

## **Annual report of the Medical and Sanitary Department / Sierra Leone.**

### **Contributors**

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SIERRA LEONE.

Annual  
MEDICAL AND SANITARY  
REPORT


FOR THE YEAR

1922.



FREETOWN:  
Printed at the Government Printing Office  
SIERRA LEONE

1923



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Donation 387



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THE ANNUAL

# Medical and Sanitary Report

FOR THE YEAR

1922

## I—ADMINISTRATIVE.

### (i) STAFF.

#### A—QUALIFIED MEDICAL STAFF.

Director of Medical and Sanitary Services, Deputy Director, Sanitary Service, Deputy Director, Medical Service, Senior Sanitary Officer, two Senior Medical Officers, Medical Officer of Health, eight Medical Officers of West African Medical Staff, Dental Surgeon, six African Medical Officers.

#### B—NURSING STAFF.

One Matron and Senior Nursing Sister, two Senior Nursing Sisters, two Nursing Sisters, four Senior African Female Nurses, twenty-one African Male Nurses and Apprentices, seventeen African Female Nurses and Probationers.

#### C—SUBORDINATE MEDICAL AND SANITARY STAFF.

Two Superintendent Sanitary Inspectors (European), one Mechanical Assistant to Dental Surgeon (European)—partly paid by Government, thirty-two Dispensers, including Store-keepers, who must be qualified dispensers—twenty-four Sanitary Inspectors and Learners, eleven Lunatic Asylum Assistant Keeper and Assistants, one Laboratory Assistant, sixteen Vaccinators (but with several vacancies throughout the year), Gate-keepers, Cooks, Servants, Stoker, Porters, Laundresses, etc.

#### D—CLERICAL STAFF.

Sixteen clerks—nine medical, seven sanitary. Five messengers—three medical, two sanitary.

#### E—TEMPORARY ASSISTANTS.

- (a) The European Matron of the Princess Christian Mission Hospital kindly came on night duty at the Nursing Home when a nursing sister was on the sick list and no other sister was available for duty.
- (b) Some temporary African nurses and a lunacy attendant were employed at the Kissy institutions.
- (c) No qualified medical practitioner was required during the year.

2. The qualified medical staff as compared with the pre-war strength is eight Medical Officers, West African Medical Staff, short; on the other hand it has been increased by three African medical officers. On the grounds of economy the Lady Superintendent (qualified) approved for the purpose of combating the very high



infantile mortality has never been appointed, and the Dental Surgeon and his mechanic will not return when their leave expires early in 1923. This Colony has not had a veterinary surgeon for many years.

3. The European nursing staff has been reduced by one, but there is no need, as there was during the war, for a larger number than five.

4. The increase of sanitary inspectors and learners at the expense of vaccinators is referred to in the Deputy Director, Sanitary Service's report.

5. The clerical staff, in anticipation of the proposed amalgamation of the medical and sanitary offices to take place early in 1923, on the grounds of economy, was reduced by one during the latter part of the year, a vacancy not being filled. Similarly messengers were reduced by one.

6. The following changes of title came into use; where necessary they were given legal sanction by the Interpretation (Amendment) Ordinance, 1922 :—

Principal Medical Officer became Director of Medical and Sanitary Services. Senior Sanitary Officer became Deputy Director, Sanitary Service. Provincial Medical Officer became Deputy Director, Medical Service. Sanitary Officer became Senior Sanitary Officer.

#### F—PRINCIPAL ACTING APPOINTMENTS.

*(Substantive holders are given in Table I.)*

7. Dr. F. J. A. Beringer acted as Director of Medical and Sanitary Services from 29th June, when Dr. W. I. Taylor went on leave until 29th October, when he was promoted to this office on the retirement of Dr. Taylor.

8. Major W. H. Peacock acted as Deputy Director, Sanitary Service, from 29th June to the end of the year.

9. The following acted as Deputy Director, Medical Service :—Dr. Wood-Mason, from 30th November to 16th December, and Dr. C. H. Allan, from 17th December to the end of the year.

10. The following acted as Senior Sanitary Officer :—Dr. W. Allan, from 1st January to 26th May and from 29th June to 23rd August, and Dr. Walls, from 19th September to the end of the year.

11. The following acted as Senior Medical Officer :—Dr. Wood, from 1st January to 18th March, and Dr. Murphy, from 27th July to 15th September, when he was promoted to the rank of Senior Medical Officer.

12. The following acted as Medical Officer of Health :—Dr. Walls, from 19th September to the end of the year, during the same period that he was Acting Senior Sanitary Officer.

13. The following nursing sisters acted as Senior Nursing Sisters :—Miss I. Stevens, from 19th October to the end of the year, and Miss Bell, from 14th to 21st July, and again from 25th October to 24th November.

14. The Deputy Director, Medical Service, inspected the following stations during the year :—Kennema, Kent, Njala, Pujehun, Sembahun, Sumbuya, Waterloo and York.

## (ii) FINANCIAL.

15. The following tables give the revenue and expenditure for the year and for 1921:—

Medical Revenue.				1922.			1921.		
				£	s.	d.	£	s.	d.
Hospital receipts	...	...	...	115	2	9	77	11	6
Nursing Home receipts	...	...	...	743	6	6	806	10	10
Sale of medicines	...	...	...	215	16	7	258	12	2
Druggists fees	...	...	...	1	10	0	1	0	0
Maintenance of lunatics	...	...	...	186	9	2	212	14	2
Departmental fines	...	...	...	28	12	3	7	5	0
Total	...	...	...	£1,290	17	3	£1,363	13	8
Medical Expenditure.				£	s.	d.	£	s.	d.
Personal Emoluments	...	...	...	28,758	12	6	28,772	11	10
Other Charges	...	...	...	14,747	2	8	19,018	14	10
Total	...	...	...	£43,505	15	2	£47,791	6	8
Sanitary Revenue.				£	s.	d.	£	s.	d.
Sanitary services (contribution by Bonthe)	...	...	...	219	7	3	310	5	2
Sanitary Expenditure.				£	s.	d.	£	s.	d.
Personal Emoluments	...	...	...	7,745	18	9	7,991	3	7
Other Charges	...	...	...	11,594	4	6	11,248	0	7
Total	...	...	...	£19,340	3	3	£19,239	4	2

16. The detailed cost for the year 1921 of two dispensaries in charge of African dispensers, taken at random, was worked out during the year in connection with the controversy that arose as to the value of the medical aid given by African dispensers not under the immediate supervision of a medical officer, and is shown in the following table. It may be taken that the direct average cost of a dispensary in sole charge of a dispenser in an out-station is under £200 per annum:—

Items.					Port Lokko, 1921.			Kaballa, 1921.		
					£	s.	d.	£	s.	d.
Provisions and necessities	...	...	...	...		—		4	13	7
Lighting	...	...	...	...	1	0	0	2	0	0
Travelling, transport, etc.	...	...	...	...	2	18	9	38	11	1
Rent	...	...	...	...	6	0	0	—	—	—
Medicines and equipment	...	...	...	...	49	2	7½	42	18	2½
Salaries and wages	...	...	...	...	114	5	0	103	5	0
Miscellaneous	...	...	...	...		—		0	11	5
TOTAL	...	...	...	...	£173	6	4¾	191	19	3¼

17. The following table showing the cost per patient per day for the Freetown and Kissy medical institutions is given, but with considerable diffidence. It is, I believe, the first time the attempt has been made to show expenditure in this form. It has involved a great deal of work on the part of one of the African staff, Mr. P. Q. A. John, First Class Dispenser, to whom I am greatly obliged. The work was new to him and the figures had not been kept in a form lending themselves readily to an analysis of this kind. I am consequently unable to be sure that the figures are absolutely correct, but from results obtained independently, I think those for the lunatic asylum and the Kissy infirmaries are accurate within a very small margin;



those for the Colonial Hospital are also, I think, very nearly correct. The Nursing Home figure is the most likely to show considerable variation between different periods: the cost is relatively high and the patients are few and the least constant. Steps are now being taken to bring out a monthly analysis of costs of the more important medical institutions.

Particulars.	Colonial Hospital, 1922, July—December.			Nursing Home, 1922, July—December.			Lunatic Asylum, 1922, July—December.			The Infirmary, 1922, July—December.		
I.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1. Food and drink ...	979	0	2½	241	12	3½	1,051	2	6½	650	8	1½
2. Fuel and light ...	137	6	11	30	12	6	30	1	4½	20	15	5½
3. Medicines and equipment	943	18	4½	111	5	8	156	0	3	101	0	0
4. Salaries and wages ...	1,939	12	3	902	18	5	469	15	8	309	7	8
5. Uniforms, passages, transport and rent ...	105	1	11	78	2	6½	13	19	8	8	0	3
6. Miscellaneous, including coffins, tobacco, soap, etc.	82	15	0	13	6	9	40	2	9½	45	11	0
7. Total cost ...	4,187	14	8½	1,377	18	2	1,761	2	3½	1,135	2	5½
8. Patients ...	747			52			103			198		
9. Hospital days ...	11,094			697			17,142			13,097		
10. Cost per day per patient	0	7	6½	1	19	6½	0	2	0½	0	1	8½
II. Cost at same rate per patient per annum ...	137	15	6	721	11	5	37	8	1	31	2	8
III. Total cost per annum at the same rate ...	8,375	9	4½	2,755	16	4	3,522	4	6½	2,270	4	11½
Cost per patient per day, January to June, 1922 ...	0	9	6½	2	7	2½	0	1	11½	0	1	5½
Cost per patient per day, April to September, 1920	0	19	4	1	5	6	0	2	0½	0	1	6½

18. In the above table the cost per patient in the Colonial Hospital during the six months for 1920 is abnormally high, as the old buildings had just been burnt down and the temporary hospital could accommodate fewer than a third the number of the old, and the cost of most items could not be appreciably reduced. For a similar reason the cost per patient was higher during the first half of 1922 than for the second half: the new hospital was partly opened in January, but not fully until August.

19. It should be noted that the table includes the cost of the nursing staff of each institution, including the European sisters at the Colonial Hospital and Nursing Home, together with the cost of the sisters' passages to and from the United Kingdom, but does not include the cost of medical officers, of repairs, etc., coming under Public Works votes, of administration, including the salaries of clerks, stationery, store-keeping, nor capital charges. There are no European nursing sisters at present at the lunatic asylum or the infirmaries.

20. The lunatic asylum must have a proportionately larger number of attendants and nurses than the infirmaries.

21. The great majority of patients in the Colonial Hospital pay nothing, the inmates of the infirmaries pay nothing at all, and very few in the lunatic asylum. The revenue derived from fees at these institutions was £301 11s. 11d. as against the partial expenditure of £14,167 (approximately), as given in the table in paragraph 17, that is 2·8 per cent.

22. At the Nursing Home, which is for Europeans only, all patients pay, the maximum charge being 21s. per day. The revenue derived from these fees during the year was £743 6s. 6d. as against a partial expenditure of £2,755 (approximately), that is 26·9 per cent. "Partial expenditure" is written because other cost detailed in paragraph 19 are not included.



## II—PUBLIC HEALTH.

### (i) GENERAL REMARKS.

23. The general health of European officials was better than during the previous year, that of African somewhat worse. The number invalided, European and African officials, was considerably less, approximately only one-third. Deaths in both cases were the same.

24. There was an increase of 3,416 patients treated at all hospitals and dispensaries as compared with 1921.

Europeans	...	...	...	126
IN-PATIENTS.				
Natives ...	...	...	...	2,787
Europeans	...	...	...	233
OUT-PATIENTS.				
Natives ...	...	...	...	48,540
Total	...	...	...	<u>51,686</u>

The subsequent attendances of out-patients were 103,878, that is to say, each out-patient attends on an average 2.08 times after the first visit.

25. *General Diseases.*—Rare as usual. Two cases of exophthalmic goitre, one of lymphadenoma and 518 of rickets are noted amongst natives. Five hundred and sixteen of the cases of rickets were reported by the medical officer at Makene.

26. Tuberculosis, dysentery and venereal diseases treated during the last three years are as follows:—

Disease.	1920.	1921.	1922.	Remarks.
Tuberculosis ...	65	116	91	Steady decrease
Dysentery ...	404	185	252	
Gonorrhœa ...	1,143	1,087	969	
Syphilis ...	472	687	647	

27. *Communicable Diseases (Insect-borne diseases).*—There was no yellow fever, and but one (doubtful) case of trypanosomiasis was observed.

28. There was an increase of 684 cases of malaria and of two cases of blackwater fever treated. Two deaths of Europeans non-officials from blackwater fever, not treated in Government institutions, were notified.

29. Malaria and blackwater fever treated during the last three years are as follows:—

Disease.	1920.	1921.	1922.	Remarks.
Malaria ...	3,690	3,960	4,644	Steady increase.
Blackwater fever ...	6	7	9	

30. *Infectious and Epidemic Diseases.*—There were the usual mild outbreaks of smallpox in the Protectorate. Seventy-six cases of chicken-pox came under treatment at hospitals and dispensaries with one death. Twenty-nine cases of influenza, all in natives, came under treatment. Of dysentery, there were 252 cases as compared with 185 in 1921.



31 *Helminthic Diseases*.—The report of ankylostomiasis for 1921 was not published in the annual report for that year, but was submitted separately. It may be useful to summarize the chief points here.

(a) Six hundred and seventeen persons were examined throughout Sierra Leone; 197 were found infected, giving a percentage of 31.9.

(b) Of these, 369 were examined in the Freetown Colonial Hospital laboratory with the following results:—

Persons.	No. Examined.	No. Infected.	Per Cent.
Prisoners ... ..	311	78	25
Other natives ... ..	42	10	23.8
Europeans ... ..	16	...	...
			} 17

(c) An analysis of the places of residence of these "other natives" indicated that the infected lived for the most part in an area through which two streams run with their tributaries. But the numbers are too small on which to be able to base any very definite conclusion.

(d) In Freetown treatment was for the most part by oil of eucalyptus, by thymol or beta-naphthol or the last two together. All these modes of treatment appeared efficacious. Elsewhere thymol was also used.

(e) At the Kissy institutions (lunatic asylum and infirmaries) sixty-five were examined, in each case after an aperient. Ova were found in two cases only. The dry earth system at the Kissy medical institutions is efficiently carried out in the opinion of the Medical Officer, Dr. Cummings.

(f) At other places the following results were reported:—

Place.	No. Examined.	No. Infected.	Per Cent.	Remarks.
Bonthe ... ..	12	5	42	—
Moyamba ... ..	50	42	84	Prisoners.
Moyamba ... ..	6	3	50	Other natives.
Daru ... ..	100	50	50	Hospital patients.
Pujehun ... ..	15	7	47	All infected were prisoners from other places.

32. In 1922 examinations were made as follows:—

Place.	No. Examined.	No. Infected.	Per Cent.	Remarks.
Freetown ... ..	297	53	18	Laboratory routine faecal examinations, Nursing Home and Colonial Hospital.
Freetown ... ..	648	157	24	Ditto, prison.
Kissy ... ..	60	6	10	—
Moyamba ... ..	20	13	65	Prisoners, no symptoms.
Moyamba ... ..	5	1	20	Other natives.
Daru ... ..	44	23	52	Selected cases.
Pujehun ... ..	60	9	15	None with symptoms.

33. The medical officer in charge of prison reports that of the prisoners from Waterloo District, that is the neighbourhood of Freetown but outside the Freetown Police District, 60 per cent. were infected, and during an outbreak of beri-beri 50 per cent. of patients suffering from this disease were found to be "heavily" infected.

34. All these results are based on microscopical examination. It will be observed that the percentages in Freetown, where most of the observations were made, are almost exactly the same in each of the two years. Of the total examined in 1922, i.e. 1,134, 262 or 23·1 per cent, were positive.

35. The Laboratory Report, printed elsewhere in this Report, indicates the wide prevalence of other helminthic diseases.

#### (ii) EUROPEAN OFFICIALS.

36. Table showing the sick, invaliding and death rates of European officials :—

	1920.	1921.	1922.
Total number of officials resident ... ..	233	214	209
Average number resident ... ..	133	144	109
Total number on sick list ... ..	166	217	159
Total number of days on sick list ... ..	1,784	1,815	1,426
Average daily number on sick list ... ..	4·87	4·97	3·90
Percentage of sick to average number of residents	3·66	3·45	3·57
Average number of days on sick list to each patient	10·74	8·36	8·96
Average sick time to each resident ... ..	13·4	12·6	13·08
Total number invalided ... ..	10	15	5
Percentage of invalidings to total residents	4·29	7·00	2·39
Percentage of invalidings to average number resident	7·51	10·41	4·58
Total deaths ... ..	4	2	2
Percentage of deaths to total residents	0·86	0·93	0·95
Percentage of deaths to average number resident	1·50	1·38	1·83

37. Causes of invalidings and deaths of European officials :—

Causes.	Invalided.	Died.
Heart failure ... ..	...	1
Appendicitis—collapse ... ..	...	1
Phlebitis ... ..	1	...
Myocarditis ... ..	1	...
Blackwater fever and general debility ...	1	...
Neurasthenia ... ..	1	...
Disease of the eye ... ..	1	...
Total ... ..	5	2

#### (iii.) AFRICAN OFFICIALS.

38. Table showing the sick, invaliding and death rates of African officials :—

	1920.	1921.	1922.
Total number of officials resident ... ..	850	850	850
Average number resident ... ..	750	750	750
Total number on sick list ... ..	1,862	1,248	1,071
Total number of days on sick list ... ..	5,742	7,780	7,887
Average daily number on sick list ... ..	15·68	21·31	21·60
Percentage of sick to average number resident	2·09	2·84	2·88
Average number of days on sick list to each patient	3·08	6·23	7·36
Average sick time to each resident ... ..	7·6	10·37	10·38
Total number invalided ... ..	23	24	7
Percentage of invalidings to total residents	2·70	2·82	0·82
Percentage of invaliding to average number resident	3·06	3·20	0·93
Total deaths ... ..	9	6	6
Percentage of deaths to total residents	1·05	0·70	0·70
Percentage of deaths to average number resident	1·20	0·80	0·80



## 39. Causes of invalidings and deaths of African officials:—

Causes.	Invalided.	Died.
Dysentery ... ..	...	1
Ulcerative endocarditis ... ..	...	1
Pneumonia ... ..	...	1
Malaria ... ..	...	1
Appendicitis ... ..	...	1
Blackwater fever ... ..	...	1
Chronic valvular disease and dilatation of the heart ... ..	1	...
Dilatation of the heart and arterio sclerosis ... ..	1	...
Cirrhosis of liver ... ..	1	...
Urinary fistula ... ..	1	...
Chronic pleuritic thickening in chest ... ..	1	...
Myocarditis and enlarged spleen ... ..	1	...
Chronic rheumatism ... ..	1	...
Total ... ..	7	6

## (iv.) PRISONERS.

## 40. Table showing sick and death rates in the Freetown prison:—

	1920.	1921.	1922.
Total number of prisoners admitted ... ..	1,386	1,035	1,116
Average strength ... ..	435	318	276
Total death ... ..	12	25	12
Total number of prisoners on sick list ... ..	464	186	290
Daily average number on sick list ... ..	22	21	28
Sick rate per 1,000 of average strength ... ..	50.6	66.03	101.4
Death rate per 1,000 of average strength ... ..	27.6	78.66	43.5

41. Elsewhere in this report will be found the following, dealing with the Freetown prison:—

- (a) Laboratory Report by Dr. Dimock, Medical Officer in charge, laboratory section, on Freetown prison.
- (b) Investigation into the causes producing beri-beri in Freetown prison December, 1922, by Professor Blacklock, M.D., Director of Sir Alfred Lewis Jones Research Laboratory—preliminary report.
- (c) Annual report with statistical report of Freetown prison for 1922, by Dr. Wood, Medical Officer in charge, prison.
- (d) Annual Sanitary report on prison by Major Peacock, Acting Deputy Director, Sanitary Service.

## 42. Table showing sick and death rates at all prisons:—

Prison.	Daily Average Number in Custody in 1922.	Sick Rate per 1,000 of Average Strength.	Death Rate per 1,000 of Average Strength.
Freetown ... ..	276	101.4	43.5
Bonthe ... ..	19	3.0	...
Batkanu ... ..	32	111.6	...
Kaballa ... ..	28	79.7	35.7
Kennema ... ..	51	14.8	...
Moyamba ... ..	36	4.6	...
Pujehun ... ..	23	22.6	...

43. Except as regards Freetown, I fear these figures are of little value. One death occurred at Batkanu, none elsewhere outside Freetown. Prisoners come and go in rapid succession at these small prisons: long sentence prisoners are not kept. In previous years the figures for this table appear to have been worked out by a different formula for Freetown from that used for Protectorate prisons. This year the same is used for all, i.e.  $\times = \frac{\text{Daily average sick} \times 1,000}{\text{Daily average strength}}$ .

(v.) EUROPEAN NON-OFFICIALS.

