Practitioners—per cent	43·3
Deaths—Infants under one year ... ..	903
Infantile Mortality per 1,000 births ... ..	264·03
Deaths under one year Certified by Medical Practitioners—number	291
Deaths under one year Certified by Medical Practitioners—per cent	11·6
Deaths—Children under five years ... ..	1,178
Percentage of deaths of Children under five years to total deaths	47·2
Total Still-births ... ..	172
Still-births proportion $\frac{1}{2}$ of the total Births (Normal and Still-births)	4·7
Deaths uncertified by Medical Practitioners—number ... ..	1,411
Deaths uncertified by Medical Practitioners—per cent ... ..	56·6



TABLE V.—METEOROLOGICAL RECORDS.

STATION.	1921.						1922.						1923.					
	Absolute Max.	Absolute Min.	Average Maximum.	Average Minimum.	Relative Humidity.	Rainfall inches.	Absolute Max.	Absolute Min.	Average Maximum.	Average Minimum.	Relative Humidity.	Rainfall inches.	Absolute Max.	Absolute Min.	Average Maximum.	Average Minimum.	Relative Humidity.	Rainfall inches.
Dorin ...	102	52	89.9	68.7	83.1	66.25	100	51	88.8	67.1	74.2	43.90	103	54	89.2	66.1	77.9	53.49
Kaduna ...	102	54	88	65.3	70.2	56.18	96	51	85.6	67.8	66.3	51.28	100	50	88.0	63.6	60.8	43.55
Maiduguri ...	115	49	96.4	67.9	53.6	28.87	115	50	98.9	98.6	49.5	17.73	114	50	97.4	68.3	50.9	25.85
Naraguta ...	95	46	78.6	62.2	61.6	51.22	98	52	81.7	62.1	65.9	43.77	94.9	40	82.2	60.7	59.7	69.38
Kano ...	107	50	94	66.9	52.7	36.62	109	50	93.4	66.9	50.3	33.34	108	49	92.9	66.2	56.8	32.84
Lokoja ...	102	56	91.2	72.2	75	50.96	102	53	90.2	71.9	74.6	47.10	100	59	88.4	71.8	73.5	44.41
Sokoto ...	109	50	91.5	67.5	50.2	33.98	112	54	96.5	69.7	53.1	35.41	110	51	96.5	68.7	43.6	25.05
Yola ...	108	45	93.5	64.4	58.6	40.36	107	49	93.1	61.5	60.8	39.21	108	49	93.0	60.9	58.7	37.77
Zaria ...	101	38	87.6	59.2	58.7	41.91	99	40	85.9	56.9	56.8	54.26	101	40	90.0	54.9	56.2	39.74
Zungeru ...	106	56	92.5	74.5	65	57.14	104	53	93.7	65.9	65.4	40.43	103	56	93.3	69.9	70.4	43.87
Lagos ...	99	60	86.1	75.2	84.4	83.22	92.3	67	86.1	73.1	82.2	84.37	92	69	86.3	75.0	82.8	71.56
Forcados ...	90	62	87.1	71.3	81.7	147.75	93	60	84.2	74.3	82.6	136.51	92	64	83.9	72.5	84.4	106.29
Idadan ...	103	58	90.8	71.3	89.4	67.89	103	52	92.5	67.3	83.8	44.86	102	52	92.0	64.2	81.9	47.27
Calabar ...	90	70	83.5	72.8	84	100.18	96	65	84.0	73.2	83.3	91.14	91	59	84.2	72.9	84.8	106.86
Enugu ...	97	55	86.3	62.3	82.2	74.63	93	58	81.5	60.7	86.9	36.30	98	54	87.7	67.5	83.8	62.74





TABLE VI.—RETURN OF DISEASES AND DEATHS OF EUROPEANS FOR THE YEARS 1921, 1922, 1923—*continued*.

Diseases.	Remaining in Hospital at end of 1920.	1921.			Remaining at end of 1921.	1922.			Remaining at end of 1922.	1923.			Remaining at end of 1923.
		In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.	
		Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.			Total Admissions.			
General Diseases.													
Anæmia ... ..		14	191	...	...	15	176	...	1	18	217	...	...
Anæmia-Pernicious ... ..		...	...	...	...	...	3	...	...	...	...	...	...
Diabetes ... ..		...	...	...	...	...	1	1	...	...	2	...	...
Exophthalmic goitre... ..		...	...	...	...	...	...	...	...	...	...	...	...
Gout ... ..		1	13	...	...	...	2	...	...	3	7	...	1
Leucocythæmia ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Lymphadenoma ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Myxœdema ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Purpura ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Rickets... ..		...	...	...	...	...	...	...	...	...	...	...	...
Scurvy ... ..		...	2	...	...	...	...	...	...	...	20	...	...
Other Diseases ... ..		7	57	...	...	3	91	...	...	10	28	...	...
Local Diseases.													
DISEASES OF THE NERVOUS SYSTEM.													
Sub-section 1.—Diseases of the Nerves:—													
Neuritis ... ..		13	15	...	...	13	29	...	2	17	33	...	...
Meningitis ... ..		1	...	...	...	1	2	1	...	...	1	...	...
Myelitis ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Hydrocephalus ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Encephalitis ... ..		...	...	...	...	...	...	...	...	...	1	...	...
Abscess of brain... ..		...	...	...	...	...	...	...	...	...	...	...	...
Congestion of brain ... ..		...	1	...	...	...	...	...	...	...	...	...	...
Other Diseases ... ..		4	38	1	...	14	28	...	1	7	25	...	...
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—													
Apoplexy ... ..		1	...	1	...	1	1	...	...	...	...	...	...
Insomnia ... ..		...	...	...	...	...	...	...	...	1	1	...	...
Neurasthenia ... ..		...	...	...	...	...	...	...	...	5	5	...	...
Paralysis ... ..		1	...	...	...	1	1	...	...	...	...	...	...
Chorea ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Epilepsy ... ..		1	...	...	...	...	1	...	...	1	...	...	...
Neuralgia ... ..		...	89	...	...	1	64	...	...	18	62	...	...
Hysteria ... ..		1	4	...	...	...	5	...	...	...	...	...	...
Other Diseases ... ..		18	77	1	...	19	45	...	...	8	75	...	...
Sub-section 3.—Mental Diseases:—													
Idiocy ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Mania ... ..		...	...	...	...	1	...	...	...	1	...	...	...
Melancholia ... ..		...	...	...	...	2	...	1	...	...	...	...	...
Dementia ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Delusional Insanity ... ..		4	...	...	...	...	...	...	...	5	1	...	...
Other Diseases ... ..		1	...	...	...	7	3	...	...	8	3	...	...
DISEASES OF THE EYE.													
Conjunctivitis ... ..		...	44	...	...	2	35	...	...	2	57	...	...
Keratitis ... ..		1	4	...	...	...	1	...	...	...	2	...	...
Ulceration of cornea ... ..		...	3	...	...	...	...	...	...	2	1	...	...
Iritis ... ..		3	4	...	1	...	...	...	...	2	2	...	...
Optic neuritis ... ..		...	...	...	...	...	...	...	...	...	...	...	...
Cataract ... ..		...	...	...	...	...	1	...	...	...	4	...	...
Other Diseases ... ..		...	25	...	...	...	25	...	...	...	18	...	...





TABLE VI.—RETURN OF DISEASES AND DEATHS OF EUROPEANS FOR THE YEARS 1921, 1922, 1923—*continued*.

Diseases.	Remaining in Hospital at end of 1920.	1921.			Remaining at end of 1921.	1922.			Remaining at end of 1922.	1923.			Remaining at end of 1923.
		In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.	
		Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.			Total Admissions.			
Local Diseases—contd.													
DISEASES OF THE DIGESTIVE SYSTEM—continued.													
Hernia ... ..	...	3	32	...	...	3	9	...	...	4	3	...	...
Diarrhoea ... ..	...	11	128	...	...	3	156	...	...	26	169	...	...
Constipation ... ..	...	1	54	...	...	...	43	...	...	4	54	...	...
Colic ... ..	...	5	35	...	...	3	34	...	...	...	21	...	...
Hæmorrhoids ... ..	...	4	40	...	...	9	34	...	2	11	40	...	...
Pancreatitis ... ..	...	...	1	...	...	1	4	...	...	...	...	...	...
Hepatitis—Acute ... ..	...	3	32	...	...	9	37	...	...	7	19	...	1
Abscess ... ..	...	...	...	...	...	2	...	...	...	...	...	...	...
Cirrhosis ... ..	...	1	1	...	...	...	...	...	...	...	...	...	...
Jaundice ... ..	1	4	5	1	...	6	10	...	...	2	7	...	...
Peritonitis ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Ascites ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Diseases ... ..	1	15	5	...	...	...	30	...	...	6	27	...	...
DISEASES OF THE LYMPHA- TIC SYSTEM.													
Splenitis ... ..	...	4	10	...	...	...	11	...	...	2	4	...	...
Inflammation of lymphatic gland ... ..	2	15	34	...	...	13	45	...	2	28	33	...	1
Suppuration of lymphatic gland ... ..	...	9	10	...	...	7	11	...	...	10	23	...	...
Lymphangitis ... ..	...	...	7	...	...	1	8	...	...	...	3	...	...
Elephantiasis ... ..	...	...	...	...	...	...	...	...	...	...	1	...	...
Other Diseases ... ..	...	1	...	...	...	...	...	...	...	...	2	...	...
DISEASES OF THE URINARY SYSTEM.													
Acute nephritis ... ..	...	2	6	...	1	1	...	...	...	...	2	...	...
Bright's Disease... ..	...	...	3	...	...	...	...	...	...	2	...	...	...
Pyelitis ... ..	...	...	...	...	...	...	...	...	...	1	...	...	...
Calculus ... ..	...	2	6	...	...	...	2	...	...	...	...	...	...
Renal colic ... ..	...	...	6	...	...	...	1	...	...	1	6	...	...
Cystitis ... ..	...	6	16	...	...	7	25	...	...	1	18	...	...
Vesical calculus... ..	...	2	6	...	...	...	...	...	...	8	1	...	...
Suppression ... ..	...	...	...	...	...	1	...	...	...	...	...	...	...
Hæmaturia ... ..	...	...	1	...	...	4	5	...	...	...	2	...	...
Chyluria ... ..	...	...	...	...	...	...	1	...	...	...	...	...	...
Other Diseases ... ..	1	4	11	...	...	4	10	...	...	1	4	...	...
DISEASES OF THE GENERA- TIVE SYSTEM.													
Male Organs:—													
Urethritis... ..	...	2	40	...	...	1	40	...	...	4	23	...	...
Gleet ... ..	...	...	2	...	...	...	7	...	...	1	4	...	...
Stricture ... ..	...	1	1	...	...	...	3	...	...	2	7	...	...
Prostatitis ... ..	...	1	5	...	...	...	...	...	...	2	6	...	...
Soft chancre ... ..	...	1	31	...	...	2	39	...	...	2	26	...	...
Condyloma ... ..	...	...	1	...	...	...	...	...	...	...	...	...	...
Inflammation of scrotum ... ..	...	...	1	...	...	...	...	...	...	...	1	...	...
Hydrocele ... ..	...	...	1	...	...	1	4	...	...	2	2	...	...
Orchitis ... ..	...	1	15	...	...	3	16	...	...	2	7	...	...
Epididymitis ... ..	1	2	10	...	...	1	4	...	...	2	8	...	...
Abscess of testicle ... ..	...	...	...	...	...	...	5	...	...	...	...	...	...
Other Diseases ... ..	1	4	7	...	...	7	2	...	...	5	6	...	1

TABLE VI.—RETURN OF DISEASES AND DEATHS OF EUROPEANS FOR THE YEARS 1921, 1922, 1923—*continued*.

Diseases.	Remaining in Hospital at end of 1920.	1921.			Remaining at end of 1921.	1922.			Remaining at end of 1922.	1923.			Remaining at end of 1923.
		In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.	
		Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.		
Local Diseases—contd.													
DISEASES OF THE GENERATIVE SYSTEM—continued.													
Female Organs:—													
Ovaritis ... ..	...	...	...	...	...	...	...	...	...	1	...	...	...
Ovarian cyst ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Endometritis ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Displacement of uterus ... ..	...	...	1	...	...	...	...	...	...	...	...	...	...
Vaginitis ... ..	...	...	2	...	...	...	...	...	...	...	...	...	...
Amenorrhœa ... ..	...	...	...	...	...	...	3	...	...	...	...	...	...
Dysmonorrhœa ... ..	...	...	3	...	...	2	3	...	...	...	2	...	...
Menorrhagia ... ..	...	...	2	...	...	...	4	...	...	...	2	...	...
Leucorrhœa ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Diseases ... ..	...	1	1	...	...	...	1	...	...	...	4	...	...
AFFECTIONS CONNECTED WITH PREGNANCY.													
Abortion ... ..	...	...	...	...	...	1	...	1	...	2	2	...	...
Other Affections ... ..	...	3	...	...	...	...	...	...	...	1	1	...	...
AFFECTIONS CONNECTED WITH PARTURITION.													
Delayed Labour ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Retained placenta ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Premature Birth ... ..	...	...	...	...	...	...	2	1	...	...	...	...	...
Other Affections ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
AFFECTIONS CONSEQUENT ON PARTURITION.													
Post-partum hæmorrhage ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal septicæmia ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Mastitis ... ..	...	...	1	...	...	...	1	...	...	...	1	...	...
Abscess of breast ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Affections ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
DISEASES OF ORGANS OF LOCOMOTION.													
Osteitis ... ..	...	...	1	...	...	...	7	...	...	8	...	...	...
Arthritis ... ..	...	1	21	...	...	11	18	...	1	...	32	...	...
Spondylitis ... ..	...	...	...	...	...	...	...	...	...	1	3	...	...
Bursitis ... ..	...	1	3	...	...	2	9	...	...	8	3	...	...
Myalgia ... ..	...	5	62	...	...	3	90	...	...	5	106	...	...
Other Diseases ... ..	1	5	41	...	...	2	27	...	...	...	21	...	...
DISEASES OF CONNECTIVE TISSUE.													
Cellulitis ... ..	1	12	20	...	...	10	38	...	...	16	43	...	2
Abscess ... ..	...	9	43	...	...	13	42	...	1	12	49	...	...
Other Diseases ... ..	...	2	7	1	...	...	3	...	...	5	5	...	...



TABLE VI.—RETURN OF DISEASES AND DEATHS OF EUROPEANS FOR THE YEARS 1921, 1922, 1923—continued.

Diseases.	Remaining in Hospital at end of 1920.	1921.				1922.				1923.				Remaining at end of 1923.
		In Patients.	Out Patients.	Deaths.	Remaining at end of 1921.	In Patients.	Out Patients.	Deaths.	Remaining at end of 1922.	In Patients.	Out Patients.	Deaths.		
		Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.			
Local Diseases—contd.														
DISEASES OF THE SKIN.														
Ulcer ... ..	2	24	93	...	2	2	89	...	...	13	83	...	...	
Urticaria ... ..	...	2	20	...	...	...	18	...	...	1	37	...	...	
Eczema ... ..	...	1	58	...	...	2	55	...	...	5	54	...	...	
Boil... ..	1	20	164	...	3	12	138	...	1	15	131	...	...	
Carbuncle...	...	5	6	...	1	3	3	1	...	1	1	...	...	
Herpes ... ..	...	1	21	...	...	...	12	...	...	2	17	...	...	
Psoriasis ... ..	...	4	3	...	...	1	5	...	...	...	3	...	...	
Oriental sore ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	
Tinea ... ..	...	...	145	...	...	1	164	...	...	1	145	...	...	
Scabies .. ...	...	1	26	...	...	2	33	...	...	2	30	...	...	
Acne ... ..	...	...	8	...	...	...	19	...	...	...	3	...	...	
Prickly heat ... ..	...	...	48	...	...	...	35	...	...	4	44	...	...	
Other Diseases ... ..	...	8	90	...	...	2	70	...	...	3	106	...	...	
INJURIES.														
General ... ..	...	16	11	2	...	5	9	4	...	4	44	...	...	
Local ... ..	...	36	379	...	...	44	375	...	...	55	336	1	...	
TUMOURS.														
Benign ... ..	...	2	11	...	...	1	11	...	...	1	16	...	...	
Malignant ... ..	...	1	...	...	...	1	...	1	...	...	...	...	...	
MALFORMATIONS ... ..	...	...	3	...	...	...	1	...	...	2	...	...	1	
POISONS.														
Vegetable ... ..	...	...	1	...	...	1	1	...	...	2	1	...	...	
Animal ... ..	...	...	2	...	...	...	4	...	...	...	3	...	...	
Other Poisons ... ..	...	2	16	...	...	...	14	1	...	1	2	...	...	
PARASITES.														
ANIMAL PARASITES.														
Protozoa ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	
Trematoda (Flukes) ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	
Cestoda:—														
Tænia solium ... ..	...	...	1	...	...	1	4	...	...	...	6	...	...	
Tænia saginata... ..	...	...	6	...	...	...	9	...	...	6	5	...	...	
Other Cestodes ... ..	...	...	...	...	...	...	1	...	...	...	2	...	...	
Nematoda:—														
Ascaris ... ..	...	...	2	...	...	...	3	...	...	...	3	...	...	
Tricocephalus dispar ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	
Trichina ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	
Dracunculus ... ..	...	...	2	...	...	...	...	...	...	...	...	...	...	
Filaria ... ..	...	...	6	...	...	3	10	...	...	...	9	...	...	
Strongylus ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	
Ankylostomum ... ..	...	1	2	...	...	...	...	...	...	...	...	...	...	
Oxyuris ... ..	...	...	1	...	...	...	...	...	...	...	...	...	...	
Other Nematodes ... ..	...	...	1	...	...	1	1	...	...	...	...	...	...	
Insecta:—														
Insects producing myiasis ... ..	...	1	13	...	...	...	5	...	...	2	6	...	...	
Dermatophilus penetrans ... ..	...	...	10	...	...	...	16	...	...	...	12	...	...	
Other Insects ... ..	...	...	25	...	...	...	22	...	...	...	9	...	...	
Cause Unknown ... ..	...	...	...	...	...	...	...	1	...	...	...	...	...	
Total ... ..	27	836	5,064	27	19	826	5,085	38	23	988	5,005	15	17	

TABLE VII.

RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921,  
1922, 1923.

