

Report on the Medical and Sanitary Departments / Government of the Gold Coast.

Contributors

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GOVERNMENT OF THE GOLD COAST.

REPORT

ON THE

MEDICAL DEPARTMENT.

FOR THE PERIOD

APRIL, 1923—MARCH, 1924.





GOVERNMENT OF THE GOLD COAST.

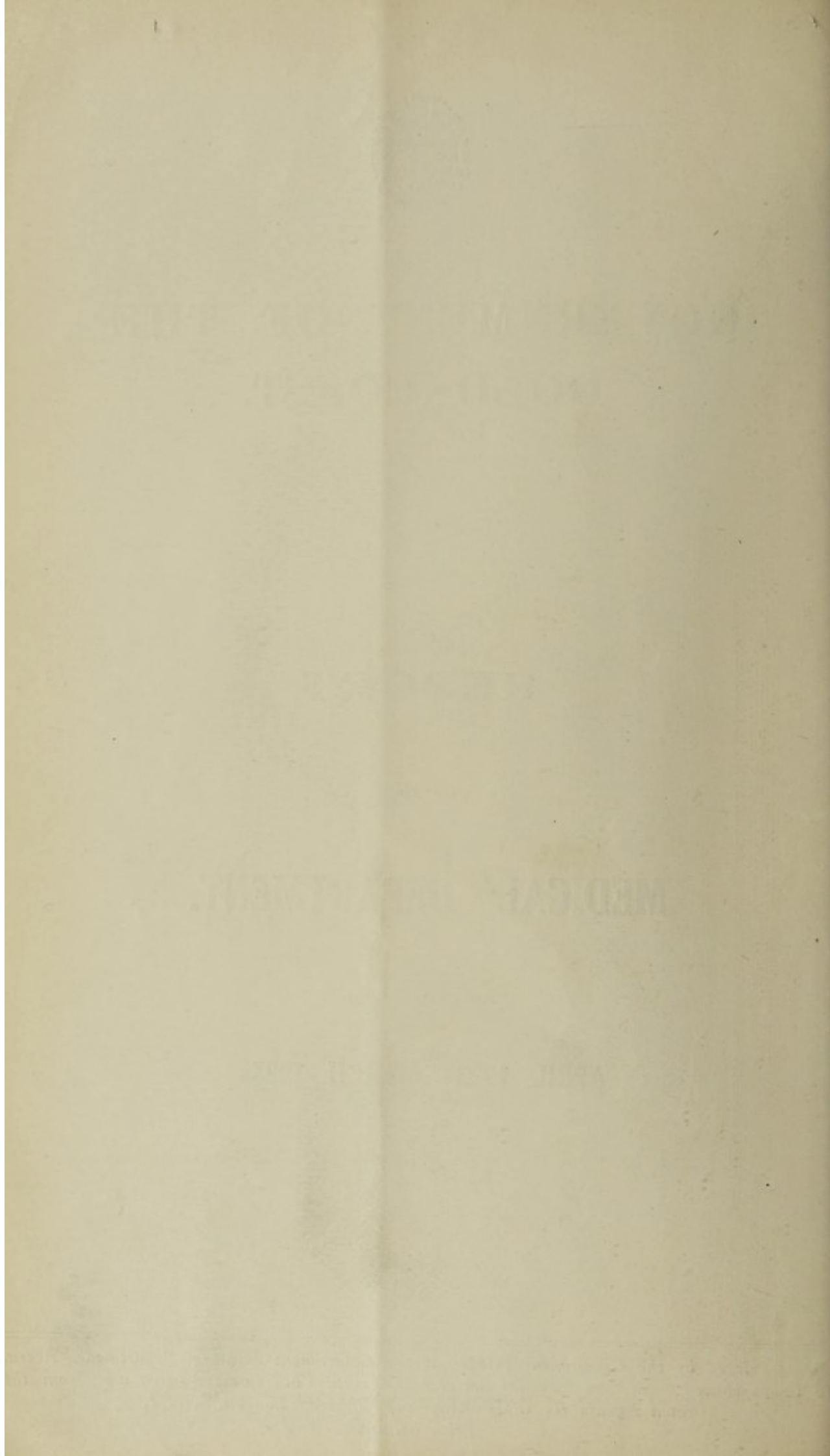
REPORT

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REPORT FOR THE YEAR 1st APRIL, 1923, TO 31st MARCH, 1924.

1. ADMINISTRATION.

TABLE 1.—MEDICAL STAFF AT 31st MARCH, 1924.

- 1 Director of Medical and Sanitary Services.
- 1 Deputy Director of Medical and Sanitary Services.
- 1 Deputy Director of Sanitary Services.
- 1 Director of Medical Research Institute.
- 2 Assistant Directors of Medical Services.
- 1 Surgical Specialist.
- 2 Medical Specialists.
- 6 Senior Medical Officers
- 2 Senior Sanitary Officers.
- 2 Pathologists.
- 35 Medical Officers (four of whom are Medical Officers of Health).
- 1 Radiologist and School Medical Officer.
- 2 African Medical Officers.

27 Vacancies :—

- 16 Medical Officers.
- 2 Medical Officers of Health.
- 5 Women Medical Officers.
- 4 African Medical Officers.
- 1 Dental Surgeon.
- 1 Analytical Chemist.
- 1 Office Assistant and Accountant.
- 1 European Storekeeper.
- 1 Wardmaster.
- 5 Superintending Sanitary Inspectors.
- 1 Laboratory Superintendent.
- 1 Laboratory Assistant.

2 Vacancies :—

- 1 Dispenser's Instructor.
- 1 Radiographer.

EUROPEAN NURSING STAFF.

- 4 Senior Nursing Sisters.
- 14 Nursing Sisters.

PRINCIPAL MEMBERS OF THE SUBORDINATE STAFF OF :—

- (a) Medical Department.
- (b) Sanitation Branch.
- (c) Lunatic Asylum.

(A)

- 2 Chief Dispensers.
- 6 First Division Dispensers.
- 3 First Division Nurses.
- 1 Chief Clerk.
- 1 First Division Clerk.

(B)

- 1 Chief Clerk.
- 1 First Division Clerk.
- 1 Sanitary Inspector and Training Officer.
- 1 Senior Division Sanitary Inspector.
- 4 First Division Sanitary Inspectors.

(C)

- 1 Chief Attendant.
- 1 Assistant Chief Attendant.
- 1 Matron.

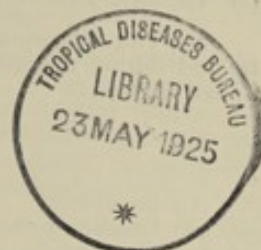


TABLE 2.—FINANCIAL.

(a) <i>Statement of Revenue 1st April, 1923, to 31st March, 1924.</i>				
Revenue (Hospital Fees)	...	...	...	£3,305 9 7
(b) <i>Statement of Expenditure.</i>				
Medical Department (including Sanitary Branch)—				
Personal Emoluments	...	...	...	£103,645 16 1
Other Charges	...	...	...	111,505 8 9
Total	...	...	...	£215,151 4 10

II. PUBLIC HEALTH.

(a) GENERAL REMARKS.

3. The following Table shews the most noteworthy contrasts in the Returns of Diseases treated during the quarter ending 31st March, 1922, the year 1922-23, and for the period under review :—

Disease.	1st January to 31st March, 1922	1922-23.	1923-24.
Small-pox	1	3	2
Chicken-pox	37	212	265
Dysentery	272	908	551
Enteric Fever	8	19	36
Influenza	69	243	193
Malaria :—			
Tertian	199	2,341	786
Quartan	11	101	78
Subtertian	385	1,371	2,041
Chronic	717	1,865	543
Blackwater	10	48	21
Unclassified	487	1,780	2,494
Measles	35	182	88
Pneumonia	161	599	534
Rheumatic Fever	57	132	109
Sleeping Sickness	3	15	6
Whooping Cough	30	379	193
Alcoholism	3	14	34
Yellow Fever	5	22	13*
Tuberculosis	138	385	411
Plague	—	1	44

* Includes four suspicious cases among Africans.

4.—*Dysentery*.—All types—shews a decrease of 357 cases, nearly 40 per cent., compared with the number for the previous year. The percentage mortality, 3.4 per cent., is slightly higher than that for the previous year—2.5 per cent.

5. *Malaria*.—Five thousand nine hundred and sixty-three cases of malaria were treated during the year as compared with 7,506 for the previous year, shewing a decrease of 1,543 cases with a very low mortality of 10 deaths.

6. *Blackwater Fever*.—Twenty-one cases with seven deaths occurred as against 48 cases with six deaths for the previous year.

In her report on the Infant Welfare Clinic, Dr. E. Mary Magill, Radiologist and School Medical Officer, reports as follows on three cases of quinine hæmoglobinuria in children :—

"Two small children of six years each developed a transient hæmoglobinuria (oxy-hæmoglobin found in specimen sent to Laboratory) with slight temperature, not exceeding 101 degrees, after the first does of four grains of Quinine Sulphate. Enquiry elicited the fact that one of these had been given three grains by his father on the previous day. The other child had not received any. Neither child at any time during the hæmoglobinuric period appeared to be at all inconvenienced. They were kept in bed for a couple of days; the urine was normal before the expiration of 48 hours, and no further ill-effects were observed. The third case gave more anxiety. A child of ten years of age with a plus two spleen and Malignant Tertian Rings was put on the quinine list at one of the schools. He received four grains about 10 a.m. on the first regular quinine day at that school. The father, an educated man, reported that the urine was black at 1 p.m. the same day; he also told me that the child had been given one teaspoonful (about 1 grain quinine sulphate) of Mistura Quinine that morning.

"I visited the home and found the child in bed and obviously ill. Temperature 102. Pulse 130, conjunctivæ very yellow. Abdominal pain and tenderness over the splenic area. Urine scanty and practically black. No vomiting occurred, but constipation was present.

"No history of rigors could be elicited.

"I visited the child regularly for ten days during which there was slow and steady improvement. At the end of a fortnight all symptoms had disappeared, but the child remained weak and languid for a considerable period. That attack occurred in April, 1923. There was a history of his having had two such previous attacks. Since April he has been well, only suffering from occasional attacks of 'Fever.' Malignant Tertian Rings were again found in his blood in November, 1923, and February, 1924. He has taken no quinine since the hæmoglobinuric attack of April, 1923."

7. *Yellow Fever*.—Following the outbreak of the previous year thirteen new cases were reported with ten deaths as compared with twenty-two cases and fifteen deaths in the previous year. Of the thirteen cases four were suspicious cases and occurred among Africans, and all recovered. Yellow Fever is referred to under III. Sanitation.

8. *Tuberculosis*.—Four hundred and eleven cases applied for treatment—64 deaths are recorded as compared with 385 cases and 43 deaths in the previous year.

9. *Yaws*.—Five thousand three hundred and twelve cases were treated during the year showing a very great increase over the numbers for the previous year. The great majority of these cases occurred in the Mandated District of Yendi where the marked success of the treatment by Galy and N.A.B. encouraged the natives to present themselves from all parts of the district. These figures indicate rather an increasing confidence in scientific methods of treatment than an actual increase in the incidence of the disease.

10. *Syphilis*.—All types—1,311 cases this year as compared with 541 last year. In the Venereal Clinic at Accra alone the numbers for the year were 451 as against 150 for the previous year. The same remarks apply to the increase in a number of cases seen and treated as to yaws.

11. *Leprosy, Nodular and Anæsthetic*.—One hundred and forty-six as against forty-five. Most of these seen and treated in the Northern Territories Stations, particularly Yendi. (See under III. Sanitation, and Appendix E.).

Generally speaking the figures for the period shew an increase in the number of cases seen and treated as compared with 1922-23 as the following Table indicates:—

Remaining in Hospital	1922-23	...	...	...	202
"	1923-24	...	...	...	268
Total Cases Treated	1922-23	...	...	...	71,203
"	1923-24	...	...	...	77,492
Deaths	1922-23	...	...	...	382
"	1923-24	...	...	...	475
Remaining over	1922-23	...	...	...	268
"	1923-24	...	...	...	519

(b) EUROPEAN OFFICIALS.

Table shewing Sick, Invaliding and Death Rates of European Officials.

	1st January to 31st March, 1922.	1922-23.	1923-24.
Total number of Officials resident	741	979	994
Average number resident	692	719	689
Total number on the Sick List	191	800	792
Total number of days on the Sick List	1,762	7,781	6,115
Average daily number on the Sick List	19.57	21.31	16.70
Percentage of sick to average number resident	2.82	2.96	2.42
Average number of days on the Sick List for each patient	9.22	9.72	7.70
Average sick time to each resident	2.54	10.82	8.87
Total number invalided	15	30	32
Percentage of invalidings to total residents	2.02	3.06	3.21
Percentage of invalidings to average number resident	2.16	4.17	4.65
Total deaths	2	6	10
Percentage of deaths to total residents	0.2	0.61	1.00
Percentage of deaths to average number resident	0.28	0.83	1.45

NUMBER OF DAYS ON SICK LIST.

Causes.	1st January to 31st March, 1922.	1922-23.	1923-24.
Tropical Diseases	836	3,713	2,143
Non-Tropical Diseases	926	4,068	3,972
Total	1,762	7,781	6,115

Causes of Invaliding of European Officials.—Alcoholism 4, Anæmia and general debility 3, Malaria 3, Cardiac debility 3, Amoebic Dysentery 2, Adenitis 2, Gastritis 2, and one each for the following causes: Bronchial Asthma, Neurasthenia, Dyspepsia, Compound fracture of leg, Blindness of right eye, abscess, Proctitis, Blackwater Fever, Glycosuria, Appendicitis, Alcoholic Polyneuritis, Heat Exhaustion, Diarrhoea. Total, 32.

The following table shews, in periods, the approximate length of tour of those invalided :

8 months and under	...	...	...	...	17
9 to 16 months	...	...	...	...	12
17 to 21 months	...	...	...	...	3

Of the thirty-two Officials invalided only two were military.

Invaliding Rate per 1,000, 1st January to 31st March, 1922	...	20.24	per quarter
" " 1922-23	...	30.64	
" " 1923-24	...	32.19	

Causes of Deaths of European Officials:—Yellow Fever 2, Blackwater 2, Heart Failure 3, Chronic Myocarditis 1, Rupture of Thoracic Aneurism 1, Cerebral Embolism 1. Total 10.

(c) AFRICAN OFFICIALS.

Table showing Sick, Invaliding, and Death Rates of African Officials.

	1st January to 31st March, 1922.	1922-23.	1923-24.
Total number of Officials resident	2,368	2,543	2,878
Average number resident	1,590	1,867	2,581
Total number on the Sick List	255	1,061	785
Total number of days on the Sick List	2,904	10,269	8,440
Average daily number on the Sick List	32.26	28.13	23.06
Percentage of Sick to average number resident	2.02	1.50	0.89
Average number of days on the Sick List for each patient	11.38	9.67	10.75
Average sick time for each resident	1.82	5.50	3.27
Total number invalided	8	10	19
Percentage of invalidings to total residents	0.33	0.39	0.66
Percentage of invalidings to average number resident	0.50	0.53	0.73
Total deaths	—	13	16
Percentage of deaths to total residents	—	0.51	0.55
Percentage of deaths to average number resident	—	0.69	0.62

In the nineteen cases of invaliding shewn above are included one West Indian and one Ceylonese.

Causes of Invalidings of African Officials:—Pulmonary Tuberculosis 4, Cataract 2, Nephritis 2, Blindness 2, Mania 2, and one each for the following: Glycosuria, Chronic Rheumatism, Hemiplegia, Eye-strain, Dracunculus, Senility, Malaria. Total, 19.