44. Table showing causes of invalidings and deaths of European non-officials:—

	Died.	Invalided.
Malaria ... ..	2	1
Blackwater fever ... ..	1	3
Fever and general debility ... ..	1	...
Pyrexia and hepatitis ... ..	1	...
Intestinal stasis and vomiting ... ..	1	...
Intestinal trouble ... ..	1	...
Asthma ... ..	1	...
Vague gastric trouble ... ..	1	...
Jaundice ... ..	1	...
Neurasthenia ... ..	2	...
Fracture-base of skull (accident fall) ... ..	—	1
Dysentery ... ..	1	1
Run down ... ..	1	...
Hernia ... ..	2	...
Fibroid tumour ... ..	1	...
Gastritis ... ..	1	...
Double pneumonia ... ..	...	1
<b>TOTAL ...</b>	<b>18</b>	<b>7</b>

(vi.) HEALTH OF TROOPS AND POLICE.

(a) IMPERIAL TROOPS.

45. EUROPEANS.

Invalided ... ..	16
Deaths ... ..	2

46. TABLE SHOWING CAUSES OF INVALIDING.

Fracture skull (vault) ... ..	1
Blackwater fever ... ..	2
Malaria ... ..	2
Syphilis ... ..	1
Cerebral tumour ... ..	1
V. D. H. ... ..	1
Endarteritis ... ..	1
Anæmia ... ..	5
Duodenal ulcer ... ..	1
Hepatitis ... ..	1
<b>TOTAL ...</b>	<b>16</b>

47. TABLE SHOWING CAUSES OF DEATHS.

Endocarditis and arterial degeneration (out of hospital) ... ..	1
Malaria ... ..	1
<b>TOTAL ...</b>	<b>2</b>



## 48. TABLE SHOWING CAUSES OF ILLNESS.

Diarrhoea	...	...	...	...	6
Influenza	...	...	...	...	1
Pneumonia	...	...	...	...	1
Tonsillitis	...	...	...	...	8
Malaria	...	...	...	...	143
Blackwater fever	...	...	...	...	2
Pyrexia of unknown origin	...	...	...	...	1
Syphilis	...	...	...	...	8
Soft chancre	...	...	...	...	5
Gonorrhoea	...	...	...	...	23
Disease due to infection	...	...	...	...	1
Nervous System—nervous disease	...	...	...	...	4
„ mental disease	...	...	...	...	1
Disease of ear and nose	...	...	...	...	5
Disease of Circulatory System	...	...	...	...	5
Disease of blood	...	...	...	...	26
Disease of Respiratory System	...	...	...	...	12
Disease of teeth and gums	...	...	...	...	1
Disease of Digestive System	...	...	...	...	26
Disease of the skin	...	...	...	...	15
Other diseases due to animal parasites	...	...	...	...	1
General injuries	...	...	...	...	1
Local injuries	...	...	...	...	26
No appreciable disease	...	...	...	...	2
All other causes	...	...	...	...	44
TOTAL					<u>368</u>

## (b) 49. NON-EUROPEAN TROOPS.

Invalided	...	...	...	...	21
Deaths	...	...	...	...	1

## 50. TABLE SHOWING CAUSES OF INVALIDING.

Lymphadenitis	...	...	...	...	2
Chronic periostitis	...	...	...	...	1
Wound, lacerated eye	...	...	...	...	1
D. A. H.	...	...	...	...	2
V. D. H.	...	...	...	...	1
Chronic bronchitis	...	...	...	...	1
Hernia	...	...	...	...	2
Chronic rheumatism	...	...	...	...	1
Lung, emphysema of	...	...	...	...	1
Lung, tuberculosis of	...	...	...	...	1
Ascites	...	...	...	...	1
T. B. of hand	...	...	...	...	1
Hemiplegia	...	...	...	...	1
Otitis media	...	...	...	...	1
Hip-joint disease	...	...	...	...	1
Tubercular arthritis	...	...	...	...	1
Beri-beri	...	...	...	...	1
Syphilis	...	...	...	...	1
TOTAL					<u>21</u>

## 51. TABLE SHOWING CAUSE OF DEATH.

Intestinal obstruction	...	...	...	...	1
------------------------	-----	-----	-----	-----	---

## 52. TABLE SHOWING CAUSES OF ILLNESS.

Diarrhœa	...	...	...	...	7
Mumps	...	...	...	...	2
Pneumonia	...	...	...	...	3
Rheumatic fever	...	...	...	...	4
Chicken-pox	...	...	...	...	6
Tonsilitis	...	...	...	...	3
Malaria	...	...	...	...	84
Soft chancre	...	...	...	...	35
Gonorrhœa	...	...	...	...	42
Nervous System—nervous disease	...	...	...	...	3
Disease of the eye	...	...	...	...	13
Disease of the ear and nose	...	...	...	...	4
Disease of the Circulatory System	...	...	...	...	4
Disease of the Respiratory System	...	...	...	...	29
Disease of the urinary organs	...	...	...	...	7
Disease of the Digestive System	...	...	...	...	16
Disease due to disorders of metabolism and nutrition	...	...	...	...	1
Disease of the skin	...	...	...	...	26
Other disease due to animal parasites	...	...	...	...	2
Local injuries	...	...	...	...	41
All other causes	...	...	...	...	133
Intestinal obstruction	...	...	...	...	1
TOTAL					466

## (c) SIERRA LEONE BATTALION, W. A. F. F.

53. The following table gives the sick and death rates :—

Average Strength of Battalion during 1922.	Percentage of Sick per 1,000.	Percentage of Deaths, Natives.	Percentage of Deaths, European.
370	33	—	—

## (d) SIERRA LEONE POLICE.

54. The following table gives some statistics of sickness and deaths :—

Total Number of Men under Command.	Total Number of Deaths.	Death Rate per 1,000.	Total Number of Men on Sick List.	Daily Average Sick per 1,000.
303	3	9.90	811	2.73

## (vii) HILL STATION EUROPEAN RESERVATION.

(Between 700 and 900 feet above Freetown and overlooking it and connected with it by a winding railway about five miles long.)

55. The average number of residents at Hill Station during the year was about fifty, divided as follows. Owing to the shortness of tours changes are frequent :—

Official	...	...	...	...	30
Military	...	...	...	...	3
Missionary	...	...	...	...	1
Merchantile	...	...	...	...	3
Wives of the above	...	...	...	...	13



## (viii) GENERAL TABLE OF INVALIDINGS AND DEATHS OF EUROPEANS.

56. In the following table the figure for "others" under total resident is taken from the 1921 Census and is therefore not quite comparable with the two others. It is not practical to obtain even an approximate figure for total unofficial European residents for 1922.

—			Total Resident.	Deaths.	Invalided.
Official, including	West	African			
Frontier Force	...	...	209	2	5
Imperial Military	...	...	285	2	16
Others	...	...	591	7	18

## III.—HOSPITALS AND DISPENSARIES.

## (a) FREETOWN.

57. The old law courts buildings continued to be used as a temporary native hospital up to January 9, 1922, on which date the patients were transferred to the two blocks of the new Freetown Colonial Hospital, which had been completed. Shortly afterwards, the operating theatre, and the kitchen, laundry and fumigating chamber—all worked by steam—were brought into use. The third and last block to be completed was opened on the 8th August.

58. The building originally erected as a mortuary was converted into a dental surgery.

59. The old law courts buildings continued to be used for medical offices, stores, laboratory, dispensary and out-patients department, some modification of the interior arrangements being made to better adapt them for these purposes.

60. The new Colonial Hospital buildings are still not half completed. The original plans included, in addition to those already erected, three more blocks of two wards, each similar to those already built, a European hospital block, surgeon's quarters, sisters' quarters, offices, stores and out-patients department. Their completion, under the present financial conditions of the Colony, seems far off.

61. The installation of an electric light and x-ray plant was under consideration and it is hoped that this will shortly be accomplished.

62. The six wards are divided as follows :—

—				Beds.	Cots.
1 Maternity ward with a small Labour ward with two beds divided off	...	...	...	11	2
1 Female ward	...	...	...	13	3
3 Male wards of fourteen beds each	...	...	...	42	—
1 Male ward for senior officials, and better class patients	...	...	...	14	—
TOTAL	...	...	...	80	5

63. Running along the whole length of each side of each ward is a verandah which is completely mosquito proofed; consequently, the windows and doors of the wards can nearly always be kept open. The floors are of painted concrete.

64. Some complaints that one heard patients make when the new hospital was first opened were of—

- (a) the concrete floors,
- (b) draught, and
- (c) being starved.

As to (a), concrete no doubt is colder to bare feet than wood, mud and other material to which the native is accustomed for his flooring, but it is obviously more sanitary for a tropical native hospital, and patients are beginning to get used to it. As to (b), the African likes to shut up every crevice of his sleeping room to the extent of putting paper and rags into ventilators, as I have frequently seen; but in a hospital one must have fresh air. As to (c), the native has not yet reached the understanding that food is often cut down to save his life.

65. Another curious idea of the native is that he is being defrauded by the dispenser when he adds water to make up his medicine.

66. The total number of admissions during the year was 1,282 with 120 deaths. Prevailing diseases were:—Malaria (147 cases), local injuries (90), pneumonia (83), ulcers (59), bronchitis (58), dysentery (52).

67. The total in-patients and the maternity in-patients since 1904 are shown in the following table:—

Year.	Total In-patients.	Maternity In-patients.	Remarks.
1904	1,098	61	
1905	1,358	74	
1906	1,170	46	
1907	1,051	60	
1908	949	57	
1909	1,214	97	
1910	1,447	117	
1911	1,481	125	
1912	1,645	191	
1913	1,465	63	
1914	1,387	?	
1915	1,136	?	
1916	1,096	109	
1917	1,664	105	
1918	1,493	?	
1919	1,477	93 ?	{ Apparently only full term cases were recorded this year.
1920	602	133	{ Hospital burnt—temporary hospital of one male ward and four maternity beds.
1921	737	142	{ New hospital opened—four wards in January, including maternity ward of eleven beds—two more wards in August.
1922	1,282	169	

68. The annual report of the maternity ward appears in the appendix. Native women will not remain in hospital long enough: 35.5 per cent. of labour cases insisted on going home after a stay of a day only.

69. Out-patient cases during the last three years have been:—

	1920.	1921.	1922.
New cases ...	8,152	5,654	10,573
Subsequent attendances ...	13,270	16,209	10,443
Total attendances ...	21,422	21,863	21,016



70. The Nursing Home (European hospital) remains as last year in the building which was originally the Government rest-house. The total number of patients treated was 126 as against 175 in 1921 and 209 in 1920, with seven deaths as compared with two and five in 1921 and 1920, respectively. Six operations were performed—one being fatal, but death was not due to operation.

71. The number of status of those receiving treatment as in-patients in this institution were as follows :—

—				Admissions.	Deaths.
(a)	Government officials	...	...	34	1
(b)	Members of mercantile firms	...	...	28	2
(c)	Shipping	...	...	52	2
(d)	Miscellaneous	...	...	5	2
(e)	Ladies	...	...	7	Nil
TOTAL				126	7

#### (b) KISSY MEDICAL INSTITUTIONS.

(Lunatic asylum, male and female infirmaries and infectious diseases hospital. Kissy is about five miles from Freetown by road or rail.)

72. The large old male infirmary had become dangerous through age and decay and was demolished in 1921, the patients having been transferred to the stone infectious diseases hospital, which thus became the male infirmary temporarily. Infectious cases were treated in huts within a barbed wire fence and in a ward next the leper ward. It was considered that this provision for infectious cases was inadequate. The less seriously ill infirmary patients were gradually discharged and the remnant transferred in November of the year under review to the ward next the leper ward referred to, thus giving the infectious diseases hospital back to its original function, but considerably reducing the accommodation for male infirm.

73. It might be stated here that the Kissy medical institutions consist of three groups of buildings, one on the slope of the mountains some 200 feet above sea level, comprising the lunatic asylum of two compounds for male and female patients, respectively, and a female infirmary. The main wards of the asylum comprise three wooden buildings in the male compound and one in the female, all falling to pieces. The attendants' quarters, dispensary and offices are of stone, and a high wall encloses the compounds.

74. A few yards from the asylum is an ordinary native house converted for use as a female infirmary. Another dilapidated building !

75. The other two groups are some three-quarters mile away and perhaps one-quarter mile from one another on the edge of the Sierra Leone River. The three groups form roughly an isosceles triangle. One group consists of the remains of the male infirmary referred to above, a dangerous wooden building used as a female infirmary (since evacuated), and a long wooden building divided into two wards, a larger used as the male infirmary and a smaller for male lepers. This building appears to be safe. Kitchen, offices, quarters, etc., are here also.

76. The third group consists of the stone infectious diseases hospital with out-buildings, five additional corrugated iron huts for one or at most two cases each, all within a high stone wall enclosing three sides, the fourth being of barbed wire and overlooking the steep side of the river. Near this, there were being erected at the close of the year, two corrugated iron huts with concrete floors for two, or at the most four, patients each with kitchen, attendants' quarters etc., all within a barbed wire fence. There is room for two more huts of the same type within the enclosure. The new huts are being built to replace similar temporary buildings, which were on land now taken over for Admiralty purposes.



77. A comprehensive scheme has been submitted for dealing with quarantine cases, infectious diseases, lepers, and the infirm at Kissy within one large circumscribed area surrounded by a further unoccupied area. All would be under the Medical Officer, Kissy. The inaccessible quarantine station on Aberdeen peninsula with its dilapidated wooden buildings would be done away with: medical attendance there has always been a difficulty, as the very time when an epidemic is threatened or quarantine restrictions are imposed, is the same time a medical officer can least be spared to visit the quarantine station.

78. Under existing conditions, it is almost impossible to give proper treatment to lunatics: there can be no sorting out of cases. The chances of recovery of one just within the "borderline" is naturally diminished by being segregated with all other kinds of mental cases within the same enclosure.

79. As much attention as possible has been given to occupational treatment: gardening, mat making, laundry, etc.

80. The reduction of beds for the old and infirm and for chronic cases formerly transferred from Freetown and elsewhere is here shown. The further reduction necessary early in 1923 is included.

—					For Years Past.	1921.	1922.	1923 (early).
Male	...	...	...	...	70 or more	54	28	28
Female	...	...	...	...	46	46	46	26

81. One case of smallpox, thirty-eight of chicken-pox, and one of measles, were admitted during the year. Most of the chicken-pox cases were Freetown sanitary labourers: they are under observation, the rest of the population of the labouring classes are not.

82. Some statistics for the other Kissy institutions are given here:—

—		Admissions.	Total Treated.	Died.
Lunatic asylum	...	44	134	16
Infirmaries	...	339	384	77

83. Dr. Cummings, Medical Officer, reports that a large number of the infirmary patients suffer from syphilis, that intravenous and intramuscular injections of Novarsenobillon and Galyl were given. He says "the latter drug was found more efficacious and its curative powers greater than Novarsenobillon."

84. "The death rate among pulmonary tuberculosis cases was again very high; there has been no active treatment and only symptoms were treated."

85. "The lepers, two in number, had a change in their usual experience. Active treatment was started in the last quarter of the year on both these patients. The nasal discharges were examined before treatment, also swabs were taken from ulcers on one of the patients; in all of these an acid-fast bacillus, which was diagnosed microscopically as the *B. lepra*, was found. Moogrol, an ether preparation of the chaulmoogric series of acids prepared by Messrs. Burroughs, Wellcome and Company, was used. Weekly intramuscular injections were given in increasing doses, starting from 1 c.c. One patient who is suffering from the nodular type, with ulceration on Ala Nasi, ears and legs, has been greatly benefited by the drug; his ulcers have all healed up rapidly, the texture of his skin has improved and some nodules have disappeared. His arms and face appear smoother than they were before treatment. Unfortunately, this patient has had some reaction following the injections; he complained of headache, malaise and fever and lost weight. The drug was lessened in quantity and later on the injections were suspended; these will be resumed as soon as the patient has recovered from the reaction. The other patient is suffering from the Anaesthetic type; he has shown no reaction whatever, and the patches on his skin do not appear to have improved, nor has there been any change in the anaesthetic area. The treatment is being continued."



## (c) HOSPITALS AND DISPENSARIES ELSEWHERE.

86. *In the Colony :*

Bonthe has a hospital—very dilapidated—with, usually, a Senior Medical Officer in charge.

Sierra Leone village dispensaries, with dispensers in charge, are at Waterloo, Kent and York.

Other villages are visited by travelling medical officers.

87. The question of opening more dispensaries in the sole charge of dispensers appears to have exercised the minds of the community during the year. The people want them ; but, unfortunately, the Medical Department, after careful consideration, has come to the conclusion that with the dispensers as at present trained it is a waste of money to open more, from the purely medical point of view. The Medical Department has of course nothing to do with the matter from the aspect of policy. Proposals have been submitted for the somewhat better teaching of nurses, the main recommendation, from the financial point of view, being a slight increase of African nurses, male and female, to allow more time being given to study. The teaching syllabus is being improved and examinations and tests for promotion and, if necessary, even before approval is given for increments of salary, are being more thoroughly enforced and stiffened. The idea of promotion simply on the grounds of seniority in the technical staff—dispensers and nurses—is not encouraged. Merit, other things being equal, is given greater support.

88. *In the Protectorate :—*

(a) The following have small permanent hospitals and are in charge of medical officers :—

Daru, on the railway in Central Province and the headquarters of the West African Frontier Force.

Pujehun, the headquarters of the Southern Province.

(b) The following have “bush” hospitals—i.e. native built huts and are in charge of medical officers :—

Moyamba, on the railway in Central Province.

Bo, on the railway in Central Province.

Makene, the only station in the Northern Province with a medical officer.

(c) The following are in charge of dispensers :—

Kennema, regularly visited by Medical Officer, Bo, the headquarters of the Central Province.

Bandajuma, closed 22nd July, 1922, when abandoned by the detachment of West African Frontier Force.

Sembehun and Sumbuya, in the Southern Province.

Kaballa, Port Lokkoh and Batkanu, in the Northern Province.

## (d) HOSPITAL AND DISPENSARY STATISTICS.

89. Table showing total number of cases treated at all hospitals and dispensaries for eighteen years :—

Year	...	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
Patients	...	31,211	32,635	33,027	38,468	33,401	36,052	39,405	41,946	31,536
Year	...	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.
Patients	...	49,419	50,513	49,368	57,765	55,562	44,698	51,287	48,270	51,689

90. Quinine was issued gratuitously to the public to the extent of 251,521 grains.



## IV.—SCIENTIFIC.

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91. Reports appear as appendices.

F. J. A. BERINGER,

*Director of Medical and Sanitary Services.*

FREETOWN, SIERRA LEONE,

11th May, 1923.

## V—SANITATION.

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### i. (a) ADMINISTRATION.

1. The European staff of the Sanitary Department remained the same as during the previous year. The title of Senior Sanitary Officer and Sanitary Officer were altered to Deputy Director, Sanitary Service, and Senior Sanitary Officer, respectively. Major Peacock acted as Deputy Director, Sanitary Service, for the second half of the year. Dr. Beringer ceased to hold the office of Deputy Director, Sanitary Service, on the 29th October on his promotion to Director, Medical and Sanitary Services, Sierra Leone, and Dr. O'Hara May, Senior Sanitary Officer, Gold Coast, was promoted to fill his place, but the promotion had not been announced at the conclusion of the year. During the leave of Dr. Allan, Medical Officer of Health, Freetown, Dr. E. S. Walls, Medical Officer, acted in this capacity. Details as to leave and resumption of duty of European officers will be found in another place.

2. One third grade clerk resigned during the year and his place was not filled.

3. The total strength of sanitary inspectors and learners sanctioned was twenty-four. Five sanitary learners, having passed the necessary qualifying examination, were appointed Fifth Grade Inspectors, bringing up the total of that rank to twelve.

4. Difficulty is still experienced in obtaining a sufficient supply of suitable men to maintain the establishment of sanitary inspectors at full strength, and it has not been possible to fill any of the vacancies in the first four grades. This handicap is not likely to be overcome until a good secondary education on modern lines is available in this Colony for boys capable of benefiting by it.

5. Reference was made in the last annual report to the failure of the scheme for training Protectorate youths to be public vaccinators. Approval was given during the year to abolish as soon as possible the rank of vaccinator, except in Freetown, and transfer this work to the sanitary inspectors. For this reason provision was made to increase the establishment of sanitary inspectors from twenty-four to thirty in 1923. The staff of vaccinators was reduced from sixteen to eight at the end of the year.

6. Dr. Beringer inspected the following places during the year :—Mano, Njala, Sumbuya, Pujehun, Bandajuma, Bo, Blama, Kennema, Segbwema, Pendembu, Daru, Bonthe, and Moyamba. Major Peacock the following :—Port Lokko, Waterloo, York, Kent, and the Banana Islands.

7. Two sanitary inspectors were posted to Protectorate stations at the beginning of the year ; one to Pendembu, visiting Daru and Segbwema each month, the other to Moyamba, visiting also Mano. An inspector has been stationed at Bo since 1919, and he now visits Blama and Kennema once a month.

8. The total cost of the Sanitary Department during the year was £19,340, distributed as follows :—

	£
Salaries, allowances and travelling ...	8,547
Labour ... ..	7,083
Material and maintenance ... ..	1,803
Anti-malarial measures ... ..	1,150
Rent of buildings ... ..	504
Tsetse-fly investigation ... ..	150
Miscellaneous ... ..	40
Meteorology ... ..	36
Library and scientific apparatus ... ..	27

With the exception of the item anti-malarial measures, under which some permanent drainage work was carried out in continuation of the Steegmann Scheme, these sums do not include any sanitary works carried out by the Public Works Department.