Diseases.	Remaining in Hospital at end of 1920.	1921.				Remaining at end of 1921.	1922.				Remaining at end of 1922.	1923.				Remaining at end of 1923.
		In Patients.		Deaths.	Out Patients.		In Patients.		Deaths.	Out Patients.		In Patients.		Deaths.	Out Patients.	
		Total Admissions.	Total Admissions.				Total Admissions.	Total Admissions.				Total Admissions.	Total Admissions.			
Infective Diseases.																
Beri-Beri ... ..	...	18	1	9	...	2	4	...	...	8	69	2	1			
Cerebro-Spinal Fever ... ..	...	77	91	2	5	1	1	1	...	268	4	25	10			
Chicken Pox ... ..	27	520	150	3	33	1,116	169	1	59	805	222	1	42			
Cholera ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...			
Dengue ... ..	...	...	1	...	...	...	...	...	...	...	9	...	...			
Diphtheria ... ..	...	1	...	1	...	...	1	...	...	...	...	...	...			
Dysentery :—																
(a) Amœbic ... ..	7	397	512	67	3	586	604	70	11	567	750	75	20			
(b) Bacillary ... ..	...	25	18	7	1	11	16	2	...	31	3	15	3			
(c) Type not determined ... ..	...	74	230	7	...	54	210	3	1	93	517	12	1			
Endocarditis-infective ... ..	...	5	...	2	...	...	1	...	...	1	3	1	...			
Enteric ... ..	1	8	...	4	...	5	...	3	1	6	1	2	...			
Erysipelas ... ..	...	...	18	...	...	...	...	...	...	4	2	1	...			
Gonorrhœa ... ..	24	745	2,541	2	23	602	2,565	4	37	914	3,482	4	43			
Influenza ... ..	7	46	76	3	1	122	562	3	8	179	749	12	4			
Kala-Azar ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...			
Leprosy :—																
(a) Nodular ... ..	35	488	36	26	432	26	43	14	159	344	82	9	188			
(b) Anaesthetic ... ..	...	36	13	...	14	33	15	41	242	495	36	27	194			
Malaria :—																
(a) Tertian ... ..	...	34	140	...	...	295	655	12	1	102	755	2	1			
(b) Quartan ... ..	...	...	...	...	...	2	1	...	...	...	1	...	...			
(c) Aestivo-autumnal ... ..	13	1,628	11,250	28	23	787	9,248	33	18	1,337	11,379	16	16			
(d) Chronic ... ..	...	23	152	4	...	12	361	1	...	58	360	54	...			
(e) Type not determined ... ..	...	36	722	3	...	98	1,147	...	...	128	1,963	58	3			
Blackwater Fever ... ..	...	2	3	1	...	4	...	1	...	8	3	8	...			
Measles... ..	...	14	44	...	...	15	51	1	...	20	90	14	1			
Papataci Fever ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...			
Plague ... ..	...	...	...	...	...	...	...	...	...	5	...	2	...			
Pneumonia ... ..	16	790	316	172	20	635	261	112	22	748	626	167	27			
Pyrexia of uncertain origin... ..	1	116	881	1	2	111	471	2	1	306	932	1	...			
Rabies ... ..	...	...	2	...	...	...	...	...	...	2	...	...	...			
Relapsing Fever ... ..	...	...	...	...	...	1	...	...	...	9	1	...	...			
Rheumatic Fever ... ..	...	11	77	...	...	9	39	...	1	20	1,084	2	1			
Septicaemia ... ..	1	23	1	16	...	10	5	9	...	19	16	13	1			
Small-pox ... ..	48	991	40	182	26	639	273	97	16	373	177	44	4			
Syphilis (a) Primary ... ..	3	144	270	1	7	100	295	2	2	201	362	3	13			
(b) Secondary ... ..	30	373	486	19	43	299	600	12	53	470	658	11	45			
(c) Inherited ... ..	...	6	23	1	...	1	40	1	...	19	17	...	2			
Tetanus... ..	2	29	9	16	...	36	8	22	...	36	27	17	2			
Trypanosomiasis (Sleeping Sickness) ... ..	1	21	5	6	1	13	1	4	2	29	39	9	3			
Tuberculosis ... ..	4	169	104	62	14	133	154	65	11	162	134	53	9			
Undulant Fever ... ..	...	...	...	...	...	...	...	...	...	...	12	...	...			
Whooping Cough ... ..	...	1	42	1	...	...	...	...	...	...	59	...	...			
Yaws .. ..	3	230	909	4	5	165	844	2	5	278	1,127	3	1			
Yellow Fever ... ..	...	...	...	...	...	1	...	...	...	...	...	...	...			
Other Diseases ... ..	1	67	144	9	15	18	686	...	...	29	200	5	...			



TABLE VII.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921,  
1922, 1923—continued.

Diseases.	Remaining in Hospital at end of 1920.	1921.				1922.				1923.				Remaining at end of 1923.
		In Patients.		Deaths.	Remaining at end of 1921.	In Patients.		Deaths.	Remaining at end of 1922.	In Patients.		Deaths.		
		Total Admissions.	Out Patients.			Total Admissions.	Out Patients.			Total Admissions.	Out Patients.			
Intoxications.														
Alcoholism ... ..	...	3	3	...	...	5	2	...	...	2	...	...	...	...
Morphinism ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Intoxications ... ..	...	2	8	1	...	...	2	...	...	...	...	...	...	...
General Diseases.														
Anæmia ... ..	10	90	1,559	3	6	68	116	5	2	79	1,980	3	3	3
Anæmia-Pernicious ... ..	...	...	...	...	...	...	...	...	...	4	3	...	...	...
Diabetes ... ..	...	2	3	...	...	1	15	...	...	...	11	...	...	...
Exophthalmic goitre... ..	...	...	1	...	...	...	...	...	...	1	3	1	...	...
Gout ... ..	...	...	2	...	...	...	1	...	...	...	6	...	...	...
Leucocythæmia ... ..	...	1	1	1	...	1	...	...	...	...	...	...	...	...
Lymphadenoma ... ..	...	...	...	...	...	1	...	1	...	...	...	...	...	...
Myxœdema ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Purpura... ..	...	...	...	...	...	...	...	...	...	1	...	...	...	...
Rickets... ..	...	...	1	...	...	...	4	...	...	1	3	...	...	...
Scurvy ... ..	...	1	1	...	...	...	4	...	...	...	6	...	...	...
Other Diseases ... ..	8	149	1,369	6	4	121	639	3	5	49	851	6	1	1
Local Diseases.														
DISEASES OF THE NERVOUS SYSTEM.														
Sub-section 1.—Diseases of the Nerves:—														
Neuritis ... ..	5	28	100	...	1	13	109	5	...	44	173	7	2	2
Meningitis ... ..	...	14	5	13	1	11	...	7	...	16	7	11	2	2
Myelitis ... ..	...	1	2	1	...	3	1	...	...	1	7	...	...	...
Hydrocephalus ... ..	...	...	1	...	...	1	1	1	...	...	2	...	...	...
Encephalitis ... ..	...	6	...	4	...	1	2	1	...	7	...	4	...	...
Abscess of brain ... ..	...	2	...	2	...	2	...	2	...	1	...	1	...	...
Congestion of brain ... ..	...	2	61	...	...	2	...	...	...	...	1	...	...	...
Other Diseases ... ..	...	7	...	3	...	10	45	3	...	17	...	1	1	1
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—														
Apoplexy ... ..	...	2	2	1	...	4	...	2	...	21	3	9	...	...
Neurasthenia ... ..	...	...	...	...	...	...	...	...	...	...	10	...	...	...
Paralysis ... ..	...	48	30	18	4	26	31	7	2	27	23	5	1	1
Chorea ... ..	...	1	1	...	...	2	...	1	...	2	2	1	...	...
Epilepsy ... ..	...	1	24	26	2	21	40	2	1	27	60	...	1	1
Neuralgia ... ..	...	1	217	2,197	...	134	2,141	...	...	251	2,780	...	2	2
Hysteria ... ..	...	6	6	1	...	7	8	...	...	4	4	...	...	...
Other Diseases ... ..	1	17	156	4	...	21	171	4	...	26	155	1	1	1
Sub-section 3.—Mental Diseases:—														
Idiocy ... ..	...	...	...	...	...	...	...	...	...	1	...	...	...	...
Mania ... ..	10	21	2	3	9	9	4	4	8	17	6	3	6	6
Melancholia ... ..	9	12	4	...	8	...	2	2	6	10	1	...	8	8
Dementia... ..	2	13	3	4	1	2	1	...	1	7	5	2	2	2
Delusional Insanity ... ..	1	5	4	...	2	4	2	...	2	19	6	6	3	3
Other Diseases ... ..	...	2	2	...	...	7	1	4	...	4	2	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE VII.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921,  
1922, 1923—continued.

[illegible]



TABLE VII.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921,  
1922, 1923—continued.

Diseases.	1921.				1922.				Remaining in Hospital at end of 1922.	1923.				Remaining at end of 1923.
	Remaining at end of 1920.	In Patients.	Out Patients.	Deaths.	Remaining at end of 1921.	In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.		
		Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.							
Local Diseases—contd.														
DISEASES OF THE DIGESTIVE SYSTEM—continued.														
Gastritis ... ..	2	65	841	...	2	57	731	1	2	47	730	1	...	...
Ulceration of stomach ...	...	...	23	...	...	2	...	1	...	1	5	...	...	...
Hæmatemesis ... ..	...	2	1	...	...	1	4	...	...	2	4	2	...	...
Dilatation of stomach ...	...	1	...	...	...	...	1	...	...	3	6	1	...	...
Stricture of stomach ...	...	2	3	...	...	1	...	...	1	...	4	...	...	...
Dyspepsia... ..	...	29	5,810	...	...	15	1,127	...	...	46	1,877	...	...	...
Enteritis ... ..	2	40	115	12	...	37	111	6	...	42	701	3	2	...
Appendicitis ... ..	...	9	10	...	1	10	7	...	...	12	11	3	...	...
Colitis ... ..	1	39	186	2	...	36	235	1	...	36	213	8	...	...
Ulceration of intestines ...	...	3	52	2	...	4	...	...	...	2	...	...	...	...
Sprue ... ..	...	...	...	...	...	...	...	...	...	...	7	...	...	...
Hernia ... ..	16	414	252	19	18	512	334	18	25	461	415	10	27	...
Diarrhœa ... ..	14	904	2,734	41	3	775	2,752	39	19	1,148	4,188	54	16	...
Constipation ... ..	1	148	10,214	...	...	82	9,827	2	...	147	14,180	1	...	...
Colic ... ..	2	208	3,250	2	1	90	2,933	1	...	198	3,199	...	...	...
Hæmorrhoids ... ..	...	35	286	1	1	41	274	1	1	54	293	1	1	...
Pancreatitis ... ..	...	...	5	...	...	...	...	...	...	...	...	...	...	...
Hepatitis—Acute ... ..	...	35	113	4	...	20	115	3	...	34	113	5	2	...
Abscess ... ..	1	8	19	3	...	30	47	2	2	89	153	10	1	...
Cirrhosis ... ..	...	14	5	4	1	12	2	10	1	16	14	10	1	...
Jaundice ... ..	...	16	20	1	1	22	30	2	2	24	58	...	1	...
Peritonitis ... ..	1	24	15	13	...	14	19	5	...	21	24	13	...	...
Ascites ... ..	2	47	22	9	4	16	31	7	1	29	23	10	1	...
Other Diseases ... ..	2	42	340	8	2	37	387	8	2	54	347	12	1	...
DISEASES OF THE LYMPHATIC SYSTEM.														
Splenitis ... ..	...	28	584	2	...	15	386	1	2	28	359	1	...	...
Inflammation of lymphatic gland ... ..	3	221	1,241	...	7	165	1,043	...	9	159	1,095	...	11	...
Suppuration of lymphatic gland ... ..	...	86	272	...	3	111	244	...	3	151	462	...	3	...
Lymphangitis ... ..	...	12	87	...	1	4	69	...	...	...	20	...	...	...
Elephantiasis ... ..	3	85	75	2	2	50	67	...	10	110	72	3	7	...
Other Diseases ... ..	1	17	45	1	1	9	21	...	1	42	140	...	6	...
DISEASES OF THE URINARY SYSTEM.														
Acute nephritis ... ..	...	28	25	5	...	15	40	10	2	32	49	10	...	...
Bright's Disease ... ..	...	21	18	8	3	14	10	6	1	18	20	7	1	...
Pyelitis ... ..	...	1	...	1	...	1	1	1	...	1	...	1	...	...
Calculus ... ..	...	...	...	...	...	2	...	...	...	1	4	1	...	...
Renal colic ... ..	...	...	...	...	...	...	1	...	...	3	...	...	...	...
Cystitis ... ..	...	37	129	2	...	20	103	1	...	40	130	1	2	...
Vesical calculus ... ..	...	1	1	...	...	1	...	...	...	...	1	...	...	...
Suppression ... ..	...	2	1	...	...	1	...	...	...	1	...	...	1	...
Hæmaturia ... ..	...	2	6	...	...	5	16	...	...	10	24	...	1	...
Chyluria ... ..	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Other Diseases ... ..	...	12	27	3	...	29	53	...	...	27	95	4	1	...

TABLE VII.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921,  
1922, 1923—continued.

Diseases.	Remaining in Hospital at end of 1920.	1921.				Remaining at end of 1921.	1922.				Remaining at end of 1922.	1923.				Remaining at end of 1923.
		In Patients.		Deaths.	In Patients.		Deaths.	In Patients.		Deaths.						
		Total Admissions.	Out Patients.		Total Admissions.			Out Patients.	Total Admissions.			Out Patients.				
Local Diseases—contd.																
DISEASES OF THE GENERATIVE SYSTEM.																
Male Organs:—																
Urethritis ... ..	1	7	52	...	...	3	58	...	...	6	120	...	...	1		
Gleet ... ..	...	4	49	...	...	3	112	...	...	25	59	...	...	...		
Stricture ... ..	6	95	201	9	8	82	227	8	6	117	366	4	...	8		
Prostatitis ... ..	...	5	3	...	...	5	3	...	...	5	17	1	...	...		
Soft chancre ... ..	7	78	222	...	8	88	286	...	10	101	422	...	...	2		
Condyloma ... ..	...	2	1	...	...	1	3	...	...	8	9	...	...	3		
Inflammation of scrotum	1	9	10	...	2	6	5	...	1	7	30	...	...	...		
Hydrocele ... ..	4	136	98	1	5	92	133	1	6	129	110	1	15	...		
Orchitis ... ..	2	81	207	1	1	73	211	...	2	92	269	...	...	1		
Epididymitis ... ..	1	52	110	...	...	31	86	...	1	42	63	...	...	1		
Abscess of testicle ...	...	3	19	...	1	2	12	...	...	5	42	...	...	...		
Other Diseases ... ..	1	79	101	1	1	94	136	2	4	72	151	1	...	9		
Female Organs:—																
Ovaritis ... ..	...	4	31	...	...	...	14	...	...	2	25	...	...	...		
Ovarian cyst ... ..	...	3	11	...	...	7	...	...	...	9	3	1	3	...		
Endometritis ... ..	1	15	140	...	...	7	103	2	...	39	36	...	...	...		
Displacement of uterus	...	3	9	1	1	2	8	...	...	25	7	...	...	...		
Vaginitis ... ..	...	3	50	...	...	7	35	...	...	32	45	...	...	3		
Amenorrhœa ... ..	1	3	94	...	...	1	58	...	...	5	64	...	...	...		
Dysmenorrhœa ... ..	...	11	117	...	...	2	125	...	...	30	144	...	...	...		
Menorrhagia ... ..	...	7	48	...	...	3	52	...	...	14	66	...	...	1		
Leucorrhœa ... ..	...	1	44	...	...	4	22	...	...	6	23	...	...	...		
Other Diseases ... ..	1	26	88	...	...	15	104	3	...	35	200	2	...	1		
AFFECTIONS CONNECTED WITH PREGNANCY.																
Abortion ... ..	1	11	54	1	...	10	51	1	...	38	66	1	...	1		
Other Affections ... ..	...	5	50	2	...	4	32	...	...	10	34	1	...	...		
AFFECTIONS CONNECTED WITH PARTURITION.																
Delayed Labour ... ..	...	20	14	7	...	34	4	4	...	39	6	6	...	6		
Retained placenta ... ..	...	6	6	2	...	1	4	...	...	11	8	1	...	...		
Premature Birth ... ..	...	3	9	...	1	3	3	...	...	8	7	...	...	...		
Other Affections ... ..	...	8	12	...	...	5	6	1	...	5	14	1	...	...		
AFFECTIONS CONSEQUENT ON PARTURITION.																
Post-partum hæmorrhage	...	1	1	...	...	...	4	...	...	2	1	...	...	1		
Puerperal septicæmia ...	...	2	4	2	...	3	1	2	...	3	2	3	...	...		
Mastitis ... ..	...	3	69	...	...	...	69	...	...	16	81	...	...	1		
Abscess of breast ... ..	...	2	9	...	...	7	15	...	...	11	14	...	...	...		
Other Affections ... ..	...	1	23	...	...	...	5	...	...	1	11	...	...	...		



TABLE VII.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921, 1922, 1923—*contd.*

Diseases.	Remaining in Hospital at end of 1920.	1921.				1922.				1923.				Remaining at end of 1923.								
		In Patients.		Out Patients.	Deaths.	Remaining at end of 1921.	In Patients.		Out Patients.	Deaths.	Remaining at end of 1922.	In Patients.			Out Patients.	Deaths.						
		Total Admissions.	Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.									
Local Diseases—contd.																						
DISEASES OF ORGANS OF LOCOMOTION.																						
Osteitis ... ..	3	32	309	1	3	35	187	1	3	37	236	1	4									
Arthritis ... ..	10	476	2,477	...	3	356	3,937	6	9	724	3,509	5	14									
Spondylitis ... ..	...	1	...	...	...	2	5	...	1	7	9	...	...									
Bursitis ... ..	...	33	96	...	...	19	115	...	3	34	294	...	...									
Myalgia ... ..	3	436	7,304	1	5	196	6,084	1	7	366	7,598	4	9									
Other Diseases ... ..	10	124	1,065	2	1	119	904	1	6	250	1,331	3	6									
DISEASES OF CONNECTIVE TISSUE.																						
Cellulitis ... ..	7	369	1,686	2	24	270	1,563	5	11	377	1,910	2	11									
Abscess ... ..	21	810	2,947	13	23	675	2,917	8	30	797	3,168	15	37									
Other Diseases ... ..	...	8	242	1	2	33	113	3	...	59	400	2	4									
DISEASES OF THE SKIN.																						
Ulcer ... ..	45	1,523	14,957	3	58	1,511	12,997	7	66	1,915	22,054	10	57									
Urticaria ... ..	...	2	109	...	...	3	209	...	...	15	243	...	...									
Eczema ... ..	1	57	1,628	...	...	43	2,419	...	...	39	1,874	...	2									
Boil ... ..	...	120	1,648	...	3	82	1,530	...	2	145	1,904	...	13									
Carbuncle ... ..	...	7	8	...	...	8	22	...	1	9	25	...	...									
Herpes ... ..	...	3	92	...	...	7	70	...	...	13	66	...	...									
Psoriasis ... ..	...	1	55	...	1	...	12	...	...	4	27	...	...									
Craw-Craw ... ..	...	...	...	...	...	...	...	...	...	...	1	...	...									
Oriental sore ... ..	...	...	...	...	...	...	...	...	...	4	...	...	...									
Tinea ... ..	...	48	2,314	...	...	6	2,235	...	...	22	2,671	...	...									
Scabies ... ..	5	104	3,200	...	...	65	3,889	...	...	82	2,956	...	...									
Acne ... ..	...	...	14	...	...	...	17	...	...	...	15	...	...									
Prickly heat ... ..	1	2	8	...	...	2	49	...	6	47	162	...	...									
Other Diseases ... ..	5	69	1,433	1	1	46	1,189	...	2	59	3,896	...	3									
INJURIES.																						
General ... ..	1	49	92	19	4	60	305	11	1	206	745	13	18									
Local ... ..	54	2,148	25,542	40	70	1,543	25,234	59	64	2,039	30,757	62	99									
TUMOURS.																						
Benign ... ..	4	128	188	3	6	75	284	...	2	98	281	...	1									
Malignant ... ..	1	35	24	3	1	14	7	2	...	35	38	8	2									
MALFORMATIONS ... ..	...	7	14	1	...	7	10	...	...	16	29	...	...									
POISONS.																						
Vegetable ... ..	...	4	2	...	...	...	...	...	...	2	2	...	1									
Animal ... ..	...	13	44	3	2	11	54	1	...	27	155	3	...									
Other Poisons ... ..	...	10	34	1	...	10	49	3	...	4	44	...	...									
PARASITES.																						
ANIMAL PARASITES.																						
Protozoa ... ..	...	...	2	...	...	...	...	...	...	1	2	...	...									
Trematoda (Flukes) ... ..	...	7	4	...	...	18	21	1	2	36	22	...	3									

TABLE VII.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR THE YEARS 1921, 1922, 1923—continued.

