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NIGERIA

SOUTHERN PROVINCES.

ANNUAL

MEDICAL AND SANITARY REPORT

FOR THE

YEAR ENDING 31ST DECEMBER, 1916.

CONTENTS.

COLONY AND SOUTHERN PROVINCES.

NORTHERN PROVINCES.

Annual Medical and Sanitary Report, Colony and Southern Provinces, for the year 1916.

I. ADMINISTRATIVE.

STAFF.

Medical Staff.

EUROPEAN.

1 Principal Medical Officer.
2 Deputy Principal Medical Officers.
2 Provincial Medical Officers.
7 Senior Medical Officers.
60 Medical Officers.

Promotions—Nil.

Transfers—

1 Medical Officer, J. Currie, to the Northern Provinces on promotion to be Senior Medical Officer.
2 Medical Officers, W. A. Nicholson and E. J. Powell, from Sierra Leone to the Southern Provinces.
2 Medical Officers, W. A. Nicholson and E. J. Powell, to the Northern Provinces.
1 Medical Officer, A. C. N. McHattie, to Zanzibar as Medical Officer of Health.

Seconded—

to the Royal Army Medical Corps—the Principal Medical Officer, Major W. H. G. H. Best; 1 Senior Medical Officer, J. B. Bate; and 9 Medical Officers, viz.: J. C. M. Bailey; W. H. Peacock; R. C. Macpherson; C. F. Forde; Captain E. L. Anderson; F. M. P. Rice; W. E. Glover; J. W. B. Hannington; C. J. B. Pasley;
to the Overseas Contingent—5 Medical Officers, viz.: T. M. R. Leonard; G. H. Gallagher; T. R. Sandeman; E. Gibson and C. Mackey.
to East Africa—3 Medical Officers, viz.: C. Kelsall; W. H. Kauntze; A. R. Paterson.

Invalided—2 Medical Officers, A. E. Neale and R. C. Macpherson.

Deaths—1 Medical Officer, G. Beatty (in England).

Retirements—Nil.

Appointments—Nil.

NATIVE.

5 Medical Officers.

Appointment—1 Medical Officer, I. G. Cummings.

Sanitary Staff.

EUROPEAN.

1 Senior Sanitary Officer.
3 Sanitary Officers.
4 „ Inspectors.

Promotions—Nil.

Transfers—
1 Senior Sanitary Officer, J. A. Pickels, to the Northern Provinces on promotion to be Principal Medical Officer.
1 Sanitary Officer, R. Laurie, to Sierra Leone on promotion to be Senior Sanitary Officer.
1 Sanitary Officer, F. J. A. Berringer, from Sierra Leone.
1 Sanitary Officer, W. D. Inness, to the Northern Provinces.

Termination of Appointment—
1 Sanitary Inspector.

Appointments—
1 Senior Sanitary Officer, H. A. Foy.
1 Sanitary Officer, G. J. Pirie.

NATIVE.

1 1st Class Clerk.
1 Registrar of Vital Statistics.
1 2nd Class Clerk.
2 3rd „ Clerks.
1 Deputy Registrar of Vital Statistics.
66 Sanitary Inspectors.

Resignations—
1 Sanitary Inspector.

Dismissals—
1 Sanitary Inspector.

Termination of Appointments—
5 Sanitary Inspectors.

Appointments—
7 Sanitary Inspectors.
1 3rd Class Clerk

Medical Research Institute Staff.

EUROPEAN.

1 Director and Bacteriologist.
1 Assistant Bacteriologist.

NATIVE.

1 2nd Class Clerk.

Laboratory Staff.

EUROPEAN.

1 Government Chemist.

NATIVE.

Laboratory Assistant.

Nursing Staff.

EUROPEAN.

5 Senior Nursing Sisters.
14 Nursing Sisters.

Resigned—
1 Nursing Sister.

Appointments terminated—
1 Nursing Sister.

Invalided—
1 Nursing Sister.

Appointments—
4 Nursing Sisters.

NATIVE.

1 Dresser.
25 1st Class Nurses.
34 2nd Class ,,
23 Nurses-in-training.
26 Attendants.

Promotions—
9 Nurses-in-training promoted to be 2nd Class Nurses.

Termination of Appointment—
3 Nurses-in-training.

Resignations—
2 2nd Class Nurses.
4 Nurses-in-training.

Store-keeping and Dispensing Staff.

EUROPEAN.

1 Medical Storekeeper.

NATIVE.

1 Storekeeper and Warden, Lagos Hospital.
3 Storekeepers.
1 Chief Dispenser.
1 Senior Dispenser.
10 1st Class Dispensers.
38 2nd Class Dispensers.
11 Dispensers-in-training.

Termination of Appointment—
1 2nd Class Dispenser.

Deaths—
1 2nd Class Dispenser.

Appointments—
2 2nd Class Dispensers.

Clerical Staff.

1 Senior 1st Class Clerk.
3 1st Class Clerks.
10 2nd Class ,,
17 3rd ,, ,,

FINANCIAL.

Statement of Revenue and Expenditure for the year 1916.

	£	s.	d.
Total Revenue	1,937	12	2

Total Expenditure:—	£	s.	d.
a. Personal Emoluments	73,125	0	1
b. Other Charges	30,780	3	4
Total	£103,905	3	5

II.—PUBLIC HEALTH.

(*a*).—GENERAL REMARKS.

The general health has during the year under review been much as in recent years; owing to the large population which is in many places very inaccessible, and to the shortage of staff, it must be remembered that only a very small percentage of the people come under the notice of the Medical Officers.

Compulsory registration of births and deaths is still confined to Lagos and Ebute Metta, and the causes of death are frequently conjectural, so few being certified by a medical man.

The total number of native cases treated was 119,093 with 724 deaths, as against 86,181 cases treated with 760 deaths in 1915. This increase has taken place in spite of a further decrease in the staff owing to the exigencies of the war, and points clearly to an increasing confidence in European methods of treatment on the part of the native.

The total number of Europeans treated was 3,154, as against 2,067 in 1915, with 9 deaths as against 8 in 1915.

The usual seasonal variations in the sick list have been observed; there has been a slight increase in the number of cases of chicken-pox, but it is gratifying to note that neither in 1915 nor 1916 has there been an epidemic of small-pox.

(1).—General Diseases.

Anæmia is again the most universally prevalent of these. Other general diseases are rare.

(2).—Communicable Diseases.

(*a*).—*Insect-borne.*

Malaria of the aestivo-autumnal type is as usual the most common of these. The total number of cases of malaria treated was 8,740; of which 543 were in Europeans. This shows a slight increase in the European cases, but a very large increase in the native cases, namely 3,148, which may be largely accounted for by the great increase in the total number of native patients treated. In 1915, 1 case occurred of malaria to 11·1 other diseases, while in 1916 1 case of malaria occurred to 14·5 other diseases.

One case of yellow fever in an European occurred on board a steamer in Lagos harbour and proved fatal. The case was not treated in hospital but was seen and diagnosed by a private practitioner. The diagnosis was confirmed by post mortem examination.

Trypanosomiasis.—Only 3 cases have been under treatment.

Blackwater Fever.—There has been a slight rise in the number of cases, 22 cases having occurred, 6 of them being natives, giving 16 cases in Europeans as against 11 in 1915. 1 native and 3 Europeans died of the disease; the rate of mortality is however a fraction less, so that although there has been an increase in the number of cases there does not appear to have been an increase in severity of type.

Infectious and Epidemic.

There was an increase in the number of cases of chicken-pox over 1915; there was also an increase in the number of cases of small-pox, although no actual epidemic occurred; shortage of staff and the consequent impossibility of prosecuting vaccination with the usual vigour probably accounts for the increase.

Dysentery shows a slight decrease in case incidence, the numbers being 1,106 in 1916 and 1,212 in 1915, the mortality showing an increase to 20% in 1916 as against 11·5% in 1915.

Only 10 cases of beri-beri with 1 death have been recorded.

182 cases of tuberculosis with 47 deaths have been treated.

Venereal disease is very common, especially in the open ports.

Helminthic.

Ankylostomes are extremely common and have been treated in 686 cases; this is a large increase on last year and is probably due to a more ready recognition of the conditions to which they may give rise on the part of the Medical Officers, and the consequent search for the parasite.

It has so far been impossible to start treatment of ankylostomiasis on a large scale.

Guinea Worm causes much sickness and disability in up-country stations where the people are dependent on shallow water holes for their supply of drinking water.

(*b*).—EUROPEAN OFFICIALS*.

Total number on Sick List	1,014
Total number of days on Sick List	5,984
Total number Invalided	62
Total Deaths	9

* See page 43 for statistics for whole of Nigeria.

TABLE SHOWING THE CAUSES OF INVALIDING AND DEATHS.

Cause.	Invalided.	Died.
Dysentery	3	...
Malaria	2	1
Blackwater Fever	5	2
Pneumonia	1	...
Pyrexia of uncertain origin	1	...
Tuberculosis	3	...
Alcoholism	2	...
Anæmia	5	...
Neuritis	5	...
Paraplegia	...	1
Neuralgia	2	...
Neurasthenia	2	...
Mental Disease	6	...
Astigmatism	2	...
Cardiac disease	7	2*
Caries of teeth	1	...
Pyorrhœa Alveolaris	1	...
Gastritis	1	...
Dilated Stomach	1	...
Gastro-enteritis	...	1
Appendicitis	1	...
Hernia	1	...
Hepatitis	1	...
Bright's Disease	...	1
Calculus	1	...
Cystitis	1	...
Urethral Fistula	1	...
Perineal Abscess	1	...
Arthritis	1	...
Cellulitis	1	...
Ulcer	1	...
Gunshot Wound	1	...
Fracture Cervical Vertebra	...	1
Sun Trauma	1	...
Total	62	9

* One died in England after being invalided.

(*c*).—NATIVE OFFICIALS.

Total number on Sick List	1,338
Total number of days on Sick List	7,296
Total number Invalided	18
Total Deaths	10

TABLE SHOWING THE CAUSES OF INVALIDING AND DEATHS.

Cause.	Invalided.	Died.
Pneumonia	...	2
Syphilis	1	...
Tuberculosis	4	2
Anæmia	1	...
General Debility	2	...
Apoplexy	...	1
Hysteria	1	...
Neurasthenia	3	...
Mental Disease	1	...
Hypermetropia	1	...
Cardiac Disease	1	...
Arterio-sclerosis	1	...
Enteritis	...	1
Hernia	1	1
Abscess of Liver	...	1
Nephritis	1	1
Burn	...	1
Total	18	10

(*d*)—SOLDIERS.

Statistics of average strength, sick and death rates of soldiers, owing to the exigencies of the war, cannot be supplied with any degree of accuracy and are therefore omitted.

(*e*)—POLICE.

Average strength	1,425
Average sick rate per 1,000	105·42
Average death rate per 1,000	7·44

(*f*)—PRISONERS.

Total number of prisoners passed through the Registers	34,379
Daily average number of prisoners ...	5,381
Sick rate per 1,000	126·8
Death rate per 1,000	12·22

(*g*)—NON-OFFICIAL EUROPEAN POPULATION.

An effort was made in 1916 to obtain more comprehensive statistics under this heading, with some degree of success.

As, however, no accurate estimate of the population is obtainable, reliable deductions cannot be drawn as in the case of officials.

Estimated population	1,650
Total number on Sick List	572
Total number of days on Sick List	5,297
Total number Invalided	34
Total number of Deaths	8

TABLE SHOWING THE CAUSES OF INVALIDING AND DEATHS.

Cause.	Invalided.	Died.
Dysentery	6	...
Malaria	9	2
Blackwater Fever	3	2
Pneumonia	1	...
Septicæmia	...	1
Tuberculosis	1	...
Syphilis	1	...
Yellow Fever	...	1
Alcoholism	1	...
Meningitis	...	1
Mental Disease	...	1
Irido-cyclitis	1	...
Cardiac Disease	2	...
Bronchitis	1	...
Enteritis	1	...
Gastritis	1	...
Nephritis	1	...
Hæmorrhoids	1	...
Suppuration of Lymphatic Gland	1	...
Urethral Fistula	1	...
Arthritis	1	...
Sun Trauma	1	...
Total	34	8

(*h*)—NON-OFFICIAL NATIVE POPULATION VITAL STATISTICS.

The total estimated population of the Colony and Southern Provinces based on the census of 1911 is:—

Africans	7,856,000
East Indians	99
Mixed and Coloured	487
Total	7,856,586

Registration is compulsory in Lagos and Ebute Metta only. The statistics from these places are as follows:—

Total Births	2,661 *
Total Deaths	2,102 *
Total Deaths of Infants under one year	728 *
Total Stillbirths	165
Infant Mortality per 1,000 Births *	264·7

* Exclusive of 165 Stillbirths.

III.—SANITATION.

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

(I).—ADMINISTRATIVE.

This report must of necessity be brief. When the Senior Sanitary Officer had the honour of taking over the duties of his office, the last quarter of the year under review had already got well into its stride; the local conditions were greatly different from those to which

he had been accustomed in the Northern Provinces; the personnel of the Sanitary Officers, constituting the sanitary branch, at the time underwent complete changes; and 1917 must, in the nature of things, be well advanced before he shall have truly found his feet.

2. The existing conditions, owing to the war, continue to have their adverse effect on sanitary progress owing to limited means and depletion of the medical staff, for no less than 19 in all have been seconded for Military Service during the year.

3. In several instances a Medical Officer has now to divide his energies in carrying out the medical work and sanitation of two stations; nevertheless routine sanitary work requiring frequent supervision has been carried out, and the sanitary condition of stations maintained with the co-operation of Executive Officers, at as high a standard of efficiency as funds and energy have permitted.

4. *Work done by Sanitary Officers.*—The routine duties of sanitary work in the way of tours of inspection were carried out.

Dr. Inness, Sanitary Officer, who was seconded for general medical and sanitary work in December, 1915, continued in this capacity at Ngwo Colliery, near Udi, for the first eight months of this year. His work in this sphere was of considerable value as he was able to watch the sanitary development of this station and also to advise as to lay-out of other new stations that were rapidly developing on the Eastern Railway.

Dr. Dalziel and Dr. Clark carried out, with great efficiency, the work of Municipal Sanitary Officer in Lagos; Dr. Clark, whose services were lent from the medical branch, acted in this capacity for a period of four and a half months while Dr. Dalziel was on leave.

5. *Sanitary Staff.*—The staff has consisted of eight Europeans and 73 Natives. Amongst the former there are four European Sanitary Inspectors; of the latter, 66 are Sanitary Inspectors, the remaining 7 being employed on clerical work mainly.

6. *Changes in the European Staff.*—Considerable changes in the personnel of the Sanitary Officers have taken place; the Senior Sanitary Officer and one Sanitary Officer were transferred to the Northern Provinces, the former on promotion, and one Sanitary Officer to Sierra Leone also on promotion. The first two vacancies resulting from the former transfers were filled by the appointment of two men from the Northern Provinces, and the third vacancy by the transfer of a Sanitary Officer from Sierra Leone.

7. *European Sanitary Inspectors.*—Early in January one of the four European Sanitary Inspectors proceeded to England on urgent private affairs; one left early in November as his agreement had expired; and one was away on leave for 5½ months during the latter part of the year.

One new European Sanitary Inspector was appointed, and he assumed duty on the 29th November, 1916. There is a prospect of bringing up the members to full strength in the ensuing year, which will be much to the interest of sanitary work to have more of it done under European supervision in some of the larger stations. One European Sanitary Inspector is always seconded to the Lagos Municipal Board to work under the Medical Officer of Health.

8. *Native Sanitary Inspectors.*—Of the 66 forming the staff of Native Sanitary Inspectors one resigned, one was dismissed, and in the case of five their appointments were terminated. These deficiencies were balanced by the appointment of 8 new Sanitary Inspectors.

9. *Sanitary Inspectors-in-Training.*—Of those in training two men were sent to Abeokuta to take up appointments there as Sanitary Inspectors. Seven men remained in training and completed the full course by the end of December when they were subjected to an examination, which consisted of three parts, (*a*) Written, (*b*) Oral, and (*c*) Practical. Six out of the seven passed the examination by attaining the number of marks required to qualify: 40% as a minimum in any one part and 50% on the total. They will now be sent out to stations where the final year of training will take the form of practical work under the supervision of Medical Officers, and it will be of interest to note the reports on the work and efficiency of each of this first and newly-qualified batch of men in the near future.

10. *Regrading of Sanitary Inspectors.*—The regrading of Native Sanitary Inspectors has now been carried out in accordance with the scheme drawn up by my predecessor. With a definite scale of salary and the prospects of promotion, members of the staff with any aptitude will doubtless work with greater energy and efficiency so as to shew themselves worthy of promotion. In course of time it will be possible to bring all the Sanitary Inspectors on the staff into their proper grades. Such grading of the Sanitary Inspectors with definite prospects will ultimately be productive of much efficiency of the service as a whole by making it attractive to a better class of candidate, which will enable us to raise the standard of training and of the qualifying examination, while promotions to the higher grades will be made with great care when a man has proved himself of the highest efficiency.

11. *Sanitary Ordinances, Orders and Regulations.*—The following Ordinances have been passed during the year under review:—

I.—The Quarantine Ordinance, 1916.

To provide for and regulate the imposition of quarantine.

II.—The Waterworks (Amendment) Ordinance, 1916.

To amend the Waterworks Ordinance.

III.—The Piers Ordinance, 1916.

To make provision with respect to piers.

IV.—The Medical Practitioners and Dentists Ordinance, 1916.

To make provision for the registration of Medical Practitioners and Dentists.

V.—The Native Authority Ordinance, 1916.

To prescribe the powers and duties of Native Authorities.

VI.—The Prisons Ordinance, 1916.

To provide for the establishment of Prisons and for regulating the government thereof.

ENACTMENTS REPEALED.

1. The Prisons Ordinance—Chapter XXIV of the Laws of the Colony of Southern Nigeria.

2. The Native Court Convicts Imprisonment Ordinance—Chapter XXVI of the Laws of the Colony of Southern Nigeria.

3. The Transfer of Prisoners Ordinance—Chapter XXVIII of the Laws of Southern Nigeria.

VII.—The Roads and Rivers Ordinance, 1916.

To provide for the repairing and cleaning of roads and the cleaning of rivers and other inland waters.

Repealing the Roads and Creeks Ordinance and Roads Proclamation (Chapter CXV of the Laws of Southern Nigeria.)

VIII.—The Lunacy Ordinance, 1916.

To provide for the custody and removal of Lunatics.

Repealing "The Lunatic Asylum Ordinance."
"The Lunatics Removal Ordinance."
"The Lunatics Removal Proclamation."

"The Lunatics (Removal to Sierra Leone) Ordinance." (Chapters CIII, CIV, and CV of the Laws of Southern Nigeria.)

IX.—The Leper Ordinance, 1916.

To establish Asylums and Settlements for the Isolation and Detention of Lepers.

Repealing the Leper Ordinance, 1908.

The following Orders in Council have been made:—

I.—Under the Burials Ordinance (Protectorate), No. 3 of 1916.

Declaration of the New Chiefs' Cemetery at Calabar to be a public burial ground for the Town of Calabar and to be reserved for and appropriated to the use of Chiefs only.

II.—Under the Destruction of Mosquitoes Ordinance (Southern Nigeria) 1910, No. 4 of 1916.

Application of the provisions of the Destruction of Mosquitoes Ordinance to that part of Bansara (in the Ogoja Province) as defined therein.

III—Under the Waterworks Ordinance, 1915, No. 9 of 1916.

Imposing a general water rate within the areas defined by a Notice, No. 51, in the Gazette of the 17th June, 1915, with certain exemptions, and revoking Order in Council No. 13 of 1915.

IV.—Under the Towns (Regulation) Ordinance (Southern Nigeria), No. 13 of 1916.

Application of the provisions of the Towns (Regulation) Ordinance to that part of Udi (in the Onitsha Province) as defined therein.

V.—Under the Destruction of Mosquitoes Ordinance (Southern Nigeria) 1910, No. 14 of 1916.

Application of the provisions of the Destruction of Mosquitoes Ordinance to that part of Udi (in the Onitsha Province) defined therein.

VI.—Under the Waterworks Ordinance, 1915, No. 15 of 1916.

Exempting certain tenements from the water rate imposed by Order No. 9 of 1915.

VII.—Under the Lunatic Asylum Ordinance, No. 18 of 1916.

Application of the provisions of section three of the Lunatic Asylum Ordinance to the cells used in the Lagos Prison for the incarceration of European Prisoners.

VIII.—Under the Dogs Ordinance, 1915, No. 22 of 1916.

Application of the provisions of the Dogs Ordinance, 1915, relative to licences and badges, to Lagos and Calabar.

IX.—Under the Infectious Diseases Ordinance, 1908, No. 24 of 1916.

Declaration of an "infected area" at Olokemeji.

X.—Under the Towns (Regulation) Ordinance, No. 28 of 1916.

Application of the provisions of the Towns (Regulation) Ordinance to the following places (in the Ogoja Province): Akunakuna, Okuni, Afunatum, Ediba, Apiapum and Adun.

XI.—Under the Towns (Regulation) Ordinance (Southern Nigeria). No. 30 of 1916.

Application of the provisions of the Towns (Regulation) Ordinance to those parts of the Ondo Province as defined therein.

The following Rule has been made:—

I.—Under the Births, Deaths and Burials Ordinance (Colony), No. 2 of 1916.

Amending Schedule Q of that Ordinance as amended by Ordinance No. XXIV of 1912.

The following Regulations have been made:—

I.—Under the Piers Ordinance, 1916, No. 9 of 1916.

Regulating the construction of and preventing the insanitary misuse of a pier.

12. *Preparations of Rules.*—Rules were drawn up under sections 43, 44 and 45 of the Draft Public Health Ordinance, 1917; they were then considered and amended by a Committee formed of the Director of Medical and Sanitary Services, the two Principal Medical Officers, the two Senior Sanitary Officers of Northern and Southern Provinces, and the Municipal Sanitary Officer, Lagos, after which they were submitted for approval.

The Municipal Sanitary Officer and Sanitary Officer helped very materially in the drafting of these rules, which occupied much time, and they were the outcome of considerable labour on the part of all concerned in their preparation. When passed, the new Public Health Ordinance with these rules will prove of great aid in dealing effectively with many and diverse insanitary conditions.

13. *Tours of Inspection.*—Tours of inspection were made to each of the three main Provinces and included visits to Abeokuta, Port Harcourt, Benin City, Agbor, Ubiaja, Ilaro, Ogwashi Oku, Imo River, Ifon, Brass, Bonny and Degema.

The rapid development of Port Harcourt, and adjacent places on the railway, necessitated special sanitary attention to these places. Visits were made both by the Senior Sanitary Officer and a Sanitary Officer. The visit by the Senior Sanitary Officer included an inspection and special report on a proposed water supply of Port Harcourt.

The routine procedure was adopted with regard to all sanitary suggestions on places inspected, matters requiring purely local action were referred to local officers concerned, while recommendations of greater import were embodied in reports for the consideration and approval of the Executive Authority.

14. *Sanitation of the Railway.*—The sanitary condition of stations on the line is maintained by means of regular sanitary labour and frequent inspections by Sanitary Inspectors as well as by Medical Officers who put forward their suggestions at monthly sanitary boards. Such suggestions made by these boards are then submitted for approval to the Chief Sanitary Board at Ebute Metta.

A special tour of inspection of each of the stations on the railway line from Ebute Metta to Okuku was carried out by a Sanitary Officer. This inspection practically covered the whole of the main line in the Western Province, and recommendations were made with regard to the sanitary requirements at each station. A steady and distinct improvement was found to have taken place in the sanitary condition of most of the stations.

15. *The Nigerian Eastern Railway.*—Much time and energy of Sanitary Officers was devoted to this section of the railway owing to its present phase of rapid development, a time when the sanitary interests require much watching and guidance. The direct control of sanitary work at Port Harcourt has now been taken over by the Sanitary Branch of the Medical Department and the staff of Sanitary Inspectors are now paid out of sanitary funds.

16. *Plans.*—Segregation plans of a number of stations were drawn up and submitted, three of which were finally approved, while many are still under consideration.

17. *Reservation Boards.*—The Reservation Boards formed under the Reservation Ordinance have continued to control the sanitary interests at the few stations where they have been constituted. The Medical Officer is a member of the Board and advises in all sanitary matters connected with the place.

18. *Estimates.*—The Estimates for the year for the expenditure directed by the Sanitary Office amounted to £17,072, a decrease of £748 on those for 1915.

(II).—Preventive Measures.

(1). —Mosquito and Insect-borne Diseases.

19. *Malaria.*—In Europeans the number of cases treated for malaria in 1916 shews an increase of 9·2% as compared with the figure for 1915, notwithstanding the reduction in the European population that has taken place owing to military requirements. This rise, due to malaria only, forms part of the general rise in the total number of cases amongst Europeans treated for all causes, which from figures already given amounts to 52% over the number treated for all causes in 1915.

In natives the number of cases treated for malaria shews a very marked rise of 60% in 1916 as compared to the figures for 1915. This may be attributed to an increased prevalence of malaria and partly to a larger number of natives seeking European medical treatment, for, from figures already given it is seen that the total number of natives treated for all causes shews a rise of 38% in 1916 over that for 1915.

Anti-mosquito work has been strenuously conducted at all stations under the direction of Medical Officers and where Sanitary Inspectors are posted, which is practically at each of the main stations. The work of house-to-house inspection has a decided effect of keeping down the

mosquito index. From the mosquito returns submitted from each station it is seen that at the majority of stations the mosquito larva index registers from 2·5 to less than 1 in many cases, which compares very favourably with the larva index of 2·1 recorded for Lagos, where the efficiency of sanitary supervision over anti-mosquito work is so fully maintained.

Lagos.—Much attention is given to anti-mosquito work in Lagos by the Municipal Health Officer and his staff who conduct close inspections of houses and compounds daily, a special eye being kept on wells, pools, drains, water-pots, trees that hold water, gutters, tanks, barrels, canoes, steamships and above all to crab holes which are numerous and a constant source of mosquito breeding. As a result there is a reduction of the larva index for 1916 to 2·1 as compared to 3·1 in 1915. Closed rooms with water receptacles within still constitute a source of mosquito-breeding, but the Medical Officer of Health notes a considerable improvement in this respect by stating "Larvæ were found in 1,927 receptacles in 1,793 rooms, forming 13·2% of "the total finds on premises in general. This shews a considerable "improvement in this respect as compared with 1915, when the "corresponding numbers were 3,244 receptacles in 3,018 rooms."

The removal of all roof gutters will contribute much towards the reduction of mosquitos, and it is hoped that 1917 will see the gutters originally provided for roofs of official houses all taken down.

With the existence of a public water supply the use of gutters for the collection of rain water is no longer necessary and every endeavour will be made to induce non-officials, both European and native, to remove all gutters from their houses, whereby they will add to their own comfort and diminish the risks of infection for themselves and other people.

20. *Wells as a source of Mosquito-breeding.*—As many wells form a fruitful source of mosquito-breeding and the generous pipe-borne water supply is now installed throughout the town of Lagos, affording a constant and far purer water-supply as compared to that from wells, it would be decidedly advantageous in the interests of Public Health if the public could be induced to realise the good that would accrue by the closing down of all unnecessary wells whereby mosquito-breeding and consequently the risk of malarial and other mosquito-borne infection would be diminished, as well as the dangers of infection by dysenteric and other intestinal diseases so liable to be conveyed from shallow wells in which the water is so often polluted.

The danger of mosquito-breeding in wells can only be understood when it is realised that the total number of wells in Lagos and Ebute Metta is 2,894, and that new wells are dug every year while others fall into disuse, hence the Medical Officer of Health very rightly remarks, "the increasing use of public water supply naturally tends to disuse "of wells and at the same time the check on mosquito-breeding in "household pots is calculated to drive the insects to wells." As regards this question of closing of unnecessary wells it is worthy of note that the Municipal Board has under the advice of the Medical Officer of Health given an excellent lead in closing, by filling in, all Municipal public wells, with the exception of four, which are in areas outside the present range of the public water service.

21. *Crab-holes.*—These form a prolific source of mosquito-breeding and require constant attention. The only satisfactory method of dealing with crab-holes has been found to be the radical one, entailing much labour, of digging out the crab. In Lagos 150,600 crab-holes were dealt with and 8·8% as compared to 11·5% in 1915 were found to contain adult mosquitos or larvæ or both.

22. *Borrow-pits in Towns.*—This is a universal difficulty that has had to be contended with everywhere in the past and with unsatisfactory results. By the regulations drawn up under the new Public Health Ordinance, at present in its draft stage, considerable facility will be established for preventing insanitary conditions arising from the digging of borrow-pits and excavations, for building and other purposes regardless of satisfactory drainage being provided for so as to avoid accumulations of water.

23. *Quinine Prophylaxis.*—The following comparative table shews the quantities of quinine issued for prophylactic purposes during the last seven years:—

	1910 Grains.	1911 Grains.	1912 Grains.	1913 Grains.	1914 Grains.	1915 Grains.	1916 Grains.
Western Province	1,206,000	1,530,100	1,344,000	915,001	593,423	770,333	844,786
Central ,, ...	140,532	299,963	355,448	407,484	597,574	53,281	326,066
Eastern ,, ...	400,671	586,384	301,286	625,845	990,733	651,749	426,452
Total ...	1,747,203	2,416,447	2,000,734	1,948,330	2,165,732	1,475,363	1,597,304

The total amount issued in 1916 shews an increase over that of 1915, notwithstanding the economy that it has been necessary to exercise owing to the war, in the use of this drug.

24. *Blackwater Fever.*—In Europeans 19 cases were treated with 4 deaths, and the following figures shew the incidence of blackwater fever with its mortality rate during the last ten years:—

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Number of cases ...	57	48	31	34	26	23	26	20	11	19
Mortality rate ...	17·5%	16·6%	32·2%	20·6%	30·7%	17·4%	23·0%	25·0%	18·2%	15·8%

The number of cases shew a rise as compared to that of 1915, notwithstanding the depletion in the European population, yet it is satisfactory to note the fall in mortality rate.

In natives 8 cases are reported to have been treated, with 1 death, a mortality rate of 12·5%, as compared to 7 treated in 1915 with 2 deaths, a mortality rate of 28·5%. These observations of cases in natives are, however, very limited.

25. *Trypanosomiasis.*—There has been no case of trypanosomiasis in any European. Three cases of this disease have been treated in natives.

26. *Yellow Fever.*—In 1916 cases of yellow fever were reported on three occasions from the Gold Coast, once from Lome, once from Bathurst and once from Sierra Leone, but in no instance did the disease assume the form of an epidemic at any of these places. On each occasion all in-coming ships were inspected with a view to preventing any chance of introduction of the disease.

It is very satisfactory to be able to state that no case of yellow fever is reported to have occurred outside of Lagos in the Southern Provinces. In Lagos: One case in an European occurred and terminated fatally on a coasting vessel in the middle of October.

The patient arrived ill on board and as the vessel had visited a number of ports near the mouth of the Niger it is not possible to say where infection took place. All necessary preventive measures were carried out, with fumigation of the ship, and no spread of infection took place locally.

All anti-mosquito work described in paragraph 19 is directed mainly against domestic mosquitos, which include the stegomyia, and it is one of the most useful means of lessening the danger of spread of yellow fever in the event of the occurrence of any sporadic or imported cases of this disease.

27. *Filariasis.*—Seven cases were treated in Europeans and 79 cases in natives, making a total of 86 cases in all. Besides these, 54 cases in natives were treated for elephantiasis, which is to a very great extent due to a filarial infection in the tropics.

28. *Pappataci Fever.*—Amongst Europeans three cases of pappataci fever have been treated. Subsequent observations in future will doubtless reveal more.

(2) *Epidemic Diseases.*

29. *Plague.*—Cases of plague were reported to have occurred at Liverpool, Orange River Colony and Cape Province, but no introduction of the infection has taken place into this Colony.

30. As a preventive measure against the introduction of plague the destruction of vermin is carried out systematically. This is especially the case in Lagos where rats and mice are trapped, destroyed and cremated regularly, and the following table shews the extent to which this is achieved:—

	1912.	1913.	1914.	1915.	1916.
Rats	18,528	16,488	13,352	13,305	15,197
Mice	8,346	8,279	6,817	8,087	9,102
Total	26,874	24,767	20,169	21,392	24,299

Phosphorous paste and Danysz virus have both been used for rat destruction; the latter with variable results.

31. *Small-pox.*—A total of 85 cases of small-pox, all in natives, is recorded for the year. Of the 85 cases 64 occurred in the Western Districts, and the towns of Olopade and Ologebe, near Olokemeji, and Abeokuta formed the main centres of prevalence of the disease.

Cases are recorded at Onitsha, Sapele and Warri.

In Lagos only 4 cases were isolated and treated, and of these 2 cases were imported ones from Ibadan, from where they had brought the infection.

The introduction of infection into Lagos was promptly combated by the extensive and systematic vaccination which is carried out here, so that the disease failed to gain a footing and no spread took place.

At Sierra Leone an outbreak of small-pox took place, and it was declared an infected port with quarantine in force from 25th March to 10th June, 1916.

32. *Vaccination.*—The following tabulated figures show the results of vaccination in recent years:—

	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Total number vaccinated	135,647	166,394	243,316	168,491	149,273	101,467	136,279
Successful	88,579	113,657	176,944	121,102	99,260	71,716	87,963
Percentage of successes	65·3%	68·3%	72·7%	71·8%	66·5%	70·6%	64·5%

33. *Cholera.*—Quite unknown here so far and fortunately so.

34. *Cerebro-spinal Fever.*—No cases have come under treatment n 1916.

35. *Enteric.*—No cases have occurred of this disease.

36. *Diphtheria.*—Fortunately no cases of diphtheria have been observed in 1916.

37. *Chicken-pox.*—Chicken-pox was very prevalent in some places, the total admissions amounting to 1,488. Lagos Prison formed one of the main centres of the disease, which prevailed in this institution from January to July; a fair number of cases occurred in the town also. The prisons at Ikot-Ekpene and Port Harcourt formed the two other main centres where 925 cases were treated.

38. *Tuberculosis.*—During the last four years the number of cases recorded amongst natives is shewn from the following figures:—

1913.	*1914.*	*1915.*	*1916.*
159	109	168	181

The cases in 1916 shew an increase on those of 1915 and verify the view put forward in the previous annual report that tuberculosis is on the increase.

In Lagos itself 54 certified deaths from tuberculosis are recorded in 1916.

39. *Beri-beri.*—There is a big decline in the number of cases of beri-beri, viz., 10 treated in 1916 as compared to 43 treated in 1915.

40. *Tetanus.*—The following figures shew the number of cases treated in each of the last 10 years with the attendant mortality rates:—

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Cases	29	26	27	29	25	29	24	46	33	34
Deaths	10	11	15	?	16	15	12	23	12	17
Mortality	34·5%	42·3%	55·5%	?	64%	51%	50%	50%	36%	50%

The statistics for this disease form an average of those for previous years, as regards mortality rate.

41. *Rabies.*—No cases of rabies have fortunately occurred in the Southern Provinces.

42. *Venereal Disease.*—So far as the cases which come under treatment are viewed the following statistics shew that both gonorrhœa and syphilis are on the increase:—

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Gonorrhœa	1,174	1,524	1,637	1,977	1,785	1,991	1,913	1,605	1,669	2,482
Syphilis	224	214	176	171	269	303	202	215	266	400

43. *Leprosy.*—Seventy cases of leprosy were treated. When facilities exist with the careful application of the new Leper Ordinance, 1916, more will be accomplished in the course of time in the way of systematic segregation of lepers to combat spread of the disease.

44. *Dysentery.*—Amongst Europeans 29 cases are recorded with no deaths.

In natives the number of dysentery cases treated in 1916 is 1,106, as compared to 1,212 in 1915. This shews a slight reduction, but the mortality was 20%, which is considerably higher than that of 11·2% recorded in 1915.

Of the total number of cases treated for dysentery the records of the Central Districts are highest and a fair number are recorded in the Eastern Districts of the Southern Provinces.

(3) *Helminthic Diseases.*

45. *Helminthic Infection.*—Very few cases of helminthic infection amongst Europeans have occurred during the year, and amongst these it is gratifying to note that there were only 3 cases of tapeworm and 2 of ankylostome infection.

Helminthic infections occur largely in the native population, and these worm infections, so far as cestodes and nematodes are concerned, comprise the following cases treated:—

Cestodes... ...	211	= 5·9%
Nematodes ...	3,362	= 94·1%
Total ...	3,573	

The following are the percentage figures of the above as regards individual worm infections:—

Tapeworms	5·9%
Ascaris	74·5%
Ankylostomes	19·2%
Others	·4%

46. *Ankylostomiasis.*—This infection is very widely distributed throughout and predisposes considerably to dysenteric conditions. Quite $\frac{2}{3}$ of the cases recorded were those treated in the Central Province.

47. *Ascaris.*—Infection with these round worms is general throughout the Southern Provinces and accounts for 74·5% of the cases treated for worms.

48. *Taeniasis.*—From the statistics of cases treated the majority of those that came under treatment were recorded in the Eastern Districts.

49. *Bilharzia.*—Very few cases of Bilhazial infection have come under observation. No cases are recorded in the Eastern Districts.

50. *Trichiniasis.*—No cases of trichina spiralis have been recorded so far in this country.

51. *Guinea-worm.*—The total number of cases treated was 568. From the records of cases treated, the distribution of guinea-worm infection is mainly in the Western Districts and to some extent in the Central Districts.

52. *Trematode Infection.*—Only 2 cases are recorded as having come under observation and treatment, as compared to 20 cases recorded for 1915.

	Beri-beri.	Cerebro-spinal fever.	Chicken-pox.	Diphtheria.	Dysentery.	Enteric fever.	Erysipelas.	Gonorrhœa.	Influenza.	Leprosy.	Malaria.	Blackwater fever.	Measles.	Rubella.	Pappataci fever.	Pneumonia.	Rabies.	Relapsing fever.	Rheumatic fever.	Septicæmia.	Trypanosomiasis.	Small pox.	Syphilis Primary.	Syphilis Secondary	Syphilis Inherited.	Tetanus.	Tuberculosis.	Whooping Cough.	Yaws.	Yellow fever	Others.
1916 ...	10	...	1,488	...	1,106	...	1	2,482	15	80	8,741	27	75	...	3	768	...	...	21	24	3	85	208	166	27	34	186	144	263	1	22
1915 ...	43	1	1,110	3	1,236	1	1	1,669	5	81	5,540	16	33	...	...	225	1	...	18	25	73	30	132	115	19	33	171	37	200	15	13
1914 ...	227	...	510	1	1,326	4	...	1,616	7	218	5,169	22	42	1	...	339	...	2	151	9	177	22	37	145	38	26	116	55	194	8	11
1913 ...	16	...	1,065	...	1,063	1	2	1,913	41	137	6,995	28	73	...	...	321	..	...	156	34	378	17	46	142	28	46	163	28	297	41	...
1912 ...	36	...	1,228	...	1,037	2	4	1,945	29	124	8,194	23	7	...	...	263	...	...	93	44	154	52	92	151	59	44	155	27	163	...	...
1911 ...	56	...	1,155	...	840	...	...	1,645	1	41	6,943	23	11	...	...	239	...	...	...	...	5	59	70	157	2?	32	167	99	104	...	...

YEAR.	ANIMALS.			CESTODA.			NEMATODES.										
	Protozoa.	Trematoda (Flukes.)	Others.	Taenia Solium.	Taenia Siginata.	Others.	Ascaris.	Trichocephalus Dispar.	Dracunculus.	Filariasis.	Strongylus.	Ankylostomiasis.	Oxyuris.	Schistosoma.	Others.	Mylasis.	Others.
1916	...	2	...	189	23	2	2,667	3	568	86	...	688	8	...	2	16	14
1915	...	20	12	215	25	1	1,639	6	718	91	...	570	3	...	4	41	20
1914	1	3	11	69	58	...	1,910	15	645	32	...	335	2	3	1	25	31
1913	...	1	...	1	6	...	1,973	3	640	63	2	212	1	...	...	17	57
1912	...	3	...	1	17	...	2,673	6	625	95	2	405	36	...	...	10	17
1911	...	...	...	1	3	...	3,349	...	484	18	...	404	1	20	...	...	63

III.—General Measures.

53. *Sewage Disposal.*—The usual methods of sewage disposal have been continued. This varies according as to whether or not a place is situated near rivers, creeks, sea or is inland. In case of the three former disposal is into water, whereas in the last mentioned disposal is effected in shallow trenches.

54. *Latrines.*—Water latrines are convenient and easy to work where facilities exist for them. In the larger towns public latrines with pail system are well maintained. It is hoped that it will be possible to extend the pail latrine system in the near future to some of the new towns that are growing up along the eastern railway.

55. *Disposal of Refuse.*—The disposal of refuse by burial, by burning or by throwing into creeks and rivers have been continued. At many places refuse has to be dried before it is fit for combustion in destructors.

56. *Water-supply*—At most stations the water supply is taken from springs, streams, wells and tanks. Lagos, Abeokuta, Benin and Calabar are places that enjoy the benefits of a pipe-borne water supply.

Lagos is particularly fortunate in being provided with a filtered pipe-borne water supply which was opened on 1st July, 1915. The advantages of such a water supply, from the public health point of view, are very great as compared to that taken from shallow wells, which are so liable to pollution, and more so in a large congested town like Lagos.

Adequate protection of sources of water supply taken from springs is necessary at some stations.

57. *Drainage.*—Surface drains are adopted and maintained at all stations. These require considerable labour to keep clear of undergrowth and maintain in efficiency with the constant wear and tear of storm water.