9. The ratio of Medical and Sanitary estimates to total estimated revenue during the last five years is shown below :—

Year.	Medical Vote.	Sanitary Vote.	Ratio of Medical and Sanitary Vote to Estimated Revenue.
	£	£	
1922 ... ..	51,164	24,106	1 : 11
1921 ... ..	57,642	25,252	1 : 12·4
1920 ... ..	38,808	18,518	1 : 12·3
1919 ... ..	31,606	15,878	1 : 10·7
1918 ... ..	29,761	14,760	1 : 13·7

Notes. 1. In 1919 and 1920 there was special war expenditure on anti-malarial measures under the control of the Senior Sanitary Officer, but not included in the Sanitary vote. It has, however, been added to it in calculating the ratio of expenditure.

2. In 1921 this anti-malarial measures vote was included in the Sanitary vote.

3. War bonuses are not included in the Medical and Sanitary votes.

4. In 1921 the salaries were adjusted and war bonus ceases to find place in the Colony Estimates.

5. The sum voted is not necessarily expended in full.

#### (b) LEGISLATION.

10. The following places were declared sanitary districts under the Public Health (Protectorate) Ordinance, 1915 :—Mano, Yonni (a trading centre near Pujehun), Makene, Daru, and Malema, the last two districts being contiguous, but in different chiefdoms. Rules made under this Ordinance were applied for the first time to Moyamba, Mano, Yonni, Daru and Makene. Additional rules were applied to Kennema, Bo, Blama, Port Lokko, Pujehun, Pendembu, Kanre-Lahun and Segbwema.

11. The following table shows the places that were declared infected under the Quarantine Ordinance, 1914, and subsequently declared free from infection, with dates and diseases on account of which action was necessary :—

Place.	Country.	Disease.	Declared Infected	Declared Free
Port Harcourt ...	Nigeria ...	Smallpox	10th January, 1922	25th March, 1922
Grand Bassa ...	Liberia ...	"	10th December, 1921	25th January, 1922
Bathurst ...	Gambia ...	"	3rd December, 1921	20th March, 1922
Boulama ...	Portuguese Guinea	Plague	4th May, 1921	21st March, 1922
Bissao ...	"	"	11th June, 1921	25th May, 1922
Grand Bassam ...	Ivory Coast ...	Yellow fever	1st September, 1922	15th Sept., 1922
Warri ...	Nigeria ...	"	25th November, 1922	29th Dec., 1922
Salt Pond ...	Gold Coast ...	"	7th December, 1922	Remaining infected at end of year.



12. Two public meat markets in Freetown (one in Walpole Street and the other in Savage Square) were closed by virtue of the powers vested in the Governor in Council by section 23 of the Public Health Ordinance of 1905. They had apparently been declared "public" meat markets under a misapprehension of the law: strictly speaking, they were private meat shops for which there is no provision. By reason of their having been open so long, it was not considered just to close them until the premises ceased to be used for the sale of meat. The Sanitary Department is not in favour of private meat shops under present conditions of sanitation and of the law.

## ii. (a) PREVENTIVE MEASURES AGAINST INSECT-BORNE DISEASES.

### MALARIA.

13. The following is taken from the Report of Dr. W. Allan, Medical Officer of Health, Freetown.

"(a) *House to House Inspection.* 92,642 inspections of houses and compounds were carried out during the year, resulting in the discovery of 373 mosquito breeding places. 373 prosecutions followed with convictions in 330 cases. The convictions realised £81 6s. 6d. in fines, making an approximate average of 4s. 11d. per case.

"(b) *Mosquito Breeding Places.* The total number of mosquito breeding places discovered and dealt with was 1,983.

"(c) *Mosquito Larvæ Index.* A mosquito larvæ index was taken at the end of each quarter when the following results were obtained:—

March	...	...	...	·6 per cent.
June	...	...	...	2·3 per cent.
September	...	...	...	·6 per cent.
December	...	...	...	·4 per cent.

Three hundred compounds were examined at each index.

"(d) *Closing of Wells.* The closing of wells was proceeded with. Twenty were closed during the year leaving, so far as is known, only two to be closed in 1923. It is difficult to state with accuracy the number still remaining open, as some have been discovered in empty compounds, where their presence had not previously been detected. It is quite certain that the number remaining at the end of 1922 is very small.

"(e) *Cesspools.* Cesspools were sprayed with disinfectant during the dry season and with a mixture of oil and disinfectant during the rains.

"(f) *Canalisation of Streams.* As usual, the streams in Freetown were regulated and canalised at the end of the rains and were kept open and clear during the dry season. In the rains the amount of water is so great that it is impossible to do anything with them.

"(g) *Filling up of Low-lying Land.* A certain amount of 'filling up' was done in the Fergusson Street area with great improvement from an anti-malarial point of view.

"(h) *Oiling of Pools and Gutters.* 42,047 pools and gutters were oiled.

"(i) *Mosquitoes.* A species of anopheles mosquito (*A. umbrosus*), not previously known to exist in Freetown, was caught by Major Rudkin, R.A.M.C., in the officers' latrine at Tower Hill Hospital. This was the only specimen "caught and its origin remains a mystery.

"(j) *Drainage.* Drainage work carried out by the Sanitary Engineer is as follows:—

- "(1) New concrete drain:  
 Wesley Street  
 Victoria Street  
 Water Street, near vegetable market  
 Sanders Street



" (2) Improvement to existing drains :

At Westmoreland Street, Kissy Road, Garrison Street, Fort Thornton, Fourah Bay Road, Oxford Street, Junction of Blackhall Road and Kissy Road, Mountain Cut, King Jimmy outfall, Water Street and Wellington Street."

14. Dr. Murphy, Acting Senior Medical Officer at Bonthe, reports that :

"About one acre of what is known as Heddle's Swamp was filled in by dumping rubbish from the dust bins."

He also states that :

To the west of the town there is a large area of grass which in the rains was under water for several months until Dr. C. H. Allan had it drained a few years ago. These drains are kept free yearly and now this area dries up rapidly and consequently a place for mosquito breeding has been almost removed. The prevailing wind is from this area towards the town."

There were 49 prosecutions for mosquito larvæ followed by 48 convictions. The total fines amounted to £13 13s. 9d., an average of 5s. 8d. per conviction.

15. At Moyamba the clearing of a considerable amount of bush was carried out near the station at the terminus of the Moyamba-Sembahun motor road and on the road leading from the station to the European quarters.

16. At Pujehun the clearing of trees and thick undergrowth was carried out around the Government compound and south-western portion of the town. Holes and depressions were filled in with stones and earth.

17. At all stations general anti-malarial measures were carried out by prisoners where available, in other cases by paid labour, or by court messengers or soldiers. £7,083 was spent on sanitary labour, distributed as follows :—

	£
Freetown ... ..	4,264
Wilberforce and Murray Town, suburbs of Freetown, and Cape Sanitary Station, the Quarantine Station near Freetown ...	427
Hill Station ... ..	602
Bonthe and York Island ... ..	416
Waterloo ... ..	61
Seventeen Protectorate towns and Government stations in amounts varying from £24 to £296 ... ..	1,313

#### YELLOW FEVER.

18. No case of this disease was reported during the year.

#### TRYPANOSOMIASIS.

19. Professor B. Blacklock, Director of the Sir Alfred Jones Research Laboratory, carried out investigations during July and August into the prevalence and degree of infection of the tsetse-fly on the Cape Lighthouse Peninsula, and his report is published as an appendix. Out of 471 specimens of *glossina palpalis* dissected, he found twenty-eight infected, twenty-seven of these with trypanosomes of the animal infecting group and one with the "gambiense type." In this connection he remarks that before assuming that this trypanosome was *T. gambiense* and derived from a human being, it is necessary to draw attention to the fact that *T. gambiense* has once been found in cattle here. With a view to getting rid of tsetse-fly in this area, Professor Blacklock suggests "that the portion of the peninsula from the Lighthouse to and beyond the isthmus at Man-of-war Bay should be cleared and planted with a crop which does not afford shelter to the fly."

20. No cases of sleeping sickness were reported during the year. Professor Blacklock saw one suspicious case in the village of Aberdeen, but blood examination showed no trypanosomes and gland puncture was refused.



(b) PREVENTIVE MEASURES AGAINST INFECTIOUS  
AND EPIDEMIC DISEASE.

21. The infectious diseases hospital at Kissy, which was utilized in 1921 as a male infirmary, was restored to its proper function during the year. Owing to the close proximity of the new Admiralty oil depot, this hospital is no longer well adapted for the treatment of smallpox cases, and when financial conditions permit it will be advisable to remove it to a more secluded site.

CEREBRO-SPINAL MENINGITIS.

22. No case was reported during the year.

INFLUENZA.

23. Owing to the prevalence of influenza in England at the beginning of the year, a careful watch was kept on ships arriving from home ports, but no definite cases were discovered. With the exception of one case in February, there were no reports of influenza in Freetown.

An outbreak occurred in the Northern Province in April, mainly in the Koinadugu District, from which reports were received of 100 cases with thirty-four deaths. Mild outbreaks occurred in the Bombali, Karene and Port Lokko Districts about the same time. These outbreaks were investigated and reported on by Dr. Metzger in the Koinadugu District, and Dr. Easmon in the Port Lokko District.

PLAGUE.

24. In Freetown :

- (a) 10,216 rats were brought in and destroyed, being paid for at the rate of 2d. per rat.
- (b) Trapping was not carried out by the department as a routine practice, but traps were lent to known householders who requisitioned for them.

Barium carbonate and tincture of squills were used and were reported on favourably. The rat varnish, which has been used during the past year, has been found highly satisfactory, and not only in the department, but outside it has been receiving great praise.

SMALLPOX, CHICKEN-POX, VACCINATION.

25. In Freetown one case of smallpox was reported in August. At York there were three cases in November. In the Protectorate there were the usual sporadic cases or small outbreaks in a good many places, but nothing in the nature of an epidemic. The largest outbreak reported occurred in May in the Pendembu District, where forty cases were notified with five deaths.

26. Chicken-pox appears to be fairly common both in Freetown and elsewhere. Altogether fifty-two cases were reported in Freetown and forty-seven in other parts of the Colony and Protectorate. The diagnosis from mild or modified smallpox is sometimes by no means easy.

27. Record of vaccinations performed :—

—	1922.	1921.	1920.
Number vaccinated	26,448	35,989	26,672
" successful	9,795	10,917	9,819
" unsuccessful	6,302	6,794	5,430
" not inspected	10,351	18,278	11,423

The falling off in the number of vaccinations as compared with 1921 is due to the fact that in the latter year there was an outbreak of smallpox in Freetown, as a result of which house-to-house vaccination was carried out on a large scale.



## DYSENTERY.

28. The Medical Officer in charge of the Colonial Hospital (in-patients and out-patients) says: "The statement in the 1921 report that dysentery has almost disappeared has not been borne out." The numbers among natives rose from thirty-six to 127 (52 in-patients, 75 out-patients). It has to be remembered, however, that owing to the opening of three ward blocks of the new Colonial Hospital the number of in-patients rose from 737 to 1,282, and that the number of out-patients also increased from 5,654 in 1921 to 10,570 in 1922.

## LEPROSY.

29. Five cases were treated at Kissy infirmary with one death. Other cases reported were four at Bonthe, two in Freetown gaol and one each at Moyamba and Makene.

## ANTHRAX.

30. Dr. Allan, Medical Officer of Health, Freetown, reports as follows:—

"During the year cases of anthrax amongst cattle in Freetown were reported. The first case was discovered on the 9th of January. The animal was reported to have died during the night and when detected the carcass was partially dressed. From the appearance of the spleen, the general inflammatory condition of the other organs and the paleness of the meat, anthrax was suspected. Slides were taken and anthrax was diagnosed bacteriologically. A guinea pig inoculated with splenic material died in three days. The diagnosis of anthrax was confirmed by Professor Blacklock, the Laboratory, Tower Hill. Altogether twenty-five cases were discovered. There are no definite legal powers to deal with this condition, but once the butchers realized the seriousness of the outbreak, they willingly co-operated with this department in its attempt to stamp it out. Segregation and inspection of herds were carried into effect as far as possible, and inspection was also made of animals arriving in Freetown, and of animals before slaughtering in the slaughter house. Incineration of the carcasses was carried out, and the grass where the infected animals were known to have been was burned. The last case occurred on the 29th of August. It would appear that practically all the cattle slaughtered in Freetown came from French country where I am informed anthrax is prevalent. These are the only cases, as far as I am aware, which have been recognized in Sierra Leone, but there seems to be no doubt that deaths were occurring amongst the cattle in Freetown before the first case was diagnosed. No case of human anthrax was discovered."

A memorandum on anthrax by Dr. Beringer (printed as an appendix) was issued when the first case was reported.

31. In consequence of the prevalence of anthrax, a Diseases of Animals Ordinance was drafted, and it is hoped that this will be enacted during 1923.

## OTHER DISEASES.

32. Whooping cough was prevalent during the early part of the year in many places in the Colony and Protectorate. Thirty-five cases were treated at Government institutions in Freetown. The type was mild and no deaths were reported.

33. Twenty cases of measles of a mild type occurred at Bo School early in the year.

## (c) PORT SANITARY WORK—FREETOWN.

34. The port of Freetown was never in quarantine during the year.

35. All ships arriving from infected places (detailed in paragraph 102) were visited and inspected by the Medical Officer of Health. No case of a notifiable infectious disease was discovered.



## iii (a) GENERAL MEASURES.

36. FREETOWN.—The following is from the Report of Dr. W. Allan, Medical Officer of Health. A summary of routine sanitary work is given in Table IV :—

## A—GENERAL SANITARY WORK.

“(a) *Sanitary Inspection.* During the year 8,501 notices were served dealing with insanitary conditions on premises. 105 persons were fined for not removing insanitary conditions after notice. The fines amounted to £41 11s.

“(b) *Meat Inspection.* 3,904 bullocks, 82 sheep, 7 goats, and 1 pig were slaughtered in the public slaughter house by native butchers for public sale. 693 bullocks and 134 sheep were slaughtered in the Imperial slaughter house for the Imperial Government. 473 bullocks, 155 sheep, 1 goat and 3 pigs were slaughtered by the European butchery for public sale. 24 bullocks and 30 sheep were slaughtered for ships in the harbour. 29 bullocks and 1½ quarters of beef were condemned during the year by order of the Police Magistrate for cysticercus bovis.

“(c) *Food Inspection.* The following were condemned and destroyed as a result of inspection of the various stores in Freetown :—

537 tins condensed milk	3 tins camp pie
14 lb. onions	5 tins cheese
5 tins biscuits	1 tin baked beans
1 case steak and kidney pie	38 tins pears
7 cases crab meat	2,634 tins salmon
85 barrels flour	5 tins plums
1 leg of ham	4 cases pine apples
84 barrels of grapes	2 cases peaches
4 tins ideal milk	43 cases macaroni
82 tins paste	1 tin kippered herrings
2 tins vegetables	89 tins apricots
1 tin oatmeal	254 tins chocolates
1 tin pea flour	32 tins pilchards
11 tins sausages	1 tin raspberries

## B—SANITARY BUILDINGS.

“(a) Repairs to dust bins at Nana Kroo Street, Kissy Road, Macdonald Street, Sackville Street and Cole Street.

“(b) Repairs to latrines at Lower Bombay Street, Oxford Street, Nana Kroo Street and Susans Bay.

“(c) Repairs to incinerators at Easton Street, Bombay Street, Henry Street, Sanders Street and Savage Street.

“(d) Repairs to chute at Falcon Bridge.

## C—HOUSING ACCOMMODATION AND OVERCROWDING.

“An investigation was made during the year into the question of housing and overcrowding in Freetown. The inquiry showed more strongly than ever the urgent need for new building regulations in Freetown as well as the necessity for legal powers to deal with unhealthy houses and unhealthy areas.”

## D—WATERWORKS.

The Waterworks Engineer, Mr. Wilfred S. Cole, reports as follows on the Freetown Waterworks :—

- “All sections of the Waterworks were maintained in good condition during the year. There were three new public standpipes erected during the year, bringing the total of public standpipes to 213. There were also nineteen new private services laid, bringing up the total of private services to 379, exclusive of fifty-seven services to Government and Municipal buildings.
- “Owing to lack of funds, no new mains were laid and no new works undertaken beyond the laying of new standpipes and private services above reported.
- “There was no shortage of water this year, and the pumping plant was operated for eleven days only, 3rd to 13th March, inclusive.
- “The total consumption of water this year was 147,506,712 gallons which works out a daily rate of 404,128 gallons. The highest daily consumption recorded was 593,200 gallons on the 26th of April and lowest 263,800 gallons on the 20th of July. The rainfall during the year has been unusually heavy. From 1st January to 31st December the rain gauge at the Congo Brook intake registered 187·45 inches of rain. With such a heavy rainfall there is every prospect of an abundant supply of water during the dry season.
- “Acting on a suggestion contained in Mr. Humphrey's report dated July, 1916, this department examined two streams—one at Adonkia and the other below Angola town. A “V” notch gauge was erected across the latter stream at an altitude of 150 feet above sea level.
- “The result of a series of gauging taken towards the end of April indicates that the average daily yield of this stream at the point selected was about 90,000 gallons. It is proposed to continue the gaugings towards the end of this dry season, as also to gauge the supply of the stream at Adonkia, but as the rainfall for 1922 has been unusually heavy, the results are not likely to indicate the minimum dry weather flow of the streams (which is the most valuable information sought) nor even the average dry weather flow.
- “A small stream in the Lumley valley near the pumping station was also gauged, and its dry weather yield was found to be about 20,000 gallons per diem. A small weir has been constructed across it and it is proposed to lead it to the pool at the pumping station this season. This, when completed, would increase the dry weather supply available for the city by about 20,000 gallons.”

37. At Moyamba a small concrete incinerator of the beehive type was built by prison labour under the direction of the Medical Officer, Dr. Mackay. It has proved very successful and burns on an average about one ton of combustible refuse a day.

38. Dr. Renner, African Medical Officer at Pujehun, writes as follows with regard to the native town of Pujehun, headquarters of the Southern Province, which was made a sanitary district in 1921 :—

- “The whole idea of sanitation is new to them, but they see what it means and are proud of their town, although at times they consider the Government a great nuisance. The town has been divided into four sections with a responsible person at each section. This has done much for general improvement as each section endeavours to compete with the other.”

He reports the following work done :—

- (1) A cattle enclosure has been provided for the town.
- (2) Three new public latrines built.
- (3) A bush incinerator.
- (4) A cemetery.



39. The following sanitary works were carried out in the Protectorate by the Public Works Department :—

- (1) Deepening and covering well at Makene.
- (2) Sinking well at Pendembu.
- (3) Transfer of rain water tanks from Bo to Daru.

40. The Engineering Branch of the Railway provided a pipeborne water supply at Bo for the bungalows and school from the Railway well.

41. At Hill Station the circumferential cleared area was slightly increased : levelling, stumping and planting with short grass were continued. A considerable amount of weeding, clearing of bush, stumping and levelling was done in the grounds of Governor's Lodge, which had not been occupied by a Governor for a considerable number of years.

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

42. The usual courses of lectures to sanitary learners in connection with the syllabus laid down in Regulation 3 of 1915 were given by the Medical Officer of Health. These courses were also taken by male nurses in training at the Colonial Hospital. Sanitary learners also received instruction in office routine, outdoor sanitary work in all its branches, Police Court duties, and so on, under the supervision of the Medical Officer of Health and Superintendent Sanitary Inspectors.

#### (c) VITAL STATISTICS.

—	Population, 1921 Census.	Birth Rate.	Death-rate.	Infantile Mortality Rate.
Freetown ... ..	44,142	16.9 per 1,000	26.3 per 1,000	418
Colony other than Freetown	41,021	20.2 per 1,000	21.2 per 1,000	217

43. Owing to the non-registration of many births, the "available" birth rate is undoubtedly much below the actual birth rate, and for this reason the infantile mortality rate, which is the number of deaths of infants under one year of age, per 1,000 registered births, appears a good deal higher than it really is. According to the 1921 Census the males exceeded the females by 28.5 per cent. and 24.3 per cent. in Freetown and the rest of the Colony respectively.

This is an additional factor in producing a low birth rate.

#### iv. RECOMMENDATIONS FOR FUTURE WORK.

44. (1) Measures to secure more accurate registration of births and to place the registration of births and deaths in the hands of the Deputy Director, Sanitary Service.

(2) Inauguration of maternity and infant welfare work under a lady superintendent with a view to reducing the abnormally high infantile mortality.

(3) (a) Legislation for the control of housing and town planning and bringing up to date the Public Health Ordinance.

(b) Legislation with regard to diseases of animals.

## VI.—METEOROLOGICAL.

45. The climate of Sierra Leone is tropical with a heavy rainfall and a high atmospheric humidity during the greater part of the year. There is a single rainy season lasting roughly from May to the end of October. This constitutes the period of the south west moonsoon. It is preceded and followed by a period of thunderstorms known as tornadoes, which travel in a direction from east to west. In August, there is sometimes a slight break in the rains. July, August and September are the months of heaviest rainfall.