Diseases.	1921.				1922.				Remaining in Hospital at end of 1922.	1923.			Remaining at end of 1923.
	Remaining at end of 1920.	In Patients.	Out Patients.	Deaths.	Remaining at end of 1921.	In Patients.	Out Patients.	Deaths.		In Patients.	Out Patients.	Deaths.	
		Total Admissions.	Total Admissions.			Total Admissions.	Total Admissions.						
Local Diseases—contd.													
Cestoda :—													
Tænia solium ... ..	...	9	144	1	...	12	222	...	...	7	376	...	...
Tænia saginata ... ..	...	68	1,168	...	...	32	1,055	...	1	54	2,425	...	...
Other Cestodes ... ..	...	...	43	...	...	3	47	...	...	2	35	...	...
Nematoda :—													
Ascaris ... ..	1	90	2,908	...	1	115	2,468	2	...	94	3,224	...	2
Tricocephalus dispar ... ..	...	...	...	...	...	1	...	...	...	...	7	...	...
Trichina ... ..	...	...	1	...	...	...	...	...	...	...	...	...	...
Dracunculus ... ..	4	244	596	1	8	301	901	1	13	512	1,151	...	19
Filaria ... ..	...	36	232	...	1	59	191	2	7	62	353	1	...
Strongylus ... ..	...	...	...	...	1	...	...	...	...	...	...	...	...
Ankylostomum ... ..	8	197	187	30	6	168	218	28	9	228	377	28	13
Oxyuris ... ..	...	...	8	...	...	5	11	...	...	...	20	...	...
Other Nematodes ... ..	...	13	17	1	1	18	19	...	...	14	16	...	...
Insecta :													
Insects producing myiasis ... ..	...	...	5	...	...	1	2	...	...	4	7	...	...
Dematophilus penetrans ... ..	...	8	161	...	...	3	121	...	...	11	140	...	...
Other Insects ... ..	...	7	82	1	...	4	35	...	...	...	76	...	...
Total ...	570	20,584	151,226	1,114	1,027	16,477	144,319	953	1,097	23,245	190,081	1,073	1,174

TABLE VIII.—SURGICAL OPERATIONS.

					1921.	1922.	1923.
Total Number	...	...	...	...	3,949	2,503	4,201
Number Cured	...	...	...	...	3,540	2,007	3,579
Relieved	...	...	...	...	312	410	517
Not Relieved	...	...	...	...	32	51	41
Number of Deaths...	...	...	...	...	65	35	64





## APPENDIX I.

### ANNUAL REPORT ON THE MEDICAL RESEARCH INSTITUTE FOR THE YEAR 1923.

#### BLACKWATER FEVER.

Blackwater fever, or Hæmoglobinuric fever has been the subject of much controversy with regard to its causation. As experience has grown and careful observations and records have accumulated, the balance of evidence has swung more and more definitely to the malarial origin of the disease. Nevertheless, from time to time, new theories arise and other parasites are described as of pathogenic importance.

Blackwater fever has one sign common to all cases, that is the passing of urine which is coloured some shade of red or brown according to the amount of blood-colouring matter it contains and dependent on the time at which the urine is voided after having reached the bladder. But the sequence of events, the nature of the onset, the number and the severity of the general signs and symptoms, the course of the disease, all these vary within fairly wide limits in different cases, in West Africa, at any rate. That these are dependent on individual idiosyncrasy and are influenced by the amount and degree of previous malarial infection, attacks, moreover, for the most part inefficiently treated, is probably the correct view, but this very lack of uniformity has led many observers to seek for other explanations.

One of the most recent papers on the subject, contributed by Dr. Lefrou and Dr. Blanchard, describes the finding of spirochaetes in the blood of several cases of blackwater fever, which occurred in French Congo. These observers, by using the method of triple centrifugation of the blood, isolated *Leptospira* from the third deposit, which they were successful in transferring to guinea-pigs.

During the year under review, an opportunity was afforded at Yaba of examining four cases of the disease by this method. Three of these occurred in Lagos (one was probably a simple hæmoglobinuria) and one in Abeokuta. The technique consists in withdrawing a certain quantity of the patient's blood from a vein, into a measured amount of a solution of Citrate of Sodium of a definite strength, in a tube.

The mixture is then centrifugalised, the rate and the time being controlled. The first sediment which consists mainly of red and white cells is discarded.

The supernatant fluid is again centrifugalised during which the remainder of the red cells and most of the blood-platelets are brought down. The second deposit is also thrown away, and the fluid is centrifugalised a third time. The deposit, on this occasion contains some blood-platelets and any spirochaetes which may be present.

In all the four cases investigated by this method, structures were readily found which by the dark-ground illumination of wet films closely resembled spirochaetes. The deposit in each case was submitted to other tests, smears were fixed and stained by Giemsa's process and also by Fontana's preparation, cultures were made and guinea-pigs were inoculated. The staining methods failed to reveal spirochaetes, the attempts at cultivation in artificial media were negative, and although spirochaete-like structures were seen in the blood of the inoculated guinea-pigs, the animals themselves, with one exception showed no ill-effects. In the first case of blackwater fever five series of sub-inoculations were carried out from guinea-pig to guinea-pig, a similar number in the second and third cases, and four series in the last case. In the second case, one guinea-pig in the third series of sub-inoculations, showed a blood-serum stained distinctly pink after centrifugalisation. This however, was almost certainly due to artificial laking. The failure to demonstrate spirochaetes except by dark-ground illumination directed attention to the examination of the blood, in health and in disease both in human beings and in laboratory animals.



About this time word was received that Dr. J. G. Thomson of the School of Tropical Medicine, London, was investigating the condition in Rhodesia and held the belief that the structures described were "pseudo-spirochaetes" and unconnected with the illness. The blood of five Europeans was examined, two of whom had suffered from black-water fever in the past, one who was recovering from amœbic dysentery, and two who were convalescent from sub-tertian malaria. A native who harboured *Filaria loa* was also included. In addition to these, the blood of six monkeys and eight guinea-pigs was also examined. The "pseudo-spirochaetes" were readily found in all cases. The slowness of their movements, the small number and irregularity of their spirals and the fact that they are not highly refractile draw attention to their non-parasitic nature. The structures were of two main types, one short and thick with few curves, the other longer and thinner and with a wavy rather than a spiral outline. Latterly, some of the finer type were seen being detached from blood-platelets, and some of the shorter forms appeared to be formed from the red cells after these had been anchored to the slide and had thereafter been freed by currents in the film. In view of these findings and in complete agreement with Dr. Thomson's conclusions, there appeared to be no adequate grounds for relinquishing the previously held belief that blackwater fever is dependent on previous malaria. Indeed the records of cases of this disease occurring in Nigeria during 1923, continue to add proof to the hypothesis.

Reports of only twelve cases were received but five or six others occurred details of which for various reasons have not been furnished.

The various data have been analysed as in previous years and the salient features are herewith presented. All the patients were male adults of British birth. Seven cases occurred in the Northern Provinces, four in the Southern Provinces and one in the British Cameroons. The towns in or near which the patients fell sick are Jos three, Onitsha two, and Ahoada, Bamenda, Ibadan, Ibi, Kaduna, Kano and Zaria, one case each.

The months in which the disease was noted are January, February, March two cases, April, June three cases, August two cases, September and October.

The age of the patient was twenty-four years (two cases), twenty-eight years (two cases), twenty-nine years, thirty-three years (two cases), thirty-four years, thirty-eight years, forty-five years, forty-nine years and fifty-five years.

Six were Government Officials, three belonging to the Provincial Administrative Department, and three engaged on railway work. Of the non-officials two were in the tin-industry, three followed mercantile pursuits and one, banking.

All the individuals had considerable previous tropical experience, except in one case, as is shown in Table I.

TABLE I.

No.	Total time in Nigeria.	Period resident since leave.	Period in other parts of the tropics.
1	4 years ...	11 months ...	None.
2	17½ months ...	17½ months ...	Rhodesia, Nyassaland, Congo Belge, 1 year.
3	3 years ...	3½ months ...	None.
4	2 years ...	6 months ...	None.
5	11 years ...	12 months ...	None.
6	3 years ...	16 months ...	Salonika, Turkey, during the war.
7	3 months ...	...	None.
8	16 months ...	...	India, Arabia, during the war.
9	3 years ...	12 months ...	India, 6 years.
10	10 years ...	2 years ...	None.
11	11 years ...	7 months ...	None.
12	6 years ...	5 years ...	Rhodesia, Portuguese East Africa, 20 years.



There was thus a sufficiently long period of residence in malarious areas for each to acquire a malarial infection. In fact, with the exception of Case (7), there is a definite history of one or more attacks of malaria in all the subjects. As regards the exception, two attacks of dysentery were contracted in the three months' period of his residence in Nigeria, but there was no history of any other illness. The details of each case are to be seen in Table II.

TABLE II.

- Case (1) Six bad attacks of malaria. Often "slight fever" this tour.
- Case (2) Nine or ten attacks of fever this tour. Several in Nyassaland.
- Case (3) Two attacks of enteritis with malarial parasites in blood, this tour.
- Case (4) A number of mild attacks of malaria.
- Case (5) Had no malaria for years.
- Case (6) Many small attacks of malaria.
- Case (7) No history of malaria.
- Case (8) Frequent attacks of malaria.
- Case (9) Two or three small attacks of malaria in last two months.
- Case (10) Exceptionally healthy. Occasional malaria.
- Case (11) Several attacks of malaria, one within 14 days of illness.
- Case (12) Much fever.

As regards quinine prophylaxis, this drug was for the most part neglected. Table III gives particulars.

TABLE III.

- Case (1) Takes 10 grains thrice daily for a few days when he has fever.
- Case (2) 5 grains quinine Hydrochloride daily.
- Case (3) Takes quinine regularly.
- Case (4) Takes quinine Bihydrochloride in varying doses at irregular intervals.
- Case (5) Took no quinine.
- Case (6) 5 grains Hydrochloride, very regularly.
- Case (7) 5 grains quinine irregularly.
- Case (8) 5 grains Hydrochloride, irregularly.
- Case (9) No quinine for one month before illness.
- Case (10) Took no quinine.
- Case (11) 5 grains daily, regularly.
- Case (12) 5 grains regularly for a year previous to illness, sometimes 10 grains.

These Tables (Tables II and III) show clearly that the patients (five, in all) who professed to take quinine regularly as a prophylactic against malaria were not thereby protected.

The possible reasons for this lack of protection are many but the most likely explanations are some looseness in the use of the term "regular", and a neglect of other precautions particularly the use of mosquito boots. In at least one case (Case 3) the inefficiency of the quinine was due to a chronic gastritis which interfered with the absorption of the drug. In the remaining seven cases, quinine was used either irregularly or not at all. It strongly emerges, from a study of the two tables that in eleven out of twelve cases there is a history of malarial attacks and inadequate quinine prophylaxis. It may be inferred that the malarial infection in several cases was inefficiently treated.

The data respecting quinine as a possible precipitant or excitant of the actual condition of hæmolysis are set out in Table IV.



TABLE IV.

Case.	Salt.	Days.	Dosage.		Total.	Last Dose.	Interval.
1	Hydrochloride	2	10 grains in solution twice daily	...	40 grains	10 grains	15 hours.
2	"	3	10 grains on each of 2 days, 10 grains twice	...	"	"	4 "
3	?	1	8 grains	...	8 "	8 "	12 "
4	Bihydrochloride	2	30 grains daily	...	60 "	?	?
5	"	1	5 grains	...	5 "	5 grains	12 hours.
6	Hydrochloride	4	20 grains on each of 2 days, 15 grains, 20 grains	...	75 "	10 "	14 "
7	Bisulphate	1	5 grains and 10 grains	...	15 "	10 "	12 "
8	Hydrochloride	?	?	...	?	?	6 "
9	?	$\frac{1}{2}$	5 grains, in solution 4 hourly	...	20 grains	5 grains	8 hours.
10	Hydrochloride	1	10 grains	...	10 "	10 "	12 "
11	"	1	5 grains in solution	...	5 "	5 "	7 "
12	"	1	15 grains in solution	...	15 ,	15 "	2 "

In the above table, the third column "Days" refers to the period before the onset of blackwater, during which quinine was being taken. In the fourth column, in cases (2) and (6) the dosage is given from the first day to the last day of its administration. In the last column "Interval" refers to the time which elapsed between the taking of the last dose of quinine and the first appearance of hæmoglobinuria.

It will be seen that in two cases, the total amount of quinine taken within twenty-four hours of the appearance of blackwater, was 5 grains. In the first of these the patient was not in the habit of taking quinine, and in the second, it was the usual daily prophylactic dose.

A definite history of previous attacks of blackwater fever was obtained in one case only, Case (12), one attack having occurred in 1902 and a second in 1903, both whilst the patient was in Rhodesia. In Case (2), however, there was information that whilst on active service in Russia during 1916, there was an illness lasting two weeks during which "Red water" was passed and jaundice was noted but no rise of temperature. He had then not been previously in the tropics.

There was complete recovery from the present illness in both of these cases.

The premonitory signs and symptoms of the disease vary in the different reports. In some there was a period of malaise, which was usually attributed to malaria and led to the taking of quinine. This period varied from one to four days, but in two cases it had been a matter of weeks.

In Case (1) the patient had been taking 10 grains of quinine twice daily for two days before the onset of hæmoglobinuria, so that presumably he had felt out of sorts.

The history is similar in Case (2). There was fever for two days, for which quinine was taken.

In Case (3) a long period of gastritis with vomiting and diarrhoea probably masked any prodromata.

The previous history could not be obtained in Case (4), as when the patient was reached after some days' travelling, he was delirious and his illness ended fatally.

Somewhat similar circumstances explain the lack of information in Case (5).

In Case (6) an attack of "fever" came on four days before the onset of blackwater, and the patient appeared to have completely recovered from this during the morning of the day in the evening of which hæmoglobinuria occurred.

An "out of sorts" feeling preceded by three days the appearance of blackwater in Case (7) and on the actual day before, the patient thought he had a "touch of sun."

In Case (8) there are no notes as regards onset.

The patient in Case (9) had been in hospital under treatment for malaria for two days before hæmoglobinuria set in.

In Case (10) there was malaise on the previous day.



An attack of fever a fortnight before, had left the patient in Case (11) "not feeling well."

In Case (12) the patient had felt ill for weeks.

The course of the illness also varied within fairly wide limits, apart altogether from the occurrence of remissions or relapses. In most instances there was a well-marked rigor usually preceding but sometimes following the appearance of blackwater. Vomiting took place in most, but not in all; it was mild in some and severe and protracted in others. Diarrhoea occurred in a few cases, usually early in the attack. Jaundice was noted in practically all, mostly on the first day of the actual illness.

Enlargement of the spleen and tenderness over the right hypochondriac area were observed in more than half of the cases. Headache was a frequent symptom and loin pains were less commonly complained of.

A temperature chart was supplied in ten cases. As it is not possible to reproduce these, the bare figures are given, the highest temperature for each day only being noted.

Case (1) 1st day 101.4° F., 2nd 101° F., then normal.

Case (2) 2nd day 103° F, 3rd 100° F, then normal.

Case (5) 1st day 103.4° F, 2nd 102.4° F, 3rd 100.4° F, 4th 100.2° F, 5th normal, 6th 100° F, 7th 102° F, 8th 100.2° F, 9th 105.8° F, 10th 102.4° F, 11th normal, 12th 100.4° F, 13th 102.4° F.

Case (6) 1st day 99.8° F, then normal.

Case (7) 1st day 103° F, 2nd 101.4° F, 3rd 101.6° F, then normal.

Case (8) 1st day 103.6° F, 2nd 102.8° F, 3rd 102.8° F, 4th 101.2° F, 5th 102.4° F, 6th 101.4° F, 7th 100.6° F, 8th 100° F, 9th 99.4° F, then normal.

Case (9) 1st day 102° F, then normal.

Case (11) 2nd day 102° F, 3rd 101° F, 4th 103° F, 5th 100.2° F, 6th 100° F, 7th 100.8° F, 8th 100.8° F.

Case (12) 6th day 104° F, 7th 102.6° F, 8th 101.4° F, 9th 100.8° F, 10th 100.8° F, 11th 101° F, 12th 99.6° F, 13th 100° F, 14th 100° F, then normal.

In Case (10) the patient was first seen on the 5th day of illness and from then onwards until his death on the 7th day the temperature varied between 97.2° F and 98.2° F.

A study of these data shows that in two cases the temperature became normal on the second day, on the third day in one case, on the fourth in two cases and on the tenth and fifteenth day each in one case. There was a relapse in Cases (5) and (11), in which the febrile state was prolonged.



