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547.

NIGERIA.
NORTHERN PROVINCES.

ANNUAL
MEDICAL AND SANITARY REPORT

FOR THE
YEAR ENDING 31ST DECEMBER, 1915.



544



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NORTHERN PROVINCES, NIGERIA.

ANNUAL MEDICAL REPORT, 1915.

I.—ADMINISTRATIVE.

STAFF.

The Medical Staff consisted of:—

European—

- 1 Principal Medical Officer.
- 1 Deputy Principal Medical Officer.
- 2 Provincial Medical Officers.
- 4 Senior Medical Officers.
- 41 Medical Officers.
- 2 Staff Sergeants.
- 12 Sergeants.
- 1 Male Nurse.
- 2 Senior Nurses.
- 12 Nurses.

Native—

- 3 Second Class Dispensers.
- 2 Third Class Dispensers.
- 4 First Class Clerks.
- 4 Wardmasters.
- 15 Head Dressers.
- 10 Dressers.
- 3 Cooks.
- 3 Head Ward Servants.
- 4 Messengers.
- 3 Headmen of Ambulance.
- 36 Ambulance Bearers.
- 15 Dispensary Attendants.
- 3 Medical Orderlies.
- 1 Storeman.

The Sanitation Staff consisted of:—

European—

- 1 Senior Sanitary Officer.
- 1 Sanitary Officer.

Native—

- 3 Inspectors of Nuisances.
- 1 Laboratory Attendant.
- 1 Second Class Clerk.
- 2 Mallamai, Pupil Inspectors of Nuisances.

The principal changes were as follows :—

Promotions.—Dr. G. R. Twomey and Dr. H. G. McKinney were promoted Senior Medical Officers on January 1st. Dr. G. B. Norman was promoted Senior Medical Officer on 16th July, 1915.

Deaths.—Dr. J. A. Beattie died at Maiduguri on 28th April, 1915, from typhoid fever and malaria.

Invalidings.—Dr. F. W. Chesnaye was invalided on pension.

Dismissals.—Dr. F. W. McCay was dismissed the service on 30th May for absence without leave.

Appointments.—Dr. H. Lynch Burgess, Medical Officer, Southern Provinces, seconded to the Colonial Office, was re-absorbed and transferred to the Northern Provinces, 17th November, 1915. Three Nursing Sisters. Five Dispensers, Third Class, payment of their salaries being made from savings of Head 11, Medical, item 15. 12 Sergeants.

Transfers.—Dr. G. B. Norman was transferred to Southern Provinces, on promotion, 16th July, 1915.

Re-absorption.—Five British Non-Commissioned Officers, Royal Army Medical Corps, were re-absorbed into their Corps.

FINANCIAL.

The total Revenue was £694 2 4

EXPENDITURE.

Personal Emoluments	...	...	...	£32,191 9 3
Other Charges	...	...	...	8,299 15 7
				£40,491 4 10



II.—PUBLIC HEALTH.

The health of Europeans generally, in comparison with former years, may be regarded as satisfactory.

I append the usual tables of analysis.

	1914.	1915.
Average population	969	897
Number of deaths	27*	14
Death rate per 1,000	27·86	15·6
Number of invalids	82	34
Invaliding rate per 1,000	84·62	37·9

* 9 killed in action.

The deaths during the year were due to:—

Blackwater fever	4
Yellow fever	1
Enteric fever	1
Dysentery	1
Malaria	1
Chronic rheumatism	1
Other diseases	3
INJURIES—	
General	1
Local	1
Total	<u>14</u>

GENERAL EUROPEAN POPULATION.

The average number of Europeans resident in the Northern Provinces during 1915 was 897.

Details of these figures are as follows:—

	1914.	1915.
Government Officials	543	507
Trading Firms	165	178
Mining Companies	223	128
Missions	38	84
Total	<u>969</u>	<u>897</u>

GENERAL NATIVE POPULATION.

The Native population is estimated at 9½ millions, which is the same figure as last year.

Reliable statistics of births and deaths are not yet obtainable.

EUROPEAN OFFICIALS.

The diseases for which Europeans mainly were treated were malaria, dysentery, blackwater fever and diseases of the digestive system.

Generally speaking, the health has been fair.

One fatal case of yellow fever occurred during the year in a European of the Public Works Department at Kaduna.

This is the second case of yellow fever so far reported from the Northern Provinces, and every precaution was taken to prevent its spread.

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

	1914.	1915.
Total number of European officials resident	769	761
Average number resident	543	507
Total number on the sick list	1,031	785
Total number of days on the sick list	4,811	4,699
Average daily number on the sick list	13·11	12·8
Percentage of sick to average number resident	2·4	2·5
Average number of days on the sick list to each patient	4·6	5·9
Average sick time to each resident	8·8	9·2
Total number invalided	61	20
Percentage of invalidings to total number resident	7·9	2·6
Percentage of invalidings to average number resident	11·2	3·9
Total number of deaths	20*	7
Percentage of deaths to total number resident	2·6	·92
Percentage of deaths to average number resident	3·6	1·4

* 9 killed in action.

INVALIDING OF EUROPEANS—1915.

Cause.	Officials.	Non-Officials.
Malaria Tertian	—	1
„ Æstivo-autumnal	—	2
Blackwater fever	3	4
Rheumatic „	1	—
Anæmia	1	3
Other diseases	6	1
Neuritis	1	1
Laryngitis	—	1
Gastritis	1	—
Dyspepsia	1	—
Appendicitis	1	—
Colitis	1	—
Lymphangitis	1	—
Abscess	—	1
Injuries (General)	2	—
„ (Local)	1	—
Total	20	14

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

	1914.	1915.
Total number of Native officials resident	788	802
Average number resident	525	594
Total number on the sick list	335	850
Total number of days on the sick list	2,749	3,903
Average daily number on the sick list	7·53	10·7
Percentage of sick to average number resident	·96	1·8
Average number of days on the sick list to each patient	8·2	4·6
Average sick time to each resident	3·5	6·5
Total number invalided	1	3
Percentage of invalidings to total number resident	·10	·37
Percentage of invalidings to average number resident	·12	·5
Total number of deaths	4	7
Percentage of deaths to total number resident	·42	·8
Percentage of deaths to average number resident	·52	1·2

III.—SANITATION.

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

(I.)—ADMINISTRATIVE.

As indicated in the Annual Report for the previous year, the Sanitary Programme for 1915 was not an ambitious one; five months of "Status belli" having proven "carpe diem" to be sound philosophy, in the absence of peace.

The number of Officers, lay as well as Medical, upon whose activities the promotion of much sanitary progress and efficiency had normally depended, seconded for military duty exclusively, kept increasing; while the two Sanitary Officers were obliged to divert a large proportion of their energy from sanitary to purely medical duty.

Fortunately, visitations of epidemic disease were not a prominent feature of the year. Here the Fates were merciful; for never, since they had been effectively occupied, were the defences of the Northern Provinces against such visitations weaker.

The second case of yellow fever, recorded in the history of the Northern Provinces, constituted the most notable event of the year. Energetic measures, which shall be described later, were promptly enforced to prevent the spreading of the disease, and they seemed to be attended by success, for no other case was noted.

With the end of the year, it had become necessary to recognise enteric fever and tuberculosis as naturalised members of the endemic community, for it was no longer either truthful or possible to regard examples of them as isolated importations.

The tsetse-fly-infected river Benue, particularly along its course through the Province of Muri, received careful personal attention from the Sanitary Officer. He sought the co-operation of the Political Officers concerned, and their response was cordial and effective. The careful work of the Sanitary Officer was done and the co-operation of the Political Officers was given under unusually trying and difficult conditions; his recommendations were and had to be onerous, considering the local state of affairs; yet, so far as the scanty means at their disposal would permit, they met his requirements in a wonderfully effective manner.

The Provinces of Bassa, Muri, Yola, Bauchi, Bornu, Kano, Nassarawa, Zaria and Niger received the personal attention of the Sanitary Officers, while they were on tour; local conditions, which could not be effectively dealt with at the time, were noted for subsequent attention; and the interest and assistance of several of the Emirs and of numerous District Headmen were enlisted in the cause of sanitary progress.

The opening up of trunk roads and the maintenance of existing ones, especially in the regions infested by tsetse-fly, was effected, so far as the narrow means available would permit. The principle of maintaining broad cleared roads—in the interest of the public health, apart from economic reasons—had ceased to be one advocated by medical and sanitary officers alone; it had become a fixed one among practically all those whose activities were of any account.

All the riparian stations along the river Benue were visited by the Senior Sanitary Officer and an Officer of the Surveys Department, travelling together and enjoying, wherever it had been possible to arrange so, the collaboration of the Political Officers concerned.

The lay-out of each station was carefully gone into on the spot and all the data, necessary for embodiment in the plan, were noted. Those stations were visited while the river was in flood, it being quite impossible, during the dry season, to recognise the essential features of riparian settlements.

The attenuation of the Medical Staff had rendered it necessary for such Medical Officers as happened to be employed locally on civil duty to travel much more extensively than had been necessary under normal conditions; and those officers, where it was possible, seized the opportunities thus vouchsafed to them, to pay sanitary attention to many landward places which had rarely experienced any medical attention at all.

The attenuated Medical Staff, naturally, failed to maintain progress in vaccination and in leper segregation. This attenuation of the Staff also rendered it necessary to postpone, until the advent of better times, the carrying out of the *ante bellum* scheme of extending the dispensaries financed by various Native Administrations. This is not an exclusively medical question, for such dispensaries are quite as much centres of sanitary enlightenment as of medical service.

The more important stations throughout the country were well maintained, so far as sanitary routine was concerned, for they had Medical Officers permanently posted to them, most of whom, however, were doing double duty; and it is creditable to those officers that they did not curtail their sanitary activities, although often sorely tempted to do so by exhaustion incidental to excessive work. Those stations normally enjoying the services of Medical Officers, from which such Officers had been withdrawn, received from other Officers, as a rule Political Officers, a generous amount of sanitary attention, and how little their sanitary routine suffered was agreeably surprising. At some such stations, although the soldiery were absent, their women and following had been left behind in the lines. Soldiers' women are notoriously unamenable to discipline, particularly sanitary discipline, in the absence of their men and their men's officers; and, when they are left in a station with no European in permanent residence, sanitary anarchy is well nigh inevitable. In the course of his travelling, the Senior Sanitary Officer visited several such stations, in which the busy Political Officers were only occasionally resident, merely using them as their headquarters, and he was impressed by the creditable maintenance of sanitary routine thereat.

From time to time a certain amount of trouble arose at certain stations due to nuisances incidental to the carrying on of offensive trades, especially fellmongering. It was recognised that the conditions were exceptional and, happily, only temporary, and it was tacitly agreed that so long as such nuisances were not actually dangerous to the public health academically correct proceedings against them should not be undertaken vexatiously. This seemed to be common sense; the traders concerned were quite willing to abate all nuisance so soon as the Government should be able to grant them the necessary facilities—new sites with requisite railway siding accommodation, etc.—for which they were prepared to pay. The trades concerned were bringing considerable wealth into the country, a factor of the first importance under existing conditions; and it was felt that it was just as necessary to endure inconvenience for the public good as it was to abolish dangerous nuisances, at all costs, in the interest of the public health. The traders, however, were left under no delusion; they were made clearly to understand that the Government would stop their operations summarily, in the event of the medical authorities declaring them to be dangerous to health.

Cattle plague appeared in several parts of the country, particularly at the top of the Benue. This was, of course, taken under the supervision of the Veterinary Branch of the Department of Agriculture. But the Principal Medical Officer deemed it wise to enter his caveat against the transport of live stock along the Benue by steamer; while steps were taken, at various centres, to prevent the exposure for sale as food of the carcasses of diseased animals.

LEGISLATION.

No new Sanitary Legislation was enacted during the year; but fresh legislation was suggested and submitted for the consideration of His Excellency, and the end of the year saw the new Public Health Ordinance within sight of completion.

PROGRESS MADE.

With the end of the year, the distribution of water by pipes was being effected, more or less partially, at Zaria, Kaduna, Kaduna Bridge, Minna, Baro and Lokoja.

During the rainy season the fronts of many of the riparian villages in the Province of Muri were kept entirely cleared; and the danger of the villagers being attended by tsetse-flies, during their movements to and from the necessary water, was thus materially diminished. The opening up of trunk roads and the maintenance of existing ones, mentioned above, was very substantial progress: considering the narrowness of the means, financial and personal, available for the purpose. In this connection, the work maintained in the backward provinces of Bassa and of Muri is especially worthy of mention. Both provinces contain numerous tsetse belts; during the year, the Political Officers were working short-handed; they were saddled with much unusual work, were fronted by abnormal worries and were hampered by meagre means; yet still they found time and energy to keep going much of this most desirable clearing.

The laying down of dbub grass was extended at various stations and the Director of Agriculture arranged to distribute improved seed, for this purpose, throughout the country and, when occasion offered, to afford instructions locally by Officers of his Department. The Director of Agriculture further arranged to teach natives the use of the scythe; in order that, where it was necessary to clear long grass, the work might be effected at less prohibitive cost than had formerly been the rule.

Considerable progress was made at various native towns in the direction of the safe-guarding of water-supplies, the extension of the use of properly constructed salgas and in keeping the latter at an adequate distance from the former.

Good work was also effected, particularly in the large provinces of Bornu and Sokoto, in adding to the towns from the margins of which long crops were pushed back.

At the new Capital, progress, due to the piping of water, was achieved in the disappearance of guinea worm and of dysentery among the labourers employed there. The area received frequent attention, although the work going on was necessarily much less extensive than had been contemplated.

As the result of the tour of the Benue, mentioned above, plans of all the riparian stations along that river were prepared by the Department of Surveys; and the suggested lay-out of each station concerned was submitted to His Excellency, the Governor-General, for his consideration.

In those suggested layings-out, all the canons of tropical hygiene were faithfully adhered to. This necessarily made the problem as a whole a very

difficult one ; for the riparian conditions were peculiar ; the areas involved were often exceedingly limited ; various interests, sometimes conflicting, had to be studied ; and the squaring of sanitary necessity with political and economic expediency was and remains a very puzzling question to settle. It is on the way to being settled ; and, what time it shall have been, the sanitary welfare of the riparian settlements will be on an unwontedly satisfactory footing, even if the final decision only be a second best one.

Several important landward stations were similarly dealt with, and the problems raised by them were comparatively simple.

The observations made and recorded by the Sanitary Officer touching the incidence of trypanosomiasis along the Benue and the method of inoculation against small-pox practised by certain natives in that region were careful and helpful and constituted a valuable addition to the sanitary archives of the Northern Provinces. *Inter alia*, they brought the question of the permanent retention or evacuation of certain places to the serious attention of the Executive.

The principle of protecting meat, offered for sale, by wire-gauze screens or cages was extended ; and the Department of Public Works did much good service in this direction by supplying butchers with such appliances at reasonable cost.

The active inspection of animals for slaughter was extended ; much was done in the way of curtailing the activities of the small, amateur, way-side butcher ; the question of putting the business of the butchers on a more restricted and less questionable footing was brought under serious consideration ; and this was rendered less difficult by the rearrangement of numerous markets.

Of course, the inspection mentioned here was restricted to places inhabited by Europeans ; much of it was conducted by amateurs ; but the grosser abuses were eliminated ; and a really substantial beginning was made.

In several places, leading natives expressed alarm at the attenuation of the Medical Staff, on the ground that they would not be able to get the children vaccinated. This was a case of : "The Mountain coming to Mohammed," and marked the most striking evidence of progress.

When yellow fever visited Kaduna in the Autumn, the local Political Officer brought the District Headman together with his leading henchmen to visit the Medical and Sanitary Officers concerned.

It was pointed out to those natives that yellow fever was a disease imported from the Coast ; that it was conveyed by the mosquito ; that it was deadly to the European and, most likely, equally deadly to our indigenous native friends ; that extensive clearing of grass and bush and the other means of eliminating mosquitoes from around human habitations were the only means of warding off and killing the disease ; that the Europeans had already begun to effect this round their quarters and the quarters under their control ; and that they, the indigenous natives, would be well advised if they imitated the Europeans.

The District Headman and his henchmen expressed their thanks for the information ; they quietly departed, and, within a week, had effected clearing operations around their quarters at the equivalent of a cost—judging by what the labour involved had cost the Government for similar operations—of between two and three hundred pounds.

This gives an indication of the sanitary progress which can be effected, with comparative ease, at places remote from direct European influence, when the leading indigenous natives have become really convinced of the soundness of the procedure.

(II.)—PREVENTIVE MEASURES.

MOSQUITO AND INSECT-BORNE DISEASES.

MALARIA, YELLOW FEVER AND FILARIASIS.

The preventive measures being practically the same for all of them, and tautology having been deprecated by the highest authorities—a deprecation with which the present reporter is in cordial sympathy—it seems wise to take these three conditions together.

The preventive measures described in former reports were maintained so far as this was possible. Of course, at many places entirely or partially deserted by the normal European community, the habitual practice in this direction was more or less in abeyance.

Practically all Europeans, those on military service excepted, in the Government service were provided with so-called mosquito-proof rooms. In many cases tar was supplied to Europeans occupying mud huts with mud floors: in order that they might be able to protect the wooden frames of their mosquito-proof rooms against the ravages of white ants.

The Public Works Department held a stock of those rooms in reserve against emergencies, together with adequate material to add liberally to the number of them. The benefit of this arrangement was seen when yellow fever declared itself at Kaduna: all the mosquito-proof rooms requisitioned for, then, being forthcoming practically at once. All second-class officials, travelling or for any other reason not provided with mosquito-proof rooms, were provided with mosquito nets. The proportion of European officials living protected by a quarter-mile neutral zone from the boundary of the nearest non-European quarter kept increasing. European officials not so protected are now strictly exceptional; and the Administration is doing all that it can to induce the trading firms to secure the same protection for their European employees.

When yellow fever occurred at the site of the new capital at Kaduna in October, all the local precautions were taken at once; the entire district was put in quarantine; the local railway stations, together with the two adjacent ones, up-line and down-line respectively, were closed to incoming and outgoing passengers; bookings to those stations were discontinued throughout the entire railway system; and guards were stationed on the Native trade routes to prevent ingress and egress.

Extensive clearing and other operations were immediately undertaken; and it is pleasing to report that the members of the European community co-operated cheerfully and energetically with the medical officers concerned. Fortunately, the outbreak was confined to the one fatal case: a European one. It is unnecessary to enlarge upon the subject here; for it was fully dealt with in a special report rendered at the time.

It may be wise, however, to record in this report, once for all, the simple fact that the members of the medical profession in West Africa are quite aware that the *Stegomyia fasciata* is the carrier of yellow fever, that *Stegomyia fasciata* is a domestic mosquito and can be kept down by keeping a four hundred yard zone round every habitation cleared and free of standing water and of water-containable receptacles, and that if this be thoroughly done yellow fever can be kept at bay. This statement seems to be necessary;

for certain pundits keep informing the profession in West Africa, through the medical journals—one of them repeated the kind service quite recently—that yellow fever is endemic in certain places in West Africa and that it can be suppressed by acting on the information given above. Apart from vigilant supervision exercised by Medical and Sanitary Officers, the problem of banishing yellow fever is partly a financial and chiefly a legal one. What the term “legal” implies in this connection is obvious to everybody conversant with the carrying out of sanitary work among backward races in the Tropics. The use of the mosquito-net continues to extend among various sections of the non-European community; so also does the taking of quinine; and the voluntary submission of themselves to medical advice and treatment increases among the members of the indigenous Native population.

Apart from statistics—which really prove nothing, in the absence of careful and accurate analysis the data for which are mostly lacking here—there can be no doubt that the activities of many members of the European community in the direction of preventive measures against mosquitoes have become almost if not quite automatic. This can be gathered from what has happened since the advent of war; for men have been doing strenuously prolonged tours—often under specially trying conditions—which, a few years ago, would have been considered out of the question.

In these days of free and extending railway communication, and in light of recent experience, sporadic cases of yellow fever are quite likely to be found in the Northern Provinces now and again, during the rainy season; but they will all be importations from the south; for, unless current teaching touching the disease be radically altered in light of future experience, it is impossible for any strain of yellow fever parasites to maintain its existence for a round year in these Provinces.

The methods of mosquito prevention are well known; they are all practised; and, since the case of yellow fever at Jebba in 1914, the *Stegomyia Fasciata* in particular has been harried constantly.

The question of the enactment of more effective legislation for dealing with sanitary offenders is having the attention of His Excellency the Governor-General and his legal advisers.

TRYPANOSOMIASIS.

As can be seen from the tables, no case of this disease was recorded in a European during the year, although the river Benue had been used extensively for passenger transport. One of the European victims, reported the previous year, returned to duty convalescent.

The vessels used for passenger transport were all fitted with more or less effective wire gauze shelters. It is necessary to so qualify the protection, because it was seldom perfect; as was bound to be the case under the conditions on which the vessels had to be used.

On the navigable rivers, vessels have to be used for the transport of cargo as well as passengers; the vessels have to be worked and they are not flush-decked; the crews are not European; sheets of wire gauze are not steel plates; and a certain amount of rupture of the flimsy protecting gauze is inevitable.

The activities of the Sanitary Officer and of his political coadjutors in the Benue region, together with the clearing operations there and elsewhere, have already been mentioned. Clearing operations are always being effected in tsetse belts, so far as funds and other means will allow; where there are

alternative routes, the use of those traversing fly-belts is consistently discouraged; constant efforts—increasingly successful—are being made to induce Natives permanently to desert foci of sleeping sickness; and Government is gradually adopting the policy of refusing to permit Europeans to settle in regions from which it is trying to induce the indigenous Natives to depart.

But it must be remembered that operations against trypanosomiasis are a constant war, in which the enemy is apt, unexpectedly, to change his venue from time to time; and, in this war, surprise attacks of trypanosomiasis will probably always be as unpreventable as are Zeppelin raids over Britain now.

EPIDEMIC DISEASES.

PLAGUE AND CHOLERA.

These diseases have, happily, still no place in the medical history of the Northern Provinces.

CEREBRO-SPINAL MENINGITIS.

Outbreaks of this disease have always been patchy in their incidence.

When they are recognised, they are always isolated in special camps of grass huts; and the grass huts are burnt at the end of the outbreak concerned.

But the patchiness of its incidence makes it a fair inference that numerous isolated outbreaks occur beyond the ken of the European; for Medical Officers are few and far between in those regions where the disease is most likely to occur; and prolonged acquaintance with the Natives, and consequent increasing information elicited from them, makes the observer incline to believe that this inference is a correct one.

PNEUMONIA AND INFLUENZA.

These diseases almost invariably assume the epidemic form. As reported on former occasions, their prevention is conditioned by progressive change in the domestic habits of the Natives, which can only be the result of education, and, consequently, a very slow progress.

PYREXIA OF UNCERTAIN ORIGIN.

A certain number of cases is always being returned under this heading; the designation is a confession of ignorance; and, until this veil of ignorance shall have been lifted, it will be impossible for Sanitary Officers to call them endemic or epidemic, or to suggest any methods of prevention.

ENDEMIC DISEASES.

ENTERIC FEVER.

It is unhappily necessary to number enteric fever with the endemic diseases of the Northern Provinces. There never has been a great outbreak of it anywhere, and had it been at all common among the Natives it would have been recognised long ago. But, now that there have been several cases among Europeans and it has appeared among Natives, it has evidently come to stay. It is well nigh certain that it was originally imported by Europeans and that a number of native carriers have consequently developed since.

This is not surprising when the personal habits of Native house-boys are remembered. In the event of a European—particularly an isolated one; and

there are many such—being attacked by the disease while inhabiting a dusty mud hut in the bush, he must be attended by his house-boys ; and the weaker he becomes the more intimately and constantly must he be so attended. Such house-boys are bound to become carriers, sooner or later ; and it is unnecessary to speculate further about the development.

The indigenous Native seems to be less susceptible to intestinal disease than is the average European ; and this probably explains why Native outbreaks have not attended every European case.

Fortunately, preventive methods are and always have been practised at every European centre ; the prevalence of dysentery being responsible for this.

As mentioned in former reports, the average European will never be induced to abandon the consumption of salads, and thus one of the best means of prevention will not be employed.

That being so, it would be wise were all young men, coming out to the Northern Provinces for the first time, obliged to submit to anti-typhoid inoculation before leaving home, just as in the case of vaccination. They are the most susceptible, and, with very few exceptions, are likely to be posted to stations in the bush remote from hospitals on their first arrival.

In the dusty, wind-swept north, a very obvious means of prevention, in addition to the routine methods, is to furnish each European with a compound sufficiently large in area to be self-contained, so far as sanitation goes, in order that the transport of latrine buckets through the station may be avoided. This is now under consideration.

DYSENTERY.

Dysentery, like small-pox, is an endemic disease which frequently assumes the epidemic form.

The preventive methods practised have been described in former reports. The routine practice was steadily carried on throughout the year, wherever there was European supervision available.

During the campaign in the Kameruns, the Military Authorities did not seem to deem it expedient to invoke the services of sanitary officers.

SMALL-POX.

The effect of the attenuation of the Medical Staff was marked in the case of vaccinations ; 10,612 vaccinations, 6,884 of which were successful, were performed in 1915 ; while in 1914, 17,504 had been performed with 13,975 successes. Nor was the work in 1915, so far as it went, so successful as that in 1914 ; for, in 1915, there were 3,728 unsuccessful vaccinations, while, in 1914, there had only been 3,529 failures. The higher pressure at which the men available had been working probably accounted for this. This was very disappointing, as vaccination had been progressing so satisfactorily before the advent of war ; but, having regard to what has been reported above touching the anxiety of certain representative Natives on this account, it may turn out to have been a blessing in disguise, for the less easily a thing sought for is obtainable, the more highly is it likely to be valued.

TETANUS.

Little can be done to prevent tetanus, because its chief incidence is among those Natives who do not seek medical treatment for their wounds and injuries.

RHEUMATISM.

The prevention of this disease can only be effected by a revolution in the habits and customs of the Natives.

TUBERCULOSIS.

The prevention of tuberculosis is quite as difficult as is that of influenza and pneumonia. Here, as in so many other cases, education alone can be of real efficacy.

YAWS.

The incidence of this disease has been dealt with in former reports. No preventive measures have been devised; but it is a disease which readily yields to treatment, and treatment is freely offered to all sufferers.

VENEREAL DISEASES.

This section continues to receive constant attention. The principle of having the market and the caravansary outside of each new town is steadily followed, and in various regions the Natives of old-established towns are making the change voluntarily.

Most of the pagan Natives remain free from these diseases, and they are always encouraged to preserve their aloofness from the non-pagan peoples, so far as everything but trade is concerned. Educational efforts against the spread of venereal diseases are in constant practice.

It may be that, when the normal routine shall have been completely re-established after the war, it may be possible to render many syphilitics non-infective by greatly extending the use of salvarsan; but too much must not be expected from this, for there will be a perpetual stream of imported infection from without the Nigerian borders.

HELMINTHIC DISEASES.

ANKYLOSTOMIASIS.

Constant efforts are made against this disease; it is carefully looked for and treated in the native hospitals and in the prisons; and every endeavour possible is made to reform the sanitary habits of the Natives in those regions in which it is prevalent.