46. The highest rainfall is recorded on the coast, decreasing gradually inland, as is shown in the table below.

AVERAGE MONTHLY AND ANNUAL RAINFALL (IN INCHES).

Month.	*Freetown (Tower Hill).	†Bonthe.	†Daru.	†Kaballa.
January ... ..	0·35	0·17	0·18	0·17
February ... ..	0·26	0·56	1·22	0·44
March ... ..	1·15	1·92	4·13	1·59
April ... ..	3·59	4·57	8·40	3·38
May ... ..	10·75	10·45	9·36	8·91
June ... ..	19·80	22·64	12·75	12·84
July ... ..	34·51	26·82	10·34	12·60
August ... ..	36·19	24·66	12·68	13·62
September ... ..	26·90	25·93	16·30	16·51
October ... ..	11·86	11·07	12·46	12·86
November ... ..	5·58	8·07	7·91	6·01
December ... ..	1·53	1·70	1·93	0·97
TOTAL ... ..	152·47	138·56	97·66	89·90

\*Forty years average.

†Ten years average.

Freetown and Bonthe are on the coast, Daru is approximately eighty-five miles inland and Kaballa 120 miles inland.

47. Rainfall records taken in Freetown (Tower Hill), 180 feet above sea level, for the last forty years are now available, and the following table for each of the last four decennia shows very markedly the decrease in the rainfall, which is said to be common to the whole of West Africa and the neighbouring islands.

AVERAGE RAINFALL—FREETOWN (TOWER HILL).

Period.	Average Rainfall.
1882-1891 ... ..	166·07
1892-1901 ... ..	165·15
1902-1911 ... ..	156·00
1912-1921 ... ..	122·66

The highest rainfall recorded was 204·19 inches in 1883, and the lowest 102·34 inches in 1914.

48. In December and January, Sierra Leone comes into the region of the north-east trades and the resultant wind known as the "harmattan" blows from N.N.E. It is an exceedingly dry wind and is accompanied by a thick haze, probably composed of minute particles of dust. During this period there are cool nights and hot days and the maximum diurnal variations are registered.

The lowest mean temperatures are usually recorded in the months of July and August.

49. Records of temperature, humidity and rainfall taken at Freetown (Tower Hill), Bonthe (Sherbro), Bo and Batkanu during 1922 are given in table V.

W. H. PEACOCK,

*Acting Deputy Director, Sanitary Service.*

3rd April, 1923.



TABLE I.

## A—MEDICAL STAFF.

Office.	Name.	Absent on Leave						Remarks.
		From			To			
Director of Medical and Sanitary Services ...	W. I. Taylor ...	29	6	22	28	10	22	Retired 29th October, 1922.
"	F. J. A. Beringer ...	—			—			Appointed 29th October, 1922.
Deputy Director of Medical Service ...	J. B. Bate ...	30	11	22	31	12	22	
Senior Medical Officer	C. H. Allan ...	27	7	22	16	12	22	
"	E. W. Wood-Mason	1	1	22	18	3	22	Promoted A.D.M.S., Gold Coast on 15th September, 1922, but did not leave during the year.
"	J. C. Murphy ...	1	1	22	26	5	22	Appointed 15th September, 1922.
Medical Officer ...	J. M'Conaghy ...	{ 2 6 22			11	11	22	Vacation leave.
"	J. Y. Wood ...	{ 12 12 22			31	12	22	Sick leave.
"	M. Jackson ...	{ 5 4 22			15	9	22	
"	J. M. Mackay, M.C.	{ 1 1 22			4	2	22	
"	J. D. Dimock ...	{ 9 4 22			4	8	22	
"	E. S. Walls ...	{ —			{ —			New appointment—11th January, 1922.
"	J. W. Hartley ...	{ —			{ —			New appointment—17th May, 1922.
"		{ —			{ —			New appointment—14th June, 1922.
African Medical Officer	W. O. Taylor ...	26	7	22	25	10	22	
"	M. C. F. Easmon ...	{ 10 4 22			23	4	22	Sick leave.
"	E. J. Wright ...	{ 15 6 22			31	12	22	Vacation leave.
"	G. N. Metzger ...	{ —			{ —			
"	E. H. Cummings ...	{ —			{ —			
"	E. A. Renner ...	{ —			{ —			
Dental Surgeon ...	John Carr ...	5	10	22	31	12	22	

## B—SANITARY STAFF.

Deputy Director, Sanitary Service ...	F. J. A. Beringer ...	—			—			Promoted 29th October, 1922.
"	H. O'Hara May ...	—			—			Appointed 29th October, 1922, but did not take up his appointment during the year.
Senior Sanitary Officer	Major W. H. Peacock	1	1	22	26	5	22	
Medical Officer of Health ...	W. Allan ...	24	8	22	31	12	22	
Superintendent Sanitary Inspector ...	D. S. Bowen ...	20	4	22	15	9	22	
"	G. V. Herd ...	5	10	22	31	12	22	

## C—NURSING STAFF.

Matron and Senior Nursing Sister ...	Miss L. R. Stevens	19	10	22	31	12	22	
Senior Nursing Sister	Miss K. G. Appleton	9	2	22	21	7	22	Vacation leave.
"	Miss C. Littlewood	25	10	22	31	12	22	Sick leave.
Nursing Sister ...	Miss I. Stevens ...	14	7	22	23	11	22	
"	Miss V. Bell ...	1	1	22	29	4	22	
African Senior Female Nurse ...	Miss B. C. Cole ...	1	1	22	28	1	22	
		—			—			

TABLE I—*continued.*C—NURSING STAFF—*continued.*

Office.	Name.	Absent on Leave						Remarks.
		From			To			
African Senior Female Nurse ... ..	Miss L. Johnson ...	2	11	22	1	12	22	
"	Miss L. Cline ...	1	1	22	18	1	22	
"	Mrs. E. Fyne ...	22	7	22	21	8	22	
African Male Nurses and Apprentices ...	(Twenty-one) ...	—			—			
African Female Nurses and probationer Nurses... ..	(Seventeen) ...	—			—			

## D—AFRICAN MEDICAL SUBORDINATE STAFF.

Chief Dispenser ...	O. E. King ...	1	3	22	31	5	22	
Store-keeper and Assistant Chief Dispenser	E. G. Luke ...	2	11	22	11	11	22	
Assistant Chief Dispenser ...	D. T. Betts ...	—			—			
First Class Dispenser	W. A. Macauley ...	—			—			
"	I. H. Wright ...	—			—			
"	O. E. Nylander ...	—			—			
"	H. E. Frazer ...	—			—			
"	P. J. John ...	1	1	22	15	1	22	Sick leave.
"	T. L. Hooke ...	21	2	22	14	4	22	"
"	M. O. Frazer ...	23	5	22	22	7	22	Invalided out of service, 2nd October, 1922.
"	M. P. Neville ...	22	12	22	31	12	22	
"	Eight	1	2	22	31	3	22	
Second Class Dispensers	Twelve	—			—			
Third Class Dispensers	J. T. Roberts ...	—			—			
Laboratory Assistant ...		15	8	22	29	9	22	

## E—AFRICAN SANITARY SUBORDINATE STAFF.

Public Vaccinators ...	S. H. Brown and fifteen others	—			—			There were several vacancies throughout the year.
Fifth Grade Sanitary Inspectors ...	E. A. Nicholson and eleven others ...	—			—			
Sanitary Learners ...	Twelve	—			—			

## F—CLERICAL STAFF.

First Grade Clerk ...	M. W. Frazer ...	—			—			
Second Grade Clerk ...	M. St. George Auber	1	1	22	14	2	22	
"	S. G. Randall ...	—			—			
Third Grade Clerks ...	Four	—			—			One resigned 1st June 1922, and not replaced.
Fourth Grade Clerks	Nine	—			—			



TABLE IV.

## SUMMARY OF ROUTINE SANITARY WORK DONE DURING THE YEAR IN THE TOWN.

## 1. NAME OF TOWN—FREETOWN.

—				Approximate Area.	Number of Proclaimed Open Spaces.
1920	...	...	...	2½ square miles.	2 Public recreation grounds.
1921	...	...	...		
1922	...	...	...		

## 2. POPULATION.

—				No. of Natives.		No. of Europeans.		Total.
				Males.	Females.	Males.	Females.	
1911 Census	...	...	...	33,532		558		34,090
1921 Census	...	...	...	24,830	19,312	700	71	44,913

## 3. HOUSING.

—				Number Occupied by Europeans.	Number Occupied by Natives.
Number of houses :					
1920	...	...	...	157	6,241 and 67 unoccupied.
1921	...	...	...	—	—
1922 (1921 Census)	...	...	...	162	6,350 and 121 unoccupied.
Number of huts :—					
1920	...	...	...	} Included in the number of native houses.	
1921	...	...	...		
1922	...	...	...		

## 4. ERECTION OF NEW BUILDINGS DURING THE YEAR.

—				1920.	1921.	1922.
Number of houses built without sanction				...	...	...
Number of huts built without sanction				...	...	...

## ACTION TAKEN.

—				Number of Prosecutions.	
				Huts.	Houses.
1920	...	...	...	...	...
1921	...	...	...	...	...
1922	...	...	...	...	...

TABLE IV—*continued.*

## 5. LATRINES.

	For Males.		For Females.	
	Number.	Number of Seats.	Number.	Number of Seats.
Number of public latrines :—				
1920 ... ..	12	89	12	64
1921 ... ..	12	98	12	73
1922 ... ..	12	98	12	73
Number of new public latrines erected during the year :—				
1920 ... ..	2	17	2	12
1921 ... ..	1	12	1	12
1922 ... ..	...	...	...	...

	1920.	1921.	1922.
Number of private latrines ... ..	307	277	291
Average number of pails of nightsoil removed daily ...	343	331	340
Average number of soiled pails removed and clean pail substituted ... ..	...	...	...
Number of nightsoil men employed to clean latrines and remove excreta ... ..	Prisoners employed		
Number of cesspools ... ..	4,269	4,423	4,329
Number of cesspools cleansed ... ..	1,055	1,081	2,321
Number of new cesspools constructed during the year ...	403	50	73
Number of old cesspools abolished ... ..	36	43	69

## 6. REMOVAL OF REFUSE.

	1920.	1921.	1922.
Number of dustbins ... ..	73	73	73
Number of carts (if employed) at work, etc. ... ..	5	5	5
Amount of refuse removed daily from streets ... ..	about 35 tons.		
Number of carts (if employed) at work daily, etc. ...	5	5	5
Amount of refuse removed daily, etc. ... ..	...	...	...
Number of men employed for removing refuse ... ..	...	...	...

## 7. MODE OF DISPOSAL OF EXCRETA, REFUSE AND OFFAL.

	Daily Average Number of Pails of Excreta.			Daily Average Number of Cartloads of Refuse.			Daily Average Number of Cartloads of Slaughter-house and Market Offal.		
	1920.	1921.	1922.	1920.	1921.	1922.	1920.	1921.	1922.
Buried or trenched ... ..	...	...	...	...	...	...	...	...	...
Burnt ... ..	...	...	...	...	...	...	...	...	...
Thrown into sea ... ..	...	...	...	...	...	...	...	...	...
* Otherwise dealt with ... ..	...	...	...	...	...	...	...	...	...

\* State mode of disposal.



TABLE IV—*continued.*

8. AVERAGE DAILY NUMBER OF CARTLOADS OF TIN CANS, BOTTLES,  
BROKEN CROCKERY AND OTHER INCOMBUSTIBLE MATERIAL REMOVED  
FROM HOUSES, HUTS, AND COMPOUNDS.

1920.	1921.	1922.
12	12	12

## 9. WATER SUPPLY.

Nature of Water Supply.	1920.	1921.	1922.
Pipe-borne water :—			
Source (river, lake or spring) :—			
Number of stand-pipes along roads ... ..	206	210	213
Number of stand-pipes in compounds and houses ...	378	417	434
Wells :—			
Public :			
Number ... ..	1	1	1
Number with pumps protected against surface water and mosquito-protected ... ..	...	...	...
Private :			
Number ... ..	55	12	2
Number protected against surface water and mosquito- protected ... ..	31	...	...
*Tanks :—			
Public :			
Number ... ..	4	4	5
Number mosquito-protected ... ..	...	...	...
Private :			
Number ... ..	31	29	29
Number mosquito-protected ... ..	11	9	9
Nature of tanks :			
Wood ... ..	...	...	...
Iron ... ..	...	22	31
Concrete ... ..	...	7	12
Barrels :—			
Number ... ..	1,939	1,021	1,132
Number mosquito-protected ... ..	251	247	223

\* The heading "Tanks" covers all fixed receptacles (including reservoirs) for storage of water.

TABLE IV—*continued*.

## 10. DRAINAGE.

Nature of Drainage.	Public.	Private.
Masonry drains :—		
Linear yards of masonry drains :		
1920 ... ..	11,197	...
1921 ... ..	11,659	...
1922 ... ..	12,808	...
Linear yards reconstructed during the year :		
1920 ... ..	...	...
1921 ... ..	...	...
1922 ... ..	...	...
Linear yards repaired during the year :		
1920 ... ..	...	...
1921 ... ..	...	...
1922 ... ..	...	...
Linear yards of new drains constructed during the year :		
1920 ... ..	2,067	...
1921 ... ..	462	...
1922 ... ..	1,149	...
Earth drains or ditches :—		
Number of linear yards of ditches cleaned :		
1920 ... ..	43,375	...
1921 ... ..	39,473	...
1922 ... ..	37,080	...
Number of linear yards of ditches dug and graded :		
1920 ... ..	60	...
1921 ... ..	400	...
1922 ... ..	...	...
Average frequency of clearing ditches of grass :		
1920 ... ..	...	...
1921 ... ..	...	...
1922 ... ..	...	...

## 11. INSPECTIONS AND PROSECUTIONS.

	1920.	1921.	1922.
Number of Inspectors employed ... ..	19	19	19
Number of houses inspected ... ..	90,876	92,378	93,642
Number of houses where larvæ were found ... ..	438	483	373
Number of notices served to remove conditions causing the breeding of larvæ ... ..	153	...	...
Number of persons fined for having mosquito larvæ on premises ... ..	403	407	330
Number of notices served to remove insanitary conditions on premises ... ..	4,642	4,532	8,501
Number of persons fined for not removing insanitary conditions after notice ... ..	176	142	105
Number of soda and aerated water factories inspected ... ..	...	...	1



TABLE V.

STATION—FREETOWN (TOWER HILL).  
 Latitude 8° 29' N. Longitude 13° 9' W.

MONTH.	Absolute Shade, Maximum.	Absolute Shade, Minimum.	Average Maximum.	Average Minimum.	Relative Humidity.	Rainfall in Inches.
January ...	93	68	89	74	66.5	...
February ...	94	73	91	75	63	...
March ...	95	73	91	75	61	...
April ...	92	71	88	74	67	4.45
May ...	91	71	88	75	71.5	3.82
June ...	91	69	86	73	76.5	15.87
July ...	87	72	82	75	83	37.68
August ...	86	70	81	73	81.5	32.79
September ...	89	70	83	73	82.5	38.38
October ...	88	69	86	72	78.5	12.18
November ...	91	71	87	74	76	7.12
December ...	91	65	87	74	73.5	1.61
The Year ...	95	65	86.6	73.9	73.4	153.90

STATION—BONTHE (SHERBRO).  
 Latitude 7° 32' N. Longitude 12° 30' W.

January ...	93	62	89	70	73	0.02
February ...	93	69	90	74	73	...
March ...	94	69	92	72	68	...
April ...	93	70	90	72	73	5.25
May ...	98	70	88	73	73	7.20
June ...	98	69	87	73	82	23.48
July ...	89	70	82	73	84	20.08
August ...	87	69	83	71	81	24.90
September ...	87	69	83	71	82	29.74
October ...	89	69	85	72	82	15.78
November ...	89	70	86	72	81	14.00
December ...	90	68	87	71	78	3.45
The Year ...	98	62	86.8	72	77.5	143.90

TABLE V—*continued.*

## STATION—BO.

Latitude 7° 57' N. Longitude 11° 46' W.

MONTH.			Absolute Shade, Maximum.	Absolute Shade, Minimum.	Average Maximum.	Average Minimum.	Relative Humidity.	Rainfall in Inches.
January	...	...	96	56	91	69	69	0.05
February	...	...	97	64	94	69	63	...
March	...	...	101	68	95	71	69	0.28
April	...	...	95	68	91	72	80	7.29
May	...	...	94	68	89	71	85	12.92
June	...	...	90	68	86	71	87	13.88
July	...	...	85	70	82	71	90	9.13
August	...	..	87	61	82	69	88	16.16
September	...	...	86	60	82	67	86	25.81
October	...	...	89	64	86	71	87	17.86
November	...	...	98	60	91	70	83	9.39
December	...	...	92	60	85	63	85	3.66
The Year	...	...	101	56	87.8	69.2	81	116.43

## STATION—BATKANU.

Latitude 9° 4' N. Longitude 12° 26' W.

January	...	...	98	67	93	70	67	...
February	...	...	99	70	97	72	64	...
March	...	...	101	70	98	73	67	0.02
April	...	...	99	70	97	72	71	6.13
May	...	...	96	67	93	70	76	12.62
June	...	...	96	66	90	69	85	13.95
July	...	...	95	67	91	69	82	31.63
August	...	...	92	66	89	69	85	26.06
September	...	...	93	67	90	69	81	18.98
October	...	...	94	68	91	70	81	17.71
November	...	...	94	69	93	70	81	2.76
December	...	...	95	63	93	70	81	4.10
The Year	...	...	101	63	92.9	70.2	76.7	133.96



TABLE VI.

RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1922.

Diseases.	*IN-PATIENTS.					OUT-PATIENTS.	
	‡Remaining in Hospital at end of 1921.	TOTAL		†Total Cases treated.	§Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
INFECTIVE DISEASES.							
Beri-beri ... ..							
Cerebro-spinal Fever ...							
Chicken-pox ... ..	...	...	...	...	...	1	
Cholera ... ..							
Dengue ... ..							
Diphtheria ... ..							
Dysentery:—							
(a) Amœbic ... ..	...	8	...	8	...	...	
(b) Bacillary ... ..							
(c) Type not deter- mined ... ..	...	...	...	...	...	1	
Endocarditis—infective							
Enteric ... ..							
Erysipelas ... ..							
Gonorrhœa ... ..	...	...	...	...	...	7	
Influenza ... ..							
Kala-azar ... ..							
Leprosy:—							
(a) Nodular ... ..							
(b) Anæsthetic ... ..							
Malaria :—							
(a) Tertian ... ..	...	...	...	...	...	5	
(b) Quartan ... ..	...	...	...	...	...	1	
(c) Aestivo-autumnal ...	...	55	3	55	...	26	
(d) Chronic ... ..							
(e) Type not deter- mined ... ..	...	...	...	...	...	28	
Blackwater Fever ... ..	...	4	2	4	...	2	1
Measles ... ..	...	...	...	...	...	1	
Papataci Fever ... ..							
Plague ... ..							
Pneumonia ... ..							
Pyrexia of uncertain origin ... ..	...	...	...	...	...	2	
Rabies ... ..							
Relapsing Fever ... ..							
Rheumatic Fever ... ..	...	...	...	...	...	1	
Septicæmia ... ..							
Smallpox ... ..							
Syphilis :—							
(a) Primary ... ..	...	1	...	1	...	...	
(b) Secondary* ... ..							
(c) Inherited ... ..							
Tetanus ... ..							
Trypanosomiasis (Sleep- ing Sickness) ... ..							
Tuberculosis ... ..	...	1	...	1	...	...	
Carried forward ... ..	...	69	5	69	...	75	1

\*“Tertiary Syphilis” is a term sometimes applied to the later symptoms.

\*In-patients are those treated in hospitals and institutions, and the term does not apply to those treated in their own quarters, even though they would ordinarily be in-patients if there were suitable accommodation.

†“Total cases treated” will, of course, include those remaining in hospital at the end of the previous year.

‡i.e., the year previous to that for which the return is made.

§The figures in this column to be carried on to the next year's return.