The duration of hæmoglobinuria, in cases in which there was neither remission nor relapse and in which there was no suppression, was twenty-four hours (Cases (6) and (9)) forty-eight hours, (Cases (3) and (7)) sixty hours, (Case (2)) and ninety-six hours (Case 8)). Relapses occurred in four cases. In Case (1) the first period of hæmoglobinuria lasted just over six hours. After a seven hours' interval and following a rigor, the urine was again porter-coloured and it did not clear until thirty-nine hours later. In the interval the temperature had fallen, but it rose again during the relapse. The total period of hæmoglobinuria was forty-five hours, and recovery was rapid. In Case (5), the initial period of passing black water was seventy-two hours. The urine cleared gradually but remained "smoky" until the ninth day, when it again became very dark. During the ensuing five days hæmoglobinuria was persistent and the patient died on the thirteenth day of illness. This case might be described as one showing a remission. The temperature gradually fell from the second day to the sixth day, when it was normal but it immediately rose again regaining normal on the eleventh day and fluctuating thereafter until the thirteenth day. In Case (11) the initial hæmoglobinuria completely disappeared after ninety-six hours. The urine remained clear for forty-eight hours, but became dark red again and remained so for thirty-six hours, when death took place. There was some abatement of the fever when the urine became clear, the temperature then being about 101° F and it showed no rise when the relapse occurred. A series of relapses characterised Case (12). The first period of hæmoglobinuria lasted thirty-six hours. Forty-eight hours later the red colour returned and persisted for twenty-four hours. At the end of the sixth day of illness, after the urine had been clear for twenty-four hours, there was a relapse lasting seven-and-a-half hours. Two days later the urine was again reddish for four hours. On the tenth day, after a two days' interval of freedom there were two relapses the first lasting four hours in the early morning and the other nine-and-a-half hours in the latter part of the day. And again on the following day two relapses occurred one lasting twelve hours and the other about two hours. The final relapse was noted at the end of the twelfth day but only one coloured specimen was passed, and progress was steadily maintained thereafter. The temperature was febrile during all this time but was steadily falling and the normal line was reached on the day after the last relapse occurred.

As already noted death occurred in two of these relapsing cases, Nos. (5) and (11).

In the two cases, in which suppression occurred and death followed, the hæmoglobinuria was obvious for the first twenty-four hours in Case (4) and thereafter no urine was passed. In Case (10) hæmoglobinuria was observed on the morning of the first day. Thereafter no urine was passed until the fifth day when two drachms of port-wine urine were passed, after which there was complete suppression. The illness lasted seven days in Case (4) and six days in Case (10).

Albuminuria, as a rule cleared up within twenty-four hours of the disappearance of the hæmoglobinuria but in Case (1) it persisted forty-eight hours, in Case (6) for seventy-two hours, and for six days in Case (8), after the urine had regained a normal colour.

The blood was examined in nine cases. The results are shown in Table V from which it will be seen that the parasite of subtertian malaria was found in only one instance, Case (8) and that by the medical officer in attendance.

Smears were received at the Medical Research Institute from seven of the cases.



TABLE V.

500 leucocytes counted for differential } counts.  
250 polymorphs counted for Arneith }

Case	Day	Para.	Pig.	P.	S.	L.	M.	E.	T.	Ma.	My.	Ery.	Vac.	Nor.	Meg.	I.	II.	III.	IV.	V.
1	1st ...	0	0	69.4	3.8	1	20.8	0.2	3.6	0	1.2	1	1	0	0	79.6	16.8	3.6	0	0
	2nd ...	0	0	64.4	11.4	3	16	0	3.2	0.2	1.8	1	3	0	0	77.2	17.2	5.6	0	0
	3rd ...	0	0	61	14.4	3.8	15.4	0.6	2.2	0.6	2	0	2	3	0	65.2	26.8	7.6	0.4	0
2	1st ...	0	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	2nd ...	0	0	58.4	21	4.6	13.6	0	2.2	0.2	0	0	6	0	0	71.6	24.4	4	0	0
	3rd ...	0	0	62.2	11.4	2.6	19.2	0	3.8	0	0.8	0	0	0	0	45.2	39.6	14.8	0.4	0
	4th ...	0	0	66.6	17.6	4.4	7.6	0.6	2.6	0	0.6	0	0	0	0	57.6	34.4	7.6	0.4	0
	5th ...	0	0	52.6	9.8	4.2	20.6	4	2.4	0.2	6.2	0	0	3	6	54.8	33.6	11.6	0	0
	9th ...	0	0	65	7.6	3.6	19	0.2	3.2	0	1.4	0	0	0	3	64	30.4	5.2	0.4	0
	10th ...	0	0	81.4	6.4	1.8	6	0.6	3.4	0	0.4	1	0	0	0	62.8	29.6	7.6	0	0
6	1st ...	0	0	76.2	5.8	1.6	12.2	1.2	2.6	0	0.4	0	0	0	0	70.4	23.2	5.6	0.8	0
	2nd ...	0	0	70.6	7	2	11.8	4	2.8	0.2	1.6	0	0	0	0	72	22	5.2	0.8	0
	3rd ...	0	0	68	7	1.8	14.6	4.8	2.6	0.6	0.6	0	0	0	0	69.6	24	6	0.4	0
	4th ...	0	0	59.6	14	4.6	10.4	4.4	1.8	0.4	4.8	1	0	0	0	54	30	13.2	2.8	0
	5th ...	0	0	63.8	11.8	2.6	12	4.2	2.2	0.2	3.2	0	3	0	0	48	28.8	18.8	4	0.4
7	2nd ...	0	0	64.8	18.2	3.8	11.6	0	1.6	0	0	0	0	0	0	79.2	16.8	4	0	0
8	1st ...	+	+	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5th ...	+	+	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	5th ...	0	0	59.8	15.2	2.2	16.6	1.2	3	0	2	0	0	1	0	56	26	15.2	2.4	0.4
11	2nd ...	0	0	76	9.2	2.2	11.6	0	0.8	0	0.2	0	2	0	0	61.2	30.8	7.6	0.4	0
	3rd ...	0	0	67	10	3.4	16.4	0	2.2	0	1	0	15	0	0	49.6	29.6	17.6	3.2	0
	4th ...	0	0	62.8	13.2	4.4	15.8	0	2.4	0	1.4	0	4	1	0	50.8	31.6	15.6	2	0
	5th ...	0	0	63.4	18.6	3	7.4	0.4	5.8	0	1.4	0	7	1	0	59.2	28.4	9.6	2	0.8
	6th ...	0	0	67.2	12.6	4.4	9.6	2.2	2.2	0	1.8	0	0	0	0	50.4	29.2	16.4	3.6	0.4
12	6th ...	0	0	48.4	8.8	4.8	36	0.4	0.8	0	0.8	0	6	1	0	64	22	9	5	0
	14th ...	0	0	43.6	20	7.2	23.2	0.8	2.8	0	2.4	0	0	2	4	64.4	24.4	11.2	0	0

"Day" refers to onset of haemoglobinuria. Para=Parasites (subtertian malaria). Pig=Pigment. P=Polymorphonuclear neutrophils. S=Small lymphocytes. L=Large lymphocytes.  
M=Mononuclears. E=Eosinophils. T=Transitionals. Ma=Mast cells. My=Myelocytes. Ery=Erythrocytes. Vac=Vacuolated mononuclears. Nor=Normoblast.  
Meg=Megaloblasts.

The Roman numerals refer to Arneith's divisions.



## RELAPSING FEVER.

Relapsing fever made its reappearance in Lagos during the year. The sole previous authenticated record of its occurrence was in 1910, when, on July 23rd, spironemata were found, at this Institute, in the blood smear from a native patient in the Colonial Hospital at Lagos. It is true that on rare occasions since that date, cases of "Relapsing Fever" have been reported both in Europeans and in natives, from the Northern as well as from the Southern Provinces of Nigeria, but the diagnosis was not based on findings at this laboratory. It is possible that what was really meant was the relapsing type of malarial fever.

Fortunately the outbreak in 1923 was a small one. The first case was diagnosed on 11th July, the second on 12th September, the third on 13th September, the fourth on 15th September, the fifth on 19th October, the sixth on 9th November and the seventh on 27th November. Five of these seven cases were diagnosed during life, and all recovered under treatment in hospital. The remaining two were both admitted to hospital in a moribund state and the diagnosis was made from post-mortem findings. Cases (1), (3) and (4) all received a single dose of Salvarsan. Cases (5) and (6) were given a single dose of Novarsenobillon with happy results, although in Case (5) it was not administered until a relapse had occurred.

Excluding Cases (2) and (7) in which death took place a few hours after admission to hospital, the clinical course of the disease presented no unusual features. Prostration was marked and there was intense headache, with general body pains. The spleen was moderately enlarged in all the cases.

In connection with the much larger outbreak of the disease in the Gold Coast, it is interesting to note that five of Lagos cases occurred in "Zabarumas," or, as they are called in the Gold Coast Report "Zabramahs," a people inhabiting the hinterland to the north of Nigeria. The first case, however, was that of a labourer belonging to the Public Works Department, who for five years previously had never been out of Lagos.

The causative organism, a *Spironema*, was readily found in all the cases. In five instances, only one smear was obtained, in one case blood films were taken on three successive days and in another, films were made on four successive days. In its morphology and in its behaviour in laboratory animals, the spironema agrees closely with that described in the Gold Coast epidemic. Twenty organisms in each smear, with the exception of one case in which only a very few spironemata were found in a spleen-smear made post-mortem, were drawn with the aid of the camera-lucida and afterwards measured by compass. The details of these are set out below.

Case (1). Yesufu. Male. Age about thirty years. Labourer. The shortest was 13.5 microns, the longest 27 microns and the average length 17.5 microns.

Case (2). Isa. Male. Age about thirty years. Carrier. The shortest was 7.5 microns, the longest 19.5 microns, and the average length was 13 microns.

It should be noted that the smear from which these measurements were taken, was made from the brain, post-mortem.

Case (3). Yahaya. Male. About twenty-two years of age. Carrier.

13/9/23. Shortest 13 microns, longest 29.5 microns, average 20 microns.

14/9/23. Shortest 12 microns, longest 23.5 microns, average 16 microns.

15/9/23. Shortest 11 microns, longest 26 microns, average 19 microns.



Case (4). Brimah. Male. Age about twenty years. Carrier.  
The shortest was 10 microns, the longest 25 microns and the average length was 16 microns.

Case (5). Dogo Yaro. Male. Age about thirty-five years. Carrier.

26/10/23. Shortest 13.5 microns, longest 27 microns, average 20 microns.

27/10/23. Shortest 11 microns, longest 29 microns, average 18.5 microns.

28/10/23. Shortest 13 microns, longest 33 microns, average 19 microns.

29/10/23. Shortest 14.5 microns, longest 31 microns, average 21.5 microns.

Case (6). Abudu. Male. Age about twenty-two years. Carrier.  
The shortest was 11.5 microns, the longest 31 microns and the average length was 21 microns.

In addition to these, smears from two other cases of the disease were kindly sent by Dr. Cauchi. One of the cases occurred at Kaduna in November. The shortest organism was 13.5 microns, the longest 27 microns and the average length was 19.5 microns: The other case occurred at Kontagora in December. The shortest spironema was 14 microns, the longest 30 microns and the average length was 20 microns. The breadth of the organism in all the cases was about 0.3 microns. In Cases (3) and (5) it was noted that coiled, looped or bent forms were numerous on the second and third days. No attempt was made to count the spirals. In such forms as were observed to be dividing, the process was always by transverse division, although occasionally the two halves were bent back into such close apposition as to simulate longitudinal division. The organism tapered gradually at both extremities to a fine point. In fresh blood, under the microscope, the movements noticed were of two kinds, one a very rapid darting to and fro, impossible to follow, the other in which a fine tremor occurred with more or less rotation in the long axis. The spironemata stained readily, were well shown up with Giemsa and were particularly prominent with Fontana.

Cultivation. 10 c.c. of citrated blood from Case (3) and a similar quantity from Case (4) were incubated at 37.5 C but no growth took place. At the end of seventy-two hours groups of motionless spironemata were found under the microscope, which was an interesting result, inasmuch as both patients had received an intravenous injection of Salvarsan, a few hours previous to the collection of their blood. On the fourth day, two c.c. of the culture from Case (3) were given intraperitoneally to monkey No. 1, and a similar amount from Case (4) was given by the same route to monkey No. 2. Neither of these animals showed any reaction, and, in daily examinations of their blood during the ensuing fortnight, no spironemata were seen. However, five weeks later, along with four other monkeys, they each received 2.5 c.c. of blood intraperitoneally from Case (5). The two previously inoculated monkeys (*Cercopithecus tantalus*) showed no reaction whilst the four fresh monkeys (also *Cercopithecus*) developed an infection rapidly. Very possibly, therefore, the previous injection served as a protective vaccination. The other attempt at cultivation was more successful. The medium used was that recommended by Wenyon for the cultivation of protozoa (fresh rabbit's blood in saline with a small percentage of agar, the mixture having a definite P.H.), and as the patient, Case (5) had received no treatment, growth readily took place at a temperature of 37.5 C in the incubator. The tubes rapidly became contaminated, however, after several examinations.



Animal transmission. Three guinea-pigs were inoculated intraperitoneally with 1 c.c. citrated blood from Case (3), two guinea-pigs were similarly treated from Case (4), and, as above noted, monkeys No. 1 and No. 2. The results were negative in all. Monkeys Nos. 3, 4, 5, and 6 were inoculated intraperitoneally with 2.5 c.c. of citrated blood from Case (5). At the same time, two fresh guinea-pigs received an injection by the peritoneal route, of 2 c.c. blood from the same case. Monkey No. 3 was positive one day later, and two days later monkeys Nos. 4, 5 and 6 were also positive. In all four the injection lasted four days, monkey No. 3 clearing up one day before the others. No relapse was observed in any although the blood was examined daily for twenty-one days after the primary infection. The guinea-pigs did not at any time exhibit signs of illness nor were the organisms found in the blood.

The spironemata in the four monkeys were also measured, as in the human cases, and the figures are given below.

Monkey No. 3 inoculated 26/10/23 from Case 5.

27/10/23. Only one spironema seen in blood smear.

28/10/23. Only two spironemata seen in blood smear.

29/10/23. Shortest 12.5 microns, longest 31 microns, average 20 microns.

30/10/23. Shortest 13 microns, longest 26.5 microns, average 19 microns.

Monkey No. 4, as No. 3.

28/10/23. One spironema seen in blood smear.

29/10/23. Shortest 15.5 microns, longest 32 microns, average 22 microns.

30/10/23. Shortest 11 microns, longest 28 microns, average 19 microns.

31/10/23. Shortest 13 microns, longest 31 microns, average 18.5 microns.

Monkey No. 5 as Nos. 3 and 4.

28/10/23. Shortest 13 microns, longest 26.5 microns, average 19 microns.

29/10/23. Shortest 14.5 microns, longest 28 microns, average 20 microns.

30/10/23. Shortest 13.5 microns, longest 29 microns, average 20 microns.

31/10/23. Shortest 13 microns, longest 22.5 microns, average 17 microns.

Monkey No. 6, as Nos. 3, 4 and 5.

28/10/23. Two spironemata seen in smear.

29/10/23. Shortest 15 microns, longest 32 microns, average 24.5 microns.

30/10/23. Shortest 13 microns, longest 34 microns, average 22 microns.

31/10/23. Shortest 16 microns, longest 32 microns, average 23 microns.

It will be seen that although the average length of the organism in the human cases and in the monkeys varies between 13 microns (in a human case, post-mortem) and 24.5 microns (in monkey No. 6), yet considering the small number of spironemata measured, the averages agree fairly closely.



Experiments with lice and bugs. On 15/9/23 eight lice (*Pediculus humanus*) which were recovered from the room in which the patient in Case (3) slept, were fed on two guinea-pigs. The animals remained healthy. On 17/9/23, thirteen lice obtained from the clothing, in Case (4) were fed, some on a monkey, some on a guinea-pig. No infection resulted. On 18/9/23 all of these twenty-one lice were ground in a mortar, with a small amount of normal saline, and the material was well rubbed into a scarified area on the abdomen of a monkey and of a guinea-pig. Neither of these animals was infected thereby, although a few spironemata were seen in the ground-up material under the microscope. On 25/9/23 four bugs (*Cimex rotundatus*) obtained a week previously from the room in which Cases (3) and (4) occurred, were crushed in a mortar and the material rubbed into a scarified area on the abdomen of a monkey. A few structures resembling the spironema were seen in this material under the microscope, but it failed to infect the animal. On 30/10/23, fifty-nine lice, obtained locally by one of the Institute labourers were offered a feed on monkeys Nos. 3 and 4, both of which were then showing large numbers of spironemata in the peripheral blood. Twenty-four lice fed on monkey No. 3 and twenty-one on monkey No. 4. Fourteen refused to feed. Each louse was then placed on a small piece of paper in separate plugged test-tubes and kept in the dark at laboratory temperature. On the following day 31/10/23 there were three deaths in Batch C, that is those which had not fed. The remaining eleven readily fed on monkey No. 5 which on that day showed numerous spironemata in the peripheral blood. Batch A consisting of the twenty-four lice which had fed on monkey No. 3 had a death roll of one, and the remainder took a blood feed from a clean guinea-pig. Batch B containing twenty-one lice which had fed on monkey No. 4 which also had one casualty, were offered a feed on a clean guinea-pig, and the twenty survivors quickly distended themselves with blood. During the night all three batches were kept at laboratory temperature and on the following morning, 1/11/23 the living ones again greedily fed from a guinea-pig. The deaths in Batch A numbered six, those in Batch B, four, and there were no losses in Batch C. However, it was deemed advisable in view of the comparatively cold nights to keep all the insects in the incubator, in the hope that a fair percentage would be alive at the end of seven to ten days. The results however, of this change, were disastrous. On the morning of 2/11/23 not a live louse remained and the experiment ended abruptly. No further opportunity has presented itself of improving on and completing this experiment as no fresh case of relapsing fever occurred.

### LEPROSY.

The close proximity to the Medical Research Institute, of a small Leper Asylum (containing sixteen to twenty inmates) has stimulated an interest in the treatment of the disease which has been manifested in the Annual Reports from 1915 onwards. Previous to that year, the Medical Officers in charge of the Asylum had relied mainly on the crude Chaulmoogra oil and they had also given Deycke's Nastin treatment an extended trial.

During 1915 the late Dr. H. Sinclair Coghill used Salvarsan on two lepers, with some benefit and during 1916 he administered Heiser's treatment (Chaulmoogra oil, Camphorated oil and Resorcin) with really encouraging results. The only objection to the use of this mixture is that as the dosage increases, it becomes a somewhat bulky amount to inject intramuscularly and the patience of the leper soon gives way. For this reason, and in the belief that the curative principle of the crude oil is more concentrated in the extract, Sodium Gynocardate, recommended by Rogers was used in 1917 and 1918, both intramuscularly and intravenously. In the latter half of 1918 Atoxyl was given as well as Gynocardate to several of the patients but there was no evidence of better results in these. On the whole, the Gynocardate treatment was



superior to Heiser's, as regards the rate of improvement, and there was not the same objection by the patients to its continued use. In the following year, Roger's method was adhered to, combined with the use of Nastin B.I. This latter preparation did not appear to hasten or aid the healing process. By the end of 1919 the disease was, to all appearance definitely arrested in five cases, greatly ameliorated in six, and without any restraining effect in one. This last was a recent and very acute case.