58. *Clearance of Bush and Undergrowth.*—This is continued at all stations and is one of the main sanitary undertakings that have to be carried out as a routine procedure. Paid sanitary labour for this purpose has always been provided and as it formed a heavy item of expenditure a scheme has been drawn up with a view to substituting part of the paid labour by prison labour with a view to effecting a definite saving in 1917 since economy has to be exercised wherever possible.

59. *Markets.*—The question of improving markets or moving some existing ones to more suitable sites will receive attention in the future. At Onitsha the new market on the river bank has been opened, and a very necessary adjunct in the form of a latrine will shortly be provided.

60. *Slaughter-houses.*—Proper slaughter-houses are as necessary as good markets. The slaughtering of animals in accordance with proposed rules under the new Public Health Ordinance, at present under consideration, and the provision of proper slaughter-houses together with the systematic inspection of the carcase after slaughter will prove of considerable benefit in the interests of public health.

61. *Infectious Diseases Hospital.*—At outstations separate native hospitals are erected and maintained to provide for the isolation of infectious cases. The one that serves Lagos is well situated and affords

ample accommodation for ordinary requirements. During 1916 a total of 149 cases of chicken-pox were admitted and a few cases of measles and small-pox.

62. *Sanitary Stations.*—Three such stations, one each at Lagos, Forcados and Bonny, are regularly maintained but no necessity has arisen to make use of them.

Clayton Machines for fumigation are available at Lagos, Forcados and Calabar.

63. *Prisons.*—There has been a considerable rise in prison population during 1916, but as prison accommodation is insufficient and does not meet sanitary requirements, the result has been a high degree of overcrowding in many of the prisons. The provision of increased cell accommodation is very necessary so as to reduce this existing overcrowding. Owing to the rise in the number of prisoners and the difficulty in procuring blankets considerable shortage in these has been experienced and it is likely to be so until the war is over. In some of the prisons in the Eastern Districts dysentery was fairly prevalent and the records of admission for this disease are high for Enugu, Afikpo, Okigwi and Port Harcourt.

64. *Lagos.*—Here routine sanitary work has steadily been carried on and no sanitary improvements involving heavy expenditure have been possible at the present time.

As regards reclamation it has only been possible to continue this work at Apapa where 33½ acres have been reclaimed.

To a small extent new drains were constructed and a large number of surface drains were dug and graded to improve drainage of certain areas. More than half the public water fountains are now connected up to drains in proximity to prevent waste water lodging around the fountains. A limited area in Lagos is provided with efficient subsoil drainage, and much good would result from the extension of this system. The question of the extension of any drainage scheme, surface or subsoil, is one involving considerable expenditure and therefore prohibitive at the present juncture for any extensive adoption, though further limited areas might well be dealt with to great advantage, as soon as funds are available.

In the Sanitary Report for 1915 my predecessor drew attention to the changes that were being made at the Customs wharf in that they would affect the Municipal drainage scheme in that neighbourhood very considerably, and unless ample precautions be taken will lead to considerable nuisance arising.

The construction of this wharf extension is steadily progressing but as the sanitary authorities have not been approached with regard to the extension scheme in so far as the extent to which the Municipal drainage scheme in its vicinity will be affected, it is not possible to form any view as to what changes will have to be made in the existing drainage and whether it is likely to be interfered with so that nuisance should accrue.

The filtered pipe-borne water supply is of distinct advantage from the public health point of view. The closing of unnecessary old wells and the prevention of new wells in the vicinity of stand-pipes together with removal of roof gutters will, as already pointed out, be in the interests of public health; the Municipal Board having seen this point have taken efficient action with regard to public wells under their control, with the exception of four that are out of range of the public water supply.

The kiln destructors for refuse have been found most useful and the ashes with incombustible material have been freely utilised for filling up hollow places that require drainage.

The need for an improved slaughter-house with more accommodation is growing yearly, for an average of 33 cattle per day have been slaughtered, and with facilities for transport of carcases to the public markets much encouragement will be given to butchers to slaughter at the public slaughter-house.

Inspection of cattle before slaughter has been carried out and ·46% have been disqualified as unfit for slaughter.

Rigorous examination of all meat exposed for sale has been conducted with very good results so that meat, affected by pleuro-pneumonia, tuberculosis and various cystic and parasitic diseases, has been seized and sale of it prevented.

The rules under the new Public Health Ordinance will provide for inspection of the carcase as a whole after slaughter which will practically prevent diseased meat reaching the markets for sale.

65. *Port Harcourt.*—The importance of Port Harcourt has steadily increased and the place has grown very considerably. As a result, sanitary supervision has had to be closely watched so that sanitary matters may advance as far as possible with the development of the place.

The staff of Sanitary Inspectors now forms part of the staff of Government Inspectors directly under the supervision and control of the Medical Officer, and if in 1917 a European Sanitary Inspector is available, the needs of Port Harcourt in this respect will be met and he will be posted there.

The proposed source for a pipe-borne water supply for Port Harcourt from the Shuini River was investigated by my predecessor and found unsuitable, so that it was abandoned, and other sources are now being sought.

Lectures.

66. *In Lagos.*—The tuition of Sanitary Inspectors-in-training has been carried out by the two officers who have during 1916 filled the position of Municipal Sanitary Officer.

The tuition has taken the form of systematic lectures in subjects pertaining to sanitation as well as demonstrations in the work of meat inspection. Their practical training for acquiring a knowledge of the general duties of sanitary inspection of the town is carried out under the supervision and teaching of the Municipal Sanitary Officer.

At outstations the usual sanitary addresses to the Chiefs were given by Sanitary Officers when on tour, with a view to increasing their knowledge and interest in sanitary matters.

67. *School Teaching.*—The following report on the teaching of Hygiene in schools of the Colony and Southern Provinces has been very kindly furnished by the Director of Education :—

"Hygiene continues to be one of the subjects of the regular school "course, and in view of the fact that some young teachers in the "schools in the different provinces have gone through a regular "course of training, the teaching of hygiene as well as other sub-"jects has shewn marked improvement in not a few of the schools.

"The subject has thus received more care and attention than "formerly and has been taught more intelligently. The lessons "given have undoubtedly had the effect of making many children "give increased attention to personal cleanliness and the cleanly "treatment of their bodily ailments. Very few school children do "not now know the value of quinine as a fever medicine and the "necessity of getting rid of mosquitos."

IV.—Recommendations.

68. At the present time, in view of the scarcity of funds, it is extremely difficult to put forward recommendations as every new project means expenditure, and hence all such have to be held up for some future time.

It is, however, desirable that the following matters are kept in view during the coming year and improvement effected wherever possible.

1. The provision of latrines, dust-bins and refuse destructors at all stations.

2. The protection of springs where they form sources of water supply to smaller places.

3. Increasing the cell accommodation in prisons to meet the requirements and lessen the overcrowding that exists.

I attach the following tables :—

1. Table I (Table IV of the Model Report).
2. Table of Statistics in reference to Prisons.
3. Table of cases of Infectious Diseases.
4. Table of cases of Helminthic Infection.
5. Table shewing returns of Anti-mosquito Work.

H. ANDREW FOY,
Senior Sanitary Officer.

14th September, 1917.

IV.—METEOROLOGY.

The mean temperature at Lagos in 1916 was 80°·5 slightly lower than any previous year during which records have been kept. From June to October the mean monthly maximum was no more than 84·0 and the absolute maximum did not exceed 89°.

March as usual produced the highest shade temperature, a maximum of 92·2 being recorded ; the solar radiation thermometer, however, showed the highest temperature of the year to be 158°·5 on the 26th October.

The harmattan was unusually severe in January the grass thermometer reading as low as 61° and on several occasions the humidity dropped to 36%. Further north, at Olokemeji, a minimum of 47° was registered, which is the lowest ever recorded in the Southern Provinces. At the end of the year, however, when the harmattan again appeared, it was much milder and this appears to have been the case over the country generally.

The rainfall at Lagos was nearly 12 inches below the average for the last 20 years, and 30 inches below that of 1915. Only at Forcados did the precipitation along the coast approach the normal, while the up country stations registered very much higher falls than usual.

Particularly was this the case at Abeokuta, where the rainfall was as much as 14 inches higher than Lagos, although generally it does not amount to much more than half the rainfall at the latter place.

Olokemeji and Oyo both showed very large increases, the precipitation producing a run off in the Ogun basin, which carried away the approaches to the Lafenwa bridge near Abeokuta, where the river rose to 30·5 feet above low-water level.

Though the rainfall of Lagos was small by comparison with the average, the electrical conditions which accompanied the rains, especially those of September, were of unusual intensity. Several instances of damage by lightning occurred, one discharge reaching the ground by way of the east tower of the Government offices, but the, results were not serious.

V.—HOSPITALS AND DISPENSARIES.

Station.	Nature of building.	Extent of Mosquito-proofing.	No. of Beds.		In-patients.	Out-patients.	Subsequent Attendances at Dispensary.	Operations performed.
			Male.	Female.				
Lagos—European	Brick and Wood	Completely	12	1	164	332	...	259
„ Native	Wood and Iron	Partially	53	14	1,364	4,168	13,031	
„ Massey Street Dispensary	Brick	None	...	...	...	13,543	43,108	...
„ Ereko Dispensary	„	„	...	...	...	3,498	7,809	101
„ Ebute Metta Dispensary :—								
European	„	„	...	...	...	288	388	...
Native	„	„	...	...	...	4,246	17,886	...
„ Prison Hospital and Dispensary :—								
European	„	„	...	...	...	4	16	...
Native	„	„	...	...	253	993	3,883	...
I.D.H.—European	„	Completely	6	4	...	...	...	...
„ Native	„	„	25	13	163	121	890	...
Yaba Lunatic Asylum	„	None	24	24	53	...	...	...
„ Leper Asylum	Mud and thatch	„	21	12	25	...	...	...
Ibadan—European	Wood on Iron pillars ...	Completely	5	...	25	91	587	13
„ Native...	Brick	„	16	4	292	2,010	19,880	
Abeokuta—European	None	...	...	...	...	131	250	43
„ Native	Mud with iron roof ...	None	8	8	183	2,561	16,219	
Badagry—European	None	...	...	...	...	5	...	...
„ Native	Brick	Completely	6	...	9	1,345	8,059	...
Warri—European	Concrete	„	6	...	36	250	444	5
„ Native	Brick	Partially	20	4	291	2,410	11,327	
„ I. D. Hospital	Brick and Mud	„	20	...	...	...	...	...
Sapele—European	Brick	Completely	2	2	13	138	138	7
„ Native	„	Partially	16	2	166	2,423	2,376	
„ J. D. Hospital	„	„	8	...	...	...	...	...
Onitsha—European	Brick and Wood	Completely	3	1	29	89	1,095	190
„ Native	Cement and Wood	Partially	19	5	714	6,715	30,830	
Forcados—European	Concrete	Completely	4	...	19	154	120	5
„ Native	Brick	Partially	8	4	222	2,618	7,481	
Agbor—European	None	...	...	...	...	11	...	...
„ Native	Brick	None	6	...	194	2,186	13,623	5
Benin City—European	None	...	...	...	...	11	13	21
„ Native	Brick	Partially	8	...	153	1,280	8,752	
Enugu—European	None	...	...	...	...	49	...	...
„ Native...	Bush house	None	...	...	925	1,555	12,114	...

Okwoga—European	None	...	...	...	...	...	...	...	...	...	...
„ Native	Bush house	None	...	...	...	...	...	211	1,135	8,323	...
Calabar—European	Wood	Completely	...	6	2	123	320	...	}	333	
„ Native	Brick	„	...	46	11	1,069	11,214	48,662	}		
„ I.D. Hospital	Concrete	None	...	50	16	169	...	...		...	
Bonny—European	None	...	...	...	...	...	28	...		...	
„ Native	Brick	Partially	...	10	3	119	1,656	1,803		7	
„ I.D. Hospital	„	None	...	8	4	...	...	...		...	
Brass—European	None	...	...	...	...	...	54	...		...	
„ Native	Brick	None	...	8	...	42	873	8,935		5	
Degema—European	None	...	...	...	...	...	59	...		...	
„ Native	Brick	None	...	27	5	137	954	6,137		41	
Ikot-Ekpene—European	None	...	...	...	...	...	18	...		...	
„ Native	Brick	None	...	16	3	591	1,466	4,594		63	
Opobo—European	„	Completely	...	4	...	6	121	...		...	
„ Native	Corrugated Iron	None	...	6	2	54	2,083	9,508		140	
Owerri—European	None	...	...	...	...	...	39	...		...	
„ Native	Bush house	None	...	...	...	127	2,566	7,682		21	
Port Harcourt—European	Wood and Iron	Completely	...	2	...	7	396	...	}	19	
„ Native	„ „	Partially	...	32	...	1,067	4,751	16,736	}		
Afikpo—European	None	...	...	...	...	...	10	...		...	
„ Native	Bush house	None	...	...	...	145	718	4,106		34	
Ikom—European	None	...	...	...	...	...	12	...		...	
„ Native	Bush house	None	...	...	...	61	1,016	4,164		26	
Obubra—European	None	...	...	...	...	...	8	...		...	
„ Native	Brick	None	...	4	2	55	668	6,768		26	
Obudu—European	None	...	...	...	...	...	10	...		...	
„ Native	Brick	...	...	...	...	149	1,241	10,174		...	
Okigwi—European	None	...	...	...	...	...	3	...		...	
„ Native	Bush house	None	...	...	...	194	1,536	8,490		1	
Ogoja—European	None	...	...	...	...	...	10	...		...	
„ Native	Bush house	None	...	...	...	42	1,003	5,954		...	
Abakaliki—European	None	...	...	...	...	...	20	...		...	
„ Native	Bush house	None	...	...	...	121	770	4,668		10	
Victoria—European	Brick	„	...	...	...	6	8	...		...	
„ Native (16)	Brick and galvanised iron	One completely	...	401	...	3,872	18,861	No record		16	
„ I.D. Hospital	Galvanised iron	None	...	...	99	...	...	...		...	
Buea—European	None	...	...	...	...	...	13	...		...	
„ Native	Galvanised Iron	None	...	...	10	...	77	377	3,001		1
Ossidinge—European	None	...	...	...	...	...	5	...		...	
„ Native	Galvanised Iron	None	...	...	4	...	27	427	No record		4
Bamenda—European	None	...	...	...	...	...	12	...		...	
„ Native	Brick	None	...	...	20	4	154	890	No record		5

VI.—SCIENTIFIC.

Scientific work has necessarily suffered owing to reduction of staff, and beyond that carried on at the Medical Research Institute and Chemical Laboratory, the reports of which are included in the Appendix, but little has been done.

At the Yaba Asylums some interesting experimental work was carried out by Drs. Connal and Coghill on the treatment of lepers by the intra-muscular injection of chaulmoogra oil mixture. The results appear in the report of the Director of Medical Research Institute.

The following are reports by various Medical Officers of interesting cases met with in the course of their work :—

By Dr. G. B. Norman, Senior Medical Officer at Ibadan—

Case 1. A native with unilateral Gangrene of the toes admitted in August last with a history of having the condition for some months, which began he says like a "Rheumatic pain". Heart normal; urine normal. A well-marked line of granulations forming over the tarsal bones, very offensive discharge present. An operation was performed, tarsal bones were necrosed and removed, the internal cuneiform was slightly necrosed and was scraped. Patient was discharged in September. I could find no cause for the condition.

Case 2. West Indian Railway Official came into hospital with a history of having fever, he had previously to admission taken 30 grains quinine and next day had an attack of hæmoglobinuria, which cleared up immediately with no other symptoms. This was evidently caused by the dose of quinine.

Case 3. West Indian Station Master at Ibadan admitted into hospital in November with a history of bad gastritis for some years. Had been losing weight. Much pain over the epigastric region and tenderness over abdomen. Had a profuse hæmorrhage followed in a few days by a smaller hæmorrhage from which he never recovered. *Post mortem* examination revealed fibrous growth over the whole pyloric region which was sent to Yaba and pronounced a Scirrhus Cancer.

Case 4. Boy, native of Ibadan, brought in dead, history of being crushed against a wall by a runaway horse causing immediate death.

Post Mortem no external injuries, but a large rent in the liver practically dividing that organ in half.

By Dr. O. Sapara, Medical Officer at Massey Street Dispensary, Lagos—

I.

The large percentage of anæmia cases shown in the returns is due to debility consequent on malarial infection.

The cases of cystitis of non-gonorrhoeal origin were mostly treated with a decoction of a native plant "Egbesi" said to be a *Sarcocephalus*

esculentis of the order of *Rubiaceoe* in combination with "Irun 'Gbado" (Corn-silk) with marked success.

II.

(*a*) The wholesome effect of quinine on malarial fever is being recognised by all classes of the community and nursing mothers now bring their children to the Dispensary to be treated when in fever in preference to taking them to "Bush Doctors" for a course of "Agbo" treatment.

No case is recorded in the Dispensary of blackwater fever; I, however, saw four cases among natives in consultation with other practitioners during the year and in all these cases I invariably advised the decoction of the native plant "Rere" (*Cassia occidentalis*) which I have found of very great value in these cases and also in malarial cases, especially when combined in the latter case with "Oruwo," for subjects who cannot stand quinine or women in pregnancy.

(*b*) Whooping cough was prevalent among children between February and April as is customary in this country, but the attacks were milder in comparison with those of previous years.

Gonorrhoeal infection calls for attention as owing to a wrong notion in vogue among certain class of the community it lends itself to spreading.

No variola cases occurred during the year, but the cases of varicella that were treated at their homes by me were treated with the ointment I suggested and found useful in even cases of variola; this is composed of crude paraffin, "Ori" (*Butyrospernum parkii*) c Tr. Lavand Co.; this ointment I may mention is being used at my suggestion by Dr. Oluwole on variola cases with marked success in the district where the disease is now raging.

There can be no doubt that tuberculosis is spreading among the native community to a degree which cannot but be considered alarming; the main factors which conduce to spread the disease are at present over-crowding, insanitary dwellings, ignorance of the nature of the disease; and unless some steps be actively taken to ameliorate these conditions matters are bound to grow from bad to worse year by year.

By Dr. W. S. Clark, Medical Officer at Enugu Ngwo—

Report on two cases of pappataci fever which occurred at Enugu Ngwo.

Phlebotomus is present; species unknown. They do not appear to be very numerous.

As few cases of pappataci fever have so far been described from West Africa, a short description of the following two cases may be of interest and especially so on account of certain symptoms which might have given rise to a suspicion of yellow fever in a mild form although otherwise there was little resemblance.

Case (1). Patient felt in his usual health on the morning of 28th November, 1916. In the afternoon severe headache began and was worst through the temples and behind the eyes. The pain spread down both jaws and was especially felt in the left temporo-maxillary joint, later the pains spread down the neck and right shoulder. The temperature was 102·5°F., pulse 87 per minute, tongue clean or with very slight whitish coating. Phenacetin and caffein gave no relief and patient had a very restless night. 29th, very restless night, the pains had extended all over the body and were worst in the head, neck, right shoulder and elbow and the back.

The pains appeared to be neuralgic in character and disappeared for short times from certain situations. The temperature was 102°F, pulse 90, tongue slightly coated, tip clean and very red, throat also very red, and the eyes were noticed to be injected. No appetite. Aspirin grains xv t.i.d. were given and was followed by rapid relief of the pains for several hours after each dose.

30th.—Patient again had a very restless night and slept very little on account of severe pain in the back and legs and also in the epigastric region. Many of the muscles were slightly tender to touch and there was also enlargement of the posterior cervical glands on the right side and also those of the axillæ. The temperature was 101°F, pulse 80, tongue coated, tip clean, throat red and eyes still injected but less so than on the previous day. 1/12/16. Patient had a much better night, pains much easier and slept fairly well; temperature was normal, pulse 70. About midday the temperature rose again to 100°F, with epigastric pain and feeling of sickness and the pains returned—headache, backache and pains in the limbs. There was retching but only clear fluid was brought up. 2/12/16.—Patient had a very restless night and the epigastric pain was most complained of; the temperature was again normal and remained so; the tongue was much coated. Recovery was now steady but there were slight recurrences of pain and attacks of sickness with retching especially on exertion.

Blood examination.—No parasites were found. No leucocyte count was made.

Urine.—There was no albuminuria.

Case (2). Patient felt irritable but otherwise well on the morning of 1/12/16. About midday he began to feel feverish and had severe pain in his head and neck. The pain was first felt at the top of the head and a little later settled down into the temples and jaws and along the gums and teeth like neuralgia. As the day advanced he felt cold and had shivers and the pains extended all over his body. He took 10 grains of quinine. 2/12/16.—Had little or no sleep, pains quite so severe especially in the head, neck and jaws; there was no appetite and patient felt sick. On 3/12/16 he felt worse, he had had no sleep and the doctor was sent for. Temperature was 103°F, pulse 95; skin dry, tongue with whitish coat, tip clean and throat red. His gums were red, swollen, soft and oozing blood, his eyes markedly injected and pupils contracted. He complained of severe pain in his head, neck, jaws and back. Aspirin grains x every 3 or 4 hours were given and within about an hour there was great relief. 4/12/16.—Patient had a better night and slept a little, his temperature was 99·5°F in the morning and later fell to normal. There was still considerable gastric disturbance and almost everything taken was vomited and there was again slight oozing of blood from the gums.

5/12/16.—Patient felt much better but still could keep little in his stomach. Temperature was normal. There had been a return of the pains during the night, but this were relieved by a dose of aspirin. Improvement was now steady, though slow.

Blood examination.—No parasites were found. No leucocyte count was made but there appeared to be a leucopenia. A differential count showed 12% large mononuclears.

Urine.—There was no albuminuria.

By Dr. Jackson Moore, Medical Officer at Benin City—

Convict Umokoro, aged 25, a man of good physique and robust, came to the Dispensary on the 6th of November, complaining of pains in the joints and body. His temperature was 99, and he did not look ill. He received anti-rheumatic medicines.

On the 7th, he again appeared at Dispensary, when his temperature had risen to 100. The joint pains had disappeared and he stated that he felt dull and heavy. An aperient was given, also 5 grains of quinine three times daily.

On the 8th, he was admitted into hospital with a temperature of 102.

On the 9th, his temperature had increased to 103 in the evening.

On the 10th, he felt and looked distinctly worse. Quinine was doubled in doses. Morning temperature 102·2 and evening 103·4.

On the 11th, his temperature was slightly higher. He complained of tender areas over the body, some of which were slightly enlarged and very painful to touch. Skin dry.

On the 12th, his condition became more grave. Temperature 104 in the morning and 104·5 in the evening, and later running up to 105·2 during a rigor, and the sore areas had greatly increased in size and were localised.

On the 13th, he looked very ill. One rigor followed another and temperature reached 105·5. There were large swellings in each gluteal region, two on the back and one on each thigh.

He was anaesthetised and the six of the larger tumours incised, evacuated and drained. The right gluteal swelling yielded 10 ounces of a non-fetid creamy pus, the others varied from 6 to 4 ounces.

After the removal of pus, his condition considerably improved. Sweating was profuse and temperature in the evening fell to 102·6.

On the 14th, temperature was 101 and evening 102·1. He looked better and felt fairly comfortable.

On the 15th his temperature was 99·4 and 100·3. All the abscesses were progressing satisfactorily.

After this date he slowly improved and had an uninterrupted recovery, except for the opening of two abscesses, on the 26th of November and 1st of December.

An examination of the blood was made on three occasions during the high fever, but no parasites observed. The pus showed staphlococceal infection, which was verified by report from Yaba.

I have seen several cases of cellulitis, especially among prisoners, where it was impossible to trace the cause of infection.

In this case the prisoner was a young man in the prime of life, physically very robust, and up to his appearance at the dispensary was a very healthy subject.

He stated that he had always been robust. There were no wounds, or abrasions on the body.

By Dr. G. Hungerford, Senior Medical Officer at Onitsha—Two cases of interest.

Hæmorrhage in the bladder of obscure origin.

Diagnosis of primary cause uncertain and difficult.

Case 1. J. M., a photographer, came to out-patient department. Complained that he was in severe pain and had not passed water for 20 hours.

Examination revealed an orange shaped tumour in the supra pubic region. A No. 7 silver catheter was passed with but slight difficulty. A dribble of bloody urine, almost pure blood came away.

The total inability of the patient to pass water, his acute pain, the ineffectiveness of catheterization, the character of the tumour, all pointed to a bladder filled with the blood clot. A supra pubic cystotony was rapidly becoming necessary.

The patient kept asking to be operated on. I, however, determined to delay for a little. He was put to bed and hot fomentation applied over the tumour.

An hour later I again passed a catheter. On this occasion a few more dribbles of almost pure blood were passed. I now injected, through the catheter, a couple of ounces of hot boric solution, having to proceed cautiously as a rupture of the bladder might be caused. With much groaning and straining, the patient now passed, through the catheter, frequent dribbles of bloody urine, about 4 ounces in all.

I injected some more boric solution and, as the patient was showing signs of collapse, made him desist from further effort and removed the catheter.

Within an hour he began to pass bloody urine of his own accord, and within 24 hours was passing normal urine. His recovery was uninterrupted.

There was no history of injury or accident which could account for this condition. It is true that the patient had an old standing stricture, but not of a severe type.

Case 2. Though coming under my notice at Opobo, I am recording the case as it is similar in character to case 1, and is equally obscure as regards the origin of the hæmorrhage.

A young chief was admitted to hospital complaining of inability to pass water freely. He was found to have a stricture, but the passing of a fair sized catheter was perfectly feasible. He was kept in bed and put on light diet.

There was no history of his having passed blood at any time.

Three days after his admission, at 3 a.m., I was summoned to hospital by the Dispenser. I found the man to be in much pain. A tumour in the supra pubic region, similar to what I have above described in case No. 1, existed. A catheter was passed, but only a few drops of almost pure blood came away. The man was in intense pain.

An anæsthetic was given. I opened the abdomen and found an immensely distended bladder. This I opened by a straight incision in the median line.

The bladder was tightly packed with jelly-like blood clot. Before attempting to clear this out, I stitched the sides of the bladder wound on each side of the incision to the abdominal walls in such a way that the danger of blood escaping into the peritoneal cavity was obviated. I then removed the blood clot with which the bladder was packed, and washed out the bladder with warm boric solution.

The patient was now in such a collapsed condition that I did nothing further than cover the wound with a large aseptic pad, bandage, and let him recover from the anæsthetic.

On the following morning he was in a more satisfactory condition than I had thought possible and passed urine without the aid of a catheter.

Fearing further hæmorrhage into the bladder, I allowed the abdominal wound to granulate up without any sutures, taking great care that the wound should be kept aseptic. The wound healed slowly but quite successfully, the man being discharged from hospital within three weeks.

I cannot pretend to offer a satisfactory explanation of the cause of hæmorrhage in these two cases. Various obvious suggestions occur at once—Bilherzia,—Prostatic hæmorrhage—Vesical hæmorrhage, etc., but no history was obtained which pointed to any of these being the correct solution of this apparently autogenous hæmorrhage.

It would be interesting to know whether similar cases have been met in the Colony.

TABLE I.

TOWN AREA AND OPEN SPACES.

Name of Town.	1915.		1916.	
	Approximate Area in Acres.	Number of Proclaimed Open Spaces.	Approximate Area in Acres.	Number of Proclaimed Open Spaces.
Lagos	1,152	3	1,152	3
Calabar	9·20 sq. miles.	3	9·20 sq. miles.	3

(2).—POPULATION.

Name of Town.	1915.			1916.		
	Number of Europeans.	Number of Natives.	Total.	Number of Europeans.	Number of Natives.	Total.
Lagos	600	77,288	77,888	600	78,680	79,280
Calabar	125	14,263	14,388	118	16,588	16,706

(3).—HOUSING.

Town.	1915.				1916.			
	Houses.		Huts.		Houses.		Huts.	
	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.
Lagos	269	4,048	...	12,000	270	5,000	...	12,000
Calabar ...	65	54	2,249	...	65	54	2,284	...

(4).—MOSQUITO-PROTECTION OF HOUSES.

Town.	1915.				1916.			
	Number wholly mosquito-protected.	Number with mosquito-proof room.	Number wholly mosquito-protected during the year.	Number partially mosquito-protected during the year.	Number wholly mosquito-protected.	Number with mosquito-proof room.	Number wholly mosquito-protected during the year.	Number partially mosquito-protected during the year.
Lagos	25	122	2	...	28	137	3	15
Calabar ...	...	6	...	1	...	7	...	1

TABLE I—*continued.*

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

Town.	1915.					1916.				
	No. of public buildings erected with full sanction as to site, &c.	No. of houses erected with full sanction as to site, &c.	No. of huts erected with full sanction as to site, &c.	No. of houses built without sanction.	No. of huts built without sanction.	No. of public buildings erected with full sanction as to site, &c.	No. of houses erected with full sanction as to site, &c.	No. of huts erected with full sanction as to site, &c.	No. of houses built without sanction.	No. of huts built without sanction.
Lagos	...	187	574	...	...	1	90	164	...	...
Calabar ...	...	...	2	1	44	1	...	19	2	33

ACTION TAKEN.

Town.	1915.				1916.			
	No. of prosecutions.		No. demolished.		No. of prosecutions.		No. demolished.	
	Houses.	Huts.	Houses.	Huts.	Houses.	Huts.	Houses.	Huts.
Lagos	...	...	150	...	1	2	...	...
Calabar ...	...	2	...	31	1	8	2	17

(6).—MARKETS.

Town.	1915.			1916.		
	Total Number.	Number paved and drained.	Number unpaved.	Total Number.	Number paved and drained.	Number unpaved.
Lagos	10	5	5	10	5	5
Calabar	5	...	5	5	...	5

(7).—SLAUGHTER HOUSES.

Town.	1915.			1916.		
	Total Number.	Number paved and drained.	Number unpaved.	Total Number.	Number paved and drained.	Number unpaved.
Lagos	2	2	...	2	2	...
Calabar	1	1	...	1	1	...

(8).—LATRINES.—PUBLIC.

Town.	1915.																1916.											
	No of Latrines.				No. erected during the year.				No. repaired during the year.				No. demolished during the year.				No. of Latrines.				No. erected during the year.				No. repaired during the year.				No. demolished during the year.			
	Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.	
	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.
Lagos	37	236	37	226	1	5	1	5	16	91	16	89	...	...	...	...	37	236	37	226	...	...	...	...	8	41	8	39	...	...	...	...
Calabar ...	16	121	15	107	...	...	...	...	8	54	7	42	1	10	1	10	18	137	17	124	2	16	2	17	2	10	2	12	...	...	...	...

LATRINES—*continued.*

Town.	1915.									1916.								
	No. of private latrines.	Average No. of pails of nightsoil removed daily.	Average No. of clean pails substituted for soiled pails.	No. of nightsoil men employed.	No. of cesspools.	No. of cesspools cleaned.	No. of new cesspools constructed during the year.	No. of old cesspools abolished.	No. of cesspools regularly oiled by the Department.	No. of private latrines.	Average No. of pails of nightsoil removed daily.	Average No. of clean pails substituted for soiled pails.	No. of nightsoil men employed.	No. of cesspools.	No. of cesspools cleaned.	No. of new cesspools constructed during the year.	No. of old cesspools abolished.	No. of cesspools regularly oiled by the Department.
Lagos	7,132	7,979	797	150	...	...	...	...	...	6,500	930	930	159	...	...	...	...	...
Calabar	475	260	961	42	171	Unknown	1	...	...	511	289·01	709·54	74	171	Unknown	11	11	...

(9).—REMOVAL OF REFUSE.

Town.	1915. Number of dust-bins.	1915. Number of carts removing street refuse daily.	1915. Amount of refuse removed daily.	1915. Number of carts removing refuse from yards and premises daily.	1915. Amount of refuse removed from yards and premises daily.	1915. Number of men employed for removing refuse.	1916. Number of dust-bins.	1916. Number of carts removing street refuse daily.	1916. Amount of refuse removed daily.	1916. Number of carts removing refuse from yards and premises daily.	1916. Amount of refuse removed from yards and premises daily.	1916. Number of men employed for removing refuse.
Lagos	55	57	110 tons (12 tons) Cartloads.	...	...	250	55	20	19–20 tons.	...	...	257
Calabar	66	4	91 Cartloads.	...	27 Cartloads.	67	74	7	39 Cartloads.	...	8·09 Cartloads.	73

(10).—MODE OF DISPOSAL OF EXCRETA, REFUSE AND OFFAL.

Town.	1915. Buried or Trenched. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	1915. Burnt. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	1915. Thrown into Sea. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	1915. Otherwise dealt with. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.
Lagos ...	...	...	...	...	100	...	197	...	...	...	...	...
Calabar ...	69	27 Carts	...	...	...	...	191	64 Carts	1¼ drums	...	...	...

Town.	1916. Buried or Trenched. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	1916. Burnt. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	1916. Thrown into Sea. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	1916. Otherwise dealt with. Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.
Lagos ...	...	...	...	...	...	...	930	90-100 tons	...	...	...	...
Calabar ...	79	8·09 Cart-loads	...	...	...	...	210	30·91	1·02 drums of 10 galls. capacity.	...	...	...

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

Town.	1915.	1916.
Lagos	...	...
Calabar	Unknown; 3 carts removed daily from public spaces and streets.	48 Cartloads from public streets and spaces.

(12).—WATER SUPPLY.

Pipe-borne Water.

Town.	1915.				1916.			
	Source (river, lake or spring).	No. of linear yards.	No. of public standpipes.	No. of private standpipes.	Source (river, lake or spring).	No. of linear yards.	No. of public standpipes.	No. of private standpipes.
Lagos	River 28" main, other mains.		167	182	River 17 Miles	53,424	171	215
Calabar	Spring	19,560	4	102	Spring	19,560	6	102

Wells.

Town.	1915.				1916.			
	Public.		Private.		Public.		Private.	
	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.
Lagos ...	85	10	2,670	...	5	1	2,889	...
Calabar ...	...	...	...	...	...	...	2	...

Tanks (Public).

Town.	1915.						1916.					
	Number underground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	Number of 400 galls. capacity or less.	Number above 400 galls.	Number underground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	Number of 400 galls. capacity or less.	Number above 400 galls.
Lagos ...	...	...	2	2	2	...	...	...	2	2	2	...
Calabar ...	3	...	2	1	...	5	3	...	2	1	...	5

Tanks (Private).

Town.	1915.						1916.					
	Number under ground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	No. of 400 galls. capacity or less.	Number above 400 galls.	Number under ground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	No. of 400 galls. capacity or less.	Number above 400 galls.
Lagos ...	1	1	630	591	564	67	1	1	574	544	431	144
Calabar ...	...	...	36	33	11	25	...	...	46	46	17	29

Nature of Tanks.

Town.	1915.			1916.		
	Wood.	Iron.	Concrete.	Wood.	Iron.	Concrete.
Lagos	1	485	145	...	456	121
Calabar	...	36	...	...	46	...

Barrels.

Town.	1915.		1916.	
	Number.	Number mosquito protected.	Number.	Number mosquito protected.
Lagos	1,792	604	545	288
Calabar...	232	1	271	1

(13).—DRAINAGE.

Public Masonry Drains.

Town.	1915.				1916.			
	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards constructed during the year.	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards constructed during the year.
Lagos	31,962	750	...	?	31,995	1,599	...	...
Calabar	13,053	17 1/8	97	579	13,514 1/4	...	21 1/8	461 1/4

Public Earth Drains or Ditches.

Town.	1915.			1916.		
	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.
Lagos	?	1,590	Weekly	900	6,570	Weekly.
Calabar	15,724	...	Once a quarter.	15,724	...	Once a quarter.

Private Masonry Drains.

Town.	1915.				1916.			
	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards constructed during the year.	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards constructed during the year.
Lagos ...	...	...	...	...	...	...	...	...
Calabar ...	16,669	...	1	...	16,669	...	393	...

Private Earth Drains or Ditches.

Town.	1915.			1916.		
	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.
Lagos	...	...	...	...	...	...
Calabar	3,724	50	Once a quarter.	3,724	...	Once a quarter.

(14).—CLEARANCE OF UNDERGROWTH, LONG GRASS AND JUNGLE.

Town.	1915.		1916.	
	No. of Square yards of weeds, grass and vegetation cut and removed.	Average frequency of clearance of rank vegetation on the same area.	No. of Square yards of weeds, grass and vegetation cut and removed.	Average frequency of clearance of rank vegetation on the same area.
Lagos	?	6 weeks	71,900	6 weeks.
Calabar	366,716	Monthly	9,488,840	Monthly.

(15).—EXCAVATION AND LOW-LYING LAND.

Town.	1915.							1916.						
	No. of pools and excavations.	Number of excavations filled up.	Amount of low-lying and marsh land raised and drained.	Number of pools, marshes, streams, &c., fish stocked.	No. of cubic yards of material used for filling up pools and excavations.	Number of persons fined for making new excavations.	Average No. of men daily employed in filling up pools.	No. of pools and excavations.	Number of excavations filled up.	Amount of low-lying and marsh land raised and drained.	Number of pools, marshes, streams, &c., fish stocked.	No. of cubic yards of material used for filling up pools and excavations.	Number of persons fined for making new excavations.	Average No. of men daily employed in filling up pools, &c.
Lagos	...	...	45,500	...	69,500	...	...	...	...	9,200 sq. yds.	...	Dredger 329,123 398 kiln ashes.	...	...
Calabar ...	324	270	...	...	Unknown	...	...	205	192	...	...	Unknown	...	...

(16).—OILING.

Town.	1915.				1916.			
	Number of drains oiled.	No. of pools and excavations oiled.	No. of tanks and barrels oiled.	Average No. of men daily employed for oiling.	No. of drains oiled.	No. of pools and excavations oiled.	No. of tanks and barrels oiled.	Average No. of men daily employed for oiling.
Lagos	94	7,800	304	3	117	4,637	210	3
Calabar ...	166	172	10	4	317	175	5	4

(17).—INSPECTIONS AND PROSECUTIONS.

Town.	1915.								1916.							
	No. of Inspectors employed.	No. of houses inspected.	No. of houses where larvæ were found.	No. of notices served to remove conditions causing breeding of Larvæ.	No of persons fined for having mosquito Larvæ on premises.	No of notices served to remove insanitary conditions on premises.	No. of persons fined for not removing insanitary conditions after notice.	No. of Soda and Aerated factories inspected	No. of Inspectors employed.	No. of houses inspected.	No. of houses where larvæ were found.	No. of notices served to remove conditions causing breeding of Larvæ.	No. of persons fined for having mosquito Larvæ on premises.	No. of notices served to remove insanitary conditions on premises.	No. of persons fined for not removing insanitary conditions after notice.	No. of Soda and Aerated factories inspected.
Lagos	29	620,196	...	...	1,024	2,901	1	2	29	630,586	...	...	665	2,935	18	2
Calabar	7	98,252	463	324	241	3,809	28	1	5	98,415	210	205	183	3,750	14	1

(17).—INSPECTIONS AND PROSECUTIONS—*continued.*

	Lagos and Ebute Metta.								Calabar.							
	1915.				1916.				1915.				1916.			
	1st Qr.	2nd Qr.	3rd Qr.	4th Qr.	1st Qr.	2nd Qr.	3rd Qr.	4th Qr.	1st Qr.	2nd Qr.	3rd Qr.	4th Qr.	1st Qr.	2nd Qr.	3rd Qr.	4th Qr.
Houses Inspected...	151,983	153,475	157,104	157,634	155,384	157,412	159,616	158,174	24,928	23,142	25,288	24,894	24,213	23,115	24,893	26,194
Houses containing Larvæ... ...	4,179	5,887	5,098	4,087	2,853	4,358	3,208	3,136	66	94	129	114	93	65	23	29
Mosquito Index ...	2·7	3·8	3·2	2·5	1·8	2·7	2·009	1·9	·2	·4	·5	·4	·38	·28	·09	·11
Rainfall	5·0	43·5	29·3	12·4	12·57	64·49	28·09	20·78	11·6	41·1	53·9	29·8	8·44	32·30	45·07	25·53

(18).—ANTI-MOSQUITO WORK—*continued.*

Town.	1915.				1916.			
	Houses Inspected.	Number of Houses with Larvæ.	Rainfall.	Mosquito Index.	Houses Inspected.	Number of Houses with Larvæ.	Rainfall.	Mosquito Index.
Lagos ...	620,196	19,251	90·4	3·1	630,586	13,555	125·93	21·4
Calabar ...	98,252	463	134·04	0·4	98,415	210	111·34	21·0

RETURN OF ANTI-MOSQUITO WORK 1916.

Station.	Houses Inspected 1916.	Number of houses with larvae 1916.	Rainfall 1916.	Rainfall 1915.	Mosquito Index 1916.	Mosquito Index 1915.
Lagos and Ebute Metta	630,586	13,555	62·96	90·4	2·14	3·1
Aro	8,950	215	...	42·5	2·40	1·1
Epe	16,136	399	53·55	91·5	2·47	3·8
Badagry	11,148	292	63·19	54·4	2·61	4·5
Ibadan I...	32,317	2,471	67·68	55·2	7·61	1·3
Warri	30,889	174	105·11	138·6	·56	·28
Forcados	29,600	297	138·21	283·4	1·00	·24
Sapele	13,006	8	77·95	105·5	·06	1·12
Koko	1,615	23	...	...	1·42	1·72
Benin City	8,839	224	71·79	50·2	2·53	5·56
Onitsha	22,728	45	74·21	81·3	·18	·16
Siloko	6,726	107	...	...	1·59	2·74
Okwoga	4,215	7	72·32	68·0	·16	·95
Asaba	17,471	105	17·53	60·3	·60	·48
Enugu	17,577	37	66·08	...	·21	...
Agbor	5,697	50	61·58	86·6	·87	·46
Calabar	98,415	210	111·34	136·6	·21	·41
Bonny	12,030	967	127·20	176·1	8·03	·68
Brass	14,370	55	110·40	154·8	·38	·55
Opobo	11,811	85	131·47	154·8	·71	·33
Owerri	28,813	291	104·61	110·9	1·00	·76
Degema	19,983	242	74·79	77·2	1·21	·48
Ikot-Ekpene	1,069	14	88·94	96·9	1·30	1·9
Ogoja	2,916	...	...	...	...	2·8
Abakaliki	2,358	23	80·55	95·4	·97	...
Obudu	2,252	13	88·38	83·0	·57	·088
Aflkpo	1,042	32	44·97	38·9	3·07	10·0
Port Harcourt	10,397	270	90·55	71·5	2·59	2·2

TABLE II.