TABLE VI—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
INFECTIVE DISEASES— <i>continued.</i>					...		
Brought forward ...	...	69	5	69	...	75	1
Undulant Fever ...							
Whooping Cough ...							
Yaws ...							
Yellow Fever ...							
Other Diseases ...							
INTOXICATIONS.							
Alcoholism ...	...	1	...	1	...		
Morphinism ...							
Other Intoxications ...							
GENERAL DISEASES.							
Anæmia ...	...	3	...	3	...	5	
Anæmia—pernicious ...							
Diabetes ...							
Exophthalmic Goitre ...							
Gout ...							
Leucocythæmia ...							
Lymphadenoma ...							
Myxœdema ...							
Purpura ...							
Rickets ...							
Scurvy ...							
Other Diseases ...	...	...	...	...	...	9	
LOCAL DISEASES.							
<i>Diseases of the Nervous</i>							
<i>System.</i>							
Sub-section 1.							
Diseases of the Nerves:—							
Neuritis ...							
Meningitis ...							
Myelitis ...							
Hydrocephalus ...							
Encephalitis ...							
Abscess of Brain ...							
Congestion of Brain							
Other Diseases ...	...	...	...	...	...	1	
Sub-section 2.							
Nervous Disorders of Un-							
determined Nature:—							
Apoplexy ...							
Paralysis ...							
Chorea ...							
Epilepsy ...							
Carried forward ...	...	73	5	73	...	90	1



TABLE VI—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES.—							
<i>continued.</i>							
Brought forward ...	...	73	5	73	...	90	1
Neuralgia ...	...	...	...	...	...	1	
Hysteria ...	...						
Other Diseases ...	...						
Sub-section 3.—Mental							
Diseases :—							
Idiocy ...	...						
Mania ...	...						
Melancholia ...	...						
Dementia ...	...						
Delusional Insanity							
Other Diseases ...	...	7	...	7			
<i>Diseases of the Eye.</i>							
Conjunctivitis ...	...	...	...	...	...	3	
Keratitis ...	...						
Ulceration of Cornea ...	...						
Iritis ...	...						
Optic Neuritis ...	...						
Cataract ...	...						
Other Diseases ...	...	...	...	...	...	2	
<i>Diseases of the Ear.</i>							
Inflammation ...	...	...	...	...	...	1	
Other Diseases ...	...	...	...	...	...	2	
<i>Diseases of the Nose.</i>							
Inflammation ...	...	1	...	1			
Other Diseases ...	...	...	...	...	...	7	
<i>Diseases of the Circula- tory System.</i>							
Pericarditis ...	...						
Endocarditis ...	...						
Valvular Disease :—							
(a) Mitral ...	...						
(b) Aortic ...	...						
(c) Tricuspid ...	...						
(d) Pulmonary ...	...						
Arterial Sclerosis ...	...						
Aneurism ...	...						
Other Diseases ...	...	6	...	6			
Carried forward ...	...	87	5	87	...	106	1

TABLE VI—continued.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES.—							
<i>continued.</i>							
Brought forward ...	...	87	5	87	...	106	1
<i>Diseases of the Respiratory System.</i>							
Laryngitis ...	...	...	...	...	...	...	...
Bronchitis ...	...	...	...	...	...	7	...
Broncho-pneumonia ...	...	...	...	...	...	...	...
Abcess of Lung ...	...	...	...	...	...	...	...
Gangrene of Lung ...	...	...	...	...	...	...	...
Emphysema ...	...	...	...	...	...	...	...
Pleurisy ...	...	1	...	1	...	...	...
Empyema ...	...	...	...	...	...	1	...
Other Diseases ...	...	...	...	...	...	...	...
<i>Diseases of the Digestive System.</i>							
Stomatitis ...	...	...	...	...	...	...	...
Caries of Teeth ...	...	...	...	...	...	3	...
Pyorrhœa alveolaris ...	...	...	...	...	...	...	...
Glossitis ...	...	...	...	...	...	1	...
Sore Throat ...	...	...	...	...	...	3	...
Inflammation of Tonsils ...	...	1	...	1	...	5	...
Gastritis ...	...	1	...	1	...	...	...
Ulceration of Stomach ...	...	...	...	...	...	...	...
Hæmatemesis ...	...	...	...	...	...	...	...
Dilatation of Stomach ...	...	...	...	...	...	...	...
Stricture of Stomach ...	...	...	...	...	...	...	...
Dyspepsia ...	...	1	...	1	...	11	...
Enteritis ...	...	...	...	...	...	2	...
Appendicitis ...	...	6	1	6	...	...	...
Colitis ...	...	...	...	...	...	2	...
Ulceration of Intestines	...	...	...	...	...	...	...
Sprue ...	...	...	...	...	...	...	...
Hernia ...	...	4	...	4	...	...	...
Diarrhœa ...	...	...	...	...	...	14	...
Constipation ...	...	...	...	...	...	6	...
Colic ...	...	...	...	...	...	1	...
Hæmorrhoids ...	...	...	...	...	...	...	...
Pancreatitis ...	...	...	...	...	...	2	...
Hepatitis—acute ...	...	4	...	4	...	...	...
Abscess ...	...	...	...	...	...	...	...
Cirrhosis ...	...	...	...	...	...	...	...
Jaundice ...	...	1	...	1	...	3	...
Peritonitis ...	...	...	...	...	...	...	...
Ascites ...	...	...	...	...	...	...	...
Other Diseases ...	...	...	...	...	...	4	...
Carried forward ...	...	106	6	106	...	171	1



TABLE VI—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES.— <i>continued.</i>							
Brought forward ...	...	106	6	106	...	171	1
<i>Diseases of the Lymphatic System.</i>							
Inflammation of Lym- phatic Gland ...	...	2	...	2	...	2	
Splenitis ...	...	...	...	...	...	2	
Suppuration of Lympha- tic Gland ...	...	...	...	...	...		
Lymphangitis ...	...	...	...	...	...	2	
Elephantiasis ...	...	...	...	...	...		
Other Diseases ...	...	...	...	...	...		
<i>Diseases of the Urinary System.</i>							
Acute Nephritis ...	...	...	...	...	...		
Bright's Disease ...	...	...	...	...	...		
Pyelitis ...	...	...	...	...	...		
Calculus ...	...	...	...	...	...		
Renal Colic ...	...	...	...	...	...		
Cystitis ...	...	...	...	...	...	2	
Vesical Calculus ...	...	...	...	...	...		
Suppression ...	...	...	...	...	...		
Hæmaturia ...	...	...	...	...	...		
Chyluria ..	...	...	...	...	...		
Other Diseases ...	...	1	...	1	...		
<i>Diseases of the Generative System.</i>							
Male Organs:—							
Urethritis ...	...	...	...	...	...		
Gleet ...	...	...	...	...	...		
Stricture ...	...	...	...	...	...		
Prostatitis ...	...	...	...	...	...		
Soft Chancre ...	...	...	...	...	...	1	
Condyloma ...	...	...	...	...	...		
Inflammation of Scrotum	...	...	...	...	...		
Hydrocele ...	...	...	...	...	...		
Orchitis ...	...	1	...	1	...	1	
Epididymitis ...	...	...	...	...	...		
Abscess in Testicle ...	...	...	...	...	...		
Other Diseases ...	...	...	...	...	...	1	
Female Organs:—							
Ovaritis ...	...	...	...	...	...		
Ovarian Cyst ...	...	...	...	...	...		
Endometritis ...	...	...	...	...	...		
Displacement of Uterus	...	...	...	...	...		
Vaginitis ...	...	...	...	...	...		
Carried forward ...	..	110	6	110	...	182	1

TABLE VI—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS	
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES.— <i>continued.</i>							
Brought forward ...	...	110	6	110	...	182	1
<i>Diseases of the Generative System—contd.</i>							
<i>Female Organs, contd.</i>							
Amenorrhœa ...							
Dysmenorrhœa ...							
Menorrhagia ...							
Leucorrhœa ...							
Other Diseases ...							
<i>Affections connected with Pregnancy.</i>							
Abortion ...							
Other Affections ...							
<i>Affections connected with Parturition.</i>							
Delayed Labour ...							
Retained Placenta ...							
Premature Birth ...							
Other Affections ...							
<i>Affections consequent on Parturition.</i>							
Post-partum Hæmorrhage							
Puerperal Septicæmia...							
Mastitis ...							
Abscess of Breast ...							
Other Affections ...							
<i>Diseases of Organs of Locomotion.</i>							
Osteitis ...							
Arthritis ...							
Spondylitis ...	...	2	...	2	...	2	
Bursitis ...							
Myalgia ...	...	1	...	1	...	8	
Other Diseases ...	...	...	...	...	...	3	
<i>Diseases of Connective Tissue.</i>							
Cellulitis ...	...	1	...	1	1	3	
Abscess ...	...	1	...	1			
Other Diseases ...	...	1	1	1			
<i>Diseases of the Skin.</i>							
Ulcer ...							
Urticaria ...	...	...	...	...	...	2	
Eczema ...	...	1	...	1	...	6	
Carried forward ...	...	117	7	117	1	206	1



TABLE VI—continued.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	TOTAL	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES.— <i>continued.</i>							
Brought forward ...	...	117	7	117	1	206	1
Diseases of the Skin— <i>continued.</i>							
Boil ...	...	1	...	1	...	5	
Carbuncle ...	...	2	...	2	...		
Herpes ...	...						
Psoriasis ...	...						
Oriental Sore ...	...						
Tinea ...	...	...	...	...	...	1	
Scabies ...	...	...	...	...	...	1	
Acne ...	...						
Prickly Heat ...	...	...	...	...	...	2	
Other Diseases ...	...	...	...	...	...	3	
Injuries.							
General ...	...						
Local ...	...	5	...	5	...	13	
Tumours.							
Benign ...	...						
Malignant ...	...						
Malformations ...	...						
Poisons.							
Vegetable ...	...						
Animal ...	...						
Other Poisons ...	...						
Parasites.							
Animal Parasites							
Protozoa ...	...						
Trematoda (Flukes) ...	...						
Cestoda :—							
Tenia Solium ...	...	...	...	...	...	1	
Tenia Saginata ...	...						
Other Cestodes ...	...						
Nematoda :—							
Ascaris ...	...						
Trichocephalus Dispar ...	...						
Trichina ...	...						
Dracunculus ...	...						
Filaria ...	...						
Strongylus ...	...						
Ankylostomum ...	...						
Oxyuris ...	...						
Other Nematodes ...	...						
Insecta :—							
Insects producing							
Myiasis ...	...						
Dermatophilus							
Penetrans ...	...						
Other Insects ...	...	...	...	...	...	1	
No appreciable Diseases	...	1	...	1	...		
Total ...	...	126	7	126	1	235	1

**TABLE VII.**  
**RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1922.**

Diseases.	*IN-PATIENTS.					OUT-PATIENTS.
	‡Remaining in Hospital at end of 1921.	TOTAL		†Total Cases treated.	§Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
<b>INFECTIVE DISEASES.</b>						
Beri-beri ... ..	7	71	8	78	23	4
Cerebro-spinal Fever ...						
Chicken-pox ... ..	2	38	1	40	1	35
Cholera ... ..						
Dengue ... ..						
Diphtheria ... ..						
Dysentery :—						
(a) Amœbic ... ..	2	57	3	59	3	93
(b) Bacillary ... ..	...	2	...	2	...	
(c) Type not deter- mined ... ..	...	29	2	29	...	71
Endocarditis—infective						
Enteric ... ..	...	1	1	1		
Erysipelas ... ..	...	...	...	...	...	1
Gonorrhœa ... ..	1	31	...	32	1	930
Influenza ... ..	...	...	...	...	...	29
Kala-azar ... ..						
Leprosy :—						
(a) Nodula ... ..	1	...	...	1	1	6
(b) Anæsthetic ... ..	1	3	...	4	1	4
Malaria :—						
(a) Tertian ... ..	...	4	...	4	...	255
(b) Quartan ... ..						
(c) Aestivo-autumnal	5	163	...	168	10	2,549
(d) Chronic ... ..	...	4	3	4	...	1
(e) Type not deter- mined ... ..	...	111	1	111	1	1,437
Blackwater Fever ... ..	...	1	...	1	...	2
Measles ... ..	1	19	...	20	...	1
Papataci Fever ... ..						
Plague ... ..						
Pneumonia ... ..	1	89	26	90	...	104
Pyrexia of uncertain origin ... ..	...	12	...	12	...	16
Rabies ... ..						
Relapsing Fever ... ..						
Septicæmia ... ..	...	17	12	17		
Smallpox ... ..	...	7	...	7	...	10
Tetanus ... ..						
Syphilis :—						
(a) Primary ... ..	...	8	...	8	1	87
(b) Secondary* ... ..	8	73	5	81	6	437
(c) Inherited ... ..	...	1	...	1	...	32
Tetanus ... ..	...	14	8	14	...	11
Trypanosomiasis (Sleep- ing Sickness) ... ..	...	...	...	...	...	1
Tuberculosis ... ..	2	40	22	42	1	48
Undulant Fever ... ..						
Carried forward ...	31	795	92	826	49	6,164

\* "Tertiary Syphilis" is a term sometimes applied to the latter symptoms.

\*In-patients are those treated in hospitals and institutions, and the term does not apply to those treated in their own quarters, even though they would ordinarily be in-patients if there were suitable accommodation.

† "Total cases treated" will, of course, include those remaining in hospital at the end of the previous year.

‡ i.e., the year previous to that for which the return is made.

§ The figures in this column to be carried on to the next year's return.



TABLE VII—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
INFECTIVE DISEASES.— <i>continued.</i>						
Brought forward ...	31	795	92	826	49	6,164
Whooping Cough ..	...	2	...	2	...	144
Yaws ... ..	...	...	...	...	...	166
Yellow Fever ...	...	6	1	6	...	174
Other Diseases ...	...	...	...	...	...	...
INTOXICATIONS.						
Alcoholism ... ..	...	2	...	2	...	1
Morphinism ... ..	...	9	...	9	...	2
Other Intoxications ...	...	...	...	...	...	...
GENERAL DISEASES.						
Anæmia ... ..	...	9	3	9	...	294
Anæmia—pernicious ...	...	...	...	...	...	...
Diabetes ... ..	...	...	...	...	...	2
Exophthalmic Goitre ...	...	...	...	...	...	...
Gout ... ..	...	...	...	...	...	...
Leucoeythæmia ... ..	...	...	...	...	...	1
Lymphadenoma ... ..	...	...	...	...	...	...
Myxœdema ... ..	...	...	...	...	...	...
Purpura ... ..	...	7	...	7	...	511
Rickets ... ..	...	106	14	106	11	3,075
Scurvy ... ..	...	...	...	...	...	...
Other Diseases ... ..	...	...	...	...	...	...
LOCAL DISEASES.						
<i>Diseases of the Nervous System.</i>						
Sub-section 1.—Diseases of the Nerves :—						
Neuritis ... ..	...	...	...	...	...	31
Meningitis ... ..	...	2	2	2	...	1
Myelitis ... ..	...	1	...	1	1	1
Hydrocephalus ... ..	...	...	...	...	...	...
Encephalitis ... ..	...	...	...	...	...	...
Abscess of Brain ... ..	...	3	3	3	...	3
Congestion of Brain ...	...	4	...	4	...	93
Other Diseases ... ..	...	...	...	...	...	...
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature :—						
Apoplexy ... ..	...	4	3	4	...	15
Paralysis ... ..	2	27	11	29	5	1
Chorea ... ..	...	...	...	...	...	22
Epilepsy ... ..	1	11	...	12	3	262
Neuralgia ... ..	...	4	...	4	...	...
Carried forward ...	34	992	129	1,026	69	10,963

TABLE VII—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES— <i>continued.</i>						
Brought forward ...	34	992	129	1,026	69	10,963
Hysteria ...	...	...	...	...	...	...
Other Diseases ...	3	27	4	30	...	216
Sub-section 3.—Mental Diseases.—						
Idiocy ...	...	...	...	...	...	...
Mania ...	...	1	...	1	...	1
Melancholia ...	...	3	...	3	1	1
Dementia ...	...	10	1	10	...	1
Delusional Insanity...	...	1	1	1	...	1
Other Diseases ...	...	1	...	1	...	1
<i>Diseases of the Eye.</i>						
Conjunctivitis ...	2	14	...	16	...	555
Keratitis ...	...	...	...	...	...	8
Ulceration of Cornea ...	...	1	...	1	...	8
Iritis ...	...	3	...	3	1	23
Optic Neuritis ...	...	...	...	...	...	...
Cataract ...	...	...	...	...	...	14
Other Diseases ...	4	7	...	11	4	50
<i>Diseases of the Ear.</i>						
Inflammation ...	...	1	...	1	...	112
Other Diseases ...	...	4	...	4	...	300
<i>Diseases of the Nose.</i>						
Inflammation ...	...	3	1	3	...	48
Other Diseases ...	...	2	...	2	...	226
<i>Diseases of the Circulatory System.</i>						
Pericarditis ...	...	1	1	1	...	...
Endocarditis ...	...	4	2	4	1	2
Valvular Disease :—						
(a) Mitral ...	3	17	2	20	...	108
(b) Aortic ...	...	4	2	4	...	58
(c) Tricuspid ...	...	...	...	...	...	...
(d) Pulmonary ...	...	...	...	...	...	2
Arterial Sclerosis ...	...	1	...	1	1	1
Aneurism ..	...	4	1	4	...	5
Other Diseases ...	...	10	1	10	...	53
<i>Diseases of the Respiratory System.</i>						
Laryngitis ...	...	2	...	2	...	116
Bronchitis ...	...	91	2	91	3	6,186
Broncho-pneumonia ...	...	13	1	13	...	9
Abscess of Lung ...	...	...	...	...	...	...
Gangrene of Lung ...	...	...	...	...	...	...
Emphysema ...	...	1	...	1	...	6
Carried forward ...	46	1,218	148	1,264	80	19,074



TABLE VII—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES— <i>continued.</i>						
Brought forward ...	46	1,218	148	1,264	80	19,074
<i>Diseases of the Respiratory System—continued.</i>						
Pleurisy ...	...	13	1	13	1	126
Empyema ...	...	3	1	3	...	2
Other Diseases ...	2	9	1	11	1	180
<i>Diseases of the Digestive System.</i>						
Stomatitis ...	...	2	1	2	...	189
Caries of Teeth ...	...	4	...	4	...	1,110
Pyorrhœa Alveolaris ...	...	3	...	3	...	33
Glossitis ...	...	...	...	...	...	82
Sore Throat ...	...	...	...	...	...	196
Inflammation of Tonsils ...	...	3	...	3	...	501
Gastritis ...	1	16	...	17	2	247
Ulceration of Stomach	...	1	...	1	...	...
Hæmatemesis ...	...	...	...	...	...	...
Dilatation of Stomach	...	...	...	...	...	...
Stricture of Stomach ...	...	...	...	...	...	...
Dyspepsia ...	...	14	...	14	...	3,179
Enteritis ...	...	10	1	10	...	27
Appendicitis ...	...	3	...	3	...	4
Colitis ...	...	30	1	30	...	17
Ulceration of Intestines	...	...	...	...	...	...
Sprue ...	...	...	...	...	...	...
Hernia ...	2	39	2	41	4	206
Diarrhœa ...	1	42	7	43	...	723
Constipation ...	...	4	...	4	...	5,583
Colic ...	...	7	...	7	...	317
Hæmorrhoids ...	...	4	...	4	...	53
Pancreatitis ...	...	...	...	...	...	...
Hepatitis—acute ...	...	18	3	18	...	97
Abscess ...	...	6	3	6	...	128
Cirrhosis ...	...	...	...	...	...	1
Jaundice ...	...	6	2	6	...	52
Peritonitis ...	...	6	4	6	...	2
Ascites ...	3	1	1	4	...	11
Other Diseases ...	2	12	1	14	1	255
<i>Diseases of the Lymphatic System.</i>						
Splenitis ...	...	21	...	21	...	216
Inflammation of Lymphatic Gland ...	2	21	...	23	...	329
Suppuration of Lymphatic Gland ...	...	9	...	9	...	24
Carried forward ...	59	1,525	177	1,584	89	32,964

TABLE VII—continued.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1921.	TOTAL		Total Cases treated.	Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
<b>GENERAL DISEASES— continued.</b>						
Brought forward ...	59	1,525	177	1,584	89	<b>22,969</b>
<i>Diseases of the Lympha- tic System—continued.</i>						
Lymphangitis ...	1	1	...	2	...	<b>22</b>
Elephantiasis ...	1	31	1	32	3	<b>51</b>
Other Diseases ...	...	1	...	1	...	<b>17</b>
<i>Diseases of the Urinary System.</i>						
Acute Nephritis ...	3	23	9	26	3	<b>36</b>
Bright's Disease ...	2	2	...	4	1	<b>16</b>
Pyelitis ...	...	...	...	...	...	<b>1</b>
Calculus ...	...	...	...	...	...	...
Renal Colic ...	...	...	...	...	...	...
Cystitis ...	...	8	2	8	...	<b>30</b>
Vesical Calculus ...	...	...	...	...	...	...
Suppression ...	...	11	...	11	1	...
Hæmaturia ...	...	2	...	2	...	<b>4</b>
Chyluria ...	...	...	...	...	...	...
Other Diseases ...	...	15	1	15	1	<b>44</b>
<i>Diseases of the Genera- tive System.</i>						
Male Organs:—						
Urethritis ...	...	1	...	1	...	<b>26</b>
Gleet ...	...	1	...	1	...	<b>13</b>
Stricture ...	1	16	...	17	3	<b>55</b>
Prostatitis ...	...	4	...	4	...	<b>5</b>
Soft Chancre ...	...	7	...	7	...	<b>208</b>
Condyloma ...	...	...	...	...	...	...
Inflammation of Scrotum ...	...	1	...	1	...	<b>11</b>
Hydrocele ...	1	16	...	17	2	<b>188</b>
Orchitis ...	...	12	...	12	1	<b>99</b>
Epididymitis ...	...	2	...	2	...	<b>15</b>
Abscess of Testicle ...	...	...	...	...	...	...
Other Diseases ...	2	16	...	18	3	<b>42</b>
Female Organs:—						
Ovaritis ...	...	1	...	1	...	<b>12</b>
Ovarian Cyst ...	...	2	...	2	...	<b>2</b>
Endometritis ...	...	6	1	6	...	<b>27</b>
Displacement of Uterus ...	...	...	...	...	...	<b>2</b>
Vaginitis ...	...	...	...	...	...	<b>12</b>
Amenorrhœa ...	...	...	...	...	...	<b>153</b>
Dysmenorrhœa ...	...	1	...	1	...	<b>76</b>
Menorrhagia ...	...	...	...	...	...	<b>39</b>
Leucorrhœa ...	...	...	...	...	...	<b>27</b>
Other Diseases ...	...	14	1	14	1	<b>55</b>
Carried forward ...	70	1,719	192	1,789	108	<b>34,252</b>