Causes of Deaths of African Officials:—Pneumonia 4, Septicæmia 2, and one each for the following causes:—Fibrosis of lungs, Bronchitis, Injuries, Dysentery, V.D.H., Phthisis, Tubercular laryngitis, Malaria, Hæmorrhage, Peritonitis. Total, 16.

(d) GENERAL EUROPEAN POPULATION.

(i) Government Officials	...	...	...	994
(ii) Employees of Trading Firms	...	...	...	1,425
(iii) Employees of Mining Companies	...	...	...	527
(iv) Missionaries	...	...	...	97
Total	...	...	...	3,043

Table shewing Sick, Invaliding and Death Rates of European Non-Officials.

1st January to 31st March, 1922.

	Number.	Deaths.	Invalided.	Deaths Rate per cent	Invaliding Rate per cent.
Merchants	1,565	5	14	0.32	0.90
Mining Companies	518	1	4	0.19	0.77
Missionaries	77	—	—	—	—
Totals	2,150	6	18	0.28	0.83

	Number.	Deaths.	Invalided.	Deaths Rate per cent	Invaliding Rate per cent.
1922—23.					
Merchants ...	1,410	19	29	1.34	2.05
Mining Companies ...	521	5	15	0.95	2.88
Missionaries ...	88	1	2	1.13	2.27
Totals ...	2,091	25	46	1.23	2.27
1923—24					
Merchants ...	1,425	11	25	0.77	1.75
Mining Companies ...	527	2	28	0.37	5.31
Missionaries ...	97	1	2	1.03	2.06
Totals ...	2,049	14	55	0.68	2.68

Causes of invaliding of European Non-Officials:—Blackwater Fever 8, Pulmonary Tuberculosis 5, Alcoholism 4, Malaria 3, Anaemia 2, Appendicitis 3, Adenitis 2, Duodenal Ulcer 2, Dysentery 2, Pneumonia 2, Bronchitis 2, Rheumatism 2, and one each from the following causes:—Paratyphoid, Volvulus, Mental Disease, Nervous breakdown, Enteric Fever, Defective Vision, Syphilis, Bright's Disease, Myocarditis, Neurasthenia, Senility, Jaundice, Obstruction of Bowel, Pleurisy, Catarrhal Fever, Fibrositis, Phlebitis, Colitis. Total, 55.

Causes of Deaths of European Non-Officials:—Yellow Fever 8, Blackwater Fever 2, Alcoholism 1, Fracture of Skull 1, Cerebral Malaria 1, Cyanide poisoning 1. Total, 14.

European Mortality and Invaliding Rates for the year:—

Class.	No.	Deaths.	Invalid- ings.	Death Rate per 1,000.	Invalid- ing Rate per 1,000
Officials ...	994	10	32	10.06	32.19
Non-Officials ...	2,049	14	55	6.83	26.84
Totals ...	3,043	24	87	7.88	28.57

ANNUAL SANITARY REPORT 1923-24.

III.—SANITATION.

(A)—General Review of work done, laws passed and progress made.

(I.)—ADMINISTRATIVE.

(a) EUROPEAN STAFF.

Dr. J. M. Dalziel, Deputy Director of Sanitary Services, retired on pension on 21st April, and Dr. G. J. Pirie was appointed in his place and arrived in the Colony on 20th July.

Dr. H. O'Hara May, Senior Sanitary Officer, was promoted to Deputy Director of Sanitary Services, Sierra Leone, and left this Colony on 1st April.

Dr. A. C. Lorena, Senior Sanitary Officer, went on leave on 26th April.

Dr. W. G. Watt, Medical Officer of Health, was promoted to Senior Sanitary Officer on 29th October, 1922, vice Dr. O'Hara May.

Dr. D. J. F. O'Donoghue, Medical Officer of Health, died suddenly on 16th May.

Owing to Dr. Watt's promotion and Dr. O'Donoghue's death two vacancies were created in the Medical Officer of Health grade of the Sanitary Branch. Dr. A. C. Paterson, Medical Officer in the Medical Department, acted as Medical Officer of Health in one of these vacancies from 1st October, 1923. The other vacancy was not filled during the year. The new Medical Officer of Health appointment approved in 1923-24 Estimates remained vacant during the year.

Superintending Sanitary Inspectors (European).—There were four on the staff during the year, one new appointment approved in the 1923-24 Estimates was filled as from the 20th February, 1924.

(b) AFRICAN STAFF.

Mr. A. Quao Thompson, First Division Sanitary Inspector, was promoted on 1st April, 1923, to one of the two new posts of Senior Division Sanitary Inspectors—the other post remaining vacant for want of a suitable candidate.

Two 2nd Division Sanitary Inspectors (Messrs R. C. Jackson and J. Fianu) were promoted to the First Division, vice First Division Sanitary Inspector D. M. Stewart, whose appointment was terminated, and First Division Sanitary Inspector Thompson, who was promoted.

One Second Division Sanitary Inspector retired on pension, one was dismissed the Service, the appointment of one terminated, and one resigned.

With the exception of short leave periods, 69 African Sanitary Inspectors, one Senior Division, one Sanitary Inspector and Training Officer, four First Division, 61 Second Division, and two female Sanitary Inspectors—were on duty throughout the year.

The following places were visited by the Deputy Director of Sanitary Services or a Senior Sanitary Officer during the year:—Seccondee, Tarquah, Huni Valley, Cape Coast, Saltpond, Winnebah, Nsawam, Akuse, Addah, Quittah, Somanya, Kpong, Coomassie.

Some of the coastal towns were visited several times during the year.

ORDINANCES, ETC.

Various orders by the Governor under the Quarantine Ordinance and the Infectious Diseases Ordinance were made declaring certain places infected by reason of infectious disease or revoking the same.

II.—PREVENTIVE MEASURES AGAINST.

(i) Insect-Borne Disease, Malaria, Yellow Fever, etc.—Anti-mosquito work has been carried out as a routine during the year by the Sanitary Staff.

Malaria.—In Accra the School Medical Officer examined 505 children and young persons ranging in age from 5 to 18 years of age for malarial parasites. In 25.8 per cent. of these examined malarial parasites were found.

Quinine administration was carried out by Dr. Magill (the School Medical Officer) at Accra. In her report she states that "children with enlarged spleens were put upon a special list and were given one dose of quinine per week."

The dosage was, under ten years of age, 4 grains. Over ten years of age, 6 grains.

In the case of very small children two grains were given at the beginning, gradually increasing to four grains. Quinine in chocolate coated tabloids was at first given, but owing to the children having difficulty in swallowing these, Quinine Sulphate in solution (10 grains to the ounce) was substituted.

Five hundred and five children with enlarged spleens were examined and given quinine during part of the year. Later in the year ((December) the quinine distribution was stopped and the children were re-examined.

Dr. Magill states that, "unfortunately of the 505 originally examined only 365 could be traced." On the re-examination of blood smears 22.7 per cent. showed parasites after the Quinine administration.

Dr. Magill comments on this as follows:—"This result is very disappointing, 25.8 per cent. only showing parasites before the dosage. If any deductions can justifiably be drawn from examinations made at such variable times they would appear to suggest that the quinine dosage adopted was inadequate."

The result of the weekly quinine dose in reducing the size of the spleen was considerable.

Apart from those on the special list about 16,633 doses of quinine were given to school children, who were not on the special list, but who came up voluntarily.

Two groups, each of twenty boys, aged ten to fourteen years were tested by giving group I twelve weekly doses of six grains of quinine sulphate in solution. Group II. received no quinine.

The test was only continued for twelve weeks and Dr. Magill says: "Very little value can be attached to a test of such short duration, and the results obtained do not suggest that those taking quinine were in any better case than those without it."

Yellow Fever.—The Yellow Fever outbreak which began the previous year continued till July of the year under review.

Before the outbreak was checked 13 fresh cases occurred, eight at Cape Coast, two at Quittah, one at Winnebah, one at Seccondee, and one at Huni Valley. Of these ten were among Europeans and all proved fatal. The remaining cases were Africans, one of which died.

One of the fatal cases (a European) occurred at Secondee and created considerable alarm among the European commercial community there. A somewhat alarming cable was sent by the Secondee Chamber of Commerce to the Secretary of State and in consequence Dr. Maplestone of the Sierra Leone Research Laboratory was sent to Secondee by the Secretary of State to report. Dr. Maplestone visited Secondee, Cape Coast, Saltpond, Winnebah and Accra, and in his report states: "I was met on board the 'Zaria' by the Medical Officer of Health, Secondee, and went ashore with him early on the morning of the 2nd instant. There had only been a single case of Yellow Fever in the town, which had ended fatally on the 7th July, and there had been no further cases since, nor had any other cases been reported elsewhere in the Colony during this period. Owing to the absence of cases I was, therefore, unable to carry out my instructions.

About the same time the Deputy Director of Sanitary Services just recently appointed to the Gold Coast made his first visit of inspection to Winnebah, Saltpond, Cape Coast, Secondee and Tarquah. In his report he states: "During my tour I found Winnebah, Saltpond, Cape Coast, Secondee and Tarquah clean—cleaner than my past experience of native towns under European supervision had led me to expect. African life especially in towns when uncontrolled surrounds itself readily with unwholesome conditions. In the above towns the growth of these insanitary fringes has been successfully held in check, and I fear that, if further and immediate improvement is desired, sanitary effort will find itself up against the hard core of native custom and habit, and will require an expenditure out of all proportion to any improvement possible."

Further in his report Dr. Maplestone says: "The fact that all the Europeans attacked during the course of the present outbreak were living at the time of infection in houses more or less surrounded by native dwellings, and that no Europeans who spend their nights at a distance from native towns have contracted Yellow Fever, suggests the advisability of segregation of Europeans at night. Of course more complete segregation than this would be impossible if business is to be conducted. Therefore, the only means of lessening the incidence of Yellow Fever on the Gold Coast that suggests itself at the present moment is a still further reduction of mosquitoes and, as the index is already so low, it would mean the annual expenditure of a large sum of money to make any material improvement in this direction. In this connection it is worthy of notice how often the example of the Panama Canal Zone has been quoted to me by commercial men during my tour. Because this comparison is so much used it cannot be too greatly emphasized that the conditions at Panama and the Gold Coast are not comparable for the following reasons:—

"1. The area dealt with at enormous expense at Panama is strictly limited, being only ten miles in width by about seventy miles in length.

"2. All the people in this area had to submit to what was practically military control, and it is unlikely that the trading community of the Gold Coast would be willing to undergo similar restrictions.

"That the factor of individual carelessness and neglect of professional advice has played some part in the incidence of Yellow Fever during the present outbreak is indicated by the two following examples. One of the victims did not use a mosquito net at all, and another used a net full of holes and had a number of natives living under his house. This is a factor which will never be entirely overcome, and will always to some extent nullify whatever efforts the Government may make to keep down the disease."

Noguchi Yellow Fever vaccine was received and used at Accra, Winnebah and Secondee, Takoradi; altogether 180 Europeans presented themselves for vaccination. No Yellow Fever has occurred since so that no local statistics are available as to the value of this vaccine.

(2) *Infectious and Epidemic Diseases.*

During the year no cases of Typhus or Cholera occurred.

Enteric Fever.—Ten sporadic cases were reported. Of these seven were at Accra, with two deaths, and three at Takoradi. One case at Takoradi (a European) died. Forty-nine Europeans at Takoradi were given anti-typhoid vaccine.

Dysentery and Diarrhoea were prevalent. There was a small increase in the cases reported during the rainy season. Human carriers, and flies, account for many cases. Many cases probably also arise from the careless habits of the Africans with regard to their drinking water supply.

Chicken Pox is always with us, and cases have been reported from various parts of the Colony and Northern Territories.

Small Pox and Vaccination.—Eight cases of smallpox were reported during the year in Northern Territories and one in the Colony.

Vaccination against smallpox was carried out as usual.

Eight Vaccinators were employed and additional vaccinations were carried out by Sanitary Inspectors and Medical men.

VACCINATIONS—1918 to 1923-24.

	1918.	1919.	1920.	1921.	1922-23.	1923-24.
Total Vaccinations ...	14,700	21,467	221,386	87,449	122,566	82,425
Total verified successful	10,726	16,943	177,085	58,073	46,588	36,468
Percentage verified successful	73	78.9	80	66.4	38.01	44.24

Relapsing Fever.—One hundred and fifty-eight cases of Relapsing Fever were reported during the year. All were males except two. Of these three died giving a case mortality of 1.9 per cent. Dr. P. S. Selwyn-Clarke, Medical Officer of Health, Accra, at the time, in his report on Relapsing Fever, when referring to the fact that only two cases were females, states:—"This very large preponderance of male cases is not dependent upon the degree of lousiness of the two sexes, for observation showed that infestation was shared in equal measure by both men and women.

"The explanation, rather, lies in the fact that infected males belonged almost exclusively to an immigrant tribe who had come into the Accra district from their Northern Territory villages in search of work and money to purchase European goods. It is contrary to the customs and habits of these tribesmen to bring their women and children with them."

All the cases except two were Africans mainly from the Northern Territories. One hundred and fifty of the cases occurred in the Colony, the majority of these in Accra. The great majority of the cases in Accra occurred in the Tudu and Zongo road areas where, Dr. Selwyn-Clarke says, "the inhabitants are almost entirely members of Northern Territory tribes or Hausas, both of whom live under unhealthy conditions. In commenting on the practical limitation of the outbreak to Northern Territory tribesmen, Dr. Selwyn-Clarke says: "They were immigrant tribes not possessing any house, property or relatives with satisfactory living accommodation; they crowded together into insanitary corrugated iron structures lacking both light and ventilation.

"Owing to temporary trade depression many of the Zabramahs were unemployed for some time prior to the commencement of the outbreak and, having neither friends nor relatives in the district, they became half starved."

With reference to the mode of transmission of this disease the following paragraph is taken from Dr. Selwyn-Clarke's report:—"During the initial stages of the Accra outbreak of spirillar fever preventive measures against the spread of the disease were greatly hampered by the lack of knowledge of the exact means of transmission of the organism. The authorities were only in possession of negative evidence to the effect that the disease was not spread by the *Ornithodoros Moubata* as in the East African strain, since this arthropod was unknown on the Gold Coast. In consequence preventive measures had to be adapted so as to include the prevention of infection by lice, ticks, bed-bugs, biting flies, and mosquitoes. All but the first mentioned were excluded by experiment and finally, after a series of experiments most courageously performed on himself by Dr. A. Ingram, Director of the Medical Research Institute, Accra, and on a number of volunteers, it was conclusively proved that infection in the outbreak under review was carried by infected lice and that, moreover, lice were, if not the only, at any rate the principal vectors.

"In this connection it should be stated that it was found the mere bite of an infected louse was insufficient to infect but that it was necessary to crush an infected louse on the skin and to rub its body into abrasions of the skin before infection took place.

"Experiments carried out by the Director of Medical Research Institute also proved that a louse which had ingested spirochetes from a relapsing fever patient did not become infectious until a period of six or seven days had elapsed, after which the louse appeared to remain infected for some time."

Relapsing Fever was declared an infectious disease under section 3 of the Infectious Diseases Ordinance from 28th April to 31st July, 1923. This declaration was continued to 31st December, and in January, 1924, it was placed permanently on the list of infectious diseases. The mortality in this disease is so low that the full powers of the Infectious Diseases Ordinance are not required. Steps have therefore been taken to introduce a section into the Infectious Diseases Ordinance giving the Governor-in-Council power to make regulations with regard to any communicable disease other than a declared infectious disease. When this action has been completed Relapsing Fever can be removed from the list of declared infectious diseases and dealt with under particular Regulations applicable to the disease.