METEOROLOGICAL RETURNS FOR THE YEAR 1916.

Station—Lagos.

	Lat. 6–27′ N. Long. 3–24′ E.					
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	90·3	65·4	87·8	73·8	81·6 %	0·06
February	90·4	70·1	88·9	76·4	82·2 %	1·45
March	92·2	71·2	89·7	78·0	88·6 %	3·73
April	91·2	72·2	88·8	76·5	77·6 %	5·46
May	90·4	70·1	88·1	75·9	76·8 %	6·96
June	88·4	70·2	84·7	74·3	85·3 %	18·84
July	86·2	70	82·5	73·0	87·1 %	7·59
August	88·2	71	83·1	72·9	81·6 %	0·98
September	87	70	84·6	72·6	81·2 %	4·07
October	89	70	85·2	73·1	84·0 %	6·04
November	90·4	70·5	87·4	74·4	82·9 %	5·29
December	90·1	69	87·8	74·4	83·4 %	0·02
Means	92·2	65·4	86·5	74·6	81·8 %	60·49

Station—Onitsha.

	Lat. 6–10′ N. Long. 6–47′ E.					
January	97	70	94·8	70	84 %	...
February	101	74	97·0	76·4	80 %	0·50 %
March	101	75	99·4	76·5	80 %	3·24 %
April	95	75	94·6	75·4	85 %	7·53 %
May	95	74	91·6	76·1	80 %	6·52 %
June	93	72	87·9	73·5	89 %	16·82 %
July	90	70	85·3	72·9	89 %	11·95 %
August	92	70	85·1	72·2	89 %	4·06 %
September	91	70	84·6	72·2	84 %	11·22 %
October	94	71	87	73·3	84 %	10·40 %
November	96	71	91·6	73·9	95 %	1·97 %
December	94	64	91·9	72·3	84 %	...
Means	101	64	90·9	73·9	85 %	74·21 %

Station—Calabar.

	Lat. 4° 58′ N. Long. 8° 19′ E.					
January	No records available			...	94 %	...
February	91	67	90·0	72·2	90 %	...
March	91	67	87·6	71·0	85 %	8·44
April	...	67	...	73·6	...	...
May	88	70	83·0	75·2	76 %	16·40
June	88	71	84·7	73·1	80 %	15·90
July	86	70	82·5	72·2	84 %	21·16
August	86	70	82·7	71·7	75 %	8·02
September	85	70	83	72·1	79 %	15·89
October	87	70	84·1	71·5	75 %	15·19
November	86	70	84·3	71·7	75 %	7·47
December	89	70	85·5	72·6	75 %	2·87
Means	91	67	84·7	72·4	88·0%	111·34

TABLE II.—*continued.*

Station—Ibadan.

	Lat. 7° 24' N. Long. 3° 53' E.					
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	98	62	95·1	70·3	79 %	...
February	100	66	96·8	72·7	89 %	0·03
March	101	67	96·0	73·5	89 %	2·74
April	96	67	92·7	71·6	89 %	11·78
May	96	61	91·0	70·9	89 %	7·95
June	94	65	87·1	68·9	89 %	6·95
July	89	66	83·7	68·5	89 %	14·38
August	88	66	83	68·3	89 %	4·40
September	90	66	85·4	69·5	89 %	5·35
October	95	65	87·3	69·6	89 %	11·90
November	94	67	90·6	70·4	89 %	2·10
December	95	60	92·9	68·1	89 %	...
Means	101	60	90·1	71·6	88·1%	67·58

Station—Forcados.

	Lat. 5° 23' N. Long. 5° 26' E.					
January	89	66	86·4	72·2	75 %	...
February	89	72	86·6	75·0	64 %	3·64
March	91	71	97·9	76·0	72 %	7·39
April	89	70	86·6	72·6	76 %	8·69
May	89	68	85·1	73·9	80 %	14·80
June	90	69	82·9	71·4	84 %	23·07
July	83	68	79·9	71·4	84 %	42·44
August	84	66	81	71·4	80 %	2·89
September	84	68	80·8	72·2	84 %	20·66
October	86	69	83	72·4	85 %	8·56
November	87	68	84·5	72·4	85 %	4·45
December	87	65	85·1	72·2	90 %	1·62
Means	91	65	84·1	72·7	79·0%	138·21

Station—Enugu.

	Lat. Long.					
January	No	records	available	...	...	...
February	96	68	92·8	70·1	68 %	1·28
March	100	71	94·9	74·0	60 %	2·14
April	96	69	92·0	73·0	72 %	6·46
May	96	62	90·2	70·4	80 %	8·17
June	94	62	88·6	70·2	75 %	8·87
July	93	63	85·5	69·5	84 %	9·56
August	89	68	85·1	69·2	79 %	4·12
September	88	65	84·1	69·5	94 %	12·65
October	90	66	82·6	68·6	84 %	9·69
November	96	66	90·7	70·1	75 %	3·14
December	95	62	91·1	70·6	60 %	...
Means	100	62	88·8	70·4	75·0%	66·08

TABLE III.

VACCINATIONS PERFORMED DURING THE YEAR 1916.

Total Number Vaccinated	136,279
Total Number Successful	87,963

TABLE IV.

RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916.

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
INFECTIVE DISEASES:—							
Beri-Beri	...	...	...	...	...	...	...
Cerebro-Spinal Fever	...	...	...	...	...	...	...
Chicken Pox	...	...	...	...	...	...	...
Cholera	...	...	...	...	...	...	...
Dengue	...	...	...	...	...	...	...
Diphtheria	...	...	...	...	...	...	...
DYSENTERY:—							
(*a*) Amœbic	...	5	...	5	...	10	...
(*b*) Bacillary	...	...	...	...	...	...	...
(*c*) Type not determined	...	7	...	7	1	7	...
Endocarditis-infective	...	...	...	...	...	...	...
Enteric	...	..	...	...	...	...	...
Erysipelas	...	...	...	...	...	...	...
Gonorrhœa	...	2	...	2	...	58	...
Influenza	...	...	...	...	...	5	...
Kala-Azar	...	...	.	...	...	...	...
LEPROSY:—							
(*a*) Nodular	...	...	...	...	...	...	...
(*b*) Anaesthetic	...	...	...	...	...	...	...
MALARIA:—							
(*a*) Tertian	...	...	...	...	...	...	...
(*b*) Quartan	...	...	...	...	...	...	...
(*c*) Aestivo-autumnal	...	2	166	1	168	4	375	1
(*d*) Chronic	...	...	...	...	...	...	1	...
(*e*) Type not determined	...	...	...	...	...	...	...	...
Blackwater Fever	...	...	16	3	16	2	3	1
Measles	...	...	...	...	...	...	...	...
Papataci Fever	...	...	...	...	...	...	3	...
Plague	...	...	...	...	...	...	...	...
Pneumonia	...	...	1	...	1	...	...	...
Pyrexia of uncertain origin	...	...	...	...	...	...	1	...
Rabies	...	...	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...	...	...
Rheumatic Fever	...	...	1	...	1	...	...	...
Septicaemia	...	...	1	1	1	...	1	...
Small-Pox	...	...	...	...	...	...	...	...
Syphilis (*a*) Primary	...	...	...	...	...	...	1	..
(*b*) Secondary	...	...	1	...	1	...	6	...
(*c*) Inherited	...	...	...	...	...	...	...	...
Tetanus	...	...	...	...	...	...	...	...
Trypanosomiasis (Sleeping Sickness)	...	...	...	...	...	...	...	...
Tuberculosis	...	...	3	...	3	...	1	...
Undulant Fever	...	...	...	...	...	...	...	...
Whooping Cough	...	...	...	...	...	...	...	...
Yaws	...	...	...	...	...	...	...	...
Yellow Fever	...	...	...	...	...	...	...	...
Other Diseases	...	...	3	...	3	...	3	...
INTOXICATIONS:—							
Alcoholism	...	...	5	...	5	...	1	...
Morphinism	...	...	...	...	...	...	...	...
Other Intoxications	...	...	...	...	...	...	...	...
GENERAL DISEASES:—							
Anæmia	...	...	7	...	7	...	155	...
Anæmia-Pernicious	...	...	...	...	...	...	...	...
Diabetes	...	...	...	...	...	...	...	...
Exophthalmic goitre	...	...	...	...	...	...	1	...

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
GENERAL DISEASES—*continued.*							
Gout	...	3	...	3	...	5	...
Leucocythæmia	...	...	...	...	...	...	...
Lymphadenoma	...	...	...	...	...	...	...
Myxœdema	...	...	...	...	...	...	...
Purpura	...	...	...	...	...	...	...
Rickets	...	...	...	...	...	...	...
Scurvy	...	...	...	...	...	...	...
Other Diseases	...	2	...	2	...	...	...
LOCAL DISEASES.							
DISEASES OF THE NERVOUS SYSTEM.							
Sub-section 1.—Diseases of the Nerves:—							
Neuritis	...	9	...	9	...	16	...
Meningitis	...	2	1	2	...	...	...
Myelitis	...	...	...	...	...	...	...
Hydrocephalus	...	...	...	...	...	...	...
Encephalitis	...	...	...	...	...	...	...
Abscess of brain	...	...	...	...	...	...	...
Congestion of brain	...	...	...	...	...	...	...
Other Diseases	...	4	...	4	...	32	...
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—							
Apoplexy	...	...	...	...	...	...	...
Paralysis	...	...	...	...	...	...	...
Chorea	...	...	...	...	...	..	...
Epilepsy	...	1	...	1	...	...	...
Neuralgia	...	3	...	3	...	33	...
Hysteria	...	...	...	...	...	1	...
Other Diseases	...	3	1	3	...	37	...
Sub-section 3.—Mental Diseases:—							
Idiocy	...	...	...	...	...	...	...
Mania	...	...	...	...	...	...	...
Melancholia	...	...	...	...	...	...	...
Dementia	...	...	...	...	...	...	...
Delusional Insanity	...	3	...	3	...	2	...
Other Diseases	...	1	...	1	...	4	...
DISEASES OF THE EYE:—							
Conjunctivitis	...	...	...	...	...	32	...
Keratitis	...	...	...	...	...	2	...
Ulceration of cornea	...	...	...	...	...	...	...
Iritis	...	...	...	...	...	1	...
Optic neuritis	...	...	...	...	...	...	...
Cataract	...	...	...	...	...	...	...
Other Diseases	...	1	...	1	...	10	...
DISEASES OF THE EAR:—							
Inflammation	...	1	...	1	...	26	...
Other Diseases	...	1	...	1	...	25	...
DISEASES OF THE NOSE:—							
Inflammation	...	...	...	...	...	12	...
Other Diseases	...	...	...	...	...	10	...
DISEASES OF THE CIRCULATORY SYSTEM:—							
Pericarditis	...	...	...	...	...	...	...
Endocarditis	...	...	...	...	...	...	...

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES—*continued.*							
DISEASES OF THE CIRCULATORY SYSTEM—*continued.*							
Valvular Disease:—							
(1) Mitral	...	5	...	5	...	1	...
(2) Aortic	...	1	...	1	...	4	...
(3) Tricuspid	...	...	..	...	...	...	...
(4) Pulmonary	...	...	...	...	...	...	...
Arterial sclerosis	...	1	...	1	...	...	1
Aneurism	...	...	...	...	...	...	...
Other Diseases	...	3	...	3	...	11	...
DISEASES OF THE RESPIRATORY SYSTEM:—							
Laryngitis	...	...	...	...	...	17	...
Bronchitis	...	3	...	3	...	129	...
Broncho-pneumonia ...	...	1	...	1	...	13	...
Abscess of Lung	...	...	...	...	...	...	...
Gangrene of Lung	...	...	...	...	...	...	...
Emphysema	...	...	...	...	...	1	...
Pleurisy	...	2	...	2	...	1	...
Empyema	...	1	...	1	...	...	...
Other Diseases	...	2	...	2	...	23	...
DISEASES OF THE DIGESTIVE SYSTEM:—							
Stomatitis	...	2	...	2	...	20	...
Caries of teeth	...	1	...	1	...	42	...
Pyorrhœa alveolaris ...	...	1	...	1	...	2	...
Glossitis	...	...	...	...	...	...	...
Sore throat	...	2	...	2	...	40	...
Inflammation of tonsils ...	...	5	...	5	...	26	...
Gastritis	...	31	...	31	...	103	...
Ulceration of stomach ...	...	...	...	...	...	...	...
Hæmatemesis	...	...	...	...	...	1	...
Dilatation of stomach ...	...	1	...	1	...	1	...
Stricture of stomach ...	...	...	...	...	...	...	...
Dyspepsia	...	3	...	3	...	165	...
Enteritis	...	9	...	9	...	10	1
Appendicitis	...	3	...	3	...	1	...
Colitis	...	3	...	3	...	8	...
Ulceration of intestines ...	...	...	...	...	...	1	...
Sprue	...	...	...	...	...	...	...
Hernia	...	1	...	1	...	3	...
Diarrhœa	...	7	...	7	...	96	...
Constipation	...	1	...	1	...	128	...
Colic	...	1	...	1	...	20	...
Hæmorrhoids	...	4	...	4	...	16	...
Pancreatitis	...	...	...	...	...	...	...
Hepatitis—Acute	...	2	...	2	...	13	...
Abscess	...	...	...	...	...	...	...
Cirrhosis	...	...	...	...	...	...	...
Jaundice	...	3	...	3	...	2	...
Peritonitis	...	...	...	...	...	...	...
Ascites	...	...	...	...	...	6	...
Other Diseases	...	1	...	1	...	13	...
DISEASES OF THE LYMPHATIC SYSTEM:—							
Splenitis	...	...	...	...	...	5	...
Inflammation of lymphatic gland	1	16	...	17	...	19	...
Suppuration of lymphatic gland	...	...	...	...	...	4	...
Lymphangitis	...	...	...	...	...	...	...
Elephantiasis	...	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	...	...

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES—*continued.*							
DISEASES OF THE URINARY SYSTEM:—							
Acute nephritis	...	1	...	1	...	5	...
Bright's Disease	...	1	1	1	...	...	...
Pyelitis	...	...	...	...	...	...	...
Calculus	...	6	...	6	...	...	...
Renal colic	...	...	...	...	...	...	...
Cystitis	...	3	...	3	...	25	...
Vesical calculus	...	1	...	1	...	2	...
Suppression	...	...	...	...	...	...	...
Hæmaturia	...	...	...	...	...	1	...
Chyluria	...	...	...	...	...	...	...
Other Diseases	...	1	...	1	...	4	...
DISEASES OF THE GENERATIVE SYSTEM:—							
Male Organs:—							
Urethritis	...	...	...	...	...	24	...
Gleet	...	...	...	...	...	1	...
Stricture	...	1	...	1	...	3	...
Prostatitis	...	5	...	5	...	5	...
Soft chancre	...	...	...	...	...	2	...
Condyloma	...	...	...	...	...	1	...
Inflammation of scrotum	...	...	...	...	...	4	...
Hydrocele	...	...	...	...	...	1	...
Orchitis	...	1	...	1	...	5	...
Epididymitis	...	2	...	2	...	2	...
Abscess of testicle	...	...	...	...	...	1	...
Other Diseases	...	1	...	1	...	1	...
Female Organs:—							
Ovaritis	...	...	...	...	...	...	...
Ovarian cyst	...	...	...	...	...	...	...
Endometritis	...	...	...	...	...	...	...
Displacement of uterus	...	...	...	...	...	...	...
Vaginitis	...	...	...	...	...	...	...
Amenorrhœa	...	...	...	...	...	...	...
Dysmenorrhœa	...	...	...	...	...	1	...
Menorrhagia	...	1	...	1	...	2	...
Leucorrhœa	...	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	...	...
AFFECTIONS CONNECTED WITH PREGNANCY:—							
Abortion	...	...	...	...	...	...	...
Other Affections	...	...	...	...	...	...	...
AFFECTIONS CONNECTED WITH PARTURITION:—							
Delayed Labour	...	...	...	...	...	...	...
Retained placenta	...	...	...	...	...	...	...
Premature Birth	...	...	...	...	...	...	...
Other Affections	...	...	...	...	...	...	...
AFFECTIONS CONSEQUENT ON PARTURITION:—							
Post-partum hæmorrhage	...	...	...	...	...	...	...
Puerperal septicæmia	...	...	...	...	...	...	...
Mastitis	...	...	...	...	...	...	...
Abscess of breast	...	...	...	...	...	...	...
Other Affections	...	...	...	...	...	...	...
DISEASES OF ORGANS OF LOCOMOTION:—							
Osteitis	...	2	...	2	...	1	...

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES—*continued.*							
DISEASES OF ORGANS OF LOCOMOTION—*continued.*							
Arthritis	...	2	...	2	...	119	...
Spondylitis	...	...	...	...	...	...	...
Bursitis	...	...	...	...	...	4	...
Myalgia	...	1	...	1	...	7	..
Other Diseases	...	1	...	1	...	10	...
DISEASES OF CONNECTIVE TISSUE:—							
Cellulitis	1	6	...	7	...	23	...
Abscess	...	7	...	7	...	32	...
Other Diseases	...	2	...	2	...	2	...
DISEASES OF THE SKIN:—							
Ulcer	...	4	...	4	...	36	...
Urticaria	...	1	...	1	...	8	...
Eczema	...	1	...	1	...	63	...
Boil	...	10	...	10	...	78	...
Carbuncle	...	1	...	1	...	3	...
Herpes	...	...	...	...	...	1	...
Psoriasis	...	...	...	...	...	2	...
Oriental sore	...	...	...	...	...	..	...
Tinea	...	...	...	...	...	130	...
Scabies	...	...	...	...	...	5	...
Acne	...	...	...	...	...	6	...
Prickly heat	...	...	...	...	...	23	...
Other Diseases	...	...	...	...	...	43	...
INJURIES:—							
General	...	3	...	3	1	26	...
Local	...	11	1	12	...	137	...
TUMOURS:—							
Benign	...	...	...	...	...	1	...
Malignant	...	...	...	...	...	2	...
Malformations	...	...	...	...	...	...	...
POISONS:—							
Vegetable	...	...	...	...	...	...	...
Animal	...	...	...	...	...	...	...
Other Poisons	...	1	...	1	...	...	...
PARASITES.							
ANIMAL PARASITES:—							
Protozoa	...	...	...	...	...	...	...
Trematoda (Flukes)	...	...	...	...	...	...	...
Cestoda:—							
Tænia solium	...	...	...	...	...	3	...
Tænia sagninata	...	...	...	...	...	...	...
Other Cestodes	...	...	...	...	...	...	...
Nematoda:—							
Ascaris	...	...	...	...	...	4	...
Tricocephalus dispar	...	...	...	...	...	...	...
Trichina	...	...	...	...	...	...	...
Dracunculus	...	...	...	...	...	...	...
Filaria	...	...	...	...	...	7	...
Strongylus	...	...	...	...	...	...	...
Ankylostomum	...	...	...	...	...	2	...
Oxyuris	...	...	...	...	...	...	...
Other Nematodes	...	...	...	...	...	...	...
Insecta:—							
Insects producing myiasis	...	...	...	...	...	5	...
Dematophilus penetrans	...	...	...	...	...	4	...
Other Insects	...	...	...	...	...	2	...
Total	5	445	9	450	8	2,704	4

TABLE V.

RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916.

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	Total.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
INFECTIVE DISEASES:—						
Beri-Beri	1	5	1	6	1	4
Cerebro-Spinal Fever	...	...	...	...	...	...
Chicken Pox	108	1,281	5	1,389	31	207
Cholera	...	...	...	...	...	...
Dengue	...	...	...	...	...	...
Diphtheria	...	...	...	...	...	...
DYSENTERY:—						
(*a*) Amœbic	...	231	28	231	7	170
(*b*) Bacillary	...	27	9	27	2	9
(*c*) Type not determined ...	9	330	85	339	5	310
Endocarditis-infective ...	...	...	...	...	...	...
Enteric	...	...	...	...	...	..
Erysipelas	...	1	...	1	...	...
Gonorrhœa	8	310	...	318	20	2,104
Influenza	...	5	...	5	...	5
Kala-Azar	...	...	...	...	...	...
LEPROSY:—						
(*a*) Nodular	15	13	1	28	20	2
(*b*) Anaesthetic	35	26	5	61	50	18
MALARIA:—						
(*a*) Tertian	...	1	...	1	...	11
(*b*) Quartan	...	2	...	2	...	4
(*c*) Aestivo-autumnal ...	7	969	7	976	24	6,369
(*d*) Chronic	...	3	...	3	...	759
(*e*) Type not determined ...	...	3	...	3	...	69
Blackwater Fever	...	6	1	6	...	2
Measles	...	10	...	10	...	65
Papataci Fever	...	...	...	...	...	...
Plague	...	...	...	..	...	...
Pneumonia	5	499	82	504	8	263
Pyrexia of uncertain origin ...	...	1	...	1	...	3
Rabies	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...
Rheumatic Fever	...	4	...	4	1	16
Septicaemia	...	20	15	20	2	2
Small-pox	...	39	11	39	6	46
Syphilis (*a*) Primary	3	108	...	111	2	96
(*b*) Secondary ...	...	54	...	54	4	105
(*c*) Inherited	...	1	...	1	...	26
Tetanus	4	26	17	30	1	4
Trypanosomiasis (Sleeping Sickness)	...	3	...	3	...	...
Tuberculosis	5	97	47	102	4	80
Undulant Fever	...	...	...	...	...	...
Whooping Cough	...	4	...	4	...	140
Yaws	...	22	1	22	...	241
Yellow Fever	...	...	...	...	...	...
Other Diseases	...	2	1	2	...	14
INTOXICATIONS:—						
Alcoholism	...	1	...	1	...	1
Morphinism	...	...	...	...	...	...
Other Intoxications	...	...	...	...	...	1
GENERAL DISEASES:—						
Anæmia	3	60	4	63	2	2,260
Anæmia-Pernicious	...	...	...	...	...	1
Diabetes	...	...	...	...	...	2
Exophthalmic goitre	...	1	...	1	...	1

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
GENERAL DISEASES—*continued.*						
Gout	...	1	...	1	...	...
Leucocythæmia	...	2	...	2	...	...
Lymphadenoma	...	...	...	...	...	...
Myxœdema	...	...	...	...	...	...
Purpura	...	...	...	...	...	...
Rickets	...	...	...	...	...	8
Scurvy	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	...
LOCAL DISEASES.						
DISEASES OF THE NERVOUS SYSTEM.						
Sub-section 1.—Diseases of the Nerves:—						
Neuritis	1	19	...	20	...	158
Meningitis	...	12	8	12	1	2
Myelitis	...	...	...	...	...	...
Hydrocephalus	...	1	...	1	...	1
Encephalitis	...	...	...	...	...	...
Abscess of brain	...	2	2	2	...	...
Congestion of brain	...	1	...	1	...	1
Other Diseases	...	26	2	26	2	67
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—						
Apoplexy	...	5	3	5	...	4
Paralysis	2	14	2	16	1	14
Chorea	...	...	...	...	...	2
Epilepsy	...	17	2	17	...	55
Neuralgia	2	51	...	53	...	2,056
Hysteria	...	5	...	5	...	20
Other Diseases	...	7	2	7	...	50
Sub-section 3.—Mental Diseases:—						
Idiocy	4	...	...	4	5	...
Mania	53	19	9	72	55	7
Melancholia	4	3	3	7	4	4
Dementia	2	8	5	10	2	...
Delusional Insanity	4	13	5	17	1	13
Other Diseases	...	1	...	1	...	1
DISEASES OF THE EYE:—						
Conjunctivitis	4	98	...	102	1	1,901
Keratitis	...	4	...	4	...	33
Ulceration of cornea	...	5	...	5	1	54
Iritis	...	2	...	2	...	23
Optic neuritis	...	...	...	...	...	...
Cataract	1	6	...	7	1	9
Other Diseases	...	14	...	14	1	107
DISEASES OF THE EAR:—						
Inflammation	1	41	...	42	3	1,144
Other Diseases	...	5	...	5	...	623
DISEASES OF THE NOSE:—						
Inflammation	...	...	...	...	...	73
Other Diseases	...	1	...	1	...	47
DISEASES OF THE CIRCULATORY SYSTEM:—						
Pericarditis	...	11	7	11	...	9
Endocarditis	...	10	4	10	...	9

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES—*continued.*						
DISEASES OF THE CIRCULATORY SYSTEM—*continued.*						
Valvular Disease:—						
(1) Mitral	1	68	7	69	1	210
(2) Aortic	...	2	...	2	...	15
(3) Tricuspid	...	...	...	...	...	...
(4) Pulmonary	...	...	...	...	...	1
Arterial sclerosis	...	...	...	...	...	2
Aneurism	...	1	...	1	...	5
Other Diseases	...	13	2	13	...	87
DISEASES OF THE RESPIRATORY SYSTEM:—						
Laryngitis	...	6	...	6	...	263
Bronchitis	6	678	14	684	33	10,821
Broncho-pneumonia	...	43	13	43	1	45
Abscess of Lung	...	5	3	5	...	...
Gangrene of Lung	...	...	...	...	...	...
Emphysema	...	1	...	1	...	8
Pleurisy	4	106	9	110	3	171
Empyema	...	5	3	5	...	...
Other Diseases	...	8	3	8	...	46
DISEASES OF THE DIGESTIVE SYSTEM:—						
Stomatitis	...	14	...	14	...	490
Caries of teeth	...	6	...	6	...	1,174
Pyorrhœa alveolaris	...	16	...	16	1	25
Glossitis	...	1	...	1	...	60
Sore throat	...	1	...	1	...	211
Inflammation of tonsils	1	12	...	13	...	404
Gastritis	2	28	...	30	1	441
Ulceration of stomach	...	1	...	1	...	5
Hæmatemesis	...	2	...	2	1	5
Dilatation of stomach	...	2	...	2	...	1
Stricture of stomach	...	...	...	...	...	...
Dyspepsia	...	20	...	20	...	1,349
Enteritis	...	47	10	47	...	117
Appendicitis	...	3	1	3	...	...
Colitis	...	13	...	13	1	79
Ulceration of intestines	...	...	...	...	...	1
Sprue	...	...	...	...	...	1
Hernia	5	161	7	166	20	180
Diarrhœa	4	842	55	846	32	2,859
Constipation	2	115	...	117	5	7,985
Colic	2	177	...	179	13	3,147
Hæmorrhoids	...	37	1	37	1	264
Pancreatitis	...	...	...	...	...	...
Hepatitis—Acute	1	15	1	16	...	23
Abscess	...	4	4	4	...	1
Cirrhosis	...	3	2	3	...	2
Jaundice	...	12	...	12	...	16
Peritonitis	...	9	6	9	...	10
Ascites	4	35	7	39	1	19
Other Diseases	1	10	1	11	...	73
DISEASES OF THE LYMPHATIC SYSTEM:—						
Splenitis	...	16	...	16	...	495
Inflammation of lymphatic gland	4	174	...	178	4	824
Suppuration of lymphatic gland	1	51	..	52	2	180
Lymphangitis	...	13	...	13	...	70
Elephantiasis	1	30	...	31	5	23
Other Diseases	...	...	...	...	...	15

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES—*continued.*						
DISEASES OF THE URINARY SYSTEM:—						
Acute nephritis	...	14	7	14	...	50
Bright's Disease	...	17	9	17	2	5
Pyelitis	...	...	...	...	...	1
Calculus	...	3	...	3	...	...
Renal colic	...	...	...	...	...	1
Cystitis	...	22	2	22	1	74
Vesical calculus	...	1	...	1	...	...
Suppression	...	1	...	1	...	6
Hæmaturia	...	12	...	12	1	13
Chyluria	...	2	...	2	...	1
Other Diseases	...	6	2	6	...	15
DISEASES OF THE GENERATIVE SYSTEM:—						
Male Organs:—						
Urethritis	...	3	...	3	...	58
Gleet	...	5	...	5	...	32
Stricture	2	48	1	50	2	53
Prostatitis	...	4	...	4	...	9
Soft chancre	...	39	...	39	3	169
Condyloma	...	2	...	2	...	3
Inflammation of scrotum	...	6	...	6	1	6
Hydrocele	...	51	1	51	10	61
Orchitis Gonorrhœal	2	48	...	50	4	193
Epididymitis Gonorrhœal	...	18	...	18	2	40
Abscess of testicle	...	3	...	3	2	...
Other Diseases	2	24	...	26	2	56
Female Organs:—						
Ovaritis	...	1	...	1	...	2
Ovarian cyst	...	...	...	...	...	3
Endometritis	...	8	...	8	...	122
Displacement of uterus	...	3	...	3	...	6
Vaginitis	...	4	...	4	...	21
Amenorrhœa	...	...	...	...	...	38
Dysmenorrhœa	...	...	...	...	...	121
Menorrhagia	...	...	...	...	...	41
Leucorrhœa	...	...	...	...	...	13
Other Diseases	...	5	...	5	...	30
AFFECTIONS CONNECTED WITH PREGNANCY:—						
Abortion	...	6	1	6	...	17
Other Affections	...	...	...	...	...	2
AFFECTIONS CONNECTED WITH PARTURITION:—						
Delayed Labour	...	13	2	13	...	4
Retained placenta	...	2	...	2	...	1
Premature Birth	...	2	...	2	...	1
Other Affections	...	2	1	2	...	...
AFFECTIONS CONSEQUENT ON PARTURITION:—						
Post-partum hæmorrhage	...	5	4	5	...	4
Puerperal septicæmia	...	1	...	1	...	2
Mastitis	...	1	...	1	...	34
Abscess of breast	...	1	...	1	...	19
Other Affections	1	8	...	9	...	17

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
DISEASES OF ORGANS OF LOCOMOTION:—						
Osteitis	2	49	1	51	2	172
Arthritis...	12	630	13	642	15	7,569
Spondylitis	...	...	...	...	...	3
Bursitis	...	29	...	29	1	158
Myalgia	...	2	...	2	1	1,576
Other Diseases	...	20	1	20	1	69
DISEASES OF CONNECTIVE TISSUE:—						
Cellulitis	3	259	2	262	8	1,255
Abscess	11	535	5	546	9	2,531
Other Diseases...	...	9	...	9	...	44
DISEASES OF THE SKIN:—						
Ulcer	35	833	4	868	50	11,641
Urticaria...	...	8	...	8	...	84
Eczema	...	247	...	247	9	2,698
Boil	1	170	...	171	3	1,212
Carbuncle	...	3	...	3	...	40
Herpes	...	6	...	6	...	52
Psoriasis...	...	...	...	...	...	6
Oriental sore	...	4	...	4	...	...
Tinea	...	15	...	15	1	1,545
Scabies	...	11	...	11	...	924
Acne	...	1	...	1	...	40
Prickly heat	...	...	...	...	...	11
Other Diseases...	1	56	2	57	2	733
INJURIES:—						
General	...	41	9	41	3	812
Local	57	1,205	23	1,262	52	15,389
TUMOURS:—						
Benign	2	33	...	35	1	119
Malignant	...	9	4	9	2	6
Malformations	1	12	...	13	1	9
POISONS:—						
Vegetable	...	3	1	3	...	5
Animal	...	6	1	6	...	9
Other Poisons	...	8	1	8	...	9
PARASITES.						
ANIMAL PARASITES:—						
Protozoa...	...	...	...	...	...	...
Trematoda (Flukes)	...	2	...	2	...	...
Cestoda:—						
Tænia solium	...	22	...	22	1	164
Tænia Sagninata	...	4	...	4	...	19
Other Cestodes	2	...	...	2	...	...
Nematoda:—						
Ascaris	...	69	...	69	2	2,594
Tricocephalus dispar ...	...	3	...	3	...	...
Trichina	...	...	...	...	...	...
Dracunculus	15	102	...	117	1	451
Filaria	...	10	...	10	..	69
Strongylus	...	...	...	...	...	...
Ankylostomum	11	431	104	442	6	244
Oxyuris	...	1	...	1	...	7
Other Nematodes ...	...	1	...	1	...	1
Insecta:—						
Insects producing myiasis	...	...	...	...	...	11
Dematophilus penetrans	...	26	...	26	2	207
Other Insects	...	...	...	...	...	12
Total	480	12,641	724	13,121	596	105,972

TABLE VI.

QUININE ISSUED GRATIS FOR PROPHYLACTIC PURPOSES DURING THE YEAR 1916.

Number of grains issued to Europeans	922,225
,, ,, ,, ,, ,, Natives	584,449
,, ,, ,, ,, ,, School Children	90,630

TABLE VII.

SURGICAL OPERATIONS PERFORMED DURING THE YEAR 1916.

Total Number.	Cured.	Relieved.	Unrelieved.	Died.
1,401	1,231	128	12	30

ANNUAL REPORT FOR THE YEAR, 1916.

By W. Ralston, B.Sc. (Lond.) F.I.C., Government Chemist, Nigeria.

The work dealt with herein covers a period of about six months only as I was absent on leave of absence from the 13th June till the 19th December.

2. The samples submitted are classified in the following table.

Kind.	Dept. Submitting.	No.	Total.
Gin	Customs	20	—
Rum...	,, ...	8	—
Wines, etc....	,, ...	9	—
Whisky, Brandy	,, ...	6	—
Perfumery...	,, ...	18	—
Toilet Requisites and Drugs ...	,, ...	17	—
Provisions	,, ...	11	—
Matches	,, ...	12	101
Water	—	16	16
Chemico-legal	Police	6	—
Miscellaneous	Health Office, etc., ...	4	—
Minerals	P.W.D.	10	—
Cylinder Oil	Railway	2	22
			139

3. *Customs Work.*—The bulk of the samples as usual has again been supplied by the Customs Department. The brands of Trade Gin sampled were Buffalo (3 samples being collected from Akassa, Koko-Benin and Brass Station), Turkey (4 samples from Brass), Paddle (2 samples from Brass), Dollar 3 samples from Boma), Guinea fowl and Monkey Brands (1 sample each from Koko-Benin), 1 sample Geneva from Warri, and one sample each of Young's Old Tom Gin and Finest Drv Gin came from Calabar.

The weakest Gin was the Dollar and Lion Brands from Boma and Warri showing about 29% alcohol, but the average strength for most was about 38%. The Gin from Calabar was not Trade Gin and showed 45 to 46% alcohol. The residues were free from any injurious or foreign substances. The Rum was ordinary Trade Rum, containing from 29 to 37% alcohol, but one sample entered as "Alcohol" contained 48%—5 samples came from Brass, 2 from Koko-Benin and 1 from Sapele.

The strength of Whisky was found to run from 38·7% (Ajax) to 44% (Benho). 2 samples (X. T. C. and Ben-ho) were received from Onitsha, 2 samples (Ajax and Finest Old Scotch) from Calabar and 1 (Old Scotch) from Sapele.

One sample of Brandy came from Onitsha, and was found to contain about 46% alcohol. These are normal strengths and nothing injurious was found in any of the residues.

Under Wines are included 6 samples of Zanol Concentrated Extracts containing about 26% alcohol. These were of different flavours and were intended to be sweetened with sugar aud diluted with water in suitable proportions. A sample of Schweppes' Kola Wine from Calabar, one of Kola Tonic from Akassa and a sample of a compounded liquor from Onitsha called "Ginco" were found to be non-alcoholic.

Perfumery.—15 samples were from Lagos, 1 from Calabar and 2 from Degema. 13 of these samples were free from alcohol, a Lavender Water gave 27% and the remaiuing four contained amounts varying from 60·3% to 72·4%.

Toilet Preparations and Drugs.—Five of these samples were for washing and dressing the hair, five were liniments for trating wounds and bruises exterñally while the other medicines were for internal application. Five were received from Lagos, 7 from Calabar, 2 from Burutu, and one each from Degema, Forcados and Warri. Nine of these samples were found free from alcohol, two contained 15 and 17% respectively, other two showed 39·2% while the remaining four gave 56%, 68%, 69%, and 80% respectively.

Provisions.—These were chiefly of different brands of Salmon; one was a tin of Sardines and another a tin of boiled Beef. These were all found to be wholesome and fit for human food, being free from injurious drugs.

Matches.—These samples came from Eket, Onitsha, Burutu Sapele, Calabar, Abonema, Brass and Koko-Benin and the brands included were Yew Tree and Sun, Three Shields, Lion, Mail, Lancer, Captain Webb, Trumpet, Three Stars, Red Hand, Jonkoping. They were all found free from White Phosphorus.

4. *Water Analyses.*—Two samples came from the Eastern Railway at Port Harcourt and 4 were Udi Colliery Waters. A sample of Iju Water was analysed for the Locomotive Department at Ebute Metta in order to find if there was anything present likely to cause the pitting of two boilers, but such water did not seem a probable cause. Seven samples of water were analysed for the Municipal Sanitary Officer of Lagos, 4 being from selected Public Standpipes and such Iju water was found to be satisfactory. Another sample was from the Wesleyan Mission Well which used to be one of the best supplies in Lagos, but though of fair quality it was found not to be nearly so pure as the Iju supply.

Two samples were sent by the Medical Officer at Ibadan and were drawn from a fairly deep Well on the Railway Area.

This water was found to be a soft water of fair degree of purity, suitable as a source for drinking water.

5. *Chemico-legal Work.*—Six sacks of Palm Kernels were submitted by the Police Department for investigation as to the cause of a fire which occurred in the hold of a ship loading in the Lagoon. The fire seems to have broken out in several separate places in the cargo which consisted of bags of Kernels solidly packed, tier on tier. No person could have got in to start such fires in each place at the same time so the probable cause lay either in some incendiary bombs having been criminally laid in with the bags or in the possibility of spontaneous combustion. The conclusion arrived at favoured the latter idea, as all the circumstances seemed to support it. The Kernels had been stored some time in the bags, and it was the dry season. There had been a blazing sun and little breeze for several days previously during the period of loading and so not only was the fibre of the sacking made very dry but also it would have become more oily from the heated Kernels exuding oil and there was very little chance of the heat being reduced in a closed full hold. Such oily fibre would absorb oxygen from the air very readily and in these circumstances the temperature would rise so high as to cause oily vapours to inflame and so start the fires. The sacs showed that the fires started at them and not inside among the Kernels, and after the fire the fibre of the sacs held from *20 to 25% of oil.*

6. *Miscellaneous Work.*—Ten Minerals were analysed for the Public Works Department, 5 from Zungeru (being 1 Limestone and 4 Clay Rocks) and 5 Limestone from Lagos. Two samples of Cylinder Oil were examined for the Locomotive Department at Ebute Metta, one being an oil obtained from the Cameroons.

Two lots of a Nutrient broth were neutralised for the Acting Director of the Medical Research Institute; and the tannin in the liquor from a tan pit was estimated for the Health Officer of Lagos, in addition to the Salinity of water found in a crab-hole.

7. *Experimental Work on Preparation of Alcohol from Yam.*—A report was submitted in June before sailing on leave giving the results obtained so far in this investigation. Since then I have had the benefit of reading up this subject as regards the production of spirit from Potatoes and find the distillers' loss of the starch amounts from 15 to 20%, the yield of alcohol corresponding to the remainder, 100 kilograms of starch giving about 57·5 litres in practice.

Taking Potatoes as containing 20% and Yam as containing 30% starch and calculating the yield of absolute alcohol (100% under the same conditions (viz., allowing 15% starch to be lost) the results may be shown tabulated as follows:—

Source.	Starch.	Starch lost 15 %	Yield of Alcohol (100%)	Remarks.
Kg.	Kg.	Kg.	Litres.	
1. Potatoes ... (100)	20	3	12·2	From distillers' figures, this would represent their maximum yield.
2. Yam ... ... („)	30	4½	18·2	
3. „ ... ... „	„	—	18·4	This is the volume of the 14·8 Kgms. (%) given as my best result.

Comparing the third result in this table with the second, it will be seen my opinion as to the probable yield of alcohol from yam on a manufacturing scale is well justified. The difficulty in conducting the fermentation properly, met with in my experiments, appears to have been most probably due to the deficiency of food-stuff to develop the yeast, as the technical reference states that "Potato mash has not

enough food-material for the vigorous production of yeast, and the yam analysis shows its composition to be very similar to potatoes save in containing more starch. Hence as with potatoes, yam mash would require to be fermented in presence of some other substance like a *Malt Wort*. It is proposed to try a mixture of Maize and yam which are likely to be suitable as sources in this country, the Maize being malted as shown in my report to provide the diastase necessary for the saccharisation of the starch in the yam, as well as the food-material for the yeast.

8. *General Remarks.*—The continuance of the war has greatly reduced the number of samples submitted through affecting the importation.

One of my Native Assistants was transferred during my absence on leave, and the other Assistant has been in the Laboratory 4½ years so that I now begin to derive a little benefit from his training. He is useful for conducting the more mechanical processes and attending to lamps and other minor operations although a great deal of vigilance is necessary to prevent him making mistakes as he has practically no theoretical knowledge of the scientific principles underlying his work.