TABLE VII—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1921.	TOTAL.		Total Cases treated.	Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES— <i>continued.</i>						
Brought forward ...	70	1,719	192	1,789	108	34,252
<i>Affections connected with Pregnancy.</i>						
Abortion ...	...	14	...	14	...	46
Other Affections ...	...	21	1	21	1	59
<i>Affections connected with Parturition.</i>						
Delayed Labour ...	...	136	4	136	1	7
Retained Placenta ...	...	3	...	3	...	3
Premature Birth ...	...	...	...	...	...	1
Other Affections ...	...	...	...	...	...	1
<i>Affections consequent on Parturition.</i>						
Post-partum Hæmor- rhage ...	...	...	...	...	...	...
Puerperal Septicæmia ...	...	...	...	...	...	1
Mastitis ...	...	9	...	9	2	31
Abscess of Breast ...	...	1	...	1	...	12
Other Affections ...	...	...	...	...	...	7
<i>Diseases of Organs of Locomotion.</i>						
Osteitis ...	...	12	...	12	5	46
Arthritis ...	8	17	1	25	1	204
Spondylitis ...	...	...	...	...	...	...
Bursitis ...	...	1	...	1	1	1
Myalgia ...	...	6	...	6	...	979
Other Diseases ...	2	26	1	28	2	449
<i>Diseases of Connective Tissue.</i>						
Cellulitis ...	...	30	...	30	1	262
Abscess ...	2	54	3	56	1	387
Other Diseases ...	...	8	...	8	...	33
<i>Diseases of the Skin.</i>						
Ulcer ...	19	201	4	220	33	3,820
Urticaria ...	...	1	...	1	...	36
Eczema ...	...	9	...	9	...	272
Boil ...	...	13	...	13	...	316
Carbuncle ...	...	1	...	1	...	9
Herpes ...	...	...	...	...	...	25
Psoriasis ...	...	...	...	...	...	4
Oriental Sore ...	...	...	...	...	...	...
Tinea ...	...	1	...	1	...	163
Scabies ...	...	3	...	3	1	424
Carried forward ...	101	2,286	206	2,387	157	41,850

TABLE VII—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1921.	TOTAL.		Total Cases treated.	Remaining in Hospital at end of 1922.	Total Cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES.— <i>continued.</i>						
Brought forward ...	101	2,286	206	2,387	157	41,839
Diseases of the Skin— <i>continued.</i>						
Acne ...	...	...	...	...	...	1
Prickly Heat ...	...	...	...	...	...	364
Other Diseases ...	...	23	...	23	1	...
Injuries.						
General ...	3	11	1	14	...	91
Local ...	5	226	9	231	20	4,228
Tumours.						
Benign ...	1	11	1	12	2	50
Malignant ...	...	15	2	15	1	11
Malformations ...	...	...	...	...	...	3
Poisons.						
Vegetable ...	...	1	...	1	...	2
Animal ...	...	...	...	...	...	...
Other Poisons ...	...	...	...	...	...	...
Parasites.						
Animal Parasites.						
Protozoa ...	...	...	...	...	...	2
Trematoda (Flukes) ...	...	...	...	...	...	...
Cestoda :—						
Tænia Solium ...	...	1	...	1	...	151
Tænia Saginata ...	...	3	...	3	...	19
Other Cestodes ...	...	...	...	...	...	...
Nematoda :—						
Ascaris ...	...	11	1	11	...	1,470
Trichocephalus Dispar ...	...	...	...	...	...	...
Trichina ...	...	...	...	...	...	...
Dracunculus ...	...	...	...	...	...	...
Filaria ...	...	3	...	3	...	5
Strongylus ...	...	...	...	...	...	...
Ankylostomum ...	7	75	4	82	1	19
Oxyuris ...	...	...	...	...	...	...
Other Nematodes ...	...	3	1	3	...	1
Insecta :—						
Insects producing Myiasis ...	...	...	...	...	...	1
Dematophilus Pene- trans ...	...	...	...	...	...	7
Other Insects ...	...	...	...	...	...	10
Undiagnosed ...	...	1	...	1	...	26
No appreciable Disease ...	...	...	...	...	...	229
Total ...	117	2,670	225	2,787	182	48,540



## TABLE VIII.

## (a) LIST OF SURGICAL OPERATIONS PERFORMED IN COLONIAL HOSPITAL IN 1922.

Nature of Operation.	Number.	Cured.	Relieved.	Unrelieved.	*Died.
Malignant tumour ... ..	1	—	—	—	1
Non-malignant tumour ... ..	10	10	—	—	—
Radical cure of hernia ... ..	10	10	—	—	—
Radical cure of hydrocele ... ..	3	3	—	—	—
Radical cure of elephantiasis scroti ... ..	6	6	—	—	—
Amputation ... ..	10	9	—	—	1
Suturing ... ..	5	4	1	—	—
Incision ... ..	6	4	—	2	—
Sequestrotomy ... ..	5	4	1	—	—
Curettage ... ..	6	5	—	1	—
Circumcision ... ..	4	4	—	—	—
Cystotomy ... ..	2	1	—	—	1
Laparotomy ... ..	2	1	—	—	1
Breaking down ankylosis ... ..	1	—	1	—	—
Avulsion of nail ... ..	2	2	—	—	—
Dilatation of stricture ... ..	2	1	1	—	—
Reduction of dislocation ... ..	1	1	—	—	—
Scraping of fistula ... ..	2	—	2	—	—
Herniotomy ... ..	3	—	3	—	—
Exploration of liver abscess ... ..	1	—	—	—	1
Removal of bladder diverticulum simulating hernia ... ..	1	1	—	—	—
Removal of fibroid testicle ... ..	1	1	—	—	—
Ligature of hæmorrhoids ... ..	1	1	—	—	—
Examination of contracted rectum ... ..	1	—	—	1	—
Excision of lens protrusion ... ..	1	1	—	—	—
Plastic operations ... ..	2	2	—	—	—
TOTAL ... ..	89	71	9	4	5

\* In no case was death due to operation.

## (b) LIST OF SURGICAL OPERATIONS PERFORMED IN NURSING HOME IN 1922.

Nature of Operation.	Total Number.	Cured.	Relieved.	Unrelieved.	Died.
Appendicitis ... ..	3	2	—	—	1*
Herniotomy ... ..	2	—	2	—	—
Carbuncle (scraped) ... ..	1	1	—	—	—
TOTAL ... ..	6	3	2	—	1

\* Death was not due to operation.

## (c) SURGICAL OPERATIONS PERFORMED ELSEWHERE REPORTED BY MEDICAL OFFICERS.

Station.	Number.	Cured.	Relieved.	Unrelieved.	Died.
Daru ... ..	57	17	33	6	1
Kissy ... ..	14	14	—	—	—
Bonthe ... ..	11	6	3	1	1
Bo ... ..	3	2	1 <sup>x</sup>	—	—
Moyamba ... ..	3	2	—	—	1
Pujehun ... ..	2	1	—	—	1
TOTAL ... ..	90	42	37	7	4

Where death occurred the nature of the operation or disease was reported :—

Elephantiasis scroti, adherent placenta following foot presentation, reduction of small intestine through perforated wound of abdomen, inguinal hernia.

The case marked x was an amputation of leg and died later of malignant disease.





## APPENDIX I.—COLONIAL HOSPITAL LABORATORY REPORT.

TO HONOURABLE THE DIRECTOR OF MEDICAL AND SANITARY SERVICES.

SIR,

I have the honour to forward to you the annual report of work carried out in the hospital laboratory during 1922.

Dr. McConaghy was in charge from January until May, when the work was taken over by Dr. Dimock; Dr. McConaghy's report on the first five months of the year is incorporated in this report. As in previous years, the work has mainly consisted of routine examination of material from the Nursing Home, Colonial Hospital and the Freetown Prison.

During the year 2,002 specimens have been examined, of which 866 have come from the prison.

## NURSING HOME AND COLONIAL HOSPITAL.

The number of blood smears examined was 379. The results are tabulated below :—

Total.	Negative.	P. Falciparum.	P. Vivax.	Secondary anaemia and Polychromatic degeneration.	Pigmented Leucocytes only.	Polymorph Leucocytosis.	Filaria Bancrofti.	Filaria Perstans.
379	255	90	5	17	5	4	2	1

No cases of quartan malaria found.

Clinical, microscopical or spectroscopical examinations were made on 296 specimens of urine.

Ova of schistosoma hæmatobium were found on two occasions.

One hundred and sixteen specimens of sputum were examined, in twenty-two of which B. tuberculosis was found.

Forty-eight specimens of pus, chiefly from cases of suspected venereal disease, were examined.

Particulars of the findings of 297 examinations of faeces are tabulated below :—

Total number of specimens examined ...	...	297
Total number in which nothing of pathological significance was observed ...	...	122

## SINGLE INFECTIONS WITH HELMINTHIC OVA.

Ankylostomes present ...	...	27
Tæniidæ ...	...	6
Ascaris ...	...	41
Trichuris trichina ...	...	5
Strongyloides larvæ ...	...	7

## DOUBLE INFECTIONS.

Ankylostomes and strongyloides ...	...	2
Ascaris and strongyloides ...	...	3
Ascaris and trichuris trichina ...	...	3
Ankylostomes and ascaris ...	...	15
Dipylidium caninum and ascaris ...	...	1
Tæniidæ and strongyloides stercoralis ...	...	1

## TRIPLE INFECTIONS.

Ascaris, ankylostomes and tæniidæ ...	...	1
Ascaris, ankylostomes and strongyloides ...	...	1

One quadruple infection with ascaris, ankylostomes, trichuris trichina and strongyloides was found.

Entamæba histolitica ...	...	29
Cysts of E. histolitica ...	...	5
Balantidium coli ...	...	1
Mucous and blood only ...	...	16
E. histolitica in association with ascaris ...	...	4
E. histolitica in association with ankylostomes ...	...	6

During the year the equipment of the laboratory has been increased, but there is still a great shortage of apparatus, particularly for bacterial work.

During the year only thirteen post-mortem examinations were made. The cause of death in these cases is shown below :—

Cause of Death.	No.
Pulmonary tuberculosis ...	2
Drowning ...	2
Suicide—gun-shot wound ...	1
Pneumonia ...	1
Aortic aneurism ...	1
Chronic valvular disease of the heart and myocardial degeneration ...	2
Perforation of right lung and extensive injury to liver ...	1
Cases in which no record has been made ...	3

One exhumation was carried out in Lumley cemetery.

Post-mortem work is particularly restricted here by the following factors :— Firstly the inability of the people to understand the necessity for any such procedure, and secondly, the inadequate facilities afforded for making such examinations when the opportunity occurs. There is only one mortuary for the whole of Freetown. It consists of a corrugated iron shed in close proximity to the cattle market at Mabella Point. It contains one table, and a water tap ; the floor is covered with sand. A path runs close below the only window, and the services of the police are in constant demand to keep the people from wandering about just outside the building when work is proceeding inside.

Before any examination can be made, all the instruments, antiseptics, towels, etc., have to be transported from the Colonial Hospital, a distance of nearly a mile and a-half. The importance of post-mortem work in the study of tropical diseases necessitates the provision of some building within the hospital grounds (e.g. on the end of the new sea-wall) in which place, this work could be carried out more efficiently, and with much greater economy of time and money than circumstances at present allow.

## MISCELLANEOUS WORK.

Two samples were examined for suspected presence of poison. Many slides from cattle examined for the presence of B. anthracis.

Microscopical sections of several tumours made for diagnostic purposes. Rats were examined periodically for evidence of plague.



## FREETOWN PRISON.

The total number of blood smears examined was 173. Result of the examinations are shown in the following table.—

Total.	Negative.	P. Falciparum.	P. Vivax.	Pigmented Leucocytes only.	Polymorph Leucocytosis.	Marked Secondary Anemia and Polychromatic Degeneration.	Filaria Bancrofti.	Gametocytes of M. Tertian.	I
173	122	38	1	2	4	4	1	1	—

It will be observed that *P. falciparum* is responsible for the great majority of malarial cases.

Chemical, microscopical and spectroscopical examinations were made on the urine of twenty-four cases. Ova of *schistosoma hæmatobium* were found on five occasions.

Twenty specimens of sputum were examined, in eight of which *B. tuberculosis* were found.

One nasal smear was found to contain *B. lapræ*.

Six hundred and forty-eight specimens of faeces were examined: particulars of the findings are tabulated below:—

Total number of specimen examined	...	648
Total number in which nothing of pathological significance was observed	...	316

## SINGLE INFECTION WITH HELMINTHIC OVA.

Ankylostomes present	...	...	111
Tæniidae	...	...	9
Ascaris	...	...	69
Trichuris trichina	...	...	11
Strongyloides stercoralis larvæ	...	...	26

## DOUBLE INFECTION WITH HELMINTHIC OVA.

Ankylostomes and ascaris	...	25
Ankylostomes and strongyloides stercoralis	...	10
Ankylostomes and trichuris trichina	...	2
Ascaris and strongyloides stercoralis	...	8
Ascaris and tænia	...	4
Tænia and trichuris trichina	...	1
Trichuris trichina and strongyloides stercoralis	...	1

## TRIPLE INFECTIONS WITH HELMINTHIC OVA.

Ankylostomes, ascaris and strongyloides stercoralis	...	3
Ankylostomes, ascaris and tænia	...	2
Ankylostomes, ascaris and trichuris trichina	...	4
Entamœba histolitica	...	15
Cysts of entamœba histolitica	...	5
Balantidium coli	...	1
Mucous & blood only	...	25

Of the common intestinal amœbæ, *entamœba coli* and *endolimax nava* have been frequently observed, generally along with some helminthic infection.

Of the intestinal flagellates, *trichomonas hominis* and *lamblia intestinalis* are not uncommonly found. The pathogeneity of these protozoa being doubtful, I have not tabulated the cases in which they have been found. During June what at first appeared to be an outbreak of dysentery occurred in the prison.

Investigation showed that the "outbreak" was due to ingestion accidentally or otherwise of powdered glass or finely ground sand.

The diagnosis was substantiated by the sudden cessation of cases when suspicion as to their cause was raised.

J. D. DIMOCK.

## APPENDIX II.—REPORT ON THE MATERNITY WARD, COLONIAL HOSPITAL.

During the year 169 patients were admitted to the maternity ward, of these 135 were delivered in the hospital, seven had false pains, nine were admitted after the birth of the child and eighteen had complicated pregnancies.

Of the 135 labour cases, forty-one was abnormal. The abnormal cases were made up as follows :—

Case.	No.	Remarks.
Breech ... ..	2	—
Concealed accidental hæmorrhage	1	Still-birth
Craniotomy ... ..	2	—
Dead births ... ..	7	Evidenced by peeling or maceration
Dystocia ... ..	2	One podalic version
		One supraemia c̄ maternal death
Eclampsia ... ..	4	{ One forceps extraction c̄ maternal death
		{ One premature labour
Forceps ... ..	5	{ One dead birth c̄ maternal death
		{ One still-birth with maternal death
		{ One torn perinaeum
Placenta prævia ... ..	2	One podalic version—both stillborn
Premature labour ... ..	3	—
Still-birth ... ..	1	—
Torn perinaeum ... ..	3	Requiring suturing
		{ One maternal death from enteritis
		{ Two with one twin transverse
Twins ... ..	9	{ Two with first twin forceps extraction, second twin podalic version.

N.B.—In this list no case has been counted twice—but each case has been designated by its outstanding feature.

The majority of the serious cases are brought to hospital after protracted labour and much interference at home.

Of the 135 labours forty-eight were primiparae.

The average stay in hospital of each of the 135 labour cases was four to ten days—forty-eight of these patients only stayed for one day each, leaving the hospital against advice—hence it is impossible to give the morbidity rate.

No case of Ophthalmia neonatorum were treated.

The seven cases admitted having given birth at home were made up as follows :—

Case.	No.	Remarks.
Parametritis ... ..	4	All resolved
Retained Placenta ... ..	3	One died from septicæmia
Septicæmia ... ..	1	Died
Baby born before admission	1	—

The eighteen complicated pregnancies were made up as follows :—

Case.	No.	Remarks.
Abortion ... ..	11	—
Filroid Uterus ... ..	1	—
Malaria ... ..	1	Treated with Quinine
Misscarriages ... ..	2	—
Observation ... ..	1	—
Pneumonia ... ..	1	Abortion : maternal death
Pyrexia, undiagnosed ... ..	1	—

E. J. WRIGHT,  
*Medical Officer-in-charge of Female Wards.*



## APPENDIX III.—REPORT ON FREETOWN PRISON, WITH STATISTICS.

During the year Senior Medical Officer Dr. Wood-Mason and Dr. J. Y. Wood were alternately in charge.

## HEALTH OF EUROPEAN STAFF.

1. This was fairly satisfactory.

## HEALTH OF NATIVE STAFF.

2. As usual fever, chiefly malarial, was the usual complaint: eighty-seven cases of all diseases were treated, thirty-nine being placed on the sick list for short periods, while four were sent to the Colonial Hospital as in-patients. One case of chicken-pox was isolated. Three were permanently invalided, one being the Senior Matron, for hemiplegia, the others for chronic rheumatism and syphilitic affection of the eye, respectively.

## HEALTH OF PRISONERS.

3. (a) This was fairly satisfactory until June when an outbreak of fever, accompanied by bronchitis, occurred, followed immediately by a small outbreak of diarrhoea of which one prisoner died. The cause was not traced. Shortly afterwards began the usual epidemic of beri-beri. Attention has been drawn in former reports to the ill-effects of the rainy season on prisoners.
- (b) Once again no case of death was recorded from amœbic dysentery, while the numbers were still further reduced from twenty-four to nineteen.
- (c) Four cases of tuberculosis were isolated on admission and two cases of leprosy, making a total of five lepers.
- (d) Three prisoners were released on medical grounds, viz., paralysis, chronic Bright's disease, blindness.
- (e) Medical boards were held on two prisoners detained on His Majesty's pleasure, and one on a condemned prisoner to determine his mental condition. One remand prisoner was sent to Kissy lunatic asylum under certificate of emergency.
- (f) *Beri-beri*. At the beginning of the year nine cases were still under treatment, all eventually recovering. Towards the end of the rains a heavy outbreak occurred, both types of the disease being present. Up to the end of the year fifty-nine cases had been admitted to the prison hospital, but fresh cases were still occurring. On the surface it would appear as if this were the heaviest outbreak yet seen in the prison, but this is really due to the greater care and accuracy taken in diagnosing the disease. Many of the cases were very severe, but only three deaths occurred. Twenty-three still remained in hospital on 31st December. A special committee was appointed to attempt to trace the cause. Further remark here is therefore unnecessary.
- (g) Fifty-six prisoners were treated for ankylostomes. This does not of course mean that ankylostomiasis was severe, but merely that these were found in the laboratory to be heavily infected.
- (h) Daily average of sick in hospital was twenty-eight. The chief diseases treated were digestive disturbances, malaria and cardiac conditions.
- (i) Total number of deaths was twelve as against twenty-five in 1921.
- (j) Only three post-mortems were done. No major operations were done.
- (k) The sanitary condition of the prison remained excellent.
- (l) His Excellency the Governor visited the prison hospital during the early part of the rains, while frequent visits of inspection were made by the Director of Medical and Sanitary Services.
- (m) A statistical return is attached.

JOHN Y. WOOD,  
*Medical Officer in Charge of Prison.*

## STATISTICAL REPORT, FREETOWN PRISON.

In-patients—Remaining in hospital 31st December, 1921	...	...	34
Admitted during 1922	...	...	290
Total	...	...	324

—	March Quarter.	June Quarter.	September Quarter.	December Quarter.	Total.
Admissions ...	37	100	64	89	290
Cured ...	28	54	40	40	162
Relieved ...	25	31	22	44	122
Not relieved ...	2	—	—	1	3
Died ...	1	1	2	8	12
Remaining in hospital at end of 1922 ...	—	—	—	—	25

Deaths ... 12.

## CAUSES OF DEATHS :

Beri-beri	...	...	3
Pulmonary tuberculosis	...	...	2
Exhaustion following diarrhoea	...	...	1
Heart failure	...	...	1
Ankylostomiasis	...	...	1
Persistent vomiting	...	...	1
Liver abscess	...	...	1
Senile debility	...	...	1
General paralysis of insane	...	...	1

Under observation and treatment (but not admitted to hospital as in-patients)—273.