The most successful treatment was Novarsenobillon in doses of 0.6 gm. intravenously. The causal organism was a spirochete.

Plague.—On the 13th March, 1924, a telephone message was received from the Medical Officer of Health, Secondee, to the effect that, since the 12th, six cases of illness had occurred in Secondee that were now suspected to be plague. The diagnosis of suspected Plague was made from smears from buboes, etc. Four of the cases were dead; the remaining two cases, one of which was a European, were alive. All the ordinary quarantine precautions were immediately taken and Secondee was declared an Infected Place and an active anti-rat campaign started.

The Deputy Director of Sanitary Services and the Acting Director of Medical Research Institute left Accra on the morning of the 14th and arrived in Secondee that afternoon.

Guinea pigs and all material necessary to confirm the diagnosis were brought from Accra, and in due course the diagnosis of plague was definitely confirmed in the laboratory. From the onset of the outbreak to the end of the year under review 44 cases occurred with 24 deaths, the case mortality for this period being 54.5 per cent. The cases were mainly confined to the Kroo Town and Zongo areas of Secondee. The tribes principally affected were Kroos, Hausas and Yorubas—the two latter being natives of Nigeria.

The great majority of the cases were bubonic, and a considerable proportion of these had symptoms of lung complication. In about 2.2 per cent. the dominant features of the illness were those of an acute pneumonia. Plague bacilli were found in the sputum, and also in smears made from the lungs after death. Buboes are very common among the Africans and in the very early stages or in mild cases of the Bubonic type, the diagnosis could only be decided by microscopical examination of smears from the buboes of sick persons. No rats showing symptoms of illness were seen or caught, but during this period (14th to 31st March) 11 per cent. of the rats examined in the laboratory were infected with *Bacillus pestis*. None of the rats found to be infected showed symptoms of sickness during life. One of the characteristics of the outbreak was this absence of obvious sickness in living rats.

How or where the disease originated is not certain. What is known is that a European (Mr. Brigden) and his native servant went from Tarquah to Secondee on 4th March, 1924. They both returned to Tarquah three days later, on 7th March, 1924. On 8th March, 1924, the Medical Officer, Tarquah, was called to see the native servant, but he died before the Medical Officer arrived. After a postmortem examination the death was believed to be due to pneumonia. On the 10th a private medical man was called in to see Mr. Brigden and the Medical Officer was called in in consultation the same day. Mr. Brigden's illness was looked upon as Malaria, and he was sent to Secondee Hospital that afternoon.

This case (the only European case of Plague) was diagnosed as suspected Plague at Secondee on the 13th after bipolar staining gram negative bacilli similar to *Bacillus Pestis* had been demonstrated in smears made from the four native cases referred to at the beginning of this paragraph.

The sudden death of the servant at Tarquah and the subsequent diagnosis of Plague in Mr. Brigden pointed to the servant having probably had Plague, and that he was the source of Mr. Brigden's infection.

Prior to this five persons had died at the small village of Tailor Kroom, near Nsuta, about six miles on the Secondee side of Tarquah. There was no Medical Officer and so no definite diagnosis was made. The grouping of the deaths—practically all in one family—and their suddenness made the manager of the Manganese Mine there suspect some serious disease.

When Plague occurred at Secondee the cases at Tailor Kroom were considered also to be probably cases of Plague and all anti-rat and other measures were put in force.

It was not until the 28th of March that a dead body brought from Tailor Kroom to Tarquah was definitely diagnosed as Plague. There have been no more cases at Tailor Kroom since that date.

The occurrence of these early suspicious cases at Tailor Kroom and the sudden death of Mr. Brigden's boy gave rise to a suspicion in certain quarters that the Tarquah and Nsuta districts were the source of the Plague infection in Secondee. In my opinion, however, it is clear that the origin of the outbreak was Secondee and that sporadic cases of Plague had occurred in that town prior to the 13th March. Mr. Brigden's servant (if Plague) was undoubtedly infected in Secondee and, if the early deaths at Tailor Kroom were due to Plague, there is every reason to suspect that the infection came from Secondee, as Tailor Kroom is near Nsuta Railway Station and within one and a half hours of Secondee by rail.

The origin of the disease in Secondee is obscure. Las Palmas and Teneriffe in the Canary Islands were infected with Plague for certain periods during 1923. Dakar in French Senegal, where Plague periodically occurs, has not reported Plague for some time. It is very improbable that any human case of Plague was imported into Secondee from any of these ports, but an infected rat or flea might have been brought in.

The absence of sickness during life in the infected rats at Secondee, however, points rather to long contact of the rats there with the Plague *Bacillus*, in consequence of which the rat has developed a considerable immunity to the disease, and it may be that for some reason yet unknown, the proportion of infected to non-infected rats increased to a point that rendered the transference of the disease to man possible, and so originated the outbreak.

Cerebro-Spinal Fever.—There was no particular outbreak of this disease during the year.

Influenza.—Thirty cases were reported in the Colony, but no definite epidemic outbreak occurred.

(3) ENDEMIC DISEASES.

Tuberculosis.—Two hundred and three deaths from Phthisis were reported during the year, as follows:—Accra 72, Cape Coast 46, Secondee 28, Tarquah 57.

Pulmonary Tuberculosis is a declared Infectious Disease under the Infectious Diseases Ordinance, but is not notifiable. In the Gold Coast increasing numbers of the people are drifting from their former simple isolated village life into the larger trading and mining centres where they live together with other races in denser communities, and come in contact with diseases which are new to the pathological environment to which they have been accustomed.

One would imagine that once introduced into a susceptible race tuberculosis would rapidly spread under the conditions of housing favoured by the African.

It has been my experience, however, that, though the disease runs a sub-acute or acute course in Africans actually infected, it does not spread so rapidly as one would expect. I attribute this mainly to the tropical sun, and the fact that the climate and simple life of the African have habituated him to a practically wholly outdoor life. The risk of spread is, however, becoming greater since the people, in increasing numbers, are obtaining employment in more sedentary indoor occupations and in the dust-laden atmosphere associated with underground mining.

In the more complicated European civilisations the peoples have to a certain extent become tuberculized, and have thus slowly acquired a resistance to the tubercle bacillus, which is shown by the predominance in Europe of the more chronic types of the disease. The African on the other hand, has not yet been sufficiently long in contact with the disease to develop resistance to infection.

Steps have been taken to add a section to the Infectious Diseases Ordinance empowering the Governor to make regulations for any disease not being a declared Infectious Disease. It is intended to remove Pulmonary Tuberculosis from the list of declared Infectious Diseases and deal with it by regulations under this new section. Before these regulations are drawn up the question of compulsory notification will require to be carefully considered as without notification, particularly in the larger towns and mining districts, little can be done.

The Medical Officer of Health, Accra, reports that 25 cases of Pulmonary Tuberculosis were treated at the Contagious Diseases Hospital during the year. Of these 15 died, a case mortality of 60 per cent.

At present as Pulmonary Tuberculosis is a declared Infectious Disease it is treated in a Contagious Diseases Hospital. This does not encourage persons to come up readily for treatment owing to the distance from the main population and to the restrictions usually associated with a Contagious Diseases Hospital. The new regulations will be framed with a view to encouraging the sufferers to come up to a general hospital for treatment.

Leprosy.—The number of lepers in the Gold Coast is not known. No legislation with regard to lepers exists. Under the new section in the Infectious Diseases Ordinance it will be possible to make Leprosy Regulations. Leprosy is a loathsome disease, but it is not so dangerous to life as tuberculosis. A British Empire Leprosy Relief Association has been founded in London to assist in dealing with leprosy in the Empire. This should do a great deal to stimulate anti-leprosy work in the Colonies.

In Accra 10 cases of leprosy were treated at the Contagious Diseases Hospital. The treatment used $\frac{1}{2}$ cc. Moogrol intramuscularly increasingly by weekly doses to or 6 cc. The Medical Officer of Health, Accra, states in his annual report: "Good results are apparent in the shape of healing of ulcers, diminution in the size of nodules and improvement in the general health." . . . "As to the final results of the treatment it is much too early to say anything."

So far as the treatment has gone it does encourage lepers to come up for treatment as all the cases treated at Labadi Contagious Diseases Hospital, Accra, came up voluntarily. They were allowed out during the day but were required to return and sleep at the hospital at night. The Medical Officer of Health says: "During the nine months I have been in charge only one patient, a young woman, failed to return. She remained away two to three months and then returned and begged to be allowed to come back and receive treatment." Leprosy regulations should be humane and drafted in such a way as to encourage leper settlements, such as villages or institutions, in the various tribal areas. Compulsory segregation in places remote from their countrymen would only lead to hiding of cases. The discipline and life in these leper settlements should not be such as to cause too great a departure from the normal conditions obtaining in their own tribal villages. Dr. Helen Hendrie, Acting Medical Officer at Yendi in the Northern Territories, in her interesting report on Leper work in the district of Yendi, states, with reference to the segregation area for lepers which she started there, that "Ten Konkombas received treatment. As the Konkombas had no food supplies they left the area whenever they felt in the slightest degree improved."

"Of the 23 cases permanently resident in the segregation area 13 belong to the town of Yendi itself, the other ten belong to small villages in the immediate vicinity, so near that their relations can carry food to them daily."

The Konkombas people live some considerable distance from Yendi. Dr. Hendrie is emphatic that Moogrol is superior to chaulmoogra oil in the treatment of leprosy.

HELMINTHIC DISEASES.

Ankylostomiasis.—Little is known as to the incidence of this infection.

Tape Worm.—This is a very common parasite in Africans particularly the less educated and those who are in the habit of eating under-cooked meat. Meat inspection is strictly carried out at all slaughter houses in the larger towns. In Accra 641 carcasses were destroyed as unfit for human food, out of a total of 3,441 pigs slaughtered during the year. The Soyer stoves in use in Accra for the sterilisation of pigs' carcasses have amply justified their cost.

Guinea Worm prevails mostly in the Northern Territories of the Gold Coast, or in persons who have come from these Territories.

III.—GENERAL MEASURES.

(a) EUROPEANS.

The principle of Residential Separation is carried out as far as practicable in the case of Government officers. Some officers such as Medical Officers in charge of large hospitals for Africans, and Prison Superintendents, who must live near their charges, cannot get the benefit of Residential Separation. The value of Residential Separation for Europeans was shown during the outbreak of Yellow Fever in 1922-23 when only one of 18 European cases was living in a residential area. Many of the employees of European commercial firms still live in their business premises in the native towns, but some companies have put up residences for their senior staff in residential areas.

(b) AFRICANS.

The congested area in Cape Coast has been finally evacuated and the people have distributed themselves through the town till they build their houses on the New Amanful site.

The layout of the new Takoradi township is under consideration.

ROUTINE WORK.

The routine work of the Department was well maintained during the year.

The total houses inspected during the year was 490,513. There were 11,218 prosecutions during the year. Of these 3,726 were for having mosquito larvæ in premises and 7,492 for other insanitary conditions. There were 3,660 convictions in the case of larvæ prosecutions and 7,198 for other insanitary conditions.

The total fines were £4,360 19s. 6d.

The larval index in each of the following towns was as follows:—

Accra	...	...	...	...	...	...	6
Winnebah	...	...	...	...	...	...	.82
Saltpond	...	...	...	...	...	...	1.66
Cape Coast	...	...	...	...	...	...	1.4
Seccondee	...	...	...	...	...	...	.19
Coomassie	...	...	...	...	...	...	2.13

Sanitary Improvements.—The existing sanitary conveniences were kept in repair, and new ones were constructed at various places.

Sewage Disposal.—A water carriage system was introduced at the new Native Hospital at Korle Bu, Accra. Imhoff tanks were installed and the effluent, which is exceedingly pure, is discharged into the lagoon. This is the only water carriage system in the Gold Coast.

Water Supply.—The increase of the Accra water supply has been under consideration and the question of introducing chlorine treatment of the water discussed. The chlorine treatment of the Seccondee water supply continues to give good results.

A pipe borne water supply has been introduced at Winnebah. This water is chlorinated and filtered.

B.—MEASURES TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

The training of Sanitary Inspectors has been under consideration, and it is now proposed that all applicants for Sanitary Inspector appointments must have passed the 7th standard before being accepted as a Sanitary Inspector-in-Training. They will then be required to do a three years' course. The first two years to be spent in Accra, and, on passing the necessary examination, the third year will be spent either in Accra or in an outstation under a Medical Officer of Health or a Medical Officer. A final examination will then have to be passed before the candidate is appointed as a Second Division Sanitary Inspector on probation.

The teaching of hygiene continues in all Government and Assisted Schools as formerly.

Infant Welfare.—The infant mortality in the larger towns is known to be exceedingly high. In Accra for the year under review the Infant Mortality was about 261 per 1,000 births, as compared with 232 for the year 1922-23.

Steps have been taken to get the people interested in infant work and it is hoped that next year it will be possible to start two Child Welfare Centres in Accra.

Prisons.—The sanitary state of the prisons in the Colony has been satisfactory.

C.—RECOMMENDATIONS.

1. That European Segregation be re-enforced.
2. Pipe borne water supply be provided especially for Coomassie and Cape Coast.
3. Provision to inaugurate Child Welfare Schemes in the larger towns—Accra, Seccondree, Coomassie.
4. Provision to provide for a humane form of segregation of lepers.

D.—ACTION TAKEN DURING THE YEAR WITH REGARD TO RECOMMENDATIONS CONTAINED IN THE SANITARY REPORT FOR THE YEAR 1922-23.

1. One additional Medical Officer of Health to investigate the incidence of leprosy. Provision for one additional Medical Officer of Health was made in the 1923-24 Estimates. No appointment has, however, yet been made. In addition two vacancies in the Medical Officer of Health grade due to the promotion of Dr. W. G. Watt to Senior Sanitary Officer, and the death of Dr. D. J. F. O'Donoghue still remain unfilled. Medical Officers were not keen on entering the Sanitary Branch of the Medical Department, and the Secretary of State has not found suitable candidates in Britain. One Medical Officer who contemplated joining the Sanitation Branch and took his Diploma of Public Health when on leave, has since decided to remain in the Medical Branch.

2. A Sanatorium for Tuberculosis Patients.

No special sanatorium with full equipment, staff, etc., has matured, but provision has been made for the treatment of cases of tuberculosis at Korle Bu Hospital and for their reception in special huts in the Contagious Diseases Hospital compound, Accra.

In this connection reference might usefully be made to the circular on M.P. 12076/22, dated 29th July, 1922, from the Secretariat which emphasized the point that economy was necessary in preparing the Estimates for 1923-24 and accordingly no special provision was asked for to provide sanatorium treatment.

3. Pipe borne water supplies for Coomassie, Cape Coast, Saltpond.

These towns have not yet had a pipe borne water supply laid on. The provision of such for Cape Coast and Coomassie has been under consideration. A pipe borne water supply has been laid on to the town of Winnebuh.

The water is chlorinated and filtered.

4. Draining of Lagoon at Saltpond.

Recently a survey of the lagoon has been made by the Public Works Engineer.

5. Appointment of two more whole time School Medical Officers.

Dr. Magill, the Radiologist, acted as School Medical Officer in Accra during the year.

6. Provision of water carriage sewage system in all towns with a pipe borne water supply.

This has received consideration particularly with regard to Accra, and was investigated by a Committee. It was decided that the water supplied to Accra was not sufficient for both water supply and water sewage system, and that the cost of the double undertaking, e.g., increasing the water supply and introducing a water borne sewage scheme would be prohibitive. The first essential would be an increase in the water supply to Accra.