The work done for the Railway Department might very well be increased in future.

W. RALSTON,
Government Chemist.

6.3.17.

Chemical Laboratory,
Yaba.

MEDICAL RESEARCH INSTITUTE, LAGOS, ANNUAL REPORT, 1916.

The eighth Annual Report is presented herewith.

The work done has been described under main headings which will be found in the index.

Dr. Connal was on duty from 1st January until 6th April and from 9th September until 31st December.

Dr. H. Sinclair Coghill was on duty from 2nd April until 31st December.

The post of Laboratory Attendant remained vacant throughout the year.

There were no changes in the native staff.

It was again a privilege to undertake the medical supervision of the adjacent Lunatic and Leper Asylums.

Meteorological records, which were taken daily, and the bacteriological analyses of the Lagos Water Supply, which were made regularly, are not included in this Report, as the figures can be found in the publications of the Departments concerned.

Helminthiasis.

It is rare to find a sample of fæces from a native West African free from ova of one or more of the worms Ascaris, Ankylostomum and Trichuris.

The Ascaris, so far as the experience of this Laboratory goes, appears to cause little systemic disturbance, save occasional colicy pains, sometimes constipation and seldom diarrhœa. Many of the ova present the larger longer oval of the unfertilised variety.

Trichuris ova occur in the fæces with much the same frequency as Ascaris, with this difference that whereas the latter is extremely rarely found in the stools from a European resident, the former are not at all uncommonly encountered. As with Ascaris, the pathological results of harbouring Trichuris are not prominent, but there are grounds for suspecting, particularly in Europeans, that some degree of anæmia is caused.

No exact statistics have been collected regarding the prevalence of these two worms, except as concerns the residents at the Yaba Lunatic Asylum.

During 1915 some observations were made as to the prevalence, signs and symptoms and treatment of Ankylostomiasis amongst the lunatics and the staff of that institution and further results will now be described.

It will be remembered that the conclusion was reached that the infection with Ankylostomes amongst these people was almost universal, that obvious signs of ill health due to the worm were absent and that the Thymol treatment, as carried out, had been of little avail in expelling the parasite. What follows, deals with the conditions eighteen months after the treatment.

One hundred individuals were examined. This number is made up of 51 lunatics and 20 members of the staff with 29 of their children. All these with the exception of one lunatic and eleven children were reported on in 1915. All the adults save one lunatic had received Thymol treatment in that year but only five of the children had been so treated.

The ages of the adults ranged from 30 to 50 years, those of the children from 1½ to 17 years.

The usual physical examination of skin, chest and abdomen was made.

Thereafter the fæces were searched for parasites and finally the blood was examined, the Hæmoglobin estimated by Tallquist's method, the red and white cells enumerated, a differential leucocyte count made, and notes taken of blood parasites and of changes in the red cells.

Ankylostome ova were found in the fæces of all. The diagnosis was made in each instance from a little of the fæces on the end of a match, slightly moistening the mass with tap water and examining under a ⅞" square coverglass, using a low magnification. It was not necessary in any case to resort to one or other of the methods for concentrating ova in fæces.

The eggs were found in this first sample in 71 cases. A second sample was necessary in 14, a third in 5 cases, a fourth in 2 and a fifth in one.

A second stool had to be examined in the remaining seven cases, and in four of these, a positive finding was not obtained until a third stool had been searched.

For convenience of description and comparison the cases have been allocated to four groups.

Group I consists of those in whose fæces there were the ova of Ankylostomum, Ascaris and Trichuris. Group II contains those who harboured only Ankylostomum and Trichuris. Group III is made up of those where Trichuris ova were absent but the eggs of the other two were present, and Group IV includes those who were infected with Ankylostomes alone.

There were 26 male lunatics. The details of those are set out in Table I. Nine fall into Group I. Cysts or free forms of Entamœba histolytica were present in the fæces of six, spirochætes in unusually large numbers occurred in two, and Cercomonas also in two, although there was no apparent intestinal irritation. No blood parasites were observed. The total red cells per cmm were distinctly below normal in three cases, Nos. 3, 6 and 7, and the hæmoglobin percentage was subnormal in these also. A chronic cystitis was present in case 3, there was a large bleeding malignant ulcer of the foot in case 6 (he died from this cause in December) and case 7 was one of the two in which Spirochætes were abundant in the fæces.

Group II includes seven of the twenty-six. The intestinal protozoa observed were E. histolytica in 6 and Cercomonas in two. Schistosome ova occurred in the fæces of one. Embryos of Loa loa were noted in the day blood of three.

The total red cell count was satisfactory in all as was also the hæmoglobin percentage except in case 12, but the colour index in this last was normal.

The third Group comprises four individuals. E. histolytica was present in the stools of two and embryos of Acanthocheilonema perstans were noted in the blood of one. The blood-counts were practically normal, save in case 18 where the red cells just reached five million per cmm but the colour index was above unity.

Group IV contains six cases. The fæces of two contained Balantidium and Giardia was present in one. Embryos of Loa loa and of A. perstans were present in the blood stream of one patient each. Case 22 had a bladder infection with Schistosomum which explains the somewhat anæmic blood picture.

There is no clear evidence, therefore, amongst the male lunatics of a grave anæmia due to the presence of Ankylostomes and in no case were there œdema or any signs of cardiac involvement.

The number of female lunatics examined was twenty-five. Only two individuals come into Group I. One was infected with Tetramitus.

Group II includes the biggest proportion, namely thirteen. E. histolytica occurred in the fæces of 7, Cercomonas in one and Giardia in one.

Case 32 was distinctly anæmic, the mucous membranes being pale and the demeanour listless but there was no œdema.

Three cases make up Group III. E. histolytica was present in two and Giardia in one. The total red cell count was very low in case 43 but apart from this the patient was active and cheerful. Her age was about 50 years.

The remaining seven come into Group IV. E. histolytica was noted in five, Cercomonas in one and an unusually large number of Spirochætes in one.

Embryos of Loa loa were seen in smears from the day blood in one and of A. perstans in another.

As regards the cellular content of the blood, the figures were satisfactory in all.

With the exception of cases 32 and 43, in which there was distinct anæmia, it cannot be said that the female lunatics suffered definitely from harbouring Ankylostomes. The full figures are in Table II.

The personnel of the staff consists of 12 males and 8 females.

Group I contains four males and one female. The intestinal protozoa were E. histolytica in one and Cercomonas in another. The blood counts are high.

Group II includes four males and 3 females. E. histolytica was present in 5 and Cercomonas in two.

Case 59, male, showed 0·4% Myelocytes (neutrophil). There was a certain amount of pallor of the mucous membranes, and physically a slow intelligence and a lack of energy which were all probably due to the effect of the Ankylostomes. Case 67, female, was passing small shreds of mucus, containing pus cells, erythrocytes and active E. histolytica, but there was no actual diarrhœa and the case was more probably one of chronic Dysentery than Ankylostomiasis.

Three males and two females are placed in Group III. E. histolytica was found in the stools of two, Cercomonas in one and Balantidium in one. Embryos of A. perstans were observed in the blood of one.

Case No. 69 (female) was distinctly anæmic and in the absence of other causes it must be presumed that the condition originated in the Ankylostome infection.

Group IV is made up of three cases which do not require comment.

Tables III and IV give all the details.

Amongst the children there were 21 boys and 8 girls.

Group I bulks largest, containing 11 boys and 4 girls.

Only two, one boy and one girl showed a definite anæmia, the signs in the boy being the more distinct. Case No. 80, he was aged 15 years.

There was a well marked poikilocytosis. The Eosinophils reached 47·8% in a total leucocyte count of 11,675 per cmm. The case was very probably one of Ankylostomiasis anæmia The diagnosis was less certain in the case of the girl, No. 85, age 6 years, inasmuch as she harboured both E. histolytica and Quartan malarial parasites.

Group II is blank. Group III contains 12, 9 boys and 3 girls. The Hæmoglobin percentage was 65 in case 93 (male aet 2 yrs) and case 97 (female aet 2½ yrs).

In both these individuals malarial parasites were plentiful, subtertian in the former and Quartan in the latter.

Group IV has two cases, a boy and a girl.

The details are set out in Table V.

The colour-index was calculated on a count of six million red cells as the male standard and five and a half million as the female standard.

Summarising, 38 male adults showed ankylostome ova more or less abundant, but never difficult to find and in none of these was there clear evidence of Anæmia due to the action of Ankylostomum. Thirty-three adult females, all showing ankylostome ova in the fæces, yielded only two cases in which reasonable grounds were present for believing that an anæmia due to the action of Ankylostomes had occurred.

Amongst 29 children there was only one, a boy of 15 years who definitely suffered from Ankylostomiasis anæmia.

Schistosomiasis. In addition to the two cases of this infection, noted above, two cases, one in a male child and the other in a male adult, both natives were seen in Lagos. Only one specimen of urine from each case was obtained, the ova being of the terminal spined variety in both.

A few adult male Schistosomes were obtained from the portal vein of an ox, slaughtered in Lagos.

Filariasis. Twenty-six blood smears collected from as many natives at Ikom and 14 from Etomi were received in December. Embryos of A. perstans were present in 11 of the former and 8 of the latter and embryos of Loa loa were also found in one of the 11 and one of the 8 cases. Two male lunatics and one female as already noted, also harboured A. perstans. Embryos of Loa loa were found in the blood of 5 lunatics, and in two Europeans at Ebute Metta.

Two labourers attached to the Institute complained on the same day (13/11/16) of "fever" and vague body pains. The temperature in one case registered 99°·6 and in the other 99° F. Embryos of A. perstans were very abundant in the blood. The patients received no treatment but were kept under observation. The temperature was normal on the following day, and within three days the embryos lessened greatly in numbers and the pains disappeared.

Embryos of F. bancrofti were found in the blood of one male native from Lagos.

Tæniasis. Ten specimens of T. saginata from natives were received, during the year, from Calabar.

One specimen of Dipylidium from a cow was sent from Lokoja.

Some adult Trichuris were received from Sapele, and some adult Ankylostomum duodenale from Ikot-Ekpene.

TABLE I.

Male Lunatics.

No.	Group.	Hb%	Total reds.	Total whites.	Intestinal protozoa.	Blood parasites.	Neutrophil %	Eosinophil %	Mononuclear %	Remarks.	Colour index.
1.	I	90	5,700,000	6,250	E. histolytica	...	51·4	15·6	11·8	...	90/95
2.	I	90	5,433,000	10,625	E. histolytica	...	47·8	17·4	8·8	...	90/90
3.	I	75	5,166,000	6,875	E. coli	..	35·2	16·4	8·4	Chronic cystitis	75/85
4.	I	95	5,800,000	11,250	E. coli, Spirochætes	...	35	12·8	11	...	95/97
5.	I	95	5,966,000	7,500	E. histolytica Cercomonas Blastocystis	...	35·8	3·6	24	...	95/98
6.	I	70	4,766,000	18,125	E. histolytica Blastocystis ...	...	61·4	8·2	9·2	Malignant ulcer	70/78
7.	I	85	5,133,000	7,187	E. histolytica Spirochætes Cercomonas Blastocystis	...	28·4	14·6	15·2	...	85/85
8.	I	90	5,766,000	7,187	E. histolytica	...	37·2	10·8	13·6	...	90/95
9.	I	95	5,600,000	9,870	Nil	...	37·2	5·2	21·6	...	95/93
10.	II	95	5,450,000	8,650	Nil	...	59·2	8	11·2	...	95/90
11.	II	90	5,633,000	12,500	E. histolytica Blastocystis ...	...	30·2	11·2	29·2	...	90/93
12.	II	85	5,133,000	13,125	E. histolytica Blastocystis Cercomonas	Embryos Loa loa	30	17·4	11·2	...	85/85
13.	II	90	5,363,000	9,900	E. histolytica	,,	33·8	19·2	18·2	...	90/88
14.	II	95	5,900,000	11,200	E. histolytica Cercomonas ...	...	50	6	23·2	Schistosomiasis (rectal)	95/98
15.	II	90	5,600,000	10,625	E. histolytica	Embryos Loa loa	38	20·2	10·2	...	90/93
16.	II	90	5,500,000	10,000	E. histolytica Blastocystis ...	...	37·2	24	14	...	90/92
17.	III	95	5,633,000	11,250	E. coli	...	34·4	26·4	10·4	...	95/93
18.	III	95	5,033,000	6,875	E. histolytica	...	39·4	17	16·2	...	95/83
19.	III	90	5,633,000	9,687	E. histolytica	..	39	10	14·4	...	90/93
20.	III	95	5,333,000	10,312	Blastocystis	Embryos A. perstans	46	16·4	7·4	...	95/88
21.	IV	90	5,540,000	8,125	Nil	...	48	7	12·2	...	90/92
22.	IV	65	5,200,000	8,125	Giardia	...	36	17·8	15·4	Urinary Schistosomiasis	65/87
23.	IV	95	6,040,000	11,250	Balantidium	Embryos A. perstans	50·4	18	14·2	...	95/100
24.	IV	90	5,233,000	6,875	Nil	...	38·2	21·8	12	...	90/87
25.	IV	95	5,600,000	8,750	E. coli Blastocystis	...	46·2	9·2	6	...	95/93
26.	IV	95	5,600,000	9,375	Cercomonas Blastocystis Balantidium	Embryos Loa loa	37·8	7	22·2	...	95/93

TABLE II.

Female Lunatics.

No.	Group.	Hb %	Total reds.	Total whites.	Intestinal protozoa.	Blood parasites.	Neutrophil %	Eosinophil %	Mononuclear %	Remarks.	Colour index.
27.	I	90	4,766,000	6,875	Tetramitus Blastocystis ...	. .	38·8	21·4	11·6	...	90/86
28.	I	90	4,900,000	8,125	E. coli Blastocystis	...	63	6·2	11	...	90/89
29.	II	85	4,600,000	8,750	Nil	...	57·2	6	10·6	...	85/84
30.	II	90	4,800,000	8,125	E. histolytica Cercomonas ...	...	31·4	17	12	...	90/87
31.	II	85	5,166,000	8,750	E. histolytica	...	56·8	12	9	...	85/93
32.	II	85	4,233,000	5,937	E. histolytica Blastocystis ...	...	66·6	4	7	...	85/76
33.	II	85	5,066,000	7,500	Nil	...	39	13·6	18·6	...	85/91
34.	II	90	5,130,000	8,125	Giardia	...	42·2	10·6	10	...	90/93
35.	II	90	5,400,000	11,875	Blastocystis	...	57·8	5·6	11·4	...	90/98
36.	II	80	5,500,000	10,525	E. histolytica Cercomonas Blastocystis	...	45·4	16	10·2	...	80/100
37.	II	90	5,533,000	8,387	E. coli, Cercomonas Blastocystis	...	49·6	11·4	13	...	90/100
38.	II	85	5,200,000	11,875	E. histolytica	...	50·4	8·6	12·2	...	85/95
39.	II	85	5,533,000	6,562	E. histolytica	...	35·8	22·6	12·6	...	85/100
40.	II	85	5,200,000	6,875	E. histolytica, E. coli ...	...	59·4	4·6	8	...	85/95
41.	II	85	5,733,000	11,250	Blastocystis	...	28·2	17	17·8	...	85/104
42.	III	85	5,120,000	8,750	E. histolytica Blastocystis ...	...	60·4	7	8·2	...	85/93
43.	III	85	3,966,000	6,562	E. coli	...	48·2	8	17·6	...	85/71
44.	III	90	5,200,000	9,375	E. histolytica Giardia ...	...	60·2	4·6	15·4	...	90/95
45.	IV	85	5,133,000	9,375	E. histolytica	...	57·4	4·4	10·6	...	85/93
46.	IV	90	4,900,000	8,125	E. coli Blastocystis	...	63	6·2	11	...	90/89
47.	IV	85	4,933,000	6,562	E. histolytica Blastocystis ...	...	41·6	7·2	23·2	...	85/89
48.	IV	85	5,133,000	17,550	E. histolytica	Embryos A. perstans	68·2	3·8	12·4	...	85/93
49.	IV	90	5,100,000	11,250	Giardia Cercomonas	...	56·8	8·4	7·6	...	90/93
50.	IV	90	5,163,000	13,750	E. histolytica Spirochætes ...	...	59·6	6·2	12	...	90/93
51.	IV	90	5,766,000	14,375	E. histolytica	Embryos Loa loa	55·8	9·6	9·2	...	90/104

TABLE III.

Asylum Male Staff.

No.	Group.	Hb%.	Total reds.	Total whites.	Intestinal protozoa.	Blood parasites.	Neutrophil %	Eosinophil %	Mononuclear %	Remarks.	Colour index.
52.	I	95	5,733,000	8,725	Nil	...	52·8	4·2	9·6	...	95/95
53.	I	100	5,766,000	10,312	Cercomonas	...	44	11·4	9·8	...	100/95
54.	I	95	5,866,000	9,375	E. coli	...	46·4	6·8	13·6	...	95/97
55.	I	90	5,933,000	10,000	Nil	...	47·6	12	11·6	...	90/98
56.	II	95	5,700,000	11,875	Nil	...	32	23	15·6	...	95/95
57.	II	90	5,533,000	9,375	E. histolytica	...	24·4	13	18·2	...	90/92
58.	II	95	5,766,000	8,125	E. histolytica	...	50·4	3·6	13·6	...	95/95
59.	II	85	4.166,000	10,000	E. histolytica	...	22·4	10·8	24·6	O. 4% Myelocytes	85/68
60.	III	90	5,600,000	12,812	E. coli, Cercomonas	...	34	22·4	12·6	...	90/93
61.	III	95	5,533,000	10,000	E. histolytica	Embryos A. perstans	38	14·8	17	...	95/92
62.	III	90	5,900,000	8,750	E. histolytica Blastocystis ...	...	41·6	14	21	O. 6% pigmented	90/98
63.	VI	95	5.800,000	9,687	E. coli Blastocystis	...	31	22·4	12·6	Mononuclears	95/97

TABLE IV.

Asylum Female Staff.

No.	Group.	Hb%	Total reds.	Total whites.	Intestinal protozoa.	Blood parasites.	Neutrophil %	Eosinophil %	Mononuclear %	Remarks.	Colour index.
64.	I	85	5,433,000	9,375	E. histolytica	...	43·8	3·2	10·8	...	85/98
65.	II	90	5,666,000	10,625	E. coli, Cercomonas Blastocystis	...	47·2	5·2	10	...	90/102
66.	II	85	5,333,000	13,125	E. histolytica Cercomonas Blastocystis	...	46·4	15·4	7·8	...	85/96
67.	II	85	4,566,000	12,250	E. histolytica	...	55·2	2·6	7	...	85/82
68.	III	85	5,233,000	9,062	Balantidium Blastocystis ...	..	39·8	6	18·2	...	85/95
69.	III	60	3,866,000	7,187	Nil	...	37·6	12·4	10·2	...	60/69
70.	IV	85	5,200,000	9,682	Cercomonas Blastocystis ...	...	37	14·6	7·4	...	85/95
71.	IV	90	5,500,000	11,250	Blastocystis	...	48·2	17·6	7·4	...	90/100

TABLE V.

No.	Group.	Sex.	Age.	Hb.	Total reds.	Total whites.	Intestinal protozoa.	Blood parasites.	Neutrophil %	Eosinophil %	Mononuclear %	Remarks.	Colour index.
72.	I	M	13	85	5,933,000	7,812	E. histolytica Blastocystis ...	...	30·2	10·6	22·4	Pigmented Monos.	85/98
73.	I	M	6	85	5,500,000	10,937	E. histolytica	Quartan rings.	51·8	10·6	14·2	Myelocytes O. 2%	85/92
74.	I	M	10	90	5,833,000	11,250	E. histolytica Blastocystis ...	...	27·8	9·6	26·8	...	90/97
75.	I	M	6	80	5,500,000	13,750	Nil	...	30·6	20·4	16·6	...	80/92
76.	I	M	14	90	5,700,000	6,875	E. histolytica	...	31·4	19·6	12·8	...	90/95
77.	I	M	5	85	5,500,000	16,250	Nil	Quartan gametes.	30·8	20·8	14·4	...	85/92
78.	I	M	2	80	4,333,000	12,812	Nil	Quartan gametes.	28·2	5	35·4	...	80/72
79.	I	M	9	85	5,666,000	9,375	E. histolytica	...	33·2	15·8	25·4	...	85/93
80.	I	M	15	55	3,166,000	11,675	Nil	...	25·8	47·8	92	Poikilocytosis.	55/52
81.	I	M	6	85	5,100,000	9,375	E. histolytica	...	21·2	12·4	24	...	85/85
82.	I	M	8	80	5,400,000	12,500	E. histolytica Blastocystis ...	Quartan young.	46·8	14·6	15·8	Normoblasts Poikilocytosis.	80/90
83.	I	F	12	90	4,766,000	7,812	Nil	...	20·6	8	29·2	...	90/86
84.	I	F	10	80	5,933,000	9,375	E. histolytica Blastocystis ...	...	54·2	16·8	14·6	O. 4% Myelocytes.	80/107
85.	I	F	6	75	4,833,000	11,875	E. histolytica	Quartan gametes.	49·6	12·6	12·6	...	75/87
86.	I	F	10	85	4,866,000	7,500	Nil	...	32	9·6	18·4	Poikilocytosis.	85/87
87.	III	M	14	85	5,033,000	6,250	E. histolytica Blastocystis ...	Quartan rings.	33	20·2	15·4	...	85/85
88.	III	M	11	90	5,733,000	10,000	E. histolytica	...	28·2	17	17·8	...	90/95
89.	III	M	9	85	5,833,200	8,125	E. histolytica	Subtertian rings.	31	20·8	16·2	...	85/97
90.	III	M	9	85	5,500,000	8,750	E. histolytica	...	43	13	10	...	85/92
91.	III	M	5	85	5,500,000	7,812	Nil	...	27·2	27·8	14·6	...	85/92
92.	III	M	11	90	5,800,000	10,000	E. coli Blastocystis	Subtertian rings.	32	19·8	13	...	90/97
93.	III	M	2	65	4,800,000	12,500	Nil	Subtertian rings.	47·6	16·8	17	...	65/80
94.	III	M	1½	85	5,230,000	12,125	Mite	Subtertian rings.	35·2	3·4	30	...	85/87
95.	III	M	13	85	5,533,000	10,000	E. coli Blastocystis	...	25·6	20·6	20·4	...	85/92
96.	III	F	15	90	4,966,000	7,187	E. histolytica	...	25·6	11·4	7·2	...	90/89
97.	III	F	2½	65	5,266,000	8,387	Nil	Quartan rings.	25	12	27·4	...	56/94
98.	III	F	12	95	5,800,000	7,500	E. histolytica Blastocystis ...	...	28·2	31·8	17·4	...	95/105
99.	IV	M	4	85	4,266,000	8,125	Nil	Subtertian rings.	43·2	8	15·8	...	85/70
100.	IV	F	17	85	5,600,000	8,750	E. histolytica Blastocystis ...	...	44·6	10·8	7·6	...	85/102

Blackwater Fever.

The Annual Report on the occurrence of this disease in Nigeria during 1915 was not prepared, as, for various reasons the returns were incomplete and some cases were merely notified, no particulars, being furnished. It is now proposed to synopsise such information as has been collected during 1915 and 1916.

More or less complete data concerning 39 cases, have been supplied of which number 28 occurred in 1915 and 11 in 1916. Sixteen were reported from the Northern and 23 from the Southern Provinces, but it must be clearly understood that cases occurred in both years and in both Provinces, details of which are not to hand.

The cases came from the following places where Blackwater Fever has been known to occur previously, Lagos (including Ebute Metta and Iddo) (10), Minna (2), Zaria (2), Ibadan (2), Kano, Lokoja, Zungeru, Ilorin, Benin City, Warri, Degema, Brass, Forcados and Aro. The places where previous cases had not been known were Quall, Tilde Filani, Kuti Wenji, Abinsi, Bisichi, Gona Creek, Faiki, Nafada, Itu, Uromi, Otampa, Nomeh, and Patani.

The ages of the patients were 20, 22, 24 (4), 25 (2), 26, 27 (9), 28, 29, 31 (2), 33, 34 (3), 35 (2), 36 (2), 37, 39, 40 (3), 42, 45, 49 and 56 years.

All were of British birth and nationality except 10, of which number there were 3 West Indians (negroes), 2 "Syrians," 2 Italians, 1 French, 1 German and 1 West African Negro.

All were males except one.

The number of cases occurring in the different months was, January 2, February 2, March 3, April 0, May 0, June 3, July 4, August 4, September 5, October 7, November 6 and December 3.

As regards the period spent in the tropics, 26 had no experience other than in West Africa.

The total periods in these cases were 9½ years, 9 years (2), 8 years, 7½ years, 7 years (2), 4 years (3), 3½ years, 3 years (4), 2½ years (3), 2 years (4), 1½ years, 14 months, 13 months, and one some years. The negro had spent his 24 years in Nigeria.

The tropical experience of the remainder was—

(1) 19 years, Rhodesia, East Africa, Angola and 1 year in West Africa.

(2) "Many years" in South Africa and Gold Coast and 2 months in Nigeria.

(3) "Some years" in Cyprus and 4 years in Nigeria.

(4) 8 years "off and on" sailing between Liverpool and West Africa.

(5) 7 years in East Africa and 10 years in West Africa.

(6) "Sometime" in British Honduras and 2 years in Nigeria.

(7) "Had lived in Malay States" and 14 months in Nigeria.

(8) "All over the East, as a sailor" and 3 years in West Africa.

(9) 32 years in Trinidad (West Indian) and 2 years in Nigeria.

(10) 24 years in West Indies (West Indian) and 8 months in Nigeria.

(11) 22 years in West Indies (West Indian) and 8 months in Nigeria.

(12) "Syrian" much travelled, and 2 years in Nigeria.

(13) "Syrian" much travelled, and "many years" in Nigeria.

It is to be understood that except in the case of the West Indians, the Syrians, the Negro, and seven others, one of whom had spent 7 years, three of whom had spent about 3 years and the other three about 2 years or less in Nigeria, the usual few months of leave had been enjoyed at home.

The length of the tour in which the disease was contracted, was one month, two months (3), three months, four months (3), six months (2), eight months (3), nine months (3), ten months (2), eleven months (3), twelve months (3), fifteen months, twenty-one months, twenty-four months (3), two and a half years, three and a half years (5), and seven years. It was given as "many years" in one case.

Government officials numbered 19 and non-officials twenty.

Six patients had previously suffered from Blackwater Fever, and two of these had had two previous attacks. The interval between the last and the present was 3 months, 7 months, one year, 2 years, "two attacks in the previous three years," six years and seven years.

There was a definite history of antecedent attacks of malaria within the preceding six months in every case with the exception of one where it was stated there had been no malaria.

Regarding the prophylactic use of Quinine it was stated to be "regular" in four cases, "five grains daily" in five cases. It was "every other day," "twice a week" frankly "irregular" or "only when feeling unwell" in the remainder.

The particular salt used in prophylaxis was mentioned in 18 cases. The Bisulphate was used in 9, the Hydrochloride in 5, the Sulphate in 2, and the Bihydrochloride and Euquinine in one each.

Information regarding the administration of quinine immediately prior to the attack of Blackwater Fever is incomplete in many instances. The data respecting 24 cases have been included in Table VI.

Rigor is mentioned as having occurred in 17 cases, an hour or two before the passing of blackwater in 13 and shortly after the appearance of haemoglobinuria in four. It was definitely absent in four. Jaundice was noticed in 31 cases. It appeared on the first day of illness in 25, it was first observed on the second day in 2 and it was merely noted as "present" in 4 cases.

Pain was complained of by 21 patients. It was referred to the loins in 8, to the back in 5, it was "abdominal" in 3, "epigastric" in 2, "hepatic" "over the spleen" "round the umbilicus" "at the back of the neck" in one case each, the limbs ached in two instances and headache was present in seven individuals. Four patients made no complaint of pain.

Vomiting occurred in 33, slight in the mild cases and persistent in the severe. There was no vomiting in two cases.

Enlargement of the spleen was noted in three cases.

As regards unusual clinical features, ascites and oedema of the scrotum occurred in one case, sore lips and gums, a septic throat, and impairment of near vision also come into this category.

The fear of impending death was present in one case which recovered.

Diarrhoea was noted in 3 cases and frequency of micturition in two.

TABLE VI.

Salt of Quinine.	Dosage.	Onset.	Interval.
Hydrochloride	10 grains evening 2-1-15	? 4-1-15	About 12 hours.
	5 grains „ 3-1-15		
?	5 grains thrice daily 17-1-15	11 p.m. 18-1-15	About 3 hours.
	5 „ „ „ 18-1-15		
Hydrochloride	5 grains thrice daily 3-3-15	Forenoon 5-3-15	About 36 hours.
Bihydrochloride	5 grains intramuscularly	2 a.m. 3-6-15	19 hours.
	7 a.m. 2-6-15		
Hydrochloride	5 grains in morning 14-6-15	Forenoon 14-6-15	A few hours*
Sulphate	5 grains thrice daily 11-6-15	9 a.m. 14-6-15	14 hours.
	5 grains once 12-6-15		
	5 grains once 13-6-15		
Hydrochloride	5 grains thrice daily 25-6-15	During night 26-6-15...	A few hours* (relapse)
	15 grains intramuscularly		
	26-6-15 evening		
Hydrochloride	15 grains 3-7-15	? 3-7-15	8 hours.
Bihydrochloride	10 grains 29-7-15	? 29-7-15	3 hours.
?	5 grains 4 p.m. 7-8-15	6 p.m. 8-8-15	2 hours.
	5 grains 1 am. 8-8-15		
	5 grains 4 p.m. 8-8-15		
Bisulphate	10 grains daily in liquid for six weeks (grains V morning and evening)	5 p.m 4-10-15	9 hours.
Hydrochloride in solution ...	10 grains 9 a.m. and 6 p.m. 10-10-15	8 p.m. 11-10-15	14 hours.
	10 grains 6 a.m. 11-10-15		
Bihydrochloride	5 grains intramuscularly 10 a.m. 4-11-15	8 p.m. 4-11-15	10 hours.
Bihydrochloride intramuscularly	7½ grains intramuscularly 4-11-15	7 a.m. 6-11-15	About 12 hours.
Hydrochloride by mouth ...	10 grains by mouth, morning and evening 5-11-15		
Bisulphate	10 grains 8 a.m. } 5-11-15	? 6-11-15	A few hours.
	15 grains 3 p.m. }		
Bisulphate	About 10 grains evening of 12-11-15	Early morning 13-11-15	About 12 hours.
Hydrochloride	5 grains morning } 3-12-15	2 p m. 4-12-15	3 hours.
	10 grains 2 p.m. }		
	15 grains 11 a.m. 4-12-15		
Hydrochloride	10 grains 2 p.m. 6-3-16	4 a.m. 7-3-16	14 hours.
Bisulphate	5 grains evening 9-7-16	7 a.m. 10-7-16	Less than 12 hours.
Bisulphate	10 grains evening 12-10-16	Morning 13-10-16	Less than 12 hours.
Bisulphate	10 grains 6 p.m. 16-10-16	8 p.m. 16-10-16	2 hours.
Enquinine	5 grains morning 27-10-16	Midnight 27-10-16	About 16 hours.
Bisulphate	10 grains 21-11-16 10 grains 22-11-16	6 a.m. 24-11-16	Less than 12 hours.
	15 grains 23-11-16 (evening)		
Bihydrochloride	10 grains 9 a.m. 4-12-16...	3 p.m. 4-12-16	6 hours.
Hydrochloride	5 grains mid-day 18-12-16	6 p.m. 18-12-16	6 hours.

* The same case.

Distension of the abdomen, hiccough, and suppression of urine characterised five fatal cases.

The duration of haemoglobinuria was 8 days, 7 days, 6 days (4), 5 days (3), 4 days (6), 3½ days, three days (9), 2½ days, 2 days (5), 1½ days (3), one day, 16 hours and 12 hours.

There were three cases of relapse. The interval was 7 days and the duration of the haemoglobinuria in the relapse 2 days, in one case, 2 days and one day respectively in the second case, and in the third, information was received of a relapse on board ship the patient having been invalided as soon as he was fit to travel after his primary attack.

Death resulted in 8 cases, in two of which there was a history of a previous attack of Blackwater Fever.

The blood was examined in 31 cases. The day of disease on which the smears were taken is not stated in 11 and the results of these were "no parasites" in 9, "subtertian" in one, and "no parasites; haemoglobin 70%; red cells 4,400,000 per cmm; white cells 4,900 per cmm; large mononuclears 18%" in one.

It so happened in one case that blood smears were obtained two days before, one day before and on the actual day of the onset of the haemoglobinuria. Subtertian rings were few in the first set of smears, numerous in the second set, and absent in the third. Pigmented mononuclears were present in the last two. Anisocytosis was a feature of all 3 sets of slides. The differential leucocyte counts were:—

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional.	Mast cells.	Myelocytes.
2 days before ...	57·2	21·2	3·8	6·4	3·4	7·8	0·2	...
1 day before ...	52·4	20·4	12·2	7·2	3	4·2	0·6	...
Day of onset ...	61·4	22·2	5·8	6	1	3·2	0·2	0·2

The blood was examined on the day of onset in five other cases. The results in two were merely "one parasite," in one case, and "no parasites" in the other.

Differential leucocyte counts were made in the remaining three:—

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional.	Mast cells.	
I	56·2	17·4	10·4	9·6	1	5	0·4	One erythrophage (mononuclear).
II	67	7·4	3·2	6	16·4	...	...	Anisocytosis.
III ...	81·6	5	1·4	8·4	1	2·4	0·2	Aniso-poikilocytosis.

No parasites and no pigmented mononuclear cells were found in any of these three cases. Several differential counts were made in the last case:—

	Polymorph.	Small lymph.	Large. lymph.	Mononuclear.	Eosinophil.	Transitional.	Mast cells.	Myelocytes.	Normoblasts.	Megaloblasts.
1st day ...	81·6	5	1·4	8·4	1	2·4	0·2	...	...	...
2nd day ...	82	2·8	1	11·2	...	2·4	0·6	...	...	...
3rd day ...	64	11·4	4	17·6	0·4	2·6	...	...	...	...
4th day ...	50	18	6·6	20·4	3·2	1·8	...	...	...	...
5th day ...	63·4	8·6	2·8	14	2	2·4	0·4	4·6	1	0·8
7th day ...	60·2	8·6	3·2	19·4	3	4	...	...	...	1·6
13th day ...	66·4	13	4·2	9·2	4·2	2·8	...	...	0·2	...

On the second day mononuclear erythrophages were 0·8% (4 in 500 leucocytes), one having ingested one red cell, another 3, another 5 and the fourth was merely vacuolated.

On the third the erythrophages were 1·6% (one with 1, and one with 3 red cells ingested). On the fourth day the percentage was 0·8, on the fifth 0·4 and on the seventh day they were 0·6%. They were not observed on the thirteenth day.

The blood was not examined until the second day of illness in five cases. In two of these the results given are merely "no parasites; some pigmented mononuclears" and "no parasites; large number of transitionals" respectively. Differential leucocyte counts were made in the other three.

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional.	Mast cells.	Myelocytes.	Normoblasts.
I. 2nd day	71	8·6	2·2	10	...	6·6	0·2	1·4	...
3rd day	62	8·8	3·2	17·6	1·8	6	0·2	0·4	...
5th day	65·4	11·4	2·4	11	0·8	7·2	0·4	1	0·4

No parasites or pigmented mononuclear cells were seen on any occasion but anisocytosis, poikilocytosis and basophilia were noted. Erythropages (mononuclear, vacuolated) were 0·8% on the second day, 2·2% on the third and 1·6% on the fifth day.

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional.
II. 2nd day	75	10·6	5·6	7·6	...	1·2
3rd day	67	15·4	8·2	5·4	0·6	3·4

No parasites and no pigmented leucocytes were seen in this case but there was obvious inequality in the size and shape of the red cells. No erythrophages were encountered.

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional.	Mast cells.	Myelocytes.	Normoblasts.
III. ...	63·4	10·2	5·4	10·4	0·2	2·4	0·2	7·6	0·2

There was distinct poikilocytosis. The erythrophages were 0·2 per cent.

An examination of the blood was first made on the third day of illness in 3 cases. The findings were (1) "no parasites" (2) "no parasites; a few pigmented mononuclear leucocytes; haemoglobin 60%; polymorph 59·42%, large and intermediate mononuclears 12%, small mononuclears 31%, eosinophils 1·5%" (3) "no parasites; haemoglobin 50%; polymorphs 67·5% large and intermediate mononuclears 14%; small mononuclears 18·5%."

Blood smears were first taken on the fourth day of illness in three cases. In the first case, the patient was not seen until the 4th day and he died a few hours thereafter. The results of the examination were that no parasites were found but a few pigmented mononuclear cells were observed. There was considerable poikilocytosis.

The differential leucocyte count was:—

Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Transitional.	Mast cells.	
37·5	5·6	11·4	41	4·4	0·1	(1,000 leucocytes counted).

One thousand mononuclear leucocytes were then examined and it was found that those of endothelial origin amounted to 32%, three of these cells containing malarial pigment.

Five hundred endothelial cells were next scrutinised, 74·6% had no ingested red cells, 20% had one, 4% had two, 0·8% had three and 0·6% had four ingested red cells. During this last count, one normoblast was met with.

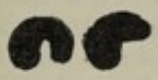
The results in the other two cases were (1) "no parasites; several pigmented leucocytes; many abnormal shaped R.B.C.; Polymorphs 60·9%, large and intermediate mononuclears 22·8% small mononuclears 8·5%, eosinophils 7·1%, mast cells 0·4% and hæmoglobin 30%," (2) "no parasites, hæmoglobin 70% ploymorphs 55·5%, large and intermediate mononuclears 12%, small mononuclears 31%, eosinophils 1·5 per cent."

The blood was first examined on the 6th day of illness in one case. There were stippling and polychromasia of the erythrocytes and anisocytosis and poikilocytosis. No parasites nor pigmented mononuclear cells were seen. The differential leucocyte count was:—

Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional	Mast cells.	Myelocytes.	Normoblasts.
57·8	12·8	5·6	6·2	2·2	0·4	0·2	12·2	2·6

Five hundred myelocytes (they were all neutrophil) were classified according to the shape of the nucleus as under:—

240



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The remaining two cases in which a blood examination was made were:—

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Transitional.
I 7th day	63	23·8	7·2	5·4	0·6

There were no parasites and no pigmented mononuclear cells and there were many normoblasts.

	Polymorph.	Small lymph.	Large lymph.	Mononuclear.	Eosinophil.	Transitional.	Myelocytes.	Normoblasts.
II 8th day	73	9·4	5·4	6·2	0·6	3·8	0·6	0·4

No parasites, but a few pigmented mononuclear cells were seen, and anisocytosis was evident.

Dr. L. H. Booth has added a note on the urine to the description of one of his cases.

"A striking fact was the very high degree of acidity of the urine, all through the illness. The urine kept for 24 hours in bulk without turning putrid at all. The daily quantity was from 70–90 ounces all along. The first specimen passed free from hæmoglobin was almost colourless and the next few specimens, instead of being highly acid were neutral, with a phosphatic deposit. Later on, each specimen became

highly acid again, and highly coloured, containing much bile, but the specific gravity did not vary, remaining at 1,015 throughout. This continued for 4 days.

The urine then became more or less normal. Glucose had been administered throughout the illness, and it was stopped at about the time when the urine became normal. The urine at times had a peculiar odour, similar to acetone. Profuse drenching sweats were common every day. It seems as if many of the symptoms in the case may have been accounted for, by an Acidosis."

Dr. A. H. Wilson has also sent notes of his case in a negro, at Benin City. "Sambo. Ejaw tribe. Male. Age 24.

Came to Hospital, January 8th 1915, complaining of 'feeling cold, with slight headache.' Temperature 101°F. He stated his urine was black, and he passed, on request, 4 ounces of porter-coloured urine. The specific gravity was 1,025 the reaction neutral; albumen about $\frac{1}{4}$, deposit on standing, greyish brown, consisting of granular debris, granular casts and a few red blood corpuscles. The blood film on this date showed no parasites.

He is a robust healthy strong man, not anæmic and showing no sign of being ill.

The only history obtainable from him regarding the present illness is that he has been feeling cold for 10 days and passing black urine for 3 days.

His past history is that during the last three years he has had three attacks of "Blackwater," this being the third. During the two previous attaks the Blackwater lasted 2 months, not every day during this period but for 1 to 3 days at a stretch, associated with shivering, the non-Blackwater periods extending from 2 to 4 days. He does not appear to have been seriously ill at these times, nor to have had any severe symptoms; sometimes there was vomiting, but not always and never severe, no pain or tenderness in Epigastrium, no loin pain, no Jaundice.

The course of the present illness has been as follows:—the urine contained hæmoglobin up to 14th January, steadily decreasing and the albumen steadily decreased also, ceasing on the same date.

During this period the patient's general condition remained good. There were no marked symptoms of any sort. There was slight vomiting on two days only, 8th and 10th January. There was no pain or discomfort anywhere and no jaundice at any time. The temperature fluctuated between 101°F and 98°F until the first week in February."

It is necessary to insert here some comments on "Studies in Blackwater Fever, V. On the importance of furnishing population statistics in connexion with cases of Blackwater Fever", by J. W. W. Stephens, Annals of Tropical Medicine and Parasitology Vol. X No. 3 pp 345–356.