—	March Quarter.	June Quarter.	September Quarter.	December Quarter.	Total.
Out-patients ...	456	451	445	388	1,740
Subsequent attendants ...	618	552	583	500	2,253

Average weight of prisoners, 131 lb.

Numbers Examined.	New-comers.	Remands and Trials.	For Solitary Confinement.	Corporal Punishment.	Execution.
March quarter ...	213	42	76	2	1
June quarter ...	219	68	63	1	2
September quarter ...	247	89	38	4	2
December quarter ...	229	52	57	4	—
TOTAL ...	908	251	234	11	5

JOHN Y. WOOD,  
*Medical Officer in Charge of Prison.*

8th March, 1923.



## APPENDIX IV.—SANITARY REPORT, FREETOWN PRISON.

The general sanitary condition of the prison was satisfactory throughout the year and there was no overcrowding at any time.

2. Unfortunately the health of the prisoners was seriously affected by an outbreak of beri-beri which broke out in the month of June and lasted until the end of the year. As this outbreak will form the subject of special reports by a committee appointed to investigate it, only brief reference is necessary here. There were fifty-nine cases with three deaths. The greatest incidence took place between July and October, which are the months of heaviest rainfall.

3. Professor Blacklock, of the Sir Alfred Jones Research Laboratory, made an investigation into the nature of the diet and the methods of preparation and cooking of the various foodstuffs, and his report will be found in an appendix. Briefly, he took the view that the diet scale laid down was one which should preclude the occurrence of beri-beri, and that in all probability the outbreak was due to two factors:—

- (1) Over-cooking of food.
- (2) Deterioration of rice by age and storage.

4. In order to ensure that prisoners receive a standard rice of good quality containing a sufficient amount of pericarp and germ, it will probably be necessary to purchase unhusked rice and decorticate it in the prison. The ordinary native methods produce a rice which contains a considerable amount of grit and adherent husk and in the further treatment necessary before cooking the elements which are rich in vitamine B are damaged or removed.

5. There were twelve deaths during the year, a death-rate of 43.5 per 1,000 of the average daily strength, which was 276.

6. In view of the fact that dysentery and diarrhoea were important causes of deaths in many previous years, notably during the period 1913—1919 inclusive, it is satisfactory to note that there was only one death from these causes during 1922.

7. It is remarkable that no less than half the deaths during the year occurred in tailors, although the average daily strength of prisoners employed as tailors was only 15 per cent. of the average daily strength of all prisoners. Tailors in Freetown prison also appear to have a special susceptibility to beri-beri, 57 per cent. of the 1922 cases occurring in tailors. Except as regards the sedentary nature of their occupation, tailors are living under precisely the same conditions as other prisoners. It will probably be necessary to employ the tailors in some active outdoor occupation for part of each prison day.

8. The substitution of canvas hammocks for plank beds was commenced and proved very satisfactory. They are much more easily kept clean and free from biting insects, such as bed bugs.

W. H. PEACOCK, MAJOR,

*Acting Deputy Director, Sanitary Service.*

3rd April, 1923.

APPENDIX V.—INVESTIGATION INTO THE CAUSES PRODUCING  
BERI-BERI IN FREETOWN PRISON, DECEMBER, 1922,

BY

THE DIRECTOR, SIR ALFRED LEWIS JONES  
RESEARCH LABORATORY.

Many causes have been stated to produce the conditions known as beri-beri. Among these may be mentioned infection by a definite organism, insanitary conditions, overcrowding, psychological factors and dietetic error. The whole trend of modern research is in favour of the disease being due to error in diet, and more particularly to lack of anti-beri-beri vitamine. It appears to-day essential, when confronted with an epidemic of beri-beri, to investigate the diet upon which those who are infected subsist, and to study the factors which are at work either in the preparation of the food previous to cooking or in the methods adopted in cooking, which may influence the quantity or quality of this vitamine normally present in the raw articles of diet.



Of the various vitamins known, that which concerns us here is the anti-beri-beri vitamin, called also anti-neuritic or the water-soluble B vitamin. This vitamin possesses two important characters: it is very soluble in water and is destroyed by exposure to high temperature. For example, Chich and Hume\* found that wheat embryo, which is rich in this vitamin, loses at least half of it when heated for forty minutes at a temperature between 100°C. and 117°C.

The question has to be considered from several aspects.

- (1) Does the diet prescribed contain in the raw state sufficient vitamin?
- (2) Does the method of preparation for cooking reduce the available vitamin?
- (3) Do the methods of cooking adopted produce any diminution of it?
- (4) Are there any other facts which are relevant?

### THE FREETOWN PRISON DIET.

The full diet of prisoners are shown in the scale of dietary for prisoners† and amended recently is as follows:—

Rice	...	...	10 ozs. daily
Foofoo	...	...	1 lb. daily
Beef	...	...	3 ozs. daily
Split peas	...	...	2 ozs. Tuesday, Thursday, Sunday
Ground-nuts‡	...	...	1 oz. Monday, Wednesday, Friday, Saturday
Salt	...	...	$\frac{1}{2}$ oz. daily
Palm oil	...	...	$\frac{1}{8}$ gill daily
Tomatoes§	...	...	2 ozs. daily
Greens, spinach, sorrel, crean-crean	...	...	$\frac{1}{4}$ bundle daily or alternatively
Ockro, green	...	...	2 ozs. daily or alternatively
Ockro, dry	...	...	1 oz. daily
Pepper	...	...	1½ ozs. to twenty persons
Kaindah (locust beans)	a trace, flavouring.		

1. *The following articles when raw contain vitamin:* Rice, split peas, ground-nuts, tomatoes, kaindah and, to a less extent, beef, crean-crean, spinach, sorrel, ockro.

2. *The following notes on the preparation for cooking of the above articles of diet have been collected from various local sources.*

- (a) *Rice*.—The rice used is native rice; it is cut when ripe, dried, thrashed, heated in water for a sufficient time to loosen the husk, partially dried and pounded in a mortar to remove husk. The pericarp is got rid of by further pounding in a mortar; the rice is winnowed, washed in water, and is then ready for cooking.

This process involves two operations, each of which, if excessive, may cause loss of vitamin, i.e. boiling and pounding to remove the pericarp.

- (b) *Split peas*.—These are small dried imported split peas. The exact method of preparation of these is not available, but examination showed that the embryo was deficient and germination experiments failed.

- (c) *Ground-nuts*.—These are prepared for cooking by roasting on a metal plate, which is held over the fire, the nuts being stirred about to dry and brown them. The temperature necessary for this operation is high—130°C. or more, which is sufficient to cause rapid and, possibly, complete destruction of vitamin. The ground-nuts are then pounded to powder in a mortar and are ready for cooking.

\*Med. Res. Coun. 1919 Rep. Our present state of knowledge concerning accessory.

†Manual of Regulations for the Government of Prisons in the Colony of Sierra Leone, 1922, p. 31.

‡Added to diet in 1919.

§Added to diet in November, 1922.



- (d) *Tomatoes*.—These are fresh and ready for cooking.
- (e) *Kaindah* (locust beans). These are taken from the pod, dried in the sun for two to three weeks, boiled for four to six hours in a vessel containing water and covered with bags, beaten in a mortar and washed in water to remove the outer coat. They are dried for a week and it is at this stage they are received from the contractor. To prepare them further before cooking they are roasted on a metal plate for about five minutes at high temperature and pounded in a mortar to a powder.

These processes, especially the last, involve loss of vitamine.

- (f) *Beef*.—Fresh and ready for cooking.
- (g) *Crean Crean*.—Fresh and ready for cooking.
- (h) *Spinach*.—Fresh and ready for cooking.
- (i) *Sorrel*.—Fresh and ready for cooking.
- (j) *Ockro, green*.—Fresh and ready for cooking.
- (k) *Ockro, dry*.—This is heated on a metal plate at high temperature and pounded to powder in a mortar.

3. *The methods of cooking adopted in Freetown prison* are as follows:—

- (a) *Rice*. Observation made on 5th December, 1922.

Time-table :

- 11.40 a.m. Rice poured into boiling water in steam jacketed rice boiler and lid closed.
- 12 noon The excess of water  $2 + \frac{1}{2}$  buckets full was drawn off through the outlet tap at the base of the boiler and was thrown away. Lid closed.
- 12.20 p.m. The rice was examined by the cook and was considered to be sufficiently cooked ; the steam to the rice boiler was turned off and the lid closed.
- 2 p.m. The rice was taken out and weighed into portions. The reading of the pressure guage at the beginning of the operation was 10lb. and at 2.35 p.m. 15lb. The temperature readings taken at intervals of about twenty minutes showed that a high temperature about 100°C was obtained in the rice boiler soon after the rice was put in, and was maintained till 2 o'clock when the rice was removed.

There are two points which require attention with reference to this procedure.

- (1) As stated above the anti-beri-beri vitamine is very soluble in water. It is evident, therefore, that the rejection of the rice water during the cooking entails loss of vitamine.
- (2) The time of cooking on this day was from 11.40 a.m. to 12.20 p.m. But, usually, cooking starts at 11.30 a.m. It was found by repeatedly watching the process that the method of cooking was variable. On some days the rice was put in cold water and the proportions of rice and water varied. An important fact observed was that although the steam to the rice boiler was supposed to be turned off at 12.20 p.m. in the operation detailed above, the rice boiler did not cool down. This was in agreement with an observation made before the operation started that the water in the rice boiler, even before this boiler's steam had been turned on, was almost boiling. Examination proved that the stop cock on the steam pipe leading to the rice boiler was defective, and permitted the passage of steam even when shut off as far as possible. This defect was stated by those in charge of the cooking to have existed over a year and, possibly, longer.

It appears that the rice is subjected to a cooking process which is so prolonged as to impair very definitely the vitamine content. In this connection one may refer to the results obtained by Chich and Hume\*, who found that yeast extract, which had been subjected to a temperature of 100°C for sixty

\* Loc. Cit. Med. Res. Coun.



minutes had lost about half of its anti-beri-beri vitamine.

(b) *Split peas.* These are made into soup.

Operation observed 12th December, 1922, second boiler used.

Time-table:—

9.30 a.m.—Peas placed in cold water in boiler: steam turned on.

11.30 a.m.—Beef added.

12.30 p.m.—Tomatoes added.

1.30 p.m.—Steam turned off.

2.30 p.m.—Beef taken out.

3.30 p.m.—Soup taken out and apportioned.

The temperature recorded at intervals during the cooking was 100°C. soon after 9.30 a.m., and remained high, being 96°C. at 1.30 p.m., and 95°C. at 2 p.m. At 3.30 p.m. it was 80°C. It will be noted that the tomatoes, which when raw contain much anti-beri-beri vitamine, were added at 12.30 p.m.

(c) *Ground-nuts.* Made into soup as follows:—

Time-table:—

11.30 a.m.—Beef and salt put in boiling water in boiler, lid closed.

12.30 p.m.—Add pounded ground-nuts, lid closed.

1.30 p.m.—Steam turned off, add pepper, lid closed.

3.30 p.m.—Serve.

(d) *Spinach, sorrel, crean-crean, ockro kaindah* are used in making sauce as follows:—

Time-table:—

7.30 a.m.—Place green vegetables in boiling water and boil twenty minutes.

7.50 a.m.—Throw away water. Rinse in cold water and put aside till required (vide below).

8.0 a.m.—Meat, salt, pepper and kaindah are mixed in water placed in boiling water in the boiler and boiled.

8.20 a.m.—Add palm oil and vegetables.

9.30 a.m.—Finishing cooking. Dish.

4. *Other facts which are relevant.*—An examination of samples of rice supplied to the prison showed that the old rice i.e. last year's harvest, which was supplied up to November, 1922, was at the date of examination of bad quality, whereas the new rice, entirely of this year's harvest, supplied in December was of good quality. The old rice was defective in several ways. It was of light weight powdery and of bad colour. The grains were punctured and hollowed out leaving only the shell; the majority of the damage apparently having been done by the rice weevil, which was present in large numbers. Microscopic examination showed that over half of the old rice grains were so defective. Those grains which are destroyed do not, however, float readily in water. Enquiry elicited the statement confirmatory of the microscopic findings that the old rice was in reality a mixed rice consisting of a portion of last year's harvest and a portion of this year's. Admixture of new rice with last season's rice can begin in October or exceptionally in late September if the crops are early. The deterioration of rice is recognized in the trade and allowance for loss of weight in kept rice is made at the rate roughly of 1 lb. per bushel of 84 lb. per month. Selling by weight, therefore, this means that a lb. at the end of the period of storing of rice has more bulk than a lb. at the beginning of the period. But this increase of volume to the lb. does not appear likely to suffice to compensate for the loss of vitamine, due to the mechanical action of weevils and other grain pests, because many grains may have lost all their vitamine through removal of the subpericarpial layers and the germ, without suffering great loss of weight and conversely. The treatment of rice in a country destined to produce much rice will re-pay very full and accurate investigation, as to the methods best adopted for its preparation for sale and the preservation of it.

Reviewing the treatment of the above articles of diet, it is seen that although the diet in its raw unprepared state contains ample vitamine to prevent beri-beri, the processes of preparation for cooking and of cooking each involve certain operations which materially reduce this vitamine. Thus the methods of preparation for cooking of ground-nuts, kaindah, and dried ockro seem to be such as to deprive these articles of



any vitamine value. The methods of prolonged cooking affect adversely the rice, split peas, tomatoes, beef and green vegetables. Attention was drawn to the removal of rice water during cooking and to the fact that water soluble vitamine is lost in the process. These defects in preparation for cooking and in the methods of cooking are not, it appears, sufficient to account for an outbreak of beri-beri. This conclusion is based upon the fact that these method of preparation and cooking are apparently more or less constant throughout the year, whereas the outbreak of beri-beri are seasonal in their incidence. They occur chiefly at the end of the wet season. We are driven to seek for the determining cause of such outbreaks in another factor and, so far as the epidemic in the Freetown prison are concerned, this factor is probably to be sought in the adverse effects on vitamine which are produced by age and storage of rice. Above it was noted that "old rice" examined in December was of poor quality and had suffered much damage by weevils. That this mechanical damage is of importance in diminishing vitamine content seems highly probable, and experiments have already been undertaken which, it is hoped, will place beyond doubt the influence of this destruction of the vitamine of the grain by age and grain pests. Even with a lens, it is obvious that the embryo has been removed in a large proportion of grains which have been damaged.

I am of opinion that what has been occurring in the Freetown prison is somewhat as follows :—

A diet which in its raw state contains sufficient vitamine to prevent beri-beri in prisoners, no matter how long may be their period of detention, is by the above-mentioned methods of preparation and cooking so reduced in vitamine that it affords a very small margin of safety. This margin of safety is just sufficient while rice, the chief source of vitamine, is unaffected, or affected only to a small degree, by age and storing. When in the process of deterioration the rice has lost still more of its vitamine value, the beri-beri epidemic starts and increase until such time as new rice comes into use, when the disease dies down.

It is known from animal experiments that animals living on a diet which will in the course of a long time result in the production of neuritis, will suffer in health before the neuritis appears. They show loss of weight and very commonly develop gastrointestinal disorders. One would expect, therefore, that persons living for a long time on a diet deficient in anti-beri-beri vitamine would suffer from disorders such as dysentery. Doubtless, other conditions may have a contributory value in causing the cases to be severe or mild. But such conditions as overcrowding and insanitary surroundings are probably not such predisposing causes in the prison as they would be in the native dwellings in the congested portion of Freetown. As regards the infection theory supported by some, there is evidence which it proposed to submit later in conjunction with the results of the experimental work, that in the present epidemic, infection has no part. Of the influence of psychological states nothing has been discovered which can be produced as evidence.

The following suggestions are made in order to re-establish, with as little expense as possible, the essential conditions of dieting as regards the anti-beri-beri vitamine.

- (1) All foods of which the vitamins have been damaged in the course of preparation for cooking e.g. ground-nuts, kaindah (locust beans) dried ockro, can be discarded from the diet unless their retention as protein, fat or carbohydrate renders them economically useful.
- (2) The present methods of cooking can be modified without expense or possibly with reduction of expense so as to produce a radical improvement in the amount of vitamine available at the end of cooking. To secure this in the first place the stop cork referred to should be put right. It should then be determined what is the minimum time required to cook the articles of diet, and cooking should not be commenced earlier than is absolutely necessary to ensure proper cooking, immediately before serving. No more water should be added to the rice than is required for its cooking, and under no circumstances, should the rice water be thrown away.
- (3) Tomatoes and similar articles provided to counteract existing beri-beri should be giving raw.
- (4) A portion of the meat ration should always be in the form of liver, brain or sweet bread, substances rich in anti-beri-beri vitamine.



Appended is a table showing some of the times advocated (by writers on cooking) for cooking certain of the articles referred to above, and a comparison with the times given in the prison. Allowance for the great bulk cooked in institutional cooking has to be made. On the other hand the method by which often household cooking is done is by simmering and the temperature is not the same as obtained in the steam jacketed boilers. Cassel's, p. 36, referring to the boiling of meat says—"The great art of boiling meat is not to let the meat boil."

Table of times giving for the cooking of various articles of the prison diet.

Articles.	Gordon and Rhode Cooking Book.	Cassel's Cooking Book.	Prison Kitchen.
Boiled rice ... ..	Boil 16 minutes, p. 237	10 minutes* in boiling water, p. 187	150 minutes under present condition of stopcock
Pea soup, split peas ...	20-40 minutes, p. 26	Soak overnight and boil till tender, p. 15	360 minutes
Tomatoes in soup ...	Cook very gently 20-40 minutes, p. 27	A few minutes, p. 20	60-180 minutes
Ground-nuts ... ..	—	—	60-180 minutes

\*P. 188. The water in which rice is boiled contains a considerable amount of nourishment, and under certain circumstances more than the rice itself.

#### APPENDIX VI.—ANTHRAX.

This is a dangerous infectious disease of animals and is communicable to man.

The animals chiefly affected are cattle ; less so sheep, goats and mules.

The signs of the disease are generally ill-health, fever, trembling, weakness, bloody discharge from nostrils and bowels. The mortality is great.

In some cases there are only slight signs of illness before the sudden death of the animal takes place.

After death the most noticeable features are the spleen, which is greatly enlarged (two or three times the normal) highly congested, soft and friable, the flesh which is paler than normal and the bowels which contain bloody material. Bloody discharge from nostrils and bowels should be looked for.

Ordinary medicinal treatment is of little use.

All available energy should be concentrated on saving the living animals. Three principles should be kept in view, remembering that a diseased animal and its discharges are the sources of fresh mortality.

(a) The healthy must be got away from the sick and from any place where there are or *may be* discharges from the sick. For instance, small quantities of discharges from the nose of a sick animal may be scattered over miles which have been walked over by the animal before death and which cannot possibly be seen by the naked eye, yet if any of the discharge is eaten by a healthy animal death is almost certain to follow.

(b) Those that appear to be healthy, but have been or *may have been* in contact with a sick animal must be most carefully watched, and on the first appearance of ill-health in an animal it must be removed from the remainder.

(c) All animals that have died of the disease and all things with which they have come in contact must be destroyed by fire. It takes a good deal of wood to burn a bull, but it is the only way of stopping the spread of infection where there is no special incinerator or large quantities of disinfectant. The micro-organism causing anthrax can remain in a communicable form for a long time after the death of an animal.

J. BERINGER,  
*Deputy Director of Sanitary Services.*



## APPENDIX VII.—CASES OF BITES BY BABOONS.

## CASE 1. History as told by mother :—

"I was going to my farm one morning with my children Vandy and Alie, and on the way I stopped to wash some clothes at a stream and then proceeded on.

I had hardly left the stream when I suddenly saw a baboon approaching. It made straight for Alie and in my endeavour to save the child, baby Vandy, who was on my back, fell to the ground. The baboon at once left Alie, sprang on the infant, and bit his face. My shout for help brought some men on the scene and the baboon ran away."

The children were brought into hospital the day after the injury, and on examination, baby Vandy, three months old, who, undoubtedly, had lost much blood, was still in a state of shock.

There was a large raw area, 3 to 5 square inches, on the right side of the face. The upper border was on a level with the eye-brow, and the lower border with that of the ala of the nose. From side to side, it extended from the bridge of the nose to within one full inch of the ear.

The edges of the wound were clearly cut, as if by a razor, except round the ala of the nose.

The eye-lids were completely gone, and the eye-ball was protruding but uninjured. On the forehead was a distinct curved incision showing the tooth marks.

Alie, 4 years, had an irregular wound 6 inches  $\times$  3 inches on the right flank. The muscles escaped lightly.

## CASE 2. History as told by mother :—

"I was not present when my son was injured. My sister had taken the boy with her to the farm. On their return in the evening, the boy was walking behind her and a man following. The man went to the bush, and as they were waiting for him, a baboon appeared and sprang on the boy. The man came to the rescue (it would appear that a tug-of-war ensued! E. A. R.) and the baboon ran away."

This case was admitted into hospital exactly a week after the first. The boy, Abdulai, is about three years old.