Unfortunately, during the year under review, the worst foci of the disease happened to be in those regions in which the endemic activities of Medical and Sanitary Officers had to be suspended. The advent of war found, and very materially crippled, an effective crusade against the disease; a crusade which shall be resumed as soon as possible.

Although there is much ankylostomiasis in the Northern Provinces, practically no European station can be called a focus of the disease, and this furnishes fairly good evidence of the efficiency of the sanitary arrangements at Government stations.

The general introduction and adoption of the salga at places where it has not, so far, been in universal use, which everything is being done where possible to encourage, is by far the best preventive measure. This reform, even under the most favourable conditions, will not be a rapidly effected one; even now, there are certain localities in Great Britain and Ireland where, given its introduction, ankylostomiasis would spread as easily as it does in pagan villages here—and by the very same means.

BILHARZIA. *diffusa*

Invasion by this parasite is seldom or never observed among the members of the European community, although it is noted among the Natives in various localities.

Although the Europeans very rarely bathe in the rivers, they seldom or never bathe in sterilized water exclusively; and this fact makes the observer sceptical when the skin is alleged to constitute an avenue of admission to the parasite. It is impossible to say whether one sex suffers more than does the other from this particular invasion, because Native women seek medical aid to a far smaller extent than do their men.

So far, the only preventive measures employed have been the routine safe-guarding of water supplies and the endeavour to induce the Natives to "cook" their drinking water.

GUINEA WORM.

Prevention here is entirely covered by what is done in the safe-guarding of water-supplies.

The increased and increasing supervision of markets in general, and the more thorough inspection of meat and regulation of butchers in particular, must, in time, have a perceptible effect in the prevention of invasion by entozoa, but miracles need not be looked for, which will never materialise.

In a heterogeneous Empire, in which a large proportion of the citizens who constituted the dominant race revelled in the ingestion of half-raw meat, it would be rather absurd for the Imperial Authorities to expect the subject races to cease absolutely to welcome entozoal guests.

(III.)—GENERAL MEASURES.

SEWAGE DISPOSAL.

The arrangements for sewage disposal have been described at length in former reports and little remains to be recorded in this one.

During the year the arrangements worked well at all stations which had not been deserted, and in some stations they worked abnormally well, because there was less work to do and because a large number of those, the catering for whose requirements normally called for most supervision, were temporarily absent.

It may be wise, however, even at the risk of weary reiteration, to dwell briefly on the comparative merits of salgas and latrine buckets, for an inter-colonial communication on this subject has been in circulation recently. As has been stated before, salgas are quite unsuitable for regions where the sub-soil water approaches the surface within 8 feet, unless in such regions embankments be thrown up and the salgas dug in the centres of the embankments. But in regions where the sub-soil water lies more than 8 feet below the surface, the salga is head and shoulders above the latrine bucket in sanitary efficiency.

It requires far more latrine buckets than salgas to provide for a given number of people; this means that a latrine bucket system affords far more open mouths for the ingress and egress of flies than does a salga system; and, moreover, buckets have larger openings than have salgas. In addition to this, salgas are more often darkened than are latrine buckets. Where the people are

negligent and careless, as they generally are, offensive salgas can be attended to by less labour than is necessary in the case of offensive buckets, and salgas do not necessitate the transport of excrement along the public thoroughfares.

DISPOSAL OF REFUSE.

The methods recorded in former reports were not added to during the year and they worked well. Additional incinerators were erected at various places.

WATER SUPPLY.

The only new fact to record here is that, by the end of the year, water had been laid on to Minna by pipe from the river Bako, and it constituted an improvement as necessary as it was welcome.

DRAINAGE.

There is nothing new to be reported concerning drainage.

CLEARANCE OF BUSH, UNDERGROWTH, &c.

In this connection there is nothing new to mention. Except at Kaduna, on account of yellow fever, and along the upper Benue, on account of trypanosomiasis, less bush clearing was done directly by Government than had been done for some years before, *imprimis*, because certain stations were temporarily deserted; *in secundis*, because economy had become a paramount necessity. It must not be inferred from this that clearing operations, absolutely necessary to the maintenance of health, were left undone; but a considerable amount of clearing, which would have been lightly undertaken in a fat year, was allowed to await the advent of better times.

In landward places under the Native Administrations as much clearing as ever was effected, and even more in some regions.

MEASURES TAKEN TO SPREAD KNOWLEDGE OF HYGIENE AND SANITATION.

LECTURES.

Formal lectures continue to be unknown in the Northern Provinces, for reasons formerly stated.

During the year, the local instruction given by Political, Medical and Sanitary Officers was continued so far as possible; the Sanitary Officer had special conferences with various pagan Chiefs and their Henchmen; and the Senior Sanitary Officer had similar conferences with one Sultan and three Emirs. This was much less than the normal activity in this direction, but it was all that circumstances would permit.

SCHOOL TEACHING.

Apart from routine teaching by members of the Staffs of the Government Schools, no hygiene was taught during the year, no member of the Medical Staff being in a position to devote any of his time to the purpose.

Towards the end of the year, one well-born young Mallam—it is hoped the first of a series of such men—was attached to the Sanitary Branch, to be

trained as a Sanitary Inspector. The method of training those men is this: One is attached to each of the Sanitary Officers, with whom he travels and who explains each day's work to him. After the work of the day has been completed, he renders to the Sanitary Officer a report thereon, written in the Hausa language. After a time he is sent out, on his own, at various places to inspect and report on local conditions, and the Sanitary Officer concerned checks the value of the reports by, afterwards, going over the ground. The period of training is to be one year, or less, according to the aptitude of the pupil. When he has satisfied himself touching the knowledge, the ability and the general fitness of the pupil for the office, the Sanitary Officer certifies the pupil as a qualified Sanitary Inspector. The ex-pupil is then prepared for employment as such.

It is hoped that, a few years hence, each considerable Native Administration throughout the country will number among its officers a qualified Sanitary Inspector, who, being well born, well qualified and accepted by the people as such and as one of themselves, will be able to introduce sanitary reform and maintain it, and in doing so will secure the co-operation—instead of the passive resistance—of the Natives.

Of course it must be understood that those Mallams—Native scholars—are ex-pupils of the Government Schools, and are appointed Apprentice Sanitary Inspectors only after having received a nomination from the Director of Education.

RECOMMENDATIONS FOR FUTURE WORK.

This report is rather a certificate of the maintenance of routine than a record of progress. For example, leper segregation has only been mentioned, although in a normal year a report of material progress in this direction would naturally have been expected, and the present tendency is for much in the way of desirable new departure to lie dormant, temporarily, like leper segregation; for, although the conquest of Kameruns has released numerous Medical Officers from transfrontier service, the Medical Staff will probably be kept attenuated until the end of the war, through a proportion of its members being lent for military service in Europe.

This being so, much of what was formerly called arrears must now be numbered with problems of the future, to be tackled when the times will permit.

But the attenuation of the Political is not likely to be relatively so great as that of the Medical Staff, and there is a hopeful prospect of the Sanitary Officers being able to resume the normal extension of their activities in their landward fields of action.

The rule for the immediate future, therefore, is likely to be the maintenance of routine at Government Stations and attempted progress in the landward districts.

(Sd.) M. CAMERON BLAIR,

Senior Sanitary Officer.

29th January, 1916.

IV.—METEOROLOGY.

The Meteorology records in the Northern Provinces are incomplete, and observations have only been made at sixteen stations owing to the withdrawal of Medical Officers for duty on the Cameroons Expedition.

Except at Yola and Birnin-Kebbi the rainfall during 1915 was considerably in excess of that in 1914 at all other stations.

The following are figures of interest :—

	Reading.	Date.	Station.
Highest shade temperature	114	April	Maiduguri
Lowest shade temperature	46	December	Zaria
Highest mean temperature	98.1	"	Birnin-Kebbi
Lowest mean temperature	53.1	"	Naraguta
Maximum total rainfall	61.91	"	Naraguta
Minimum total rainfall	14.46	"	Birnin-Kebbi
Maximum rainfall on one day	4.40	"	Zungeru
Greatest range of temperature	55	"	Kano
Highest mean relative humidity	90	July	Zungeru
Lowest mean relative humidity	22	November	Kano

V.—HOSPITALS AND DISPENSARIES.

Zungeru hospital contains three wards ; two small, containing two beds each, and one large general ward of four beds.

In each of the small wards there is a mosquito-proof moveable house, 9 by 7 by 7, and in the larger ward three of the same size—only to this extent is there mosquito proofing.

Native hospital consists of two long buildings, previously built as a slaves' home and three other small buildings—one being used as a Clerks' hospital. There are two mosquito cages for the isolation of suspected cases of yellow fever.

Lokoja hospital contains six large wards of two beds in each, one bed in each ward being placed in a mosquito-proof house, 9 by 7 by 7. This is the only mosquito proofing in the building.

Native hospital consists of two large buildings, a portion of one being reserved for the treatment of women.

There are two mosquito houses for the isolation of suspicious cases of fever.

Kaduna hospital.—The present temporary hospital at Kaduna Junction has not proved very suitable, and it is proposed, during next year, to convert one of the new larger type houses at the New Capital into a hospital to accommodate eight patients.

The Native hospital is of a temporary nature.

Kano European hospital was opened in August, 1915 ; the number of patients admitted to the end of the year being 47, 21 official and 26 non-officials. Out-patients 145, the majority of the cases being malaria.

TABLE I.
VACCINATION RETURN FOR THE YEAR ENDED
31ST DECEMBER, 1915.

Station.	Number vaccinated.	Number successful.	Number failed.	Lymph used.	Remarks.
Zungeru	345	289	56	Dried lymph supplied by Lister Institute.	
Lokoja	2,473	1,415	1,058		
Kaduna	167	100	67		
Kano	771	617	154		
Yola	432	234	198		
Zaria	312	144	168		
Bauchi	863	709	154		
Ilorin	53	—	53		
Sokoto	2,510	1,859	651		
Maiduguri	1,267	963	304		
Birnin-Kebbi	201	73	128		
Naraguta	95	36	59		
Minna	608	123	485		
Ibi	49	9	40		
Jebba	94	81	13		
Offa	300	220	80		
Katsena	72	12	60		
Totals	10,612	6,884	3,728		
Percentage	6.50	35.0		

THE PRINCIPAL MEDICAL OFFICE,
ZUNGERU, 29th January, 1916.

TABLE II.
METEOROLOGY.

Table showing rainfall in inches.

	YEAR.											AVERAGE TO 1914.	RAINFALL 1915.
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.		
Zungeru ...	51.10	41.31	60.39	37.16	48.78	58.89	53.44	42.90	29.93	35.17	33.46	44.77	54.61
Lokoja ...	41.72	49.64	51.83	36.68	44.12	65.14	45.59	41.57	46.74	34.76	42.81	45.51	48.15
Kano	36.69	38.12	27.55	34.86	49.03	26.81	40.00	29.20	19.05	19.06	32.03	32.33
Zaria	51.27	61.05	29.80	45.48	55.88	53.80	43.35	43.13	33.01	35.64	45.24	46.95
Yola ...	33.77	42.76	34.60	27.55	53.77	44.26	38.67	42.22	38.93	29.93	27.83	37.66	26.70
Sokoto ...	32.14	33.32	...	19.86	20.44	29.72	23.11	28.70	19.16	16.38	24.94	24.77	28.37
Ilorin	47.02	49.00	54.74	55.46	65.18	51.14	52.58	38.85	43.83	42.83	50.06	43.37
Ibi	23.49	...	...	53.30	49.63	36.38	46.10	43.42	23.75	39.43	39.47
Geidam	22.39	21.28	16.87	10.46	12.59	5.76	19.30	15.52	...
Maiduguri	23.30	31.89	19.53	30.00	18.38	13.98	11.49	21.22	25.32
Kontagora	46.28	58.40	37.28	51.15	60.67	53.01	54.09	32.83	36.27	6.54	43.65	...
Ankpa	58.77	66.85	56.44	...	47.81	49.78	19.57	49.87	...
Nafada	37.27	33.24	30.32	22.01	16.58	22.28	26.95	...
Birnin-Kebbi	27.70	25.10	30.69	20.32	33.37	21.77	24.82	14.46
Katagum	23.70	23.03	18.21	19.96	20.50	13.81	9.54	18.39	...
Bauchi	42.24	...	47.88	43.23	38.86	48.79	35.83	33.89	45.16	41.98	...
Baro	46.46	55.77	47.98	46.14	43.51	39.50	32.33	44.52	47.51
Naraguta	57.84	47.33	51.37	59.17	53.92	61.91
Womba, etc.	19.11	...	49.02	44.40	40.45	53.95	58.94	49.40	42.46	...
Kaduna	41.67	41.67	61.90
Minna	53.62
Jebba	29.56	30.93	30.25	53.22
Offa	40.82	30.58	35.70	56.46

TABLE III.

DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR.

DISEASES.	IN-PATIENTS.			OUT-PATIENTS.	Deaths.	
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.		Cases Treated.
INFECTIVE DISEASES :—						
Dysentery	11	11	...	20	1
Enteric	3	3	...	2	1
Erysipelas	1	...
Gonorrhœa	9	...
Influenza	4	...
Malaria—						
(a) Tertian	71	71	...	77	1
(b) Quartan	1	...
(c) Æstivo-autumnal	42	42	...	98	...
(d) Chronic malaria	2	2	...	7	...
(e) Blackwater	11	11	...	11	4
Measles	1	...
Malta fever	1	...
Pneumonia	2	2	...	2	...
Rheumatic fever	1	1	...	3	...
Small-pox
Syphilis—						
(a) Primary	2	2	...	4	...
(b) Secondary	4	...
Yellow fever	1	1	...	...	1
Other seases	1	1	1	1	...
INTOXICATIONS :—						
Alcoholism	1	1	...	1	...
Others	1	...
GENERAL DISEASES :—						
Anæmia	23	23	1	24	...
Gout	2	...
Chronic rheumatism	5	5	...	10	1
Other diseases	7	7	1	6	...
LOCAL DISEASES.						
DISEASES OF THE NERVOUS SYSTEM :—						
Sub-section 1—						
Neuritis	1	1	...	3	...
Other diseases	4	4	...	4	...
Sub-section 2—						
Paralysis	1	...	1	...	...	...
Neuralgia	2	2	...	15	...
Hysteria	1	...
Other diseases	7	...
MENTAL DISEASES :—						
Sub-section 3—						
Delusional insanity	2	2	...	...	...
DISEASES OF THE EYE :—						
Conjunctivitis	7	...
Other diseases	1	...
DISEASES OF THE EAR :—						
Inflammation	1	1	...	3	...
Other diseases	1	1	...	8	...

TABLE III.—DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.			OUT-PATIENTS.		Deaths.
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.	Cases Treated.	
LOCAL DISEASES— <i>continued.</i>						
DISEASES OF THE NOSE	6	...
DISEASES OF THE CIRCULATORY SYSTEM:—						
Aortic	2	2	...	1	1
Pulmonary	1	1	...	...	...
Other diseases	1	1
DISEASES OF THE RESPIRATORY SYSTEM:—						
Laryngitis	1	...
Bronchitis	1	1	...	29	...
Pleurisy	1	1	...	3	...
Other diseases	3	...
DISEASES OF THE DIGESTIVE SYSTEM:—						
Stomatitis	1	...
Caries of teeth	8	...
Sore throat	1	1	...	10	...
Inflammation of tonsils	4	4	...	11	...
Gastritis	1	17	18	1	30	...
Dilatation of stomach	2	...
Dyspepsia	5	5	...	50	...
Enteritis	4	4	...	3	...
Appendicitis	2	2	...	1	...
Colitis	5	5	...	11	...
Diarrhœa	10	10	...	43	...
Constipation	8	...
Colic	1	1	...	5	...
Hæmorrhoids	2	...
Hepatitis, acute	5	5	...	3	...
Abscess	2	2	...	...	...
Jaundice	1	1	...	3	...
Other diseases	5	5	...	22	...
DISEASES OF THE LYMPHATIC SYSTEM:—						
Inflammation of lymphatic gland	4	4	...	9	...
Suppuration of lymphatic gland	6	...
Lymphangitis	2	2	...	6	...
DISEASES OF THE URINARY SYSTEM:—						
Renal colic	1	...
Cystitis	1	1	...	2	...
Vesical calculus	1	...
DISEASES OF THE GENERATIVE SYSTEM:—						
Male Organs—						
Urethritis	7	...
Stricture	1	...
Prostatitis	2	...
Soft chancre	10	...
Orchitis	4	4	...	9	...
Epididymitis	1	...
Other diseases	5	...
Female Organs—						
Abortion	3	1
DISEASES OF ORGANS OF LOCOMOTION:—						
Arthritis	1	1	...	...	...
Other diseases	5	5	...	28	...

TABLE III.—DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.			OUT-PATIENTS.	Deaths.	
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.		Cases Treated.
<i>LOCAL DISEASES—continued.</i>						
DISEASES OF CONNECTIVE TISSUE:—						
Cellulitis	3	...
Abscess	2	2	...	20	...
DISEASES OF THE SKIN:—						
Urticaria	1	...
Eczema	1	1	...	5	...
Boil	3	3	...	16	...
Carbuncle	2	2	...	5	...
Herpes	1	...
Tinea	4	...
Acne...	2	...
Prickly heat	2	...
Ulcers	1	1	...	9	...
Other diseases	3	3	...	6	...
INJURIES.						
General	11	11	...	11	1
Local	14	14	...	28	1
Surgical operations	4	4	...	1	...
Tumours	2	2	...	1	...
Poisons	5	...
CESTODA:—						
Tænia solium	3	...
Tænia saginata	1	1	...	1	...
NEMATODA:—						
Filariasis	1	...
Ankylostomiasis	1	1	...	...	...
TOTAL ...	2	323	325	4	812	14

TABLE III.

DISEASES AND DEATHS (NATIVE) FOR THE YEAR.

DISEASES.	IN-PATIENTS.			OUT-PATIENTS.		Deaths.
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.	Cases Treated.	
INFECTIVE DISEASES :—						
Beri-beri	2	1	3	...	...	1
Cerebro-spinal fever... ..	...	2	2	...	...	2
Chicken-pox ... ..	...	56	56	1	1	...
Dysentery	2	240	242	7	115	40
Enteric ... ..	...	...	...	...	...	2
Erysipelas ... ..	...	2	2	...	...	...
Gonorrhoea	26	599	625	21	343	...
Influenza ... ..	...	1	1	...	1	...
Leprosy—						
(a) Nodular ... ..	...	2	2	...	71	...
(b) Anæsthetic ... ..	...	1	1	...	1	...
Malaria—						
(a) Tertian	6	399	405	7	477	6
(b) Quartan ... ..	...	1	1	...	...	...
(c) Æstivo-autumnal ... ..	...	37	37	...	340	2
(d) Chronic malaria ... ..	...	6	6	...	34	3
Measles ... ..	...	3	3	...	5	...
Pneumonia	2	95	97	6	12	29
Relapsing fever ... ..	...	...	...	...	2	...
Rheumatic fever ... ..	...	15	15	...	...	...
Septicæmia ... ..	...	2	2	...	22	1
Trypanosomiasis (sleeping sickness) ... ..	...	3	3	...	4	2
Small-pox	1	13	14	...	91	17
Syphilis—						
(a) Primary	3	61	64	8	50	...
(b) Secondary ... ..	...	112	112	36	97	...
(c) Inherited ... ..	...	1	1	...	...	...
Tetanus ... ..	...	2	2	...	...	1
Tuberculosis ... ..	...	7	7	1	4	5
Undulant fever ... ..	...	1	1	...	...	1
Whooping cough ... ..	...	...	...	...	2	1
Yaws... ..	1	14	15	1	25	...
Other diseases	4	4	8	...	12	...
GENERAL DISEASES :—						
Anæmia ... ..	...	15	15	3	61	1
Chronic rheumatism ... ..	...	32	32	6	329	1
Other diseases ... ..	...	16	16	...	20	...
LOCAL DISEASES.						
DISEASES OF THE NERVOUS SYSTEM :—						
Sub-section 1—						
Neuritis	1	2	3	1	10	...
Congestion of brain ... ..	...	...	...	...	5	...
Other diseases ... ..	...	4	4	1	1	1
Sub-section 2—						
Apoplexy ... ..	...	1	1	...	...	1
Paralysis ... ..	...	2	2	1	3	...
Epilepsy ... ..	...	2	2	...	4	...
Neuralgia ... ..	...	2	2	...	73	...
Other diseases ... ..	...	8	8	...	87	...

TABLE III.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.	Deaths.
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.	Cases Treated.	
LOCAL DISEASES— <i>continued.</i>						
MENTAL DISEASES :—						
Sub-section 3—						
Dementia	1	1	...	...	...
Other diseases	1	1	...	...	1
DISEASES OF THE EYE :—						
Conjunctivitis	1	61	62	1	549	...
Keratitis	4	4	...	14	...
Ulceration of cornea	5	5	...	12	...
Iritis	4	...
Optic neuritis	3	...
Cataract	9	...
Other diseases	2	2	...	22	...
DISEASES OF THE EAR :—						
Inflammation	10	10	...	165	...
Other diseases	6	6	...	63	1
DISEASES OF THE NOSE						
...	9	...
DISEASES OF THE CIRCULATORY SYSTEM :—						
Pericarditis	1	1	...	3	1
Endocarditis...	2	2	...	...	...
Valvular mitral	5	5	...	11	2
Valvular aortic	1	1
Valvular tricuspid
Pulmonary	1	1	...	...	...
Arterial Sclerosis	2	...
Other diseases	1	1	...	...	...
DISEASES OF THE RESPIRATORY SYSTEM :—						
Laryngitis	2	2	...	29	...
Bronchitis	4	153	157	7	1,223	5
Broncho-pneumonia	21	21	1	13	2
Emphysema	1	1
Pleurisy	3	49	52	1	15	2
Empyema	1	2	3	...	...	1
Other diseases	3	3	1	7	1
DISEASES OF THE DIGESTIVE SYSTEM :—						
Stomatitis	1	1	...	43	...
Caries of teeth	1	2	3	...	236	...
Sore throat	3	3	...	59	...
Inflammation of tonsils	1	1	...	21	...
Gastritis	6	6	...	104	...
Ulceration of stomach	1	1	...	1	2
Hæmatemesis	1	...
Dilatation of stomach	1	...
Dyspepsia	18	18	...	129	...
Enteritis	4	4	...	6	4
Appendicitis	1	...
Colitis	9	9	...	3	2
Ulceration of intestines	1	...
Hernia	11	11	...	28	1
Diarrhœa	2	174	176	2	525	12
Constipation	16	16	...	1,478	...
Colic	25	25	...	219	...
Hæmorrhoids	6	6	...	23	...

TABLE III.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.			OUT-PATIENTS.		Deaths.
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.	Cases Treated.	
<i>LOCAL DISEASES—continued.</i>						
DISEASES OF THE DIGESTIVE SYSTEM—<i>continued.</i>						
Hepatitis, acute	2	6	8	...	10	...
Abscess	1	1	...	2	...
Cirrhosis	3	3	...	2	3
Jaundice	13	13	...	9	...
Peritonitis	1	1	...	...	1
Ascites	4	4	...	1	2
Other diseases	1	14	15	...	25	1
DISEASES OF THE LYMPHATIC SYSTEM :—						
Splenitis	1	1	...	13	...
Inflammation of lymphatic gland ...	3	40	43	3	69	...
Suppuration of lymphatic gland ...	1	11	12	1	11	...
Lymphangitis	1	4	5	...	11	...
Elephantiasis	2	2	...	1	...
Other diseases	1	...
DISEASES OF THE URINARY SYSTEM :—						
Acute nephritis	12	12	...	2	5
Bright's disease	1	1	...	1	2
Cystitis	10	10	1	3	1
Vesical calculus	1	1	...	...	...
Suppression	1	1	...	...	1
Hematuria	5	5	...	7	...
Other diseases	2	2	...	...	...
DISEASES OF THE GENERATIVE SYSTEM :—						
Male Organs—						
Urethritis...	1	1	...	2	...
Gleet	30	30	3	1	...
Stricture	7	7	...	7	...
Soft chancre	41	41	1	27	...
Inflammation of scrotum	2	...
Hydrocele	3	3	...	8	...
Orchitis	26	26	...	34	...
Epididymitis	2	2	...	2	...
Abscess of testicle	1	1	...	...	...
Other diseases	8	8	16	...	8	...
Female Organs—						
Ovaritis	2	...
Displacement of uterus	1	...
Vaginitis	2	...
Amenorrhœa	1	...
Dysmenorrhœa	2	...	2	...	11	...
Menorrhagia	1	...
Leucorrhœa	7	...
Abortion	4	4	1	4	...
Delayed labour	1	...
Postpartem hæmorrhage	1	...
Retained placenta	1	1	...	1	...
Premature birth	2	2	...	...	...
Mastitis	2	...
Other diseases	2	2	...	3	...
DISEASES OF ORGANS OF LOCOMOTION :—						
Osteitis	6	6	...	4	...
Arthritis	4	4	...	22	1

TABLE III.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.			OUT-PATIENTS.		Deaths.
	Remaining in Hospital at end of 1914.	Admissions.	Total Cases Treated.	Remaining in Hospital at end of 1915.	Cases Treated.	
<i>LOCAL DISEASES—continued.</i>						
<i>DISEASES OF ORGANS OF LOCOMOTION—continued—</i>						
Bursitis ... ..	...	1	1	...	3	...
Other diseases	6	142	148	5	975	1
<i>DISEASES OF CONNECTIVE TISSUE :—</i>						
Cellulitis	1	27	28	...	114	1
Abscess	2	150	152	5	332	6
Elephantiasis ... ..	...	3	3	...	6	...
Other diseases ... ..	...	5	5	1	5	1
<i>DISEASES OF THE SKIN :—</i>						
Urticaria ... ..	...	4	4	...	6	...
Eczema ... ..	...	3	3	1	30	...
Boil ... ..	...	25	25	...	144	...
Carbuncle ... ..	...	2	2	...	4	...
Herpes ... ..	...	2	2	...	13	...
Psoriasis ... ..	...	...	...	...	3	...
Tinea ... ..	...	7	7	1	31	...
Scabies ... ..	...	...	...	...	13	...
Acne ... ..	...	...	...	...	1	...
Prickly heat... ..	...	...	...	...	3	...
Ulcers	42	152	194	16	1,287	...
Other diseases ... ..	...	22	22	...	98	...
<i>INJURIES.</i>						
General... ..	...	84	84	7	845	5
Local	47	354	401	27	3,177	8
Surgical operations	4	63	67	3	17	3
Tumours ... ..	...	11	11	...	23	...
Malformations ... ..	...	...	...	...	4	...
Poisons ... ..	...	13	13	...	36	...
Trematoda (Flukes) ... ..	...	3	3	...	...	...
Other diseases	1	1	2	1	...	...
<i>CESTODA :—</i>						
Tenia solium ... ..	...	8	8	...	73	...
Tenia saginata	1	115	116	...	360	...
<i>NEMATODA :—</i>						
Ascaris ... ..	...	1	1	...	47	...
Dracunculus	7	241	248	5	311	...
Ankylostomiasis	4	60	64	...	149	2
Oxyuris	2	2	...	7	...
<i>INSECTA :—</i>						
Other diseases	29	29	...	112	...
Total	193	4,171	4,364	195	15,887	200

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NIGERIA.
SOUTHERN PROVINCES.