It is impossible to disagree with the suggestions of this author as regards the collection of statistics. It is true that such statistics as are furnished are incomplete. Dr. Stephens' paper, properly read must be understood to be not a complaint against those who forward the facts of the cases, but rather as a powerful plea for a real investigation into the nature of the disease. At present it is impossible to state the number each month, in stations where a case of Blackwater Fever occurs (*a*) of officials (*b*) of non-officials (*c*) of Syrians, Asiatics, West Indians, etc. (*d*) of natives, nor their age periods, nor their African service, nor their previous attacks of Blackwater Fever, nor their attacks of Malaria during the previous six months, nor the quinine prophylaxis, nor the proportion of the sexes. A few figures might be obtained in small stations.

Seamen's Hospital Society
TROPICAL DISEASES
16 MAY 1923
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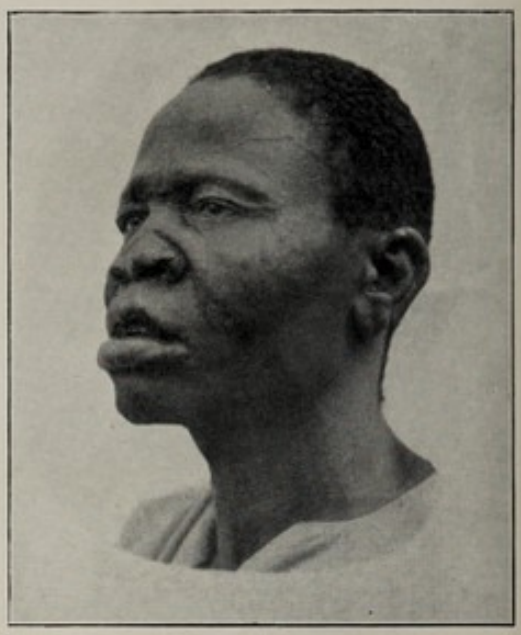
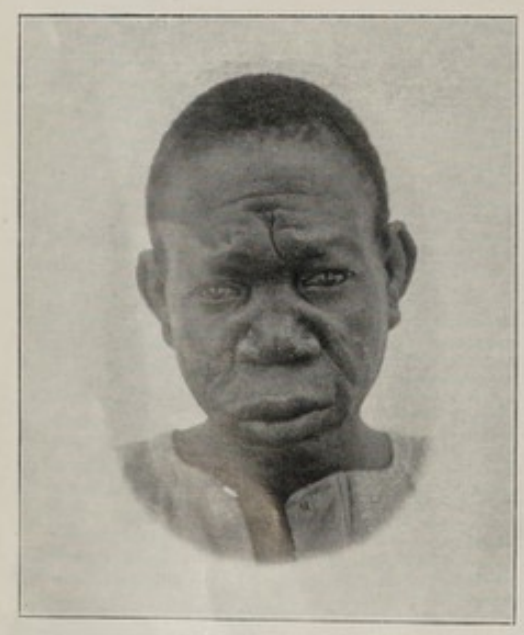
CASE I.

May, 1916.



December, 1916.

CASE II.



May, 1916.

December, 1916.

Not one, but many whole-time statisticians would be required and such observers would have to remember amongst other things that it is given to few officials, non-officials and others to remain long in one station, that "a go of fever," in West Africa is, to many, Europeans and natives alike, less upsetting than a "common cold", and forgotten within a week or two, and also that while there are over 17 million inhabitants of Nigeria there are less than fifty qualified medical men to attend to their illnesses.

Leprosy.

The method of treatment of this disease, described by Surgeon Victor G. Heiser, U.S. Public Health Service, in his Report "Leprosy. Its treatment in the Phillipine Islands by the hypodermic use of Chaulmoogra Oil Mixture" has been tried with some of the inmates of the Yaba Leper Asylum.

The treatment was begun in May, 1916 so that it is as yet too soon to make a complete report, more particularly as all the patients are old-standing cases.

The outstanding results only are described, and some photographs are attached.

The oil-mixture used was that recommended by Heiser, Chaulmoogra oil 60 cc, Camphorated oil 60 c.c. and Resorcin 4 grains. The mixture was sterilised by boiling, and 2 c.c, injected intramuscularly into the buttock, were given as an initial dose. After the lapse of one week, 3 c.c were given and this dose was increased by 1 c.c per week until 8 c.c were being administered. Beyond this amount some discomfort was complained of, so that the procedure finally adopted was to inject 6 c.c twice a week. This dose was well tolerated and every case responded to treatment. The most rapid and obvious effect was the healing of ulcers, many of them large and deep, and of many years' duration. Softening, then absorption of the nodules, fading of the maculæ and the return of sensation were also observable, even to the patients themselves. Seven cases have been selected for description.

Case I, Male. Age 38 years. Inmate of Asylum for 4 years. First noticed the disease 11 years ago.

Face leonine. Skin of face infiltrated and yellowish in colour.

Nodules on cheeks, ears, lips and nose.

Anæsthetic patches, both arms and both legs.

Maculæ right hand and both legs.

Treatment begun 19.5.16.

By December, 1916, the nodules had been considerably absorbed, particularly in the lips, nose and ears. The photographs show distinct wrinkling where absorption has taken place, and the lips, nose and ears are smaller. Sensation has returned in both arms, but only slightly in the legs, whilst the maculæ have disappeared except from the lower part of the legs.

Case II, Male. Age 21 years. Inmate of Asylum for 6 years. First noticed the disease 7 years ago.

Leonine expression. Skin of face thickened. Large nodules over and between eyebrows and on nose, cheeks, ears and lips.

Anæsthetic patches, both arms and both legs.

Maculæ on shoulders, back, buttocks, chest and abdomen.

Treatment begun 19.5.16.

By December, 1916, the nodules on cheeks, lips, ears and nose had in great part been absorbed. The anæsthesia had disappeared from the arms except for a small area on the left.

The maculæ had completely disappeared.

Case III, Male. Age 40 years. Inmate of Asylum for 11 years. First noticed the disease 24 years ago.

Greater part of both arms from elbow downwards, anæsthetic.

Similarly with both legs from knee downwards, and also an area above right knee. Also two areas on the back of the trunk.

Many maculæ on chest, abdomen, shoulders and back.

Treatment commenced 19.5.16.

By December, sensation had returned to both arms except from the wrist downwards.

The anæsthesia had also disappeared from the area above the right knee, and below the knee in both legs a slight recovery of sensation had taken place.

The maculæ had completely disappeared except from the abdomen, where they were becoming more faint.

Case IV, Male. Age 30 years. Inmate of the Asylum for 3 years. First noticed the disease 7 years ago.

Both arms anæsthetic, left from two inches above elbow, and right, from just below elbow, downwards. Patches of anæsthesia over left ankle and foot; and right leg from below knee completely anæsthetic.

A deep ulcer, active over 2 years at the base of left middle finger, extending down into the palm. An ulcer also on stump of left ring finger.

Treatment begun 19.5.16.

By December, sensation had returned to the left arm as far as the elbow (downwards there was still anæsthesia) and on the right arm sensation was present as far as the wrist. There was complete sensation in the left leg, but only a slight return in the right.

Both ulcers had completely healed.

Case V, Male. Age 45 years. Inmate of Asylum for seven years. Disease started "when a small boy."

Anæsthesia over left arm from elbow downwards except for a small area at back of wrist. The left knee and foot are anæsthetic.

Patches of anæsthesia back and front right leg, below knee.

A large deep ulcer $2\frac{1}{2}$" in diameter on sole of left foot.

Treatment begun 28.9.16.

By December, sensation had been completely restored to the left arm and right leg. Over the left knee also sensation had returned but there was little improvement below the ankle.

The ulcer had completely healed.

Case VI, Male. Age 25 years. Inmate of Asylum for two months. First noticed the disease two years ago.

The face and the back of the head and neck, with numerous maculæ, all anæsthetic.

Treatment. begun 5.6.16.

CASE IV.

May, 1916.

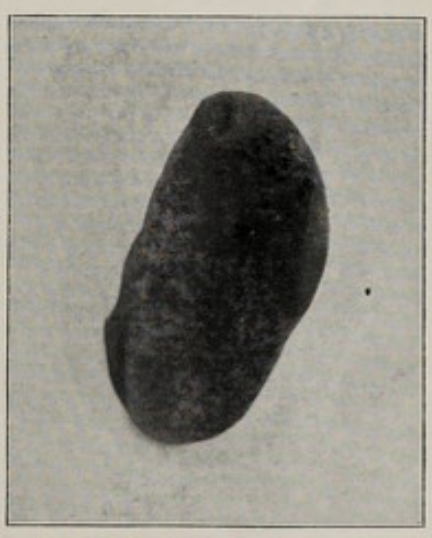
December, 1916.

CASE V.

Large deep ulcer,

2½ inches in diameter,

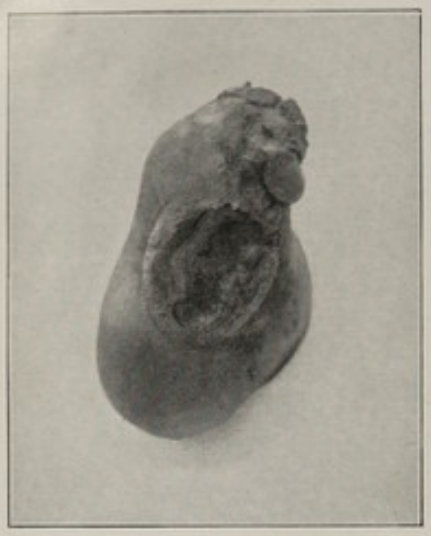
sole of left foot.



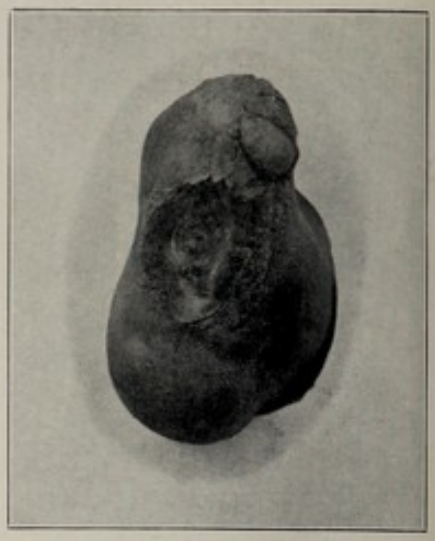
September, 1916.

December, 1916

CASE VII.



September, 1916.



December, 1916.

Seamen's Hospital Society
TROPICAL DISEASES
16 MAY 1923
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By December, 1916, sensation returned, except to a small patch over occipital prominence.

Maculæ have disappeared except from left cheek.

Case VII, Female. Age 50 years. Inmate of Asylum for 12 years Disease started 24 years ago.

Both wrists and hands anæsthetic, also some anæsthetic patches on right upper arm. Complete anæsthesia below knee, lower two thirds of left leg.

Maculæ on left breast and both upper arms.

A large, deep, ragged ulcer middle third of left sole. Another ragged ulcer over area formerly occupied by base of left toes.

Treatment begun 28.9.16.

By December, 1916, sensation had been restored in the right upper arm and there was a slight improvement at the wrists. Sensation had returned half way down the left leg. The ulcer which occupied the area at the base of the toes had healed and cicatrised and the ulcer on the sole was filling up with healthy granulations.

Thanks are gratefully given to Dr. Pickels, Principal Medical Officer, Northern Provinces, Nigeria, for suggesting this course of treatment.

It should be added that Guaiacol Carbonate in five grains doses twice daily was found useful in controlling the febrile disturbance.

Spirochætosis.

Spirochætes similar to Spirochæta eurygyrata, Werner emend. Fantham, were observed in the faeces of 3 European and 35 native patients suffering from dysentery or diarrhœa and in 1 European and 27 native healthy individuals. The total number of the former examined was 102 Europeans and 156 natives. The number of healthy individuals was 29 Europeans and 170 natives.

For staining purposes Giemsa's method was employed. The smears were made in the usual manner and fixed whilst wet in osmic acid vapour. They were then placed in absolute alcohol to harden.

In fresh specimens from fæces examined a few hours after being passed, the movements of these parasites were exceedingly rapid, consisting of a regular wave-like flexion of the body by means of which they were able to move backwards or forwards with equal facility and a corkscrew movement especially noticeable when in contact with fæcal matter. The more rapid the movement the greater the number of waves or curves of the body observed in the same organism. In stained specimens the number of these varied between 2 and 10, depending also a good deal on the length of the parasite and to a lesser extent on its relative thickness—the thicker the parasites the smaller the number of waves and *vice versa*. In the very short members the movement was far more erratic.

As a rule the ends of the parasite were more or less pointed. No vacuoles were noticed in the body itself, but occasionally a diffuse nucleus in the form of chromatin granules could be made out.

The length varied greatly being 3μ. in the shortest to a little over 14μ. in the longest. With regard to breadth two varieties were noted, one being distinctly thicker and staining deeper than the other. To arrive at the exact measurement of these was not easy. The thickest would be probably rather less than 0·2μ.

The organisms can remain alive for several days if kept in moist fæces at room temperature. In fæces contaminated with urine they were found alive 2 days after being passed and in uncontaminated fæces they survived to the 4th day.

No untoward symptoms were noticed in Monkeys and Guinea pigs fed with generous doses of these parasites.

Conclusion.

It would appear that spirochætes similar to S. eurygyrata do not of themselves give rise to dysenteric or other inflammatory conditions of the intestine, though owing to the increase in their number when these symptoms are present it is possible that though not the direct causa agent—they may help to aggravate the inflammatory process or it may be that the conditions are more favourable to their multiplication than those met with in health.

Another spirochæte differing in many ways from the above was found in a specimen sent for examination by Dr. Gray of Lagos.

The patient, a European had been admitted to hospital with dysenteric symptoms.

Upon examination no amœbæ were to be found in the fæces—the only parasite observed being a fairly large spirochæte easily detected with $\frac{1}{7}$ in. objective and 3 in. occular.

Accident destroyed the only permanent specimens obtained—before the characteristics of the parasite could be more fully studied.

In the living state there was not the great variation in size as observed in S. eurygyrata—the average length would be roughly 12μ.

The most noticeable feature was the breadth of the body. This was certainly not less than 2μ.

The movement was much slower and the waves of the body larger and fewer in number—4 or 5 at most. The corkscrew motion was also less frequently noted. The ends of the organism were tapering but not so pointed.

The parasite did not survive in fæces kept after the 2nd day.

The following short notes on the case have kindly been supplied by Dr. Gray.

> "Mr. H. J. R. was admitted to Creek Hospital, Lagos, on June 12th, 1916, complaining of feeling weak and of pain in the stomach and hepatic regions.

Previous History.—Patient had done many tours in this Colony and had many attacks of malaria, none of them serious. He had never had dysentery or any other serious complaint apart from the attacks of malaria which he did not regard as serious.

Present Condition.—Patient looked ill. His skin and conjunctivæ had a subicteric tinge. His tongue was thickly coated.

Examination of the chest was negative.

Abdomen.—Tenderness was marked in the epigastric and hepatic regions, both spleen and liver were palpable.

Tenderness was felt in both iliac fossæ.

Urine.—Clear, amber colour, acid, Sp. Gr. 1,015, no albumin.

Course and Treatment.—Ol. Ricini $\frac{1}{2}$ oz. was given on the evening of admission and the morning stool was a curious orange colour and contained much blood and a little mucus.

Calomel gr. $\frac{1}{6}$ followed by a saline was given and the stools examined for amœbæ, but with negative results. In case the disease might prove to be bacillary dysentery, salines, $\frac{1}{2}$ oz. of sodium sulphate in hot water was prescribed hourly and also emetine gr. $\frac{1}{6}$ hypodermically was given daily. Before the emetine was given a specimen of the stool was sent to Doctor Coghill at the Medical Research Institute, Yaba. Doctor Coghill reported the absence of amœbæ and the presence, in large numbers, of an unfamiliar spirochæte.

It was thought that the condition might be one of spirochæte dysentery and treatment by salvarsan was proposed to and accepted by the patient; 0·25 grms. of kharsivan was injected intramuscularly into the buttock and 0·25 was injected into the lower bowel in the form of an enema. These injections were given on the 16th June.

Improvement was immediate and rapid. On the 19th of June blood and mucus were absent from the stool. Doctor Coghill reported on the 18th that the spirochætes were absent from the stool. The patient's condition improved remarkably in every way. On the 26th June, a little mucus was present in the stools but the spirochætes still remained absent. Amœbæ were never found at any time.

On the 26th, the patient felt so well that he left hospital in order to return to England. In the stool of that same morning Dr. Coghill found that the spirochætes had returned in smaller numbers and in what appeared to be a smaller type.

I advised Mr. R. to consult Doctor D. on his return to England. I do not at present know anything of the further progress of the case."

After four months leave in England, this patient returned to Lagos. The fæces were re-examined but no spirochætes were found.

Smears from six penile sores, and from three ulcerative skin conditions elsewhere were examined. Spirochæta pallida was found in three of the former.

Amoebiasis and other infections due to Intestinal Protozoa.

As noted under Spirochætosis, the fæces of 457 individuals were examined, in a search for intestinal protozoa. Two hundred and fifty-eight of these individuals suffered from intestinal disturbance as evidenced by dysentery or diarrhœa; of this number, 102 were Europeans and 156 natives. Cysts or active forms of Entamœba histolytica were found in the stools of 39 Europeans and 106 natives. The diagnosis was made under the belief that only one species of pathogenic intestinal entamœbæ existed. Had the description of E. nana. been available possibly some of the forms met with would have been classed under that name. These entamœbæ were the only protozoa (excepting spirochætes) found in 32 Europeans and 93 natives. In the other cases they were associated with one or more of the other protozoa.

Regarding the 199 healthy individuals (29 Europeans, 170 natives) cysts of E. histolytica were found in the fæces of fifty-three natives.

Tetramitus (Macrostomum) mesnili was found in seven healthy natives and in 3 European and 26 native patients.

Cercomonas hominis was observed in 15 healthy natives and in one European and 6 native sufferers from intestinal irritation.

Trichomonas intestinalis was not noted in any of the Europeans examined but it was found in the stools of 7 healthy and 9 sick natives. Lamblia (Giardia) intestinalis occurred in 4 healthy natives. Amongst those suffering from dysentery or diarrhoea, it was found in one European and two natives.

Balantidium coli also was not found in any of the Europeans. It was met with in 4 healthy natives and in three who had diarrhoea.

Blastocystis was met with in 32 healthy natives and in 96 who had dysentery or diarrhoea. It was found alone in the faeces in only 5 cases. Once it was noted along with Balantidium, once with Tetramitus, once with Lamblia and in 3 cases with Cercomonas. In all other instances it was associated with E. histolytica.

Four Europeans suffering from amoebic dysentery exhibited Blastocystis on the third or fourth day, when the symptoms had subsided under emetine.

A distinct seasonal influence was observed, during the course of these examinations. The largest number of individuals harbouring these parasites were met with during the wet season, and the parasites themselves appeared to be more abundant in the individual at that time of the year.

Faeces which had been mixed with urine were not included in the above analysis.

Two Tables are attached. Table VII includes the figures of all examinations and Table VIII deals with the cases in which only one species of protozoa was found causing the dysentery or diarrhoea.

From Table VIII it would appear that a spirochaete whose characters have not been fully studied, and also Tetramitus mesnili and Lamblia intestinalis are capable of causing an acute dysenteric illness.

Cercomonas hominis and Trichomonas intestinalis can give rise to diarrhoea.

TABLE VII.

	Healthy.		Sick.	
	European.	Native.	European.	Native.
	29	170	102	156
Spirochaeta eurygyrata	1	27	3	35
Cercomonas hominis	0	15	1	6
Trichomonas intestinalis	0	7	0	9
Tetramitus mesnili	0	7	3	26
Lamblia intestinalis	0	4	1	2
Balantidium coli	0	4	0	3
Entamoeba histolytica	0	53	39	106

Giving results of examination of fæces from 457 individuals, for intestinal protozoa.

TABLE VIII.

Cases in which only one species of intestinal protozoa was present in the faeces.

	Dysentery.		Diarrhoea.	
	European.	Native.	European.	Native.
Spirochaeta sp	1	0	0	0
Cercomonas hominis	0	0	0	1
Trichomonas intestinalis	0	0	0	2
Tetramitus mesnili	1	7	0	3
Lamblia intestinalis	1	2	0	0
Balantidium coli	0	0	0	0
Entamoeba histolytica	22	93	0	0

Yellow Fever.

One definite case occurred on a cargo boat which lay in Lagos harbour. The ship had just arrived from further down the coast, among the creeks.

According to the history the patient had been suffering from a febrile disturbance for three days before he was seen by a medical man, who was called in shortly after midnight. A few hours thereafter the patient died.

A post-mortem examination was made within 12 hours of death.

The body was that of a well nourished man of about 40 years of age.

Rigor mortis was present. The dependent parts were extensively discoloured.

There was no yellow colouration of the skin or of the conjunctivæ.

There were no petechia.

The handkerchief binding the chin, was stained red, and on removing it, the lips were seen to be covered with frothy bloods-stained mucus.

The body was warm on section. The subcutaneous and abdominal fat was abundant, light yellow in colour.

Lungs.—Old pleural adhesions, right apex.

Both lungs darkly congested, and profuse oozing on section.

No consolidation. No evidence of hæmorrhage.

Heart.—Pale and flabby, empty of blood, and with no clots. No aneurism, no injury.

No petechia on pleural or pericardial surfaces.

Liver.—Pale brownish yellow, and mottled with congested veins. Substance friable.

Gall bladder moderately full of dark thick bile, no inflammation.

Spleen.—Not enlarged, but deeply congested and quite diffluent.

Kidneys.—Deeply buried in fat. Acutely congested.

Stomach.—Quite empty. Over the major portion of the greater curvature there was extensive ecchymosis and a distinctly granular appearance of the mucous membrane but no actual ulceration.

Small intestine, nothing abnormal, contents a yellowish white grumous material.

Large intestine; nothing noteworthy.

Bladder walls injected. Organ contained only a few drops of pale, hazy urine.

Brain pale and œdematous.

"Impression" smears from Spleen, Liver, Kidney and Lung and also smears from the heart-blood showed no parasites or malarial pigment.

The urine was diluted with distilled water and centrifugalised. A heavy disc of albumen resulted from the addition of nitric acid to the fluid. The sediment was so profuse in bladder cells, that it was not possible to distinguish tube casts.

Microscopical examination of the organs confirmed the macroscopical diagnosis of Yellow Fever.

The liver showed a very advanced fatty degeneration somewhat unevenly distributed so that small groups of hepatic cells remained, showing only cloudy swelling. The normal outline of the lobules was entirely lost. There were numerous areas of capillary hæmorrhage.

The fibrous tissue was slightly increased.

The kidney showed fatty changes in the glomerular tufts and in the convoluted tubules.

The cells lining Bowman's capsules had desquamated. Necrosis and desquamation of the lining cells of the tubules generally were well marked. There were few capillary hæmorrhages. There was a considerable fibrous tissue increase.

The spleen showed dense leucocytic infiltration and there were many areas of hæmorrhage.

The lungs showed hypostatic congestion.

The brain showed nothing abnormal.

It was concluded that death had occurred at the time when hæmorrhages were taking place in the stomach. The jolting during transference from ship-board to mortuary had expelled the blood through the mouth.

Typhoid and Paratyphoid Fever.

Twenty-one specimens of blood serum were received during the year, to test against the typhoid and paratyphoid bacilli.

Most of the samples came from the Northern Provinces of Nigeria, where there appears to be more cases of typhoid fever than in the Southern Provinces.

Six sera agglutinated—Bacillus paratyphosus A only, four agglutinated Bacillus paratyphosus B only, and two agglutinated Bacillus typhosus only.

Other two sera agglutinated both types of the paratyphoid bacilli.

The remaining cases were negative.

During these tests, the sera were always put up against the Micrococcus melitensis also, but except in one case where there was a partial agglutination, all were negative.

Trypanosomiasis

Trypanosomes of the gambiense type were found in the blood of one native, from Calabar.

Smears from the gland-juice of five natives, were examined, but trypanosomes were found only in one (the same patient as above).

Amongst the lower animals, the blood of six dogs was examined, with negative results.

Blood smears from six duikers, two hartebeest, two water buck, one monkey, one cow, and one goat also showed no parasites.

Trypanosomes of the pecorum type were found in the only two pigs examined.

Out of 4 reed buck, trypanosomes of the vivax type were observed in three.

Of 3 horses, two were infected with trypanosomes resembling pecorum, and one with vivax.

Malaria.

Blood smears from 43 Europeans and 185 natives have been examined.

The parasite of subtertian malaria was found in 6 Europeans, being associated with the parasite of benign tertian in one. The parasite of quartan malaria was noted in two.

Amongst the natives the subtertian form was found in two adults, (along with the benign tertian in one) and the quartan parasite was also found in one. Twenty-nine of the natives were children and in this class the quartan parasite was found in 7 cases and the subtertian in five.

Tuberculosis.

Five specimens of tubercular disease of the lungs were received. They were all from natives and three were from Calabar.

Nineteen samples of sputum were examined for the tubercle bacillus.

The finding was positive in eight, one of these cases being a European.

Amongst the lower animals, tubercle bacilli were found in nodules in the liver from one chicken and also in the lungs and bronchial glands of a cow slaughtered in Lagos.

Tumours.

Pieces of tumour-mass received for examination, numbered nineteen.

Histologically they proved to be Epithelioma three, Scirrhus cancer two, (Pancreas and Stomach) Sarcoma two. Myxochondroma one, Fibroma nine, and simple ulceration, two cases.

Two specimens of fibroma were obtained from cows slaughtered in Lagos.

General Histology.

The following list shows the number of tissues examined:—

Liver	... 21	Glands ...	... 4	Pancreas	... 3
Kidney	... 14	Ovary ...	... 4	Stomach	... 3
Spleen	... 13	Brain ...	... 3	Heart	.. 2
Lung	... 11	Uterus ...	... 3	Intestine	... 2
Spinal cord ...	... 1.	Appendix	... 1.		

Amongst the lower animals there were received tissues from the following:—

Cow ...	... 5	specimens, acute Pleuro-pneumonia.
...	... 1	infarction of lung.
Pig ...	... 1	acute Pleuro-pneumonia.
Ram ...	... 1	„ „
Sitatunga	... 1	„ „
Horse	.. 1	(spleen and liver, Anthrax).

Other Clinical Material.

Smears:—

Gland juice	5	Nasal secretion	3 (all with *B. lepra*).
Abscess	4	From lung	1
From brain	2	From Urethral discharge	11
From spleen	3	From chancre	6
From Cerebro-spinal fluid	3	From pericardial fluid	1
From fluid in elbow joint	1	Blood smears	228
Sputum	20		

Hæmoglobin estimations 103. Total leucocyte counts 103. Total red cell counts 103. Differential leucocyte counts 149.

Analysis of urine 19. Examination of fæces 493.

Two urinary calculi and one set of gall-stones were obtained. One specimen of *Tinea ungium tropicalis* was received.

Under certain exceptional circumstances several vaccines were prepared.

The case of *Pyosis mansoni*, referred to in the 1915 Annual Report, required a second course of Vaccine treatment, which, like the first, cleared up the condition very rapidly.

The Wassermann test was also applied in a few exceptional cases.

During the absence of the Government Chemist on leave, several examinations of water and various plants and poisons were made.

Medical Entomology.

January.—Specimens of *Hippobosca maculata* and of *Glossina palpalis* were taken at Yaba. *Culiciomyia nebulosa* and *Anopheles costalis* were obtained in Lagos.

February.—*Culiciomyia nebulosa*, *Culex thalassius*, *Ochlerotatus irritans* were sent from Lagos.

March.—*Glossina palpalis* was caught at Yaba. *Stegomyia fasciata*, *Culex thalassius*, *Anopheles costalis* and *Culiciomyia nebulosa* were forwarded from Lagos.

August.—Mosquitos, bred from larvæ at Port Harcourt were identified as *Culex duttoni* (41) *C. consimilis* (13) *C. pruina* (4) *C. tigripes* (2), *Culiciomyia nebulosa* (14), *Stegomyia fasciata* (5).

Specimens of *Glossina caliginea*, and a larva of *Cordylobia anthropophaga* were also obtained from this station during this month.

September.—*Anopheles funestus* and *Tabanus taeniola* were caught at Obubra. *Stegomyia africana* was obtained from Ikom, also *Hippocentrum versicolor*. *Stegomyia luteocephala* and *Mansonioides uniformis* were taken at Adun. *Tabanus thoracinus* was taken at Yaba.

October.—Mosquitos bred from larvae at Brass were identified as *Culex thalassius* (55), *C. tigripes* (1), *Culiciomyia nebulosa* (12), *Anopheles costalis* (6), *Ochlerotatus nigricephalus* (5), *Stegomyia africana* (3).

Adult mosquitos caught there were *Anopheles costalis* (17), *Ochlerotatus nigricephalus* (13), *Culiciomyia nebulosa* (1) *and Stegomyia africana* (1). Four specimens of *Glossina palpalis* were also taken.

During this month also *Tabanus teniola*, *T. socialis*, *and T. ruficrus* were obtained at Ikom, also *Chrysops silacea*, *Glossina palpalis*, *G.*

caliginea, *Simulium damnosum*, *Anopheles costalis*, *Stegomyia africana*, *Mansonioides africanus*, *Culiciomyia nebulosa*, *Banksinella luteolateralis*, *Culicoides grahami*, *Ctenocephalus canis*, and *Cimex rotundatus*.

Three specimens of *Glossina palpalis* were taken at Yaba.

November.—*Tabanus ruficrus*, *T. sagittarius*, *T. kingsleyi*, *T. secedens*, *T. quadrisignatus*, *Glossina palpalis*, *G. fusca*, *Chrysops silacea*, *Anopheles mauritianus*, *A. theileri*, *A. nili*, *Stegomyia fasciata*, and *Stegomyia africana* were obtained at Ikom.

Chrysops silacea and *Glossina palpalis* were taken at Ilaro.

From Benin City and district there were received *Glossina palpalis* (17), *Chrysops silacea* (4), *Tabanus fasciatus*, *T. socialis*, *T. secedens*.

Five specimens of *Glossina palpalis* and 3 *Mansonioides africanus* were sent from Afikpo.

In December, *Glossina palpalis* was taken at Yaba.

Fifteen Specimens of *Tabanus combustus* were received, six of *T. besti*, three of *T. secedens* also *Glossina palpalis* and *Chrysops silacea*, taken on the Cross River and the creeks at Itu.

Other blood-sucking insects received, but date of capture not stated, were *Boophilus annulatus* (1), *Rhipicephalus sanguineus* (9), *Amblyomma variegatum* (1) (from horses and dogs) at Bende; *Glossina palpalis* (7) *G. tachinoides* (2) *Chrysops silacea* (5), *C. longicornis* (2), *Hippocentrum versicolor* and *Stomoxys omega*, from Ikot Ekpene and Uyo and *Glossina palpalis* (44) *Tabanus fasciatus* (12), *T. secedens* (4) *Chrysops silacea*, *Cordylobia anthropophaga*, *Hippocentrum versicolor*, *Stegomyia fasciata* (7), *Anopheles costalis*, *Mansonioides africanus* and *Mucidus mucidus* from Afikpo.

Encysted parasites in the liver of a cow slaughtered at Lagos, proved to be larvæ of *Porocephalus*.

Dissection and microscopical examination of the flies caught at Yaba, *Hippobosca maculata*, *Glossina palpalis* (6), *Culiciomyia nebulosa* (7), *Anopheles costalis* (2), *Culex thalassius* (2), *Ochlerotatus irritans* and *Tabanus thoracinus* yielded no noteworthy results.

Mosquito larvæ collected within the Municipal Boundary of Lagos, and sent for identification by the Sanitary Officer were:—

January.—*Anopheles costalis*, *Stegomyia fasciata*, *Culex rima*, *C. insignis*, *C. fatigans*, *Ochlerotatus irritans*, *Uranotænia annulata*, *Culiciomyia nebulosa* (also *Cyclops* and *Psychodids*).

February.—*Anopheles costalis*, *Stegomyia fasciata*, *Culex insignis*, *C. thalassius*, *Ochlerotatus irritans*, *O. nigricephalus*, *Uranotænia annulata*, *Culiciomyia nebulosa*, *Micræedes inconspicuosa* (also *Cyclops*).

March.—*Stegomyia fasciata*, *Culex insignis*, *C. decens*, *C. thalassius*, *Ochlerotatus irritans*, *O. nigricephalus*, *Culiciomyia nebulosa* (also *chironomids*).

April.—*Anopheles costalis*, *Stegomyia fasciata*, *Culex insignis*, *C. decens*, *C. fatigans*, *Ochlerotatus irritans*, *Culiciomyia nebulosa*.

May.—*Anopheles costalis*, *Stegomyia fasciata*, *Culex decens*, *Ochlerotatus nigricephalus*, *Ochlerotatus irritans*, *Uranotænia annulata*, *Culiciomyia nebulosa* (also *Psychodids*).

June.—*Stegomyia fasciata*, *Culex decens*, *C. insignis*, *Ochlerotatus irritans*, *O. nigricephalus* (also *Cyclops*).

November.—*Anopheles costalis*, *Stegomyia fasciata*, *Culex decens* *Ochlerotatus irritans*, *Culiciomyia nebulosa* (also *Psychodids* and *Cyclops*

December.—*Anopheles costalis, Stegomyia fasciata, Culex decens, Culex fatigans, Culex grahami, Culiciomyia nebulosa* (also *Psychodids*).

At the request of the Director of Medical and Sanitary Services, a Map was prepared showing the distribution so far as is known, to date, of Glossina in Nigeria.

Mrs. S. L. M. Summers Connal is responsible for the identifications.

ACKNOWLEDGMENTS.

Material was gratefully received from Dr. Ashton, Dr. Booth, Dr. Braithwaite, Mr. Brandt, Dr. Cobb, Mr. Cooper, C.M.G., Mr. Cross, Dr. Currie, Dr. Dalziel, Dr. Ellis, Sir. John Eaglesome, Dr. Ferguson, Dr. Foy, Dr. Franklin, Dr. Gray, Dr. Grieve, Dr. Johnson, Dr. Johnston, Dr. Kapo, Dr. Lobb, H.E. Sir Frederick Lugard, Mr. Lymburn, Dr. Lynch-Burgess, Dr. Mackey, Dr. Macpherson, Dr. Maples, Dr. Martyn-Clark, Dr. Montgomery, Dr. Moore, Dr. Morehead, Dr. Neale, Rev. Mr. Noble, Dr. Norman, Dr. Parkinson, Dr. Pirie, Dr. Pollard, Dr. Randle, Dr. Ross, Dr. Sandeman, Dr. Sapara, Dr. J. J. Simpson, Dr. Smythe, Dr. Suffern, Dr. Taylor, Dr. J. W. Thomson, Dr. Twomey, Mr. Warren, Dr. Watson and Dr. A. H. Wilson and from the following stations Abakaliki, Adun, Afikpo, Aro, Bamenda, Benin City, Brass, Calabar, Ibadan, Ibi, Ikom, Ikot-Ekpene, Ilaro, Jemaa, Kaduna, Kano, Lagos (including Ebute Metta) Lokoja, Minna, Naraguta, Obubra, Onitsha, Port Harcourt, Sapele, Tamale, Warri, Zaria, and Zungeru.

A. CONNAL.

H. SINCLAIR COGHILL.

INDEX TO MEDICAL RESEARCH INSTITUTE REPORT.

ANNUAL SANITARY REPORT ON PRISONS FOR, 1916.

PRISONS.	Average No. of prisoners per night.	Site area in square yards per prisoner.	Percentage of area prison compounds covered by buildings.	Average cell space in cubic feet per prisoner.	Average ventilation area in square feet per prisoner.	Total number of prisoners medically treated.	Total number of prisoners unfit for duty	Average number of days off duty of prisoners unfit.	Death rate per 1,000.
Abeokuta	124	65·5	11·5	559·2	5·07	245	102	9·2	16·1
Badagry	16	62·4	23·0	1066·4	14·02	34	8	13·4	62·5
Ibadan	91	36·1	24·3	328·3	4·03	282	44	14·4	98·9
Lagos	346·63	40·4	25·8	394·0	5·1	1,119	303	8·2	28·8
Benin-City ...	121·47	33·5	15·5	227·2	2·5	720	121	6·2	74·1
Forcados	65·25	135·8	7·3	324·5	5·2	248	60	11·9	30·6
Ifon	33·3	60·0	17·6	424·2	1·3	...	...	...	...
Kwale	120·76	37·91	20·9	241·7	1·6	495	107	4·5	33·1
Okwoga	86·12	24·18	17·0	90·5	·92	351	81	8·8	34·8
Onitsha	162·9	56·6	27·6	431·0	5·6	787	244	11·7	110·5
Sapele	121·9	83·0	11·5	610·3	8·6	427	83	9·8	73·8
Ubiaja	74·7	36·2	19·3	364·3	11·5	206	65	16·3	80·3
Udi	41·08	36·7	...	4668·8	·56	141	62	21·8	146·05
Warri	200·5	14·9	11·9	153·4	1·3	659	255	11·9	94·7
Enugu	495·76	27·4	15·8	191·2	3·7	2,052	1,057	9·5	308·6
Ogwashi	82·8	13·4	31·9	197·1	1·4	34	16	16·4	...
Aflkpo	139·75	37·3	17·0	263·8	11·1	451	106	9·7	71·5
Okigwi	190·2	42·8	4·1	509·9	7·9	551	143	9·2	136·6
Ogoja	84·00	53·2	13·1	386·7	5·2	275	20	7·6	11·9
Obudu	40·4	1617·7	17·5	16460·5	119·0	74	30	4·4	99·0
Abakaliki	64·25	47·5	26·0	541·2	7·0	192	41	13·8	31·1
Calabar	345·33	34·7	20·1	496·5	8·6	1,039	321	9·4	40·5
Opobo	179·75	20·4	27·2	500·1	10·1	450	169	4·1	11·1
Degema	160·15	49·8	26·2	403·4	7·0	413	58	8·0	43·7
Brass	50·42	49·0	12·7	493·7	4·6	80	22	15·0	39·6
Owerri	192·2	46·3	21·4	539·6	3·7	695	158	8·9	31·2
Ikot-Ekpene ...	293	72·5	15·0	515·6	5·6	894	565	16·1	68·2
Bonny	62	35·8	36·0	1018·5	20·4	114	8	6·6	...
Obubra	91·6	...	...	...	...	297	81	7·14	54·5
Port-Harcourt ...	360·6	137·3	8·0	737·0	8·1	751	336	15·0	27·4

COLONIAL HOSPITAL,
LAGOS,
17th September, 1916.

Sir,

I have pleasure in submitting to you my report of the dental work done during 1916.

2. Number of Officials, wives and children, etc., attended:—

European Officials	132
Native Officials	205
Others	10
Total	347

3. The following conditions were treated:—

	Total for Year.
Caries simplex	305
Pulpitis	102
Dento-Alvealar Abscess	41
Odontalgis	3
Neuralgia	1
Periostitis	64
Suppurative Cervical Periodontitis (pyorrhœa) alveclaris	22
Pulpal polypus	3
Mucosal polypus	1
Exostosis	1
Erosion	5
Dilaceration	2
Gingivitis Acuta...	7
Antrum disease	1
Mandibulan dislocation...	1
Necrosis of Jaw	2
Gangrine of Pulp	4
Total	365

4. Treatments:—

	Total for Year.
Extractions	176
Conservative:—	
Synthetic porcelain	30
Amalgam (Silver)	92
Amalgam (Copper)	7
P. G. P. (Permanent Gutta Percha) ...	20
T. G. P. (Temporary Gutta Percha) ...	21
Root fillings and dressings	135
Cleaning, scaling	31
Total	530

5. *Prosthetic Work*:—

	Total for Year.
Crowns:—	
Gold	2
Porcelain	3
Pivots	2
Bridges	1
Dentures:—	
Gold and Vulcanite	25
Repairs:—	
Gold and Vulcanite	23
Total	56

6. Fees paid: £69 18s. 6d.

7. The views expressed in previous reports regarding the prevalence of dental caries have been confirmed during 1916. The reason for this proneness to caries cannot be definitely set down but is, I think, due to some extent to the noticeable lack of resistive power in most individuals combined with bad food and, in many cases, insufficient care. Pyorrhœa is very common and the worst cases have been found amongst the native patients.

8. The work which has been done is of a permanent nature and although it becomes increasingly arduous year by year it is rendered lighter by the interest which officials take in the treatment themselves and their appreciation of the services rendered to them.

9. I arrived in Nigeria from the Gold Coast on February 12th and in addition to Lagos which received two visits, I also visited Warri, Port-Harcourt, Bonny, and Calabar. At all these stations, I was kept very busy and a large amount of valuable work has been done.

10. *Itinerary*:—

Lagos ...	... February 12th to April 8th.
Warri ...	... April 14th to May 25th.
Port Harcourt	... June 10th to July 18th.
Bonny ...	... July 18th to 25th.
Calabar ...	... July 26th to August 20th.
Lagos ...	... August 29th to September 17th.

It will be noticed from the itinerary that a considerable time has been spent in bridging comparatively short distances. This has been largely due to circumstances connected with the war and to the difficulty and uncertainty of travelling generally. I am proceeding to Accra by the s.s. "Abinsi" scheduled to leave Lagos on the 18th instant.

I have the honour to be,

Sir,

Your obedient Servant,

H. F. HARDIE,

Government Dentist.

The Honourable,

The Director of Medical and Sanitary Service,

LAGOS.

St. Bartholomew's Hospital
TROPICAL DISEASES
16 MAY. 1923
LIBRARY

NIGERIA

NORTHERN PROVINCES.

ANNUAL

MEDICAL AND SANITARY REPORT

FOR THE

YEAR ENDING 31ST DECEMBER, 1916.