7. Increase of European and African Staff.

European Staff.—Approval was obtained after the Estimates were passed for one additional Medical Officer of Health. No appointment was, however, made during the year. The two vacancies in the Medical Officer of Health grade which occurred during the year were not filled. The Superintending Sanitary Inspector appointments were reduced from six to five. Four of these appointments were already filled and the fifth was vacant till March, 1924.

African Staff.—Provision was made for two new Senior appointments—Senior Division Sanitary Inspector—for Africans. One of these was filled by the promotion of Mr. A. Quao Thompson. Provision was also made for four additional Second Division Sanitary Inspectors. These were filled as suitable candidates were obtained.

Labour.—The item scavengers and labourers was reduced from £32,816 to £32,066.

The provision under Items Clearing Government Lands and Village Sanitation, Ashanti, remained the same as in 1922-23.

The grant-in-aid (under the head Sanitation) to the Secondee Town Council was increased by £25.

8. Segregation of Kroo Labour.

One private firm in Saltpond, when Yellow Fever broke out there, put up quarters for their Kroo labourers outside of the town near the Elmina road.

W. PIRIE,

Deputy Director of Sanitary Services.

21st June, 1924.

IV.—METEOROLOGY.

RAINFALL IN INCHES.

STATION.	1921.	1922.	1923.
Accra	34.43	27.70	21.16
Aburi	50.83	52.09	43.14
Secondee	40.40	46.19	39.29
Axim	88.13	60.45	109.18
Tarquah	71.05	*58.99	71.72
Coomassie	66.95	61.95	55.75
Tamale	61.77	37.02	36.03

V.—HOSPITALS AND DISPENSARIES.

12. The total cases treated at the various Government Hospitals and Dispensaries during the year was 77,492.

The following Table shows the number of In-patients treated at Accra, Secondee, and Coomassie Hospitals:—

Station.	1st January to 31st March, 1922.				1922-23.				1923-24.			
	Europeans.		Africans.		Europeans.		Africans.		Europeans.		Africans.	
Accra	57	...	308	...	233	...	999	...	235	...	1,506	...
Secondee	69	...	169	...	235	...	550	...	170	...	602	...
Coomassie	48	...	495	...	147	...	1,379	...	116	...	1,972	...
Totals	174	...	972	...	615	...	2,928	...	521	...	4,080	...

* Eleven months only.

PRISONS.

13. The general health of the prisoners has been good. Reports from Medical Officers at outstations indicate that the housing and feeding of prisoners is satisfactory.

Accommodation.—Accommodation for prisoners, especially long-sentence prisoners, is being steadily improved. Of the larger prisons, i.e., Secondee, Accra and Coomassie, Ussher Fort Prison, Accra, is almost half complete with accommodation for three hundred and fifty, and in Coomassie a new prison on modern lines has been commenced. A new female prison is in course of construction, also, at Coomassie. Of the smaller prisons a small wing for female prisoners was added at Quittah. The total number of female prisoners is only thirty-five for the year.

Diet.—Food in all prisons is reported as being adequate and of good quality.

Daily Lock-Up.—The average daily lock-up was 1463.92 as against 1,635 in 1922-23.

Sick List.—The average sick list was 48.17, i.e., 3.2 per cent. as compared with 1.24 in 1922-23. This increase was largely due to a number of prisoners being admitted sick.

Death Rate.—The number of deaths was 32 as against 29 in 1922-23.

DENTAL.

14. In a short Report on the work done in the Dental Branch for the year the Government Dentist reports the total number of patients receiving treatment as 1,157.

Of these there were among officials:—

A. Europeans	...	...	...	...	252
Africans	...	...	...	...	222

And among Non-Officials:—

B. Europeans	...	...	...	...	263
Africans	...	...	...	...	420

VI.—SCIENTIFIC.

15. In Appendix A will be found the Annual Report of the Medical Research Institute for the year 1923-24 by Dr. W. A. Young.

16. Appendix B.—Extract from a Report on the work done in the Venereal Clinic, Accra, by Dr. C. E. Reindorf.

17. Appendix C.—Report of the Analytical Chemist by Mr. R. Simmons.

18. Appendix D.—Extract from the Medical and Sanitary Report of the Gold Coast Harbours for the year 1923-24 by Dr. F. E. Pettman.

19. Appendix E.—Observations on treatment of some cases of Leprosy by Dr. Helen Hendrie, Acting Medical Officer, Yendi.

16th July, 1924.

M. E. O'DEA,
Director, Medical and Sanitary Services.

APPENDIX A.

THE ANNUAL REPORT OF THE MEDICAL RESEARCH INSTITUTE, ACCRA,
GOLD COAST, YEAR 1923—1924.

INTRODUCTION.

I have the honour to present to you the Annual Report of the Medical Research Institute for the period 1st April, 1923, to 31st March, 1924.

2. I feel somewhat diffident about writing this report as I have only personal acquaintance with this Institute's work since the beginning of January when I arrived from Nigeria.

3. I therefore crave indulgence for anything that is or appears to be amiss in this Report.

W. A. YOUNG,

Acting Director, Medical Research Institute.

Accra,

8th April, 1924.

PERSONNEL OF THE STAFF 1st JANUARY, 1923, to 31st MARCH, 1924.

Dr. J. W. Scott Macfie, Director, resigned on 4th February, 1923.

Dr. Ingram was acting Director during Dr. Macfie's leave, and on the 26th Sept., 1923, he was promoted to the Directorship and his appointment was ante-dated to the 4th February, 1923.

He went on leave February 2nd, 1924.

Dr. Corson, Pathologist, while on leave resigned his post, transferring back to the Medical Department, and he was posted to Nigeria. Dr. Burgess, Medical Officer, joined the staff temporarily on 28th September, 1923. Meanwhile, he applied for the post of Pathologist, which was given him on 4th January, 1924, his tenure of the post being ante-dated to 28th September, 1923.

Dr. Young joined the staff as Pathologist on January 5th, 1924, being transferred from the Tsetse Investigation, Northern Nigeria, to which he had been seconded from the Medical Research Institute, Yaba. Since February 2nd, 1924, he has acted as Director.

Dr. Sneath has been temporarily attached since 18th February, 1923. He has been working in the Laboratory in his spare time from his other duties. He has now taken up other duties, which are whole time.

Mr. Leeson, Laboratory Superintendent, resumed duty on 27th June, 1923. He was at Kasunya from 1st December, 1923, to 5th December, 1923, on Bilharzia investigation.

Mr. Abbott, Laboratory Assistant, went on leave 23rd June, 1923. He resumed duty on 14th November, 1923.

NATIVE STAFF.

Mr. P. C. Paittoo, Laboratory Attendant, has been on duty throughout the year.

Mr. E. E. Bannerman joined the staff on 8th November, 1923, taking the place of Mr. B. E. Tamakloe.

The latter transferred to the Chemist's Department.

Polba Mendi, Mortuary Attendant, has been on duty throughout the period under review.

There are also three labourers.

Mr. Marbell has been our Clerk. He was made a Second Division Clerk on 25th March, 1923.

THE LABORATORY.

Before another two months have passed it is hoped that the equipment, library, etc., will have been removed from our present laboratory to the new one at Korley Bu.

It is only fitting, I think, that a brief description of this new Laboratory should be given.

It is situated about two to three hundred yards west of the new African Hospital.

The plan and views below give the best description of it.

- A. The Office.
- B. The Incubator Room.
- C. Photographic and Dark Rooms.
- D. Wash Down Lavatory.
- E. Media, etc., Preparation Room.
- F. Laboratory Superintendent's and Laboratory Assistant's Room.
- G. Pathologists' Room.
- H. Director's Room.
- L. Library and Museum.
- M. Patient's Consulting Room.
- V. Hall or Verandah.

To the north are the Garage, Animal House, Store and Gas Plant all in one block. The roof is of a light colour, zinc white, thus reflecting light back to the laboratory windows for microscopic use. The internal fittings are excellent. There is abundant bench and cupboard room.

Electricity is supplied. It is of the alternating type, 230 volts., 50 cycle, single phase.

Gas fittings are also to be had on every bench.

The gas will be acetylene.

The floors are covered with a special composition which makes them comfortable to walk upon and easy to keep clean.

On the roof, which is flat, is a large concrete tank. This is capable of containing 15 tons of water. This was thought advisable in case the electricity should fail at any time, since the water pressure in the main is not sufficient to drive the water centrifuge, etc., which we possess.

The garage can accommodate two cars.

In the animal houses there are concrete cages for different types of animals—pens for sheep, kennels for dogs, and large cages for monkeys.

The whole can easily be flushed down and so kept clean without difficulty.

There is also a mosquito proof house and special mosquito cages for ineffective mosquito work.

There is an animal post-mortem room.

In the gas plant room is a large "Incanto" Acetylene gas producer.

The Native Assistants and labourers have their quarters provided for them not far distant from the Laboratory.

THE LIBRARY.

At the present moment there are 418 volumes. These, it is intended, to have catalogued, and a catalogue will be sent to each station.

A list of the periodicals obtained every month or quarter is given below.

As far as possible all references to tropical medicine in current literature are noted and filed. The file is not yet very big as this work has not been long started, but it is steadily increasing. Thus it is hoped Medical Officers desirous of information regarding any literature they require for any subject they are interested in will only have to apply to be supplied.

LIST OF JOURNALS RECEIVED.

- Abstracts of Bacteriology.
- American Journal of Tropical Medicine.
- Annals de l'Institut Pasteur.
- Annals of Tropical Medicine and Parasitology.
- Bulletin of Entomological Research.

Bulletin de la Societie de Pathologie Exotique.
 Bulletin de l'Institut Pasteur.
 British Medical Journal.
 Comptes Rendus des Seances de la Societie de Biologie.
 Indian Journal of Medical Research.
 Indian Medical Gazette.
 Journal of Comparative Pathology and Therapeutics.
 Journal of Pathology and Bacteriology.
 Journal of Medical Research.
 Journal of Royal Army Medical Corps.
 Journal of Experimental Medicine.
 Journal of Hygiene.
 Journal of Parasitology.
 Journal of Tropical Medicine and Hygiene.
 Journal of London School of Tropical Medicine.
 Lancet.
 Memior do Instituto Oswaldo Cruz.
 New Orleans Medical and Surgical Journal.
 Phillipine Journal of Science.
 Parasitology.
 Proceedings of the Royal Society B.
 Quarterly Journal of Microscopical Science.
 Review of Applied Entomology Series A and B.
 Review of Applied Mycology.
 Tropical Diseases Bulletin and Sanitary Supplements.
 Tropical Veterinary Bulletin.
 Transactions of the Society of Tropical Medicine and Hygiene.

The following may soon be added to the above list:—

Annals de Parasitologie Humaine et Comparée Brumpt.
 Journal of Infectious Diseases.
 Journal of American Medical Association.
 British Journal of Experimental Pathology.
 Journal of Helminthology.

SPIROCHAETA LAVERANI.

Observations on an organism, believed to be *Spirochaeta laverani*, were continued by Dr. Burgess, assisted by Mr. Leeson.

The finding of this parasite in *Cricetomys gambianus*, the pouched rat, was recorded in the Annual Medical Report of 1921, page 45. It was then believed that infection had been transmitted by inoculation, through a dog, to a second rat, although no parasites appeared in the dog. This view was subsequently abandoned, because natural infection of rats has been found common, and there is no satisfactory evidence that dogs are susceptible.

Of 147 live specimens of *C. gambianus* sent by the Sanitary Department, 6.8 per cent. were found infected with the parasite. The routine method of examination was to treat thick blood drops, obtained from the tail, with Ruge's solution, stain with carbol gentian violet and count 100 fields, using a 1/12 in. objective.

C. Gambianus appears susceptible to infection almost invariably, for of 51 which were inoculated hypodermically with infected blood and which lived ten days or more afterwards and were examined more than once, all developed the infection. The parasites appeared four to eight days after inoculation, gradually increasing in numbers for about four days, after which the numbers underwent irregular fluctuations.

The means of natural infection was not determined. Infection did not occur in the animal house. Fifty-five rats, kept in separate cages close together, and not deprived of their ectoparasites, showed no infection when examined ten or more days after admission.

Infection produced no ill effects, and there was no marked difference in mortality between infected and non-infected animals. The average life of a rat in captivity was about six weeks, and the parasite usually persisted until death, though it sometimes disappeared for a time. It could be recovered from the heart blood in early post-mortems.

No animals other than *C. gambianus* were found naturally infected. The species and numbers are given elsewhere. Also attempts to infect other animals were unsuccessful, with one doubtful exception (a dog). Seven *Mus rattus* two dogs and seven guinea pigs were given hypodermic injections of infected *C. gambianus* blood without result.

S. laverani closely resembles *S. Morsus muris* in appearance. That we were not dealing with the latter is indicated by our failure to infect guinea pigs, and by the absence of rat-bite fever from the Gold Coast. To put the matter to further test a native volunteer allowed himself to be bitten by an infected rat, and two Europeans applied infected blood to fresh open cuts. In no case was there any ill effect.

As to dark ground appearances, the parasite varies in length from 3 to 5.5 micron., and is broad for its length compared with other spirochaetes. It has two or three close regular spirals, of small amplitude (diameter of spiral) and with a wave-length (longitudinal distance between crests) of about 1.75 micron. The shorter individuals have one terminal flagellum and the longer, one at each end. The flagella are conspicuous, are about 2 micron. in length, and are of undulating form, each consisting of little more than one complete undulation. The parasite performs active and persistent rotatory and translatory movements. It moves forwards or backwards indiscriminately, the reversal being quite sudden. When swimming freely its shape does not alter, but when traversing a mass of fibrin it appears flexible.

It is stained readily by Romanowsky methods, and is deeply stained by carbol gentian violet after treatment with Ruge's fixative. The flagella can be demonstrated by means of Fontana's silver method.

The effect of N.A.B. was tried. Injected into the thigh muscles it always caused the parasites to disappear, but they reappeared in all rats which lived more than six days after the injection. In nine cases in which 20 mg. were given (the weight of *C. gambianus* is about 900 gm.) the parasite had disappeared on the second or third day and remained absent for an average period of 15 days. No larger doses were given. Smaller doses produced a later disappearance and an earlier re-appearance.

Attempts to cultivate the organism were not successful. The medium used was a semi-solid one consisting of human serum, peptone and agar, P.H. 7.2, covered with a layer of liquid paraffin. Room (28 degrees C.) and incubator temperatures, and aerobic and anaerobic conditions were tried. *S. recurrentis* had been found to multiply to some extent, and to remain active for 24 days in this medium at room temperature under aerobic conditions.

Opinion is divided as to whether *S. laverani* and *S. morsus muris* should be classed with the spirochaetes or the spirilla. Indeed, *S. laverani* seems to be intermediate in character between the two. It resembles the spirochaetes in flexibility, in the closeness of its spiral and in susceptibility to N.A.B., but on the other hand in avidity for stains and in the possession of conspicuous flagella it shows affinity to the spirilla.

TRYPANOSOMIASIS.

During the last half of February and the first half of March, 1924, Mr. Abbot and myself made a brief inspection of the country stretching from Accra to Banda (Ashanti), via Coomassie, Ejura, Nkoranza, Kintampo, Whala, Lawra, Bwe (on the Volta), Tasilima, Dwere (on the Volta) and back to Kintampo. The description is given in a special report made as the result of certain inquiries by the Secretary of State for the Colonies.

Since then I have paid visits to Akuse (north from Addah) to Secondee, Takoradi, Tarquah, and up to Coomassie via Dunkwa. The type of country in these different places varies from big rain forest to orchard bush as one gets from the Colony towards the Northern Territories.