ANNUAL
MEDICAL AND SANITARY REPORT

FOR THE

YEAR ENDED 31ST DECEMBER, 1915.

NIGERIA

SOUTHERN BROUWER



MEDICAL AND SURGICAL REPORT

YEAR ENDING 31st DECEMBER 1922

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NIGERIA.
COLONY AND SOUTHERN PROVINCES.

ANNUAL
MEDICAL AND SANITARY REPORT
FOR THE
 YEAR ENDING 31ST DECEMBER, 1915.

I.—ADMINISTRATIVE.

STAFF.

(a)—EUROPEAN.

MEDICAL STAFF.

One Principal Medical Officer.
 Two Deputy Principal Medical Officers.
 Two Provincial Medical Officers.
 Seven Senior Medical Officers.
 62 Medical Officers (one seconded to the Colonial Office).
 New appointment :—
 One Medical Officer.
 Promotions :—
 One Senior Medical Officer to be Provincial Medical Officer.
 Five Medical Officers to be Senior Medical Officers.
 Transfers :—
 One Senior Medical Officer to the Gold Coast as Provincial Medical Officer.
 The Principal Medical Officer, one Senior Medical Officer and one Medical Officer served with the Army in Europe.

SANITARY STAFF.

One Senior Sanitary Officer.
 Three Sanitary Officers.
 Five Sanitary Inspectors.
 New appointments, two.
 Resignation, one.
 Termination of appointment, one.

MEDICAL RESEARCH INSTITUTE.

One Director and Bacteriologist.
 One Assistant Bacteriologist.

LABORATORY.

One Government Chemist.

NURSING STAFF

Five Senior Nurses.
 15 Nurses.
 New appointments, five.
 Retired on pension, one.
 Appointment terminated, four.

STOREKEEPING STAFF.

One Inspector of Stores.
 One Medical Storekeeper.
 Permanently invalided :—
 One Inspector of Stores.

(b)—NATIVE.

MEDICAL STAFF.

Four Medical Officers.
 New appointment, 1.

CLERICAL STAFF.

One Senior 1st Class Clerk.
 Three 1st Class Clerks.
 10 2nd Class Clerks.
 15 3rd Class Clerks.
 One Storekeeper and Warden.
 Three Storekeepers.

New appointments :—
 11 3rd Class Clerks.

Promotion :—
 One 3rd Class Clerk to be 2nd Class Clerk.

Transfers :—

Resignations :—
 One 2nd Class Clerk, one 3rd Class Clerk.

Dismissal :—
 One 3rd Class Clerk.

DISPENSING STAFF.

One Chief Dispenser.
 One Senior Dispenser.
 10 1st Class Dispensers.
 35 2nd Class Dispensers.
 11 Dispensers-in-training.

New appointments :—
 Five 2nd Class Dispensers.

Promotions :—
 One 2nd Class to be 1st Class Dispenser.
 One Nurse to be 2nd Class Dispenser.

NURSING STAFF.

One Dresser.
 24 1st Class Nurses.
 30 2nd Class Nurses.
 Six Nurses-in-training.
 13 Attendants.

New appointments :—

One 2nd Class Nurse (re-appointed after resignation).
Six Nurses-in-training.

Promotions :—

Three 2nd Class Nurses to be 1st Class.
Seven Nurses-in-training to be 2nd Class Nurses.

Termination of appointment :—

Three Nurses-in-training.
One Storekeeper.

Resignations :—

Two 2nd Class Nurses.

SANITARY STAFF.

One 1st Class Clerk.
One Registrar of Vital Statistics.
One 2nd Class Clerk.
Two Third Class Clerks.
One Deputy Registrar of Vital Statistics.

New appointment :—

One 3rd Class Clerk.

FINANCIAL.

STATEMENT OF REVENUE FOR THE YEAR 1917.

Total Revenue	...	...	...	...	£1,861 17 7
<hr/>					
Total Expenditure :—					
<i>a.</i> Personal Emoluments	...	...	...	...	£50,878 14 5
<i>b.</i> Other Charges	...	...	...	...	14,382 12 10
					<hr/>
Total...	...	...	...	...	£65,261 7 3
<hr/>					

II.—PUBLIC HEALTH.

(a) GENERAL REMARKS.

The general health of only a small portion of the whole community really comes under observation. With this kept well in mind it is possible to say that the general health has been much the same as in former years. Registration of births and deaths is compulsory in Lagos and Ebute Metta only, and even in these places but a comparatively few of the cases registered are ever seen by a qualified medical man.

In spite of the war, the general dislocation of work as a result thereof, and the fact that the staff has been considerably reduced in order to provide Medical Officers for the forces operating in the Cameroons, the returns show a considerably larger number of native cases treated than in the previous year, viz.—86,181, as compared to 82,955. This increase cannot, I think, be ascribed to an increase in the incidence of disease, but to an increased appreciation of, and confidence in, European methods of treatment.

The total deaths among natives was 760, an increase of 221 over 1914.

The number of Europeans treated was fewer by 1,165 than in the previous year. This can probably be accounted for by the withdrawal of Medical Officers from several stations and by the large emigration of the European population to the Cameroons. In this report, cases of disease, invaliding or death which occurred on active service have not been included.

To some extent sickness of every kind, excepting small-pox and chicken-pox, is increased and intensified during the rains, but notably dysentery and rheumatism, and to a certain extent also bronchitis. Rheumatism is largely gonorrhœal in origin, and as such is to be found all the year round. Bronchitis is common in the Harmattan. Pneumonia is most prevalent during the first three months of the year, though it mainly occurs in January, when the Harmattan becomes pronounced. Malaria is also a disease of seasonal variation, and while more prevalent in the wet than in the dry season its periods of greatest incidence are at the commencement and conclusion of the rains.

(i.) GENERAL DISEASES.

The most universally prevalent general diseases are chronic rheumatism and anæmia.

General diseases such as diabetes, exophthalmic goitre, gout, leucocythæmia, myxœdema, etc., are extremely rare.

(ii.) COMMUNICABLE DISEASES.

Insect-borne.

The principal insect-borne diseases that have come under observation are malaria and yellow fever. The number of cases of malaria treated has been greater, viz., 5,540, as against 5,169 last year. Yellow fever, though endemic, is fortunately not very commonly seen. There were during the year seven cases at Onitsha, with one death, two fatal cases at Forcados, five mild cases at Degema and one fatal case at Akassa, which was only diagnosed post mortem. All were natives, no case having been observed in a European.

Trypanosomiasis.—Although Table VII. shows a total of 73 cases, only three were observed during the year 1915, 70 having remained over from 1914 in the sleeping sickness camp at Eket. It having been demonstrated that the trypanosome found in the Eket district was not that associated with true sleeping sickness, that the parasite was very widespread and that the symptoms produced by it were of a very mild nature, this camp was abandoned.

Blackwater Fever.—11 cases in Europeans were treated, of whom two died. There were 20 cases in 1914 with five deaths. This disease shows a steady decline, both in incidence and mortality, during the last seven years (except in 1910, when there was a slight rise), and this in spite of the fact that the European population has increased at a rapid rate. This decline follows very closely the malaria fever curve.

Table VII. shows a total of seven cases of blackwater fever in natives; only one of these cases, however, was an actual native of the country, the remaining six being either Syrians or West Indians.

Infectious and Epidemic.

The only epidemic recorded was one of chicken-pox, and was of a very mild type. It occurred in the districts around the Niger River extending from Forcados to Onitsha, Agbor and Benin. Epidemics of small-pox and chicken-pox are more common in the dry season, usually disappearing with the onset of the rains.

Dysentery is worthy of some special mention, because of its high rate of incidence and case mortality. The incidence of this disease throughout the Southern Provinces was 13·8 per 1,000, while the deaths from this disease amounted to 18·0 per cent. of the total deaths from all causes.

33 cases of beri-beri were treated, with 13 deaths. All were natives in the Cross River districts. The absence of this disease from the prisons is a matter for congratulation.

One case of cerebro-spinal fever was reported.

Two cases of diphtheria, a very rare disease in this country, were reported, with one death.

168 cases of tuberculosis, with 40 deaths, were recorded, as against 109 with 23 deaths in 1914.

Venereal disease is extremely common. The returns do not in any way represent the true incidence of syphilis and gonorrhoea in the community. If the truth were known it would probably cause a very unpleasant surprise. An investigation into the extent to which these diseases are responsible for the high infant mortality, their effect on the birth rate, etc., would make an interesting study.

One case of enteric fever in a European was recorded.

Helminthic.

Intestinal parasites are so common that it would be difficult to find a native who does not harbour one at least of the three most common, viz., *Ascaris lumbricoides*, ankylostome (mainly *neator americanus*) and *tricocephalus dispar*.

The percentage of the population infected with ankylostomes is very high, probably over 80 per cent. These parasites, and especially the ankylostome, are of importance on account of their close association with those diseases from which one quarter of the deaths occur, viz., dysentery and diarrhoea. The presence and importance of ankylostomiasis is being increasingly recognised by Medical Officers, and the increase in the cases recorded is rather an index

of this awakening than of any actual increase in the incidence of the disease. Proposals have been put forward for the treatment, of this disease on a large scale and in a methodical manner, particularly in prisoners. The scheme, however, has not yet been inaugurated, largely on account of the scarcity and high cost of the drugs necessary for the purpose.

Filariasis is common among natives, but rarely comes under treatment.

Guinea worm is common and is the cause of much disability. It is confined almost exclusively to the up-country stations.

(b)—EUROPEAN OFFICIALS.

The general health of the European official population has been good and compares favourably with the previous year. There were four deaths as against five in 1914, and twenty-five cases of invaliding as against forty-one in 1914.

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

	1914.	1915.
Total number of European officials resident	1,740	*
Average number resident	822.33	*
Total number on sick list	745	664
Total number of days on sick list	4,488	4,178
Average daily number on the sick list	12.3	11.4
Percentage of sick to average number resident	1.4	*
Average number of days on the sick list to each patient	6.0	6.29
Average sick time to each resident	5.4	*
Total number invalided	41	25
Percentage of invalidings to total number resident	2.4	*
Percentage of invalidings to average number resident	4.98	*
Total number of deaths	5	4
Percentage of deaths to total number resident ... ..	.28	*
Percentage of deaths to average number resident ... ..	.62	*

* Figures for 1915 are not available.

The following table shows the causes of invalidings and deaths :—

Cause.	Invalided.	Died.
Malaria	3	...
Blackwater fever	2	...
Sun traumatism	1	...
Gastritis	2	...
Heart disease	2	...
Chronic nephritis	1	...
Alcoholism	2	2
Neurasthenia	1	...
Appendicitis	1	...
Arthritis	1	...
Gastro-enteritis	1	...
Insomnia	1	...
Tonsillitis	1	...
Injury to knee	1	...
Loose cartilage in knee	1	...
Neuritis ... ..	...	1
Osteitis ... ..	...	1
Boils	1	...
Anæmia	2	...
Epilepsy	1	...
TOTAL	25	4

It has been customary in the past to regard as invalids only those cases which became unfit to remain in the country prior to the expiration of a tour of twelve months' residential service, and this system has been adhered to in this report. During the year 1914, owing to the exigencies of the war, Medical Boards were held on many officers who had completed a year's service. These cases have not been included in the above tables, nor have cases of invaliding and death which occurred among officers on active service with the Cameroons Expeditionary Force.

(c)—NATIVE OFFICIALS.

So far as available statistics go the health of Native Officials compares unfavourably with the previous year, as will be seen from the following table :—

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

	1914.	1915.
Total number of native officials resident	2,180	*
Average number resident	1,706	*
Total number on sick list	1,268	1,995
Total number of days on sick list	6,867	10,838
Average daily number on the sick list	18·5	29·6
Percentage of sick to average number resident	1·08	*
Average number of days on the sick list to each patient	5·4	5·4
Average sick time to each resident	4	*
Total number invalided	7	20
Percentage of invalidings to total number resident	·32	*
Percentage of invalidings to average number resident	·40	*
Total number of deaths... ..	6	9
Percentage of deaths to total number resident	·27	*
Percentage of deaths to average number resident	·52	*

* Figures for 1915 are not available.

(d)—SOLDIERS.

Statistics of average strength, sick and death rates for soldiers are too incomplete to be of any value. There have been but few soldiers in the Southern Provinces during the year, as almost all were drafted to the Cameroons.

(e)—POLICE.

The health of the Police has been good. One case of yellow fever occurred in a police constable at Onitsha.

Statistics of average strength, sick and death rates have not been received.

(f)—PRISONERS.

The health of prisoners has on the whole been fairly good. Chicken-pox was epidemic in the Agbor, Benin City, Forcados, Onitsha and Warri prisons, but was of a very mild type. Dysentery assumed serious proportions at Udi and Onitsha.

The physique of many of the prisoners is poor on admission, and the complete change of all the circumstances of life while in prison doubtless has an adverse effect on their general health.

Daily average number of prisoners in the jails	
during the year	5,211
Daily average sick rate per 1,000	2·49
Daily average death rate per 1,000	·249

(g)—NON-OFFICIAL EUROPEAN POPULATION.

Reliable statistics under this head are almost impossible to obtain, and this difficulty has been accentuated since the establishment in Lagos of a private practitioner and a private hospital. So far as is known there were eight deaths from the following causes:—

Malaria	...	...	...	...	...	...	2
Blackwater fever	...	...	...	...	...	...	2
Meningitis	...	...	...	...	...	...	1
Aneurism	...	...	...	...	...	...	1
Abscess of liver	...	...	...	...	...	...	1
Bright's disease	...	...	...	...	...	...	1
Total	...	...	...	...	...	...	<u>8</u>

(h)—NON-OFFICIAL NATIVE POPULATION.

VITAL STATISTICS.

Registration being compulsory in Lagos and Ebute Metta only, statistics are available from these places only, and are as follows:—

Estimated population	...	...	...	...	...	77,982
Total births	...	...	...	...	...	2,704
Total deaths	...	...	...	...	...	1,960
Total deaths of infants under 1 year	...	...	...	...	...	706
Infant mortality	...	...	...	...	...	261·09 per 1000 births
Still births	...	...	...	...	...	140

The total estimated population of the colony and southern provinces, based on the census of 1911 is:—

Europeans	...	...	...	...	...	1,650
Africans	...	...	...	...	...	7,856,000
East Indians	...	...	...	...	...	99
Mixed and Coloured	...	...	...	...	...	487
Total	...	...	...	...	...	<u>7,858,236</u>

III.—SANITATION.

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

(I.)—ADMINISTRATIVE.

1. During the year 1915 progress in sanitation in the Southern Provinces of Nigeria has been adversely affected by the war, and, in many places, it has not been found possible to carry out the work with that efficiency which is desirable.

2. On account of the number of Medical Officers and others seconded for service with the military forces in the Cameroons and elsewhere, the attention which it has been possible to give to supervision and inspection has of necessity been curtailed.

3. In spite of these drawbacks it cannot be said that sanitary work has stood still ; progress has been made, mainly however in regard to points which have necessitated only a small expenditure of money or none at all.

4. Medical Officers at the various stations certainly take a keener interest in the sanitary work of their districts and devote more of their time than formerly to this branch of their work, and Executive Officers have always expressed their willingness to render every assistance, although I fear that they cannot, in all instances, have found it possible to carry out all they wished.

5. *Sanitary staff.*—The staff of the sanitary branch of the Medical Department consists of seven Europeans and 48 natives, seven of the latter being employed in office work only.

6. The Sanitary Officers have, with intervals for leave, carried out their regular duties in addition to those which had been placed upon them in 1914 on account of the war.

The work of the Municipal Sanitary Officer in Lagos was efficiently performed by Doctors Dalziel and Inness, on each of whom the responsibility fell for about six months.

7. *Dr. Inness seconded for medical work.*—In December, on account of the depletion of the Medical Staff, it was found necessary to second Dr. Inness for general medical and sanitary work at the Ngwo Colliery, near Udi. The need for laying out camps, the new station and native town, etc., in a satisfactory manner, and to ensure that proper sanitary precautions were adopted in the first instance, both generally and in the mine itself, rendered this a most suitable arrangement.

8. *European Sanitary Inspectors.*—During the year several changes in the staff of European Sanitary Inspectors occurred, two of whom left, their agreements having expired. These vacancies were with difficulty filled, but the full strength was re-established by the end of November.

9. *Clerk and Storekeeper.*—Although the work had to a certain extent to be curtailed, the pressure of office and administrative duties continued, and it was found necessary to appoint an additional "Clerk and Storekeeper."

10. *Native Sanitary Inspectors.*—I regret to have to record the death during the year of one of the native inspectors.

11. On account of the temporary removal of officers from certain stations there was a slight reduction of the staff of native Sanitary Inspectors, but as this only affected small and less important places the main work was not interfered with to any great extent.

12. *Inspectors-in-Training.*—The Inspectors-in-training have, on the whole, made good progress; two, however, who were found to possess no aptitude for the work, were sent back to their homes and, in one instance, the vacancy was filled by another candidate.

It will, I think, be found possible to utilize the services of these men on active work by the end of 1916, and they should prove a very valuable addition to our Staff.

13. *Re-grading of Sanitary Inspectors.*—Progress in the re-grading of Sanitary Inspectors has not been made to any great extent, but, with the prospect of promotion, the inducement to efficient work is greatly increased.

14. *Sanitary Ordinances, etc.*—The following Ordinances have been passed and Orders and Regulations made under previously existing Ordinances during the year, viz. :—

I.—THE DOGS ORDINANCE, 1915.

For the licensing of dogs and to provide for the suppression of rabies.

II.—THE WATERWORKS ORDINANCE, 1915.

To provide for and regulate the supply of water.

III.—THE DRUGS AND POISONS ORDINANCE, 1915.

To regulate the sale of drugs and poisons.

ORDERS IN COUNCIL.

I.—UNDER THE TOWNS ORDINANCE.

a. Application of the provisions of the Towns Ordinance to Ikot-Offiong and Ibara.

b. Application of the provisions of the Towns Ordinance to Udi Station.

II.—UNDER THE PRISONS ORDINANCE.

In reference to the diet of European prisoners.

III.—UNDER THE WATERWORKS ORDINANCE.

Laying down a scale for the Water Rate.

IV.—UNDER THE BURIALS ORDINANCE (PROTECTORATE).

a. Closing the Chiefs' Cemetery at Calabar.

b. Closing a Native Cemetery at Calabar.

V.—UNDER THE INFECTIOUS DISEASES ORDINANCE.

a. Declaration of an "infected area" at Onitsha.

b. Declaration of an "infected area" at Engenni.

c. Revocation of both the above.

VI.—UNDER THE DOGS ORDINANCE.

Application of the provisions of the Dogs Ordinance to certain places.

REGULATIONS.

UNDER THE WATERWORKS ORDINANCE.

- (a) In reference to the supply of water to Government premises.
 (b) In reference to applications for the laying on of water.

15. *Plans.*—A large number of plans were submitted for approval, the majority of which were signed either as they stood, or after certain modifications had been made. Among these were a few standard types, the adoption of which will prevent unnecessary delay in the erection of certain buildings.

16. *Estimates.*—The estimates for the year, for the expenditure directed from the Sanitary Office, amounted to £17,820, a decrease of £636 on those of 1914.

17. *Visits of Inspection*—Visits of inspection were paid to as many places as possible, but as for a considerable portion of the year there were only two Sanitary Officers in the Colony, one of whom was seconded for municipal work in Lagos, the journeys could not be either so frequent or so extensive as was desired. On visiting stations suggestions, if required, are made to the health and executive officers and, where possible, to eminent local natives, and the reports contain those recommendations and others, which cannot be carried out without reference to headquarters.

18. *Preparation of Ordinances.*—Considerable time was occupied and much work done in reference to the various Ordinances bearing on sanitation with a view to combining them, rendering them more simple, and extending their scope to meet present and future requirements.

19. *Work on the railway.*—Sanitary Inspectors regularly and frequently visit all stations on the railway, at each of which there is at least one labourer detailed for sanitary work only. Monthly Sanitary Boards, of which the local Medical Officer is a member, are held at the chief centres and their reports and recommendations are submitted to the Chief Sanitary Board (wholly lay in character) at Ebute-Metta which controls the Railway Sanitary vote, and decides what is to be done.

20. *Nigerian Eastern Railway.*—At Port Harcourt the railway construction authorities appoint their own Sanitary Inspectors, and the expense of all works and paid labour is met from railway funds.

21. *Reservation Boards.*—The Reservation Boards, which have been constituted under the Reservation Ordinance at a number of places in the "rivers," are taking greater interest in their work, with distinct benefit to the respective Reservations concerned, and as the moneys dealt with consist of contributions by the local mercantile firms as well as by the Government, a keener interest is taken by the members in the items of expenditure and the results obtained than would otherwise be the case.

II.—PREVENTIVE MEASURES.

(1)—MOSQUITO AND INSECT-BORNE DISEASES.

22. *MALARIA.*—*Anti-mosquito work.*—Anti-mosquito work has been vigorously carried on at all the main stations. Mosquito returns are furnished regularly, and the results show a steady and gradual improvement. In most instances the index has already been reduced to a low figure, and if some of the existing difficulties can be overcome, further reductions will be brought about.

In Lagos a special gang is employed for anti-mosquito measures alone and continues its work with great advantage. This gang devotes its time to roof

gutterings, crab-holes—an average of over 40 per day being dealt with—and breeding places in trees, etc. Crab-holes provide an endless supply of mosquitoes, and adult insects or larvæ, or both, were found in over 11·5 per cent. of those dealt with. Results have proved this work to be of very considerable importance.

A great difficulty is the number of water receptacles kept in dark rooms ; in Lagos 27·3 per cent. of the whole number being so placed. It is impossible to properly examine these pots unless they are removed outside, which is not always possible, as they are frequently embedded in the ground and of considerable size. In view of the large number of locked up houses, some of which remain closed for weeks consecutively, the difficulty of diminishing the prevalence of mosquitoes and lowering the mosquito index can to some extent be appreciated.

23. Interest in the prevention of mosquito breeding is gradually extending among the native population, especially in the large towns, and if offenders could be made to appreciate the danger to which they are subjecting others much more rapid advances would be made.

24. *Larvæ in wells.*—The occasions on which larvæ are found in wells by no means represent the number in which they exist, on account of the difficulty of thorough investigation, and even when they are observed the owners have a natural reluctance to having any larvicide added to the water.

25. *Trees, &c., for breeding mosquitoes.*—At Calabar, special observations were made in the Botanical Gardens, under the direction of the Health Officer, to ascertain what plants are most favoured by mosquitoes for breeding purposes, and it was found that most of the bananas and pineapples and several of the palm trees were utilized by the insects for this purpose. In Lagos, as the records show, the insects also make use of holes, etc., in many of the large trees.

26. *Work carried on.*—The work of inspecting roof gutterings, oiling of pools, filling in of hollows, drainage of small collections of water, the use of various larvicides, either with proper sprays or by other means, and the protection of tanks and other water containers is carried on at all stations. In some places like Forcados, Burutu and Bonny the mosquito-proofing of barrels is extensively carried out and is an important preventive measure. The latest form of barrel is provided with a double layer of gauze, the superficial one being in a removable frame. This allows of its being frequently taken out and cleaned without adult insects being given the opportunity to escape, and, in addition, diminishes the liability to injury.

27. *Excavations in Towns.*—The question of digging holes to obtain mud for building purposes, and thus providing cavities for the collection of water, is a large one, as having to carry mud some distance materially increases the expense of building, which to a poor man is an important item. A good deal could be done, however, if it were possible to forbid the digging of holes in a town without a permit from the Health Officer, which could be granted subject to certain conditions.

28. *Quinine prophylaxis.*—In reference to the taking of quinine as a prophylactic, the following is a comparative table showing the quantities issued for this purpose during the last few years :—

	1910.	1911.	1912.	1913.	1914.	1915.
W. Province...	1,206,000	1,530,100	1,344,000	915,001	595,423	770,333
C. „ ...	140,532	299,963	355,448	407,484	579,574	53,281
E. „ ...	400,671	586,384	301,286	625,845	990,733	651,749
	1,747,203	2,416,447	2,000,734	1,948,330	2,165,732	1,475,363

The large decrease shown during 1915 is accounted for by the economy which it has been necessary to exercise on account of the increased cost and the difficulty of obtaining the drug.

This diminution must not be taken to indicate that the appreciation of its virtues is under estimated, as among the native population the practice of making use of the benefits it confers is extending.

29. *Mosquito-proof houses and rooms.*—The mosquito-proofing of houses is not in general favour, and, in fact, it is not everyone who has a mosquito-proof room who either uses it properly or sees that it is kept in proper repair, although this will always be done when requested. Many who have been provided with mosquito-proof bed-rooms still use a net, as they "do not trust it." The number of natives who possess mosquito-nets has vastly increased, and it is often interesting to note the resources which have been tapped to obtain or make one.

30. *Blackwater fever.*—The following is a list of cases of blackwater fever with mortality rate since 1907 :—

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Number of cases...	57	48	31	34	26	23	26	20	11
Mortality rate ...	17.5%	16.6%	32.2%	20.6%	30.7%	17.4%	23.0%	25.0%	18.2%

The great decrease in the number of cases of this disease during the last 12 months is a very noteworthy feature. Although the European population has considerably increased, it is encouraging to find that the number of cases of both malaria and blackwater is steadily and rapidly falling.

This gratifying result can, I think, be attributed to a combination of causes, among the chief of which are improved conditions of life, spread of the knowledge of sanitary science and appreciation of its laws, and associated with these the taking of proper precautions against disease in which the personal element is so important a factor.

31. *Trypanosomiasis.*—No case of trypanosomiasis in an European has been reported, and only 73 natives have been treated for the disease; 70 of whom were from the old camp near Eket.

Since the unavoidable closing of the Sleeping Sickness Camp in 1914, the systematic observation and investigation of this disease in its special haunts has not been possible.

32. *Yellow fever.*—During the year cases of yellow fever were reported from Sierra Leone and the Gold Coast, but no outbreak of any extent was recorded.

No case in Lagos.—I am very glad to be able to state that in Lagos, where, in 1913, so many suffered from this disease, no case has been reported, although, in one or two instances, a certain amount of suspicion was aroused at first, which was allayed later.

Outbreaks, however, occurred at Onitsha in September and at the Engenni plantations in October, and at both places an "Infected area" was declared and quarantine restrictions imposed.

Outbreak at Onitsha.—At Onitsha, with the exception of the first, every case occurred within a very small and isolated area, thus rendering the epidemic very much easier to deal with than is usually the case. There were seven cases and one death, all the patients being natives.

It was difficult to ascertain the source of the outbreak, but it appeared very probable that the disease was brought up from the estuary of the Niger during the fishing season.

Outbreak at Engenni.—At Engenni, at the end of September and beginning of October, two deaths which were supposed to be due to yellow fever occurred among native employees, and five other patients were seen later who were suffering from mild attacks of the disease. All necessary and possible action was taken and the epidemic soon ceased.

Case at Akassa.—In November, the Coroner at Brass ordered a post-mortem examination of the body of a woman brought from Akassa, which proved that yellow fever was the cause of death. This led to further enquiries, but no trace of any other cases could be found.

In neither of the two latter instances was it possible to obtain any information whatever as to the origin of the disease.