During 1920, Potassium Cupro cyanide, in view of a very favourable report in the Tropical Diseases Bulletin, was given a trial in the last-named case and in two others which had shown improvement with Gynocardate. At the end of three months there was no evidence whatsoever, of benefit, and it was given up. For the greater part of this year, therefore, no special treatment was given. The only drug used was the crude Chaulmoogra oil and the patients were allowed to please themselves as to how much they took and when they took it. Moogrol was then adopted, in the latter half of 1921, at which time, the five patients in which the disease appeared to have been arrested at the end of 1919, still showed no sign of relapse. However there was a severe exacerbation of the disease in two of the six cases which had improved and in the acute case, the condition was still an active one. These three patients and four others recently admitted were given Moogrol intravenously. The result of four and a half months' administration was a distinct improvement in all, particularly in the acute case.

During the early part of 1922 Oscol Stibium was substituted in three of the new cases and Moogrol was continued in the remaining four. In April however, all the cases were put on Harper's treatment (Moogrol Ether and Iodine). This was given at first intravenously, then intramuscularly, and finally, omitting the ether, the Moogrol and Iodine were given in a chalk mixture, by the mouth. The improvement was more or less maintained during the six months of this regime, but in 1923 it was decided to resort again to Moogrol by the intravenous route, with seven patients, five of them old inmates and two new admissions. All showed improvement, in such ways as healing of ulcers, decrease in size and number of tubercles, disappearance of maculae and improvement in sensation.

The object aimed at is not a rapid cure which appears to be unattainable, but to keep the patients contented and optimistic so that they may be willing to continue the treatment over many months, even years, inasmuch as the disease itself being of a slowly progressive nature the process of cure must of necessity be a protracted one. The advantages of the Moogrol treatment are, besides its specific action on the lepra bacillus, (a) that the amount of the drug necessary to obtain good results is small (2 to 4 c.c.), and therefore it is easily administered with a small syringe and a fine needle, (b) that administration once or at most twice a week is adequate, (c) that no cumbersome preliminary preparation is involved, the boiling of the syringe and needle, and the application of iodine to the skin over the site of puncture being all that need be done, and (d) provided the vein be entered there is no local disturbance and the patient is satisfied. This last is an important practical point, for the Nigerian leper will not long submit to hypodermic or intramuscular medication, and he takes quite a keen interest in the successful puncture of a vein with no swelling left behind.

The following extracts from reports by Medical Officers who have been using Moogrol in outstations, are given.

Dr. W. C. Cobb, D.S.O., reports from Bauchi, 2/1/24.

Case (1) Male, aged twenty-seven years. States four years a leper. Only one lesion, a roughly oval-shaped macule on back, about five inches long, definitely anaesthetic in parts, with edges slightly raised, and much lighter in colour than



the rest of the lesion, which showed a darker area in the middle containing a small patch of scar tissue. Weekly intravenous injections of Moogrol have been given since 8/8/23, the first one  $\frac{1}{2}$  cc., six of 1 cc. and fifteen of 2 cc. After about two months of treatment slight improvement was apparent at one end of the lesion, but this was balanced by a spread at the other. At the present time, the edges of parts of the lesion are probably somewhat less raised than at first; but, considering the normally changeable nature of leprous patches, the verdict must be that there is no improvement.

Case (2) Male, aged twenty-seven years. States seven months a leper. Faint light-coloured macules on back, chest and abdomen, quite difficult to see unless light from right quarter. Weekly intravenous injections of Moogrol started on 8/8/23. First dose  $\frac{1}{2}$  cc. followed by five doses 1 cc, followed by five doses 2 cc. The patient then left prison and disappeared. During treatment the disease progressed regularly and rapidly with the result that the conclusion of treatment found him a well-marked leper. I was glad to see him go as I felt I was doing him harm.

Case (3) Male, aged thirty years. States eight months a leper. Same type as last case but macules more numerous and more evident. Weekly intravenous injections of Moogrol started 31/10/23. First dose  $\frac{1}{2}$  cc. second dose 1 cc. followed by eight doses of 2 cc. Up to the present there has been no apparent change, one way or the other.

Case (4) Male, aged twenty-five years. States one year a leper. Numerous well-marked macules, type similar to that in Case (1). Started treatment same date as Case (3), dosage the same, result the same.

Dr. A. Gaston reports from Kano, 21/1/24, as follows:—

Three lepers are being treated at the present time. They are the anaesthetic type of leprosy. One of them has had the disease for twenty years, and has had seven injections of Moogrol, but not much improvement has been noticed. The other two state that they have had the disease for two years. They are getting weekly injections of Moogrol. They have only had two injections so far and not much improvement has been noticed yet. These three lepers are all prisoners. I find that Moogrol does a lot of good in the anaesthetic form of leprosy which is the only form I have treated with this drug.

After six injections I found that the anaesthetic patches had almost completely disappeared and the patients felt much better. Some of them had a slight reaction accompanied by a slight rise in temperature and a little induration around the seat of injection, but this soon passed off.

Dr. W. E. S. Digby reports, 5/1/24, from Maiduguri. Six lepers suffering from mixed leprosy but with the nodular form more predominant, were treated with Moogrol injections, commencing 20th September, 1923. Their names were:—

(1) Mustafa Zavami. (2) Momadu Wanzam. (3) Mallam Hashim. (4) Momadu Mandara. (5) Osuman. (6) Momadu Arimi.

The injections were given intramuscularly in the gluteal region, increasing by 1 cc. each week till, on October 25th, each was receiving 6 cc. There was marked improvement in the nodules of (1) who subsequently died 21st December from Broncho-pneumonia. A more marked improvement was noted in the nodules of (2), who refused further treatment after 13th December. In the case of (3) running sores and ulcers dried and healed up, but further treatment was refused after 13th December. In the cases (4), (5) and (6) no improvement was noticed, but each individual was emphatic in saying his general health



was much improved. They all refused further treatment (4) after 13th November, (5) after 6th December and (6) after 15th November. Two other lepers with macular leprosy attended for injections for three weeks and then refused further treatment.

Dr. N. A. Dyce-Sharp reports, 24/1/24, from Kaduna as follows:—

This drug (Moogrol) has been tried on three patients during the past six months. The period is too short to warrant a definite statement on the value of the drug, but it appeared to be of considerable benefit and all three patients appreciated it.

Dr. G. H. Gallagher reports, 21/1/24, from Bamenda. S. W. Male, aet thirty, Soldier, Native of Sokoto, Anaesthetic leprosy, two years. Four intravenous and thirty intramuscular injections of Moogrol rendered the anaesthetic areas thoroughly sensitive, but there is still an ulcer on the foot. Patient states his general health is improved.

M. B. female, aet, ten. Native of Bafut, Bamenda, admitted for treatment. There was ulceration in both feet, and extensive anaesthetic areas both legs. There was absorption of the metacarpal bone of index finger. Twenty intramuscular injections of Moogrol were given. The patient discharged herself after three months. The ulceration had then all cleared up, but the anaesthetic areas remained.

#### CALABAR SWELLINGS.

Information regarding ten cases of this affection has been obtained, bringing the number of European cases up to forty, and the number of female sufferers up to five.

As with the previous cases—(Annual Report 1922, pages 2–8) the infection was contracted in Nigeria or in British Cameroons.

The length of time which elapsed between the first exposure to infection and the first appearance of signs of the disease is given as one year or less in five instances. The shortest period is three months, the next four months and then seven months, nine months and one year. The other periods are two years, three years, six years, seven years and ten years.

Swellings occurred in nine cases, and were absent in one.

The worm has appeared in the eye in six cases.

The outline of the worm has been seen beneath the skin in four cases.

Embryos of *Filaria loa* were demonstrated in the blood in three cases, but in three instances the blood has not been examined.

The swellings occurred in the upper limbs in all cases, and in five cases the upper limbs only were involved. They occurred also in the legs in three, and in the neck, head, tongue and eyelids in one.

Swellings arose in sequence in four cases, and were multiple also in four. They began during the day in two, during the night in two, and either day or night in five.

The duration of the swellings and the period of freedom depended on the stage of the infection. In the early cases, the swellings persisted longer and the period of freedom was shorter than in the older infections.

In three instances the swellings have been absent for a long period with the probability that the infection has died out.

Case (37) Duration of illness nine years. Swellings absent one-and-a-half years.

Case (38) Duration of illness fourteen years. Swellings absent four years.

Case (40) Duration of illness thirteen years. Swellings absent three years.



In three cases the swellings are becoming more severe and more frequent, with shorter periods of freedom. These cases are (31) illness of one year, (32) illness of fifteen years (35) illness of one year.

As regards Case (32) this patient is still in the area where the original infection was contracted, and it is highly probable that there has been re-infection.

In Case (33), after seven years the swellings are less severe and less frequent.

In Case (34), after one-and-a-half years there is little change.

In Case (39), the swellings had appeared for the first time two days before the report was made. The patient remembered at least two bites from Chrysops, both on the same hand, one five months and the other two months previously.

The sensation of the swellings is described as a tenseness or tightness, or stiffness in seven cases and as a dull pain in two cases.

The worm occurred in the eye in five cases in which swellings also were noted. In four of these the swellings were the first sign, and in one they were contemporary. In three instances the worm had only once appeared in the eye. In Case (40), in which there were no swellings, the infection was contracted 20 years ago. For the last eight years, no worm has been seen either in the eye or under the skin. In this instance and also in Cases (39) and (37) one or more adult worms had been removed from the eye. The cases in which the worm could be traced moving just under the skin are all of old standing, (32) fifteen years, (37) fourteen years (39) thirteen years and (40) twelve years.

The blood has not been examined for embryos in Cases (31), (34) and (39). The examination was negative in Cases (32), (33), (35) and (38). In Cases (35) and (38) the infection was recent, a few days in (38) and one year in (35). The three cases in which embryos were present or had been demonstrated were all old-standing.

As regards the cases reported in 1922, fresh information has been collected from sixteen. Of the remainder, two were regarded as cured in that report. Cases (9) and (13). One has died (Case (16)), and the cause of death has not been ascertained.

Two cases cannot be traced and replies are awaited from nine.

Taking the sixteen cases, in their order, embryos have appeared in the blood in Case (1), the swellings are less severe, the period of freedom is longer and the worm has only once appeared in the eye. In Case (4) also, embryos have appeared in the blood, but the swellings although not so widespread and so numerous are more lasting. Several times a worm has visited the eye. In Case (5), a worm has been seen under the skin of the forearm but none has visited the eye, and no embryos have been seen in the blood. The swellings are of shorter duration and there is a longer period of freedom.

Case (6) is worthy of note. A year and a half ago Dr. Parkinson, Surgical Specialist at Lagos gave the patient a course of Stibenyl, intravenously. All signs of infection have since been absent.

In Case (7) a worm has appeared once in the eye. The swellings are fewer and of shorter duration and the period of freedom is longer. Embryos have not been found in the blood.

In Case (8) the only change is that the period of freedom from swellings is longer.

In Case (10) a worm has frequently appeared in the eye, and there is no change in the conditions as regards the swellings.

In Case (12) there are still embryos in the blood, the worm visits the eye more frequently, and the swellings are more often multiple.



In Case (15) embryos have not been found although repeated examinations have been made. The swellings cause much less disturbance and occur only occasionally, the worm is less often seen in the eye but has more frequently been noted on the chest, back of hand, temple, nose, forehead and eyelid.

In Case (17) the swellings have been very infrequent, a worm has not been seen or felt in the eye, and no embryos have been found in the blood.

In Case (18) there have been no swellings since last report (18 months) and a worm has not visited the eye.

In Case (24) a worm has not again appeared in the eye, the swellings only last a day or two and there is a much longer interval of freedom. Embryos were not found in the blood on this occasion.

In Case (25) there have been no signs of infection.

In Case (27) there have been no swellings for nearly two years, and the last visit to the eye occurred seven years ago.

In Case (28) there have been no signs of the infection since the last report.

In Case (29), the worm has not been seen in the eye since last report (nearly two years) and no other signs have been noted.

#### FILARIAL EMBRYOS FROM THE SKIN.

The results obtained by Dr. Macfie and Dr. Corson on the Gold Coast, in 1922 regarding the presence of embryos of *Onchocerca volvulus* in the skin and their finding, during their research, a hitherto undescribed embryo, prompted an investigation on the same lines, in Lagos.

Dr. C. J. H. Sharp, who, at the time was in charge of the clinical laboratory at the Colonial Hospital collected the material, and sent his positive findings to the Institute. The method adopted was similar to that used in Accra, a small piece of skin, similar to that used in the Reverdin method of skin grafting, was snipped off and teased out in saline.

Fifty-five natives were thus examined in Lagos and embryos were found in six. In two of these in addition to the embryos of *O. volvulus*, the embryos described by Macfie and Corson as *Agamofilaria Streptocerca* were observed. In one of these cases only two of the latter were found amongst twenty examples of the former. In the other case, there were three specimens of *A. streptocerca* and only one of *O. volvulus*.

As regards the embryos of *O. volvulus* the following table gives the measurements obtained in each case. The specimens were simply dried in the air fixed in Methyl Alcohol and stained either with Giemsa or Ehrlich's Acid Hæmatoxyline. They were drawn to scale with the aid of the camera lucida and measured with a pair of compasses.

#### MEASUREMENTS IN MICRONS.

Case.	Number Measured.	Greatest Length.	Smallest Length.	Average Length.	Greatest Breadth.	Smallest Breadth.	Average Breadth.
1	29	320	240	281	7	4	5.5
2	26	322	245	283	5	5	5
3	20	325	230	271	6	4	5
4	16	279	215	255	6	4	5
5	3	297	282	288	5	5	5
6	1	306	306	306	6	6	6



The slight thickening behind the cephalic cone at the beginning of the nuclear column, given as a characteristic feature by Stephens and Yorke in Byam & Archibald's "The Practice of Medicine in the Tropics", Vol. III, 1923 page 1,952, was observed in a very small minority of the total number of eighty-five specimens examined. Similarly, with another characteristic, noted on the same page of the same book, as regards the two first nuclei of the gut cells, in hæmatoxylin-stained preparations, it was found that one nucleus in advance of the others was a much more common occurrence, than two so placed. The anterior V spot or first break in the column of nuclei is a very prominent one, indeed the only definite one. It is situated, on the average at 60 to 65 microns from the anterior extremity. The column of nuclei begins at about 10 microns from the head end, and ceases at about the same distance from the caudal extremity.

In no single instance was the tip of the tail-end flexed.

In all cases the G I cell was large and easily seen.

Observations based on examination of the five specimens of *Agamofilaria streptocerca*, agreed with the description given by the two discoverers, Macfie and Corson, except that in no instance was the body straight or nearly so, nor was the posterior extremity curved like the handle of a walking stick except in one case.

The measurements are, in microns.

Length.	Breadth.	1st break from head-end.	2nd break from tail-end.
230	3	60	27
225	3	59	29
212	4	58	30
197	4	60	28
212	4	59	30

The column of nuclei at the head end begins as a single row of from 6 to 10 nuclei. The clear area at the anterior end measures from 4 to 5 microns in length. The body of the worm tapers gradually from two-thirds of the total length to the tail end. The column of nuclei reaches to the extreme tip, the last eight to ten being in a single row. The cuticle is distinctly striated.

It may be added that the cases were chosen at random and that in no instance was there any appearance of lichenification or other abnormality of the skin.

#### EXPERIMENTS ON THE TRANSMISSION OF ACANTHO-CHEILONEMA PERSTANS.

On 10th October thick blood smears from forty-one prisoners and thirty-one hospital inmates were taken, between the hours of 10.30 and 11.30 a.m. These were afterwards dehaemoglobinised, fixed and stained. On examination, in the former category (prisoners) one was found with a pure perstans infection (Case J) and one with a mixed infection of perstans and loa. Nine others harboured loa only. In the latter category (hospital patients) a pure perstans (Case T) and a pure loa infection were noted.



On 11th October, between the hours of 10 and 11.30 a.m. seventy-two *Mansonioides africana* ♀ ♀ were offered a feed on the prisoner J with a pure perstans infection. Seven insects fed, and they were put into separate test-tubes. A blade of grass was inserted into each tube along with a small piece of sugar, and the cotton-wool plug was moistened with water. The insects were kept in the dark. On the fourth day there-after one was killed and dissected. One larva was found in the thorax, but it was very slightly larger than the blood form. On the fifth day one insect was killed, and another was found dead. No larvæ were found. The same result followed the dissection of the remaining four, one on the sixth, one on the seventh, one on the eighth, and one on the ninth day.

On 12th October thirty-one *M. africana* were offered a feed on hospital patient T. between 11 a.m. and noon. Only one mosquito fed. Between the hours of 3 and 4.30 p.m., forty-eight *M. africana* were offered a feed on the same patient. None fed. Between 6.30 and 7.30 p.m. the same insects were again offered an opportunity of feeding on Case T. and two took advantage. On the following day, 13th October, fifty-six *M. africana* were offered a feed on the same patient between 10 a.m. and 11 a.m. Three fed. Fifty-two were offered a feed between 6 p.m. and 7 p.m. on the same patient on the same day and one fed. Of the insects feeding on Case T., three died within twenty-four hours. Embryos were present in the gut but not elsewhere. A fourth died on the second day. No developmental forms were found on dissection. On the third day, two were found dead. Three forms were found in the thorax of one but no development had taken place, and the other showed no signs of infection. The last of the seven insects was killed on the fourth day, but the results of examination after dissection were negative.

#### DISSECTION OF HOUSE FLIES.

During September and October fifty-two *Musca domestica*, seven *Lucilia* sp and three *Fannia* sp were dissected in a search for human intestinal protozoa.

No amœbic cysts were found but in one specimen of *M. domestica* numerous *Strongyloides* ova and larvæ were seen. *Herpetomonas* in large numbers were found in the gut of sixteen insects.

#### ENTOMOLOGY.

The following biting flies caught in the Institute precincts represent comparatively rare insects at Yaba.

*Ochlerotatus irritans* 1 ♀.  
*O. domesticus* 2 ♂.  
*Uranotænia cœruleocephala* 1 ♂ 1 ♀.  
*U. balfouri* 1 ♀.  
*Hodgesia euptopous* 2 ♀ ♀.  
*Culex insignis* 5 ♂♂ 5 ♀ ♀.  
*C. thalassius* 1 ♂.  
*Tabanus pluto* 1 ♀.  
*Tæniorhynchus annetti* 2 ♀ ♀.

Dr. K. K. Grieve collected at Ebute Metta.

*Hodgesia sanguinis* 2 ♀ ♀.  
*Ochlerotatus irritans* 1 ♀.  
*O. nigricephalus* 1 ♀.  
*Culex fatigans* 1 ♂ 2 ♀ ♀.  
~~*Culex fatigans* 1 ♂ 2 ♀ ♀.~~  
*C. decens* 3 ♂♂.  
*Culiciomyia nebulosa* 4 ♂♂ 6 ♀ ♀.  
*Mansonioides africana* 1 ♀.