Everywhere in these vicinities tsetse fly are found, but at this time of year at any rate they are scanty; exceedingly so. The species we found were *palpalis-longipalpis* and *tachinoides*.

It is interesting to note that the Tsetse state of things in the part of Ashanti visited by us was identical to that described by Kinghorn in the Bulletin of S.S. Vols. 2 and 3 in the year 1910. In other words, during the last fourteen years there has been no increase in the intensity of the Tsetse fly, and, when the type of country and climatic conditions are examined, it is seen that the Tsetse fly just holds its own against natural conditions and no more.

This statement is made for the following reasons:—

The banks of the rivers visited, i.e., the Black Volta, the Tain, the Whin, and the Volta proper, are thickly clothed with bush which in most places overhangs the rivers. This means little room for movement of the flies and unsuitable places for game to drink. Here and there suitable places are found and here *palpalis* is found, and where there is high shade, *tachinoides* also exists. *Longipalpis*, though not so dependent on water, is not found, however, where there is no water in a large radius.

The result is that on some treks of twenty miles where no water was to be had no *longipalpis* was seen. If, however, one stream was encountered, it was safe to expect *longipalpis* on that road even though some miles from water.

During the dry season the orchard bush is barren of grass and leaves and devoid of water; consequently there is no game and no flies are encountered. With the beginning of the rains and the forming of streams, the game spreads and the fly would appear to follow.

Again, these rivers in the rains rise many feet, and so a large number of pupæ must be drowned.

It may be wrong to suggest this, but the impression conveyed to me was that, as long as every human case of Sleeping Sickness could be isolated and cured, the fly was of no importance so far as human beings were concerned beyond their biting irritation.

Sporadic cases of Sleeping Sickness may, and probably do, get their infection from animals infected with *T. gambiense*, but anything of an epidemic nature that would occur here would undoubtedly be due to infection from man to man either directly or indirectly.

Direct infection is a possibility as I have seen trypanosomes taken up in the proboscis of a tsetse alive in the proboscis after half an hour. I admit the infecting animal had a severe infection, but the point is, the possibility is there.

There is, however, scope for much more work to be done on the Gold Coast regarding Tsetse, their habits and infections, and undoubtedly much interesting and useful information would accrue as the result. Several of the Tsetse we caught were dissected, but no infection was found.

Most of the natives knew the Tsetse fly well, stating that it always increased in intensity during the rains, but of sleeping sickness they knew nothing, and thus it seems that if they had seen cases, they were so rare as not to impress themselves upon their minds.

How utterly different to the Sherifuri district of Northern Nigeria, where the disease is well known and is called "Hiska," or the spirit.

TRYPANOSOME IN CRICETOMYS GAMBIANUS.

In three hundred examinations of blood from three rats where at least one hundred fields were looked at, Mr. Leeson came across one case showing Trypanosomes. Considering the rarity of such an infection it was thought this might be a new trypanosome.

However, by careful drawings and measurements it was found to conform to the *T. lewisi* type.

It was with difficulty conveyed to other gambiaus rats and later died out. Ordinary rats were not easily infected either, but, once they were the infection persisted.

RELAPSING FEVER.

An excellent article on the outbreak of this disease which commenced in March, 1923, is to be found in the Annals of Tropical Medicine and Parasitology, Vol. XVII., No. 3, October 13th, 1923. It is written jointly by Dr. Selwyn-Clarke, Dr. G. H. LeFanu, and Dr. Ingram.

Dr. Ingram was unfortunate enough to fall a victim to the disease himself during his lice experiments, but by so doing afforded opportunity of standing a second European case.

The conclusions of the paper are as follows:—

1. This first recorded outbreak of Relapsing Fever in British West Africa is due to a spirochaeta conveyed by lice.
2. As regards inoculation experiments, monkeys, black and white rats become infected with the strain, but do not relapse; guinea-pigs and rabbits are refractory, whilst the pouched rat becomes infected and relapses.
3. The vectors of the organism in the present epidemic and the inoculation experiments suggest that the parasite is not the *Sp. duttoni*, but corresponds more closely to the *Sp. recurrentis* (vel *obermeieri*), or a related strain.
4. Novarsenobillon is a specific in the treatment of the disease.
5. Immunity does not appear to be lasting or complete in cases treated with Novarsenobillon.

PLAGUE.

On the afternoon of March 13th a telegram was received from Secondee by the D.M.S.S. stating that four deaths had occurred, the symptoms being high fever and buboes and that bipolar bacilli had been found in the glands post-mortem.

Mr. Abbott and myself, accompanied by Dr. Pirie, D.D.S.S., proceeded to Secondee by car early next morning.

The slides showed undoubtedly bipolar bacilli resembling those of plague. Although clinically there appeared no doubt and warranted all the usual precautions being taken, bacteriologically one had to be cautious for two reasons.

1. Bipolar bacilli are found in P.M. specimens although they are not plague. (Vide my article in Tropical Medicine and Hygiene, Vol. XXIV., February 15th, 1921, Page 40). Dr. Ingram has also found an organism resembling mine in an influenzal pneumonia. It also was motile and innocuous to Guinea pigs. (Vide Annual Report, Medical and Sanitary, 1918, page 59).
2. There was no evidence whatever of an epizootic in any class of animals and certainly not in rats.

Thus one felt that it was essential to apply the main tests towards establishing the organism found as that of the plague. Clinically, there could be no doubt.

The first live cases dealt with were those of a Kroo man and a Lagos woman. The Kroo had a large axillary bubo, the woman a large femoral one. At the stage we saw them, softening had set in and although a very few pleomorphic degenerating bacilli were found, a guinea pig when rubbed with the material on the shaven abdomen apparently remained uninfected.

The next case was another Kroo. He had femoral buboes and a large skin slough on his foot. Both contained scanty organisms difficult to identify though suggestive of plague.

Then an easily diagnosed case was got. The slide showed a pure culture of the organism.

Guinea pigs were inoculated, and culture made on Agar, 4 per cent. agar and broth.

The growth on each was typical, including the stalactite growth on broth, but the inoculated guinea pig after four days still seemed fit, though its hair tended to stand on end.

So a guinea pig was inoculated intraperitoneally with a very large dose of an agar culture. It took four days to die. The post-mortem showed slight hæmorrhages at the site of inoculation, little or no pleural effusion, gland enlargements were not marked, but the peritoneum was simply one mass of the organism so that the liver was seen through a scum of bacillus. This organism was resown and reinoculated and gave the same results.

During the period other guinea pigs had been rubbed with culture and material on the shaven abdomen, and the period required for death was found to be from seven to ten days.

Meanwhile other confirmation came to hand. Rats were caught alive every day from the infected area.

Also rats killed by the disinfection of houses were brought to the Laboratory. It was not till the 59th of the series was examined that plague bacilli were found. The liver also showed the characteristic white pins-head nodules.

This happened ten days after the first human case was seen post-mortem. Since then the number of rats infected steadily increased.

Thus sufficient had been done to show that without doubt the *Bacillus* was that of Plague.

It would appear, therefore, that the original infection in Secondee was human and that the rats became infected in due course. It may happen then that, if the epizootic cannot be controlled, the real epidemic is yet to follow.

It is to be hoped that the measures adopted will prevent such a catastrophe.

From the lengthened period it took to kill the guinea pigs it may be inferred that the bacillus had lost some virulence. Might this be due to passage through human fleas?

The majority of fleas found on the wild rats, which were all *Mus rattus*, caught at Secondee, showed the species to be *Xenopsylla cheopis*.

Examination of rats at Secondee, March 15th to 31st, 1924. (The suspected human case died on March 12th).

Date.				No. of Rats Examined.		Number Infected.
15-3-24	...	...	...	16	...	0
16-3-24	...	...	...	7	...	0
17-3-24	...	...	...	7	...	0
18-3-24	...	...	...	5	...	0
19-3-24	...	...	...	5	...	0
20-3-24	...	...	...	5	...	0
21-3-24	...	...	...	14	...	2*
22-3-24	...	...	...	20	...	2
23-3-24	...	...	...	5	...	1
24-3-24	...	...	...	5	...	1
25-3-24	...	...	...	22	...	5
26-3-24	...	...	...	14	...	6
27-3-24	...	...	...	9	...	1
28-3-24	...	...	...	5	...	5
29-3-24	...	...	...	10	...	5
30-3-24	...	...	...	5	...	0
31-3-24	...	...	...	3	...	1
Total	...	...	...	157	...	29

* First appearance of Plague in rats. All the rats examined were *Mus rattus*.

LEPTOSPIRA ICTEROKAEMORRHAGICA.

The kidneys of one hundred, freshly killed, rats were examined for leptospira with negative results. The series included 75 *M. decumanus*, 11 *M. rattus*, and 14 *Cricetomys gambianus*. Dark ground illumination was used and the material was prepared by crushing both kidneys, moistened with normal saline in a screw press and centrifuging the fluid thus obtained for about five minutes. In this way the material was separated into a large, almost solid, deposit and a small upper layer of turbid fluid. The fluid was taken for examination. It was almost free from cells, but was full of granules and in some cases contained active *Trypanosoma lewisi* or minute motile bacilli. Sand was not used for grinding up the kidneys, because it had been found to interfere with the preparation of suitably thin films.

SCHISTOSOMIASIS.

During the year experiments have been made to prove definitely which snail is the carrier.

Up to date bifid-tailed cercariæ have been found in the snails infected with miracidia from human cases, but it has not yet been possible to infect animals with the cercariæ.

EXAMINATIONS OF HUMAN PATHOLOGICAL MATERIAL.

			African.		European.	
Blood cell counts	12	Myeloid Leukaemia ..	4			
		Eosinophilia ..	2			
		Poikilocytosis ..	1			
„ Malarial Parasites ..	51		+ 8	13		+ 3
„ do. (Kasunya children)	25		+ 6			
„ do. and Spirochaetes	387	Spirochaetes ..	+ 120	1	Malaria ..	+ 1
„ of Relapsing Fever ..		Malaria ..	+ 5			
„ Microfilaria	2					
„ Trypanosomes	2					
„ Typhoid group (culture)	1					
„ do. Widal	28	Agglutination in 8 ..	8	12	Agglutination in ..	9
„ Wassermann Test ..	142		++ 37	44		++ 8
			+ 38			+
			+ 2			
„ Sachs-Georgi Test ..	15		++ 10			
			+ 2			
Cerebro-Spinal Fluid, culture	4	Meningococcus ..	1			
Chancre <i>T. pallida</i>				1		
Fæces General	8	<i>E. coli</i> <i>E. histolytica</i> and				
		<i>Giardia</i>	1			
		? <i>E. histolytica</i> ..	1			
„ Entamoebæ	57	<i>E. histolytica</i> ..	1	4		
		do. cysts ..	1			
		<i>E. coli</i> cysts and <i>Giardia</i>	1			
		<i>Giardia</i>	1			
		Flagellates	2			
„ Ova	112		+ 60			
„ Typhoid group (culture)	16	Shiga	2	2		
		Flexner W.	2			
Gland culture			1			
Gland Plague	1					
Gland trypanosomes	1					
Hairs	1					
Knee Joint Fluid, culture	1					
Larvæ in fæces				1	Tenebro	1
Liver Puncture	1	Amoeboid cells ..	1			
Nasal Scraping, B. Lepræ	1		+ 1			
Pus, culture	7	Staphylococci ..	4			
		Streptococci ..	1			
Skin, B. Lepræ	8		+ 2			
„ Fungus				1	Tinea flava ..	1
Spleen smear, malaria ..	1					
Sputum, Tubercle bacilli ..	192		+ 86	5		

do. and Pneumococci	5	Pneumococci ..	..	I	
Spirochaetes	2		+	2	
Monilia	2		+	I	
T. B. and Spirochaetes ..	I				
Throat Swab for Diphtheria	I	Vincent's angina	..	I	
Urethral Smears, Gonococci	9		+	2	I
Urine, Albumen	2			I	
.. do. and Spirochaetes	10	Albumen ..	+	I	+ I
.. Bilharzia	7I		+	23	
.. Blackwater fever ..				I	
.. Haemoglobin ..	3	Methaemoglobin and			
		albumen ..	+	2	
		Oxy-haemoglobin	+	I	
.. Pus	2		+	2	
.. Sugar	5		+	2	
.. Typhoid group (culture)	4				I
Vaccines,					I B. coli
					I Staphylococcus.
Vaginal smears, gonococci ..	10		+	3	
Worms intestinal	I	T. Saginata ..		I	
Total Examinations ..	I,204			9I	
	9I				
	<u>I,295</u>				

HELMINTHIC FINDINGS IN 60 SPECIMENS OF FAECES

(1) Hookworm	24	=	39 times.
(2) Ascaris	13	=	24 "
(3) Strongyloides	4	=	9 "
(4) Trichiuris	2	=	12 "
(5) Tænia	0	=	3 "
(1) + (2)	3		
(1) + (2) + (3)	I		
(1) + (2) + (4)	4		
(1) + (2) + (3) + (4)	I		
(1) + (3)	I		
(1) + (3) + (4)	I		
(1) + (4)	I		
(1) + (4) + (5)	I		
(1) + (5)	2		
(2) + (4)	I		
(2) + (3) + (4)	I		
	<u>60</u>		

FAECES.

DR. P. A. T. Sneath, while in charge of the Asylum, Accra made an Examination of the faeces from 110 Inmates.

Below are the results in tabular form.

No examined—Males 88 Females 22—Total 110.

INCIDENCE.

(1) Hookworm	14	=	75 times
(2) Ascaris	5	=	65 "
(3) Strongyloides larvæ	0	=	17 "
(4) Trichiuris	4	=	64 "
(5) Tænia	0	=	7 "
(6) Oxyuris	0	=	3 "
(1) + (2)	14		
(1) + (3)	I		
(1) + (4)	13		
(1) + (6)	I		
(1) + (2) + (3)	2		
(1) + (2) + (4)	15		
(1) + (2) + (5)	I		
(1) + (2) + (6)	I		
(1) + (3) + (4)	I		

(1) + (4) + (5)	1
(1) + (2) + (3) + (4) ..	8
(1) + (2) + (4) + (5) ..	3
(1) + (2) + (4) + (6) ..	1
(2) + (3)	1
(2) + (4)	12
(2) + (3) + (4)	1
(2) + (4) + (5)	1
(2) + (3) + (4) + (5) ..	1
(3) + (4)	2
(4) + (6)	1

WASSERMANN REACTIONS.

During the year 142 specimens of serum have been sent for the above test.

46	=	++
43	=	+
2	=	—

Fifteen of the sera were also used for the Sachs-Georgi Reaction, 12 being positive.

The Reaction of Khan, as described in Comptes Soc. de Biologie Tome LXXXVIII. pp. 854-856, was tried with 25 specimens of serum. The results were difficult to interpret. Those obviously positive, however, agreed with the ordinary Wassermann Results.

The method used is that of Colonel Harrison as recommended in the Medical Research Council pamphlet. Owing to the guinea pigs out here having poor complement we use a system of dilution of complement giving greater precision in the lower dilutions.

SECTIONS CUT DURING THE YEAR.

Tissues received from out-stations ...	102
From local post-mortems ...	117
Animal tissues ...	44
Total Tissues cut ...	263

There is nothing special to comment on in these sections except the total inability to demonstrate *Leptospira icteroides* in the tissues of "Yellow Fever" cases.

SPECIES OF MOSQUITO LARVAE DIAGNOSED.