Cases at Burutu.—At Burutu, in August and September, two cases were diagnosed at intervals of over a month, both of which ended fatally. Dr. Laurie went down and in conjunction with the Medical Officer of the station, the extra Medical Officer already there, and a European Sanitary Inspector took active and thorough measures against any extension of the disease, and no further case was observed.

33. *Filariasis.*—Of the 102 cases of filariasis recorded only one occurred in a European. This, however, must not be taken to indicate the extent of the affection among Europeans. Dr. Maples remarks that "Calabar swelling" is more common in Warri and Sapele than in Calabar itself, and the Medical Officer at Port Harcourt reports that several of the Europeans at that place are infected.

34. *Pappataci Fever.*—No case of pappataci fever has been observed, but, with the carrier so common a pest, it is a disease of which more will probably be heard in the future.

(2)—EPIDEMIC DISEASES.

35. *Plague.*—During the year plague has been reported from Dakar, where apparently the outbreak was somewhat extensive, and from Cape Colony, where it was possible to keep it more under control.

36. On account of the above reports full precautions were taken here, and there has been no ground for even a suspicion of the disease on this part of the Coast.

The measures for destroying vermin which were previously in operation in all Coast ports were continued.

The following table shows the number of rats and mice destroyed by traps and other mechanical means in Lagos :—

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

Small supplies of Danysz virus have been received at regular intervals, and as its potency is very rapidly lost, it was always used immediately on arrival; but, even under those circumstances, satisfactory results were not always obtained.

37. *Small-pox*.—Thirty cases of small-pox have been recorded, the majority of which were observed in the Western Province.

Nine occurred at Ibadan and 14 at Abeokuta, the latter probably originating the epidemic outbreak reported early in 1916. In both these instances the cases must have occurred at considerable intervals, as no report of any outbreak was received.

Lagos has been very free from this disease during the last few years, and the two cases which were observed in 1915 were in-patients who had just arrived from beyond Ibadan, where they had contracted the infection. The freedom of this town from the affection, where not very long ago it was endemic—the Infectious Diseases Hospital always occupied by a number of patients—can, I think, be attributed to the energetic prosecution of vaccination among the inhabitants in recent years.

38. *Vaccination*.—The numbers vaccinated in the Southern Provinces during the last few years are as follows:—

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

39. *Cholera*.—Cholera is, fortunately, unknown in the Colony.

40. *Cerebro-spinal Fever*.—We have received information of three cases of cerebro-spinal fever, one in Lagos and two in the Eastern Province, but each was apparently an isolated instance of the disease. Although sporadic cases of this affection have occurred before, there is no record of it ever having assumed an epidemic form in the Southern Provinces.

41. *Enteric*.—Two cases of enteric fever have been reported, one from Calabar and one from Lagos. Both patients were European sailors, and both were removed from the same mail steamer.

42. *Diphtheria*.—There have been three instances of diphtheria affecting natives, one of which proved fatal. Fortunately, this is a disease rarely seen in Nigeria.

43. *Chicken-pox*.—Chicken-pox is a very common affection, and a number of outbreaks have been reported, in practically all of which the Government prisons have formed important centres of the disease.

At Ikot-Ekpene over 200 cases occurred before the epidemic ceased, and at Warri and Port Harcourt the outbreaks were of almost as extensive a character.

It is a disease comparatively seldom seen outside Government institutions, as private patients rarely present themselves for treatment unless compelled.

44. *Tuberculosis*.—The question of the prevalence of tuberculosis is important, and further and more extensive observations are required.

The number of cases recorded during the last few years is as follows:—

1913.	1914.	1915.
159	109	168

The Resident Medical Officer of the Lagos Hospital states, "Tuberculosis is increasing and is of a most virulent type," and, at Calabar, there have been six deaths from this disease. Personally, I am also of opinion that the disease is extending, and other Medical Officers hold the same view.

In Lagos special accommodation is already provided for the treatment of prisoners suffering from the affection, and a special ward could, I think, be arranged without much expense for general patients in connection with the Hospital on the Ikoyi Plains. In any case, however, the question of setting aside special wards in the large centres for cases of this disease is one which will soon become prominent.

45. *Beri-beri*.—The decrease in the number of cases of beri-beri reported is very marked, and those seen have mostly been observed in patients voluntarily presenting themselves for treatment. The high mortality (383·9 per 1,000) is probably to be attributed to the fact that only the very severe instances of the affection were seen.

46. *Tetanus*.—A very gratifying diminution in the mortality from tetanus, in comparison with that of previous years, is noticeable, and is apparently probably due to the treatment now adopted.

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

47. *Rabies*.—One case of rabies was reported from Onitsha. This led to very definite and stringent precautions being adopted in relation to all dogs in the town and neighbourhood, and no further instance of the disease has occurred. Later the provisions of the Dogs Ordinance were applied to a number of other districts in which it had not previously been in force.

48. *Veneral disease*.—There is no doubt that gonorrhœa is very prevalent indeed, and is the primary cause of a considerable proportion of other affections, for which relief is sought. Syphilis, from all one can gather, is distinctly spreading.

The numbers given below, which are obtained from the records available, cannot be looked on as in any way indicative of the prevalence of either affection, as the natives frequently do not trouble about them, unless there is any special reason, and Europeans seek, where possible, to be treated privately. At Calabar syphilis is said to be very prevalent, and not only there but in all the Cross River Districts.

The cases reported are as follows:—

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Gonorrhœa	1,174	1,524	1,637	1,677	1,785	1,991	1,913	1,605	1,669
Syphilis	224	214	176	171	269	303	202	215	266

49. *Leprosy*.—Only 81 cases of leprosy have been recorded, but this represents a very small proportion of the numbers affected. The principle of

districts providing leper settlements for their own patients which are kept up under the direction of their respective native courts is rapidly extending and proving most useful. These, however, do not contain all those who suffer from the disease, as segregation is not compulsory, and many affected in a more or less mild degree still pursue their ordinary avocations.

50. *Dysentery*.—The number of dysentery cases recorded shows a slight diminution on that of the previous year, but, unfortunately, the mortality is high, being 11·2 per cent. of the cases treated. Twenty-three Europeans suffered from the affection, but all recovered.

At Udi the mortality from this cause, in combination with ankylostomiasis, was extremely high, and towards the end of the year the prison was closed.

At Port Harcourt 327 cases were recorded, more than half occurring in the prison, where a special ward was set aside for the patients. Although other influences may have been at work, it appears probable that the epidemic arose from infected water. The well from which the water is obtained is very liable to contamination, and the fact that half the cases occurred among private individuals living in the neighbourhood and who obtained their water from the same source tends to support that view.

(3)—HELMINTHIC DISEASES.

51. *Helminthic infection*.—In Calabar Hospital observations were made on a large number of consecutive patients, and the following results were obtained in regard to Helminthic infections :—*

Ascaris lumbricoides	28·6 per cent.	Tania solium	... 2·0 per cent.
Trichocephalus dispar	28·0 per cent.	Ankylostomiasis	... 13·3 per cent.
Strongylus gigas	... 0·6 per cent.	Negative	... 59·0 per cent.

These figures are, I should say, distinctly less than would be found in many parts of the colony. Some years ago a similar series of observations was made at the Lagos Hospital, where the percentage was very much higher.

52. *Ankylostomiasis*.—The number of cases of ankylostomiasis observed, of course, represents an infinitesimal number of the infections. This affection appears to have a distinct influence on the incidence, severity, and mortality of dysenteric infections, and the adoption of systematic treatment of all persons in Government institutions who are infected is becoming recognized as more necessary with every succeeding year.

In the Eastern Province the death rate among cases reported was 16·5 per cent. of those treated, and for the whole of the Southern Provinces 13·5 per cent.

A communication was received from the Rockefeller Foundation in reference to the prospect of the Government of Nigeria entering with them into a co-operative campaign against hookworm. The matter was carefully considered, but the Government decided that in the present crisis, with the existing financial pressure and shortage of staff, they were unable to make any definite arrangements on the matter, and had regretfully to refuse the offer.

53. *Teniasis*.—The number of these infections reported shows a steady annual rise. From the present and previous records, Germans and Syrians appear to be the chief sufferers.

54. *Bilharzia*.—Six cases only of bilharzia infections are recorded, but as in this part of the world the symptoms caused rarely lead to serious trouble the patients are not often seen.

* Many are double infections.

55. *Trichinosis*.—The presence of the *Trichina spiralis* in this country has not yet been proved.

56. *Guinea worm*.—The number of guinea worm infections observed is still rising. The parasite is more frequently seen in persons who have been travelling about than in those located at one place. Police and soldiers are often sufferers from the infection, and it appears probable that 1916 will show a further distinct increase.

At Abeokuta the pipe-borne water supply has led to a diminution of the disease, but not to its eradication, probably because many of the old sources of water are still utilized, the number of stand-pipes being inadequate for such a large town.

57. *Trematoda*.—Twenty cases of fluke infection are reported, this being a considerable increase on previous years.

In view of the fact that ten per cent. of the livers inspected in Lagos are infected by the liver fluke, *Fasciola gigantica*, it would be very interesting to know the forms found in these patients.

III.—GENERAL MEASURES.

58. *Sewage disposal*.—The methods of sewage disposal in vogue at the end of 1914 have been continued. At Calabar the new scheme, which had been prepared and approved, had to be held in abeyance as the necessary funds were not available. In Lagos no extension of the area of the pail system has been possible.

Except where rivers or creeks, etc., are more convenient the shallow trench method of disposal is everywhere adopted.

The principle of salgas does not lead to much expense, and, therefore, the practice has a tendency to extend. It is not, however, a method suited to the majority of places in Southern Nigeria, and should only be adopted in selected sites after careful consideration.

59. *Latrines*.—The system of public latrines has not been greatly extended during the year, as considerable expense would thereby have been involved. In the important towns the public latrines are carefully looked after and maintained in proper condition, special attendants being placed in charge. It is observed that where this course is not adopted the habits of the users do not, as a rule, tend towards cleanliness, which, in this particular, is sometimes found where least expected.

60. *Disposal of refuse*.—Refuse in the majority of cases has to be collected by head labour, which is an expensive method. When the use of carts becomes more general, and in some places motor transport possible and available, great advantage will accrue.

Rubbish, etc., is usually burnt, but otherwise is buried or thrown into a river or creek. At places like Lagos, Forcados, Burutu, Bonny, etc., it is possible to use the residue after burning in reclamation work, and this procedure might with advantage be extended in other places.

Tins and bottles form a serviceable groundwork and are easily covered up with the softer material. I cannot but repeat the great improvement which has been brought about in many parts of Lagos by the adoption of this method.

61. *Water supply*.—The pipe-borne water supply of Lagos has, at last, become an accomplished fact, and on July 1st was opened by His Excellency the Governor-General. This was an event of the greatest local importance, and

cannot fail to exert a most favourable influence on the health of the inhabitants. The official inauguration of this supply was somewhat delayed on account of certain impurities having gained admission to the pipe system, which it was desirable to eliminate.

The gradual filling up of the wells and the removal of tanks, barrels, roof gutterings, etc., which, although serving their respective purposes in their time have always been a source of danger and expense, is now possible.

At Benin City a partial failure of the springs from which the water service is obtained occurred; action was, however, immediately taken which fortunately resulted in the flow re-appearing.

The stand-pipes in Abeokuta are greatly appreciated and the water is a vast improvement on that previously obtained from other sources, but if money be forthcoming, it can be still further improved and the system extended.

At several of the up-country stations perennial springs provide the supply, which, in some instances, is excellent. At other places reliance has to be placed on wells or tanks. Tanks are, on the whole, kept well protected, but the gauze is liable to become defective, and it is therefore necessary that they be frequently examined.

Barrels have been in great demand and are in common use in Lagos, Forcados and Burutu, and to a less extent in Calabar and Bonny.

At only the first three places mentioned have efforts been made to any extent to get them made mosquito-proof.

62. *Drainage.*—Lagos is the only place where a system of subsoil drainage has been laid, and here it has proved very effectual, preventing, in the area affected, the periodical floods which used formerly to occur during the rains.

Permanent surface drainage has not been extended to any great extent, but the amount which has been completed has proved useful. At Forcados and Burutu especially, but also at other stations, considerable work has been accomplished in extending the existing systems of earth drains and in clearing and keeping clear those previously cut. At places such as those named, tidal drains are the only means of removing a large quantity of the water which occasionally accumulates, and their maintenance in good condition—which is essential—involves a considerable amount of labour.

63. *Clearance of bush, etc.*—The clearing of bush, undergrowth, etc., is now universally recognized as a necessary and important work, a large amount of labour being continually engaged on it at all stations.

The usual extensive clearing, which is necessary at Calabar, Warri, Onitsha and elsewhere, has been continued and, in certain instances, an increase of the usual grant has been made for the purpose.

64. *Reclamation.*—Reclamation has been carried out at Apapa and Forcados by means of sand deposited by the pump dredger. At the former place 44,000 cubic yards have been deposited, and at the latter considerable improvement has been effected.

At Lagos, Bonny, Burutu and Port Harcourt similar work has been done by hand labour, although at the last mentioned place, where an extensive area of swamp has been converted into useful ground, the use of mechanical transport has afforded considerable assistance.

65. *Markets.*—At Onitsha a market area has been acquired on the river bank, the land cleared of buildings, plans drawn up and a commencement made

in providing the necessary sheds. The erection of suitable market sheds would at many places be of great advantage to all concerned, and prove an investment immediately profitable financially and beneficial in general and more indirect ways.

The trading instinct of the native makes him fully appreciate these buildings, of which he is prepared to take full advantage.

66. *Slaughter-houses.*—Where slaughter-houses have been put up the small fees charged are willingly paid, and these provide ample remuneration for the small amounts of money expended in their erection.

At large centres, where there is a considerable Mohammedan population, religious rites and customs have to be considered. These, however, may lead at a later period to certain difficulties which will have to be grappled with.

67. *Segregation.*—The work initiated last year by His Excellency the Governor-General of having plans drawn up for segregation areas in connection with all stations, which could be gradually worked up to, has been continued and will prove of great future advantage. These plans will serve for the guidance of future local officers as money becomes available and opportunity arises.

68. *Infectious Diseases Hospital.*—The infectious diseases hospitals have been maintained and have proved very useful adjuncts to sanitary work. The one at Lagos, which is situated between two and three miles outside the town, is by far the most advanced as regards personnel, equipment and general arrangements. It is here that a building has been erected for prisoners suffering from tuberculosis, and it is in connection with this hospital that the special ward I have already suggested for tuberculosis patients might, I think, be arranged without great expense.

69. *Sanitary stations.*—There are three sanitary stations in the Colony, but fortunately it has not been found necessary to use any one of them during the year. Those at Lagos and Forcados have been maintained in their former state, and the one at Bonny has been considerably improved.

70. *Prisons.*—I am glad to say that the general conditions in the prisons are decidedly improving and more attention is paid to their sanitary state by the officers-in-charge, whose views as to overcrowding and other matters are now more in accordance with the requirements of sanitary science than formerly.

At some stations the death rates have been high, and one prison has been closed on account of the conditions existing. Although there are often various causes acting adversely on the health of the inmates, some quite outside prison influence, there are others such as food and water which can be remedied, and these as factors in disease are gradually being eliminated.

71. *Lagos.*—Lagos is the only town in the Colony where there is a special Health Officer and where a European Sanitary Inspector is always stationed.

Progressive sanitation has, here as elsewhere, had to suffer as a result of the war, but in spite of that it has fortunately been possible to do more than simply continue the ordinary routine work.

The increasing amount of shipping entering the port adds considerably to the work and responsibility of the Health Officer.

As a result of the new water supply and the numerous stand-pipes, many of which are away from drains, more water than formerly lies about, thus providing mosquitoes with increased facilities for breeding, of which they are not slow to avail themselves. With the large amount of additional water entering Lagos daily the drainage of the town has become a question which

has assumed a much more important character than formerly ; but, unfortunately, it has not been found possible to continue the extension of the scheme drawn up by the Municipal Engineer to anything like the extent required. A more intimate collaboration between the Engineers of the Government and the Municipal Board is required.

The changes being made at the Customs Wharf will affect the Municipal Drainage Scheme in that neighbourhood very considerably, and unless ample precautions be taken will lead to considerable nuisance arising.

The reclamation work at Oke Suna, which was found impossible to complete, led to partial flooding of a portion of the town in the immediate vicinity, and action had to be at once taken to remedy the condition.

Bakeries and other places where food is prepared are receiving more attention, and a distinct improvement is noticeable. When the new Sanitary Ordinance comes into force it will be possible to make further progress. Endeavours are being made to increase washing facilities, and thus provide inducement for washing to be done at the public laundries instead of in small compounds. No steam laundry has yet been erected.

The macadamized roads, which are the most important and can be used by heavy traffic, have been kept in repair, but it has been impossible to properly maintain those made with laterite on account of their extent and the expense involved.

The introduction of the water supply will render the year 1915 a land-mark in the progress of sanitary work in this town, and it is to be hoped that it will prove to be the immediate forerunner of a water-borne sewage system, which is becoming more necessary every succeeding year.

In spite of the public stand-pipes which have been provided, the wells show a distinct increase in number, although both the Government and the Municipal Board have closed many of those under their control.

The carrying out of the new market scheme at Alakoro has naturally been delayed, I trust only very temporarily, as the existing markets are much overcrowded.

The slaughter-houses are between one and two miles from the meat markets and some method of transport for the meat other than by head load is very badly needed. When it is understood that 38 carcasses are brought to the markets daily, the question assumes considerable importance.

A system of street naming and house numbering has been introduced, which will considerably facilitate sanitary work.

The fly nuisance has received a large amount of attention during the year, and results show the benefits accruing.

72. *Port Harcourt.*—The rise of Port Harcourt has been very rapid and the keen interest taken in it by His Excellency has led to the present advanced condition, which will have such a marked influence on its future health and prosperity. European and native settlements have been laid out, reclamation and earth drainage steadily carried on, trading sites, European and native, have been decided on, and many buildings erected, a market place has been selected and a number of sheds put up, a slaughter house provided, a most satisfactory aerated water factory established, which is very successful and of inestimable benefit to the residents in the whole district, and a pipe-borne water supply is under consideration.

Several covered wells have been made in the open spaces in the native town area, but the one which provides the main supply to the native population is outside the town, and although from its position it should be, and could be, made the best, it is probably, as a result of its condition, the worst.

A well in the European Reservation provides the main supply for that area, but distilled water can be obtained on request for drinking, and a few tanks collect rain water from the roofs. Residences raised six or more feet off the ground are succeeding those built on low platforms or on the ground itself, and in a low damp district such as this will prove a considerable improvement.

Sanitary work is carried out by the railway authorities under the direction of the Medical Officer.

73. *Calabar*.—Calabar is a place where a special Health Officer could be stationed with advantage, but unfortunately it has not been possible to provide even a European Inspector.

The scheme approved for sewage disposal has had to be held over, and this, with extension of the permanent drainage system, are the main requirements.

74. *Forcados*.—Knowing the dangers and complications liable to follow the appearance of infectious disease at Forcados and Burutu, continuous and considerable work is always being carried on, and at the latter place the Niger Company spends a large amount of money on, and the Agent takes a very keen interest in, sanitary work. Following the occurrence of sporadic cases of yellow fever the sanitary staff was increased and a European Inspector stationed there.

The drainage, which is so important a point in these places, has been greatly extended and made more efficient, and other improvements including extensive reclamation have been carried out.

75. *Abeokuta*.—Although a distinct advance in sanitary work at Abeokuta was expected, not a great difference has been made during the year.

Abeokuta is a very large and important town, and its proximity to and easy communication with the port of Lagos by road, rail and river renders its sanitary condition one of considerable moment to the Colony as a whole.

It was from this town that the first recognized case of yellow fever came; during 1915 there have been 14 cases of small-pox, and, I may add, a considerable number more occurred early in 1916.

Suggestions for paying chiefs and their messengers to carry out sanitary work and vaccination have, however, been put forward for 1916, but it remains to be seen how they will work out.

The only means at present available to bring about improvement is personal persuasion, as no Sanitary Ordinances have been applied or adopted, nor have any rules or regulations been made. The necessity for action which will yield satisfactory results cannot be too strongly urged, and any course short of that will make little change and react adversely on the port of Lagos.

76. *Ibadan*.—At Ibadan, which is a town with a circumference of nearly fifteen miles, the sanitary work is carried on by the Chiefs and their messengers under the executive officer who directs the local government and is, as far as is possible, supervised by the Medical Officer. A considerable amount of good is being done and the town is much cleaner than it was a few years ago.

The water supply is obtained from wells and water holes or water courses, many of which only contain water in the wet season.

The salga system has been adopted, and a large number are now in use.

(b)—LECTURES.

77. Systematic courses of lectures have been given by the Sanitary Officers to the Inspectors-in-Training, and Medical Officers have, in the course of travelling in their districts, occasionally visited the schools.

The chief method adopted of spreading sanitary knowledge is by addresses to the Chiefs in the native courts.

78. *School teaching.*—The Director of Education has been good enough to furnish me with the following account of the teaching of hygiene in schools and the progress being made :—

“ The elementary principles of hygiene and sanitation are regularly taught in all Government and assisted schools, and the reports of inspecting officers shew that improvement in the method of teaching this subject is noticeable. This is markedly the case in large centres such as Lagos, Calabar and Onitsha, where the principal schools are under direct European supervision. At the annual exhibition of school work which was held in Lagos in April, the work results in hygiene were very satisfactory, and highly commended by the Medical Officers who acted as judges. Practically all the schools in Lagos took part in the competition.

“ 2. There is, however, considerable room for improvement in schools which are at a distance from provincial and district headquarters, and not subject to regular European supervision or frequent inspection. In these schools the instruction given can only be characterised as mere catechism work, or the learning of question and answer by rote, without the practical application to daily existence of the principles of the subject or a clear appreciation on the part of teachers and pupils of the objective in teaching the subject.

“ At the same time indications of progress, slow though it may be, are evident and it may reasonably be expected that advance will be made as educational facilities improve.”

(c)—RECOMMENDATIONS.

79. There are already several items involving expenditure which have had to be held in abeyance, and these will naturally be the first things taken in hand when opportunity occurs.

I desire, however, to draw attention to a few points which should, I think, receive attention with a view to early action when funds are available.

1. The appointment of a fourth European Sanitary Inspector.
2. The treatment of all public wells somewhat after the “ Macgregor ” plan.
3. The provision of destructors for refuse, &c., at all stations.
4. Arrangements for suitable market areas in all towns, so that later markets may be laid out and erected.
5. The appointment of Sanitary Local Boards in connection with stations where there are no Reservation Boards or with towns where a number of merchants reside, so that the interest of the non-official Europeans in sanitary work may be increased and their services be utilized, as is the case in those places which come under the Reservations Ordinance.

6. That the question of the provision of a special ward for tuberculosis patients be considered.

7. That the Chief Sanitary Board on the railway include a sanitary adviser.

I attach the following tables and charts :—

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 showing returns of Anti-Mosquito Work.||
6. Table showing Spleen Returns.¶
7. ** Chart showing percentage of those examined having an enlarged spleen for the years 1913, 1914 and 1915.
8. ** Chart showing the death rates in the various prisons for the years 1913, 1914 and 1915.

It will be noted that, although on the whole the rates are higher in 1915 than in the two previous years, those at the most advanced prisons—Lagos and Calabar—are low and steadily falling. The high figures are at out-stations. The prison at Ibadan is under the Native Court and not under the Prison Department.

9. ** Charts showing the monthly rainfall and cases of dysentery and diarrhoea at Lagos, Calabar and Warri for the years 1913, 1914 and 1915.

In Lagos the increase in the number of cases with the heavy rains is specially marked.

10. ** Charts showing the monthly rainfall, mosquito index and cases of malaria and blackwater fever at Lagos, Calabar and Warri for the years 1913, 1914 and 1915.

The mosquito index rises with the rainfall and an increase of cases of malaria follows shortly after.

11. ** Charts showing the decrease of cases of malaria and blackwater fever in Europeans in Southern Nigeria since 1906 in comparison with the increase of population.

12. ** Chart showing the fall in fatal cases of malaria and blackwater fever in Europeans in Lagos and Ebute-Metta since 1897 in comparison with the increase of population.

ARTHUR PICKELS,

Senior Sanitary Officer.

2nd August, 1916.

* pp. 64 *seqq.*

† p. 125.

‡ p. 126.

§ p. 127.

¶ p. 128.

** Not reproduced.

IV.—METEOROLOGY.

The climate is notoriously humid, and this characteristic has been more than well maintained during the year 1915. The rains began early, concluded late, and the rainfall was greater than in the preceding year, and indeed greater than for several years past.

At the close of the year the Harmattan commenced early and was steadily maintained till the end of the year.

The rainfall over the Southern Provinces generally was above the average. In Lagos the precipitation amounted to 90"·44 during the year. The maximum recorded was at Bonny, where 176"·13 fell. The minimum, 38"·91, was at Afikpo.

The temperature of Lagos is very uniform. The diurnal variation in 1915 never exceeded 23°, the average being 11½°. The absolute maximum of 97° occurred in March, while the minimum of 67° was registered in January, but the mean temperature curve shows March and July to have been the warmest and coolest months respectively. The daily curve is fairly regular, attaining its maximum about noon and minimum about 4 a.m.

The diurnal uniformity disappears as the places of observation come more within the influence of the Harmattan. Ogbomosho for example shows a maximum of 42 degrees of variation. There the maximum thermometer recorded a temperature of 111° and the minimum 52°. The lowest temperature registered in the country, however, was 48° at Olokemeji.

Rheumatism, dysentery and bronchitis are intensified during the rains. Malaria is most common at the beginning and end of the rains ; pneumonia in the Harmattan.

V.—HOSPITALS AND DISPENSARIES.

The following is a brief account of the various hospitals and dispensaries throughout the Southern Provinces, and the work accomplished in connection therewith:—

Lagos hospital—The European wards in the Lagos hospital contain 13 beds; the whole building is mosquito-proof and there is a portion specially proofed for yellow fever cases. 125 European Government officials were treated, with 1 death, and 13 European non-officials with no deaths. Comparatively few European non-officials are now admitted to the Lagos hospital as there has been a private hospital established by an European private practitioner.

The Native wards consist of three blocks with a total of 52 beds for males and one block of 14 beds for females and children. All are efficiently mosquito proofed, and there is special accommodation for yellow fever cases.

The X-ray apparatus has proved of very great assistance as an aid to diagnosis and has kept in very good order. It is run off the main and is used both for screening and photography.

The pipe-borne water supply from Iju has been laid on and has proved a great convenience. It is hoped that the system can be extended later on when sufficient fittings and efficient drainage can be provided. A hot water supply is a necessity and will, it is hoped, soon be installed. Plans for this have been put forward.

313 surgical operations were performed in the Lagos hospital.

The Infectious Diseases Hospital is situated on Ikoyi Plain about two miles from Lagos. There are separate wards for small-pox, chicken-pox, yellow fever, measles, and tuberculosis. 38 cases were treated as in-patients.

21,370 cases were treated at the various dispensaries in Lagos and Ebute-Metta during the year.

Calabar hospitals.—The European hospital contains eight beds and is mosquito-proof. The following structural improvements were carried out, viz., a concrete outside staircase was added to each of the bathrooms. The partitions between two sets of small and dark rooms have been removed, converting them into two wards to accommodate two patients each instead of four single bedded rooms. This arrangement has several advantages.