St. Mary's Hospital Portland
TROPICAL DISEASES
16 MAY. 1923
LIBRARY

Annual Report on the Medical Department, Northern Provinces, for the year 1916.

I. ADMINISTRATIVE.

STAFF.

The Medical Staff consisted of :—

(*a*) EUROPEAN.

1 Principal Medical Officer.
1 Deputy Principal Medical Officer.
2 Provincial Medical Officers.
4 Senior Medical Officers.
35 Medical Officers.

PROMOTIONS :—

Dr. J. A. Pickels was transferred on promotion from the Southern Provinces to be Principal Medical Officer *vice* Dr. F. Manning retired.

Dr. J. Currie was transferred on promotion from the Southern Provinces to be Senior Medical Officer.

Dr. C. E. S. Watson was promoted Provincial Medical Officer, *vice* Dr. H. P. Lobb, deceased.

TRANSFERS :—

Dr. C. F. Watson was transferred to the Gold Coast as Deputy Principal Medical Officer.

Dr. G. J. Pirie was transferred to the Southern Provinces, to be Sanitary Officer.

Dr. B. A. Percival was temporarily lent to Gibraltar.

Drs. W. A. Nicholson and E. J. Powell were temporarily transferred from Sierra Leone to this Colony.

APPOINTMENTS :—

Dr. G. F. Darker was temporarily appointed to be Medical Officer.

RETIREMENT :—

Dr. F. Manning, Principal Medical Officer retired, on pension.

DEATH :—

Dr. H. P. Lobb, Provincial Medical Officer, died at Kano.

The following Medical Officers served with the army in Europe and East Africa, viz. :—

Dr. R. F. Williams
„ A. J. M. Crichton
„ W. C. E. Bower *
„ J. T. Watt
„ W. A. Trumper
„ L. W. Davies
Dr. J. Lindsay
„ B. J. Courtney
Capt. J. M. Benson
Dr. C. J. H. Pearson
Capt. F. E. Bissell
Dr. H. North.

* Killed in Action.

The following Medical Officers served with the Military Forces in the Cameroons, viz.:—

Capt. F. E. Bissell
Dr. H. L. Burgess
„ W. G. Cobb
„ J. T. Watt
„ J. C. C. Hogan
„ C. W. McLeay
„ N. A. D. Sharp
Dr. P. W. Black
„ E. A. Chartres
„ L. W. Davies
„ L. Doudney
„ J. Lindsay
„ E. J. Porteous
„ W. A. Trumper
Dr. R. F. Williams.

Nursing Staff consisted of :—

1 Male Nurse.
2 Senior Nursing Sisters.
12 Nursing Sisters.

RESIGNATIONS:—

Miss. V. I. Shirtliff.
„ G. B. D. Pearson.
„ E. A. Evans.

APPOINTMENTS:—

Miss J. Murphy
„ A. L. Walker
„ D. C. A. Rolfs
„ B. Nesbitt.
Mrs. M. E. Tate
Miss E. B. Mellis
„ M. I. Rhind
As Nursing Sisters.

NON-COMMISSIONED OFFICERS:—

12 Sergeants.

APPOINTMENTS:—

Sergt. F. H. Plaum
„ T. W. G. Rogers
„ J. E. Kelliher
„ H. A. Baigent
„ T. H. Smitherman.
Sergt. H. Chipchase
„ H. Blair
„ N. W. J. Turnbull
„ A. Pretious
As Medical Subordinates.

RE-ABSORPTIONS:—

Staff Sergt. J. D. Cameron.
„ A. J. Milne.
„ A. A. Sims.

The following Non-Commissioned Officers, R.A.M.C., were serving with the Military Forces in East Africa, viz.:—

Sergt. J. Meason
„ J. E. Kelliher
„ H. A. Baigent
Sergt. C. M. O'Bergin
„ N. W. J. Turnbull
„ T. W. G. Rogers
Sergt. H. Blair.

Clerical Staff consisted of :—

NATIVE.

4 First class Clerks.
3 Second class Clerks.

APPOINTMENTS:—

D. E. Johnson, as First class Clerk.
N. O. Dixon, as Second „ „
J. H. Agusiobo, as Second class Clerk.

PROMOTIONS:—

J. E. Ogodazi, as Second class Clerk.

DISPENSING STAFF:—

3 Second class Dispensers.
7 Third „ „

HOSPITALS AND DISPENSARIES STAFF:—

4 Ward-Masters.
15 Head-Dressers.
10 Dressers.
4 Cooks.
4 Head-Ward Servants.
10 Ward-Servants.
4 Messengers.
2 Head-men of Ambulance.
39 Ambulance Bearers.
15 Dispensary Attendants.
3 Medical Orderlies.
1 Storeman.
2 Punkah boys for Hospitals.

The Sanitary Staff consisted of:—

(*a*) EUROPEAN.

1 Senior Sanitary Officer.
1 Sanitary Officer.

TRANSFERS:—

Dr. H. A. Foy, Sanitary Officer, was transferred to the Southern Provinces, on promotion as Senior Sanitary Officer.

Dr. W. D. Inness, Sanitary Officer, was transferred to Northern Provinces, *vice* Dr. H. A. Foy promoted.

(*b*) NATIVE.

1 Second class Clerk.
3 Inspectors of Nuisances.
1 Laboratory Attendant.
2 Mallamai Pupil Inspectors of Nuisances.

TRANSFER:—

J. B. Woode, Second class Clerk, from Secretariat, *vice* E. E. K. Addo.

DISMISSAL:—

E. E. K. Addo.

FINANCIAL.

	£	s.	d.
The total Revenue was	957	3	5

EXPENDITURE.

Personal Emoluments...	33,545	17	9
Other Charges	9,252	15	8
Total	42,798	13	5

II.—PUBLIC HEALTH.

(*a*).—GENERAL REMARKS.

It is only with a very small portion of the permanent native population that the Medical Officer comes into contact for the treatment of disease and it is therefore very difficult to ascertain with any degree of accuracy the prevalence, or even the existence, of various diseases.

As far as can be ascertained from observations made and information obtained, the general health has been satisfactory.

Although the number of European treated shows a steady decrease during the last three years,—the reasons for which are

various,—that of natives who have sought assistance is now almost as large as in 1914 when so many more stations were open.

EUROPEAN.

	1911.	1912.	1913.	1914.	1915.	1916.
Average European population ...	641	703	804	969	897	762
Number of Deaths	13	22	13	27	14	14
Death Rate per 1,000	20·28	31·29	16·16	27·86	15·6	18·3
Number Invalided	40	50	70	82	34	34
Invaliding Rate per 1,000	62·40	71·12	87·06	84·62	37·9	44·6

During the year seventeen Europeans died in the Northern Provinces the causes of death being as under:—

	Officials.	Non-Officials.
Blackwater Fever... ...	3	5
Adenitis	1	...
Tetanus	1	...
Diabetes	...	1
Carcinoma Pancreas ...	...	1
Paratyphoid	...	1
*Tuberculosis	...	1
†General Injury	2	1
Total	7	10

* French Non-Commissioned Officer.
† Not recorded in Table IV.

The number of deaths among natives was 227, an increase of 27.

INVALIDINGS.

	Officials.	Non-Officials.
Anaemia	2	1
Aphasia	1	...
Arthritis	1	...
Blackwater Fever... ...	3	...
Bronchitis	...	1
Colitis	1	...
Delusional Insanity ...	1	...
Emesis	...	1
Epididymitis	1	...
Cardiac Disease	2	...
Lymphangitis	1	...
Malaria	1	1
Malaria Boils	1	...
Neurasthenia	2	...
Pneumonia	1	...
Scleritis	1	...
Siriasis	1	...
Stricture of Stomach ...	1	...
Trypanosomiasis	1	1
Ulcers	1	1
Ulceration of Tongue ...	1	...
Rheumatism	3	1
Total	27	7

	1913.	1914.	1915.	1916.
Average European population	804	969	897	762
Total Number of Europeans Treated	1,547	1,506	1,137	990
Average frequency of Treatment of each ...	1·92	1·55	1·26	1·29

Insect-Borne Diseases.

Malaria.—Malaria still claims about the same proportion of cases among the Europeans as formerly. The total number of cases treated however has gone up from 1,598 to 1,918.

Blackwater Fever.—This affection still continues to cause an undiminished amount of sickness and death. During the last few years the incidence rate per 1,000 of average European population has shown a slow but continuous rise. (See Chart).

	1911.	1912.	1913.	1914.	1915.	1916.
Average European population ...	641	703	804	969	897	762
Number of cases	12	14	17	22	22	22
Incidence per 1,000 among average European population	18·72	19·90	21·14	22·70	24·52	28·87
Number of deaths	6	4	6	6	4	8
Death Rate per 1,000 of average European population	9·3	5·6	7·4	6·1	4·4	10·4
Case Mortality %	50	28·57	35·29	27·27	18·18	36·36

Yellow Fever.—No case of this disease has been reported.

Trypanosomiasis.—Four cases of sleeping sickness have come under observation, two of which were in Europeans. Of the four, three were reported from the Benue District and one from the Bauchi plateau.

Infectious and Epidemic Diseases.

Varicella.—In contradistinction to what occurs in the Southern Provinces, very few cases of this disease have been observed.

Variola.—Small outbreaks of small pox have been reported from various districts but these have all been easily controlled and no serious epidemic has broken out.

Enteric Fever.—Eleven instances of this affection have been observed, two in Europeans and nine in natives; fortunately no fatal result has occurred.

Dysentery.—This disease continues to cause a considerable amount of sickness but although the number of cases remains as great as in the previous year the mortality is less than half what it was then.

Tuberculosis.—The number of patients suffering from this infection who seek treatment is gradually increasing, 23 cases having been noted with 8 deaths.

Venereal Diseases.—These affections are responsible directly for 6·7% of the total cases treated, which is practically the same as in 1915; they are very prevalent and unfortunately are frequently regarded by the patients themselves as of no consequence.

Helminthic Diseases.

Persons suffering from these infections form 3·9% of the total patients treated.

Guinea worm is by far the most common but anchylostome infection is very frequent and much more so than is indicated in the table of diseases.

(*b*).—EUROPEAN OFFICIALS.

The health of European officials has been fair; the number of deaths remains the same as in 1915—although two were not due to disease—but the invalidings have increased.

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

	1915.	1916.
Total number of European officials resident	761	x
Average number resident	507	x
Total number on the sick list...	785	506
Total number of days on the sick list	4,699	5,257
Average daily number on the sick list	12·8	14·3
Percentage of sick to average number resident	2·5	x
Average number of days on the sick list to each patient ...	5·9	10·3
Average sick time to each resident...	9·2	x
Total number invalided	20	27
Percentage of invalidings to total number resident	2·6	x
Percentage of invalidings to average number resident	3·9	x
Total number of deaths	7	7 *
Percentage of deaths to total number resident	92	x
Percentage of deaths to average number resident	1·4	x

x Figures for 1916 are not available. * Two of these were not due to disease.

See page 43 for statistics for whole of Nigeria.

(*c*).—NATIVE OFFICIALS.

From the statistics available it would appear that the health of the native officials has shown a decided improvement in almost all the points mentioned in the subjoined table.

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

	1915.	1916.
Total number of native officials resident	802	x
Average number resident	594	x
Total number on the sick list...	850	588
Total number of days on the sick list	3,903	3,062
Average daily number on the sick list	10·7	8·3
Percentage of sick to average number resident	1·8	x
Average number of days on the sick list to each patient ...	4·6	5·2
Average sick time to each resident...	6·5	x
Total number invalided	3	22
Percentage of invalidings to total number resident	·37	x
Percentage of invalidings to average number resident	·5	x
Total number of deaths	7	5
Percentage of deaths to total number resident	·8	x
Percentage of deaths to average number resident	1·2	x

x Figures for 1916 are not available.

(*d*).—SOLDIERS.

Statistics for the year 1916 are not available.

(*e*).—POLICE.

The health of the members of the Police Force has, as far as can be ascertained, been satisfactory.

TABLE SHOWING THE SICK AND DEATH RATES OF THE NATIVE MEMBERS OF THE GOVERNMENT POLICE FORCE.

	1915.	1916.
Average strength of Police	936	893
Sick rate per 1,000 of average strength	...	...
Death rate per 1,000 of average strength	10·68	8·95

(*f*).—PRISONERS.

TABLE SHOWING THE SICK AND DEATH RATES OF PRISONERS IN THE GOVERNMENT PRISONS IN NORTHERN PROVINCES.

	1916.
Total number of prisoners passed through the Registers	2,418
Daily average number of prisoners	793
Sick rate per 1,000	115·7
Death rate per 1,000	15·7

The health of the Prisoners in the Government Prisons has been fair.

(*g*).—EUROPEAN NON-OFFICIALS.

TABLE SHOWING INVALIDING AND DEATH RATES OF EUROPEAN NON-OFFICIALS.

	1915.	1916.
Number of European non-officials resident	390	412
Total number invalided	14	7
Percentage of invalidings to number resident	3·5	1·6
Total number of deaths	7	10 x
Percentage of deaths to number resident	1·7	2·4

x One of these was not due to disease.

(*h*).—GENERAL NATIVE POPULATION.

The general health of the native population has, as far as can be gathered, continued as before and no epidemic of any magnitude has been reported.

VITAL STATISTICS.

Since the census in 1911, when the native population was estimated at 9½ millions, it has not been possible to obtain data as to any change on which reliable calculations can be made.

No statistics as to births and deaths are available, the only records kept are those relating to deaths of Europeans and non-European aliens.

III.—SANITATION.

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

(I).—ADMINISTRATIVE.

The limitations imposed by war continued to curtail sanitary routine during 1916 and were not conducive to the breaking of new ground. The conquest of the Kameruns did little or nothing to make good the antecedent attenuation of the Medical personnel; for the

Medical strength released thereby was largely seconded for military service furth of West Africa; and it was not the least active section of the Staff which was so seconded. Important areas remained bereft of the immediate attention, normally their's; whilst it was only during a small fraction of the year that both of the Sanitary Officers were in a position to direct their energies to their own special work exclusively. Fortunately, the annus medicus was an uneventful one; and no sanitary emergency arose which was beyond the means available to cope with it.

In the autumn, Dr. Foy, who had been Sanitary Officer since 1910, left the Northern on being promoted Senior Sanitary Officer of the Southern Provinces; and he was replaced by Dr. Inness, Sanitary Officer, Southern, transferred to the same office in the Northern Provinces.

The chief feature of the year was the unusually heavy rain-fall: a rainfall exceeding, in various regions, any previous one within the recollection of the oldest inhabitants. In consequence of this, many weak spots were detected which had been unsuspected before; and it was found that the lay-out arranged at certain towships would have to be reconsidered. This state of affairs was especially pronounced along the valley of the river Benue where some of the riparian settlements took almost incredible skaith from the floods. Here, the war was of service to the country; for, had it not been for the arrest of development caused thereby, much money and labour would have been wasted on impossible areas.

No case of yellow fever was recorded; but the occurrence of cases of enteric fever and of tuberculosis amongst the indigenous natives emphasised the fact, already recognised, that these two imported diseases had come to stay. This unfortunate fact was kept in view when the conservancy arrangements at new settlements and the ventilation of new buildings were under consideration.

Two cases of trypanosomiasis were noted amongst the European community. Only two cases were recorded amongst the native population ; but they gave no indication of the incidence of the disease; for more or less reliable rumours of it's existence in various localities were prevalent. So much administrative attention as possible was directed to coping with the disease; and *inter alia*, the province of Nassarawa was toured and Pati Lokoja was occupied during a part of the rainy season by one or other of the Sanitary Officers, with this object in view.

The amount of touring accomplished by the Sanitary Officers was unavoidably meagre. Such a state of affairs is particularly unfortunate in the Northern Provinces where the most important form of sanitary activity is—and must be, for years to come—a constant crusade. Outside of proclaimed townships, inspections of localities by the Sanitary Officers, followed by reports of what ought to be done, are of little or no use: what is required is the enlistment of the interest and co-operation of the leading natives on the spot; this calls for constant collaboration of the Political with the Medical and Sanitary staff; and this combined activity cannot be resumed in it's entirety before the termination of the war shall have restored normal conditions. Nevertheless, the ground covered was considerable: the entire railway system within the Northern Provinces, a stretch of considerably over seven hundred miles, received exhaustive attention and parts of it were traversed more than once; the sites of various provincial school settlements were dealt with; landward portions of the provinces of Ilorin, Muri, Nassarawa, Bauchi and Niger received careful attention from the Sanitary Officers on tour; new settlements were dealt with centrally by means of data collected during tours made in former years: established townships and stations received their normal share of routine attention; and special visits were paid to individual places at which particularly careful preventive measures seemed to be called for.

Careful watch was maintained over various new settlements with a view to preventing the construction of borrow-pits and to securing the filling in of borrow-pits already constructed. The prevention of borrow-pits has always been one of the chief sanitary problems; for, amongst the non-Europeans—indigenous and alien,—sun-dried mud has always been the principal building material, and it has also been extensively used by Europeans. Since the outbreak of war, building materials such as iron, cement, etc., have steadily increased in price and, latterly, have become well nigh unobtainable at any price. This state of affairs made itself prominent during the year by rendering necessary the erection of many buildings of mud or of sun-dried brick which, under happier circumstances, would have been built of burnt brick, stone, concrete, or iron. An exacerbation of the chronic creation of borrow-pits was the inevitable result; and the increasing price of labour tended to the creation of them close to the buildings concerned.

Constant vigilance was directed to the operations of the Fellmongers and the nuisances inseparable from their offensive trade were restricted to the narrowest possible limits. Despite the war, this trade continued to increase materially; and it became increasingly probable that this industry alone would be the cause of the creation of sundry new townships in the near future.

The old settlement of Lokoja was visited by the Governor-General in person; and he went exhaustively into it's needs on the spot. The extent of disirable land available at that settlement is strictly limited and the constant problem is how to make a hundred feet of frontage do the duty of a thousand. His Excellency gave careful attention to all the rival—and often conflicting—claims and interests involved; he made generous concessions to the claims of the Public Health; and the best was made of a settlement which could never in the nature of things be an ideal one.

The maintenance of trunk roads continued to receive unremitting attention, especially in regions haunted by tsetse-fly. An idea, that the Northern Provinces are a country more or less destitute of roads, seems to be prevalent in some quarters. This idea is quite erroneous: for a country which has been in effective occupation by European influence for some sixteen years or less—and this is true of the country away from the banks of the Niger and the Benue—the system of roads is wonderfully extensive. This is particularly true of the Hausa States and of the province of Bornu; the greater part of which has been traversed by well-maintained main roads, well furnished with rest camps, for over twelve years now. Even the most backward pagan regions are now furnished with well-maintained roads; this desirable form of public work has been going on for years; and it is materially extended every year. It is now possible, from Zaria or from Kano, to travel by motor-car to Sokoto, to Katsina and thence to the French frontier, and to Bornu. In January, 1916, the Governor-General himself travelled from Zaria to Katsina by motor car; and returned to catch his train at Kano, where he arrived exactly to scheduled time. In previous years he had motored successfully to both Katsina and Sokoto. The maintenance of broad trunk roads in the Northern States by the Native Administration is often a matter of considerable difficulty: this is particularly true of places like dry Bornu where, over thousands of square miles, there is not a stone the size of a split pea and where surface wells run to a depth of three hundred feet. Apart altogether from the question of flybelts, the benefit accruing to the public health from the existence of the trunk roads is unquestionable: they enable the traveller to journey day after day over cleared country and to rest by night in spacious rest-camps away from native towns; whilst the humble native way-farer has only to camp at the road-side, if he be wishful to sleep on cleared ground.

Improved arrangements were made for the storage and distribution of vaccine lymph; with a view to the lessening of wastage arising from the lymph becoming inert.

The problem of infantile mortality received considerable attention from the administration. It is a serious problem here, as it is in many other parts of the world; but, for obvious reasons, it's extent cannot be accurately estimated from the data which are available. Although—which is all to the good—more than one fallacy touching it was exposed, no systematic plan of tackling the problem was decided upon; but an useful train of inquiry was started, which it is hoped will afford a fruitful field for medical activity, what time the termination of the war shall have restored to the staff it's normal dimensions. Infantile mortality is almost certainly greater among the Mohammedan than it is among the pagan divisions of the population: and, remembering the conditions of mohammedan domestic life, it hardly seems necessary to labour the point, how much more difficult this fact renders the problem.

The question of the more effective pooling of imperial resources, which has become prominent throughout the empire since the advent of war, directed considerable attention to the Northern Provinces as a potential, meat-exporting country; and the administration, in consequence, paid lively heed to the diseases of cattle. This, of course, is chiefly a matter for the consideration of the Veterinary Staff; but it will aways command sanitary attention as well. Cattle plague and pleuro pneumonia are unfortunately well known: and, so far as the question of export is concerned, dealing with them is a perfectly simple matter. Inquiry during the year tended to confirm belief in the wide dissemination of entozoa among the cattle.

Considerable attention was directed to the problem, to what extent was the prevalence of this invasion likely to lay an embargo on the export of meat. A kindred problem was whether or not trypanosomiasis laid an absolute embargo on the export of meat concerned. It was recognised that the completion of the railway had rendered it possible for an immensely larger number of trypanosome free cattle to reach Lagos than had been the case in the days when they had to be driven all the way; but that a certain number of apparently healthy cattle, really suffering from invasion, would always reach the port. It was, of course, obvious that the railway could make no possible difference in the incidence of entozoa, other than trypanosomata. It became evident, therefore, that the free export of meat could not become an established industry until what time a *modus vivendi* should have been reached, touching what degree of invasion by Entozoa or by trypanosomata should involve the condemnation of a carcase.

Meanwhile, the Government kept giving due attention to the problem at this end: careful consideration was extended to how to improve the breed and increase the number of cattle, to the regulation of cattle ranches and cattle routes, to the incidence of the various parasitic invasions among the cattle and to the possible enactment of legislation calculated to prevent or mitigate them.

By far the most notable administrative event was the transfer of the capital from Zungeru to Kaduna, a move which had been completed by the end of the year. This change was effected smoothly and with despatch; and it was attended by unexpectedly small dislocation of business. But Zungeru was not entirely deserted: it became a military recruiting centre. For this purpose, it is well adapted: it is a relatively healthy place; it possesses a splendid water-supply; the surrounding country is sparsely populated and visitations of epidemic disease can be controlled with comparative ease; it is a traditional military centre; and, being on the Railway and practically midway between the Hausa States and the Yoruba country, it is central.

It was practically decided that some of the evacuated buildings at Zungeru should be utilised as future central Asylums for Lunatics and Lepers respectively.

Legislation.

(1) "An Ordinance to regulate the sale of drugs and poisons and to provide for the registration and licensing of druggists", which had been enacted on the 31st December, 1915, was published in "The Nigeria Gazette" of the 6th January, 1916.

(2) A Bill entitled: "An Ordinance for the regulation and management of public hospitals and dispensaries" was set forth in the issue of "The Nigeria Gazette" published on the 22nd June, 1916.

(3) A Bill entitled: "An Ordinance to provide for the custody and removal of lunatics" was set forth in the issue of the "The Nigeria Gazette" published on the 29th June, 1916.

(4) A Bill entitled: "An Ordinance to establish asylums and settlements for the isolation and detention of lepers" was set forth in the issue of "The Nigeria Gazette", published on the 29th June, 1916.

(5) A Bill entitled: "The Public Health Ordinance, 1917" was set forth in the issue of "The Nigeria Gazette" published on the 7th December, 1916.

(6) An Ordinance to provide for the custody and removal of lunatics", set forth in the Bill cited under (3) above, was enacted on the 15th December, 1916, and was published in "The Nigeria Gazette" of the 21st December, 1916.

(7) "An Ordinance to establish asylums and settlements for the isolation and detention of lepers", set forth in the Bill cited under (4) above, was enacted on the 15th December, 1916, and was published in "The Nigeria Gazette" of the 21st December, 1916.

Progress made.

Under existing conditions, to write of "progress made", in the usually accepted sense of the term, would be neither candid nor honest; for, since the outbreak of war, "Business as usual" has not been the rule in the Northern Provinces: the personnel denied the privilege of serving in the war have done their best to carry on with the normal routine; but a one-horse cart can hardly effect the same amount of haulage as a two-horse waggon. If the war has not put back the hands of the clock of sanitary progress, it has, at least, staid them. The term "progress made", as used here, essentially means the stereotyping, as matters of routine, of activities which were new in the recent past.

But there was one piece of "progress made", in the usual sense, to wit: the transfer of the capital from Zungeru to Kaduna, mentioned above. Practically all the houses in Zungeru were more than time-expired; they had, nearly all of them, been built of wood, as was inevitable in the pioneering days when Zungeru was founded, what time transport rivalled a king's ransom in costliness; they were dilapidated and verminous; and many of them had become so bat-infested that the occupiers of them lived—literally—under more manure than, normally, they were wont to apply to their gardens.

Had Zungeru remained in occupation as the capital much longer, it would have had to be rebuilt, or it's European inhabitants—war precluding the cost of rebuilding—would have been obliged to revert to mud huts.

The houses at Kaduna are of a greatly improved type: they are built of brick, or of concrete blocks; they are raised above the ground on solid plinths; the roofs are covered with iron, or tiles, or slates; and the match-boarding of the roofs is applied above, not under, the rafters. It is true that this last practice has rendered the roofs less heat-proof than they would have been had the match-boarding been applied below the rafters: but the arrangement eliminates the pestilent nuisance caused by bats; and an occupier can always secure the requisite degree of coolness by applying a ceiling-cloth to that part of the verandah roof under which he lives by day. Kaduna is at an elevation which averages over two thousand feet above the level of the sea; whereas Zungeru has an elevation of only five hundred feet, besides which, it rests chiefly on radiating laterite.

During it's later history, the health record of Zungeru had become wonderfully good and furnished a good example of what steadily applied activity could do in the way of mitigating the adverse effects of climate. But the sickening radiated heat, during a considerable part of the year, was never compatible with getting the best out of the men employed there. At Kaduna, there are far more days in the year when one feels that it is a good thing to be alive than can ever be the case at Zungeru under any conditions. At Kaduna again, nearly everybody who is wishful to do so can make a good garden; potatoes and numerous European vegetables of other kinds can be grown successfully with ease; and it is difficult to over-estimate the benefit of this in a country where blackwater fever is apt to attack the malarious. There can be little doubt that in the past—it is the case still in many places—deficiency of salts of potasium has been the most important lack in European dietaries: tubers have been unobtainable in many parts of the North during a considerable part of the year; green vegetables have been scarce at most and unobtainable at many places; fresh meat has been bled; in the case of tinned meats and vegetables, the fluid containing the extractives has generally been discarded; and the making of a garden where tubers and green culinary vegetables are successfully cultivated has been and always will be a little island of progress. The French have a much more lively sense of the importance of kitchen gardens to the public health than the British have: at every station in the French territory across our Northern border, the officer has, as one of his routine duties, when in command, to run an irrigated, station, kitchen garden; he receives a Government grant for the purpose; and, what time he is relieved by another officer, he has to hand over the kitchen garden in the same way as he does the other stores and Government property with the charge of which he has been entrusted.

At Kaduna, there is a botanical garden run by the department of Agriculture. There, experiments are made with a view to discovering what can be grown with advantage; and the lessons learnt there will avoid a lot of misdirected energy.

Fresh milk is obtainable at Kaduna; and so also is fresh butter.

Nothing was done in the way of clearing the original bush; for it had been decided wisely that clearing of trees should be effected, in all cases, under the direct supervision of an officer of the Forestry Department. This means that no vegetation shall be eradicated until something else is ready to replace it: a most important point in a country where the formation of laterite is such a common phenomenon as it is here. Arrangements were made to let in allotments much of the ground which it would have been a very expensive matter to keep clear—and it would have been imperatively necessary to keep it clear; whilst the laying down of dhub grass was materially and successfully extended.

Of course, at it's occupation, the programme realised at the new capital was not nearly so ambitious as that which had been planned originally: *e.g.*, none of the more spacious residences—barring two: one

occupied by the Secretariat; the other as a temporary hospital—had been erected; most of the public offices had to find accommodation in buildings meant for dwelling houses; the piped water-supply was only a temporary one; and the water-system of sewerage, originally adumbrated, remained a problem of the future; but, with all it's temporary limitations, it is a much less unhealthy place than is Zungeru; with the advent of more prosperous times, it will be a centre of continuous sanitary progress; the output of work by the officers of all departments will be more effective of it's kind and much less interrupted; whilst the psychological effect of the sight of fire-places and chimneys applied to the houses is subtly stimulating and all to the good.

By the end of the year the Soda-water Factory had been transferred from Zungeru to Kaduna: and arrangements had been completed for the transfer of the ice-plant as well, at the beginning of the new year. Preparations had been completed for the erection of a new technical school across the Northern boundary of the capital. This adumbrated a material increase of indigenous, skilled labour, a portion of which, it is hoped, will be enlisted eventually in the cause of sanitary progress.

The laying down of dhub grass was materially extended at many places besides Kaduna; and considerable energy was directed to the kindred activity of maintaining and extending broad roads, as mentioned above.

Water-supplies, particularly in connection with faecal contamination, received constant attention. At Kano, for example, arrangements were made for the filling in of all the wells in the compounds of the alien, non-European quarter; it was made compulsory for every compound to be provided with a salga; and safe areas were appointed for the digging of new wells.

At several places where the sub-soil water was too near the surface to permit the construction of effective salgas, it was arrranged that, instead of reverting to the pan system, simple holes with small orifices should be dug frequently and covered up so soon as they became unserviceable.

An enduring piece of progress made was that, during the year, the salga system had become impregnable. There was a time when in some quarters it was almost necessary to apologise for advocating the adoption of the salga system officially: the salga being an indigenous native institution which had been in use for centuries and with the introduction of which European influence had had nothing whatever to do. During 1916, appliances kindred but inferior to our indigenous salgas had been adopted by the sanitary authorities with the Imperial forces in different parts of the world, notably in Egypt and in Mesopotamia, and the officers concerned kept describing in the Medical Journals how practically superior they were to other contrivances. They had found in practice that, however superior other more elaborate contrivances and systems might be theoretically, no contrivance rivalled the salga in ease of construction, simplicity and efficiency. They found, on the whole, less nuisance, in the way of flies blown, foul matter, stench, etc., after they had adopted the small-mouthed, deep, latrine pit than they had experienced before. All this held good for standing as well as for shifting camps. Absolute simplicity having thus been found to be the best procedure among masses of civilised Europeans living under sanitary discipline of military strictness, nobody can cavil in future at the indigenous salga being retained as the stock system for the natives of the Northern Provinces. During the year again, at several stations, the Europeans had finally adopted the salga for their own personal use; having found it on the whole, after years of experience, superior to any other available contrivance. It will now be superfluous to write a line in defence of the salga in any future Annual Report.

The tendency of the natives to buy muslin, and supply themselves with mosquito-nets voluntarily, kept increasing. For example, whilst travelling through a part of Nassarawa, one of the more backward of the provinces, rarely traversed by a white man, the Senior Sanitary Officer observed mosquito-nets in huts in several villages; nor was there any reason to believe that the owners were in the habit of travelling away from their own villages.

Another mark of progress observed fairly often was the use, made for the boiling of water, of the kettles carried about by mohammedans; their primary purpose being to contain ablution water in connection with prayer.

The war did not seem to have affected internal trade adversely: the harvest was a good one; the price of labour rose, if anything; the people were well fed and well clad; and increasing prosperity was shown in various places by the improved dwellings which they were erecting for themselves.

It was noticed that in many cases the natives were getting more alive to the fact that invasion by entozoa was avoidable: this could be seen in the more thorough cooking of meat and in occasional instances—never observed formerly—of their refusing to buy cooked meat in the markets; because it was not sufficiently cooked. They were also resenting the invasion more; for many sought European medical aid for the expulsion of the parasites, which they would have treated as a matter of course quite recently.

Another instance of the native treating his flesh food more seriously was at a railway station near which is a considerable meat market. Now that place has been long known to be one to which the flesh of animals, which have died of disease, has been brought for sale. Formerly the great majority of natives passing through were in the habit of buying meat there, although they were quite aware of the evil reputation of the place. During the year, numerous natives who had always bought meat there ceased to do so and stated that they would no longer buy diseased meat; and on several occasions, natives voluntarily cautioned Europeans against buying the meat. The place in question is one much frequented by cattle Fillani; there is a lot of tsetse-fly in several spots around; and trypanosomiasis is probably the most common cause of death among the cattle in question. The cattle Fillani are nomads; there is no European, official or non-official, in permanent residence anywhere near the spot alluded to; and it is well to state this, for the purpose of forestalling questions; as, under present conditions, there is little hope of ending the abuse. For every instance of this state of affairs which is known, there are probably scores unknown. It furnishes no reason for panic; but it gives the Government strong support in it's policy of abolishing way-side meat markets, where possible, and of regulating the butchers.

The inspection of animals for slaughter and the regulation of the sale of meat at areas within reach of stations and townships was maintained and, if there were any change in this activity, it was in the direction of greater stringency.

Roof-gutters were not applied to the permanent buildings put up by Government and this omission was likely to become a permanent one. European traders, however, applied them to many buildings; for economic reasons. There can be little doubt that the elimination of roof-gutters and water-tanks is a very effective means of keeping down mosquitos; but, in a dry country like the Northern Provinces, when water is required for economic as well as for domestic purposes and the cost of labour is going up, it is hardly possible to abolish such appliances entirely.

Ambitious sanitary schemes involving the use of imported material were out of the question; the price of all imported material, without exception had gone up; in many cases enormously: and the estimates had not been increased.

(II)—Preventive Measures.

Mosquito and Insect-Borne Diseases.

MALARIA, YELLOW FEVER AND FILARIASIS.

The routine preventive measures against mosquitoes were maintained at all occupied stations and townships; and at rest-camps as well, so far as this was possible.

It is now practically impossible to find an European of any class who does not either inhabit a mosquito-proof room at night, or sleep habitually under a mosquito-net. And the use of the mosquito-net is steadily increasing among the domestic servants of Europeans. The senior Europeans—official and non-official—tend to have old servants who have been with them for years; old servants use the mosquito-net well nigh universally; the African is a very imitative person; and, having come to the conclusion that the use of the mosquito-net is a "nobby" thing, the younger are steadily following the example of the older servants. It is only fair to state, however, that, in many instances, although the essential "nobbiness" is attained by the acquisition of the net, the practical object of it is not always attained. Nevertheless all good things must have a beginning and the tendency is all in the right direction.

Allusion has already been made to the use of the net by indigenous natives in landward districts.

Some of the more observing Political Officers have maintained, in recent years, that by far the most effective method of fighting mosquito-borne disease is to cheapen the mosquito-net and they have cited the desire of the indigenous natives to buy them when within their means. One officer, in particular, has advocated the practice of Government putting mosquito-nets on the local markets at cost-price: as is done in India in the case of quinine. This is a suggestion which will deserve serious consideration after the war. Practically every European takes a daily prophylactic dose of quinine, which he regards as part of his ration: and the number of people who take their dose in solution tends to increase. The practice by Europeans of the principle of giving prophylactic doses of quinine, during the rains, to the native dependents in their compounds is slowly becoming less uncommon. Travelling through the bush becomes less dangerous every year—so far as these diseases are; concerned for all new rest-camps are built at an adequate distance from the native towns concerned; and quarters for carriers are constructed well away from the rest-houses.

Isolated mining-camps receive more attention than was the case formerly; and the interest of the Chamber of Mines has been enlisted in support of sanitary activity.

Although no case of yellow fever was recorded during the year, this affords no assurance that the disease will not visit us from time to time: why it does not invade us oftener remains an unsolved problem. It may be taken as a general rule that the longer a settlement has been lived in—this general rule does not apply to isolated trading stations which are not under continuous Government supervision—the less is the incidence of insect-borne disease among the permanent inhabitants: the tendency of cases of these diseases to be importations becoming steadily more pronounced. This is evidence that the preventive measures practised are bearing fruit. It is unfortunate that the small populations at most of our townships do not admit the establishment of ice-plants; for there can be no doubt that the possibility of procuring ice, eliminating as it does the water-cooler, is one of the most potent means of keeping down mosquitoes in any European quarter. The establishment of

ice-plants, however, is sure to extend: for example, there would have been one at Kano now, had not the war stopped the firm which had intended to establish it.

Further increase of the piping of water is in abeyance; for obvious reasons.

The practice of running passenger trains right through between Lagos and Kano, instead of stabling them up for the night at Jebba, at Minna and at Zaria—the former practice—has probably resulted in these three stations becoming less potent foci of malarial infection than they were. But, even apart from this, the larger stations are not really dangerous by night, except on account of mosquitoes passing from person to person among the sleeping passengers; for the water is piped, and the halting native passengers spend the night in open sheds, with gutterless roofs, which are cleaned out daily.

From the sanitary point of view, the only danger arising from the accelerated train service is that imported cases of yellow fever may occasionally be carried farther North than was possible formerly.

Trypanosomiasis.—The incidence of trypanosomiasis—two European and two native cases—shown in the returns for the year would be ludicrous, were it not for the fact that the machinery available for investigating it was inadequate; for there can be no doubt that there are numerous active foci. The native seldom or never assists with information: as stated in a former report, all he generally does is to spread a bogus report, of the existence of sleeping sickness in some village against the inhabitants of which he has a grudge; in order that they may be harassed by a visitation of the white man.

A tour was made through Nassarawa—one of the Provinces most infested with tsetse-fly—in consequence of reports of the existence of sleeping sickness, principally at Jemaa. When the Senior Sanitary Officer arrived at Jemaa, the worst of the alleged cases were reported dead. Of the remainder, there were only two or three possible cases; and, even in them, a diagnosis of the disease could not be made. The entire dangerous bush in the neighbourhood of Jemaa had been cleared—this was in December, the dry season; not a single tsetse-fly was to be found; arrangements for the future safeguarding of the station were made by the Political Officers in charge, the Emir and his henchmen, and the Senior Sanitary Officer in concert; and the last-named arranged, if possible, to visit Jemaa and sit down there for a time in person during the following rains.

The question of the possible evacuation of more than one station in the province is kept alive by the Government.

It was thought at one time that a large, flat-topped hill at Lokoja, known as Pati Lokoja, which rises to a height of some eight hundred feet above the Niger bank on which it stands, might possibly be utilised as an isolation camp for cases of sleeping sickness; provided it were fly-free. With the object of deciding this point, Dr. Foy, the then acting Senior Sanitary Officer, lived continuously day and night on the top of Pati Lokoja for a round period of seven days during the rains. He found tsetse-flies daily: G. Tachinoides: G. Palpalis and G. Morsitans. The relative proportions were: G. Tachinoides 84%; G. Palpalis 6%; and G. Morsitans 10%. This finally ruled out Pati Lokoja.

The fight against trypanosomiasis must be a very slow one. Already, in various regions, natives have been induced to leave their stricken villages *en masse* and settle on fly-free areas; but most of the victims are timid Pagans in secluded villages; it is very difficult to get at them; and, even after their confidence may have been gained, it is often difficult to find a fly-free area sufficiently near them to induce them to move.

Much is done, by means of the broad roads already referred to, to protect the traveller from point to point. But there is always danger to the Political Officer, the Soldier, the Miner and the petty native trader, whose avocations take them off the beaten track : and every petty by-way cannot be converted into a broad trunk-road.

Steps were taken to collect information touching what forest plantations, if any, were characterised by the absence of tsetse-flies; with a view to the possible changing of the forest growth in some of the peccant centres.

The natives of villages along dangerous river banks will always be difficult to deal with. Those people have been amphibious for centuries ; in many cases their religion as well as their existence generally is thirled to the river ; and to induce them to desert it would be about as easy as to induce Great Britain to resign her sea-power. It may be as well to add that the banks of long winding rivers are much more difficult to tackle than are the shores of circumscribed lakes.

Infectious and Epidemic Diseases.

PLAGUE AND CHOLERA REMAIN UNKNOWN.

Cerebro-Spinal Meningitis when it occurs is dealt with as previously reported.

As indicated in the report for the previous year, only a small proportion of the cases of this disease is likely to come within European knowledge.

Frequently one hears, from non-medical informants, accounts of native deaths which have occurred in remote places away from all possible medical observation ; and some of them are very suggestive of this infection.

Dysentery.—This disease is, as a rule, commonest just after the break of the rains, when the streams rise and fall suddenly: each rise being attended by recent washings of the surface soil. The amoebic is the commoner form of the disease. Mild attacks are very common among the natives, with the result that they go along the common trade routes fouling the ground in the neighbourhood thereof. The ordinary native will drink from any puddle ; and, after the break of the rains, the inevitable result shows itself.

Enteric Fever.—The carriers of this disease are probably increasing in number steadily. It is in the case of new permanent quests such as this that the handicap, arising from the small percentage of sick natives coming under direct medical supervision, is chiefly felt. This handicap has been heavier during the war, in consequence of so many of the soldiery being absent ; for they are a body of natives who do come under direct observation and consequently constitute perhaps the best criterion of the incidence of such diseases.

The principle of large, sanitarily self-contained compounds in the dry north has been conceded. In the North, the salga cannot be improved on, so far as the natives are concerned. In the cases of Europeans, the best plan is to empty the contents of the pans from the earth-closets into deep, blind wells, followed by a liberal covering of dry earth at each operation ; thus avoiding the blowing about of contaminated dust. This is already the rule in Bornu, and will soon be universal. Of course, measures are taken to safe-guard the water in the wells.

Pneumonia. Influenza and Tuberculosis.—There is nothing fresh to add to what has been written about these diseases in former reports.