	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	Totals.
<i>Aedes argenteus</i> ..	48	45	92	93	48	37	37	43	58	103	147	100	851
<i>Culex fatigans</i> ..	10	8	20	8	6	3	5	3	4	13	7	6	93
<i>Aedes (Och) irritans</i>	6	12	2	—	—	—	2	—	—	1	—	—	23
<i>C. thalassius</i> ..	4	8	11	4	1	6	6	6	1	1	—	—	48
<i>Anopheles costalis</i> ..	2	5	5	8	—	—	—	—	1	1	—	3	25
<i>Culex nebulosus</i> ..	—	—	—	—	—	1	—	—	—	—	—	—	1
<i>C. decens</i> ..	1	—	1	3	—	1	6	1	1	1	—	—	15
<i>Aedes (Och) albocephalus</i> ..	1	2	7	—	—	1	2	—	—	—	—	—	13
<i>Mucidus scotophagoides</i> ..	—	2	—	1	—	—	—	—	—	—	—	—	3
<i>Aedes (S) unilineatus</i>	—	1	—	—	—	—	—	—	—	—	—	—	1
"metallicus" ..	—	1	—	—	—	—	—	—	—	—	—	—	1
"luteocephalus" ..	—	1	—	—	—	—	—	—	—	—	—	—	1
"(Och) apicoannulatus" ..	—	1	—	—	—	—	—	—	—	—	—	—	1
"(Och) hirsutus	—	—	—	—	1	—	—	—	—	—	—	—	1
	72	86	138	118	55	49	58	53	65	120	154	109	1,077

RATS RECEIVED FROM MEDICAL OFFICER OF HEALTH, ACCRA,
EXAMINED FOR PLAGUE BACILLI AND FOUND NEGATIVE.

	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	Totals.
Mus rattus ..	18	26	15	26	71	72	12	26	162	146	36	109	719
„ decumanus ..	2	2	1	19	5	2	3	1	—	3	298	385	721
„ alexandrinus ..	—	—	—	—	—	—	—	—	—	—	1	—	1
Cricetomys gambianus	9	3	7	22	24	17	8	22	18	18	15	40	203
	29	31	23	67	100	91	23	49	180	167	350	534	1,644

While writing this report on April 8th three dead *C. gambianus* and two *Mus rattus* showed the presence of Plague bacilli and the day after 1 field rat and 1 *Mus rattus* found dead were also positive.

ANIMALS EXAMINATIONS.

	Blood.	P.M. Tissue.	Series of Examinations.	No. of Blood.	Exams P.M.	No.	Positive.	Other findings.
Bats ..	—	3	—	—	—	—	—	
Cats ..	—	4	Spirochaeta laverani.	1	—	—	—	Belascaris 1
Cricetomys gambianus	199	11	„	143	26	11	—	Haemogregarine .. 1
			do. Re-examined after ten days in Animal house previously neg.	55	—	—	—	Trypanosoma lewisi 1
			Spirochaetes	—	10	—	—	
			Dark ground examination of kidneys.					
Dogs ..	24	1	Sp. laverani	22	—	—	—	
Goats ..	1	1	—	—	—	—	—	
Guinea pigs	1	15	—	—	—	—	—	
Hedgehogs	5	6	Sp. laverani	2	—	—	—	Nucleated Red cells 1
Horses ..	—	3	—	—	—	—	—	
Lizards ..	—	1	—	—	—	—	—	
Mus rattus	220	15	Sp. laverani	100	32	—	—	
			T. lewisi ..	120	33	39	7	
			Spirochaetes	—	13	—	—	
			Dark ground examination of kidneys.					
Mus decumanus ..	212	72	Sp. laverani	106	3	—	—	
			T. lewisi ..	106	3	4	—	
			Spirochaetes					
			Dark ground examination of kidneys.					
Monkeys ..	1	4	—	—	72	—	—	Tubercle 1
Mice white	—	4	—	—	—	—	—	Trichiuris 1
Oxen ..	49	27	—	—	—	—	—	T. pecaui 19
								T. vivax 2
								Tubercle in gland .. 1
Pigs ..	5	1	—	—	—	—	—	Tapeworms 1
Rats white	—	7	—	—	—	—	—	
Rabbits ..	—	1	—	—	—	—	—	
Sheep ..	7	1	—	—	—	—	—	
Snakes ..	—	9	—	—	—	—	—	
	724	186	Totals.					

ANIMAL INCULCATION.—A.

SERIES.

13

110

2

20

32

6

3

Series.	Animal.	Natural infections.	Treated with N.A.B.	Sub Inoculations from strain.	Positives.	Treated with N.A.B.*	Fed on Blood.	Positives.	Re Sub Inoculated.	Positives	Sub Inoculations from Patient.	Positives.	Inoculated with crushed lice.	Positives.	Ticks Fed on
Sp. laverani ..	C. gamb ..	11	1	22	19	8	2	—	—	—	—	—	—	—	—
	G.P.	—	—	5	—	—	—	—	—	—	—	—	—	—	—
	M. rattus	—	—	5	—	—	—	—	2	—	—	—	—	—	—
	Human ..	—	—	3	—	—	—	—	—	—	—	—	—	—	—
	Rabbit ..	—	—	1	—	—	—	—	—	—	—	—	—	—	—
	Hedgehog	—	—	1	—	—	—	—	—	—	—	—	—	—	—
	G.P.	—	—	—	—	—	—	—	—	—	3	—	—	—	—
	Monkey ..	—	—	1	—	—	—	—	—	—	4	—	—	—	—
	White rat ..	—	—	2	—	—	—	—	2	—	8	—	5	—	—
	M. rattus	—	—	—	—	—	—	—	—	—	3	—	1	—	—
T. lewisi (C.g. Strain) ..	C. gamb ..	—	—	94	43 ¹ S.L. 18*	—	—	—	3	3 ¹ S.L. 1*	21	14 S.L. 2*	—	—	3
	Rabbit ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	White mouse	—	1	—	—	—	—	—	—	—	1	2	—	—	—
	C. gamb ..	1	—	10	8	—	—	—	4	1	—	—	—	—	—
	M. rattus	—	—	8	—	—	—	—	9	6	—	—	—	—	—
	Haemogregarine with Graha-mella ..	1	—	2	2	—	—	—	—	—	—	—	—	—	—
	C. gamb ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*Spircohaeta laverani also present.

*N.A.B. = Novarsenobillon.

B. OTHER INOCULATIONS.

No.	Animal.	Experiment.	Result.
9	Mus rattus	Bilharzia	—
10	M. decumanus	"	—
1	M. alexandrinus	"	—
2	M. rattus	P. M. material	—
1	C. gamb	"	—
1	G.P.	Y.F.	—
5	C. gamb	? Poison	—
4	M. rattus	"	—
1	C. gamb	Snake venom	Died in two days.
1	C. gamb	Culture test	—
1	M. decumanus	"	B. friedlander.
1	M. rattus	"	—
1	G.P.	Tubercle	Positive.
3	G.P.	Ox trypanosome	T. brucei in one
1	G.P.	Inoculated with filtered extract of T. brucei G.P.	—
Total A Animals used in Series			185
Total B. Other Inoculations			42
			227

WATER EXAMINATIONS.

No. of Samples showing minimum quantity of water
in which B. coll was found:

	100	10	1	0.1	0.01 c.c.
No. 1 Storage Reservoir 12	7	—	—	—	—
No. 2 " " 15	7	2	—	—	1
No. 1 Final Filter .. 7	—	—	—	—	—
No. 2 " " 9	2	—	—	—	—
No. 3 " " 9	2	—	—	—	—
No. 4 " " 10	3	1	—	—	—
No. 5 " " 9	3	1	—	—	—
No. 6 " " 8	2	—	—	—	—
Standpipes 27	18	1	—	—	—
House Filters 2	—	1	1	—	—
Coomassie 9	2	1	—	—	3
Total .. 117					

AERATED WATER EXAMINATIONS.

Accra 30	10	4	—	—	—
Coomassie 13	—	4	4	—	—
Abontiakoom 1	—	—	—	—	—
Total .. 44					

LIST OF POST-MORTEM EXAMINATIONS.

Acute Miliary tuberculosis	...	...	...	...	...	2
Phthisis pulmonalis	...	...	...	...	...	10
Alcoholism chronic	...	...	...	...	...	1
Abscess Lung—meningitis tubercular	...	...	...	...	...	1
Aneurysm thoracic rupture	...	...	...	...	...	1
Cerebral hæmorrhage	...	...	...	...	...	1
Cirrhosis of liver	...	...	...	...	...	2
Decomposed bodies	...	...	...	...	...	2
Dysentery—type ?	...	...	...	...	...	2
Drowning	...	...	...	...	...	3
Exhumations (too decomposed for examination)	...	...	...	...	...	2
Endocarditis acute	...	...	...	...	...	1
Gasgangrene fracture pelvis	...	...	...	...	...	1
Gunshot wounds—Head	...	...	...	...	...	1
„ Abdomen	...	...	...	...	...	1
Hodgkins' Disease	...	...	...	...	...	1
Hanging asphyxiation—suicide	...	...	...	...	...	1
Liver abscesses multiple amœbæ	...	...	...	...	...	1
Marasmus	...	...	...	...	...	2
Malaria cerebral	...	...	...	...	...	1
Myocarditis	...	...	...	...	...	3
Motor accident (laceration lungs, liver and kidneys)	...	...	...	...	...	1
Meningitis—pneumococcal	...	...	...	...	...	1
Nephritis chronic	...	...	...	...	...	1
Pancreatitis subacute	...	...	...	...	...	1
Peritonitis — amœbic perforation	...	...	...	...	...	1
B. coli	...	...	...	...	...	1
Post-partum hæmorrhage	...	...	...	...	...	1
Pyæmia	...	...	...	...	...	1
Pericarditis acute	...	...	...	...	...	2
Plague	...	...	...	...	...	1
Pneumonia lobar	...	...	...	...	...	8
Broncho pneumonia	...	...	...	...	...	17
Post influenzal	...	...	...	...	...	12
c Malaria	...	...	...	...	...	3
Relapsing Fever	...	...	...	...	...	1
Status epilepticus subacute nephritis	...	...	...	...	...	1
Senility—arterio-sclerosis	...	...	...	...	...	1
Suffocation and rape	...	...	...	...	...	1
Traumatic rupture of spleen	...	...	...	...	...	3
Typhoid	...	...	...	...	...	2
Uræmia — fatty degeneration of liver and kidneys	...	...	...	...	...	1
Yellow Fever	...	...	...	...	...	1

The only Post-mortem that calls for special attention is the one of Plague.

This was a baby girl of two weeks old. There was a history of fever for three days.

The only noticeable change was in the liver which was pale and fatty looking. Smears from the liver and spleen were taken to stain for malaria or spirochaetes.

Instead, typical bipolar oval gram-negative bacilli were found. Unfortunately no cultures were made at the time which was not surprising, as not for one moment was plague suspected. (Since this post-mortem many rats have shown plague and one human case has occurred at Cantonments. Cultures from this case showed the organism to be a typical *B. pestis*).

DONATIONS OF SPECIMENS.

I have to acknowledge with thanks donations of specimens from:—

- (1) The Staff.
- (2) Dr. C. A. Calder, Dr. Selwyn-Clarke, Colonel M. Conolly (England), Dr. G. H. Lefanu, Dr. M. B. Hay, Mr. P. P. Horn, Dr. A. C. Lorena, Mr. G. W. Lyle, Mr. R. Simmons, Dr. W. G. Watt., Mr. J. C. Barnor.
- (3) Standard Emulsions and Sera for T.A.B. and dysentery were received from the Director, Standards Laboratory, University of Oxford, to whom we again extend our best thanks.

RECOMMENDATIONS AND CONCLUSIONS.

If the future of Secondee is to be that which is predicted, then there is much need for a branch laboratory to be set up there.

There is an excellent laboratory building there now and merely requires fitting up and the appointment of a Pathologist to run it.

In conclusion, I must take the opportunity of thanking Mr. Leeson and Mr. Abbot for their excellent work and loyal co-operation.

Of the native staff, Mr. Paittoo and Polba, a most excellent man on trek, deserve special mention, but all have given of their best.

W. A. YOUNG,

Acting Director, Medical Research Institute.

April 8th, 1924.

APPENDIX B.

Extract from a Report on the work done in the Venereal Diseases Clinic during the period April 1st, 1923, to March 31st, 1924, by Dr. C. E. Reindorf.

The result of the work done during the year under review is encouraging, and there is every prospect of a still further increase in the work during the current year.

I attach a Return showing the number of cases, treated among the various Venereal Diseases, which have attended the Clinic during the year and under II. (a), (b), (c), (d), (e), the result of treatment as far as I am able to state. It will be seen that a total number of 166 is put down as having ceased to attend before completion of cure. Though there certainly are "defaulters," there are also many others who ceased to attend through such unavoidable causes as distance from their houses, etc.

There is an increase in all types of cases, as will be seen in the table attached below.

	1921.	1922-1923.		1923-1924.
Syphilis all cases	72	150	Primary	134
			Secondary	152
			Tertiary	165
			Congenital or Inherited	Nil.
Gonorrhoea	72	402		736
Soft Chancre	12	31		162
Total No. treated (including yaws)	464	3,100		1,988

The increase in the number of cases may be taken not as an indication of an increase in Venereal Diseases but that more patients are taking advantage of, and are appreciating the treatment obtainable.

Treatment is on the most modern lines.

Including the cases of Framboesia, a grand total of 7,623 injections of N.A.B. has been given during 1923-24.

There were five cases of complications attributable to the injection: two of jaundice, two of exfoliative dermatitis, and one of nephritis. The case of nephritis died, the others recovered.

Forty-five cases of gonorrhoea were admitted to hospital of which 35 were male and ten female.

Return shewing number of cases treated in the Venereal Clinic for the year 1923-1924.

[illegible]

APPENDIX C.
ANALYTICAL CHEMIST.

Chemical Laboratory,
Accra.

REPORT ON THE WORK DONE DURING YEAR APRIL, 1923 to 31st MARCH, 1924.

The number of samples dealt with was 154, and comprised the following:—
Medical and Police Departments—

Examinations for Poisons—					
Human viscera and organs	...	...	...	...	10
Stomach contents	...	...	...	...	3
Native "medicines"	...	...	...	...	10
Potable spirits	...	...	...	...	2
Plants	...	...	...	...	4
Water	...	...	...	...	1
Examinations for bloodstains—					
Weapons	...	...	...	...	5
Clothing	...	...	...	...	1
Medical and Sanitary Services—					
Drugs for purity	...	...	...	...	7
Foods	...	...	...	...	6
Waters	...	...	...	...	8
Urines	...	...	...	...	3
Customs Department—					
Patent medicines	...	...	...	...	39
Potable spirits	...	...	...	...	4
Wines	...	...	...	...	12
Medicinal Wines	...	...	...	...	6
Liqueurs	...	...	...	...	2
Methylated spirits	...	...	...	...	7
Miscellaneous	...	...	...	...	24

The analyses of the human organs and of the stomach contents were made in connection with four deaths from suspected poisoning, but in no case was any poison detected. Moreover, the native "medicines" forwarded with the viscera and assumed to have been the cause of death were found to be innocuous.

Judging from the meagre and incomplete reports which were forwarded with the pathological specimens it appears to be a difficult matter to obtain definite and trustworthy information regarding the identity, use, mode of administration and effects of alleged poisons in this country.

No specimen of native "medicine" yet received with a "history" attached to it has been found to contain recognisable principles of either toxic or therapeutic value, toxicity tests being supplemented by experiment with animals.

Of the articles submitted for examination for the presence of blood only one, a weapon connected with a case of burglary, was proved to bear bloodstains upon it.

A further large number of imported patent medicines was submitted by the Customs Department for determination of their alcoholic content and possible potability as alcoholic beverages, the latter feature involving some degree of identification of the ingredients.