The wooden supporting columns under the hospital which were being eaten by white ants have been replaced by concrete.

The Provincial Medical Office and Health Office have been removed from their objectionable situation under the hospital to separate buildings.

122 cases were treated, with two deaths; 41 of these were officials. There were no deaths.

The Native hospital is situated about a mile from the European hospital and has an entirely separate staff. It is entirely mosquito-proofed and contains 57 beds. The following alterations have been commenced but have not yet been completed:—

The widening of the verandah surrounding the wards and converting it from a wooden into a reinforced concrete structure.

The renewal throughout of the mosquito-proofing.

The rearrangement of the kitchen department.

A commencement was made of an X Ray installation and the addition of an operation theatre for septic cases to the out-patient department.

1,164 cases were treated as in-patients, with 69 deaths.

At the out-patient department 9,457 cases were treated and there were 26,232 attendances. 311 surgical operations were performed, as against 99 in 1914.

At the Prison hospital and dispensary there were 233 intern patients, 570 extern and a total attendance of 2,849.

The Infectious Diseases Hospital register shows a total of 77 cases treated, mostly chicken-pox.

The Lunatic Asylum has accommodation for 13 males and 7 females. 24 insane persons were treated, with 6 deaths.

At the new Barracks Dispensary 1,342 cases were treated, and there was a total of 8,478.

Warri hospitals.—The European hospital has 6 one-bed wards and a well lighted and ventilated operating theatre. The wards are mosquito-proof. There is an up-to-date X-Ray apparatus. 47 cases were treated as in-patients.

The Native hospital consists of two buildings, one for males and one for females and is mosquito-proof. There is accommodation for 30 patients. 318 in-patients were treated. At the out-patient department 3,209 cases were treated, and there were 12,859 attendances.

The Infectious Diseases Hospital is on a well isolated site, and is mosquito-proof, and consists of a main building of four rooms and an office. An additional small building of two rooms has recently been erected, and is also mosquito-proof. The total of in-patients was 179, nearly all chicken-pox.

In the new prison compound there is included a prison hospital, which will be brought into use when the new prison premises are occupied.

Sapele hospitals.—There are four hospitals and a dispensary, viz.—European, Native (with Dispensary), Infectious Diseases and Prison. The European hospital contains four beds, and accommodated 6 patients during the year. There were no deaths. The wards are mosquito-proofed.

At the native, prison and infectious diseases hospitals a total of 207 in-patients were treated. At the dispensary 2,171 cases were treated.

Ibadan hospitals.—The European hospital has 5 beds and the Native 20. They are separate buildings and are both mosquito proof.

There were 21 Europeans admitted, with no deaths.

243 natives were treated as in-patients, with 34 deaths.

There were 3,385 out-patients treated at the dispensaries, of which there are two.

Onitsha hospitals.—At this station there is a European hospital, a native hospital and a dispensary. The European hospital has 4 beds, the native 24. All are mosquito proof.

The number of admissions to the European hospital was 39.

At the Native hospital 630 cases were admitted as in-patients, and 6,917 as out-patients.

Benin City hospitals.—There is a native hospital, prison hospital and a dispensary. The native hospital has 8 beds, the prison 2.

There were 160 in-patients and 1,303 out-patients.

Forcados.—The European hospital (containing 4 beds) after structural alterations had been completed, and equipment supplied was opened in October. From that date to the end of the year there were five cases admitted. The native hospital has had a new theatre built and a female ward added, with accommodation for three patients, making a total of 20 beds. 298 in-patients were treated, with 23 deaths. A new dispensary with offices has been opened; 5,515 out-patients were treated at the dispensary.

The European hospital is entirely and the native hospital partially mosquito-proofed.

Okwoga Hospital.—There are two hospitals—a brick building for natives and a “bush” hospital for prisoners. There is a dispensary under the same roof with the former. There were treated in all 228 in-patients and 645 out-patients.

Aghor Hospital.—There is a native hospital and dispensary. 132 in-patients were admitted. The out-patients treated amounted to 1,780. A permanent brick hospital and dispensary are required at this station.

Badagry Hospital.—There is a native hospital and dispensary only with accommodation for 12 patients. 15 in and 1,410 out-patients were treated. There were four deaths.

Epe Hospital.—There is a good native hospital with dispensary, but as no Medical Officer has been stationed there for any length of time since the outbreak of war little or no work has been done there.

Degema.—There is a brick native hospital with ten beds and dispensary. In-patients treated 93, out-patients 810.

Brass.—A native hospital built of brick containing 6 beds. 40 in and 1,450 out-patients were treated during the year.

Ikot Ekpene.—The medical buildings consist of an old “bush” hospital with 7 beds and a brick dispensary, containing also an office and store-room. There is also a similarly constructed mortuary. A large permanent native hospital is in course of construction at this station. 406 in, and 940 out-patients were treated.

Bonny Hospital.—There is a brick hospital containing 14 beds and a dispensary; 111 in-patients and 1,315 out-patients were treated.

Opobo Hospitals.—There is a European hospital with four beds, and a native hospital with ten beds. 11 Europeans and 1,633 natives were treated as in-patients.

There are two dispensaries—one in the station and one in Opobo town. 1,633 cases were treated.

Port Harcourt Hospitals.—The hospitals at this station are temporary, pending the erection of proper buildings.

Five Europeans and 435 natives were treated as in-patients. There were 2,397 natives treated as out-patients at the dispensary.

Obubra Hospital.—There is a brick hospital with six beds and a dispensary, but no medical officer was stationed here during 1915.

Obudu Hospital.—There is a brick hospital with four beds, but no medical officer was stationed there.

There are “bush” hospitals at Abakaliki, Ogoja, Okigwi, Owerri, Afikpo, Okwoga and Ikom. These should be replaced by permanent brick buildings as soon as possible.

Under this section no reference has been made to the prevailing diseases treated at each of the hospitals, as the diseases in Tables III. and IV. are common to all. The recording of any particular disease is more dependent on the district than the institution—thus leprosy is almost exclusively found in the region of the Niger River, trypanosomiasis in the Cross River districts, guinea worm in the up-country stations, away from the great rivers. It is only at the larger hospitals in the coast towns—Lagos, Warri, Calabar—where the natives are more enlightened that any material difference in the work of the hospitals can be appreciated. In these institutions a large amount of good general surgical work is done—gynæcology, eye work, etc.

VI.—SCIENTIFIC.

Scientific work has been severely handicapped during 1915 owing to the war, the exigencies of which have rendered it necessary to withdraw many Medical Officers from their stations and throw additional work upon others; transfers have necessarily been frequent, and there has been a general state of unsettledness, which has not been conducive to the prosecution of research work. But little original work has therefore been done beyond that of the Medical Research Institute.

Observations have been continued by Drs. T. B. Adam and R. H. Brierley into the prevalence and best modes of prevention and cure of ankylostomiasis, but this has not as yet assumed a sufficiently crystalline form to embody in this report.

Dr. Adam has done a great deal of work in connection with this disease and its relation to dysentery, and expresses his view as follows:—

“ There is a strong probability that the relation between ankylostomiasis and dysentery is a very intimate one. The extensive and severe ulceration of the lower bowel is probably brought about either by the introduction of a bacterial organism with a selective action on the lower bowel (by the ingestion of rubbish and soil as in the well recognised symptom of geophagy), or in the late stages of the very profound anæmia so characteristic of ankylostomiasis (such an ulceration as is found in pernicious anæmia).

“ Dysentery and diarrhœa cannot well be dissociated, and both may owe their origin largely to helminthic infection. Taken together they have an incidence of 61·2 per 1,000 cases of disease treated, and a case mortality of 58 per 1,000, while the deaths from these two diseases constitute 80·8 per cent. of the total deaths from all causes of cases treated in this Province during the year 1915.”

The following reports, etc., are included in the Appendix:—

1. Annual Report of the Director, Medical Research Institute, by Drs. A. Connal and H. S. Coghill.
2. Notes on a Case of Helminthic Infection associated with Paraplegia in a European, by Dr. A. E. Neale.
3. Notes on Some Investigations at Calabar, by Dr. E. E. Maples.
4. Annual Report of the Government Chemist—Mr. W. Ralston.
5. Annual Report of the Government Dentist—Mr. H. F. Hardie.

H. B. S. MONTGOMERY.

Acting Principal Medical Officer.

2nd September, 1916.

TABLE I.

(1)--TOWN AREA AND OPEN SPACES.

NAME OF TOWN.	1914.		1915.	
	Approximate area in acres.	Number of proclaimed open spaces.	Approximate area in acres.	Number of proclaimed open spaces.
Lagos and Ebute-Metta	1,152	3	1,152	3
Warri	800	...	800	...
Calabar	113,000	3	5,888	3
Port Harcourt	1,513	7	1,113	4

(2)--POPULATION.

NAME OF TOWN.	1914.			1915.		
	Number of Europeans.	Number of Natives.	TOTAL.	Number of Europeans.	Number of Natives.	TOTAL.
Lagos and Ebute-Metta ... ..	...	...	76,705	...	...	77,982
Warri	67	2,652	2,719	80	2,449	2,529
Calabar	148	14,263	14,411	125	14,263	14,388
Port Harcourt	105	5,000	5,105	131	10,100	10,231

(3)--HOUSING.

Town.	1914.				1915.			
	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 and Ebute-Metta	263	4,011	...	12,000	269	4,048	...	...
Warri	30	124	...	116	27	137	...	141
Calabar	57	50	...	2,253	65	54	...	2,249
Port Harcourt	24	78	36	425	53	...	...	...

(4)--MOSQUITO-PROTECTION OF HOUSES.

Town.	1914.				1915.			
	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 and Ebute-Metta	23	94	...	...	25	122	2	...
Warri ... ..	...	17	...	4	1	16	1	...
Calabar	1	5	...	1	...	6	...	1
Port Harcourt ... ..	...	11	...	...	...	7	...	...

TABLE I—*continued.*

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

Town.	1914.					1915.				
	Number of public buildings, erected with full sanction as to site, &c.	Number of houses erected with full sanction as to site, &c.	Number of huts erected with full sanction as to site, &c.	Number of houses built without sanction.	Number of huts built without sanction.	Number of public buildings, erected with full sanction as to site, &c.	Number of houses erected with full sanction as to site, &c.	Number of huts erected with full sanction as to site, &c.	Number of houses built without sanction.	Number of huts built without sanction.
Lagos and Ebute-Metta	...	116	327	...	...	...	187	574	...	...
Warri	2	3	30	...	...	1	...	...	...	...
Calabar	2	...	22	...	1	...	...	2	1	44
Port Harcourt ...	...	...	425	...	...	...	...	2	...	...

ACTION TAKEN.

Town.	1914.				1915.			
	NUMBER OF PROSECUTIONS.		NUMBER DEMOLISHED.		NUMBER OF PROSECUTIONS.		NUMBER DEMOLISHED.	
	Houses.	Huts.	Houses.	Huts.	Houses.	Huts.	Houses.	Huts.
Lagos and Ebute-Metta	102	...	...	...	150	...
Warri	1	1	7	...	...	...	5
Calabar	11	3	...	2	...	31
Port Harcourt

(6)—MARKETS.

Town.	1914.			1915.		
	Total Number.	Number Paved and Drained.	Number Unpaved.	Total Number.	Number Paved and Drained.	Number Unpaved.
Lagos and Ebute-Metta	13	6	7	13	6	7
Warri	1	...	1	1	...	1
Calabar	3	...	3	5	...	5
Port Harcourt	1	...	1	1	...	1

(7)—SLAUGHTER HOUSE.

Town.	1914.			1915.		
	Total Number.	Number Paved and Drained.	Number Unpaved.	Total Number.	Number Paved and Drained.	Number Unpaved.
Lagos and Ebute-Metta	2	2	...	2	2	...
Warri	1	1	...	1	1	...
Calabar	1	1	...	1	1	...
Port Harcourt	1	1	...	1	1	...

TABLE I—continued.
(9)—REMOVAL OF REFUSE.

Towns.	1914.						1915.					
	Number of dustbins.	Number of carts removing refuse daily.	Amount of refuse removed daily.	Number of carts removing refuse from yards and premises daily.	Amount of refuse removed from yards and premises daily.	Number of men employed for removing refuse.	Number of dustbins.	Number of carts removing street refuse daily.	Amount of refuse removed daily.	Number of carts removing refuse from yards and premises daily.	Amount of refuse removed from yards and premises daily.	Number of men employed for removing refuse.
Lagos and Ebute-Metta	57	55	100 tons	...	...	280	55	110 tons (12 ") cartloads	...	...	250
Warri...	40	4	4 "	...	...	46	4	16 cartloads	...	...	46 (partially)
Calabar	16	4	6 "	4	...	78	4	91 "	...	27 cartloads	67	
Port Harcourt	...	...	½ ton	...	...	30	128 refuse receptacles	42 brls.	...	...	20

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

Towns.	1914.						1915.					
	BURIED OR TRENCHED.	BURNED.	TROWN INTO SEA.	OTHERWISE DEALT WITH.	BURIED OR TRENCHED.	BURNED.	TROWN INTO SEA.	OTHERWISE DEALT WITH.	BURIED OR TRENCHED.	BURNED.	TROWN INTO SEA.	OTHERWISE DEALT WITH.
Lagos & Ebute-Metta	Daily average number of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of cart-loads of refuse.
Warri	...	100	...	...	...	100	...	...	...	...	...	...
Calabar	50	...	...	...	...	...	...	...	...	...	...	...
Port Harcourt	91	...	...	...	72	...	...	...	...	...	...	...

* Thrown into tidal water-way.

TABLE I—continued.

(11)—AVERAGE DAILY NUMBER OF CARTLOADS OF TIN CANS, BOTTLES, BROKEN CROCKERY, AND OTHER INCOMBUSTIBLE MATERIALS REMOVED FROM HOUSES, HUTS, AND COMPOUNDS.

Town.	1914.	1915.
Lagos and Ebute-Metta ...	...	...
Warri ...	16	...
Calabar ...	16	2.5
Port Harcourt ...	...	...

(12)—WATER SUPPLY—PIPE-BORNE WATER.

Town.	1914.				1915.			
	Source (river, lake or spring).	No. of linear yards.	No. of public stand-pipes.	No. of private stand-pipes.	Source (river, lake or spring).	No. of linear yards.	No. of public stand-pipes.	No. of private stand-pipes.
Lagos & Ebute-Metta	Well & river	5,077	...	44	Well, river and tank.	53,424	167	182
Warri ...	Well	...	...	...	Well	...	...	...
Calabar ...	Spring	19,900	7	95	Spring.	19,560	4	102
Port Harcourt	Well	...	...	...	Well & condensed water.	...	...	...

WELLS.

Town.	1914.				1915.			
	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 and Ebute-Metta ...	101	20	2,600	...	85	10	2,670	...
Warri ...	8	8	20	20	8	8	20	20
Calabar ...	...	...	1	1	...	...	...	...
Port Harcourt ...	8	4	...	...	9	5	...	...

TANKS (PUBLIC).

Town.	1914.						1915.					
	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 and Ebute-Metta ...	...	...	2	2	2	...	...	...	2	2	2	...
Warri ...	...	...	...	...	...	...	...	...	...	...	...	...
Calabar ...	2	2	4	4	...	6	3	...	2	1	...	5
Port Harcourt ...	...	...	...	...	...	...	...	...	1	...	...	1

TABLE I—*continued.*
EARTH DRAINS OR DITCHES.

Town.	1914.			1915.		
	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 and Ebute-Metta...	...	...	Regularly.	.	1,590	Frequently.
Warri	16,755	...	Monthly.	16,755	...	When req'd.
Calabar	1,340	...	Monthly.	15,724	...	Quarterly.
P. Harcourt ... ..	...	...	Quarterly.	5,300	2,380	Every two months.

PRIVATE DRAINS.
(MASONRY DRAINS.)

Town.	1914.				1915.			
	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 and Ebute-Metta	...	...	...	...	...	...	...	...
Warri	5,079	..	...	786	...	...	...	...
Calabar... ..	48,809	...	...	...	16,669	...	1	...
P. Harcourt ... ..	...	...	...	...	...	...	...	...

EARTH DRAINS OR DITCHES.

Town.	1914.			1915.		
	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 and Ebute-Metta
Warri	39	39	When reqd.
Calabar	Regularly	3,724	50	Quarterly.
Port Harcourt	170	...	Monthly.

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

Town.	1914.		1915.	
	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 and Ebute-Metta ...	5,575,680	Regularly.	5,500,000	Continuously.
Warri	340	Monthly.	340	Monthly.
Calabar	70,000	Monthly.	366,716	Monthly.
Port Harcourt ... ..	...	Quarterly.	3,500,000	Thrice yearly.

TABLE I.—continued.
(17)—INSPECTIONS AND PROSECUTIONS.

TOWN.	1914.										1915.									
	Number of Inspectors employed.	Number of Houses inspected.	Number of Houses where Larvae were found.	Number of Notices served to remove conditions causing breeding of Larvae.	Number of Persons fined for having Mosquito Larvae on premises.	Number of Notices served to remove insanitary conditions on premises.	Number of Persons fined for not removing insanitary conditions after notice.	Number of Soda and Aerated Fountains inspected.	Number of Inspectors employed.	Number of Houses inspected.	Number of Houses where Larvae were found.	Number of Notices served to remove conditions causing breeding of Larvae.	Number of Persons fined for having Mosquito Larvae on premises.	Number of Notices served to remove insanitary conditions on premises.	Number of Persons fined for not removing insanitary conditions after notice.	Number of Soda and Aerated Fountains inspected.				
Lagos and Ebute-Metta	33	608,747	20,349	...	1,202	3,259	5	2	32	620,196	19,251	...	1,024	2,901	1	4				
Warri ...	5	43,523	229	123	21	82	10	...	5	43,279	123	34	17	66	8	...				
Calabar ...	8	107,464	360	264	106	40	38	1	7	98,252	463	324	241	3,809	28	1				
P. Harcourt ...	2	2,555	31	...	1	17	...	...	3	14,398	268	58	34	30	...	1		

	LAGOS AND EBUTE-METTA.												WARRI.											
	1914.				1915.				1914.				1915.				1914.				1915.			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.				
Houses Inspected	141,158	151,597	156,730	159,262	151,983	153,475	157,104	157,634	11,137	9,343	11,395	11,648	12,118	10,757	11,470	8,934	12,118	10,757	11,470	8,934				
Houses containing larvae.	4,055	6,802	5,024	4,468	4,179	5,887	5,098	4,087	56	75	61	37	20	54	29	20	20	54	29	20				
Mosquito index ...	2.8	4.4	3.2	2.8	2.7	3.8	3.2	2.5	.5	.8	.5	.3	.1	.5	.2	.2	.1	.5	.2	.2				
Rainfall ...	5.8	40.3	10.8	11.9	5.0	43.5	29.3	12.4	10.9	23.0	13.9	8.4	5.5	49.2	63.2	20.6	5.5	49.2	63.2	20.6				

TABLE I.—continued.
(17)—INSPECTIONS AND PROSECUTIONS—continued.

	CALABAR.								PORT HARCOURT.							
	1914.				1915.				1914.				1915.			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Houses inspected	29,884	28,995	24,973	23,612	24,928	23,142	25,288	24,894	120	309	886	1,240	2,341	3,372	4,414	4,541
Houses with larvæ	39	88	98	135	66	94	129	114	—	9	10	12	25	55	121	126
Mosquito index ...	·1	·3	·3	·5	·2	·4	·5	·4	—	2·9	1·1	·9	31·2	1·6	2·7	2·7
Rainfall ...	12·0	56·3	34·1	19·9	11·6	41·1	53·9	29·8	—	—	—	—	—	—	53·7	17·7

(18)—ANTI-MOSQUITO WORK.

Towns	1914.						1915.									
	Houses inspected.		Number of houses with larvæ.		Rainfall.		Mosquito index.		Houses inspected.		Number of houses with larvæ.		Rainfall.		Mosquito index.	
Lagos
Warri
Calabar
Port Harcourt

TABLE II.
METEOROLOGICAL RETURNS FOR THE YEAR 1915.
STATION—LAGOS.

	LAT. 6°-27' N.		LONG. 3°-24' E.		Relative humidity.	Rainfall in inches.
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.		
January	90·3°	67°	87·5°	74·3°	82·3 %	0·78
February	91°	73°	88·9°	77·5°	82·6 %	1·59
March	97°	73·4°	90·6°	79·3°	74·4 %	2·72
April	93·3°	72·3°	89·7°	77·3°	77·9 %	7·04
May	90°	72°	88·0°	75·6°	80·9 %	11·52
June	89°	70°	85·0°	74·5°	88·4 %	24·95
July	84°	71°	82·0°	73·8°	86·4 %	15·51
August	88°	68°	82·9°	73·6°	82·8 %	3·52
September	94°	70°	84·4°	74·5°	85·4 %	10·34
October	88°	71°	86·1°	74·8°	82·2 %	7·66
November	90°	71°	87·6°	76·0°	81·9 %	4·81
December	92°	71°	85·9°	74·8°	84·8 %	Nil
Means... ..	97°	67°	86·8°	81·1°	82·5 %	90·44 Total.

STATION—ONITSHA.

	LAT. 6°-10' N.		LONG. 6°-47' E.		Relative humidity.	Rainfall in inches.
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.		
January	95°	60°	92·7°	76°	97 %	Nil
February	100°	70°	95·4°	76·7°	80 %	0·15
March	100°	72°	97·6°	76·2°	85 %	0·50
April	100°	72°	93·6°	75·2°	90 %	8·74
May	97°	70°	95·1°	74·6°	85 %	14·08
June	93°	71°	86·5°	74·5°	85 %	10·08
July	90°	74°	84·8°	75·5°	89 %	16·67
August	89°	70°	87·2°	76°	89 %	4·23
September	93°	75°	90·8°	75·1°	89 %	12·93
October	94°	75°	92·0°	76·1°	89 %	8·78
November	95°	75°	93·6°	75·9°	85 %	5·17
December	95°	70°	95°	70·7°	84 %	Nil
Means... ..	100°	60°	92°	75·2°	85·7 %	81·33 Total.

STATION—FORCADOS.

	LAT. 5°-23' N.		LONG. 5°-26' E.		Relative humidity.	Rainfall in inches.
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.		
January	100°	64°	88·7°	71·2°	80 %	Nil
February	96°	70°	88·4°	74·1°	76 %	5·03
March	95°	70°	91·0°	74·0°	76 %	9·25
April	95°	70°	89·2°	75·0°	80 %	15·32
May	95°	70°	88·8°	73·6°	80 %	12·50
June	98°	70°	86·9°	72·2°	80 %	23·72
July	84°	61°	80·7°	68·6°	89 %	24·95
August	83°	61°	80·5°	66·0°	89 %	18·72
September	84°	68°	81·8°	73·1°	84 %	18·09
October	86°	70°	83·4°	73·2°	85 %	16·02
November	87°	71°	85·4°	73·6°	76 %	2·36
December	88°	68°	86·3°	72·6°	80 %	Nil
Means... ..	100°	61°	85·9°	72·2°	81·2 %	146·56 Total.

TABLE II.—*continued.*

STATION—UDI.

	LAT. 6°-14' N.			LONG. 7°-22' E.		
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	95°	65°	89·6°	71·0°	67 %	Nil
February	96°	71°	93·0°	73·8°	72 %	0·43
March	96°	67°	93·4°	73·3°	68 %	1·91
April	97°	67°	90·0°	71·6°	76 %	4·60
May	95°	67°	89·0°	70·2°	76 %	12·12
June	89°	66°	86·1°	74·2°	79 %	7·39
July	87°	66°	81·5°	67·6°	89 %	7·82
August	85°	65°	80·7°	67·6°	89 %	8·51
September	88°	66°	84·0°	67·7°	79 %	10·31
October	92°	64°	88·5°	67·2°	80 %	5·46
November	93°	65°	89·0°	69·0°	75 %	3·17
December	95°	67°	90·0°	76·1°	59 %	0·10
Means... ..	97°	64°	87·9°	70·7°	75·7 %	61·72 Total.

STATION—CALABAR.

	LAT. 4°-58' N.			LONG. 8°-19' E.		
	Absolute shade maximum.	Absolute shade minimum.	Average maximum.	Average minimum.	Relative humidity.	Rainfall in inches.
January	92°	60°	87·1°	68·2°	72 %	0·56
February	97°	66°	91·5°	70·6°	68 %	1·46
March	96°	69°	91·6°	70·4°	76 %	9·60
April	94°	70°	90·6°	72·0°	80 %	6·50
May	94°	69°	89·3°	71·5°	89 %	21·65
June	90°	67°	87·1°	71·5°	89 %	13·03
July	87°	68°	85·6°	71·2°	94 %	22·24
August	91°	65°	87·7°	67·7°	94 %	13·31
September	90°	66°	89·5°	68·1°	89 %	18·44
October	90°	60°	88·0°	66·3°	84 %	16·41
November	90°	64°	89·2°	68·6°	89 %	11·22
December ... ..	...	...	...	...	79 %	2·25
Means	97°	60°	88·8°	69·6°	83·6 %	136·66 Total.

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°	61°	94·7°	70·1°	74 %	Nil
February	102°	68°	95·6°	73·4°	89 %	0·44
March	107°	70°	95·3°	75·0°	85 %	3·72
April	98°	68°	93·6°	73·9°	89 %	4·55
May	98°	68°	91·0°	71·6°	89 %	8·12
June	93°	68°	87·6°	71·8°	89 %	7·90
July	97°	67°	83·3°	69·9°	89 %	8·39
August	93°	67°	84·5°	69·7°	89 %	4·51
September	90°	68°	86·5°	70·6°	89 %	8·72
October	93°	67°	88·5°	70·9°	89 %	6·60
November	96°	63°	92·4°	71·4°	89 %	2·25
December	97°	64°	94·0°	69·6°	89 %	Nil
Means	107°	61°	90·6°	71·5°	87·4 %	55·20 Total.

TABLE III.

DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR.

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
INFECTIVE DISEASES:—							
Beri-beri
Cerebro-spinal fever
Chicken-pox
Cholera
Dengue
Diphtheria
Dysentery, undetermined	11	...	11	...	13	...
Endocarditis—infected
Enteric	1	...	1	...	...	...
Erysipelas
Gonorrhoea	1	...	1	...	28	...
Influenza	2	...
Kala-Azar
Leprosy (a) Nodular
(b) Anaesthetic
Malaria (a) Tertian	2	...
(b) Quartan	1	...
(c) Aestivo-autumnal	1	187	2	188	2	305	...
(d) Chronic	1	...	1	...	1	...
(e) Blackwater	8	2	8	...	3	...
Measles	1	...
Malta fever
Plague
Pneumonia	1	1	...	2	...	...	...
Rabies
Rheumatic fever	4	...	4	...	1	...
Septicæmia
Trypanosomiasis (sleeping sickness)
Small-pox
Syphilis (a) Primary	1	...
(b) Secondary	2	...	2	...	2	...
(c) Inherited
Tetanus
Tuberculosis	1	...	1	...	2	...
Whooping cough
Yaws
Yellow fever
Others
INTOXICATIONS:—							
Alcoholism	3	...	3	...	4	2
Morphinism
Others
GENERAL DISEASES:—							
Anæmia	9	...	9	...	78	...
Anæmia—Pernicious
Diabetes	1	...	1	...	...	...
Exophthalmic goitre
Gout	2	...
Leucocythæmia
Hodgkin's disease
Myxœdema
Purpura
Ricketts
Scurvy
Chronic rheumatism	7	...	7	...	75	...
Others	1	...
DISEASES OF NERVOUS SYSTEM:—							
Sub-section 1—							
Neuritis	3	...	3	...	6	1
Meningitis	1	1
Myelitis
Hydrocephalus
Encephalitis
Abscess of brain
Congestion of brain
Others	1	...	1	...	1	...