Pyrexia of uncertain origin will appear in the returns so long as truth continues to be prized above nomenclature.

Leprosy.—The new Leper Ordinance affords much greater powers of dealing with this infection than were in existence before.

To a large extent, leprosy takes the same place in the Northern Provinces as tuberculosis does at home. Tuberculosis can scarcely be said to be thoroughly in hand at home even now; and the same thing will be true of leprosy out here for a long time to come, however great the powers granted to deal with it may be. It cannot be said that much was done, in the way of dealing with leprosy directly, in the year under review; but the collection of leper statistics went on, and they are absolutely necessary in dealing with the problem systematically.

It must never be forgotten that the disease is not confined to the humbler classes and that, consequently, native potentates have to be approached on the subject most cautiously and tactfully.

Small-pox was not a prevalent disease during the year so far as those treated were concerned; but its existence was reported from many parts of the country.

Vaccination.

	1915.	1916.
Total number vaccinated	10,612	9,314
Total number successful	6,884	5,757

As can be seen from these figures, the actual number of vaccinations performed and the number of successful vaccinations had diminished as compared with the previous year.

The reason is not far to seek: during the greater part of the year, some of the stations to which Medical Officers are normally posted had no medical service at all; whilst others only enjoyed the services of Medical Officers intermittently.

Again, a good many blank monthly returns were sent in; showing the objection the natives have to coming into contact with an European, before they know something about him.

There were several parts of the country where the natives would have welcomed the visits of vaccinating Medical Officers had such been available.

Complaints were received to the effect that much of the lymph was insert. It was arranged that in future the lymph should travel to headquarters in cold storage, and be kept on ice there, and sent out in response to telegraphed requisitions.

Tetanus is prevalent in many places: but it is difficult to get authentic information; as the native fears to talk about it being as nervous in this direction as old ladies at home are touching the discussion of cancer.

Yaws and the Venereal Diseases, although always in evidence—yaws, more or less; the venereal diseases always abundant—leave nothing new to be reported. After the termination of the war, the venereal diseases will have to be tackled after a radically new fashion, if any extensively effective, racial result be aimed at.

Helminthic Diseases.

Ankylostomiasis remains as previously reported, so far as practical efforts to cope with it are concerned. In 1916, as in 1915 there was little or no possibility of medical or sanitary effort being directed against it in the regions where it was prevalent.

Of course, the victims of the invasion who find their way to the gaols and native hospitals are always treated; but they are only a moiety; and, the endemic foci being the regions where the staffs, both political and medical are most depleted, systematic preventive measures are largely a project of the future at present. Every effort is made to prevent it extending to fresh ground.

Bilharzia and *Guinea Worm* are very ocommon, particularly guinea worm. There is much contamination of the wells along the trade routes leading North, and this contamination goes right North to the desert. guinea worm, *e.g.*, is quite common in the dry country across the French border and may be found in people who have not been outside of their village, or oasis for years. Guinea worm again seems to show a preference for some water-courses: *e.g.*, it is very common along the Gulbin Kebbi Sokoto—the river on which Sokoto stands. Along this river are numerous towns as well as Sokoto, notably Argungu, Birnin Kebbi and Jegga, which are favourite resorts of traders. Now, guinea worm is very common along the course of the Gulbin Kebbi; except at the town of Argungu, whose people have practised a system of rude filtration and boiling of their drinking water for generations. Whilst it is impossible to get statistics to indicate it, increasing experience tends to the belief that guinea worm is a disease of the trade routes and is not common in villages which are remote from trade routes and whose inhabitants do not travel. When guinea worm is found in such a secluded village, it will be found as a rule that that village is on a river some part of the course of which is resorted to by traders, that the river is alternately flowing and more or less dried up, and that the villagers draw their water from the river. In the present state of knowledge, it is impossible to hint at such a tentative generalisation in the case of bilharzia.

Tæniasis, etc.—In the present state of development, it is best to group the other helminthic invasions together. An increasing number of isolated cases finds it's way to the Medical Officers; for some natives have discovered that the white man's helminthagogues are more effective than their own—they are, by no means, without such remedies —and that he is willing to dispense them gratis. Again, as mentioned earlier, a certain proportion—by no means a large one—of the natives is beginning to entertain searchings of conscience touching the quality of it's meat. This is all to the good. But it must be remembered that it remains true that the bulk of the people treat these invasions with levity and regard them as a matter of course; that, whilst they may be willing to take an occasional vermifuge, they will not, on account of them, as a rule, regard themselves as sick and submit to a prolonged course of treatment and observation; and that those natives who come to hospital voluntarily, prepared to devote a period to obtaining permanent relief, are generally soldiers, police and other Government employees seeking a few days off duty on full pay rather than the expulsion of their quests. Care of food will follow care of water: and precautions touching the latter, although making steady annual extension, are still a long way from having penetrated the bulk of the people.

Once the efficacy of the means recommended for the prevention of water-borne disease shall have borne conviction to the general native mind, the tackling of the food question will be a comparatively easy matter. It must never be forgotten, however, that the great mass of the population, whether mohammedan or pagan, is fatalistic qua disease in general.

(III)—General Measures.

Clearance of Bush, Undergrowth, etc.

At stations and townships where there are gaols and prisoners the rule is that all necessary clearing is done by the latter. At the larger stations, this labour is reinforced by paid station labour.

At the small townships, without gaols, grants are given by Government for the purpose.

This is a country of extremes: at some places, considerable clearing may be called for one year and little or none the following year; rain-fall being the deciding factor.

The rule is to keep the entire area within the boundary of a station or township either clear, or planted with short crops.

The laying down of dhub grass is making steady progress at most settlements. Water-courses are kept clear within station-boundaries and so much care and labour as are available are directed to the avoiding of "pocketing" in the water-channels, natural and artificial.

Places—which are the vast majority—under the Native Administration are looked after by it: activity being stimulated by the advice of the Political Officers concerned.

In many of the more highly civilised regions, the pushing of long crops out of the towns and well beyond the boundaries of them continues to extend steadily. The various Native Administrations, moreover, effect an enormous amount of clearing at rest-camp areas, along the trunk roads and in connection with the numerous broad avenues cut through fly-belts.

Disposal of Refuse.

Routine is maintained after the fashion described in former reports. As funds permit, the proportional distribution of incinerators is extended.

Drainage.

Subsoil drainage is, to all intents and purposes, non-existent.

Surface drainage is effected by percolation, natural and artificial water-courses and the keeping of water-courses clear.

Regulation of Buildings.

In European quarters, correct orientation is insisted upon, so far as Government buildings—particularly residential buildings—are concerned.

On non-official building sites, Government lays down a minimum sum which must be expended on improvements; whilst the arrangement of the buildings on the site and the proportion of the site which may be built upon are under the control of the sanitary authorities.

In non-European, alien quarters, plots of uniform size are laid out with regularity and the proportion of site covered by buildings is supervised narrowly; but, so far, it is impossible to dictate the material or plan of the buildings—it would not be practical to do so. It may be added that the non-Europeans are, as a rule, willing to devote to the improvement of their buildings far more imported material than is obtainable in the country now at any price, or than will be obtainable for a considerable time to come.

Sanitary Inspections (including Food Inspection) and Prosecutions.

In addition to ordinary routine inspection, food receives considerable attention. Imported provisions are inspected from time to time and here there is no difficulty: the trade in them is entirely in the hands of European firms; they readily meet all sanitary requirements and destroy, without question, any articles condemned by a Medical or Sanitary Officer; and, more often than not, where unsound provisions are concerned, they anticipate sanitary requirements.

It is difficult to imagine any necessity arising for the prosecution of an European firm in this connection.

The markets are regularly inspected. Prosecutions of natives are seldom undertaken in connection with the sale of unsound foodstuffs; the practice is to expel offenders summarily and to banish them in perpetuity from the market concerned.

Sewage Disposal.

There is no water-borne system of sewage disposal: with the exceptions of Lokoja and Baro, where night-soil is dumped in the Niger, the dry-earth system is in use everywhere. To enlarge upon this would be useless reiteration; for our methods have been described in former reports: and they were not added to during the year under review.

Town Planning.

Every new township is laid out by the Chief Survey Officer and one of the Sanitary Officers acting in concert with the Resident of the province concerned. When this work has been completed, it is embodied in a plan prepared by the Chief Survey Officer. The completed plan is then submitted to His Excellency, the Governor-General. He may, or may not, call for some amendments of the plan. Whenever the plan has been finally completed, it is signed by His Excellency and is filed in the office of the Chief Surveyor as the authorised lay-out of the township concerned. Then, and only then, can any site be put to auction, or any permanent building erected.

Water Supply.

The general routine, described in former reports, was followed during the year under review. Progress continued in the direction of safe-guarding existing supplies, and in extending the principles of soundness in the practice of native methods.

But no new departure was made: the *res angusta domi*, incidental to the war, precluded this. Several ambitious schemes are in view; but to advocate them now would be a case of: "Nero fiddling while Rome was burning."

Before leaving the subject, General Measures, it must be pointed out that the facts cannot be too often reiterated: that the Northern Provinces well nigh rival, in area, France—with England added; that their population is well over eight millions—this is a conservative estimate, innocent of exaggeration; that their budget is that of a second-rate English country; and that the total personnel of their combined Medical and sanitary staff, in residence at any given time, never exceeds that of a provincial town of one hundred thousand inhabitants. These facts must always be kept in view, for the sake of the sense of proportion: the Sanitary Officer, in writing reports, must never lose sight of them; lest his official exuberance make him so embellish the truth as to call his geese swans.

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

Lectures are not delivered : under existing conditions, they could serve no useful purpose.

Hygienic missionary effort amongst the big men—the texts of the sermons being found in abuses, calling for abolition or reform, noted whilst riding over the actual ground with them—is persisted in by the sanitary working in concert with the Political Officers. This is the most important of all measures and the war has greatly hampered it for reasons which may be inferred from what has been written above.

There is little hope of pristine activity in this direction being resumed before the end of the war ; although this is constantly aimed at.

During practically the whole year, two educated malams were attached to the two Sanitary Officers, whom they accompanied everywhere ; they went into each day's work and wrote regular reports thereon in the vernacular ; and the reason for everything done, or recommended was clearly explained to them. These two men will be discharged, in the course of 1917, to two different Native Administrations, as qualified Sanitary Inspectors : and two new pupils of the same class will be taken on.

In the Provincial Government Schools, elementary hygiene figures as a stock subject in the curriculum : and the officers of the department of Education report that it is not the subject in which the pupils are most backward.

(C).—RECOMMENDATIONS FOR FUTURE WORK.

There is only one practical recommendation for future work : to maintain routine and, so far as possible, to overtake arrears. It is greatly to be feared that, until the end of the war, this will remain the stock recommendation.

But there are several problems of, and hopes for, the future, which will appear under this head, what time the termination of the war shall have made them non-utopian. The chief of these is the establishment of a school—on the model of the survey school at Kano—for the training of Sanitary Inspectors, public vaccinators, and dispensers. The survey school mentioned is one of the brightest spots in the development of the Northern Provinces ; the intelligence shown by it's pupils surprises every new visitor, who does not know our indigenous natives ; sanitary and medical progress calls, at least, as much for the enlistment of native intelligence as does effective survey ; and, given the means of running such a school, the Medical Department could attract quite as good material as the department of surveys has attracted already.

(Sgd.) M. CAMERON BLAIR,

Senior Sanitary Officer,

Northern Provinces.

IV.—METEOROLOGY.

Meteorological records have only been kept at 18 stations. The rainfall over almost the whole of the country has been above the average and in some districts has been greater than ever remembered by old inhabitants, especially severe floods being the result.

METEOROLOGY.

Table showing Rainfall in inches.

	Year.										Average to 1915.	Rainfall 1916.
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.		
Abinsi	...	...	...	...	...	...	...	...	...	...	...	...	...	53·49
Ankpa	...	...	...	...	58·77	66·85	56·44	...	47·81	49·78	19·57	...	49·87	10·84
Bauchi	...	...	42·24	...	47·88	43·23	38·86	48·79	35·83	33·89	45·16	...	41·98	50·23
Baro	...	...	...	...	46·46	55·77	47·98	46·14	43·51	39·50	32·33	47·51	44·89	...
Birnin-Kebbi	...	...	...	...	...	27·70	25·10	30·69	20·32	33·37	21·77	14·46	24·77	...
Geidam	...	...	...	...	22·39	21·28	16·87	10·46	12·59	5·76	19·30	...	15·52	...
Ibi	...	...	23·49	...	...	53·30	49·63	36·38	46·10	43·42	23·75	39·47	39·44	47·47
Ilorin	...	47·02	49·00	54·74	55·46	65·18	51·14	52·58	38·85	43·83	42·83	43·37	49·45	52·47
Jebba	...	...	...	...	...	..	...	...	..	29·56	30·93	53·22	37·89	...
Kano	...	36·69	38·12	27·55	34·86	49·03	26·18	40·00	29·20	19·05	19·06	32·33	32·10	38·92
Kaduna	...	...	...	...	...	...	...	...	...	...	41·67	61·90	51·78	51·39
Katagum	...	...	...	...	23·70	23·03	18·21	19·96	20·50	13·81	9·54	...	18·39	21·15
Kontagora	...	46·28	58·40	37·28	51·15	60·67	53·01	54·09	32·83	36·27	6·54	...	43·65	...
Lokoja	41·72	49·64	51·83	36·68	44·12	65·14	45·59	41·57	46·74	34·76	42·81	48·15	45·56	61·13
Maiduguri	...	...	...	...	23·30	31·89	19·53	30·00	18·38	13·98	11·49	25·32	21·73	33·04
Minna	...	...	...	...	...	...	...	...	...	...	...	53·62	53·62	66·55
Nafada	...	...	...	...	...	37·27	33·24	30·32	22·01	16·58	22·28	...	26·95	37·17
Naraguta	...	...	...	...	...	...	...	57·84	47·33	51·37	59·17	61·91	55·52	72·16
Offa	...	...	...	...	...	...	...	...	...	40·82	30·58	56·46	42·62	49·23
Sokoto	32·14	33·32	...	19·86	20·44	29·72	23·11	28·70	19·16	16·38	24·94	28·37	25·10	24·46
Womba, etc.	...	...	...	19·11	...	49·02	44·40	40·45	53·95	58·94	49·40	...	42·46	...
Yola	33·77	42·76	34·60	27·55	53·77	44·26	38·67	42·22	38·93	29·93	27·83	26·70	36·74	39·93
Zaria	...	51·27	61·05	29·80	45·48	55·88	53·80	43·35	43·13	33·01	35·64	46·95	45·39	49·80
Zungeru	51·10	41·31	60·39	37·16	48·78	58·89	53·44	42·90	29·93	35·17	33·46	54·61	45·59	39·06

METEOROLOGICAL RETURNS FOR THE YEAR 1916.

STATION—ILORIN.

Lat. 8—30' 26·77' N. Long. 4—34' 53·9' E.

	Absolute shade maximun.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	98	54	93·3	63·9	60	...
February	99	62	93·4	68·6	39	0·75
March	101	66	94·9	72·9	69	4·35
April	95	67	90	71·8	72	6·22
May	98	66	91·3	68·3	75	4·16
June	91	65	86·4	70	74	4·58
July	88	64	83	71·7	76	10·07
August	87	66	82·6	69	75	2·94
September	87	65	83·4	69·2	79	9·75
October	98	64	88·8	69·1	71	8·24
November	95	64	92·3	69·2	67	1·41
December	96	51	92·7	65·1	68	...
Means	101	51	89·3	69·6	69	52·47

STATION—LOKOJA.

Lat. 7—48' 01·2' N. Long. 6—44' 22·95' E.

January	93	57	87·4	67	66	...
February	99	66	93·2	73·6	63	...
March	98	70	93·9	77·2	65	2·79
April	97	62	92	74·5	71	5·92
May	97	69	89·4	74·1	74	7·42
June	92	70	87·6	73	80	5·37
July	89	68	85·4	71·3	83	9·50
August	87	68	84·4	71·6	83	8·18
September	90	70	85·4	71·4	80	12·22
October	91	63	87·5	70·5	81	9·13
November	93	68	91	70·5	75	0·60
December	95	55	91	65·1	76	...
Means	99	55	89·1	71·6	75	61·13

STATION—KANO.

Lat. 12 N. Long. 8·32' E.

January	99	46	86·2	52	30	...
February	102	51	92·3	56	29	...
March	110	58	106	68·5	30	...
April	109	69	102·7	74·5	48	1·25
May	107	67	99·8	74·8	54	5·01
June	101	63	93	71·8	63	4·33
July	94	65	88·4	70	75	8·58
August	89	65	83·5	69·6	74	11·17
September	96	65	89·3	68·2	68	8·50
October	97	52	94·1	61·1	70	0·08
November	100	52	96·4	59	66	...
December	98	45	90	52·2	30	...
Means	110	45	93·4	64·8	53	38·92

METEOROLOGICAL RETURNS FOR THE YEAR 1916—*continued.*

STATION—KADUNA JUNCTION.

Lat. 10·50′ N. Long. 7·25′ E.

	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	98	51	88·2	55·3	32	...
February	99	50	92	58·7	28	...
March	102	52	97·3	67·2	52	0·33
April	97	66	92·1	71·4	69	2·10
May	96	66	88·8	69	73	5·18
June	89	63	84·6	65·4	78	8·76
July	86	63	81·7	66·7	82	8·74
August	85	65	79	67·6	84	10·14
September	89	63	83·1	66·6	81	13·79
October	92	52	88·1	61·1	65	2·34
November	94	53	90·5	61·4	83	0·15
December	94	52	89·1	58·2	37	...
Means	102	50	87·8	63·7	64	51·39

STATION—MAIDUGURI.

Lat. 11·47′ N. Long. 13·11′ E.

January	103	50	89·4	54·4	42	...
February	105	56	96·6	61·1	36	...
March	114	61	109·1	70·1	43	...
April	113	65	108·1	76	60	0·42
May	112	71	106·7	79·8	68	1·50
June	108	68	99·5	76	69	5·16
July	98	65	91·5	71·8	82	9·10
August	95	67	87	71	83	9·72
September	98	64	90·4	71·2	78	5·09
October	99	58	94·2	63·2	54	2·05
November	102	56	96·4	61·8	50	...
December	101	50	91·5	54·4	52	...
Means	114	50	96·7	67·5	60	33·04

STATION—NARAGUTA.

Lat. 8–52′ N. Long. 9–56′ E.

January	88	51	80·1	56	33	...
February	89	56	83·2	53·3	29	0·04
March	95	60	87·9	67·2	44	0·66
April	91	62	83·7	66·7	63	6·10
May	89	62	83·1	64·7	66	12·37
June	87	60	77·5	64·3	75	15·20
July	82	60	75·4	62·7	76	10·05
August	79	60	72·3	61·9	80	14·77
September	82	61	76·1	62·7	76	11·56
October	86	53	79·5	60·8	45	0·51
November	87	57	83·5	59·2	35	0·90
December	87	52	81·8	58·8	60	...
Means	95	51	80·3	61·5	57	72·16

METEOROLOGICAL RETURNS FOR THE YEAR 1916—*continued.*

STATION—ZARIA.

Lat. 11—06' N. Long. 7—30' E.

	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	95	47	85·1	53·9	27	...
February	97	50	86	58·3	22	...
March	101	56	94·1	66·6	37	0·02
April	98	64	92·9	70	65	5·20
May	98	64	87·9	68·7	60	5·13
June	92	63	86·4	67·6	69	2·68
July	87	63	75·6	66·1	77	8·65
August	86	63	79	66·6	79	9·85
September	83	63	76·2	66·3	75	17·47
October	90	49	84	60·1	47	0·75
November	94	50	90·8	58	38	0·05
December	94	45	87·6	51·7	26	...
Means	101	45	85·4	62·7	52	49·80

STATION—ZUNGERU.

Lat. 9—48' 32·4" N. Long. 6—39' 42·26"

January	100	62	94·8	76·1	47	...
February	106	61	97·8	66·8	42	...
March	104	61	103·7	68	64	1·41
April	102	68	96·3	75·5	76	0·85
May	98	68	94·6	72	69	7·47
June	96	64	91·9	68·5	46	2·40
July	91	66	85·5	69·8	70	2·86
August	88	67	85	70·4	85	8·33
September	92	68	87·9	71·7	85	12·79
October	97	61	91·7	69·1	81	1·94
November	97	59	94·5	65·8	75	1·01
December	102	63	96	62	50	... *
Means	106	53	93·3	68·8	66	39·06

* Records incomplete.

STATION—SOKOTO.

Lat. 13—2' 10" N. Long. 5—14' 4" E.

January	101	51	90·6	60	29	...
February	104	57	96·1	62	29	...
March	112	61	108·4	71·3	29	...
April	112	69	105·5	77·4	44	0·21
May	111	67	103·4	77	49	1·71
June	110	67	86·8	66·1	50	3·31
July	96	67	90	69·9	69	3·91
August	94	67	88·6	70	74	5·61
September	98	65	91·1	70	72	9·65
October	102	40	98·5	65·5	44	0·06
November	103	51	101·1	61·6	31	...
December	103	51	123·1	62·1	33	...
Means	112	40	98·6	67·7	46	24·46

METEOROLOGICAL RETURNS FOR THE YEAR 1916—*continued.*

STATION—YOLA.

	Lat. 9—12' 28" N. Long. 12—29' 30" E.					
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	103	60	94	66	50	...
February	105	69	99·8	73	57	...
March	107	66	101·3	77·3	53	0·66
April	104	72	100	77·7	65	2·15
May	103	68	95	74·2	72	5·45
June	95	66	89·4	72·7	82	5·72
July	90	67	81·6	71	79	7·13
August	90	68	85	71·1	77	6·49
September	90	68	84·9	70	76	8·28
October	99	64	92	73·7	69	4·05
November	98	65	95·5	78·3	55	...
December	105	59	79·6	63·2	47	...
Means	107	59	91·5	72·3	65	39·93

V. HOSPITALS AND DISPENSARIES.

The principal hospitals and dispensaries are at Kaduna, Lokoja, Kano, Zungeru and Zaria; and at each of these places arrangements are made by means of mosquito proof cages for the separation of suspicious cases of fever, in either Europeans or natives, from the other patients.

Kaduna.—The European hospital, which is intended to accommodate eight patients, is a quarters which has been adapted for the purpose pending the erection of the permanent institution. It was opened in November, 1916, the one at Kaduna Junction being then closed.

There is no mosquito proofing and nets are in general use.

The native hospital, which is of a temporary character also, is situated at the Junction and consists of a small brick building and several circular mud huts.

It is intended to erect the permanent hospital at Kaduna.

Lokoja.—There is accommodation here by means of six wards for twelve European patients and each ward is provided with a mosquito proof cage.

At the native hospital there are two large buildings, a portion of one being reserved for the treatment of women.

Kano.—This station, the next most important to the capital, has an European hospital with two wards, one of which is mosquito proof. It will accommodate sixpatients.

The hospital for natives, consisting of three wards, will allow of the admission of thirty patients.

Zungeru.—The hospital for Europeans was in use for the greater part of the year but in November, when the headquarters of the Northern Provinces was removed to Kaduna, it was almost dismantled.

The native hospital comprises two large and three small wards and will accommodate forty patients. This still continues in full working order.

Zaria.—There is no European hospital here, patients requiring hospital treatment being sent to Kaduna about 50 miles away.

The native hospital consists of a brick building with floor space for sixteen beds.

There are two ambulance coaches stationed on the railway in the Northern Provinces, at Minna and Zaria respectively, and are always available for the conveyance of patients to the hospitals at either Kano or Kaduna, or to the coast.

The following table shows the total number of patients treated at the various hospitals and dispensaries :—

	1913.	1914.	1915.	1916.
Europeans	1,547	1,506	1,137	990
Natives	26,297	29,533	20,251	24,846

VI. SCIENTIFIC.

On account of so many members of the staff having been seconded for service in various parts of the world in connexion with the war and the resulting increased work devolving on those who have had to remain, there has, I regret to say, been very little opportunity for scientific investigation.

Drs. Thomson and W. B. Johnson, however, were able to make inquiries in regard to the prevalence of pyorrhœa among the natives, the result being contained in their report attached. I append three graphs, the first shows a comparison between the rising population and the fall of death rate, invaliding rate, and average number of times sick of each individual, the second and third show details in regard to blackwater fever and malaria.

ARTHUR PICKELS,

Principal Medical Officer.

Northern Provinces.

July 31st 1917.

TABLE I.

VACCINATIONS PERFORMED DURING THE YEAR 1916.

Total number vaccinated	9,269
Successful	5,728

TABLE II.

QUININE ISSUED GRATIS FOR PROPHYLACTIC PURPOSES DURING THE YEAR 1916.

Number of grains issued to Europeans	492,775
" " " " " natives	76,010
" " " " " school children	2,850

TABLE III.

SURGICAL OPERATIONS PERFORMED DURING THE YEAR 1916.

Nature of operation.	Total number.	Cured.	Relieved.	Unrelieved.	Died.
Abscess, Incision	47	43	4	...	...
Ainhum	1	1	..	...	...
Amputation Limbs	14	10	...	...	4
Appendicectomy	1	1	...	...	...
Arthrectomy	1	1	...	...	...
Arthrotomy	1	1	...	...	...
Bone Injury	1	...	1	...	...
Bubo	5	5	...	...	...
Bullet Extraction	1	1	...	...	...
Bursitis	2	2	...	...	...
Circumcision	12	12	...	...	...
Curetting Uterus	1	1	...	...	...
Cut Throat	1	1	...	...	...
Cyst, Broad Lig...	1	...	...	...	1
Cyst Meibomian	1	1	...	...	...
Cystotomy, Supra-pubic ...	2	2	...	...	...
Dental Extraction	10	10	...	...	...
Empyema	3	...	2	...	1
Empyema, Frontal Sinus ...	1	1	...	...	...
Entropion	1	...	1	...	...
Enucleation Cyst	2	2	...	...	...
Excision Gland	1	1	...	...	...
" Skin	1	1	...	...	...
" Tumours	13	13	...	...	...
Fistula in Ano	1	1	...	...	...
Forceps Delivery	2	2	...	...	...
Fracture-Dislocation Elbow ...	1	1	...	...	...
" Setting	1	1	...	...	...
" Skull	1	1	...	...	...
Ganglion	3	3	...	...	...
Hare Lip	1	1	...	...	...
Hernia, Reduction	1	1	...	...	...
Herniotomy	23	21	...	...	2
Hydrocele	20	12	8	...	...
Hydrocele Radical cure ...	2	2	...	...	...
Hysterectomy	2	1	...	...	1
Ingrowing Toe Nail	1	1	...	...	...
Necrosis	4	4	...	...	...
Papilloma	1	1	...	...	...
Paracentesis Abdominis ...	4	...	4	...	...
Paraphymosis	1	1	...	...	...
Phymosis	24	24	...	...	...
Pterygium	1	1	...	...	...
Removal Foreign Body ...	2	2	...	...	...
" Placenta	1	1	...	...	...
Sequestrotomy	1	1	...	...	...
Skin Grafting	3	2	1	...	...
Staphyloma	2	2	...	...	...
Urethral Dilatation	6	6	...	...	...
Varicose Veins	1	1	...	...	...
Total	234	204	21	...	9

TABLE IV

RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916.

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	Total.		Total cases treated.	Remaining in Hospital at end of 1916.	Total.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Infective Diseases.							
Beri-Beri	...	...	...	...	...	...	...
Cerebro-Spinal Fever	...	...	...	...	...	...	...
Chicken Pox	...	...	...	...	...	...	...
Cholera	...	...	...	...	...	...	...
Dengue	...	...	...	...	...	...	...
Diphtheria	...	...	...	...	...	...	...
Dysentery:—							
(*a*) Amœbic	...	2	...	2	...	6	...
(*b*) Bacillary	...	1	...	1	...	1	...
(*c*) Type not determined	...	4	...	4	1	2	...
Endocarditis-infective	...	...	...	...	...	...	...
Enteric	...	...	...	...	...	2	...
Erysipelas	...	...	...	...	...	...	...
Gonorrhœa	...	...	...	...	...	2	...
Influenza	...	2	...	2	...	7	...
Kala-Azar	...	...	...	...	...	...	...
Leprosy:—							
(*a*) Nodular	...	...	...	...	...	...	...
(*b*) Anaesthetic	...	...	...	...	...	...	...
Malaria:—							
(*a*) Tertian	...	34	...	34	2	28	...
(*b*) Quartan	...	...	...	...	...	7	...
(*c*) Aestivo-Autumnal	...	38	...	38	...	159	...
(*d*) Chronic	...	...	...	...	...	1	...
(*e*) Type not determined	...	...	...	...	...	3	...
Blackwater Fever	...	6	3	6	1	16	5
Measles	...	...	...	...	...	2	...
Papataci Fever	...	...	...	...	...	...	...
Plague	...	...	...	...	...	...	...
Pneumonia	...	2	...	2	...	...	...
Pyrexia of uncertain origin	...	1	...	1	...	5	...
Rabies	...	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...	...
Rheumatic Fever	...	...	...	...	...	1	...
Septicaemia	...	...	...	...	...	...	...
Small-Pox	...	...	...	...	...	...	...
Syphilis (*a*) Primary	...	2	...	2	...	2	...
(*b*) Secondary	...	...	...	...	...	...	...
(*c*) Inherited	...	...	...	...	...	...	...
Tetanus	...	1	1	1	...	...	...
Trypanosomiasis (Sleeping Sickness)	...	1	...	1	...	1	...
Tuberculosis	...	1	1	1	...	...	...
Undulant Fever	...	...	...	...	...	...	...
Whooping Cough	...	...	...	...	...	...	...
Yaws	...	...	...	...	...	...	...
Yellow Fever	...	...	...	...	...	...	...
Other Diseases	1	2	1	3	...	1	...
Intoxications:—							
Alcoholism	...	1	...	1	...	...	...
Morphinism	...	...	...	...	...	...	...
Other Intoxications	...	...	...	...	...	...	...
General Diseases:—							
Anæmia	1	7	...	8	...	19	...
Anæmia-Pernicious	...	...	...	...	...	...	...
Diabetes	...	1	1	1	...	...	...
Exophthalmic goitre	...	...	...	...	...	...	...

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
General Diseases—*continued.*							
Gout	...	...	...	...	...	5	...
Leucocythæmia	...	...	...	...	...	...	...
Lymphadenoma	...	...	...	...	...	...	...
Myxœdema	...	...	...	...	...	...	...
Purpura	...	...	...	...	...	...	...
Rickets	...	...	..	...	...	...	...
Scurvy	...	...	...	...	...	...	...
Other Diseases	1	5	...	6	...	9	...
LOCAL DISEASES.							
DISEASES OF THE NERVOUS SYSTEM:—							
Sub-section 1.—Diseases of the Nerves:—							
Neuritis	...	1	...	1	...	5	...
Meningitis	...	...	...	...	...	...	...
Myelitis	...	...	...	...	...	...	...
Hydrocephalus	...	...	...	...	...	...	...
Encephalitis	...	...	...	...	...	...	...
Abscess of brain	...	..	...	...	...	...	...
Congestion of brain	...	...	...	...	...	...	...
Other Diseases	...	4	...	4	...	2	...
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—							
Apoplexy	...	...	...	...	...	...	...
Paralysis	...	...	...	...	...	...	...
Chorea	...	...	...	...	...	...	...
Epilepsy	...	...	...	...	...	...	...
Neuralgia	...	1	...	1	...	9	...
Hysteria	...	...	...	...	...	1	...
Other Diseases	...	4	...	4	...	3	...
Sub-section 3.—Mental Diseases:—							
Idiocy	...	...	...	...	...	...	...
Mania	...	...	...	...	...	...	...
Melancholia	...	...	...	...	...	...	...
Dementia	...	...	...	...	...	...	...
Delusional Insanity	...	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	1	...
DISEASES OF THE EYE:—							
Conjunctivitis	...	3	...	3	...	4	...
Keratitis	...	...	...	...	...	...	...
Ulceration of cornea	...	...	...	...	...	...	...
Iritis	...	...	...	...	...	1	...
Optic neuritis	...	...	...	...	...	...	...
Cataract	...	...	..	...	...	...	...
Other Diseases	...	1	...	1	...	3	...
DISEASES OF THE EAR:—							
Inflammation	...	...	...	...	...	1	...
Other Diseases	...	...	...	...	...	8	...
DISEASES OF THE NOSE:—							
Inflammation	...	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	1	...
DISEASES OF THE CIRCULATORY SYSTEM:—							
Pericarditis	...	...	...	...	...	...	...
Endocarditis	...	...	...	...	...	...	...

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.	
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
LOCAL DISEASES—*continued.*							
Valvular Disease:—							
(1) Mitral	...	2	...	2	...	...	...
(2) Aortic	...	...	...	...	...	1	...
(3) Tricuspid	...	...	...	...	...	...	...
(4) Pulmonary	...	...	...	...	...	...	...
Arterial sclerosis	...	...	...	...	...	...	...
Aneurism	...	...	...	...	...	...	...
Other Diseases	...	1	...	1	...	1	...
DISEASES OF THE RESPIRATORY SYSTEM:—							
Laryngitis	...	1	...	1	...	1	...
Bronchitis	...	3	...	3	...	16	...
Broncho-pneumonia	...	...	...	...	...	2	...
Abscess of Lung	...	...	...	...	...	...	...
Gangrene of Lung	...	...	...	...	...	...	...
Emphysema	...	...	...	...	...	1	...
Pleurisy	...	2	...	2	...	5	...
Empyema	...	...	...	...	...	...	...
Other Diseases	...	4	...	4	...	11	...
DISEASES OF THE DIGESTIVE SYSTEM:—							
Stomatitis	...	...	...	...	...	2	...
Caries of teeth	...	...	...	...	...	17	...
Pyorrhœa alveolaris	...	...	...	...	...	3	...
Glossitis	...	1	...	1	...	...	...
Sore throat	...	...	...	...	...	7	...
Inflammation of tonsils	...	2	...	2	...	12	...
Gastritis	1	14	...	15	...	33	...
Ulceration of stomach	...	...	...	...	...	...	...
Hæmatemesis	...	...	...	...	...	...	...
Dilatation of stomach	...	...	...	...	...	2	...
Stricture of stomach	...	1	...	1	...	...	...
Dyspepsia	...	1	...	1	...	36	...
Enteritis	...	3	...	3	...	20	...
Appendicitis	...	1	...	1	...	...	...
Colitis	...	9	...	9	...	2	...
Ulceration of intestines	...	...	...	...	...	...	...
Sprue	...	..	...	...	...	...	...
Hernia	...	1	...	1	...	1	...
Diarrhœa	...	2	...	2	...	17	...
Constipation	...	...	...	...	...	2	...
Colic	...	1	...	1	...	2	...
Hæmorrhoids	...	3	...	3	...	6	...
Pancreatitis	...	...	...	...	...	...	...
Hepatitis—Acute	...	...	...	...	...	6	...
Abscess	...	...	...	...	...	...	...
Cirrhosis	...	...	...	...	...	...	...
Jaundice	...	1	...	1	...	5	...
Peritonitis	...	...	...	...	...	...	...
Ascites	...	...	...	...	...	1	...
Other Diseases	...	6	1	6	..	7	...
DISEASES OF THE LYMPHATIC SYSTEM:—							
Splenitis	...	...	...	...	...	3	...
Inflammation of lymphatic gland	...	3	...	3	...	5	...
Suppuration of lymphatic gland	...	1	...	1	...	3	...
Lymphangitis	...	1	...	1	...	2	...
Elephantiasis	...	...	...	...	...	...	...
Other Diseases	...	2	1	2	...	1	...

Table IV.—Return of Diseases and Deaths (European) for the Year 1916—*continued.*

Diseases.	In-Patients.					Out-Patients.	
	Remaining in Hospital at end of 1915.	Total.		Total cases treated.	Remaining in Hospital at end of 1916.	Total.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Local Diseases—*continued.*							
Diseases of the Urinary System:—							
Acute nephritis	...	...	...	...	...	1	...
Bright's Disease	...	...	...	...	..	...	...
Pyelitis	...	...	...	...	...	...	...
Calculus	...	...	...	...	...	1	...
Renal colic	...	...	..	...	...	3	...
Cystitis	...	5	...	5	...	5	...
Vesical calculus	...	...	...	...	...	...	...
Suppression	...	...	...	..	...	...	...
Hæmaturia	...	...	...	...	...	...	...
Chyluria	...	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	2	...
Diseases of the Generative System:—							
Male Organs:—							
Urethritis	...	...	...	...	...	4	..
Gleet	...	...	...	...	...	...	...
Stricture	...	...	...	...	...	1	...
Prostatitis	...	...	...	...	...	...	...
Soft chancre	...	...	...	...	...	2	...
Condyloma	...	...	...	...	...	...	...
Inflammation of scrotum	...	...	...	...	...	...	...
Hydrocele	...	...	...	...	...	1	...
Orchitis	...	...	...	...	...	3	...
Epididymitis	...	...	...	...	...	1	...
Abscess of testicle	...	...	...	...	...	1	...
Other Diseases	...	3	...	3	...	4	...
Female Organs:—							
Ovaritis	...	...	...	...	...	...	...
Ovarian cyst	...	...	...	...	...	...	...
Endometritis	...	...	...	...	...	...	...
Displacement of uterus	...	...	...	...	...	...	...
Vaginitis	...	...	...	...	...	...	...
Amenorrhœa	...	...	...	...	...	...	...
Dysmenorrhœa	...	...	...	...	...	...	...
Menorrhagia	...	...	...	...	...	...	...
Leucorrhœa	...	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	...	...
Affections connected with Pregnancy:—							
Abortion	...	...	...	...	...	1	...
Other Affections	...	...	...	...	...	...	...
Affections connected with Parturition:—							
Delayed Labour	...	...	...	...	...	...	...
Retained placenta	...	...	...	..	...	...	...
Premature Birth	...	...	...	...	...	...	...
Other Affections	...	...	...	...	...	1	...
Affections consequent on Parturition:—							
Post-partum hæmorrhage	...	...	...	...	...	...	...
Puerperal septicæmia	...	...	...	...	...	...	...
Mastitis	...	...	...	...	...	...	...
Abscess of breast	...	...	...	...	...	...	...
Other Affections	...	...	...	...	...	1	...
Diseases of Organs of Locomotion:—							
Osteitis	...	...	...	...	...	2	...
Arthritis	...	1	...	1	...	2	...

Table IV.—Return of Diseases and Deaths (European) for the Year 1916—*continued.*

Diseases.	In-patients.				Out-patients.	
	Remaining in Hospital at end of 1915.	Total.		Total cases treated.	Remaining in Hospital at end of 1916.	Total.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Local Diseases—*continued.*							
Diseases of Organs of Locomotion—*continued.*							
Spondylitis	...	...	...	...	...	...	...
Bursitis	...	...	...	...	...	...	...
Myalgia	...	5	...	5	...	15	...
Other Diseases	...	6	...	6	...	6	..
Diseases of Connective Tissue:—							
Cellulitis	...	...	...	...	...	7	...
Abscess	...	3	...	3	...	13	...
Other Diseases	...	...	...	...	...	...	...
Diseases of the Skin:—							
Ulcer	...	5	...	5	...	7	...
Urticaria	...	...	...	...	...	...	...
Eczema	...	...	...	...	...	6	...
Boil	...	2	...	2	...	23	...
Carbuncle	...	1	...	1	...	3	...
Herpes	...	1	...	1	...	2	...
Psoriasis	...	...	...	...	...	1	...
Oriental sore	...	...	...	...	...	...	..
Tinea	...	...	...	...	...	2	...
Scabies	...	..	...	...	...	1	...
Acne	...	...	...	...	...	1	...
Prickly heat	...	...	...	...	...	1	...
Other Diseases	...	2	...	2	...	13	...
Injuries:—							
General	...	5	...	5	...	8	...
Local	...	6	...	6	...	44	...
Tumours:—							
Benign	...	...	...	...	...	...	...
Malignant	...	1	...	1	...	1	...
Malformations	...	...	...	...	...	...	...
Poisons:—							...
Vegetable	...	...	..	...	...	...	...
Animal	...	...	...	...	...	1	...
Other Poisons	...	...	...	...	...	1	...
Parasites.							
Animal Parasites:—							
Protozoa	...	...	...	...	...	...	...
Trematoda (Flukes)	...	...	...	...	...	...	...
Cestoda:—							
Tænia solium	...	...	...	...	...	...	...
Tænia sagninata	...	...	...	...	...	6	...
Other Cestodes	...	...	...	...	...	...	...
Nematoda:—							
Ascaris	...	...	...	...	...	...	...
Tricocephalus dispar	...	...	...	...	...	...	...
Trichina	...	...	...	...	...	...	...
Dracunculus	...	...	...	...	...	...	...
Filaria	...	...	...	...	...	...	...
Strongylus	...	...	...	...	...	...	...
Ankylostomum	...	...	...	...	...	...	...
Oxyuris	...	...	...	...	...	...	...
Other Nematodes	...	...	...	...	...	...	...
Insecta:—							
Insects producing myiasis	...	...	...	...	...	...	...
Dematophilus penetrans	...	...	...	...	...	...	...
Other Insects	...	...	...	...	...	...	...
Total	...	4	237	9	241	4	749	5

TABLE V.

RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916.