Samples of foreign Methylated Spirits, some of which were sold and consumed as Gin, were subjected to analysis and found to consist of Alcohol containing a small quantity of wood-alcohol and were obviously not sufficiently denatured to preclude their consumption as potable spirits. A means of colouring and thoroughly denaturing the existing stocks of these spirits was devised and carried out.

Forty-two gallons of locally denatured Trade Spirits (not Methylated Spirits) were distilled in the Laboratory yielding 20 gallons of 80 per cent. alcohol suitable for burning purposes in spirit lamps.

Some time was devoted to the chemical examination of the bark and leaves of a tree locally credited with anti-pyretic properties, and of a tuberous root stated to be used as a aphrodisiac; in neither instance did analysis reveal the presence of any alkloid or unknown active principle.

It is with regret that I have to place on record the death of my Laboratory Assistant (Mr. I. A. Hammond) during September. He had worked through a course of instruction in elementary chemistry during his service and had attained a useful standard of proficiency in practical work.

The vacancy has been filled by Mr. B. E. Tamakloe, transferred from the Medical Research Institute, and he likewise is receiving instruction in elementary theoretical and practical chemistry.

During the period under review I was absent on leave from the Colony for a period of four months.

R. SIMMONS, F.I.C.,
Analytical Chemist.

APPENDIX D.

EXTRACT FROM THE MEDICAL AND SANITARY REPORT ON THE GOLD
COAST HARBOURS, 1923-24 BY DR. F. E. PETTMAN.
MEDICAL REPORT.

The health of the European and African Staff of the Gold Coast Harbours was satisfactory during the period. Among the Europeans I noticed that the heat affects the new arrivals somewhat. I chronicle a loss of 89 days, or 7.6 per cent., of all the time lost among the European Staff through illness. Supervision is exercised over the clothing worn by those working long hours in the sun, and no actual deaths are recorded.

The European Hospital was available for use in May, 1923, and the Native Hospital was not commenced till the middle of December, 1923.

Among Europeans all cases in which time was lost at the work, are treated as in-patients.

There were 47 cases of Tropical Diseases causing a loss of 583 working days, and of Non-Tropical Diseases 108 cases caused 712 days to be lost, or a total of 155 cases and 1,295 days of work lost.

Cases treated and classed as out-patients totalled 326 cases of illness and injury. These and all other cases are included in the Return of In and Out-Patients in the Annual Report (Table V.).

Europeans invalidated during the year were seven in number, for the following causes:—

Malarial Cachexia	...	...	...	...	1
Malaria	...	...	...	...	1
Recurrent Malaria	...	...	...	...	2
Tropical Neurasthenia	...	...	...	...	1
Cardiac Disease	...	...	...	...	2

Deaths of Europeans were two in number:—

Cardiac Disease	...	...	...	...	1
Typhoid Fever	...	...	...	...	1

The maximum staff for any one month was 120, in March, but the total number of different individuals on the staff during the year was 180. With 23 cases of malaria of all kinds, including ten new cases, gives 12.7 per cent. of individuals on the staff during the year who developed malaria, or 5.5 per cent. who contracted the disease, or 19.1 per cent. and 8.3 per cent. respectively of the maximum monthly staff.

Two cases of typhoid fever developed in October, and one case in November, resulting in the death of Mr. Jackson about the end of the second week of the disease, due to heart failure.

The only other death during the year was that of Mr. Colin Wilson, who had a history of heart trouble extending over several years.

Two other cases of "cardiac attacks" developed during the year and both were invalided home. One of these, Mr. Robson, died within three weeks after reaching England. Three deaths in a year, directly or indirectly due to heart failure among an average monthly staff of 99 persons is a high rate of mortality, and would seem to indicate that the climatic conditions obtaining on the Coast have a much greater detrimental effect on cardiac derangements than is the case in most other countries.

African patients treated during the year included:—

Injuries	...	...	...	...	44
Illness	...	...	...	...	83
Male	...	...	...	...	127
Out-Patients	...	...	...	...	2271
Female	...	...	...	...	74
Total Out-Patients	...	...	...	...	2345
Illness	...	...	...	...	9
Accidents	...	...	...	...	5
Total Deaths	...	...	...	...	14

SANITARY REPORT.

SANITARY STAFF.

Under the Medical Officer the staff consists of:—

Sanitary Inspector.

Foreman in charge of water, mess house, camp, etc.

Two Foremen in charge of conservancy, drains, refuse disposal, etc., one for each Camp.

Three labourers at Secondee Camp.

Six labourers at Takoradi Camp.

With the gradual progress of building of Takoradi Camp the congestion at Secondee was relieved, and by March, 1924, the approximate number at Secondee Camp was 40 and at Takoradi 80.

The original building programme at the latter Camp allowed for 22 bungalows, which were finished and occupied during the year. It was later found necessary to increase the size of this Camp and ten more bungalows are in course of construction, being nearly completed.

All these bungalows are similar, having accommodation for three Europeans and one steward boy. They consist of three main rooms 14ft. by 14ft., each having its own section of 6ft. verandah in front, and opening on to a 4ft. verandah at the back, common to all, which connects to a bathroom and water closet. The floors are 3 in. concrete, walls are 14 inch swish bricks with $\frac{3}{4}$ inch cement plaster on either side. Ceilings are beaver board with $2\frac{1}{2}$ inch mahogany strips, and roofs are of corrugated asbestos sheeting, or 1 inch board sheeting covered by one ply roofing felt.

All buildings are mosquito proofed with Monel metal wire gauze, 17 meshes to the inch. The gauze is brushed regularly once a week with coarse fibre brushes, and no discomfort from lack of free movement of air due to screening is noticed. Punkahs or electric fans are not required in this camp, which is cooler and better situated with regard to prevailing breezes than is Secondee Camp.

Infectious and Insect-borne diseases among the European Staff were as follows:—

Malaria	...	...	...	...	...	10
Recurrent Malaria	...	...	...	...	...	13
Dysentery	...	...	...	...	...	9
Enteric Fever	...	...	...	...	...	3
Influenza	...	...	...	...	...	1

The cases of recurrent malaria occurred in men who had spent considerable time in the tropics or sub-tropics and were subject to occasional attacks of fever.

Of the ten new cases, four developed the disease when living outside of mosquito-proof dwellings, and only six out of 180 persons who were on the staff during the year, contracted malaria while living in screened quarters. This is a small percentage, but it could doubtless be still reduced if everyone concerned would always be on their guard to see that the doors are never propped or held open, that small holes in the screens are reported and repaired without delay, and that their rooms are searched every evening for stray mosquitoes that may have gained entrance. It is reasonable to suppose that freedom from malaria will be more or less in proportion to the care we take to guard ourselves against the mosquito.

Of the nine cases of dysentery none were particularly severe. The entomeba was found in the majority of cases and they cleared up readily under the usual treatment of emetine, bismuth, etc.

The stools were treated with a solution of cresol or bichloride of mercury.

Three cases of enteric fever occurred during the year, one of which proved fatal. It is worthy of note that the first two cases to develop arrived at Secondee together on 18th September. Although feeling tired and run down for some time previously they did not come to hospital till October 15th, or about four weeks after their arrival, so that the origin of the infection is not clear. The type of fever was severe and clinical diagnosis was confirmed by Accra Laboratory which demonstrated the presence of *B. typhosus*, para A and para B in the blood.

The third case was of a milder type, developed in November, ran a typical course and was diagnosed on clinical findings and temperature chart. An early blood test was negative.

Among the European staff the time lost on account of sickness was considerably greater during the months of August, September and October than at any other time of the year, and so far as we can judge may be influenced more by a low temperature and a relatively high percentage of humidity than by other considerations, as shown by the following table.

Month.	Temperature		Rainfall.	Humidity.	Days Illness.
	Max.	Min.			
April	94	69	1.28 Inches.	75.5%	56
May	93	71	12.30 "	81.1%	68
June	90	71	6.90 "	82.3%	87
July	87	69	5.76 "	84.0%	105
August	87	65	0.22 "	82.8%	143
September	87	65	0.74 "	83.8%	154
October	90	69	4.93 "	82.9%	144
November	92	70	0.78 "	78.2%	106
December	94	70	0.08 "	83.0%	77
January	93	69	5.96 "	83.2%	33
February	96	69	4.01 "	82.9%	97
March	95	71	0.99 "	76.8%	79

APPENDIX E.

LEPROSY AT YENDI.

A total of 52 males and 19 females was seen and treated at Yendi during the year 1923-4. All these cases were in an advanced state of the disease, leaving no possible doubt as to the diagnosis. Early cases do not come to hospital as they use native treatment.

In 27 of these cases a full history was obtained and recorded. The following particulars may prove of interest:—

- 12 gave a definite history of infection from other people in the compound.
- 15 could give no information *re* mode of infection.
- 20 maculo-anæsthetic.
- 7 mixed variety.
- 11 showed active ulceration.
- 15 loss of digits.

Many of the cases came for treatment because of inability to sleep at night owing to pain.

All the cases gave practically the same history of the first symptoms noticed being heat generally in the long limbs at night, followed by pain.

Moogrol received 11th October, 1923. 300 cc.

Segregation area formed immediately thereafter consisting of four huts capable of housing ten people each.

Small shelter for treatment.

Small farm.

First lepers came to live in the area about the 10th November, 1923, and treatment was started on the 11th November.

Twenty-four Dagomba and ten Konkomba received treatment. As the Konkombas had no food supplies they left the area whenever they felt in the slightest degree improved.

When the Moogrol was exhausted as no further supply was forthcoming treatment was carried on for a time with antimony to prevent the lepers becoming downhearted, also to, if possible, prevent relapse.

Chaulmoogra Oil was received on 22nd February. Treatment has been carried on with it.

TREATMENT AND REACTIONS.

Moogrol. 1st week 0.5cc Intramuscularly Slight coughing in one case.
 2nd „ 1.0cc „ „ „
 3rd „ 1.0cc Intramuscularly. Coughing in a few cases. Reaction in one case so severe that no further Intravenous given for two weeks when it was resumed with no ill-effects.
 4th „ 2.0cc Intravenously. Slight coughing.

As the supply was limited dosage was not further increased except in one case, who was reacting extraordinarily well. His dose was gradually increased to 5cc.

The immediate reaction except in one case never lasted more than half an hour after intravenous injection.

The local reaction after intramuscular injection was slight and had entirely disappeared in two days.

The general reaction was marked. Ulcers showed signs of rapid healing. The night pains disappeared. I have not been able to ascertain accurately whether sensation is re-appearing in the anæsthetic areas. In one case with marked thickening of the supra-orbital region and loss of eyebrows the thickening has disappeared and the eyebrows are growing again.

CHAULMOOGRA OIL.

First Week. 1cc. was given intramuscularly. The swelling and pain had not subsided by the time another injection was due. One case developed a small abscess. The intravenous method was tried. The immediate reaction was so marked that only in three of the stronger cases have we been able to continue this method. Both with Ether as a solvent and without the reaction is the same. The remaining cases are now only receiving treatment by mouth.

CONCLUSIONS.—Moogrol is in every way superior to Chaulmoogra oil in its immediate, its local, and its general reactions. The native has little resolution and stability and so requires every encouragement if a prolonged course of treatment is to be carried out successfully.

HELEN McD. HENDRIE,
Acting Medical Officer.

Yendi,
 20th March, 1924.

3. Housing.

Station.	1921.				1922-1923.				1923-1924.			
	Houses.		Huts.		Houses.		Huts.		Houses.		Huts.	
	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.
Accra ..	175	2,976	See	Houses.	162	3,101	—	—	230	3,087	—	—
Cape Coast ..	30	1,370	—	326	30	1,201	—	302	30	1,481	—	405
Seccoandee ..	89	1,536	—	—	173	1,568	—	—	140	1,545	—	71
Coomassie ..	81	1,537	—	71	81	1,553	—	71	131	1,635	—	—

4. Erection of New Buildings.

Station.	1921.		1922-1923.		1923-1924.	
	No. of houses built without sanction.		No. of Huts built without sanction.		No. of Huts built without sanction.	
	No. of houses built without sanction.	No. of Huts built without sanction.	No. of houses built without sanction.	No. of Huts built without sanction.	No. of houses built without sanction.	No. of Huts built without sanction.
Accra ..	213	—	157	—	—	149
Cape Coast ..	10	2	—	—	—	—
Seccoandee ..	—	—	—	—	—	—
Coomassie ..	—	—	—	—	—	—

4. (b) Action Taken.

Station.	1921.			1922-1923.			1923-1924.		
	No. of Prosecutions.			No. of Prosecutions.			No. of Prosecutions.		
	Huts.	Houses.		Huts.	Houses.		Huts.	Houses.	
Accra ..	—	—		—	—		—	—	
Cape Coast ..	—	—		—	—		—	—	
Secondree ..	—	—		—	—		—	—	
Coomassie ..	—	—		—	—		—	—	

5. Latrines.

Station.	1921.						1922-1923.						1923-1924.					
	Number.			New ones.			Number.			New ones.			Number.			New ones.		
	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.
	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.	No. Seats.
Accra ..	46	473	38	5	20	5	48	535	40	291	2	16	49	540	41	1	5	5
Cape Coast ..	17	140	17	3	12	3	9	113	9	130	—	—	10	114	10	1	6	6
Secondree ..	17	115	12	1	8	1	20	115	20	81	1	—	17	115	12	—	—	—
Coomassie ..	32	271	32	2	18	2	34	255	34	223	—	—	36	263	36	2	8	8

5. (b) Latrines (Private).

Station.	1921.								1922-1923.								1923-1924.							
	No.	Pails removed daily.	No. of clean pails substituted for dirty ones.	No. of night soil men.	Cesspools.	Cesspool cleansed.	New cesspools.	Cesspools abolished.	No.	Pails removed daily.	No. of clean pails substituted for dirty ones.	No. of night soil men.	Cesspools.	Cesspools cleansed.	New Cesspools.	Cesspools abolished.	No.	Pails removed daily.	No. of clean pails substituted for dirty ones.	No. of night soil men.	Cesspools.	Cesspools cleansed.	New Cesspools.	Cesspools abolished.
Accra ..	494	650	—	88	4	—	—	—	563	695	695	92	—	—	—	—	584	698	—	92	—	—	—	—
Cape Coast	123	730	730	36	6	—	2	2	134	730	—	30	—	—	—	—	134	730	—	34	—	—	—	—
Seccondee	245	233	430	50	—	—	—	—	308	357	384	50	—	—	—	—	321	360	575	64	—	—	—	—
Coomassie	132	403	—	42	—	—	—	—	240	489	478	67	—	—	—	—	206	425	478	67	—	—	—	—

6. Removal of Refuse.

Station.	1921.						1922-1923.						1923-1924.					
	Dustbins.	Carts removing street refuse.	Amount of refuse removed daily from street.	Carts removing refuse from yards and premises.	Amount of refuse from yards and premises.	Men employed.	Dustbins.	Carts removing street refuse.	Amount of refuse removed daily from Street.	Carts removing refuse from yards and premises.	Amount of refuse from yards and premises.	Men employed.	Dustbins.	Carts removing Street refuse.	Amount of refuse removed daily from Street.	Carts removing refuse from yards and premises.	Amount of refuse from yards and premises.	Men employed.
Accra ..	34	7	93	4	—	34	38	11	130*	4	*	56	39	7	105	4	44	62
Cape Coast	39	10	55 Cart-loads 23 lorry loads	—	1 Cart-load.	31	38	10	56	1	1 Cart-load.	34	23	10	57	1 cart-load.	2 cart-loads.	23
Secondee	21	2 lorries.	23 lorry loads	—	—	23	21	2 lorries.	25 Cart-loads.	—	*	24	23	3 lorries.	25 lorry loads.	—	—	51
Coomassie	20 Incin-erators	1	437 head loads	1	17 head loads.	82	21 Incin-erators.	1	176	2	43 head loads.	2	23 Incin-erators.	1	218 Baskets.	2 Baskets.	43 head-loads.	2

7. Mode of Disposal of Excreta, Refuse and Offal.

Station.	1921.												1922-1923.												1923-1924.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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8. Average Daily Number of Cartloads of Cans, Bottles, and Incombustible Materials found from houses and Compounds.