TABLE III.—DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR.—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
<i>Diseases of Nervous System—</i>							
<i>continued:—</i>							
<i>Sub-section 2—</i>							
Apoplexy
Paralysis	2	...	2	...	1	...
Chorea
Epilepsy	1	...	1	...	3	...
Neuralgia	47	...
Hysteria	2	...	2	...	...	...
Others	2	...	2	...	4	...
<i>MENTAL DISEASES:—</i>							
<i>Sub-section 3—</i>							
Idiocy
Mania
Melancholia	1	...	1	...	...	...
Dementia
Delusional insanity	1	...	1	...	...	...
Others
<i>Diseases of the Eye:—</i>							
Conjunctivitis	2	...	2	...	21	...
Keratitis
Ulceration of cornea
Iritis	2	...	2	...	1	...
Optic neuritis	2	...
Cataract	1	...
Others	2	...	2	...	2	...
<i>Diseases of the Ear:—</i>							
Inflammation	2	...	2	...	19	...
Other Diseases	11	...
<i>Diseases of the Nose</i>							
...	22	...
<i>Diseases of the Circulatory System:—</i>							
Pericarditis
Endocarditis
Valvular Mitral
Aortic
Tricuspid
Pulmonary
Arterial sclerosis
Aneurysm	3	1	3	...	1	...
Others	2	...	2	...	4	...
<i>Diseases of the Respiratory System:—</i>							
Laryngitis	1	...	1	...	5	...
Bronchitis	1	...	1	...	56	...
Broncho-pneumonia
Abscess of lung
Gangrene of lung
Emphysema	1	...	1	...	1	...
Pleurisy	3	...	3	...	1	...
Empyema
Others	3	...	3	...	7	...
<i>Diseases of the Digestive System:—</i>							
Stomatitis	1	...	1	...	10	...
Caries of teeth	1	...	1	...	24	...
Glossitis	3	...
Sore throat	27	...
Inflammation of tonsils	2	...	2	...	21	...
Gastritis	13	...	13	...	59	...
Ulceration of stomach
Hæmatemesis
Dilatation of stomach	1	...	1	...	1	...
Stricture of stomach
Dyspepsia	2	...	2	...	111	...
Enteritis	3	...	3	...	35	...

TABLE III.—DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR—*continued*.

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Diseases of the Generative System—							
<i>continued</i> :—							
Female Organs— <i>continued</i> —							
Retained placenta
Premature birth
Puerperal septicemia
Mastitis
Abscess of breast
Others...
Diseases of Organs of Locomotion :—							
Osteitis	1	1	1	2	...	1	...
Arthritis... ..	1	1	...	2	...	14	...
Spondylitis
Bursitis	5	...
Others	1	...	1	...	6	...
Diseases of Connective Tissue :—							
Cellulitis	5	...	5	1	3	...
Abscess	1	10	...	11	...	10	...
Elephantiasis
Others
Diseases of the Skin :—							
Urticaria	1	...	...	1	...	2	...
Eczema	4	...	4	...	27	...
Boil	3	5	...	8	...	45	...
Carbuncle	3	...
Herpes	3	...
Psoriasis	4	...
Oriental sore
Tinea	67	...
Scabies	6	...
Acne	4	...
Prickly heat	1	...	1	...	18	...
Ulcers	8	...	8	...	32	...
Others	1	...	1	...	5	...
INJURIES :—							
General... ..	1	4	...	5	...	16	...
Local	21	...	21	1	105	...
TUMOURS							
Others
Malformations							
Poisons	1	...
PARASITES—Animal							
Protozoa							
Trematoda (flukes)							
Others
Cestoda—							
<i>Tenia solium</i>	1	...
<i>Tenia saginata</i>
Others
Nematoda—							
<i>Ascaris</i>
<i>Trichocephalus dispar</i>
<i>Trichina</i>
<i>Dracunculus</i>
Filariasis	1	...
<i>Strongylus</i>
Ankylostomiasis
<i>Oxyuris</i>	1	...
Others
Insecta—							
Myiasis	7	...
Others	4	...
GRAND TOTAL	10	401	8	411	5	1,656	4

TABLE IV.

DISEASES AND DEATHS (NATIVE) FOR THE YEAR.

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
INFECTIVE DISEASES:—							
Beri-beri	8	33	13	41	1	2	...
Cerebro-spinal fever ... ..	...	1	...	1	...	...	...
Chicken-pox	26	1,047	2	1,073	108	37	...
Cholera ... ..	...	...	...	...	...	...	...
Dengue ... ..	...	...	...	...	...	...	...
Diphtheria ... ..	...	2	1	2	...	1	...
Dysentery, undetermined	22	727	138	749	9	463	1
Endocarditis—infective ... ..	...	...	...	...	...	...	...
Enteric ... ..	...	...	...	...	...	...	...
Erysipelas ... ..	...	1	...	1	...	...	...
Gonorrhoea	5	202	1	207	8	1,433	...
Influenza ... ..	...	...	...	...	...	3	...
Kala Azar ... ..	...	...	...	...	...	...	...
Leprosy (a) Nodular	14	9	3	23	15	1	...
(b) Anaesthetic	36	10	...	46	2	11	...
Malaria (a) Tertian ... ..	...	3	...	3	...	15	...
(b) Quartan ... ..	...	...	...	...	...	6	...
(c) Aestivo-autumnal	7	508	2	515	7	4,440	1
(d) Chronic ... ..	...	2	...	2	...	61	...
(e) Blackwater ... ..	...	5	1	5	...	2	1
Measles ... ..	...	9	...	9	...	23	...
Malta Fever ... ..	...	...	...	...	...	...	...
Plague ... ..	...	...	...	...	...	...	...
Pneumonia	5	151	61	156	5	67	...
Rabies ... ..	...	...	...	...	...	1	1
Rheumatic fever ... ..	...	6	1	6	...	7	...
Septicæmia	1	21	19	22	...	3	1
Others ... ..	...	...	...	...	...	3	...
Trypanosomiasis (sleeping sickness)	70	2	...	72	...	1	...
Small-pox ... ..	...	8	5	8	...	22	...
Syphilis (a) Primary ... ..	...	30	1	30	3	101	...
(b) Secondary	2	22	1	24	...	87	...
(c) Inherited ... ..	...	3	...	3	...	16	...
Tetanus ... ..	...	27	10	27	4	6	2
Tuberculosis	13	71	37	84	5	84	3
Whooping cough	1	...	...	1	...	36	...
Yaws ... ..	...	4	...	4	...	196	...
Yellow fever ... ..	...	14	3	14	...	1	1
Others ... ..	...	1	...	1	...	9	...
INTOXICATIONS:—							
Alcoholism ... ..	...	4	...	4	...	2	...
Morphinism ... ..	...	...	...	...	...	...	...
Others ... ..	...	2	1	2	...	12	...
GENERAL DISEASES:—							
Anæmia	16	126	9	142	3	2,290	4
Anæmia—Pernicious	1	...	1	1	...	2	1
Diabetes ... ..	...	1	...	1	...	1	...
Exophthalmic goitre ... ..	...	...	...	...	...	2	...
Goat ... ..	...	...	...	...	...	4	...
Leucocythæmia ... ..	...	...	...	...	...	...	...
Hodgkin's disease ... ..	...	...	...	...	...	1	...
Myxœdema ... ..	...	...	...	...	...	...	...
Purpura ... ..	...	...	...	...	...	...	...
Ricketts ... ..	...	...	...	...	...	1	...
Scurvy ... ..	...	...	...	...	...	...	...
Chronic rheumatism	8	360	4	368	10	5,369	...
Others ... ..	...	15	5	15	...	9	...
Diseases of Nervous System—							
Sub-section 1—							
Neuritis	3	13	2	16	1	66	...
Meningitis ... ..	...	5	4	5	...	...	...

TABLE IV.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Diseases of the Nervous System— <i>continued:—</i>							
Sub-section 1—<i>continued:—</i>							
Myelitis ... ..	...	1	...	1	...	2	...
Hydrocephalus ... ..	...	...	...	...	...	1	...
Encephalitis ... ..	...	1	1	1	...	2	...
Abscess of brain ... ..	...	2	2	2	...	6	1
Congestion of brain ... ..	...	...	...	...	...	1	...
Others... ..	...	5	1	5	...	11	1
Sub-section 2—							
Apoplexy ... ..	...	5	5	5	...	3	...
Paralysis ... ..	...	16	...	16	2	28	1
Chorea ... ..	...	1	...	1	...	...	...
Epilepsy	5	19	4	24	...	61	1
Neuralgia	3	28	...	31	2	1,357	...
Hysteria ... ..	...	5	...	5	...	8	...
Others... ..	...	15	2	15	...	65	...
Mental diseases:—							
Sub-section 3—							
Idiocy	4	...	...	4	4	1	...
Mania	12	18	8	30	53	...	...
Melancholia	11	4	1	15	4	2	...
Dementia	22	4	4	26	2	1	...
Delusional insanity	8	8	2	16	4	2	...
Others... ..	...	2	1	2	...	3	...
Diseases of the Eye:—							
Conjunctivitis	5	60	...	65	4	1,831	...
Keratitis ... ..	...	7	...	7	...	27	...
Ulceration of cornea ... ..	...	3	...	3	...	64	...
Iritis ... ..	...	6	...	6	...	21	...
Optic neuritis ... ..	...	1	...	1	...	4	...
Cataract	1	3	...	4	1	12	...
Others... ..	...	12	...	12	...	77	...
Diseases of the Ear:—							
Inflammation ... ..	...	12	...	12	1	1,154	...
Other diseases ... ..	...	4	...	4	...	516	...
Diseases of the Nose							
...	...	5	...	5	...	165	...
Diseases of the Circulatory System:—							
Pericarditis ... ..	...	13	6	13	...	20	...
Endocarditis	1	7	6	8	...	15	2
Valvular (1) Mitral	7	33	14	40	1	92	3
(2) Aortic ... ..	...	7	3	7	...	17	3
(3) Tricuspid ... ..	...	...	...	...	...	...	...
(4) Pulmonary ... ..	...	...	...	...	...	1	...
Arterial sclerosis ... ..	...	1	1	1	...	3	...
Aneurysm ... ..	...	6	2	6	...	2	...
Others	3	31	7	34	...	69	1
Diseases of the Respiratory System:—							
Laryngitis	6	5	3	11	...	381	...
Bronchitis	9	271	15	280	6	7,790	2
Broncho-pneumonia ... ..	...	39	13	39	...	46	...
Abscess of lung... ..	...	7	7	7	...	...	...
Gangrene of lung ... ..	...	1	1	1	...	...	...
Emphysema ... ..	...	...	...	...	...	3	...
Pleurisy	9	87	12	96	4	184	...
Empyema ... ..	...	...	...	...	...	1	...
Others	1	8	...	9	...	105	...

TABLE IV.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Diseases of the Digestive System :—							
Stomatitis	1	8	...	9	...	433	...
Caries of teeth ... ..	...	2	...	2	...	814	...
Glossitis ... ..	...	1	...	1	...	68	...
Sore throat ... ..	...	...	...	...	...	235	...
Inflammation of tonsils ... ..	...	8	2	8	1	304	...
Gastritis... ..	...	42	2	42	2	499	...
Ulceration of stomach... ..	...	1	1	1	...	...	...
Hæmatemesis ... ..	...	...	...	...	...	1	...
Dilatation of stomach ... ..	...	1	...	1	...	...	...
Stricture of stomach ... ..	...	...	...	...	...	2	...
Dyspepsia	1	21	3	22	...	1,246	...
Enteritis... ..	...	22	1	22	...	291	1
Appendicitis ... ..	...	10	2	10	...	6	...
Colitis	3	25	2	28	...	23	...
Ulceration of intestines ... ..	...	3	1	3	...	2	...
Sprue ... ..	...	1	...	1	...	...	...
Others ... ..	...	1	...	1	...	20	...
Hernia	9	130	8	139	5	191	1
Diarrhoea	31	446	43	477	4	1,850	5
Constipation	3	68	...	71	2	6,141	2
Colic	5	103	...	108	2	1,228	...
Hæmorrhoids	2	30	...	32	...	273	...
Pancreatitis ... ..	...	1	1	1	...	...	...
Hepatitis—acute ... ..	...	13	2	13	1	40	...
Abscess	3	4	3	7	...	7	...
Cirrhosis	3	3	2	6	...	1	...
Jaundice... ..	...	4	1	4	...	6	...
Peritonitis	2	11	8	13	...	5	1
Ascites ... ..	...	32	10	32	4	32	...
Others ... ..	...	18	8	18	1	31	...
Diseases of the Lymphatic System :—							
Splenitis ... ..	...	10	...	10	...	315	...
Inflammation of lymphatic gland	4	107	...	111	4	638	1
Suppuration of lymphatic gland ... ..	...	45	...	45	1	128	...
Lymphangitis ... ..	...	11	...	11	...	27	...
Elephantiasis ... ..	...	5	...	5	1	9	...
Others ... ..	...	1	...	1	...	12	...
Diseases of the Urinary Organs :—							
Acute nephritis	7	28	6	35	...	60	1
Bright's disease ... ..	...	25	7	25	...	14	2
Pyelitis ... ..	...	1	...	1	...	2	1
Calculus... ..	...	...	...	...	...	1	...
Diseases of the Urinary System :—							
Renal colic ... ..	...	1	...	1	...	3	...
Cystitis ... ..	...	16	...	16	...	89	...
Vesical calculus ... ..	...	...	...	...	...	...	...
Suppression ... ..	...	1	...	1	...	...	...
Hæmaturia ... ..	...	6	...	6	...	10	...
Chyluria... ..	...	...	...	...	...	...	...
Others ... ..	...	3	...	3	...	6	...
Diseases of the Generative System :—							
Male Organs :—							
Urethritis ... ..	...	4	...	4	...	51	...
Gleet ... ..	...	2	...	2	...	13	...
Stricture	2	43	...	45	2	56	1
Prostatitis ... ..	...	4	...	4	...	12	...
Soft chancre ... ..	...	21	...	21	...	90	...
Condyloma ... ..	...	3	...	3	...	1	...
Inflammation of scrotum ... ..	...	6	...	6	...	3	...
Hydrocele	4	22	...	26	...	28	...
Orchitis, Gonorrhoeal	1	29	...	30	2	140	...

TABLE IV.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Diseases of the Generative System—							
<i>continued:—</i>							
Male Organs—<i>continued</i>—							
Epididymitis .....	...	25	...	25	...	51	...
Abscess of testicle .....	...	...	...	...	...	1	...
Others	1	41	...	42	2	32	...
Female Organs:—							
Ovaritis .....	...	...	...	...	...	15	...
Ovarian cyst .....	...	1	...	1	...	2	...
Endometritis .....	...	11	...	11	...	134	...
Displacement of uterus .....	...	1	...	1	...	4	...
Vaginitis .....	...	2	...	2	...	16	...
Amenorrhoea .....	...	1	...	1	...	36	...
Dysmenorrhoea .....	...	1	...	1	...	87	...
Menorrhagia .....	...	1	...	1	...	15	...
Leucorrhoea .....	...	...	...	...	...	12	...
Abortion .....	...	7	...	7	...	19	...
Delayed labour .....	...	11	2	11	...	6	...
Postpartum haemorrhage .....	...	3	...	3	...	...	...
Retained placenta .....	...	2	...	2	...	...	...
Premature birth .....	...	2	1	2	...	...	...
Puerperal septicaemia .....	...	2	1	2	...	16	1
Mastitis .....	...	1	...	1	...	37	...
Abscess of breast .....	...	...	...	...	...	9	...
Others .....	...	15	...	15	1	18	...
Diseases of organs of locomotion:—							
Osteitis	4	29	1	33	2	101	...
Arthritis	6	70	1	76	2	874	1
Spondylitis .....	...	...	...	...	...	1	...
Bursitis	1	22	...	23	...	76	...
Others .....	...	26	...	26	...	232	...
Diseases of Connective Tissue:—							
Cellulitis	3	216	2	219	3	807	...
Abscess	22	324	6	346	11	1,617	...
Elephantiasis	2	3	...	5	...	7	...
Others .....	...	8	...	8	...	39	...
Diseases of the Skin:—							
Urticaria .....	...	5	...	5	...	103	...
Eczema	4	31	...	35	...	1,634	...
Boil	2	59	...	61	1	817	...
Carbuncle .....	...	1	...	1	...	5	...
Herpes	1	3	...	4	...	52	...
Psoriasis .....	...	1	...	1	...	7	...
Oriental sore .....	...	...	...	...	...	...	...
Tinea	1	11	...	12	...	1,446	...
Scabies	1	4	...	5	...	798	...
Acne .....	...	...	...	...	...	1	...
Frickly heat .....	...	...	...	...	...	10	...
Ulcers	40	469	12	449	35	9,918	...
Others	1	18	2	19	1	575	...
INJURIES:—							
General	2	30	9	32	...	1,075	...
Local	9	1,077	33	1,086	57	10,288	...
Tumours	2	50	4	52	2	101	...
Others .....	...	5	1	5	...	2	...
Malformations	1	5	...	6	1	6	...
Poisons .....	...	12	2	12	...	43	...
Parasites—Animal .....	...	...	...	...	...	...	...
Protozoa .....	...	...	...	...	...	...	...
Trematoda (flukes) .....	...	...	...	...	...	20	...
Others .....	...	5	...	5	2	7	...

TABLE IV.—DISEASES AND DEATHS (NATIVE) FOR THE YEAR—*continued.*

DISEASES.	IN-PATIENTS.				OUT-PATIENTS.		
	Remaining in Hospital at end of 1914.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1915.	TOTAL.	
		Admissions.	Deaths.			Cases treated.	Deaths.
Injuries— <i>continued</i> :—							
Parasites— <i>continued</i> :—							
Cestoda—							
<i>Tænia solium</i>	1	11	...	12	...	202	...
<i>Tænia saginata</i> ... ..	...	4	...	4	...	21	...
Others ... ..	...	...	...	...	...	1	...
Nematoda—							
<i>Ascaris</i>	2	22	...	24	...	1,615	...
<i>Tricocephalus dispar</i> ... ..	...	...	...	...	...	2	...
<i>Trichina</i> ... ..	...	1	...	1	...	3	...
<i>Dracunculus</i>	14	149	...	163	15	555	...
Filariasis	2	7	...	9	...	81	...
<i>Strongylus</i> ... ..	...	...	...	...	...	...	1
Ankylostomiasis	17	382	75	399	11	170	1
<i>Oxyuris</i> ... ..	...	...	...	...	...	3	...
Others ... ..	...	1	...	1	...	3	...
Insecta—							
Myiasis ... ..	...	4	...	4	...	30	...
Others ... ..	...	1	...	1	...	15	...
GRAND TOTAL	565	8,744	710	9,309	447	76,872	50

TABLE V.

SURGICAL OPERATIONS PERFORMED DURING THE YEAR 1915.

Total Number.	Cured.	Relieved.	Unrelieved.	Died.
1,091	863	191	11	26

APPENDIX.

MEDICAL RESEARCH INSTITUTE, ANNUAL REPORT, 1915.

1. *Introductory.*—Original investigations are described first. Special attention has been directed to ankylostomiasis, babesiasis, blood-sucking flies, dysentery, skin diseases, and trypanosomiasis.

2. An increase in the amount of clinical material sent to the laboratory for examination and opinion has to be recorded.

3. A bacteriological analysis of the Iju water-supply has been conducted at regular intervals.

4. *Ankylostomiasis.*—Since 1910 Medical Officers have supplied reports from their district as to the prevalence of ankylostomiasis. These reports record the results of examining fæces for ankylostome ova. The subjects of examination are, in the majority of cases, the inmates of the district gaol.

5. Previous to 1910 no such systematic investigation was made. This must be borne in mind when considering the figures in the annual reports, which are as under:—

ANKYLOSTOMIASIS.

1907	...	22 cases.	1911	...	404 cases.
1908	...	19 "	1912	...	405 "
1909	...	30 "	1913	...	212 "
1910	...	123 "	1914	...	383 "

6. The figures from 1907 to 1909 refer to actual cases of ankylostomiasis in the sense of a severe anaemia. In succeeding years the figures are swelled by the inclusion of cases in which the ova of ankylostomes had been found in the fæces, and very many of these cases showed no obvious signs of the ill effects of harbouring the worm.

7. As the result of a circular letter sent round to all stations special efforts were made in the direction of diagnosis, and also along a particular line of treatment which had been very favourably reported on by Dr. J. E. A. Ferguson, of British Guiana.

8. Figures have been extracted from the reports sent from various stations in the Southern Provinces, Nigeria, and are quoted below.

9. Fæces from 200 natives were examined at Ibadan. Ankylostome ova were noted in 120, equal to 60 per cent.

10. The total examined at Benin City was 139, and 60 of these, 43 per cent., were proved to harbour ankylostomes.

11. At Warri the results were positive in 19 out of 104 cases, that is 18 per cent.

12. One hundred natives were examined at Bonny, ova being found in 20.

13. A similar number was reported on from Opobo. Here the adult worm was recovered in two cases, and the ova were noted in 20.

14. Seventy-two individuals were examined at Udi, with positive findings in 59, 81 per cent.

15. At Calabar the number was 66, ova occurring in 64, a percentage of 97.

16. There were 63 examinations at Okwoga, 41 of them with positive results, that is 65 per cent.

17. Fifty-nine prisoners were reported on from Badagry, ova being noted in 41, or 69 per cent.

18. The faeces of 50 inmates of the gaol in Lagos were searched, with a successful result in 24.

19. At Agbor the number of examined cases was 47 adult and 10 children, 44 of the former and seven of the latter being proved to harbour the worm, a percentage of 93 and 70 respectively.

20. Forty-three examinations were made at Okigwi, ova being observed in 42, or 97 per cent.

21. The subjects chosen at Degema numbered 35, of whom 11, or 31 per cent., presented ova in the faeces.

22. The actual figures from the other stations are not available, but the percentage of prisoners at Ikot Ekpene infected with ankylostomes was given as 97, and 12 cases showing ova in the stools were reported from Brass.

23. It will be seen from the tabular statement below that 1,088 individuals were examined, the percentage of infected in the different stations ranging from 18 to 97, and the percentage of the total being 52.

	Total cases examined.	Percentage infected.
Calabar	66	97
Okigwi	43	97
Agbor	57	89
Udi	72	81
Badagry	59	69
Okwoga	63	65
Ibadan	200	60
Lagos	50	48
Benin City	139	43
Degema	35	31
Opobo	100	22
Bonny	100	20
Warri	104	18
TOTAL	1,088	52

24. Few, if any, medical officers have sufficient time to spare from their other duties to make the large number of examinations necessary before it can be reasonably assumed that ankylostome ova are absent from the faeces.

25. The results now to be given of the examination of the inmates and staff of the Yaba Lunatic Asylum (all native) and of the native staff of the Medical Research Institute indicate that from Badagry downwards in the above table the percentage of infected persons was, in all probability, higher than that recorded.

26. The faeces of 136 individuals were examined. This number comprised 50 lunatics, 40 labourers, 28 members of the nursing, clerical and general staff and 18 children.

27. A few grammes of the faeces, immediately after voiding, were enclosed in a clean Petri dish and sent to the laboratory. Sufficient of this material, well mixed and moistened with water, to be thinly spread under a $\frac{7}{8}$ in. square cover glass, was examined under a low power of the microscope. Negative results were not accepted until five such smears from each of three separate stools chosen at weekly intervals had been searched.

28. Ankylostome ova were found in 133, that is a percentage of nearly 98.

The ova were detected in the first stool at the first examination in 80, at the second examination in 23, at the third in 13, at the fourth in six, and at the fifth in five.

29. Two or more stools had to be examined in only nine cases; the results were positive at the first examination of the second stool in four, at the second examination in one, and at the fifth examination in one, the remaining three cases being negative after repeated search.

30. It was possible, then, to demonstrate the ova in the first specimen of faeces in 127 out of the 136 cases, and in 80 of these the ova were present in the first smear examined.

31. The three negative cases included one female attendant, one male and one female lunatic.

32. Eighty-eight subjects were chosen for treatment. The first group, made up of 19 adults, received in July 25 grains thymol thrice in the day time at intervals of four hours, on two successive days. No ill effects were observed to follow this heroic dosage. Ankylostome ova had been demonstrated in the faeces of all except one.

33. Five months after treatment, the faeces were re-examined and four cases were considered free from ankylostomes, repeated search for the ova being unsuccessful.

34. Leaving out of account these four cases, and also the one in which no ova had been found before treatment, the following results were obtained from the remaining 14.

35. Ova had been found in the first smear from the first stool in four cases.

When re-examined in December they were still present in the first stool, in the first smear in two cases, and in the second smear in the other two.

36. Cases in which ova were found in the second smear from the first stool in July numbered five. In December, the results were positive in the first smear from the first stool in four instances, and in the third smear in the remaining one.

37. There was one case in which ova had been found in the third smear from the first stool in July. When re-examined in December the ova were noted in the second smear of the first stool.

38. One case which showed ova in the fourth smear from the first stool in July showed them in the second smear from the first stool in December.

39. There were two cases in which ova had been demonstrated only in the fifth smear from the first stool in July, and in December they were found in the first smear in one, and at the fourth in the other.

40. The last case was positive in the second smear from the second stool in July, and positive again in the first stool in the first smear in December.

The Table may make these statements more clear.

NINETEEN CASES TREATED WITH 25 GRAINS THYMOL THRICE DAILY.
ON TWO SUCCESSIVE DAYS IN JULY, 1915.

No ova in July.	Ova present in						No ova in December.
	July.		December, in first stool.				
			1st smear.	2nd smear.	3rd smear.	4th smear.	
—	1st stool ...	1st smear 5	2	2	—	—	1
—	" " ...	2nd " 7	4	—	1	—	2
—	" " ...	3rd " 2	—	1	—	—	1
—	" " ...	4th " 1	—	1	—	—	—
—	" " ...	5th " 2	1	—	—	1	—
—	2nd " ...	2nd " 1	1	—	—	—	—
1							1

41. Eleven cases were treated in July with 25 grains thymol thrice in the day-time on the first day and 30 grains thymol thrice in the day-time on the next day. Again no ill effects were observed. Apparently complete freeing from ankylostomes occurred in only one case.

42. The findings in July were positive in the first smear of the first stool in five cases. Re-examined in December, ova were found in the first smear from the first stool in four instances and from the fourth smear in one.

43. Four cases showed ova in the second smear from the first stool in July. In December, the ova were noted in the first smear of the first stool in three and in the fifth smear in one.

44. In the remaining case the third smear of the first stool was positive in July, and the first smear of the first stool in December. These figures are also shown in a table.