Dr. Hanington bred from larvæ at Beau  
*Culiciomyia nebulosa* 13 ♀ ♀ 1 ♂.



Dr. Corson collected at Ibi.

*Culex decens* 6 ♂♂ 3 ♀♀.  
*C. fatigans* 1 ♂ 6 ♀♀.  
*C. duttoni* 24 ♂♂ 30 ♀♀.  
*C. tigripes* 1 ♂ 2 ♀♀.  
*C. invidiosus* 4 ♀♀.  
*Culiciomyia nebulosa* 6 ♂♂.  
*Tæniorhynchus aurites* 1 ♀.  
*Stegomyia luteocephala* (bred from holes in Mango trees) 3 ♂.  
*S. (Aedes) fasciata (argenteus)* 1 ♂.  
*Mansonioides africana* 1 ♀.  
*Anopheles costalis* 23 ♂♂ 8 ♀♀.  
*A. domicolus* 1 ♀.  
*A. funestus* 1 ♀.  
*Toxorhynchites phytophagus* 1 ♀.  
*Hæmatopota pertinens* 6 ♀♀.  
*H. bullatifrons* 1 ♀.

Dr. Moiser collected at Kaduna.

*Anopheles costalis* 31 ♂♂ 140 ♀♀.  
*A. funestus* 6 ♂♂ 64 ♀♀.  
*A. nili* 3 ♂♂ 13 ♀♀.  
*A. mauritanus* 5 ♀♀.  
*A. pharænsis* 1 ♀.  
*A. domicolus* 1 ♀.  
*Culex invidiosus* 11 ♀♀.  
*C. decens* 1 ♀.  
*C. duttoni* 17 ♂♂ 9 ♀♀.  
*Culiciomyia nebulosa* 19 ♂♂ 10 ♀♀.  
*Mansonioides africana* 1 ♀.  
*Stegomyia (Aedes) fasciata (argenteus)* 4 ♂♂ 4 ♀♀.

Dr. Stephens collected at Ilorin.

*Tabanus tæniola* 1 ♀.  
*Stomoxys calcitrans* 5 ♀♀.  
*Glossina palpalis* 4 ♀♀.  
*Ceratopogon castaneus* 2 ♀♀.  
*Mansonioides africana* 3 ♀♀.

Dr. Glover collected at Ikot-Ekpene.

*Chrysops silacea* 6 ♀♀.  
*C. dimidiata* 1 ♀.

These were preserved in alcohol and were dissected on receipt. No larvæ of *Filaria loa* were found.

Dr. Sieger collected at Ossidinge.

*Chrysops silacea* 5 ♀♀.

These, also, were preserved in alcohol, and were found on dissection to contain no larvæ of *Filaria loa*.

The following experiments were done.

26/3/23. One female *Stegomyia (Aedes) fasciata (argenteus)* was not allowed a blood feed before it was put into a large bell jar along with two males of the same genus and species. A raisin was suspended from the top of the jar and a beaker of water was placed in the bottom of the jar. All three insects were reared from larvæ. One male died within four hours. Each day the female was offered a blood feed on a human arm, at 9 a.m. She consistently refused this until on the twelfth day of captivity she died, without having laid any eggs. On dissection, no sign of eggs could be seen. The second male predeceased the female by one day.



On the same day as the last experiment was begun, a similar one was done with two females and one male *Culiciomyia nebulosa*. All were bred from larvæ. The females refused a preliminary blood feed both on a guinea-pig and on a human arm. The jar in which the insects were confined contained banana as well as raisin, and a beaker of water. The females were daily offered a feed on a human arm. On the third day the male died and on the following day one female also succumbed. The remaining female survived for sixteen days, refusing the daily offer of a human arm. No eggs were laid, and none were seen in either female, on dissection.

Several experiments were performed as regards mating of males of *Culiciomyia nebulosa* with females of *Stegomyia (Aedes) fasciata (argenteus)*, but these were invariably negative.

On two different occasions *Tæniorrhynchus annetti* ♀ was caught in the laboratory. The first was put into a glass jar containing a beaker in which floated some grass. Next day a raft of eggs was found on the water. The larvæ hatched out two days later.

Some ground rice was then put in the water, but apparently conditions were unfavourable as all the larvæ were dead by the third day.

The second *T. annetti* was put into a glass jar containing a beaker of water. Although bulging with eggs, no raft was laid, and after four days she was transferred to a test tube in which were water and some grass. This was kept in the dark and on the following morning a raft appeared. The larvæ hatched out in two days. These were transferred to a jar containing mud and pond water, but they were all dead at the end of twenty-four hours.

On 1st October twenty *Mansonioides africana* ♀ obtained from neighbouring native houses were released into a large bell jar, containing a beaker of water on which floated grass and water weeds. On 5th October two rafts of eggs were found floating on the water. The larvæ hatched out on 9th October but all were dead three days later.

On 15th October six *M. africana* ♀ collected by labourers from their houses were put into a jar containing a beaker of water on which floated water weeds and grass. Three days later a cluster of eggs was laid on a leaf close to the water. The larvæ hatched out in three days but survived only two days.

The following dissections were done, under the binocular microscope.

Mosquitoes collected by Sanitary Inspectors in Lagos.

*Anopheles costalis* 2 ♀ ♀ negative.

*Stegomyia (Aedes) fasciata (argenteus)* 4 ♀ ♀ negative.

*Culiciomyia nebulosa* 1 ♀ negative.

*Culex fatigans* 5 ♀ ♀ negative.

Three *Mansonioides africana* were induced to feed on a native who showed a few subtertian rings in his blood. One died three days afterwards and the remaining two were killed on the seventh day. No oocysts were found in the stomach nor were sporozoites observed in the salivary glands.

A collection of *Tabanus* preserved in 80% alcohol was received from Dr. Corson at Ibi. The individuals were

<i>T. taeniola</i>	15
<i>T. secedens</i>	10
<i>T. fasciatus</i>	1



There was also one specimen of *Glossins tachinoides*. A search was made in all for the larvæ of *Filaria*, but the result was uniformly negative.

As noted elsewhere in this report, many bugs and lice were dissected in a search for the spironema of relapsing fever, and also a number of *Mansonioides africana* after having fed on a patient in whose blood there were embryos of *Acanthocheilonema perstans*.

Most of the year however, has been taken up with the systematic dissection of mosquitoes brought in by the labourers from the native houses in the vicinity of Yaba. Every Saturday evening each labourer was provided with several plugged test tubes and told to collect mosquitoes from his house, particularly those which had bitten him. This lessened the likelihood of his filling the test tube with male specimens. A bribe was offered for the largest collection each Monday morning.

As it was quite impossible, on account of the presence of blood in the stomach to dissect the whole collection in one day, the weaker specimens were worked on first and the others fed on sugar-water.

It was somewhat of a surprise to find that *Mansonioides africana* greatly outnumbered all the other mosquitoes brought in. The actual number was 4,027 of which 3,064 were dissected, the others having died before their blood feed was digested.

Larvæ of *Filaria* were found in the proboscis of one, and in the muscles of the head and thorax of another.

Small nematodes were found in the stomach of two, and in a third, two much larger nematodes were noted, one extending from the thorax into the abdomen and the other coiled at the tip of the abdomen.

Spironemata were observed in the stomach of five individuals but their numbers were small. On one occasion the stomach contents, in a little saline were injected into the peritoneum of a rat, but the inoculation was unproductive.

Amœbæ and other protozoa were occasionally found in the stomach, most probably derived from the water in which the insect hatched, but none was of known pathogenic importance. *Herpetomonas* were noted in the stomach contents on one occasion.

In ten specimens however there were structures resembling developmental forms of *Proteosoma* or *Plasmodium*. There were bodies resembling oocysts in the stomach wall of seven, and structures similar to sporozoites in the salivary glands of four, one insect showing both types of structures.

298 *Anopheles costalis* were collected of which 198 were dissected; of these, forty were found to be infected with malaria, and twelve with filaria. Eleven showed sporozoites in the glands but nothing in the stomach. Twenty-one showed oocysts in the stomach but nothing in the glands. Eight had the parasite both in the glands and in the stomach.

Three of the insects with the stomach only infected contained also filaria and two mosquitoes with a malarial infection of both stomach and glands showed also very numerous filariæ in the head and thorax.

The other mosquitoes dissected were:—

*Culiciomyia nebulosa*, fourteen, all negative.

*Culex rima*, eight, one with *Herpetomonas* in stomach, seven, negative.



*C. fatigans*, five, one with filaria, four negative.

*C. thalassius*, five, one with? oocysts on stomach wall, four negative.

*Ochlerotatus irritans*, five, all negative.

*Stegomyia (Aedes) fasciata (argenteus)* four, all negative.

*Culex tigripes*, two, negative.

*C. quasigelidus*, two, negative.

*C. grahami*, one, negative.

*C. duttoni*, one, „

*Anopheles umbrosus*, one, negative.

*Taeniorrhynchus annetti*, one, negative.

The differences between the stomachs of the various mosquitoes and also between their glands, are remarkable. The stomach of *Mansonioides africana* is very tough, as are also the glands which usually have bifurcations at the tips. The glands and the stomach of *Culiciomyia nebulosa* are extremely soft and very easily burst.

A record was kept for six months, of the number of rafts of mosquito eggs laid in a barrel which received the waste water from a wash-hand basin. The rafts were counted each morning, after which they were removed singly, and the barrel emptied. No note was made of single eggs laid.

The figures are:—

January ...	...	339 rafts.
February ...	...	302 „
March ...	...	186 „
April ...	...	295 „
May ...	...	354 „
June ...	...	1,131 „

The month of March may be regarded as the end of the dry season. Most of the rafts were laid by *Culex decens* and by *Culiciomyia nebulosa*.

#### MOSQUITO LARVÆ.

As in the past, collections of mosquito-larvæ made by the Sanitary Inspectors on their daily rounds in the Municipal area of Lagos were kindly sent by the Medical Officer of Health, Dr. R. W. Orpen, to the Institute for identification. 868 collections were received and in Table VI will be found the receptacle and the larvæ as identified. It will be seen that, as formerly, the larvæ of *Aedes (Stegomyia) argenteus (fasciata)* greatly outnumber the others, the total collections being 634, and the favourite breeding place being the house-hold water pots and other receptacles containing, in most cases clear water. *Culiciomyia nebulosa* is next in order of frequency, occurring as it did in 216 receptacles. The favourite breeding medium for this mosquito is a liquid containing much decomposing and malodorous matter such as "agbo" and native dyes. The other mosquitoes hatching out from the collections were *Culex fatigans* eighteen, *Anopheles costalis* twelve, *Culex decens* eight, *Ochlerotatus irritans* seven, *Stegomyia luteocephala* two, *Culex tigripes* two, and *Culex insignis* one.





[illegible]



## CLINICAL MATERIAL.

During the year 434 samples of faeces have been examined at the Institute. The colour, the consistence and the presence or absence of mucus are noted in the ledger. In the accompanying Table No. VII, the samples have been divided into six groups, according as they were formed, pultaceous or liquid and with or without mucus. It will be noted that nearly half of the total fall into the third group, that is pultaceous in appearance and without mucus. The number placed under "liquid" without mucus, is the next largest, and "formed" faeces form the smallest double group. This is in accordance with the general belief, that in the tropics, formed faeces are the exception not the rule.

The liquid faeces, providing the next largest group is an indication of the liability to gastro-intestinal disorders in the tropics.

The percentage of negative findings in the formed and in the pultaceous group is very similar, i.e. 41% in the first and 44% in the latter. In the liquid group, the percentage is not quite so high, being just over 58 but in this case the comparatively high figure is an indication of the prevalence of gastro-intestinal irritation due to diet or some cause other than protozoal.

The percentage of negative findings however falls very low, in the groups in which mucus is present. Associated with this, the proportion of findings of *E. histolytica* and of pus and epithelial cells is very greatly higher than in the groups where mucus is not noted.

Other facts worthy of notice are, the large number of cases in which *Blastocystis* was found, and also the prevalence of *Trichocephalus* and *Ascaris*. The last two are mainly found in the stools from natives, of which there were 116 samples.

*Entamoebae histolytica* occurred in forty Europeans and thirty-two natives.

*Lambli*a was met with in thirteen Europeans and three natives.

It should be added that spirochaetes were noticed in most samples of faeces but they were particularly abundant in the case with liquid faeces included in the table.

TABLE VII.

	Formed	Formed with mucus.	Pulta- ceous.	Pulta- ceous with mucus.	Liquid.	Liquid with mucus.
Total ... ..	34	27	212	31	88	42
Negative ... ..	14	2	94	3	34	1
<i>E. histolytica</i> ... ..	*5	†8	‡13	\$11	10	†25
Epithelial and pus cells ...	2	24	20	26	14	41
Red blood cells ... ..	...	1	...	1	...	14
Charcot Leyden Crystals ...	1	2	3	...	2	...
<i>E. coli</i> ... ..	3	1	15	...	3	...
<i>E. nana</i> ... ..	2	1	9	...	5	...
<i>I. bütschlii</i> ... ..	1	...	8	...	3	...
<i>Lambli</i> a ... ..	1	...	10	1	3	1
<i>Tetramitus</i> ... ..	...	...	6	...	6	1
<i>Trichomonas</i> ... ..	...	...	3	...	...	...
<i>Embadomonas</i> ... ..	...	...	...	...	1	...
<i>Cegcomonas</i> ... ..	...	...	1	...	2	...
<i>Spirochaetes</i> ... ..	...	...	...	...	1	...
<i>Blastocystis</i> ... ..	7	1	37	...	20	...
<i>Trichocephalus</i> ... ..	9	2	35	...	11	1
<i>Ascaris</i> ... ..	6	2	34	5	11	1
<i>Ankylostome</i> ... ..	1	1	18	4	9	1
<i>Strongyloides</i> ... ..	2	...	5	...	1	...

\*All in cyst-stage. †All in active stage. ‡Cysts only in 8. \$All active amoebae. ||Only four in cyst-stage.



## BLOOD SMEARS.

Blood smears form the next largest series of specimens examined, 299 from Europeans and 107 from Natives a total of 406. Subtertian malarial parasites were found in forty-one, thirty Europeans and eleven Natives. Crescents were noted on three occasions, on two of which they were only stage of the parasite seen. The quartan parasite, in the ring form and in the <sup>gametocyte</sup> stage was met with in only one patient, a native. The benign tertian parasite was not encountered. Pigmented mononucle~~e~~<sup>ar</sup> leucocytes were seen on three occasions in the absence of malaria parasites.

The embryos of *Filaria loa* were observed in the blood of eight persons, five Europeans and three Natives.

Forty-nine differential leucocyte counts were made and the Arneth formula was ascertained in thirty-one instances.

## URINE.

Ten specimens were examined. Red blood cells and pus were found in three, and pus in two.

## SPUTUM.

Thirty-eight samples were stained for the tubercle bacillus. The findings were positive in nine (European three, Native six).

## WIDAL TEST.

Serum from six patients reacted positively to bacillus paratyphosus B in three instances and the result was negative in the remainder.

## VACCINES.

Sixteen vaccines were prepared.

## MISCELLANEOUS.

Smears. Twenty smears were received, seven taken from skin eruptions, four of pus from the eye, three of gland juice, three from the nose, and one each from cerebro-spinal fluid, an ulcer of the lip and an ulcerated tonsil.

Fluid. Two samples of pleural exudate and one from a knee joint were examined.

Water Analysis. Six samples of water were submitted to a bacteriological analysis.

## HISTO-PATHOLOGY.

The following organs were sectioned and reported on, Liver, five specimens, Spleen five, Brain five, Lung three, and Kidney two specimens.

Sixteen specimens of Carcinoma were received. Epithelioma of toe two, of foot, of leg, of scrotum, of penis, of buttock, and of lip. Carcinoma of rectum two, of breast two, of bladder, of stomach, of face and of testis.

Sarcomas numbered thirteen, of jaw three, of foot three, of testis two, of chest, of abdominal wall, of femur of thigh and of scrotum.

The following simple tumours occurred.



Cutaneous horn, Lipoma, Fibro-myxoma of Parotid, Gersoid Aneurism, Epulis, Fibroma of scalp, Fibroma of lip. Adenoma of breast and Polypus from nares.

Other specimens were Gumma of muscle, Gumma of gland, Tubercular disease of gland, Elephantiasis of scrotum, Chronic inflammatory conditions, cervix uteri, scrotum, thumb, heel, shoulder and psoas muscle. Three pieces of skin were examined for leprosy, two tumours were found to be occasioned by *Onchocerca volvulus* and tubercular disease was found in one specimen of Fallopian tube.

#### VENEREAL.

During the year the Sachs Georgi test was applied to fifty-three samples of serum. The result was positive in nineteen.

Sixteen smears from chancres were examined and *Spironema pallidum* was demonstrated in three. Pus obtained by prostatic massage in four cases showed the gonococcus in all. Three smears from the discharge from the penis, showed this organism in two. A vaginal smear was negative.

The following sent specimens to the Institute. Dr. Adam, Dr. Adcock, Dr. Aitken, Dr. Birt, Dr. Booth, Dr. Braithwaite, Dr. Cauchi, Dr. Corson, Dr. Craig, Dr. Cummings, Dr. Digby, Dr. Dyce-Sharp, Dr. Fetherston-Dilke, Dr. Gallagher, Dr. Glover, Dr. Gray, Dr. Grey, Dr. Grieve, Dr. Hanington, Dr. Kelsall, Dr. Leonard, D.S.O., Dr. Mackey, Dr. McLeay, Dr. Maples, Dr. Martyn-Clark, Dr. Moiser, Dr. J. J. Moore, Dr. Fitzgerald Moore, Dr. Morehead, Dr. Neal, Dr. Nicholson, Dr. O'Keefe, Dr. Orpen, Dr. Parkinson, Dr. Pollard, Dr. Ross, Dr. C. J. Sharp, M.C., Dr. Sieger, Dr. Stephens, Dr. Stirrett, Dr. Thomson, Dr. Waldron, Dr. Walker, Dr. A. H. Wilson, and Dr. G. Wilson.

#### THE CLINICAL LABORATORY.

The Clinical Laboratory at Lagos fulfilled its function, although unfortunately it was not possible to have a medical officer in charge, for a large part of the year. Consequently, from a lack of continuity, a detailed report is not available and only bare figures can be given. A study of these will show that a large amount of work has been done.

The total number of blood smears examined was 572 of which 435 came from Africans and 137 from Europeans. The cases in which subtertian malarial parasites were observed numbered thirty-seven in each group, a total of seventy-four. The only other parasites noted are *Spironema* in five cases, and these have been more fully described elsewhere in this report.

Fifty-three differential leucocyte counts were made, nine total red and white cell counts, and eight hæmoglobin estimations.