On examination, there was a V-shaped wound extending from the frontal part of the scalp, along the temple and bending to the lower margin of the eye. In the centre of the wound a piece of muscle had been dug out. The outer margin of the eye-lids were torn, but the eye itself was uninjured.

Both cases came from the Barri Chieftdom—the first from Bama, and the second from Giema, neighbouring villages I understood.

The most striking feature of these cases is the well defined edges of the wounds, indicating the sharpness and regularity of the incisor teeth of the baboon.

Curiously enough, all three children were attacked on the right side, but this, I believe, is merely a coincidence.

E. A. RENNER,  
*Medical Officer.*

MEDICAL DEPARTMENT,  
PUJEHUN, SOUTHERN PROVINCE,  
24th August, 1922.

## TREATMENT OF THE BABOON CASES.

## CASE I. VANDY.

The wound was sprinkled with boric powder, and then a hot fomentation applied and kept on for about two hours. This was done for the first three days to get the wound thoroughly clean, and then it was dressed with boric gauze daily.

The eye was irrigated twice daily with a 5 per cent. solution of boric acid. It did well for the first month, but owing to the mother's mischievous interference with the dressings sepsis set in again.

At the end of the eighth week, the mother would no longer stay in hospital, and the patient was discharged.

The wound had healed beautifully except for an area the size of a penny. The inflammation of the eye had subsided, but the cornea was left opaque.

Alie was dressed daily with weak solution of Izal lotion.

## CASE II. ABDULAI.

Two sutures were applied to the eyelid and the wound was washed and dressed with a weak solution of Izal. The centre of the wound was packed and allowed to granulate from the bottom. The patient was discharged at the same time as Case 1 with the wound almost healed. He was brought to see me three months after. Much scar tissue had formed, and the disfigurement was greater than I had expected. The mother could give me no information of baby Vandy (Case I.)

E. A. RENNER,  
Medical Officer.

17th January, 1923.

# APPENDIX VIII.—PRELIMINARY REPORT ON THE PREVALENCE OF THE TSETSE-FLY

(by the Director, Sir Alfred Lewis Jones Research Laboratory, Freetown.)

PRELIMINARY REPORT on the prevalence of the tsetse-fly, *glossina palpalis*, on the Cape Lighthouse Peninsula, by D. B. Blacklock.

The investigation was carried out during the height of the rainy season, from 12th July to 19th August, 1922. This time was chosen as the most suitable for the purpose of ascertaining the number of fly present and also for determining the proportion of wild fly which were in an infective condition. The figures obtained are in some respects comparable to those given by Yorke and Blacklock for the same area in 1914-1915 during the dry season.

*Temperature.*—The room used as a temporary laboratory was situated in the bungalow of Cape Lighthouse. It is about a hundred yards distant from the nearest bush. The temperature, maximum and minimum, was recorded daily at 6 p.m. in the laboratory. The highest temperature recorded during the period was 82° F. on 16th July, the lowest was 69° F. on the 7th, 8th and 16th of August.

In table 1 are given the figures obtained.



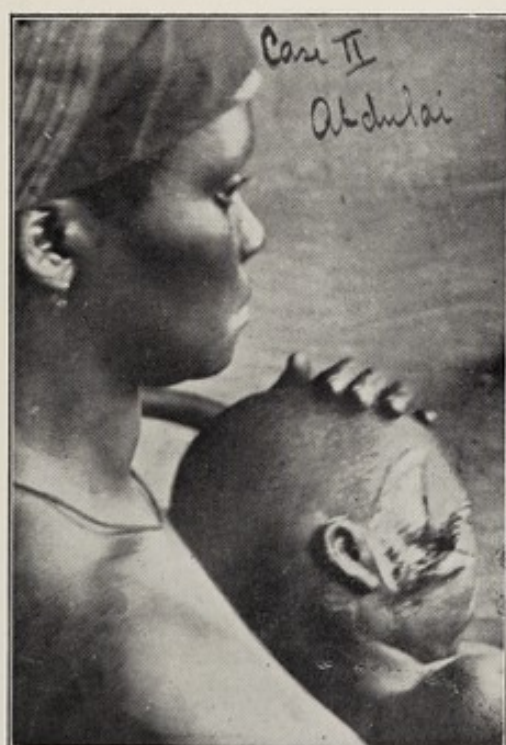






TABLE I.

Maximum and minimum temperatures recorded at the Cape Lighthouse bungalow from 12th July to 19th August, 1922.

Date 1922.			Maximum.			Minimum.
July	12	...	76	...	...	72
"	13	...	75	...	...	73
"	14	...	79	...	...	73
"	15	...	78	...	...	72
"	16	...	82	...	...	74
"	17	...	79	...	...	70
"	18	...	80	...	...	73
"	19	...	80	...	...	72
"	20	...	80	...	...	71
"	21	...	78	...	...	75
"	22	...	80	...	...	73
"	23	...	79	...	...	72
"	24	...	78	...	...	71
"	25	..	79	...	...	71
"	26	...	80	...	...	72
"	27	...	79	...	...	70
"	28	...	80	...	...	70
"	29	...	78	...	...	73
"	30	...	78	...	...	75
"	31	...	79	...	...	72
August	1	...	80	...	...	71
"	2	...	78	...	...	71
"	3	...	76	...	...	70
"	4	...	77	...	...	70
"	5	...	77	...	...	71
"	6	...	75	...	...	71
"	7	...	75	...	...	69
"	8	...	76	...	...	69
"	9	...	78	...	...	72
"	10	...	78	...	...	72
"	11	...	79	...	...	70
"	12	...	80	...	...	70
"	13	...	79	...	...	71
"	14	...	78	...	...	71
"	15	...	76	...	...	70
"	16	...	79	...	...	69
"	17	...	79	...	...	70
"	18	...	79	...	...	71
"	19	...	77	...	...	71

*Presence of Glossina in Cape Lighthouse Bungalow.*—On 14th July the fly was present in the bungalow, four being captured in the verandah while biting—three in the morning and one in the afternoon. On frequent occasions subsequently they were observed in the verandah. It is of some importance for those who are visiting this place to note that the bungalow itself is not free from the fly at this season of the year. In all probability these flies did not reach the bungalow by a direct flight, as on several occasions they were seen to accompany persons emerging from the bush and going towards the house. Nevertheless it is important to note that such opportunities of attracting the fly to the bungalow are by no means rare, as people frequently approach it from the bush.

Further, it is to be observed that the fly once having arrived there has no hesitation in biting. This is a fact which requires emphasis, as it is undesirable, even if the fly is but slightly infected with trypanosomes capable of causing disease in man, that persons occupying the bungalow should run any risk. During the same afternoon it was noted that in walking from the sanitary station on the rocks past the Lighthouse and to Man-of-war Bay, flies in twos and threes were attacking at intervals all the way up till 4 p.m.

On subsequent days the fly was constantly biting in the undergrowth among the oil-palms near the Lighthouse. The character of the day did not appear to influence their behaviour, except in so much that they were slower in flight; on dark wet days their attack was more leisurely and their bite more irritating. They were observed to bite in the bush as early as 6 a.m. and as late as 5.15 p.m.

The fly in the latter case were attacking the men who tap the oil-palm for the palm wine. It was a stormy and wet day, July 20, and under the oil-palms it was particularly dark.

The personal observations made with regard to the biting of the fly on wet dark days are borne out by the captures made by the fly boys, referred to below.

*Numbers of Wild Fly obtained.*—After the first days during which time some boys were instructed as to the most suitable means of capturing and transporting the fly to the laboratory, a record was kept for several days of the number of flies captured and the approximate time required and the type of weather.

TABLE II.

Notes made on these points.

Date.	No. of Flies.	No. of Boys.	Time Taken.	Kind of Days.
1922.				
July 14	8	2	—	—
" 15	20	2	Before noon	Sunny
" 18-19	14	1	—	—
" 20	9	1	—	Sunless, wet
" 21	23	2	7.30 to 10.30 a.m.	Sunny
" 22	16	3	9 to 10 a.m.	"
	11	1	9 to 10.30 a.m.	"
	20	1	2 to 5 p.m.	"
" 23	12	1	Forenoon	Dull, wet
	12	2	—	"
	12	1	Afternoon	Brighter
" 26	10	1	to 9 a.m.	Sunny
" 27	26	1	All day	Very heavy rain
" 28	13	1	to 8 a.m.	Dull
	19	1	to 11 a.m.	"
	12	1	to noon	"
" 29	20	1	to 10.30 a.m.	Very wet, no sun
	12	1	"	"
	14	1	"	"
	12	1	"	"
" 31	20	1	to 11 a.m.	Cold, wet
	315	27		

It will be seen that of 315 flies, over half were captured while attacking on dull sunless days, and also that each boy could capture in a few hours about a dozen flies.

*Method of Capture.*—Nets were given to the boys, but they soon discarded them as cumbersome to carry and difficult to use. They preferred to capture the flies by laying the blade of a knife on the legs of the fly after it had alighted on the skin to feed, and then transferring it with the fingers to a bottle plugged with wool.

*Breeding Places of the Fly.*—On a previous occasion the question as to where the fly was breeding was dealt with at some length, and there is at present nothing to add to the facts discovered then. It may be of service to note the conclusions arrived at on that occasion.



## CONCLUSIONS.

1. The breeding grounds of *glossina palpalis* are not so strictly limited to the immediate vicinity of water as has hitherto been thought, they may occur quite independently of fresh water and at least a quarter of a mile from sea water.

2. Although *glossina palpalis* is to be found in considerable numbers in mangrove swamps and may travel in these to a distant of at least half-a-mile from dry land, the swamps do not constitute a breeding ground of the fly.

3. The pupæ or *glossina palpalis* do not hatch when subjected to daily flotation on sea water.

4. The ground around the trunk of oil-palms (*eloeis guineensis*) which have not been stripped of their lower petioles constitutes an excellent breeding place for *glossina palpalis*.

5. *Glossina palpalis* can breed in localities in which, practically, the only tree is the oil-palm.

6. Stripping the oil-palm of the lower petioles would suffice to destroy the breeding ground in such localities.

Yorke W. and Blacklock B.—Notes on the Bionomics of *glossina palpalis* in Sierra Leone, with special reference to its pupal habitats.

Ann. Trop. Med. and Parasit. Vol. IX. July, 1915, No. 3 p. 349.

*Dissections of Wild Fly.*—At first dissections were made of labial cavity, hypopharynx salivary glands and gut, but later, in order to economise time, the detailed examination of the gut was omitted. The information which can be obtained from dissection of gut is of importance only in respect of the number of flies which have become infected. It is the rule with flies which become infected with most trypanosomes that early multiplication occurs in the alimentary canal. From here it spreads forwards and in flies which develop the power of infecting fresh hosts the infective stages are found in the labial cavity, hypopharynx and salivary glands. If, therefore, we confine attention to these latter organs, we are likely to encounter only such infections of the fly as proved that the fly is capable of infecting. The term "Infective" is applied to such flies in contra distinction to "Infected" which merely implies that the fly has trypanosomes present in it, but does mean necessarily that at its next meal it will inject trypanosomes into the wound which it makes in piercing the skin. Thus *T. gambiense*, the commonest trypanosome which causes human trypanosomiasis in West Africa, undergoes its early development in the alimentary tract of *glossina palpalis* and finally reaches the salivary glands where it becomes capable of infecting when introduced by the fly in biting. *Trypanosoma brucei*, which causes cattle disease in Zululand and elsewhere, develops in a similar manner in *glossina morsitans*. *T. vivax* is limited in its development to the labial cavity, while *T. pecorum* develops first in the gut and later reaches its infective phase in the hypopharynx. These two latter trypanosomes are the commonest trypanosomes which affect domestic animals, cattles, sheep, goats and dogs in Sierra Leone. Yorke and Blacklock (1915) found trypanosomes, by single fresh film examination, in nineteen of 143 cattle examined. Of these nineteen infected animals eleven were infected with *T. congolense*, two with *T. vivax*, five with *T. congolense* and *T. vivax*, and one with *T. gambiense*.

The total number of wild flies dissected by me was 471. Of these 307 were males and 164 females.

Of the 471 dissected, twenty-eight were infected in the labial cavity, hypopharynx, or salivary glands. Of the twenty-eight infected, twenty were males and eight females. In table III are shown the sexes and site of infection of the flies.

TABLE III.

Results of dissection of infected flies :—

No.	Sex.	Proboscis Labial Cavity.	Hypopharynx.	Salivary Glands.
1	M	—	+	—
2	F	+	+	—
3	M	—	+	—
4	"	+ +	+	—
5	"	+	+	—
6	"	+ + +	+	—
7	"	+	—	—
8	"	+	—	—
9	F	+ + +	+	—
10	M	+ +	+ +	—
11	"	+	+	—
12	"	+	—	—
13	"	+ +	+ +	—
14	"	+ +	+ +	—
15	"	+ +	+ +	—
16	"	+ +	+ +	—
17	F	+	+ +	—
18	"	—	+ +	—
19	"	—	+	—
20	M	—	+	—
21	"	+ +	—	—
22	"	—	—	+ +
23	F	+ +	—	—
24	"	+ +	—	—
25	M	+	+ + +	—
26	"	+ +	+	—
27	"	+	—	—
28	F	+	—	—

Yorke W. and Blacklock B.—Notes on certain animal parasites of domestic stock in Sierra Leone. Ann. Trop. Med. and Parasit. July, 1915, Vol. IX. No. 3. p. 413.

It is of some interest to compare with this result that obtained by us in the 1914-15 investigation, during the dry season.

Four hundred wild *glossina palpalis* caught on the Cape Lighthouse Peninsula were dissected and examined; trypanosomes were found in twenty-one of them. If we leave out of calculation two flies in which the gut only was found infected, we can construct a comparable table. In the former series the labial cavity and hypopharynx are grouped under proboscis and the sex is not stated.

Table IV giving result of dissecting of wild *glossina palpalis* found to be infected with trypanosomes.

No. of Fly.	Salivary.	G/Proboscis.	Intestine.
1	0	0	+ + +
2	0	+ +	0
3	0	+ +	+ +
4	0	+ + +	0
5	0	+ +	0
6	0	+ +	0
7	0	+ + +	0
8	0	+	0
9	0	+ + +	+ + +
10	0	+	0
11	0	+ + +	0
12	0	+ + +	0
13	0	+	0
14	0	+ +	0
15	0	0	+
16	0	+ + +	+ + +
17	0	+	0
18	0	+	0
19	0	+	0
20	0	+ +	+ + +
21	0	+	0



We have, therefore, in 1914-1915, of 400 flies, nineteen infected, i.e. 4·7 per cent., and in 1922 of 471 flies twenty-eight infected, i.e. 5·9 per cent. It would appear therefore that as between the dry and wet season there was not much variation in the infective rate. It must be borne in mind, however, that the two seasons in question are not strictly comparable, not only owing to the interval between them, but also owing to the possibility of the partial clearing which was carried after 1915 having altered the proportion of infective flies.

*Species of Trypanosoma infecting the Fly.*—In both tables it will be noted that proboscis in infection predominates and these trypanosomes belong to the animal-infecting group. In view of the site of infection and the known distribution of such parasites in Sierra Leone, these represent *T. congolense* and *T. vivax*. It will be observed that in 1914-1915 no salivary gland infection was recorded, whereas in the present series one fly infected in the salivary gland was discovered. Before assuming that this trypanosome was *T. gambiense* and derived from a human being, it is necessary to draw attention to the fact stated above that *T. gambiense* has once been found in cattle here. It would have therefore been very desirable to examine both human beings and domestic stock on the peninsula but, unfortunately, all attempts to carry out this investigation were frustrated by the reluctance of the people to submit either themselves or their stock to this examination. However, judging from the results of dissection of wild flies, there is justification for the statement that the condition at the Cape Lighthouse Peninsula are at present such as to preclude the possibilities of successful maintenance in the area of cattle. Further, it may be said that the condition of infection of the wild fly there is much the same, subject to the factors adverted to above, as it was eight years ago.

Sufficient is known of the habits of the fly on the peninsula to show that clearing of the under-growth would have a prompt action in checking the breeding of the fly. By making the clearing first in a definite area of the peninsula, and noting the result upon the prevalence of fly under the new conditions, it would very soon be possible to estimate what value the measures adopted had and whether to apply such measures over the whole area was likely to ensure permanent freedom from fly. The more drastic the clearing of the under-growth the less prospect has the fly of evading its enemies; the fly, which prefers shady dark places in which to deposit its larvæ, would in all likelihood move back off the cleared area into the untouched portion of the bush. Merely to clear the ground and keep it clear of bush is, however, not likely to prove economical. Nor would it be advisable to clear over a large area at once, but rather to clear a small area and plant it with crops which, while offering little protection to the fly, would serve to keep down the under-growth and also yield a little revenue to the land owners. Crops which appear likely to yield little protection to the fly are ground-nuts, cassada and sweet potatoes.

*The Oil-palm.*—Of the trees on the peninsula this is not only the commonest, but also the most important from the point of view of the present breeding places of *glossina*.

In a previous review of the situation, we acted on the assumption that the oil-palm was of considerable commercial value, and we accordingly recommended only the cutting of the lower petioles. More prolonged investigation has convinced me that in so far as the peninsula is concerned the oil-palm is not of such value as would at first appear.

During this investigation I took the opportunity of watching and accompanying the men who were engaged in tapping the palm wine and observed that practically all the trees were being or had been in the past deeply scarred and fissured by the tappers. In order to obtain an authoritative opinion on this important question, I asked the Commissioner of Lands and Forests if he would accompany me on a survey through the peninsula. This he kindly agreed to do and we paid our visit on the 29th of November. He was able to see for himself the great amount of damage to the trees which had been done and was, I think, in agreement with the view that as at present utilized on the Cape Peninsula the oil-palm is of relatively little commercial value. His considered opinion on this subject would of course be necessary before proceeding with any clearing scheme.



It is only possible to state here that in considering the oil-palm as the chief shelter by which the breeding places of *glossina* are provided, it does not appear so necessary now to preserve them. If this view is accepted it will render the task of clearing much more easy. The time occupied in carefully clearing the petioles off the palms is very much greater than that required to cut them down. I am far from supporting any idea of destroying palm trees wholesale, because, though possibly valueless from the commercial point of view, they are, when well grown, an asset from the aesthetic side. If only such palms were dealt with as appeared obviously capable of affording breeding shelter to the fly, it would not in my opinion detract from the appearance of the cleared land in any way.

The question of permission and powers and the opposition of owners are not ones, upon which I am capable of forming an opinion. But subject to the agreement on this head, I would suggest that that portion of the peninsula which extends from the Lighthouse to beyond the narrow neck of land between Man-of-war Bay and the open sea should be dealt with as a preliminary operation. I would suggest that all the undergrowth, including young oil-palms, should be cleared in a satisfactory manner in such a way that no removable shelter for the fly should remain. It is a possibility that on being deprived of its normal shelter, the fly might use the rocks which afford shade and security. This also it is very necessary to find out before proceeding to larger operations. Subsequent to clearing, the ground should be planted in such a way as to render the growing up of the bush impossible. In this connection I have the opinion of the Commissioner of Lands and Forests that the grass *melinis minutiflora*, which he has interested himself in, might grow on the peninsula. It would probably be of considerable value as a cattle food, but whether this or some other form of crop should be used is for discussion by experts on this subject.

#### SUMMARY AND CONCLUSIONS.

1. The tsetse-fly, *glossina palpalis*, is at present fairly numerous on the Cape Lighthouse Peninsula.
2. The fly is infected with trypanosomes in a proportion greater than five per cent.
3. Non-immune cattle could not be expected to survive long in the presence of fly so infected.
4. The fly breeds on the ground in the undergrowth and in the shelter of low palm petioles.

It is suggested that the portion of the peninsula from the Lighthouse to and beyond the isthmus at Man-of-war Bay should be cleared and planted with a crop which does not afford shelter to the fly.

I desire to acknowledge the action of the Government in providing funds for this investigation, and the assistance kindly given by the Acting Director of Medical and Sanitary Services, Dr. Beringer, and the Harbour-master, Mr. Wikner.

#### APPENDIX IX.—DENTAL REPORT.

SIR,

I have the honour to inform you that the following is the work done by me for Government officials and free patients from the Colonial Hospital from 11th October, 1921 to 4th January, 1922, and 27th March to 26th September, 1922.

Consultations.	Extractions with Local Anæsthetic.	Dressings.	Scaling.	Fillings.	Root Fillings.
1,411	598	474	409	395	193



In the Gambia in about five weeks the following :—

Consultations.	Extractions.	Dressings.	Scaling.	Fillings.	Root Fillings.
188	109	88	22	83	38

The following is extracted from the report of the Government Dental Surgeon for eight months in 1918.

Fillings, Temporary and Permanent.	Root Fillings and Dressings.	Scaling, etc.
151	109	22

The figures to me prove the fact that a dentist is a necessity in Sierra Leone.

\* \* \* \* \*

I have the honour to remain,

SIR,

Your obedient servant,

JOHN CARR,

*Government Dental Surgeon.*

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In the United States the following

Year	1911	1912	1913	1914	1915
...	...	...	...	...	...

The following table shows the results of the investigation for the year 1915.

...	...	...
...	...	...

The following table shows the results of the investigation for the year 1916.