Station.				1921.				1922-1923.				1923-1924.			
Accra ..	..	..	..	23 1/2	..	..	..	330	..	..	..	44	..	..	..
Cape Coast ..	..	..	..	1	..	..	..	1 Cart Load	..	..	..	2 Cart Loads.	..	..	..
Secondee ..	..	..	..	14 Head Loads	..	..	..	29	..	..	..	126 Head Loads.	..	..	..
Coomassie ..	..	..	..	150 Head Loads	..	..	..	1660	..	..	..	403 Head Loads.	..	..	..

Water Supply.

1921.																
Station.				Pipe-Borne Water.			Wells.			Tanks.						
							Public.		Private.	Public.			Private.		Nature of Tank.	
				No.	Mosquito proof.	No.	Mosquito proof.	Mosquito proof.	Above ground.	Mosquito proof.	Above ground.	Mosquito proof.	Wood.	Iron.	Concrete.	No.
Accra	..	..	..	—	—	162	147	—	—	139	117	7	148	12	41	39
Cape Coast	..	..	..	10	6	221	193	4	22	140	136	11	129	70	381	367
Secondees	..	..	..	—	—	45	43	—	77	176	176	2	231	33	114	114
Coomassie	..	..	..	16	3	142	31	3	—	44	44	3	38	3	367	115
1922-1923.																
Accra	..	..	..	—	—	124	124	2	—	74	73	3	15	2	26	23
Cape Coast	..	..	..	10	6	212	202	7	2	211	211	14	115	82	393	359
Secondees	..	..	..	—	—	4	4	—	—	117	113	1	139	36	36	36
Coomassie	..	..	..	16	3	162	115	—	—	64	62	3	58	3	255	132
1923-1924.																
Accra	..	..	..	—	—	114	84	1	—	230	206	5	103	122	20	14
Cape Coast	..	..	..	10	4	232	232	7	2	227	227	10	123	76	353	353
Secondees	..	..	..	—	—	—	—	—	—	82	82	—	62	20	—	—
Coomassie	..	..	..	16	3	110	110	3	—	79	79	3	72	3	257	257

RETURN OF DISEASES AND DEATHS (IN AND OUT-PATIENTS) FOR THE YEAR, 1923-24.

Diseases.	Remaining in Hospital at end of 1922-1923.	YEARLY TOTAL.		Total Cases Treated.	Remaining in Hospital at end of 1923-1924.	Remarks.
		New Cases.	Deaths.			
INFECTIVE DISEASES.						
Beri-Beri	1	59	12	60	—	Includes cases in Venereal Clinic.
Cerebro-Spinal Fever	—	4	2	4	—	
Chicken-Pox	9	286	—	295	—	
Cholera	—	—	—	—	—	
Dengue	—	18	—	18	—	
Diphtheria	—	—	—	—	—	
Dysentery	1	550	19	551	4	
Endocarditis—infective	—	—	—	—	—	
Enteric	2	34	2	36	4	
Erysipelas	—	7	1	7	—	
Gonorrhoea	4	1,958	—	1,962	3	
Influenza	1	192	—	193	—	
Kala Azar	—	—	—	—	—	
Leprosy (a) Nodular	1	136	—	137	—	
(b) Anæsthetic	—	9	—	9	—	
Malaria (a) Tertian benign	6	780	—	786	—	
(b) Quartan	—	78	—	78	—	
(c) Subtertian	4	2,037	6	2,041	4	
(d) Chronic Malaria	2	541	2	543	1	
(e) Blackwater	—	21	7	21	—	
(f) Unclassified Fever	6	2,488	6	2,494	5	
Measles	—	88	—	88	—	
Malta Fever	—	—	—	—	—	
Plague	—	44	24	44	20	
Pneumonia	8	526	81	534	11	
Rabies (Hydrophobia)	—	1	—	1	—	
Relapsing Fever	8	158	3	166	81	
Rheumatic Fever	1	108	—	109	1	
Septicaemia	—	29	11	29	—	
Trypanosomiasis (Sleeping Sickness)	1	5	2	6	1	
Small-Pox	—	2	—	2	—	
Syphilis (a) Primary	1	447	2	448	9	
(b) Secondary	2	841	1	843	5	
(c) Inherited	—	20	—	20	—	
Tetanus	—	31	9	31	2	
Tuberculosis	13	398	64	411	22	
Whooping Cough	—	193	—	193	—	
Yaws	2	5310	—	5,312	7	
Yellow Fever	—	13	10	13	—	
Other Diseases	4	448	—	452	—	
INTOXICATIONS.						
Alcoholism	—	34	1	34	—	
Morphinism	—	—	—	—	—	
Other forms	—	20	—	20	—	
GENERAL DISEASES.						
Anæmia	1	264	2	265	—	
Anæmia—Pernicious	—	3	1	3	—	
Diabetes	—	8	2	8	—	
Exophthalmic Goitre	—	7	—	7	—	
Gout	—	12	—	12	—	
Leucocythæmia	—	—	—	—	—	
Hodgkin's Disease	1	1	—	2	—	
Myxœdema	—	—	—	—	—	
Purpura	—	—	—	—	—	
Rickets	—	25	—	25	—	
Scurvy	—	—	—	—	—	
Rheumatism	2	79	—	81	7	
Other Diseases	1	1,881	1	1,882	—	
Diseases of the Nervous System—						
Neuritis	1	192	1	193	—	
Meningitis	—	16	6	16	—	
Myelitis	—	7	—	7	—	
Carried forward	—	—	—	—	—	

RETURN OF DISEASES AND DEATHS (IN AND OUT-PATIENTS) FOR THE YEAR, 1923-24.

Diseases.	Remaining in Hospital at end of 1922-1923.	YEARLY TOTAL.		Total Cases Treated.	Remaining in Hospital at end of 1923-1924.	Remarks.
		New Cases.	Deaths.			
Brought forward	—	—	—	—	—	
Hydrocephalus	—	4	—	4	—	
Encephalitis	—	—	—	—	—	
Abscess of Brain	—	—	—	—	—	
Congestion of Brain	—	—	—	—	—	
Other Diseases	1	87	3	88	7	
Apoplexy	2	23	3	25	—	
Paralysis	—	77	5	77	5	
Chorea	—	10	—	10	—	
Epilepsy	—	98	—	98	—	
Neuralgia	—	369	—	369	—	
Hysteria	—	13	—	13	—	
Other Diseases	—	105	1	105	2	
Idiocy	—	1	—	1	—	
Mania	—	14	1	14	—	
Melancholia	—	1	—	1	—	
Dementia	—	19	—	19	1	
Delusional Insanity	—	18	—	18	—	
Other Diseases	—	34	1	34	4	
Diseases of the Eye—						
Conjunctivitis	1	2,663	—	2,664	5	
Keratitis	—	92	—	92	—	
Ulceration of Cornea	—	79	—	79	2	
Iritis	—	80	—	80	—	
Optic Neuritis	—	5	—	5	—	
Cataract	—	57	—	57	—	
Other Diseases	1	336	—	337	4	
Diseases of the Ear—						
Inflammation	—	560	—	2	—	
Other diseases	—	518	1	518	—	
Diseases of the Nose—						
	—	471	—	471	1	
Diseases of the Circulatory System—						
Pericarditis	—	15	—	15	—	
Endocarditis	1	28	4	28	—	
Valvular Mitral	2	99	4	100	—	
„ Aortic	—	28	3	28	2	
„ Tricuspid	—	2	—	2	—	
„ Pulmonary	—	7	—	7	—	
Arterial Sclerosis	1	14	2	14	—	
Aneurism	—	15	—	15	—	
Other Diseases	1	190	9	191	5	
Diseases of the Respiratory System—						
Laryngitis	—	160	—	160	—	
Bronchitis	1	5,393	4	5,394	7	
Broncho-Pneumonia	1	155	10	156	—	
Abscess of Lung	—	2	—	2	—	
Gangrene of Lung	—	2	—	2	—	
Emphysema	—	—	—	—	—	
Pleurisy	—	287	2	287	—	
Empyema	—	31	2	31	—	
Other Diseases	1	384	1	385	—	
Diseases of the Digestive System—						
Stomatitis	—	323	—	323	—	
Caries of teeth	—	972	—	972	—	
Glossitis	—	186	—	186	2	
Sore Throat	—	306	—	306	—	
Inflammation of Tonsils	—	442	—	342	—	
Carried forward	—	—	—	—	—	

RETURN OF DISEASES AND DEATHS (IN AND OUT-PATIENTS) FOR THE YEAR, 1923-24.

Diseases.	Remaining in Hospital at end of 1922-1923.	YEARLY TOTAL.		Total Cases Treated.	Remaining in Hospital at end of 1923-1924.	Remarks.
		New Cases.	Deaths			
Brought forward	—	—	—	—	—	—
Gastritis	—	620	1	620	—	—
Ulceration of Stomach	—	4	—	4	—	—
Hæmatemesis	—	5	—	5	—	—
Dilatation of Stomach	—	1	—	1	—	—
Stricture of Stomach	—	—	—	—	—	—
Dyspepsia	—	758	—	758	3	—
Enteritis	—	628	6	628	3	—
Appendicitis	—	45	—	45	3	—
Colitis	—	190	—	196	1	—
Ulceration of Intestines	—	—	—	—	—	—
Sprue	—	—	—	—	—	—
Hernia	—	290	4	296	6	—
Diarrhoea	—	1,177	01	7,177	—	—
Constipation	2	4,879	1	4,880	1	—
Colic	2	493	1	496	—	—
Hæmorrhoids	1	236	—	237	—	—
Pancreatitis	—	—	—	—	—	—
Hepatitis—Acute	—	187	2	187	1	—
Abscess of Liver	—	17	4	17	2	—
Cirrhosis	—	14	4	14	—	—
Jaundice	—	75	—	75	1	—
Peritonitis	—	26	8	26	—	—
Ascites	2	34	3	36	1	—
Other Diseases	—	290	10	290	2	—
Diseases of the Lymphatic System—						
Splenitis	—	349	—	349	—	—
Inflammation of Lymphatic Gland	—	304	—	306	4	—
Suppuration of Lymphatic Gland	—	177	—	177	—	—
Lymphangitis	1	48	—	49	—	—
Elephantiasis	4	106	—	110	4	—
Other Diseases	—	18	2	18	—	—
Diseases of the Urinary System—						
Acute Nephritis	—	165	7	165	3	—
Bright's Disease	—	18	3	18	—	—
Pyelitis	—	10	1	10	—	—
Calculus	—	5	—	5	—	—
Renal Colic	—	1	—	1	—	—
Cystitis	1	222	1	223	1	—
Vesical Calculus	—	1	—	1	—	—
Suppression	—	12	—	12	—	—
Hæmaturia	—	35	—	35	—	—
Chyluria	—	—	—	—	—	—
Other Diseases	—	43	—	43	—	—
Diseases of the Generative System—						
Male Organs—						
Urethritis	2	146	—	148	—	—
Gleet	—	47	—	47	—	—
Stricture	7	214	2	221	3	—
Prostatitis	1	25	—	26	—	—
Soft chancre	1	193	—	194	—	—
Condyloma	—	3	—	3	—	—
Inflammation of Scrotum	—	29	—	29	1	—
Hydrocele	1	88	—	89	3	—
Orchitis	—	217	—	217	—	—
Epididymitis	—	88	—	88	1	—
Abscess of Testicle	—	28	—	28	—	—
Other Diseases	7	324	—	331	—	—
Female Organs—						
Ovaritis	—	25	—	25	—	—
Ovarian Cyst	—	7	2	7	—	—
Endometritis	1	142	—	143	2	—
Displacement of Uterus	—	57	—	57	1	—
Vaginitis	—	56	—	56	1	—
Amenorrhœa	—	118	—	118	—	—
Carried forward	—	—	—	—	—	—

RETURN OF DISEASES AND DEATHS (IN AND OUT-PATIENTS) FOR THE YEAR, 1923-24.

Diseases.	Remaining in Hospital at end of 1922-1923.	YEARLY TOTAL.		Total Cases Treated.	Remaining in Hospital at end of 1923-1924.	Remarks.
		New Cases.	Deaths.			
Brought forward	—	—	—	—	—	
Dysmenorrhœa	—	88	—	88		
Menorrhagia	—	67	—	67		
Leucorrhœa	—	50	—	50		
Abortion	1	32	2	32		
Delayed Labour	—	30	7	30	1	
Post partum Hæmorrhage ..	—	14	—	14		
Retained Placenta	—	17	—	17		
Premature Birth	—	11	—	11		
Puerperal Septicæmia	1	14	—	15		
Mastitis	—	36	—	36		
Abscess of Breasts	—	41	—	41		
Other Diseases	2	128	2	130	1	
Diseases of Organs of Locomotion—						
Osteitis	2	172	—	174	1	
Arthritis	5	344	—	349	5	
Spondylitis	—	3	—	3		
Bursitis	—	85	—	85		
Other Diseases	3	1,678	—	1,681	7	
Diseases of Connective Tissue—						
Cellulitis	6	692	2	697	6	
Abscess	1	1,012	1	1,022	7	
Other Diseases	—	496	—	696	2	
Diseases of the Skin—						
Urticaria	—	114	—	114		
Eczema	—	342	—	342	2	
Boil	—	701	—	701	1	
Carbuncle	—	30	—	30		
Herpes	—	49	—	49		
Psoriasis	—	36	—	36		
Oriental Sore	—	21	—	21		
Tinea	—	1,108	—	1,108		
Scabies	—	832	—	832		
Acne	—	41	—	41		
Prickly Heat	—	112	—	112		
Ulcers	49	6,520	13	6,569	10	
Other Diseases	1	882	—	883		
Injuries (General)	8	938	23	946	25	
.. (Local)	25	8,956	28	8,981	40	
Surgical Operations—						
Major	10	768	1	778	2	Not included in totals
Minor	—	1,013	—	1,013	1	
Tumours	8	349	6	357	5	
Malformations	—	6	—	6		
Poisons	—	91	—	91		
Parasites Animal—	—	204	—	204		
Protozoa	—	—	—	—		
Trematoda (Flukes)	—	113	—	113	3	
Others	2	3	—	5		
Cestoda—						
Tænia Solium	—	154	—	154	1	
Tænia Saginata	—	499	—	—		
Others	—	5	—	5		
Nematoda—						
Ascaris	—	339	—	339		
Tricocephalus Dispar	—	1	—	1		
Trichina	—	2	—	2		
Dracunculus	11	1,015	—	1,026	12	
Filariasis	—	30	—	30		
Strongylus	—	1	—	1		
Ankylostomiasis	1	277	2	278	8	
Oxyuris	—	43	—	43		
Others	—	1	—	1		
Insecta—						
Myiasis	—	28	—	28		
Others	—	—	—	—		
Totals	268	77,224	475	77,492	510	

No. of Insects	Name of Insect	Number of Insects		Total	Remarks
		1904	1905		
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95	...	...	...	...	...
96	...	...	...	...	...
97	...	...	...	...	...
98	...	...	...	...	...
99	...	...	...	...	...
100	...	...	...	...	...

Number of
Insects