As regards fæces, 385 samples were examined, 334 from Africans and fifty-one from Europeans.

The findings in the latter were *E. histolytica* in two, other protozoa in three, *Ascaris* ova in three and *Trichocephalus* ova in one. Amongst the natives *E. histolytica* was present in twelve, other protozoa in seventeen, *Ascaris* ova in 143, *Trichocephalus* ova in eighty-three, *Ankylostome* ova in fifty-seven, *Schistosoma* ova in three, *Strongyloides* ova or larvæ in twenty-two and ova of *T. saginata* in two.

Ninety specimens of sputum were examined for tubercle bacilli. The findings were negative in Europeans but were positive in twenty-one of seventy-eight Natives.

203 examinations of urine were made. Schistosome ova were found in three out of 177 Natives.

Forty-five smears from various sources were examined. The gonococcus was demonstrated in nine, and a spirochæma in two. A smear from an abscess in the leg of a native showed enormous numbers of spirochaetes many of them occurring in felted masses.

The Sachs Georgi reaction was performed in 109 cases with a positive result in forty-eight.

Two Widal agglutination tests were made.

Tissues examined histologically numbered ninety-six.

113 post-mortem examinations were carried out, either in the hospital or in the public mortuary.

Dr. Q. Stewart, whilst he was in charge of the laboratory at the beginning of the year, made a very useful collection of post-mortem specimens all beautifully preserved and mounted.

Dr. Clive Sharp, M.C., during the last few weeks of the year, carried out an extensive search for "microfilaria" in the skin, already described in this report. He also made a routine examination in all cases post-mortem, for coccidial infection of the gut.

A. CONNAL,

*Director, Medical Research Institute.*



## APPENDIX II.

## ANNUAL DENTAL REPORT FOR 1923

BY

C. N. PEARSON, GOVERNMENT DENTIST.

It is gratifying to place on record an increase of 25% in the number of European and African Officials attending for treatment especially for conservative work. It cannot be too strongly impressed on Officials and the general public that it is necessary to have dental defects remedied early. A little early attention often saves a subsequent extraction.

2. In making comparisons with former years, it must be remembered that there is only one Government Dentist, and he is on the eighteen months tour so that only alternate years can be compared for statistical purposes. Comparison with 1921 shows an increase in the number of permanent fillings, especially the white synthetics. *Pari passu* with this the extractions among Europeans showed a sensible decrease, and extractions for this year have been mainly for African patients. The number of patients fitted with dentures is slightly in excess of that for 1921. It is better to have dentures fitted than to suffer auto-intoxication from septic stumps but this fact is slow to be appreciated. The number of repairs to dentures also shows a slight increase.

3. Scaling of teeth is a most necessary and beneficial operation. It frees the teeth from the deposit of tartar or salivary salts which form an excellent nidus for the growth of bacteria whose acid producing properties are a fertile source of caries. Moreover, if tartar is not removed early, gingivitis inevitably ensues and leads to recession of the gums and general suppurative cervical periodontitis (Pyorrhœa Alveolaris). It is scarcely possible to exaggerate the evils local and general which arise from this all too prevalent condition. Teeth should be scaled regularly, if possible, every six months. Pyorrhœa Alveolaris is not readily appreciated by patients and frequently the condition is seen too late for conservative measures and extraction has to be resorted to.

4. *Dental Caries.*—On the whole the African suffers less from caries than the average European. Practically all African children are breast fed for at least the first twelve months of life and afterwards are sustained on less highly artificial foods than European children. It is reasonable to assume, as has been pointed out by other authorities, that these facts have some importance in the prevention of caries. Another helpful feature of African life is the habit of using an orange stick daily. This stick is the precursor of, and is in many cases more efficient than, the modern tooth brush, as by its use there is ensured the individual cleansing of each tooth from neck to crown by vertical movement in place of the ineffectual horizontal movement usual with the tooth brush.

5. A somewhat rare case of exostosis was observed in an African Official. The condition was probably contributed to by delay in having the teeth attended to. An X ray photograph showed necrosis of parts of the upper jaw. The necrosed bone and remaining teeth were removed and dentures fitted with a satisfactory result.

6. It is also noted among the type of African from which officials are recruited that it is becoming rarer to find one with a complete set of teeth top and bottom. Most commonly the third molar or wisdom tooth is imperfectly erupted or entirely absent.



7. The practice common among certain tribes of Nigeria of filing the two upper central incisors is mentioned only to be wholly condemned. It inevitably leads to extensive caries of these teeth and premature loss of them. It used to be considered that this practice was only found among Africans with cannibalistic tendencies but further observations show that it is also prevalent among other tribes.

8. It has been found advantageous to the patients and economic to the Government for treatment to be provided by visiting large outlying centres. Two such tours were undertaken, the first to Kano, Zaria, Kaduna, and Ibadan, and the second to Calabar and Port Harcourt. A large number of officials who otherwise would not have sought treatment took advantage of the facilities thus brought to ready access. The results of these tours encourage their more frequent adoption in the future.

### DENTAL REPORT.

#### FIGURES OF THE WORK DONE.

##### *Patients.*

European Officials	...	...	...	...	258
Native Officials	...	...	...	...	201
Wife and children and others	...	...	...	...	211

##### *Conservative Work.*

Synthetic fillings. (white porcelain)	...	...	...	...	135
Amalgams	...	...	...	...	199
Copper Amalgams	...	...	...	...	63
Gutta Percha. (temporary fillings)	...	...	...	...	384
Root fillings	...	...	...	...	64
Gutta Percha, Permanent. (permanent fillings)	...	...	...	...	59
Scalings	...	...	...	...	607
Extractions	...	...	...	...	652
Pyorrhoea alveolaris. (General Suppurative Cervical Periodon- titis) and other diseases	...	...	...	...	183

##### *Prosthetics.*

Dentures and Repairs	...	...	...	...	110
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C. N. PEARSON,  
Government Dentist.



## APPENDIX III.

ANNUAL REPORT OF GOVERNMENT ANALYST.  
YEAR ENDING DECEMBER 31st, 1923.

BY

A. B. HOBSON, M.SC., (VICT.), A.I.C.,

Owing to insufficient laboratory equipment, analytical work was only carried out with difficulty prior to August, when the chemicals, apparatus, etc., indented for at the beginning of the financial year, arrived.

During the ten months, the number of samples reported upon amounted to 201, their nature being as follows:—

Waters and Aerated waters	...	...	...	21
Beers, Wines and Spirits	...	...	...	27
Perfumes and Essences	...	...	...	49
Pharmaceutical preparations, etc.	...	...	...	24
Minerals	...	...	...	6
Foods	...	...	...	14
Toxicological	...	...	...	22
Bloodstains	...	...	...	3
Urine	...	...	...	3
Police samples (various)	...	...	...	17
Miscellaneous	...	...	...	15
				<hr/> 201 <hr/>

## WATER.

(i) *Lagos Town Supply*.—The data obtained on analysis of samples of the Lagos supply drawn from the laboratory tap, indicate a very soft water of fair organic purity, suitable for all domestic purposes.

The dissolved organic matter is of vegetable origin, and its carriage is probably due to the absence of substances of the nature of calcium carbonate, *i.e.*, of hardness, particularly temporary hardness.

This lack of "hardness" will probably prove the chief source of trouble in the future, more particularly in connection with maintenance. The Iju water shows a very marked solvent action on metals. Every sample of water yet analysed has contained zinc, as also the aerated waters manufactured in the town and it would seem desirable to reduce this solvent action, either by hardening the water at the source, or by treatment of the pipes by a solution of the Dr. Angus Smith type.



Experiments carried out in the laboratory, show that the addition of lime in an amount sufficient to increase the hardness by about three parts per 100,000, will remove quite a considerable amount of dissolved organic matter, iron, etc., and it is a well known fact that the addition of lime will reduce corrosion. However, further experiments on this subject are being carried out.

This hardening will be of benefit by rendering the water organically pure and the presence of lime is a desirable asset from the point of view of general health. Further a slight addition would be really beneficial, for use for steam raising purposes.

Should it be found that the difference in prices of lime and bleaching powder, is negligible in comparison with freight (presuming the necessity for import), the introduction of bleaching powder would have the same action as that obtained by the use of lime, and further would, by chlorination, ensure one of the finest tropical water supplies in the world.

(ii) *Various*.—General speaking, the waters of the country are contaminated in a greater or less degree with organic matter of vegetable origin.

Experiments on a sample of "silted" water, received from Ilorin Hospital, showed that complete clarification and a high degree of purity could be attained by the addition of 4.2 grams per gallon of potash alum and subsequent filtration.

In connection with the use of alum, it should be noted that aluminium sulphate is a cheaper reagent than potash alum and further that the amount required to perform the same work, are roughly in the ratio of 1:1.6.

## FOOD.

Samples of a variety of tinned foods, have been received from time to time, through the Customs Department, intended for European and African consumption. All these were found to be satisfactory as regards condition, and metallic contamination at the time of receipt.

This occasional sampling of tinned food at the coast is of considerable value, by restraining the import of food which is in a doubtful condition before shipment and protecting both the public and the importer in this respect. It is doubtful however, whether for the public, this protection is sufficient, more particularly in respect of the metallic contamination.

Tinned foods, especially of the types intended for African consumption have been examined in the laboratory and pronounced satisfactory, which I think, after twelve months or more storage in the country would have shown a content of lead, tin, etc., sufficient to give rise to serious symptoms.

The consumption of tinned foods by the African community must be fairly large and there should be a closer supervision of this type of store whilst in the country. Salmon tins lined partially with lead solder (containing traces of arsenic), which already bear indications of "pitting" on arrival at the coast, will probably reveal a considerable amount of chemical action after another 12 months in contact with an acid liquor.

Thus the contents, although perhaps sound, may be considerably tainted.



The absence of definite legislation as to the limits of metallic contamination makes the task of the analyst extremely difficult. If legal action is to be taken, in the nature of a prosecution, a line must be drawn somewhere between food in which the metallic taint is not detrimental, and food which may give rise to metallic poisoning, so as to leave a margin of safety. Otherwise the analyst has to apply a standard which the law does not recognise.

### TOXICOLOGICAL.

Twenty-two specimens have been received from Medical and Police sources, for investigation.

In only five cases were the presence of distinctive "poisons" established, analysis of these revealing morphine, turpentine, galena, and powdered glass (2).

In the first case, it was established that the cause of death was an overdose of Tincture of chloroform and morphine.

The bulk of the mixtures forwarded for investigation of their toxicological properties, consisted of crude mixtures of charcoal palm oil, feather, sand, bristec, eggshell, etc., of which it was difficult to believe that anyone could be induced to partake, except by violence.

Owing to the work involved in these cases, it should be pointed out that stomach contents should not be forwarded to the analyst, unless there is reasonable suspicion from either the symptoms or external circumstances as to the probable cause of death, and further that it is not the function of the analyst to account for death, but to ascertain the presence or absence of a particular substance or substances, which those symptoms or circumstances would indicate as the probable cause of death.

### MINERALS.

Two samples of Udi coal submitted for comparative analysis, one from an old and long standing stack, and the other a freshly mined sample, proved to be fairly similar in composition, but the old sample had a much higher ash content than the other, 10.9% against 4.5% on the sample as received.

A sample of mineral submitted by the Public Works Department from Benin Province proved to be practically pure calcspar, and a sample taken from the bed of the Oyi River with a view to determining its commercial possibilities was found to be a mixture oxide of iron, with a few small garnets and amethysts.

### POLICE.

The samples submitted were mainly for toxicological investigation. In one case, however, a number of coins were received and found counterfeit, and a fluid contained in a soda water bottle, found under the prisoner's bed proved to be a solution of potassium cyanide. The cyanide solution also contained zinc, so that it had evidently been used in a "bath" for plating purposes, and become exhausted.

There is every indication that the work of the laboratory will be very considerably increased during the coming year.



## APPENDIX IV.

### SCIENTIFIC PAPERS.

#### APPENDICITIS.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

A young man aged about twenty years was brought to hospital suffering from acute abdominal pain. There was definite swelling in the right iliac region, and marked tenderness over McBurney's point.

Operation was performed immediately. The appendix was gangrenous and perforated near the base. Appendicectomy was done and drainage instituted. The case did well. The patient was a Government official.

2. A farmer aged about thirty-five to forty years complained of constant pain at a point half an inch above the umbilicus. He was a tall, strongly built man and well nourished. Repeated examinations of his stools failed to explain the pain, nor could anything be ascertained by external examination of his abdomen. A laparotomy was performed.

The appendix was found to be directed straight upwards anteriorly, with the tip adherent to the ascending colon. The organ was much thickened, and abnormally long. Appendicectomy was performed. Two black hard concretions were found in the tip of the appendix. Recovery was uneventful. The operation relieved the symptoms.

#### ABNORMALITIES OF APPENDIX.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

1. While operating on a left inguinal hernia in a child aged two years, the caecum and appendix were found in the hernial sac. The caecum appeared to be attached to a very long mesentery. Other organs were normal.

2. While operating for strangulated umbilical hernia, the caecum was found to have an abnormally long mesentery. The appendix was lying in the mid-line near the level of the umbilicus.

#### CASE OF BLACKWATER FEVER IN AFRICAN CHILD.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

The patient, a girl aged four, was brought to hospital by relatives who had noticed her passing dark coloured urine, a specimen of which was brought. It was the typical urine of blackwater fever, and specimens were examined at regular intervals until the patient recovered. She had been vomiting, was jaundiced, and had a large and tender spleen. Quinine hydrochloride gr. iii twice daily was given, and in a short time, four days, the urine was quite clear. As in a case observed in 1919 at Victoria, a boy aged five years, quinine was administered straight away, with beneficial results. Owing to pressure of work, it was not possible to examine blood films.

#### RARE CASE OF BROW PRESENTATION.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

The patient, a multipara, had calculated that she had passed full term, and at the onset of labour, expecting a difficult labour, had herself transferred to hospital. She was seen at 7 p.m. The head was fixed, and the presentation a brow. The abdominal muscles of the mother were extremely flaccid, the probable cause of the failure of the



head to fix in the first instance, and of the malpresentation in the second. Pelvimetry showed a pelvis normal in shape, but abnormally roomy. The case was closely watched, and the progress of the head ("the best pelvimeter" Munro Kerr) was steady. There was no sign of danger to either mother or child and labour was terminated at 4 a.m.

E. H. Tweedy states:—If, as in rare cases of big pelvis, the head is fixed and descended, even though the case is one of brow, there is no cause for anxiety.

The child was apparently about ten months, and seemed dull at first as though there had been slight cerebral hæmorrhage. Seen however at an interval of twelve months he is perfectly normal.

#### A CASE OF CUTANEOUS BLASTOMYCOSIS.

By DR. E. W. ADCOCK, M.B., CH.B., (EDIN.).

This was the case of a European official aged twenty-six years who for two years has had an eczematous condition of the left palm spreading up the 1st, 2nd, and 3rd fingers in the interdigital clefts.

It is ascribed to infection received while counting nickle coin. The condition on the surface appeared to be an ordinary moist eczema, but on close examination the eruption was seen to consist of small blisters in the deep epidermal layers, which when pricked yielded a turbid fluid. These blisters were most numerous on the margin of the patch, which increased but slowly and by an eccentric spread. In other parts in the patch the condition was quiescent with a simple erythema remaining, in others cure had been established leaving a light brown stain.

On microscopic examination the fluid was found to contain small yeast-like cells. The condition was diagnosed as a cutaneous Blastomycosis. Local treatment did not seem to have much effect, (Iodine, Sulphur, Salicylic Acid, Resorcin and Chrysarobin all being tried), and it was decided to try the effect of intravenous Tartar Emetic. Gr.  $\frac{1}{2}$  was given every third day, the dose being increased to gr.  $1\frac{1}{2}$  until 10 grs. in all had been given, and all local treatment was stopped. The condition is much improved but is not yet cured, and it is proposed to give a second course of 10 grains, the result of which will be interesting to observe.

#### FOUR CASES OF CARCINOMATA IN AFRICANS.

By DR. E. C. BRAITHWAITE, F.R.C.S., (EDIN.).

It is of interest to place on record the occurrence within the last six months of four cases of Carcinomata, especially in view of recent discussions and correspondence on the subject of "Freedom of Native Races from Cancer". Two were internal cancers and two were external Epitheliomata. Three occurred in males and the other in a female. In one case the patient was comparatively a young man. In all the diagnosis was confirmed by the Microscopical section by the Director, Medical Research Institute, Yaba.

In two cases surgical intervention was possible. One patient was a native of Sierra Leone, the others of the Calabar, Eket and Bende Districts of Southern Provinces, Nigeria, respectively. One of the Epitheliomata occurred in the site of an old chronic ulcer. Possibly the second one originated in the same way. I have now seen quite a number of cases of cancer during the past twelve years among the natives of Southern Nigeria, probably about twenty in all, so that this disease is not so rare as is believed by some. Details of the cases are appended, the surgical measures adopted where possible and photographs of two cases. All the cases have been seen by other medical men in Calabar.

Sex.	Age.	Site of growth.	Nature of growth.	History of growth.	Treatment.	Result.	Result of Microscopical section.
Male ...	30 years ...	Stomach ...	Scirrhus Carcinoma	Symptoms noticed within 6 months of death only	Inoperable Medico-nal	Death within 6 weeks of admission to Hospital	Scirrhus Carcinoma of sphenoidal cell type.
Female ...	48 years ...	Rectum ...	Constricting Columnar Carcinoma	Not obtainable ...	Admitted to hospital moribund	Death within 16 hours of admission to Hospital	Malignant Adenoma called Carcinoma.
Male ...	54 years ...	Penis ...	Epithelioma ...	Slow growth possibly on site of old ulceration	Amputation of penis, removal of scrotum and both cords and both sets of inguinal gland	Recovery Patient left hospital 5 weeks after admission	Epithelioma.
Male ...	40 years ...	Leg ...	Epithelioma ...	Slow growth following on site of old chronic ulcer	Amputation of leg through knee joint and removal of femoral and inguinal glands	Recovery ...	Epithelioma.



## CASE OF EPITHELIOMA OF LEG.

The patient named John Wilson, aged about forty years, a native of Sherbro, Sierra Leone, was admitted to the Native Hospital, Calabar, on 10th October, 1923, with a large growth on the front of the left leg in its lower third.

The history was that he had an ulcer for over ten years at the site of the present growth. It had healed and broken down again from time to time. For the past five years the ulcer had never been healed. The present growth started about one year ago.

The patient was very emaciated on admission. There was a large ulcerating growth on the front and sides of the left leg in its lower third. The growth was firmly adherent to the Tibia. Growth was greatly in excess of destruction. The edges were hard and everted. There were some hard discrete enlarged femoral glands on the same side. No enlargement of the external iliac glands was made out. The leg was amputated on October 12th through the knee joint by Stephen Smith's method.

The enlarged femoral glands were subsequently dissected out.