ELEVEN CASES TREATED WITH 25 GRAINS THYMOL THRICE DAILY ON ONE DAY
AND 30 GRAINS THYMOL THRICE DAILY ON THE NEXT DAY, IN JULY, 1915.

Ova present in July.				Ova present in December in 1st stool.			No Ova in December.
				1st smear.	4th smear.	5th smear.	
1st stool ...	1st smear	6 ...	4	1	—	1	
" " ...	2nd "	4 ...	3	—	1	—	
" " ...	3rd "	1 ...	1	—	—	—	

45. Fifty-three subjects were given 10 grains thymol morning and evening for 35 consecutive days (missing one day).

Two of these were apparently uninfected by ankylostomes previous to treatment.

46. The thymol administration was begun on 21st July and stopped on 25th August; the faeces of all were re-examined in September, that is from two to three weeks after the last dose of the anthelmintic, and again in December.

47. Ova were present in the first smear from the first stool in 27, before treatment in July. When again examined in September, ova could not be found in 10 of these cases. Of the remainder, ova were still present in the first smear of the first stool in 12, in the second smear in one, in the third smear in two, in the fourth smear in one and in the fifth smear in one.

48. At the second re-examination in December, three of the 10 cases which had shown no ova in September gave positive findings in the first smear of the first stool and one in the fifth smear of the first stool, whilst one case which showed ova in September was negative in December, so that the number of apparent cures had fallen to seven. Of the remainder, the first smear of the first stool was positive in eighteen, in the fourth smear in one in the fifth smear in one.

49. Four cases showed ova in the second smear of the first stool in July. Three of these were positive in the first smear of the first stool in September and one in the fifth smear. Again examined in December, ova were absent in two of the cases, and present in the second smear of the first stool in one and in the fifth smear in one.

50. Six cases gave positive findings in the third smear from the first stool before treatment in July. After treatment in September, there were two apparent cures. Of the remaining four cases, two were positive in the first smear from the first stool and two in the second smear. When re-examined in December, the two cases which were free from ova in September were still free, two cases were again positive in the first smear of the first stool and one in the second smear, whilst one patient (a lunatic) had been discharged in the interval.

51. There were five cases in which ova were only demonstrated in the fourth smear of the first stool, in July. By September, two of these cases were apparently cured, and the findings were positive in the first smear of the first in two and in the second smear in one. These findings were identical when a re-examination was made in December.

52. Four cases showed ova in the fifth smear from the first stool in July. When again examined in September there were three cases free from ova, and the remaining case was positive in the second smear from the first stool. But in December one of these apparent cures showed ova in the fifth smear from the first stool, two cases were still negative, and in the fourth case ova were noted in the first smear from the first stool.

53. The first smear from the second stool was positive in four cases in July. By September one of the cases, an aged lunatic, had died, there were two apparent cures and in the remaining case ova were abundant in the first smear from the first stool. The results were the same at the re-examination in December.

54. One case was negative until the fifth smear of the second stool in July. This case was negative in September, but the ova were found in the first smear from the first stool in December.

55. The two cases which were negative before treatment in July remained negative throughout the examination in September and December.

These figures are detailed in the subjoined table.

Fifty-three cases treated with ten grains thymol, morning and evening for 35 consecutive days, 21st July to 25th August, 1915 (missing one day, 2nd August).

No Ova in July.	Ova present in July.		Ova present in September, in 1st stool.					No Ova in September.	Ova present in December, in 1st stool.				No Ova in December.	
			1st smear	2nd smear	3rd smear	4th smear	5th smear		1st smear	2nd smear	4th smear	5th smear		
—	1st stool	1st smear	27	12	1	2	1	1	10	18	—	1	1	7
—	" "	2nd "	4	3	1	—	—	—	—	—	1	—	1	2
—	" "	3rd "	6	2	2	—	—	—	2	2	1	—	—	2
—	" "	4th "	5	2	1	—	—	—	2	2	1	—	—	2
—	" "	5th "	4	—	1	—	—	—	3	1	—	—	1	2
—	2nd "	1st "	4	1	—	—	—	—	2	1	—	—	—	2
—	" "	5th "	1	—	—	—	—	—	1	1	—	—	—	—
2									2					2

One patient discharged.

One patient died.

56. Five children, their ages ranging from five to ten years, were treated with five grains thymol twice daily for 35 consecutive days, commencing and terminating as in the previous group.

57. In two of these cases ova were present in the first smear from the first stool in July, and they were still similarly present both in September and December.

58. The ova were found in the second smear of the first stool in July in other two of the children. At the September and December examinations the ova were present in the first smear of the first stool in both instances.

59. One child showed ova in the third sample of the first stool in July, and they were easily found in the first smear of the first stool both in September and December.

The table shows the figures.

FIVE CHILDREN (AGED FIVE TO TEN YEARS) TREATED WITH FIVE GRAINS THYMOL, MORNING AND EVENING FOR 35 CONSECUTIVE DAYS, 21ST JULY TO 25TH AUGUST, 1915 (MISSING ONE DAY, 21ST AUGUST).

		Ova present in			
		July.		September, in 1st stool.	December, in 1st stool.
				1st smear.	1st smear.
1st stool...	...	1st smear	...	2	2
" "	...	2nd "	...	2	2
" "	...	3rd "	...	1	1

60. Eleven cases received no treatment, and thus acted as controls. At the first examination, in July, ova were noted in the first smear from the first stool in seven, in the second smear in three and in the third smear in one. Re-examined in December, ova were demonstrated in the first smear from the first stool in all

61. No special precautions were taken to prevent reinfection after treatment. The inmates of the Lunatic Asylum, 48 of whom are included in the group of 53 treated with twice daily doses of thymol, are provided with washing places and latrines of such design as to render the chances of ankylostome infection through the skin remote. But a certain amount of earth eating and filth eating is indulged in, and by this means there may have been some degree of reinfection by that channel. The remaining 40 cases were warned of the dangers of bare feet, bathing in pools, and such like, but no supervision could be exercised.

62. Thirty-seven subjects were, for various reasons, only examined once and were untreated. The first smear of the first stool showed the ankylostome ova in 33, the second smear in two and the third smear in two.

63. The hæmoglobin percentage was estimated by Tallquist's method, four to five months after the first examination of the fæces in 122 individuals.

64. Eleven of the cases were in the group which received large equal doses of thymol thrice daily on two consecutive days. The hæmoglobin was 100 per cent. in six, 95 per cent. in two and 90 per cent. in three. All of these individuals were voiding ankylostome ova throughout the five months, except one who was uninfected and in whom the percentage was 100.

65. Nineteen cases were in the group which received large doses of thymol thrice daily on two consecutive days, the larger dose on the second day. The hæmoglobin was 100 per cent. in eight, 95 per cent. in five, 90 per cent. in two, 85 per cent. in two and 80 per cent. in two. All except five had harboured ankylostomes for five months. Four of the remainder were apparently cured by treatment, three of them possessing 100 per cent. hæmoglobin and one 90 per cent., and the other case (80 per cent. hæmoglobin) had not at any time showed ankylostome ova.

66. Fifty-one individuals who had received twice daily doses for 35 days (missing one day) had their hæmoglobin estimated four months after the cessation of treatment. The percentage was 100 in 16, 95 in 16, 90 in 16, and 85 in three. Two of the cases had shown no ankylostome ova either before or after treatment, and their hæmoglobin was respectively 100 and 90 per cent. Fourteen individuals had ceased to pass ankylostome ova by the time of examination in December. Four of these showed 100 per cent., four 95 per cent., five 90 per cent. and one 85 per cent. hæmoglobin.

67. The five children treated for 35 consecutive days (missing one day) with small doses of thymol all showed a high percentage (two of 100, two of 95 and one of 90) of hæmoglobin.

68. Those cases which received no treatment, 36 in number, showed the hæmoglobin as follows:—

100 per cent.	...	...	...	...	18
95 "	"	...	...	...	9
90 "	"	...	...	...	5
85 "	"	...	...	...	4

Five individuals of this group were children under 10 years of age, one with 100 per cent., one with 95 per cent. and three with 85 per cent. hæmoglobin.

69. To summarise the results, it would appear that either thymol is not a reliably useful anthelmintic for ankylostomes, or that its dosage was not sufficiently large or its exhibition not prolonged enough to effect its reputed action. 22 cases out of 85 were apparently cured, and the highest percentage of these occurred in the group which received twice daily doses of the drug over a long period.

70. At least five smears from a sample of faeces should be examined, and the examination repeated after a week and again after another week, before a negative finding as regards ankylostome ova is accepted.

71. As regards anæmia in those individuals who harboured the worm, the hæmoglobin percentage would appear to be the most easily obtained and the most reliable index of such a state.

72. The percentages recorded above are all high. Pallor of the mucous membranes, œdema of the feet, breathlessness and palpitation on exertion, were not observed in any of the cases.

73. It would seem reasonable to conclude that those 136 individuals who have been examined for the purposes of this report were not actual sufferers from ankylostomiasis, but were rather carriers of the infection.

74. No data have been collected to indicate that such carriers possess an immunity, or that additional infections by the same worm, or factors leading to a lowering of vitality, might produce a real ankylostomiasis anæmia.

75. Cases of the disease, sometimes very acute and even fatal, do occur in Nigeria, but the consensus of opinion points to its being uncommon.

76. By the courtesy of the Principal Medical Officer, some extracts from the reports by medical officers are here given.

77. Dr. J. H. McKay, reporting from the Okwoga district, stated that out of 41 prisoners with ankylostome ova in the faeces, only four showed the signs of ankylostomiasis.

78. Dr. J. S. Smith met with only one definite and typical case of the disease at Forcados.

79. Dr. Hungerford also diagnosed one case at the outdoor Dispensary in Warri.

80. Dr. Tipper treated one typical case in a native policeman at Onitsha. A large proportion of the prisoners were anæmic and weak, and their general health improved noticeably under anthelmintic treatment.

81. At Agbor Dr. Brierley diagnosed one definite case at the Dispensary. He states also that out of 44 individuals in whom he had found ankylostome ova there were signs of anæmia—dilated heart and hæmic bruits—in only one man.

82. Dr. Thompson considered that the disease is not prevalent at Brass, and no clinical signs of the disease were observed.

83. Dr. Beale-Browne concluded that the disease is not by any means serious at Degema, and he found that none of the cases showing ova had the general health affected.

84. Dr. Maclaine found that although infection is general at Ikot-Ekpene, severe cases of anæmia were practically unknown. He saw no cases of the disease during 1915, except in some prisoners returned from Port Harcourt, in whom the strain of severe labour (railway work) had been the predisposing factor.

85. Dr. Macfarlane, during his investigations at Opobo, formed the opinion that ankylostome ova were generally found in the anæmic and flabby-looking. He considered it almost safe to diagnose the presence of the parasite without a microscopical examination, simply by the appearance of the individual. He also stated that the appearance of the people in the Opobo district suggested that many of them suffer from the ravages of the disease.

86. Dr. E. L. A. Sieger, stationed at Ameke, on the North Eastern Railway, under construction, treated only two cases of ankylostomiasis during the year. He considered that the disease was not prevalent in his district.

87. Dr. Jackson Moore believed that fully 60 per cent. of the cases at Ibadan which showed ova in the stools appear in good health, and they did not complain. The remainder complained of only trivial and various disorders, mainly alimentary.

88. Dr. T. B. Adam's investigations at Warri (given at length in the 1914 Annual Report of the Medical Department, Nigeria) are of very great interest.

Five hundred natives were examined, 380 adults and 120 children.

The results are epitomised below.

Out of 353 adult males (16 years and upwards) 311 showed ankylostome ova. 101 of these were anæmic, 51 anæmic and thin, and 10 anæmic and emaciated, that is a little over 50 per cent. of the adult males harbouring ankylostomes presented signs of anæmia. 27 adult females were examined, 24 of them with ova in the stools. 11 were anæmic, 5 anæmic and thin, and 2 anæmic and emaciated (over 60 per cent. showing ill effects).

One hundred and two male children (15 years and less) were examined, and ova noted in the faeces of 92; 17 were anæmic and 45 anæmic and thin, a percentage of over 60. 16 out of 18 female children harboured ankylostomes; 3 were anæmic and 7 were anæmic and thin, the percentage being again over 60, showing evidence of the effects of the parasite.

89. The opinions quoted above are those of medical men who have had a large experience over a number of years in Nigeria. Summarising generally, it may be said that severe cases of ankylostomiasis are uncommon, but that in certain districts a certain amount of anæmia occurs, probably due to the presence of the worm.

90. *Babesiasis*.—By the request of the Principal Medical Officer, a number of blood smears from domestic animals were sent to the Institute to be examined for the presence of babesiae.

91. A large number were sent by Dr. Dalziel, Municipal Sanitary Officer, Lagos. Smears from 40 cattle, 20 pigs, 20 sheep and 20 goats were obtained at the slaughter-house. Only four of these animals were found to harbour babesiae, and the infection was very small in all. One bullock and three rams were affected, and the time of the year was November and December.

92. Twenty-four smears were sent from Ibadan by Dr. Mackey in March. The animals were sheep (8), goats (7), pigs (5) and dogs (4). Five of the sheep and two of the dogs harboured babesiae.

93. In November and December Dr. Jackson Moore sent a further 177 smears from Ibadan, 125 cattle, 25 goats, 14 sheep, 10 dogs and 3 pigs. Babesiae, in small numbers, were found in nine of the cattle and in one goat.

94. Dr. Ashton forwarded 10 blood smears in December, eight from goats, one from a cat and one from a dog. Babesiae were not found in any.

95. At different times throughout the year blood smears were examined from six goats, five dogs, four horses, three bullocks and two sheep from Lagos, Ebute Metta and Yaba. Babesiae were found in only one animal, a dog.

96. Blood smears from a dog were sent by Dr. Cole from Badagry. No babesiae were found.

97. In all, the blood of 332 animals was examined. Babesiae were noted in 10 out of 168 cattle, in one out of 66 goats, in eight out of 44 sheep and in three out of 21 dogs; no babesiae were observed in 28 pigs, four horses and one cat.

The percentages are:—

	Number examined.	Infected with Babesiae.
Cattle	168	5.9 per cent.
Goats	66	1.5 "
Sheep	44	18.1 "
Dogs	21	14.2 "

BLOOD-SUCKING FLIES.

98. The insects enumerated were all obtained in the immediate neighbourhood of Yaba.

99. Three specimens of *Glossina palpalis*, females, and two of *Stomoxys nigra* were caught in the laboratory in April.

100. During May *Glossina palpalis* 18 ♀, *Stomoxys nigra* 8 ♀, *Tabanus secedens* 3 ♀, *Stomoxys omega* 2 ♀, *Tabanus socialis* 2 ♀, *Hippocentrum versicolor* 2 ♀, *Tabanus thoracinus* 1 ♀, and *Tabanus fasciatus* 1 ♀, were obtained.

101. The following mosquitoes were caught during the same month, mostly by the labourers in their own huts:—*Culicomyia nebulosa* ♂ 123 ♀ 123, *Ochlerotatus nigricephalus* 61 ♀, *Ochlerotatus irritans* 26 ♀, *Anopheles costalis* 3 ♂ 26 ♀, *Mansonioides africanus* 21 ♀, *Culex duttoni* 3 ♂ 3 ♀, *Culex thalassius* 3 ♀, *Stegomyia fasciata* 2 ♀, *Stegomyia luteocephala* 2 ♀, *Banksinella luteolateralis* 2 ♀, *Culex consimilis* 1 ♂ and *Culex invidiosus* 1 ♀.

102. During June *Glossina palpalis* 10 ♀ were taken, also *Stomoxys nigra* 28 ♀, *Stomoxys omega* 2 ♀, *Tabanus secedens* 1 ♀, *Hippocentrum versicolor* 1 ♀ and *Glossina tachinoides* 1 ♀.

103. The mosquitoes caught in the same month were *Culicomyia nebulosa* 2 ♂ 2 ♀, *Anopheles costalis* 4 ♀, *Ochlerotatus nigricephalus* 1 ♀, *Mansonioides africanus* 1 ♀ and *Culex tigripes* 1 ♀.

104. In July *Glossina palpalis* 11 ♀ were captured, also *Mansonioides africanus* 4 ♀, *Anopheles costalis* 1 ♀ and *Anopheles mauritanus* 1 ♀.

105. Only *Glossina palpalis* 1 ♀ was obtained in August, but three were taken in September, as well as one female specimen each of *Tabanus socialis* and *Tabanus taniola*.

106. During October, *Glossina palpalis* 3 ♀, *Tabanus taniola* 4 ♀ and one *Tabanus socialis* ♀ were captured.

107. In November there were *Glossina palpalis* 1 ♀, *Tabanus taniola* 3 ♀, *Tabanus par* 1 ♀, *Tabanus kingsleyi* 1 ♀ and *Tabanus secedens* 1 ♀, and in December one female *Glossina palpalis* was caught.

108. The total blood-sucking insects caught and identified was 535, and of this number 320 were dissected and examined.

109. Smears were made of (a) proboscis, (b) cephalic muscles, (c) thoracic muscles and (d) intestinal tract. In most cases these smears were examined in the fresh as well as in the stained condition.

110. During the earlier period of the investigation attempts were made to feed the insects, particularly the glossina, on clean guinea pigs, but this procedure was soon given up as it occupied too much time, and also because many insects which would not feed on the day on which they were caught were found dead next day and therefore had to be discarded altogether. This occurred most commonly in the case of the glossinæ, and the inference was made that these flies were not locally hatched, but had come with the trains (which pass close to the Laboratory) and were spent and bruised by their journey.

111. Smears were examined from 47 *Glossina palpalis*. Trypanosomes were found in the proboscis of two and in the stomach of other two. Spirochaetes occurred in one. Mammalian red blood cells were noted in the stomach of five, avian red cells in one, and filarial embryos were observed in one of the five that had ingested mammalian blood. The remaining 37 insects showed nothing noteworthy. The trypanosome-infected flies were caught one in April, two in June and one in November.

One specimen of *Glossina tachinoides* was examined with negative results.

112. Smears from 18 *Stomoxys nigra* and from four *Stomoxys omega* were examined. The only interesting result was the findings of avian red blood corpuscles in the stomach of one *Stomoxys nigra*. These insects, however, were caught mostly newly hatched from the garden manure.

113. Specimens of seven species of Tabanus, *T. taniola* (8), *T. scedens* (5), *T. socialis* (4) and one each of *T. par*, *T. fasciatus*, *T. kingsleyi* and *T. thoracinus*, a total of 21 were dissected. Herpetomonas were observed in the intestinal tract of one *T. scedens*.

114. Two specimens of *Hippocentrum versicolor* showed nothing of interest.

115. Two hundred and twenty-seven mosquitoes were dissected. Of 112 *Culicimomyia nebulosa* spirochaetes were found in the stomach of three, herpetomonas in the stomach of other three, and filariæ in the thoracic muscles of one. Avian blood corpuscles were noted in the stomach of 27, mammalian blood in seven, and mixed avian and mammalian in two.

116. Thirty-one specimens of *Ochlerotatus nigricephalus* were examined. Herpetomonas were noted in the stomach of one. Mammalian blood was contained in the stomach of 17, and in two of these there were fresh embryos of *Acanthocheilonema perstans* (the labourer who brought these insects harboured the filaria).

117. Twenty-seven *Anopheles costalis* were dissected. Only one of these showed malarial infection, oocysts being present in the stomach wall. One harboured filaria in the thoracic muscles. Mammalian blood was noted in the stomach contents of 11 (one of these, brought by the same labourer as in paragraph 116, also showed embryos of *Acanthocheilonema perstans*) and one showed both mammalian and avian red blood cells.

Mammalian blood corpuscles were noted in the stomach contents of one *Anopheles mauritianus*.

118. Twenty-three specimens of *Mansonioides africanus* were dissected. Spirochaetes occurred in the stomach of one, and six contained mammalian erythrocytes.

Amoebæ occurred in the intestinal tract of two.

119. Smears from 22 *Ochlerotatus irritans* showed spirochaetes in the stomach of one. Ten of the insects had fed on mammalian blood, five of these showing embryos of *Acanthocheilonema perstans*, under the circumstances already alluded to in paragraphs 116 and 117.

120. Two specimens of *Stegomyia fasciata* and two *Stegomyia luteocephala* were examined. Mammalian blood was found in one *Stegomyia fasciata* and one *Stegomyia luteocephala*, and avian blood in the second specimen of the latter.

121. The remaining mosquitoes comprised three *Culex thalassius*, and one specimen each of *C. duttoni*, *C. invidiosus*, *C. tigripes* (var. *fusca*), and *Banksinella luteolateralis*. Nothing of interest was noted in the smears from these seven insects.

122. Trypanosomes were found in four specimens of *Glossina palpalis* (47 examined).

123. Herpetomonas were noted in the intestinal tract of three *Culiciomyia nebulosa* (112 examined), one *Ochlerotatus nigricephalus* (31 examined) and one *Tabanus secedens* (five examined).

124. Spirochaetes were observed in three *Culiciomyia nebulosa* (112 examined), one *Mansonioides africanus* (23 examined), one *Ochlerotatus irritans* (22 examined), and in one *Glossina palpalis* (47 examined).

125. Filaria were seen in the thoracic muscles of one *Culiciomyia nebulosa* (112 examined) and one *Anopheles costalis* (27 examined).

126. Malarial oocysts occurred in the stomach of one *Anopheles costalis* (27 examined).

127. The trypanosome-infected glossinae were caught in April, June and November. The spirochaete-infected glossina was caught in June, the culiciomyia, the mansonioides and the ochlerotatus in May. The filaria-infected culiciomyia and the anopheles were both caught in May.

The malaria-infected anopheles was obtained in June.

128. Mammalian blood had formed the meal in five *Glossina palpalis*, twelve *Anopheles costalis*, one *Anopheles mauritianus*, six *Mansonioides africanus*, seven *Culiciomyia nebulosa*, 17 *Ochlerotatus nigricephalus*, 10 *Ochlerotatus irritans*, one *Stegomyia fasciata* and one *Stegomyia luteocephala*.

129. Avian blood had been ingested by one *Glossina palpalis*, one *Stomoxys nigra*, and 27 *Culiciomyia nebulosa*.

130. Both mammalian and avian erythrocytes were found in the stomach of two *Culiciomyia nebulosa*, one *Anopheles costalis* and one *Stegomyia luteocephala*.

131. It would appear from these results that *Culiciomyia nebulosa* prefers avian to mammalian blood.

132. Several newly hatched specimens of *Stegomyia fasciata*, *Stegomyia luteocephala*, *Ochlerotatus nigricephalus*, *O. irritans*, and *Culiciomyia nebulosa* were fed on the labourer who harboured *Acanthocheilonema perstans*.

133. These insects were dissected at daily intervals up to fifteen days after the infecting feed, but no development of the filarial embryos was observed.

134. *Dysentery*.—Intestinal protozoa have been found in the faeces of 19 individuals. Not all suffered from diarrhoea.

135. The *Entamoeba tetragena* was noted in 12 cases. In four the condition was a chronic one, and the amœbæ were practically all encysted in two of these (Europeans); in the other two instances the patients were natives, the amœbæ were few but free and motile and in all four cases there were numerous degenerated epithelial and pus cells, but no red blood corpuscles. The fæces were scybalous and greenish-brown coloured in the two Europeans, and somewhat liquid and yellow-coloured in the two natives. In all four the mucus was scanty.

136. One European who had suffered from an acute attack (the first) of dysentery received a large dose of emetine before the fæces were examined. Thirty-six hours after the first dose of the drug, only a few encysted amœbæ were observed in the stools, a very few pus cells and no erythrocytes. Forty-eight hours afterwards the stools appeared normal.

137. The remaining seven cases, including one European and six natives, were all acute, abundant mucus, pus cells, erythrocytes and active amœbæ being present in the motions.

138. A balantidium was observed in six cases, all natives. In only one instance were pus cells noted, and no red blood cells were observed in any. The motions were loose, evil-smelling and yellowish-brown in colour. Mucus was not found in any, and none of the cases made any complaint or sought treatment.

139. *Blastocystis hominis* was met with in two cases, both Europeans; once in association with a case of chronic dysentery already mentioned; the other in a case where the motions were frequent, bulky, creamy and pale in appearance and very malodorous, but with no mucus, pus cells or erythrocytes.

140. A small acarine was noted in the stools of three individuals, one European and two natives. So far as could be ascertained this microscopic insect gave rise to no signs or symptoms.

141. *Filariasis*.—The blood from 306 individuals was examined for the presence of filarial embryos. Most of the material was in the form of thin smears, but in a number of cases a drop was examined in the fresh state, and thick de hæmoglobinised films were also made.

142. The embryos of *Acanthocheilonema perstans* were noted in a number of individuals, all natives. *Loa* embryos occurred also in two of these cases, and *bancrofti* embryos in one.

143. Embryos of *Loa loa* were observed in the blood of seven persons, associated with the embryos of *Acanthocheilonema perstans* in two.

144. The embryos of *Filaria bancrofti* were only observed in one case already mentioned.

145. A male and female *Loa loa* were obtained by Dr. Beale-Browne from the sac of a scrotal hernia at Degema.

146. Filariae in insect hosts have already been alluded to (para. 125).

147. *Leprosy*.—Two inmates of the neighbouring Leper Asylum were chosen for treatment with salvarsan.

The first case was one of advanced nodular leprosy, and a prolonged course of Nastin treatment prescribed some two or three years previously had effected no observable improvement in the condition.

148. Three doses of 606 were given intramuscularly. The first dose was 0.5 gram. The second dose, 0.5 gram., was administered a fortnight later, and the third dose, 0.6 gram., was given a month after the first.

149. The blood, urine and fæces were examined immediately prior to treatment on 22nd January.

The total blood counts were: Reds, 4,000,000 per cmm.; whites, 6,000 per cmm. The differential leucocyte count was: Polymorphonuclear neutrophils, 58 per cent.; lymphocytes, 10 per cent.; large mononuclears, 12 per cent.; eosinophils, 19 per cent.; and transitionals, 1 per cent. The urine presented no abnormalities.

The fæces contained ova of *Tænia saginata* and of *Trichuris trichiura*.

The temperature was 98·4 F.

150. On the following day, 23rd January, the temperature had risen to 99°·2 F., and a big increase in the white cells was noted, 19,062 per cmm. As regards the differential count, the lymphocyte percentage had arisen to 22·5, the large mononuclears had fallen to 7 per cent., the polymorphonuclear neutrophils were practically unaltered, and the eosinophils had fallen to 14 per cent.

151. On the second day after injection (24th January) the temperature was 99°·4 F., the white cells were still further increased to 20,312 per cmm., and the reds had mounted to 4,800,000 per cmm. As regards the differential count the percentages were, roughly, as before, except that the lymphocytes were 14 per cent. and the large mononuclears 11 per cent.

152. Two days later, *i.e.*, 26th January, an increase in the *Polymorphonuclear leucocytes* was shown (66 per cent.), and the eosinophils had fallen to 10 per cent.

153. On 28th January, the temperature having returned to the normal average (98°·4 F.), the white cells had decreased as far as 11,560 per cmm., and the reds numbered just over five million per cmm. The differential count was practically unchanged.