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
INFECTIVE DISEASES:—						
Beri-Beri	...	1	...	1	...	...
Cerebro-Spinal Fever	...	6	4	6	1	1
Chicken Pox	1	13	...	14	...	2
Cholera	...	...	...	...	...	...
Dengue	...	...	...	...	...	...
Diphtheria	...	1	...	1	...	...
Dysentery :—						
(*a*) Amœbic	2	74	3	76	4	22
(*b*) Bacillary	3	20	7	23	...	...
(*c*) Type not determined ...	2	108	7	110	3	94
Endocarditis-Infective ...	...	...	...	...	...	...
Enteric	...	8	...	8	...	1
Erysipelas	...	...	...	...	...	...
Gonorrhœa	21	653	1	674	28	285
Influenza	...	2	...	2	...	6
Kala-Azar	...	...	...	...	...	...
Leprosy :—	636	43	63	679	537	1
(*a*) Nodular	...	1	...	1	1	1
(*b*) Anæsthetic	...	1	...	1	...	3
Malaria :—						
(*a*) Tertian	7	180	2	187	1	248
(*b*) Quartan	...	5	...	5	...	21
(*c*) Aestivo-autumnal ...	...	404	6	404	9	744
(*d*) Chronic	...	4	...	4	...	2
(*e*) Type not determined ...	...	7	...	7	...	26
Blackwater Fever	...	7	4	7	...	2
Measles	...	43	...	43	1	13
Papataci Fever	...	...	...	...	...	...
Plague	...	...	...	...	...	...
Pneumonia	6	130	26	136	6	5
Pyrexia of uncertain origin ...	...	1	1	1	...	...
Rabies	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...
Rhuematic Fever	...	36	1	36	...	44
Septicæmia	...	4	4	4	...	...
Small-Pox	...	10	1	10	...	6
Syphilis (*a*) Primary	8	79	1	87	2	80
(*b*) Secondary	36	128	...	164	38	123
(*c*) Inherited	...	...	...	...	...	3
Tetanus	...	2	1	2	...	...
Trypanosomiasis (Sleeping Sickness)	...	1	1	1	...	1
Tuberculosis	1	16	8	17	1	6
Undulant Fever	...	...	...	...	...	...
Whooping Cough	...	1	...	1	...	...
Yaws	1	12	...	13	1	23
Yellow Fever	..	...	...	...	...	...
Other Diseases	...	5	...	5	...	7
INTOXICATIONS:—						
Alcoholism	...	...	...	...	...	1
Morphinism	...	...	...	...	...	...
Other Intoxications	...	1	...	1	...	...
GENERAL DISEASES:—						
Anæmia	3	14	...	17	...	68
Anæmia-Pernicious	...	...	...	...	...	...
Diabetes	...	1	1	1	...	...
Exophthalmic Goitre	...	...	...	...	...	...

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
GENERAL DISEASES—*continued.*						
Gout	...	...	...	...	...	1
Leucocythæmia	...	...	...	...	...	...
Lymphadenoma	...	...	...	...	...	...
Myxœdema	...	...	...	...	...	...
Purpura	...	...	...	...	...	...
Rickets	...	...	...	...	...	5
Scurvy	...	...	...	...	...	1
Other Diseases	...	47	3	47	4	310
LOCAL DISEASES.						
DISEASES OF THE NERVOUS SYSTEM:—						
Sub-section 1.—Diseases of the Nerves:—						
Neuritis	1	2	...	3	...	9
Meningitis	...	...	...	...	...	...
Myelitis	...	...	...	...	...	...
Hydrocephalus	...	...	...	...	...	...
Encephalitis	...	...	...	...	...	...
Abscess of brain	...	...	...	...	...	...
Congestion of brain	...	...	...	...	...	...
Other Diseases	1	2	...	3	...	45
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—						
Apoplexy	...	1	...	1	...	...
Paralysis	1	4	1	5	1	1
Chorea	...	...	...	...	...	...
Epilepsy	...	...	...	...	...	9
Neuralgia	...	7	...	7	...	142
Hysteria	...	...	...	...	...	1
Other Diseases	...	6	...	6	1	16
Sub-section 3.—Mental Diseases:—						
Idiocy	...	...	...	...	...	...
Mania	...	...	...	...	...	...
Melancholia	...	...	...	...	...	...
Dementia	...	3	1	3	...	...
Delusional Insanity	...	...	...	...	...	...
Other Diseases	...	...	...	...	...	...
DISEASES OF THE EYE:—						
Conjunctivitis	1	95	...	96	2	626
Keratitis	...	3	...	3	...	20
Ulceration of cornea	...	5	...	5	...	28
Iritis	...	2	...	2	...	9
Optic neuritis	...	...	...	...	...	1
Cataract	...	...	...	...	...	5
Other Diseases	...	11	...	11	...	32
DISEASES OF THE EAR:—						
Inflammation	...	9	...	9	...	139
Other Diseases	...	7	...	7	...	47
DISEASES OF THE NOSE:—						
Inflammation	...	3	...	3	...	6
Other Diseases	...	3	...	3	...	21
DISEASES OF THE CIRCULATORY SYSTEM:—						
Pericarditis	...	1	1	1	...	2
Endocarditis	...	2	2	2	...	...

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES—*continued.*						
Valvular Disease :—						
(1) Mitral	...	13	5	13	1	10
(2) Aortic	...	4	1	4	...	2
(3) Tricuspid	...	2	1	2	...	1
(3) Pulmonary	...	...	...	...	...	...
Arterial sclerosis	...	...	...	...	...	...
Aneurism	...	...	...	...	...	1
Other Diseases	...	3	...	3	1	5
DISEASES OF THE RESPIRATORY SYSTEM :—						
Laryngitis	...	4	...	4	...	24
Bronchitis	7	245	5	252	7	1,313
Broncho-pneumonia	1	19	7	20	1	8
Abscess of Lung	...	...	...	...	...	...
Gangrene of Lung	...	...	...	...	...	...
Emphysema	...	...	...	...	...	...
Pleurisy	1	26	...	27	2	36
Empyema	...	2	1	2	...	...
Other Diseases...	1	22	5	23	...	158
DISEASES OF THE DIGESTIVE SYSTEM :—						
Stomatitis	...	5	...	5	...	65
Caries of teeth...	...	2	...	2	...	208
Pyorrhœa alveolaris	...	...	...	...	...	2
Glossitis	..	1	...	1	...	3
Sore throat	...	4	...	4	...	44
Inflammation of Tonsils ...	...	3	...	3	...	23
Gastritis	...	20	...	20	1	224
Ulceration of Stomach ...	...	...	...	...	...	...
Hæmatemesis	...	...	...	...	...	...
Dilatation of stomach... ...	...	...	...	...	...	...
Stricture of stomach	...	...	...	...	. .	...
Dyspepsia	...	15	...	15	...	179
Enteritis...	...	15	4	15	...	34
Appendicitis	...	4	...	4	...	1
Colitis	...	11	...	11	1	9
Ulceration of intestines ...	...	...	...	...	...	1
Sprue	...	...	...	...	...	...
Hernia	...	17	2	17	...	17
Diarrhœa	2	144	7	146	1	396
Constipation	...	29	...	29	...	1,516
Colic	...	18	...	18	1	190
Hæmorrhoids	...	4	...	4	...	23
Pancreatitis	...	...	...	...	...	...
Hepatitis—Acute	...	6	...	6	...	8
Abscess	...	1	1	1	...	1
Cirrhosis	...	2	1	2	...	...
Jaundice	...	7	...	7	...	18
Peritonitis	...	5	4	5	...	...
Ascites	...	9	2	9	...	7
Other Diseases	...	13	1	13	...	48
DISEASES OF THE LYMPHATIC SYSTEM :—						
Splenitis	...	5	...	5	1	9
Inflammation of lymphatic gland	3	43	...	46	3	100
Suppuration of lymphatic gland	1	32	...	33	1	26
Lymphangitis	...	12	...	12	...	11
Elephantiasis	...	3	...	3	...	6
Other Diseases...	...	2	...	2	...	1

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.					OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
DISEASES OF THE URINARY SYSTEM :—						
Acute nephritis	...	...	...	...	...	...
Bright's Disease	...	4	2	4	...	2
Pyelitis	...	...	...	...	...	...
Calculus	...	...	..	...	...	...
Renal colic	...	2	...	2	...	...
Cystitis	1	10	1	11	1	9
Vesical calculus	...	1	...	1	1	1
Suppression	...	...	...	...	...	1
Hæmaturia	...	10	...	10	...	3
Chyluria	...	...	...	...	...	...
Other Diseases	...	4	1	4	...	...
DISEASES OF THE GENERATIVE SYSTEM :						
Male Organs :—						
Urethritis	...	5	...	5	...	1
Gleet	3	96	...	99	...	30
Stricture	...	19	1	19	...	9
Prostatitis	...	...	...	...	...	...
Soft chancre	1	65	...	66	3	53
Condyloma	...	2	...	2	...	2
Inflammation of scrotum	...	3	...	3	...	2
Hydrocele	...	22	...	22	1	33
Orchitis	...	24	...	24	...	34
Epididymitis	...	13	...	13	1	2
Abscess of testicle	...	...	...	...	...	2
Other Diseases	...	15	3	15	1	9
Female Organs :—						
Ovaritis	...	...	...	...	...	1
Ovarian cyst	...	...	...	...	...	1
Endometritis	...	...	...	...	...	2
Displacement of uterus	...	1	...	1	...	...
Vaginitis	...	...	...	...	...	3
Amenorrhœa	...	...	...	...	...	1
Dysmenorrhœa	...	...	...	...	...	11
Menorrhagia	...	...	...	...	...	...
Leucorrhœa	...	1	...	1	1	1
Other Diseases	...	1	...	1	...	7
AFFECTIONS CONNECTED WITH PREGNANCY :—						
Abortion	1	1	...	2	...	1
Other Affections	...	...	...	...	...	1
AFFECTIONS CONNECTED WITH PARTURITION :—						
Delayed Labour	...	...	...	...	...	...
Retained placenta	...	...	...	...	...	1
Premature Birth	...	1	...	1	...	...
Other Affections	...	...	...	...	...	...
AFFECTIONS CONSEQUENT ON PARTURITION :—						
Post-partum hæmorrhage	...	...	...	...	...	...
Puerperal septicæmia	...	...	...	...	...	...
Mastitis	...	...	...	...	...	3
Abscess of breast	...	...	...	...	...	1
Other Affections	...	5	...	5	...	1
DISEASES OF ORGANS OF LOCOMOTION :—						
Osteitis	...	1	...	1	...	14
Arthritis	...	25	1	25	3	100

TABLE V.—RETURN OF DISEASES AND DEATHS (NATIVE) FOR THE YEAR 1916—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.
	Remaining in Hospital at end of 1915.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1916.	Total cases treated.
		Admissions.	Deaths.			
LOCAL DISEASES—*continued.*						
DISEASES OF ORGAN OF LOCOMOTION—*continued.*						
Spondylitis	...	3	...	3	...	1
Bursitis	...	6	...	6	...	22
Myalgia	...	87	...	87	2	960
Other Diseases	11	69	...	80	1	407
DISEASES OF CONNECTIVE TISSUE:—						
Cellulitis	...	46	...	46	...	189
Abscess	5	193	2	198	3	447
Other Diseases	1	6	...	7	...	9
DISEASES OF THE SKIN:—						
Ulcer	16	416	...	432	29	2,507
Urticaria	...	4	...	4	..	21
Eczema	1	5	...	6	1	53
Boil	...	20	...	20	3	195
Carbuncle	...	...	...	...	...	2
Herpes	...	7	...	7	...	18
Psoriasis	...	2	...	2	1	1
Oriental sore	...	...	...	...	...	...
Tinea	1	28	...	29	2	72
Scabies	...	11	...	11	...	17
Acne	...	13	...	13	...	11
Prickly heat	...	...	...	...	...	...
Other Diseases	..	22	...	22	1	265
INJURIES:—						
General	7	95	2	102	2	556
Local	27	355	9	382	18	2,898
TUMOURS:—						
Benign	...	5	...	5	...	12
Malignant	...	4	...	4	...	...
MALFORMATIONS	...	2	...	2	...	1
POISONS:—						
Vegetable	...	...	...	...	...	...
Animal	...	10	3	10	...	26
Other Poisons	...	7	1	7	...	15
PARASITES.						
ANIMAL PARASITES:—						
Protozoa	...	...	...	...	...	...
Trematoda (Flukes)	...	3	...	3	...	1
Cestoda:—						
Taenia solium	...	...	...	...	...	52
Taenia sagninata	...	261	...	261	1	659
Other Cestodes	...	41	...	41	...	46
Nematoda:—						
Ascaris	...	2	...	2	...	76
Tricocephalus dispar	...	...	...	...	...	...
Trichina	...	...	...	...	...	...
Dracunculus	5	328	...	333	5	340
Filaria	...	5	...	5	...	11
Strongylus	...	...	...	...	...	...
Ankylostomum	...	20	4	20	...	155
Oxyuris	..	2	...	2	...	18
Other Nematodes	1	3	...	4	...	3
Insecta:—						
Insects producing myasis	...	...	...	...	...	1
Dematophilus penetrans	...	2	...	2	...	72
Other Insects	...	16	...	16	...	57
Total	*828	5,437	227	6,265	743	18,581

* Remaining includes,
195 from 1915.
636 Leprosy not included in 1915.
831

The 3 short due to Surgical Operations also included in list of Diseases in 1915.

APPENDIX.

REPORT UPON THE PREVALENCE OF PYORRHOEA INFECTION AMONG NATIVE PRISONERS AT KANO AND ZUNGERU.

Introduction.

Owing to the prevalence of pyorrhœa alveolaris among the white population of Nigeria, Dr. Manning, Principal Medical Officer, Northern Provinces, suggested to us that the convicts in the gaols at Kano and Zungeru should be examined, in order that some idea might be obtained of the prevalence of this disease among natives.

In compliance with this request 400 prisoners have been examined, and the surprising result has been obtained that 79·2% are suffering from pyorrhœa (See Table I.) It is of course impossible to generalise from such comparatively small numbers, and accordingly the figures obtained are given below with but brief comment.

Table I.

Shows the cases of pyorrhœa among the different races within the gaols. The classification of cases into "purulent" and "inflammatory" pyorrhœa is explained under the table. In the cases from Zungeru (290) a further division was made of the cases of purulent pyorrhœa into localised (to a few tooth sockets) and generalised. Of 214 cases of purulent pyorrhœa the disease was localised in 73 and generalised in 141.

It was also noted at Zungeru that the disease was associated with general loosening of the teeth in 6·4% of all cases of pyorrhœa. There was a somewhat marked difference between the percentage of pyorrhœa cases at Zungeru and at Kano, thus:—

At Kano (110 cases)	pyorrhœa—58·2%
At Zungeru (290 cases)	pyorrhœa—87·2%

This difference is no doubt partly accounted for by the fact that at Zungeru there are a much greater number of older men with longer sentences—(See Table 2 and 3.)

Table II.

Shows the percentage of pyorrhœa infection among prisoners who have been in the gaols for varying periods before examination. It so happens that the percentage in cases of under 6 months detention in gaol is actually a trifle higher than in those who had been in gaol between 6 months and 2 years.

As the cases of under 6 months include a large number who were examined on admission, it would point to the fact that the native of the country generally is heavily infected with pyorrhœa, and would show that imprisonment alone has not produced such a high figure.

With long imprisonment the percentage rises, but here we are dealing with older men (See Table 3.)

Table III.

Shows the age incidence. As would be expected there is a steady rise of the percentage of infection with increasing age.

TABLE IV.

Shows the condition of the teeth. 20·5% of all prisoners had one or more carious teeth, and 21·7% had one or more teeth missing.

Bacterial Examination.

An attempt was made to see if any one group of organisms occurred constantly in the pyorrhoea cases. Smears were taken and examined after staining by Gram's method and by simple staining.

At both Zungeru and Kano, however, the attempt was abandoned after 25 and 50 cases had been examined. The multiplicity of organisms, mostly probably saprophytic, was too great for any indication to be given without cultural work. It was interesting, however, that spirochaetes and fusiform bacilli (such as occur in Vincent's angina and tropical ulcer) were very constantly although not invariably present. The amoeba buccalis was not specially looked for, and was not seen in the dry smears.

Symptoms Noted.

Some cases showed evidence of anaemia and general toxaemia, but the majority of cases were not obviously affected by the constant absorption of pus which was occurring. The resistance of natives in this country to pyogenic infection was shown by the way in which such infections tend to localisé as abscesses rather than to spread as cellulitis or as general septicaemia, and this natural or acquired resistance may explain the comparative absence of symptoms.

An attempt was made to associate pyorrhoea infection with abdominal trouble or with chronic joint trouble, but the difficulty of obtaining satisfactory histories of previous illnesses prevented any reliable information from being obtained—the patients invariably agreed to any past illnesses suggested by the Doctor. It is worth noting that "chronic rheumatism" is a very common complaint, but that true rheumatoid or osteo-arthritic changes in joints are not at all common, although they do occur. Gastric or duodenal ulcer must be exceedingly rare, and gastric dilatation and chronic dyspepsia do not appear to be very common. There seemed to be no definite relation between the severity of the pyorrhoea infection and the nutrition of the prisoner.

Conclusions.

(1) Pyorrhoea was present in 79·2% of 400 convicts examined.

(2) This is probably a reasonably fair index as to the prevalence of pyorrhoea among the natives of the country, as the percentage was as high in those recently admitted as in those who had been in gaol for 6 months to 2 years.

(3) The percentage of infection rises steadily with age.

(4) 21·7% of prisoners had one or more teeth missing, and 20·5% had teeth carious.

(5) No results worth recording were obtained by examination of smears taken from the pus of pyorrhoea cases.

(6) No satisfactory conclusions were drawn as to the effect of pyorrhoea infection upon the genaral health and nutrition of those infected.

(Sgd.) J. W. THOMSON.

(„) W. B. JOHNSON.

TABLE I.—CASES OF PYORRHOEA.

RACE.	Number examined.	Cases showing purulent pyorrhoea.	Cases showing only inflammatory pyorrhoea with retraction of gums.	Cases with no pyorrhoea.	Total cases of pyorrhoea.	Percentage number with pyorrhoea
Hausa	158	97	29	32	126	79·7
Kanuri	71	41	10	20	51	71·8
Pagan (various)	49	35	7	7	42	85·7
Yoruba	32	21	6	5	27	84·4
Fulani	23	15	4	4	19	82·6
Coast Races	20	14	1	5	15	75·0
Ibo, Ejaue, etc.	20	9	4	7	13	65·0
Arab	16	12	2	2	14	87·5
Nupe	11	8	2	1	10	90·9
Total	400	252	65	83	317	79·2

Explanation of Table I.

Under heading of *purulent pyorrhoea* are included all cases showing the presence of pus, which exuded on pressure over the margin of the gum.

Under heading of *inflammatory pyorrhoea* are shown those cases which had no purulent pyorrhoea but in which a spongy or hypertrophic condition of gums was present, associated with retraction of the gums. Many cases of purulent pyorrhoea had a well marked condition of inflammatory pyorrhoea, but such cases are shown under the former heading.

TABLE II.—SHOWING EFFECT OF PERIOD OF RETENTION IN GAOL.

Period of time in Gaol.	Cases with purulent pyorrhoea.	Cases with only inflammatory pyorrhoea.	Cases with no pyorrhoea.	Percentage of cases of pyorrhoea.
Under 6 months ...	84	29	33	77·4
6 months to 2 years	115	24	44	76·9
Over 2 years ...	53	12	6	91·5

TABLE III.—SHOWING AGE INCIDENCE.

Age.	Purulent pyorrhoea.	Inflammatory pyorrhoea.	No pyorrhoea.	Percentage of pyorrhoea.
Under 25 years ...	44	11	27	67·1
25–35 years... ...	126	42	47	78·1
Over 35 years ...	82	12	9	91·2

TABLE IV.—SHOWING CONDITION OF TEETH.

Race.	Number examined.	Cases with one or more teeth missing.	Cases with teeth carious.	Percentage number with teeth missing.	Percentage number with teeth carious.
Hausa ...	158	44	34	27·8	21·5
Kanuri ...	71	14	17	19·7	23·9
Pagan ...	49	6	5	12·2	10·2
Yoruba ...	32	6	14*	18·7	43·7*
Fulani ...	23	4	5	17·3	21·7
Coast ...	20	4	3	20·0	15·0
Ibo, Ejau ...	20	1	2	5·0	10·0
Arab... ...	16	6	1	37·5	6·2
Nupe ...	11	2	1	18·1	9·1
Total ...	400	87	82	21·7	20·5

* Associated in many cases with the practice of filing the central upper incisors.

Table Showing the Sick, Invaliding, and Death Rates of European Officials in Nigeria during 1916.

	Southern Provinces.	Northern Provinces.	Nigeria.
Total number of European officials resident ...	...	...	1,708
Average number resident	...	...	1,055·3
Total number on sick list	1,014	506	1,020
Total number of days on sick list	5,984	5,257	11,241
Average daily number on the sick list	...	...	30·7
Percentage of sick to average number resident ...	...	...	2·9
Average number of days on the sick list to each patient	...	...	11·0
Average sick time to each resident...	...	...	10·6
Total number invalided	62	27	89
Percentage of invalidings to total number resident	...	...	5·2
Percentage of invaliding to average number resident	...	...	8·4
Total number of deaths	9	5	14
Percentage of deaths to total number resident ...	...	...	·81
Percentage of deaths to average number resident	...	...	1·3
1915.			
Average daily number on sick list	11·4	12·8	24·2
Total number invalided	25	20	45
Total number of deaths	4	7	11

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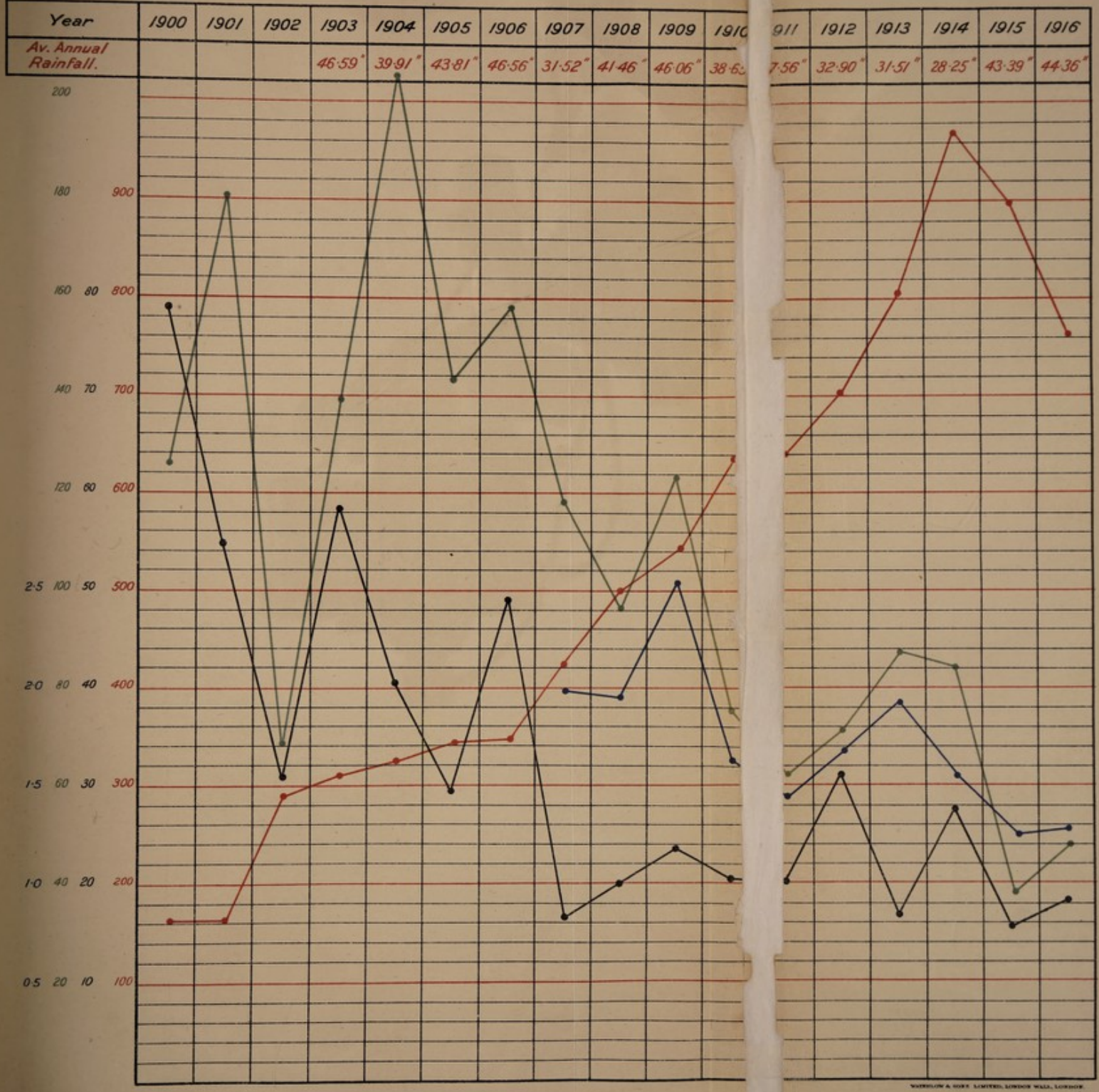
Table I.

TABLE SHOWING COMPARISON BETWEEN TH ISE OF EUROPEAN POPULATION AND THE FALL OF DEATH RATE, .. LIDING RATE, AND AVERAGE NUMBER OF TIMES EACH INDIVIDU HAS BEEN SICK.



RED = Average European Population ... ... Division = 20.

BLACK = Death Rate of Average European Population . Division = 2 per 1000.

GREEN = Invaliding Rate of Average European Population . Division = 4 per 1000.

BLUE = Average number of times each individual of Averag European Population has been Sick ... . Division = 0·1 times.

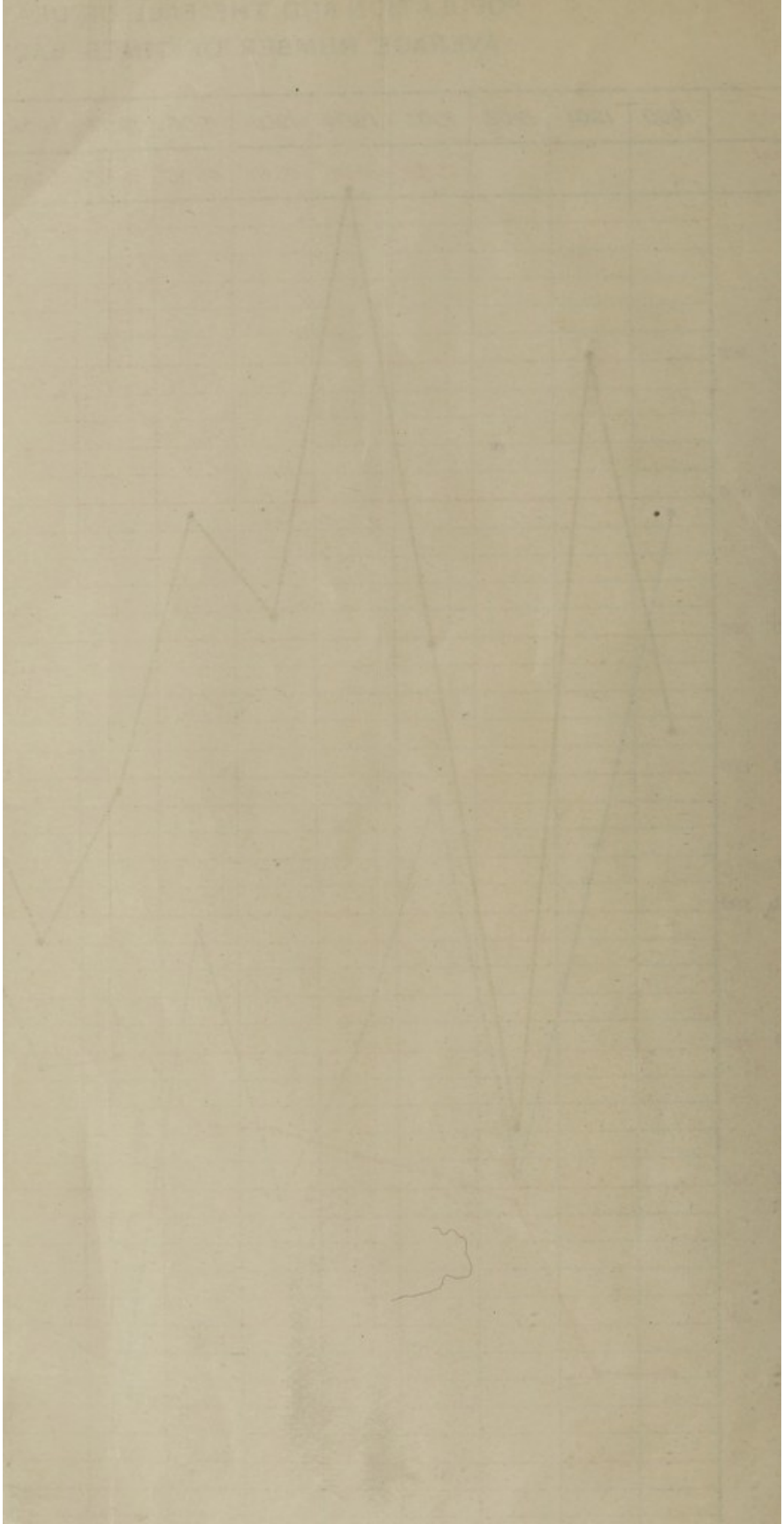
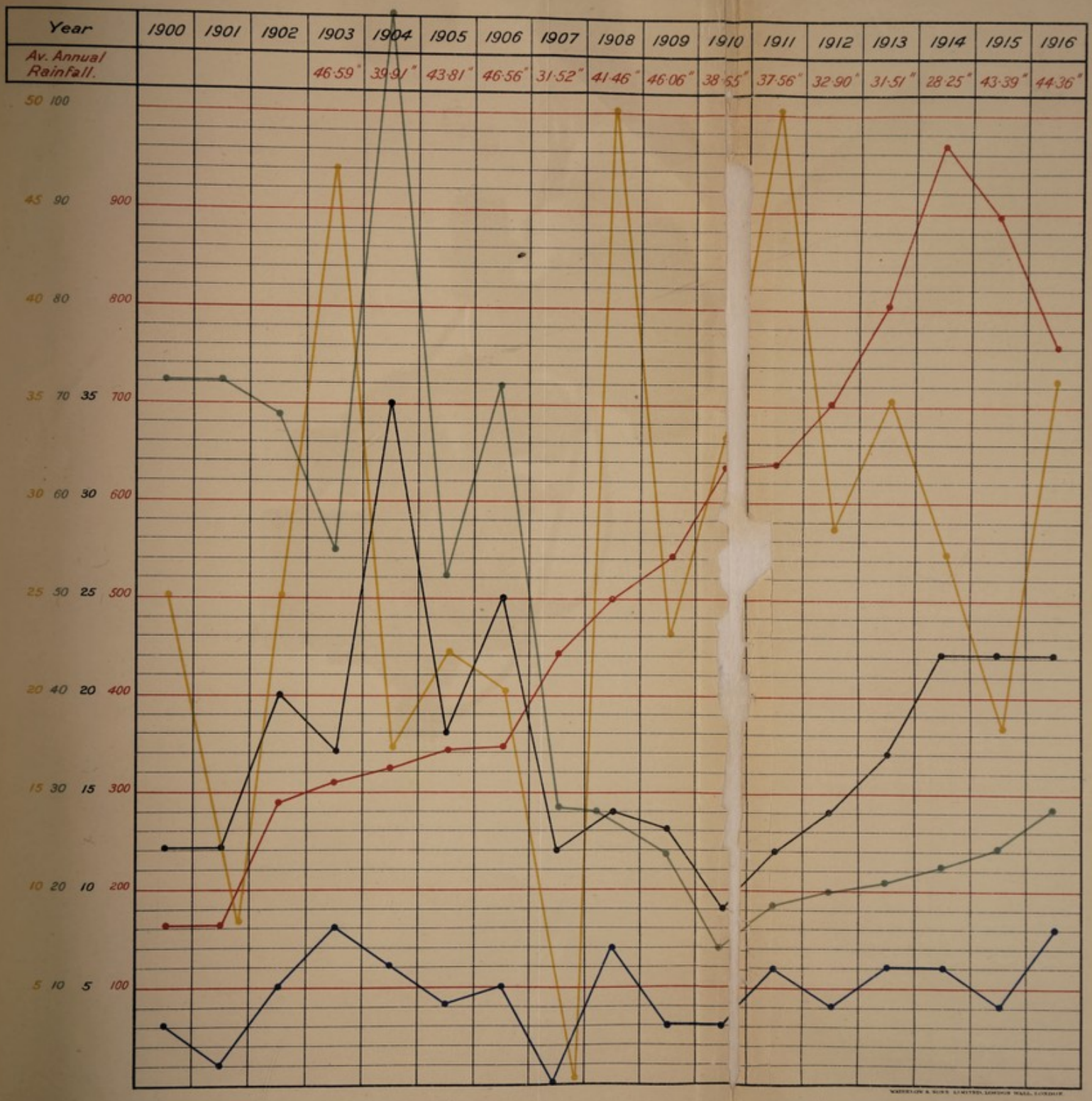


Table II.

TABLE IN RELATION TO BLACKWATER FEVER.



RED = Average European Population ... ... 1 Division = 20.

BLACK = Blackwater Fever Cases ... ... 1 Division = 1.

GREEN = Incidence Rate of Blackwater per 1000 of Average European Population ... ... 1 Division = 2 per 1000.

BLUE = Deaths from Blackwater ... ... 1 Division = 1 death.

YELLOW = Case Mortality per cent. of Blackwater Fever ... 1 Division = 1 per cent.

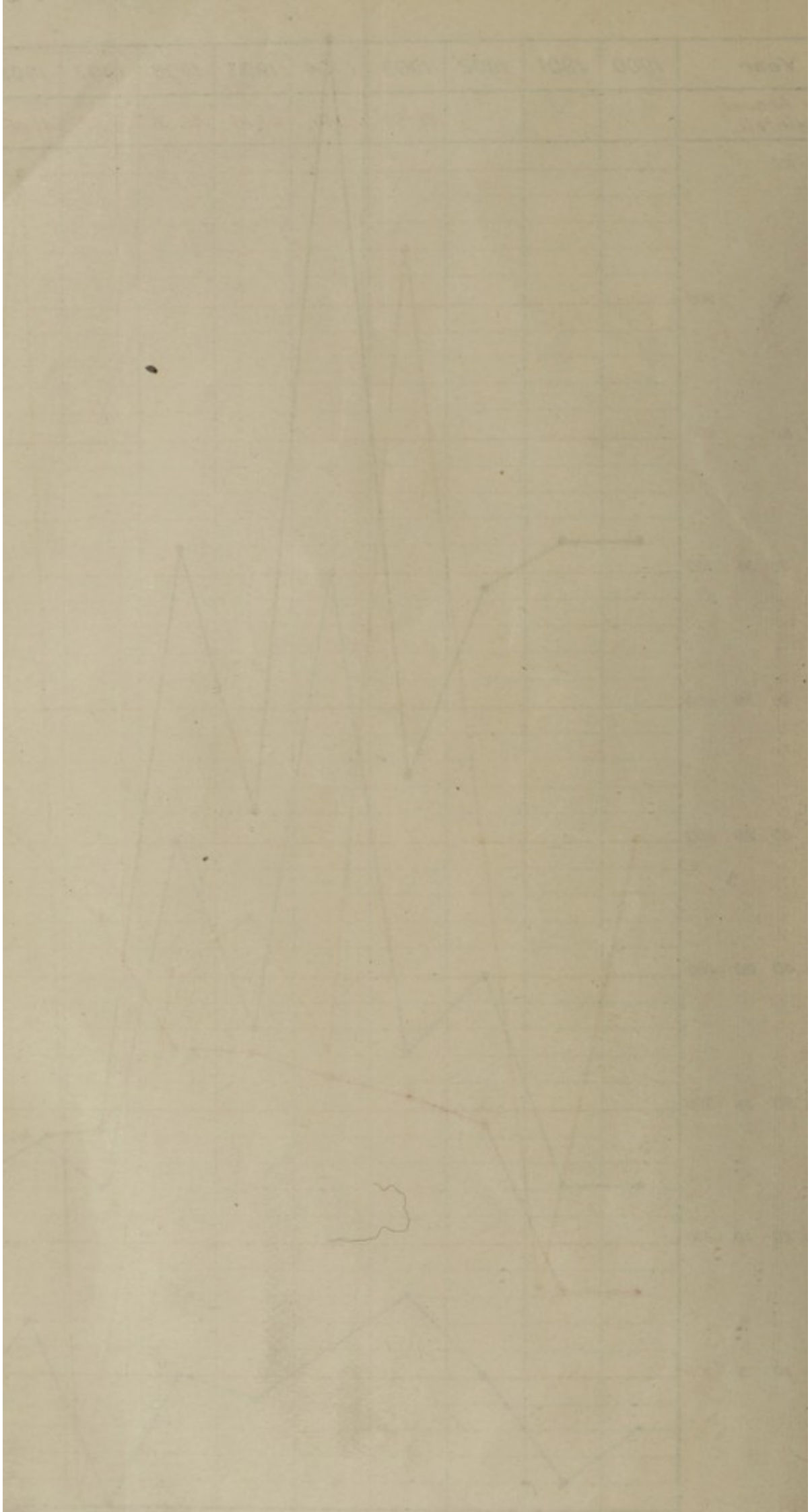
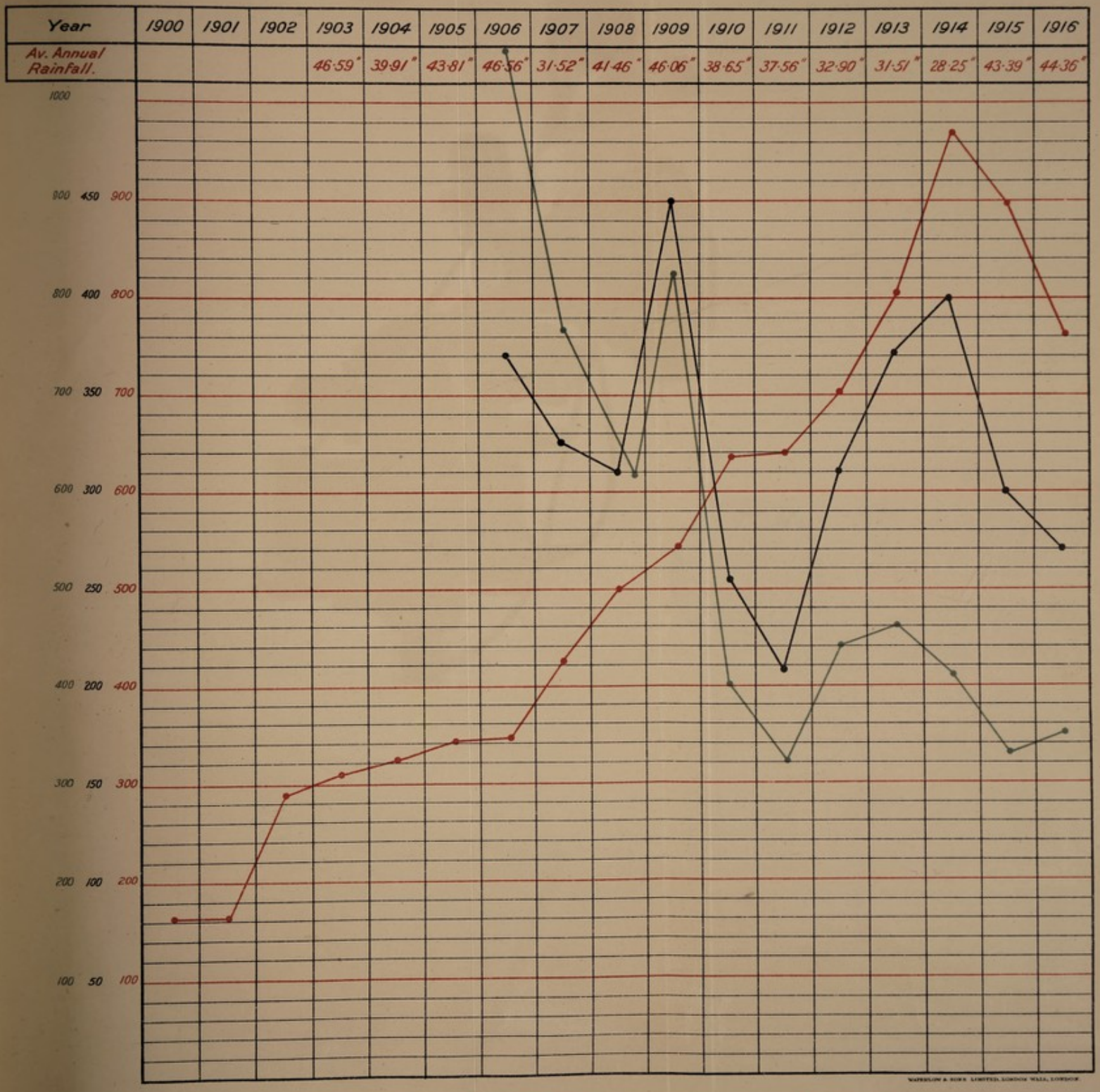


Table III.

TABLE IN REGARD TO MALARIA,

SHOWING INCIDENCE RATE PER 1000 OF AVERAGE EUROPEAN POPULATION AND NUMBER OF CASES.



RED = Average European Population ... ... 1 Division = 20.

BLACK = Number of cases of Malaria ... ... 1 Division = 10.

GREEN = Incidence Rate of Malaria per 1000 of Average European Population ... ... 1 Division = 20.

CONTENTS.

COLONY AND SOUTHERN PROVINCES.

NORTHERN PROVINCES.

RETURNS.

TABLE I.