The patient made a good recovery and left hospital on 22nd November, 1923, with a crutch. D.M.R.I. Yaba wired:—

"Growth is Epithelioma."

## CASE OF EPITHELIOMA OF PENIS.

The patient, a native of Eket District, named Udo Akpannson, aged fifty-four years, was admitted to the Native Hospital, Calabar, on 12th June, 1923, with an ulcerating cauliflower growth involving the gland and part of the body of the penis.

It commenced as a warty growth on the penis about 18 months ago which broke down and gradually spread over the glands and body of penis. It was of the cauliflower type on admission and very foul smelling. Both groups of inguinal glands were enlarged, hard and discrete, and also some of the sub-inguinal group.

He was operated upon on 15th June, 1923:—The operation consisted first in the complete removal of both sets of inguinal and sub-inguinal glands and division of both spermatic cords. The whole of the penis and scrotum and testicles were then removed. The urethra was divided long and split and sutured to the skin of the perineum 2 inches in front of the anal orifice.

He made an uninterrupted recovery and left hospital on 16th July, 1923. A portion of the growth was sent to D.M.R.I. Yaba who reported as follows:—

"Tumour penis-epithelioma."

## CASE OF CARCINOMA OF THE RECTUM.

The patient, a female, named Iquo Ekpenyon, aged about forty-eight years, was admitted to the Native Hospital on the 21st October, 1923, very ill with peritonitis. She was a native of Calabar, and was very emaciated. She died early next day.

A post-mortem dissection revealed:—

A constricting tumour all round the bowel in the lower third of the rectum. The growth had ulcerated into the peritoneal cavity in Douglas's Pouch. The small intestines and great omentum were matted together in the pelvic cavity and bathed in pus. There was also some general peritonitis present. The lymphatic glands along the left common iliac vessels were enlarged as were those along the inferior mesenteric vessels. There were no secondary deposits in the liver.

A piece of the growth was forwarded to the D.M.R.I. Yaba who wired as follows:—

"Confirming diagnosis Malignant Adenoma of Rectum."



## CASE OF CARCINOMA OF STOMACH OF THE SCIRRHUS TYPE.

The patient, a police constable, a native of the Bende District named Obona Ireku, aged about thirty years was admitted to St. Margaret's Hospital, Calabar, on 19th April, 1923. He had enjoyed good health until about six months ago, when his appetite began to fail and his strength to weaken.

A large painless tumour was found in the Epigastrium which moved on respiration. It was considered inoperable.

There were no signs of tuberculosis of the lungs, no enlarged glands in the left supra clavicular triangle, no enlargement of the liver and no glycosuria.

He rapidly lost flesh, developed a small abscess in the lower third of the left leg which was opened and drained, and died on 25th May. The post-mortem examination disclosed:—

- (a) A large scirrhous carcinoma of the body of the stomach involving the lesser curvature and the anterior-superior and posterior-inferior surfaces of the body of the stomach. The growth was ulcerated. The cardiac orifice and fundus of stomach were not involved.
- (b) The growth was slowly extending towards the pyloric antrum but the pylorus was not involved. The greater curvature also was not involved. The stomach was not dilated.
- (c) The lymphatic glands along the lesser curvature, paracardial glands, glands along the greater curvature and those in the gastro-hepatic omentum and those in the transverse fissure of the liver were enlarged and stony hard.
- (d) No involvement of liver or peritoneal cavity.
- (e) No enlargement of glands along thoracic duct or in either supra clavicular triangle.

A portion of the growth was sent to D.M.R.I. Yaba who reported as follows:—

“The tumour from the policeman is certainly a carcinoma.”

“It is, however, distinctly of the scirrhous type which according to Beattie and Dickson is characteristic of those more slowly growing tumours at or near the pylorus.”

## CASE OF EPITHELIOMA OF THE VULVA, WITH SECONDARY GROWTHS IN BLADDER AND RECTUM.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

Specimens examined by Dr. Connal.

The patient suffered from a flattened pelvis leading to a very difficult labour some years previously. Forcible extraction of the child had resulted in the complete tearing away of the urethra. When seen, there was extensive and very painful ulceration of the vulva and vagina. The ulcers had a smooth bright red base with a deep clean cut edge. A growth was found to be present in the rectum causing incontinence of fæces—and severe pain was constant in the region of the bladder. The patient was wasted to a skeleton and died from exhaustion.

Syphilitic ulceration of the vagina and rectum are common, and generally yield rapidly to N.A.B. and Mercury.

In three cases however at present under observation the ulceration has failed to heal and it is possible that a long standing untreated ulceration has, as in the above case, become malignant.



## CASE OF ODONTOMA OF MANDIBLE.

By DR. W. R. PARKINSON, F.R.C.S., (Eng.) etc.

This, as the photograph of the face and the print of the X-ray show, was so large as to be worth reporting.

The patient was a man of twenty-six years who said he had had this tumour for ten years and it had at length got so large that his friends did not like his appearance and he was literally driven to seek relief.

His mouth was stretched widely open with a diameter of 3 inches. His tongue was invisible behind the tumour, he could not talk, and his food had to be guided round the tumour with his finger and pushed down to the pharynx. There was no possibility of moving the jaw to chew.

The patient Oke was admitted on 12th June, 1923 and given a vaccine from his mouth to protect him from acute infection following operation, and was also given a mouthwash. There was some ulceration of the exposed surface of the tumour, which made this treatment advisable.

On 19th June, 1923, he was given rectal ether (6oz. Ether to 2oz. of Oil) and with a very little chloroform a good anæsthesia was obtained.

Dr. Quinton Stewart helped me with the operation, which was a good deal easier than it would appear from the photographs. The lower jaw was divided just to the left of the middle line clear of the tumour, and, as the growth did not quite reach to the mandibular joint, it was not difficult to disarticulate the lower jaw taking away the whole tumour with it. The patient did very well and was discharged on 26th July, 1923, in the condition shown by the second photograph.

Dr. H. H. Stewart took the X-ray photograph and reported that "in the upper part of the tumour the condition is suggestive of sarcomatous changes."

It was expected that the usual fibro-cystic disease of the jaw would be found; but the tumour was almost solid fibro-adenoma with some sarcomatous changes.

## CASE OF (SUSPECTED) HÆMOPHILIA.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

The patient was a youth about eighteen years of age. He was admitted to hospital for operation for a small inguinal hernia. During the operation capillary oozing from the skin edges and from the muscles was very noticeable and all attempts to arrest it failed.

The operation was rapidly completed and the wound packed. The patient was in grave danger for four days. It was necessary to pack the wound repeatedly with gauze soaked in a solution of adrenalin. The patient afterwards gave a history of previous trouble. He stated that some years previously he had an incised wound on the leg, and that the bleeding was finally controlled by the actual cautery employed by a native doctor.

## MYSOSITIS OSSIFICANS.

By DR. N. A. DYCE-SHARP, M.R.C.S. (Eng.) L.R.C.P. (Lond.).

A case of this disease appeared in the post-mortem room. The old man, a prisoner of sixty undergoing a life sentence, died suddenly.



An indefinite soft tumour, apparently a Glioma, was found in the temporal lobe of the brain extending backwards. On opening the chest, the thoracic wall was seen to be covered as to one quarter of its surface with large irregular smooth plaques, some of which moved freely and were not attached to the ribs. The vertebral column was encased in an irregular sheath of white glistening plaques throughout its whole length. No ossification of the muscles of the limbs was discovered. On raising the heart a large white plaque half an inch thick was found in the diaphragm and this plaque exactly corresponded with that portion of the diaphragm with which the pericardium was in contact. The aorta was somewhat atheromatous and presented an early aneurysm. The fingers and toes were normal.

The case is recorded because, on the authority of Osler and Macrae (1921), only one hundred cases of this condition have been described.

### THREE CASES OF UTERINE DISPLACEMENT TREATED BY OPERATION.

By DR. W. R. PARKINSON, F.R.C.S., etc.

One of the most frequent complaints of female patients in Nigeria is sterility. The commonest causes amongst those I see are:—

- (1) Endometritis of either venereal origin or following a miscarriage.
- (2) Fibromyomata of the uterus.
- (3) Uterine displacements, due in some cases to a previous Endometritis.

The three cases mentioned below were consecutive cases occurring in October 1923, and illustrate the need of laparotomy.

In each case the uterus was retroverted, retroflexed, and bound down in the pelvis by old adhesions.

In one case there was a definite history of miscarriage four years before, in the second there had been endometritis, and in the third I could get no definite history of either of those things.

Case I. A female R. B., aged twenty-nine, was admitted to hospital on 8th October, 1923, complaining that she had had a miscarriage four years before and there had been no pregnancy since. She had no vaginal discharge. Menstruation was regular, a little scanty, and gave discomfort. There was often a dragging pain in the back.

Vaginal examination revealed a retroverted retroflexed uterus that could not be brought forward into a normal position.

Operation under spinal stovain and saline solution:—

The uterus was found to be fastened back by four bands about  $\frac{1}{4}$  inch wide and  $1\frac{1}{2}$  inches long. These were attached to the back of fundus of the uterus and to the peritoneum of Douglas's Pouch at each side of the rectum. They were so long that the uterus was quite movable and could be got almost upright. The bands were cut through and the uterus promptly came forward into good position and stayed there without support. It was not stitched, but postural exercises were given later and she left hospital with the uterus remaining in normal position.



Case II. Female V. O., aged twenty-nine, was admitted on 29th October, 1923, with the same complaint: she had had one child and since then vaginal discharge and no children for seven years.

She had regular menstruation but a good deal of pain. Her uterus was fixed back and had very little movement.

Operation under spinal stovain and saline solution:—

The uterus was anchored back with short adhesions. There were small cysts in both ovaries. The uterus was freed and brought forward with some difficulty, but would not remain without suturing. Three silk sutures were used taking a good grip of the uterus and were tied outside the rectus muscle.

Case III. A female of thirty years, Aina, was admitted on 31st October 1923. There was no history of any value at all. She had not had children, nor had she ever been pregnant.

The uterus was found to be retroverted and retroflexed, and was firmly fixed in the Pouch of Douglas.

Operation under spinal stovain:—

The uterus was small and bound down firmly in Douglas's Pouch and to the rectum; and it appeared to be so small—possibly a congenital condition—that it was thought not worth the risk of a prolonged dissection that might have done more harm than good. There was a small ovarian cyst which was removed.

#### NOTES ON THE TREATMENT OF HUMAN TRYPANOSOMIASIS BY "BAYER 205".

By DR. JOHN HANINGTON, M.D., C.M. [McGILL UNIVERSITY],  
M.R.C.S. (Eng). L.R.C.P. (Lond.).

The following notes are based on the records of 132 cases of Trypanosomiasis treated at Sherifuri. Notes of the cases and treatment have been kept by the following Medical Officers:—W. B. Johnson, W. A. Young, H. Morrison and J. Hanington. The patients have come from seventy villages and hamlets all in the locally endemic area which follows the course of the Kiawa River from its leaving the Bauchi hills to Sokwa, Katagum Division. On an average, the patients were of early middle age, the few children seen being old enough to work on the farms (not under nine years), where the affection is usually contracted. For this reason also, the greatest rush of cases was after the farming season, at the beginning of the rains.

The disease is not of the mild form usually associated with West African Sleeping Sickness, but runs a rapidly fatal course; when it becomes established at a hamlet, the population is first decimated and the site is then abandoned. The clinical notes are necessarily brief, as most of the patients have come from a distance, to stay in the town of Sherifuri near this camp during treatment, and leave for their homes as soon as they feel fit, which often occurs before the usual course of five injections has been given. Their defection seems due to their feeling better and being anxious to return home, as it is difficult to make them understand the necessity of a complete course of treatment. None of the cases object to the treatment on the grounds of pain or disability, and spectacular relief of most of the symptoms advertises the treatment.



By a clinically fortunate accident, six cases have occurred among our native staff, and in these the disease was diagnosed early, and more notes are available.

## 2. SYMPTOMS AND CLINICAL SIGNS.

The majority of the people are well acquainted with the symptoms of the disease, so that their own history is of use in diagnosis. Enlarged glands were seen in 123 cases: oedema of the face in fifty-seven: wasting in twenty-four: spinal symptoms (ranging from unsteadiness and tremor, to paresis) in thirty-nine: a chronic nasal discharge was noted in seven, and appears to be a useful auxiliary diagnostic sign. "Fever" was reported and observed in forty cases: early epistaxis in seven: headache and pains in the neck in eighteen: drowsiness in sixty-six.

Examination of the fluid obtained by gland-puncture has been found most useful, giving a positive result in 107 cases: both blood and gland-juice were positive in four: the blood only, in nineteen cases: while two cases were diagnosed clinically, both blood and gland-juice being negative to examination.

## 3. ADMINISTRATION.

"Bayer 205" is a heavy, creamy-white powder, with a faintly acid taste, and swelling in water to a gummy mass which quickly re-dissolves into a clear, pale amber liquid. Either the intramuscular or intravenous route appears to be of equal value, and there have been no cases of necrosis or lasting pain following the injections. The transient albuminuria which occasionally occurs appears to be of no importance. When possible, Kleine's routine has been followed:—Gm. 1 in 10 cc. of (freshly-boiled, filtered) water, on the 1st, 3rd, 5th, 12th and 19th days.

The relief of all acute symptoms (fever, headache, pain in the neck and joints) is most striking, the patients nearly always reporting next day stating that they have been able to eat and sleep well, and looking much brighter and more vigorous. More chronic cases require after-treatment for weakness and anaemia when the acute symptoms are gone.

## 4. NOTES ON SPECIAL CASES.

The following cases are of peculiar interest, as all were diagnosed early, and treatment with "Bayer 205" (when it was available) enabled them to regain their former efficiency very quickly. Further, being members of the staff they have been subsequently under very close observation.

They are employed however in the endemic area, so that should the disease reappear in them, as in one case it has done, there will necessarily be some doubt as to whether the cure is permanent or re-infection has occurred.

*Case 1.*—This man was employed in collecting tsetse-pupae, and fell sick with high fever, headache and epistaxis on the 10th January, 1923. Trypanosomes were present in his blood. A week later he received two injections of Tartar Emetic only, as he tolerated the drug very badly. On the 3rd March he was still very sick, and trypanosomes were found in the gland-juice. He then received one injection of Tartar Emetic and later three of Tryparsamide, both drugs causing vomiting. When a supply of "Bayer 205" was received, he was given two injections of this drug, on 30th May and 6th June respectively.



He remained perfectly well until the following May, when he reported sick with a temperature of 101°, violent headache, sweating, and pain in the neck. Trypanosomes were found in the blood, and he received an injection of "Bayer 205" (Gm. 1) intravenously, the same morning. He reported for duty next day of his own accord, saying that he was feeling perfectly well and strong, and taking it hardly that he should be treated as an invalid. He set himself to work the day after each of the five injections, and has, up to the end of July, 1924, remained in good health. The contrast between the effects of treatment in his first and second attacks was remarkable. In the first, he was inefficient for at least four months, and in the second for a few days only. This case appears to be one of re-infection, as he was employed in the infected area with three other men who, as noted below, all contracted the disease shortly before his second attack.

*Case 4.*—A "fly-boy," developed the disease on May 17th, 1923, and received the usual five injections of "Bayer 205." For the following fourteen months he has remained perfectly fit.

*Cases 118, 121 and 123.*—These natives were employed in collecting tsetse-pupæ, and as they fell sick within twenty-four hours of each other, it seems possible that they were all infected by the same fly as they squatted close together over their work.

*Case 118* was diagnosed by blood-examination on his second day of fever: *Case 121* in his second severe bout of fever, eighteen days after he first fell sick, the trypanosomes being found in his blood at the fourteenth examination.

*Case 123* had fever for several days, and was thereafter ailing, though on duty as motor-boy; twenty-three days after his first attack of fever he developed marked cerebral symptoms—giddiness, mental cloudiness and eccentric behaviour—and trypanosomes were found in the blood for the first time. These three men received the routine course of "Bayer 205," and for the following three months have remained perfectly well.

## 5. AFTER-HISTORY OF THE CASES.

So far as possible, the subsequent history of the cases has been followed; in this, the Political Officers of Hadeija and Katagum have given us every assistance. Nevertheless, keeping track of the cases drawn from such a large and scattered area is extremely difficult.

## DEATHS.

Up to the end of July, 1924, fifteen deaths have been recorded from the 132 cases seen; but of these, four received no "Bayer 205," the stock being temporarily exhausted; eight were brought in in the last stages of "Sleeping Sickness;" and one small boy decamped after the second injection and was reported a month later to have died, after an illness lasting only two days—attributed by the natives to cerebro-spinal fever, a disease which was then rife. The fourteenth case came in October 1923, in an advanced stage of the disease, but received only one injection of "Bayer 205." He was reported as quite fit in March, 1924, but on the 23rd July died in his village, of what was apparently sleeping sickness.

The last case, a small girl, received three injections of "Bayer 205," and then returned to her village, where her death, without details was reported a month after the last injection.



The following statement summarises the treatment given, and the deaths recorded:—

- 18 cases received no "Bayer 205" and four died.
- 25 received one or two doses and six died.
- 73 received three to five doses and two died.
- 16 (whose sickness responded less readily to the drug) received from six to ten doses and three died.

(A table is appended).

## 6. CONCLUSION.

Finally, from our experience "Bayer 205" appears to be the most efficient drug yet produced for African Sleeping Sickness. Although death has in some cases occurred in spite of it, there has been no case where very marked improvement did not follow its use. Its employment has produced no untoward results, except the transitory albuminuria. The brevity of the course is one of its great advantages, as no native will remain of his free will for a protracted treatment. The drug keeps well in the tropics, and its administration is exceedingly simple.

## TARTAR EMETIC.

*Tartar Emetic* on the other hand is badly tolerated, painful at the best, and apt to be followed by untoward results; while as a cure it is slow and uncertain. The technique of administration is difficult. Some of the *Arsenic compounds* are known to be effective, but the course is very protracted, and often interrupted by serious complications, such as derangement of vision.

## TRYPARSAMIDE.

*Tryparsamide* appears to be the best of these, and though we have had as yet little experience of the drug, it certainly causes improvement. Nevertheless, the length of the course recommended (six months for an early case, including an interval in treatment of three months, and a double course for a late case) would make its extended use among natives very difficult.

## APPENDIX to Section 5.

### ANALYSIS OF KNOWN DEATHS, CORRELATED WITH THE ADMINISTRATION OF "BAYER 205."

Number receiving no	"Bayer 205"—	18: Deaths known—	4
"	1 dose	"	" - 3
"	2 doses	"	" - 3
"	3 "	"	" - 1
"	4 "	"	" - 0
"	5 "	"	" - 1
"	6 "	"	" - 1
"	7 "	"	" - 2
"	8 "	"	" - 0
"	9 "	"	" - 0
"	10 "	"	" - 0
		132:	15.