154. Further examinations on 30th January, 1st February, 3rd February, 5th February and 8th February revealed a white cell count of from 8,000 to 11,000 per cmm., and a red cell count of from 5,200,000 to 5,900,000 per cmm., a steady increase of the polymorphonuclear neutrophil percentage to 70 per cent., and an eosinophil percentage varying between eight and twelve. The large mononuclear percentage steadily diminished to five.

155. After the second intramuscular infection of 606, on 8th February, the temperature again rose slightly, 99° F. on 9th February, and 98°·8 F. on 10th February, and was again normal on 11th February.

156. From 8th to 24th February blood examinations were made at intervals of from three to four days. The total white cell count varied little, oscillating between 8,000 and 10,600 per cmm., and the red cell count remained just over five million per cmm. The polymorphonuclear neutrophil percentage remained higher than at first obtained, 60-70 per cent., and the eosinophils steadily fell to 4 per cent.

157. After the third dose of salvarsan, on 24th February, the febrile disturbance was practically nil, and the total and differential blood counts altered only slightly, the final estimations made on 4th March giving these results:—

Total white cells, 10,250 per cmm.; total red cells, 5,098,000 per cmm.; polymorphonuclear neutrophils, 64 per cent.; lymphocytes, 22 per cent.; large mononuclears, 8 per cent.; eosinophils, 4 per cent.; and transitional cells, 2 per cent.

158. The patient expressed the opinion that the treatment had been beneficial, and clinically the nodules on the ear and nose were smaller than previously.

159. A streptothrix was isolated from a case of nodular leprosy. The culture medium was fish agar (peptone, fish bouillon and agar) sterilised by filtration. An attempt to cultivate the streptothrix on this medium sterilised by heat failed entirely.

160. The material obtained from the successful culture was inoculated into two monkeys (*Papio sphinx*). The mode of inoculation was by subcutaneous infection in one and by scarification of the skin in the other.

161. The first monkey showed an immediate febrile reaction lasting three days, and a month later this animal had died of pneumonia with no signs, clinically or at the autopsy, of leprosy. The other monkey showed no reaction and is alive and well, showing no signs of the disease (date of inoculation, 18/1/15).

162. The leper from whom the culture was originally taken was treated with intramuscular injections of salvarsan, three doses being given, the first on 18/1/15 of 0.55 gram., the second a fortnight later, 0.6 gram., and again three weeks later a third dose of 0.6 gram.

163. There was great pain all over the body after the first and second injections, arising within half-an-hour and lasting for two days, but the temperature remained normal throughout, and no reaction occurred after the third dose. The total white cells rose from 6,000 per cmm. before treatment to 12,000 after the third injection, while the red cells increased from 4,000,000 per cmm. to 5,084,000 per cmm. Little variation was noted in the differential leucocyte count except a gradual fall of the eosinophil percentage from 19 per cent. to normal.

164. Blood smears from 306 individuals were examined in a search for malarial parasites. Subtertian rings were found in 16 cases, in one instance associated with the parasite of benign tertian malarial fever. Four of the individuals were suffering from blackwater fever. All save five of these 16 were natives.

165. The quartan malarial parasite was observed in 13 cases, all native except one.

166. The parasite of benign tertian malaria was met with only in four cases, all natives, and in one of these the subtertian parasite also occurred.

167. Cultivation of the subtertian parasite by Bass' method was done in one case.

168. The blood was obtained and treated in the usual way from a young adult male native. He complained of bodily pains and "fever" of one day's duration, and he suffered from frequent vomiting of bilious matter. The temperature was 99°·8 F. on the day on which the experiment was begun.

169. At this time, 12 noon on 21/7/15, the blood-smear showed scanty subtertian rings, a few pigmented mononuclear leucocytes and evidence of auto-erythrophagocytosis.

170. After four hours' incubation at 39° C. the parasites were in the shape of small signet rings, stirrups, pears and spheres in about equal proportion.

171. After eight hours' incubation there were still a few small signet rings, but the big majority of the parasites were in the form of compact spheres.

172. After 20 hours only spherical forms were seen, many of them actively amœboid. At the end of 24 hours, 26, 28 and 30 hours, the only change noted was a steady increase in size, although the rate of growth was not equally rapid in all, and in no instance was more than about a quarter of the red cell occupied by the parasite.

173. At the end of 32 hours it was obvious that there were two forms of the protozoon, one larger and now with fine discrete grains of black pigment, occupying very nearly half the host cell, and one smaller, occupying only about a quarter of the erythrocyte and not showing any pigment.

174. After 34 hours' incubation there was still the difference in bulk between the two forms of the parasite, but all then contained pigment.

175. After 44 hours increase in size both of cytoplasm and chromatin was noted, and the same condition ruled at the end of 54 hours.

176. When the 56th hour was reached, however, the distinction between the two forms was very evident, only a few parasites being in the pre-rosette stage, and the great majority obviously showing the characters of the sexual generation.

177. Four hours later (60 hours in all) the blood picture was particularly striking. Auto-agglutination was well marked in the fresh smear. In the stained smear most of the parasites were gametocytes. Some rosettes were observed, ingested by the large mononuclear cells as well as by the neutrophil polymorphs, and a certain number of rosettes also showed signs of degeneration. Apparently, however, some rosettes had sporulated in the interval between the 56th and the 60th hour, as some tiny rings were seen and red cells doubly or trebly infected by these were noted. In addition, there was a fair proportion of somewhat compact and spherical parasites retaining the appearances of those forms noted as in the majority in the smears taken at the 56th hour.

178. After 62 hours, agglutination of the gametocytes was a marked feature of the fresh smears. There were very few definitely recognisable schizonts, and these appeared to be degenerated. A few of the more compact spheres were still observable; these did not suggest that they had developed from the small ring forms noted at the 60th hour, but rather gave the impression that most of them were the spherical compact forms which had not progressed. A few, however, showed abundant chromatin.

179. At the end of 66 hours, gametes predominated, agglutination of these was well marked, and the compact spherical forms were few. Only a very few forms were seen, evidently of the second generation noted at the 60th hour.

180. After 68 hours, gametes still bulked largely in the stained films, but they all showed signs of degeneration. The forms already alluded to as probably proceeding from the second generation of schizonts were very few, but showed increase in bulk.

181. At the end of 78 hours all forms of the parasite had very appreciably lessened in number, but such as remained consisted of a few gametes and a few forms in the pre-rosette stage.

182. After 80 hours a few rosettes were observed, most of them infected by the leucocytes, but a few were free and some of these had shed their spores.

183. Four hours later, 84 hours in all, practically all the parasites showed signs of degeneration, a few ingested rosettes were still observable and some tiny spheres were seen inside the red cells, but the gametes had practically disappeared.

Apparently no further development took place after this, degeneration becoming more and more marked in the smears examined at the 88th, 90th, 102nd, 106th, 112th, 116th and 120th hours.

184. It was concluded that :—

(1) Most of the parasites originally present in the patient's blood were destined to become gametes.

(2) These gametes were decidedly of slower growth than those forms of the parasite which became schizonts, and many of them were so slow in growth as to suggest that, if they were not actually beginning to degenerate, they were holding back, as it were, in the hope of progressing again under more favourable conditions.

(3) The first generation of schizonts proceeded, but in lessening numbers at every stage, to sporulation, and these spores, again in still fewer numbers, developed to the rosette stage, but only a very few sporulated and this third generation speedily died out, the leucocytes accounting for many by phagocytosis.

(4) Pigment was first observed at the end of 32 hours' incubation. At the end of 60 hours auto-agglutination of the infected cells was well marked.

185. Blood smears were taken from the patient himself at midday on 22/7/15, when the temperature was normal, the vomiting ceased and the pains practically gone. No parasites were seen, but there were a few pigmented large mononuclear cells. The larger type of large mononuclear, those of endothelial origin, contained in some instances red cells, whilst others were vacuolated.

186. Smears examined again on 23/7/15 at noon were similar in appearance, except that no ingested red cells were noted.

187. This patient received no quinine. He was given phenacetin, grains 5, and a saline purge on 21/7/15. He was well on 23/5/15, and remained so.

188. Another experiment was carried out with a view to ascertaining if the parasites transferred from the culture already described would grow in the blood of another native. Ten cc. of blood were obtained from the second native in the usual way, dextrose added and the fibrin extracted.

189. One cc. of the malarial culture was added to 5 cc. of the malaria-free blood.

A tube of this latter was kept as a control, incubated as with the other at 39° C. and examined at the same intervals.

190. The results were that growth proceeded at the same rate as in the original culture, but at each examination there were fewer surviving parasites, the phagocytes being very active and ingesting red cells and plasmodia with great avidity. The first generation of schizonts reached the sporulation stage in very few numbers, and such spores as successfully invaded fresh red cells speedily died out. The sexual forms persisted a few hours longer than the asexual, but within 66 hours the few parasites that remained were all degenerated. The control tube showed no parasites at any time.

191. It was concluded that the results of this second experiment indicated that the blood of the second native contained even more antibodies than the first, inasmuch as a larger proportion of the parasites degenerated at an earlier stage, the phagocytic action of the leucocytes was more marked and development was finally arrested at an earlier period.

192. As regards monkey malaria some work was described in the 1914 report; the morphological characters of the parasite were given and some attempts at cultivation by Bass' method were also detailed.

193. The affected monkey is still alive. No more attempts at cultivation were made, but the blood was examined at regular intervals. The parasites steadily decreased in numbers. No schizonts were seen at any time. Plasmodia were noted for the last time in November. Throughout December the blood examination was negative.

194. Other seven monkeys sharing the affected animal's cage for twelve months did not develop malaria.

195. *Skin Diseases.*—A case resembling *Pyosis mansonii* was noticed in a labourer employed at the Medical Research Institute, Yaba. The condition was evidently in the earliest stage, as it had up till then escaped the notice of the patient.

196. The affection consisted of minute vesicles not bigger than a pin's head, very slightly raised above the surface and of a lighter colour than the surrounding skin. These were limited for the most part to the base of the neck, the scapular and clavicular regions, extending down on either side of the body in lesser numbers. The fore-arms and legs were entirely free, as were also the face and abdomen. The minute contents of the largest of the vesicles, when pricked, seemed to be of a semi-transparent watery consistency.

197. There was no fever associated with the eruption, and little or no irritation complained of. There was no inflammatory reaction, the skin at the base of each vesicle being perfectly normal. Cultures on ordinary agar slopes were made, and a large gram-positive diplococcus having the following characteristics was isolated:—

After 24 hours at 37°C. on Agar slope—

A very profuse luxuriant growth of a shiny dirty gray colour both by direct and transmitted light. The colonies were more or less round in outline and flat with regular edges.

After 24 hours at 37°C. on Agar plate—

Rounded regular colonies, centres slightly raised, sloping gradually to the edges (convex surface).

After 24 hours at 37°C. on Potato—

Profuse luxuriant moist flat growth, irregular in outline of a pale dirty yellow colour.

After 24 hours at 37°C. on Yam—

A somewhat less profuse growth, raised in semi-moist confluent crusts of a dirty yellow colour.

After 24 hours at 37°C. in Glucose Maltose and Saccharose.

Acid formation, but no gas. No change in other sugars. No growth in bile salt media.

198. The individual cocci measured 2.5 in diameter. A marked tendency to remain in pairs was noticed, and to a lesser extent staphylococcal formation. After repeated cultivation on agar the latter characteristic became more evident, the organism itself also becoming smaller in size.

199. When emulsified and mixed with equal parts of human blood the red cells of the latter were dehaemoglobinised to a marked degree.

200. A vaccine was prepared and used on the patient. After three injections the condition had completely disappeared.

201. What would appear to be a very advanced stage of the above condition was seen in conjunction with Dr. Gibson of Lagos.

The patient was a young European belonging to a Timber Concession. When seen the only part of his body affected was his left leg below the knee, though according to his own statement the inguinal region was the first part affected. This, however, cleared up before he was seen by Dr. Gibson.

202. The eruption was limited more or less to the middle third of the leg. At the periphery, vesicles similar to the above were seen, but larger in size, rounded and more elevated above the surface. Their contents consisted of a turbid white fluid. Towards the centre the individual vesicles had in places coalesced and probably assisted by irritation from the patient's clothes, pustules of various sizes and form had resulted. The contents of the latter gave all the characters associated with pus. The surrounding skin was discoloured by angry reddish inflammation.

203. Cultures were taken from the smaller vesicles and a diplococcus similar to the above was isolated.

A vaccine was prepared with beneficial results.

204. Efforts were made on three occasions to inoculate a monkey with this diplococcus without result.

205. *Trypanosomiasis*.—Dr. H. Andrew Foy sent to the Institute a large collection of blood smears, and four smears from gland juice, which he had obtained from natives during an inspection of a district on the Benue River. *Trypanosoma gambiense* was found in 15 of the blood smears and in two of the films made from the gland juice, 17 cases in all.

206. The same species of trypanosome was also found in the blood of a native soldier, an inmate of Lagos Hospital.

207. Many of the blood smears from domestic animals showed trypanosomes, cows, sheep, goats, horses, pigs and dogs were all found infected.

208. Cattle and horses appear to be especially prone to the disease, probably because they are more frequently to be found outside the immediate environs of a town or village than the other animals, and so are more exposed to the bites of tsetse.

209. Blood smears from 168 cattle were examined. They were all sent to the Institute in the dried state. Trypanosomes were found in 49, that is 29.1 per cent. So far as could be judged most of the parasites were *T. vivax*, and a few resembled *T. pecaudi* (*T. brucei*).

210. A single goat out of 66 examined showed trypanosomes, the parasite resembling *T. vivax*.

211. Forty-four sheep were examined and trypanosomes were found in one, the species being apparently *T. vivax*.

212. Three pigs out of 28 were found to harbour trypanosomes, resembling *T. pecorum* (*T. congolense*).

213. Blood smears from 21 dogs showed trypanosomes of the *T. pecaudi* (*T. brucei*) type in two cases.

214. Four horses were examined and trypanosomes of the *T. vivax* type occurred in two.

215. One cat was examined, with negative result.

216. The infection was mostly a heavy one in the cattle, horses and dogs, and a scanty one in pigs, sheep and goats.

The actual figures are :—

	Number examined.	Infected with Trypanosomes.
Cattle	168	29·1 per cent.
Goats	66	1·5 "
Sheep	44	2·2 "
Pigs	28	10·7 "
Horses	4	50 "
Cat	1	—

217. *Vaccine lymph*.—The following experiments were carried out at the request of the Director of the Medical and Sanitary Service with the object of ascertaining whether there would be any danger in employing cattle, suffering from an infection of trypanosomiasis or babesiasis, in the manufacture of small-pox lymph; in other words, whether or not these parasites in some latent form or other could be transmitted to people vaccinated with lymph prepared from cattle harbouring these same parasites.

218. After several visits had been paid to the cattle market at Ebute Metta, two young cows were finally chosen—one infected with trypanosomes and the other with babesia.

Three attempts were made to vaccinate these but without success, Dr. Mackey kindly helping on the first two occasions. Finally both animals died. Again two similar cows were procured and a fresh supply of lymph was tried—this met with success and after some difficulty lymph was taken from both. Owing to the weak condition of these animals they had to be allowed a good deal of liberty, and the difficulty arose how to prevent them from rubbing or scratching themselves and so rendering the experiment useless as far as they themselves were concerned.

219. Two monkeys, whose blood had previously been examined, were vaccinated successfully with this lymph. After the first day their temperatures were taken morning and evening every second day for three weeks and at irregular intervals following. Two months afterwards their blood was examined for the last time. No parasites of any sort were found, and their temperatures were normal throughout.

220. A portion of the lymph was examined microscopically, and also added to the water of condensation of three agar tubes. The result in both cases was negative.

221. Various blood smears from 23 snakes, mostly harmless green or brown colubines, were examined in a search for the pigment-bearing parasites which have been described from a few of the cold-blooded animals. *Hæmogregarines* were found in six. *Hæmoproteus* or *plasmodia* were not found in any, although in two of the animals a few of the leucocytes contain pigment granules.

222. Other cold-blooded animals examined were 3 fish, 2 frogs, 1 toad, 1 crocodile, 1 turtle and 4 small tortoises. Parasites were only found in one animal, the turtle, and these were *hæmogregarines*.

223. A variety of other animals was examined. Out of nine different birds, one, a small heron, harboured trypanosomes. Ten mice showed no blood parasites. Out of seven rats, *T. lewisi* was noted in 4 and *Grahamella* in one.

Seven monkeys, 4 bats, 2 pottos and one porcupine were examined with negative results.

224. During the investigation into the prevalence of ankylostomiasis ova other than ankylostome were noted as they occurred in the faeces. Of the 136 individuals examined, trichuris ova were found in 125, ascaris ova in 100, taenia ova in eight, schistosome ova in three and oxyuris ova in two. Trichuris ova were also found in two Europeans.

225. Water analysis samples in very large number have been examined at frequent and regular intervals from the Iju water supply.

226. Actual figures would occupy too much space. Suffice it to say that the results of bacteriological analysis proved that the measures of purification in use at the waterworks are amply efficient.

227. No pathogenic organisms have been recovered at any time, and *B. coli* have been absent from 20 c.c. of the water.

228. Mr. Peet, the Water Authority, supplied two incubators, a considerable quantity of culture media and also apparatus of various kinds.

229. During the examination of samples from the Iju waterworks a very motile gram-negative bacillus from 2-4 in length was isolated from the raw water, giving the following additional characteristics:—

After 24 hours at 37°C. on agar by transmitted light—

A not very abundant growth of a semi-transparent, ground glass appearance, becoming opaque in the thickest part of the smear. Outline irregular.

After 24 hours at 37°C. on agar by reflected light—

Flat surface of a shiny dirty gray ground glass appearance at the periphery, becoming smooth towards the centre. Edges irregular.

After 24 hours at 37°C. on bile salt agar by transmitted light—

A flat ground glass transparent thin growth, irregular edges.

After 24 hours at 37°C. on bile salt agar by reflected light—

A thin flat dry ground-glass growth of a dirty gray colour.

After 24 hours at 37°C. on Conradi-Drigalski media—

An irregular growth with reddish purple centre and somewhat raised pale blue edges.

After 24 hours at 37°C. on Fawcus picric acid and brilliant green—

Bluish green circular colonies with regular margins. A flat growth on pea green media.

After 24 hours, potato, a brownish gray growth with irregular outline.

Acid is formed in glucose—no gas. Other sugars show no change.

Does not agglutinate—Typhoid, paratyphoid A, paratyphoid B, or Bac. Celi.

A monkey and a guinea pig were fed with cultures of this bacillus, but the results were negative.

230. Dr. H. Andrew Foy sent cultures of four organisms isolated from the water in a well at Kano. One of these proved to be *B. paratyphosus A*, another was *B. pyocyaneus* and the remaining two were *B. coli communis*.

B.

CLINICAL MATERIAL.

231. *Bacteriological*.—Four cultures from clear ascitic fluid sent from Ibadan all failed to show signs of growth.

232. Four cultures from fæces and urine sent from Kano proved to be *B. typhosus* (two), *B. cloacæ* and *B. paratyphosus A*.

233. Three cultures from urethral discharge, sent from Aro, failed to show the gonococcus.

234. Two samples of urine from Lagos yielded *B. coli* on cultivation.

235. One sample of pus from a case of peritonitis in a child at Lagos showed staphylococci, streptococci and pneumococci in culture.

236. *Blood smears*.—Films from 330 individuals were examined. Sixteen were from cases of blackwater fever, and the subtertian malarial parasite was found in four.

237. *Trypanosoma gambiense* occurred in 16, subtertian malarial parasites in 16, quartan in 13, and benign tertian in four.

238. Embryos of *A. perstans* were noted in nine, of *Loa loa* in seven and of *F. bancrofti* in one.

239. In one case the blood was indicative of well-marked myeloid leukaemia, the patient being an adult male native aged about 30 years.

240. Differential leucocyte counts were made in 41 instances, and these on several occasions suggested the correct diagnosis, in the absence of blood parasites or pigment.

241. *Fæces*.—Thirty-nine specimens of fæces were received for examinations. Six of these showed active *Entamœba tetragena*, two showed only the cysts, and balantidium was found on four occasions. Blastocystis was noted in two cases, and a microscopic acarine in one. Two cases showed typical mucus casts.

242. *Fluids*.—Eight specimens were received, five of ascitic, two of pericardial and one of pleural fluid. All were simple transudates, except in one case, where streptococci were abundant in the pericardial exudate.

243. *Insects*.—Specimens of *Anopheles costalis*, *Mansonioides africanus*, *Culex grahami*, *Culiciomyia nebulosa*, *Toxorhynchites marshalli*, and some tipulids, chironomids and caddis flies were sent from Onitsha.

244. *Culex pruina* was obtained from Port Harcourt, a reduviid from Opobo, pollenia from Ibadan, dermanyssus from Lagos, lice from Yola, cordylobia larvæ from Ebute-Metta and larval ticks from Ikoyi.

245. A specimen of *Gryllotalpa borealis*, said to have bitten a patient on the hand and to have caused a lymphangitis, was sent from Lagos.

246. The Municipal Sanitary Officer of Lagos continued to send bottles of larvæ obtained by the sanitary inspectors and also adult mosquitoes caught by himself.

247. The mosquitoes were :—

June.—*Stegomyia fasciata*, *Culiciomyia nebulosa*, *Uranotænia annulata* and *Culex grahami*.

July.—*Culex thalassius*, *C. invidiosus* and *C. grahami*.

August.—*Culex decens*, *C. invidiosus*, *C. rima* and *Mansonioides africanus*.

November.—*C. grahami*, *Ochlerotatus irritans*, *O. nigricephalus* and *Culiciomyia nebulosa*.

248. Mosquito-larvæ were received for identification almost every day throughout the year.

249. During January 113 bottles were received. The larvæ of *Stegomyia fasciata* were present in 82, *Culiciomyia nebulosa* in 12, *Ochlerotatus irritans* in seven, *Anopheles costalis* in six, *Culex decens* in five and *C. tigripes* in one. The stegomyia were found mainly in pots, culiciomyia in Agbo pots and *Anopheles costalis* in pools and wells. *Ochlerotatus* and stegomyia were found in the same water in three cases, anopheles and stegomyia in two cases, culiciomyia and stegomyia in two cases, *Culex decens* and stegomyia in one case, culiciomyia and ochlerotatus in one case, and anopheles and *Culex decens* also in one case.

250. In February 107 bottles were examined. *Stegomyia fasciata* were found in 81, *Culiciomyia nebulosa* in 21, *Ochlerotatus irritans* in two, *Culex duttoni* in two and *Anopheles costalis* in one. The only receptacles noted were pots. *Stegomyia* and culiciomyia were found in the same receptacle in ten cases, stegomyia and ochlerotatus in one, stegomyia and *Culex duttoni* in one, stegomyia, culiciomyia and chirodomids in one, and culiciomyia and psychodids also in one.

251. Eighty bottles were received in March. *Stegomyia fasciata* was present in 64, *Culiciomyia nebulosa* in 12, *Anopheles costalis* in two and *Ochlerotatus irritans* also in two.

Stegomyia fasciata and *Culex nebulosa* were together in six, *Stegomyia fasciata* and *Ochlerotatus irritans* in one, *Stegomyia fasciata* and *Anopheles costalis* in one, culiciomyia and psychodids in one, anopheles and ochlerotatus in one, *Stegomyia fasciata* and psychodids in one, and *Stegomyia fasciata* and chironomids in one. The receptacles mentioned were pots, drains, canoes and wells.

252. Sixty-two collections of mosquito-larvæ were forwarded in April, *Stegomyia fasciata* hatched out in 45, *Culiciomyia nebulosa* in eleven, *Ochlerotatus irritans* in three, *Anopheles costalis* in two and *Culex decens* in one. *Stegomyia* and culiciomyia were together in six collections, and stegomyia and anopheles in one. The receptacles noted were pots, buckets, baths, pools and crab-holes.

253. During May 74 bottles were received. *Stegomyia fasciata* were identified in 59, *Culiciomyia nebulosa* in ten, *Anopheles costalis* in three and *Ochlerotatus nigricephalus* in two. *Stegomyia* and culiciomyia were found together in two, and stegomyia and anopheles in one. The larvæ were recovered from the following :—Pots, buckets, canoes, coolers, giant lily, pools, barrels, wells, crab-holes, catchpits and drums.

254. There were 135 collections for examination in June. Eighty-one of these contained *Stegomyia fasciata*, 26 *Culiciomyia nebulosa*, 11 *Anopheles*

costalis, a similar number *Ochlerotatus irritans*, four *Stegomyia luteocephala*, one *Stegomyia africana* and one *Culex decens*. *Stegomyia fasciata* and *Culiciomyia nebulosa* were associated in ten, anopheles and ochlerotatus in two, *Stegomyia fasciata* and psychodids in two, *Stegomyia fasciata* and chironomids in one, *Stegomyia fasciata*, *Culiciomyia nebulosa* and chironomids in one, and anopheles, *C. decens*, cyclops and tadpoles in one. The receptacles were bottles, gutters, tanks, pipes, wells, crab-holes, pools, drums, pots, cups, tins, catchpits, barrels, canoes and trees.

255. One hundred and one collections were examined in July. *Stegomyia fasciata* occurred in 60, *Culiciomyia nebulosa* in 23, *Anopheles costalis* in ten, *C. decens* in three, *Stegomyia luteocephala* in three and *C. grahami* in two. *Stegomyia fasciata* and culiciomyia were co-existing in five, *Stegomyia fasciata* and chironomids in two, *Stegomyia fasciata* and anopheles in one. *Stegomyia fasciata* and *Stegomyia luteocephala* in one, and culiciomyia and anopheles in one. The receptacles were drums, pools, tins, barrels, pots, wells, horns, mango trees, demijohns, buckets and gutters.

256. During August 99 bottles were received. *Stegomyia fasciata* were identified in 36, *Culiciomyia nebulosa* in 13, *Anopheles costalis* in 14, *Ochlerotatus irritans* in 14, *C. decens* in 14, *Ochlerotatus nigricephalus* in one, *Stegomyia luteocephala* in two, *C. grahami* in one, *C. fatigans* in two, *C. insignis* in one and *Uranotænia annulata* in one. *Stegomyia fasciata* were in the same receptacle as culiciomyia in one case, as cyclops in two, as *C. fatigans* and psychodids in one, and as psychodids in one. Anopheles were associated with culiciomyia in one, with cyclops in one, and with *C. decens* in two. *Ochlerotatus nigricephalus* and cyclops were together in one, *O. irritans* and *C. decens* in one, *C. decens* and *C. grahami* in one and *C. insignis* and cyclops in one. The receptacles in which the larvæ were found were pots, barrels, crab-holes, canoes, pools, gutters, catchpits, wells, tanks, pipes, mango and banyan trees.

257. There were 126 collections for identification in September. *Stegomyia fasciata* were present in 63, culiciomyia in 17, *Anopheles costalis* in nine, *Stegomyia luteocephala* in 11, *C. decens* in eight, *O. irritans* in five, *C. insignis* in three, *C. invidiosus* in three, *C. fatigans* in three, *C. grahami* in two, *C. tigripes* in two, *U. annulata* in one, *Stegomyia africana* in one and *Ochlerotatus nigricephalus* in one. *Stegomyia fasciata* were together with culiciomyia in four, with *C. fatigans* in one, with *Stegomyia luteocephala* and psychodids in one and with *C. grahami* and chironomids in one, culiciomyia were associated with *uranotænia* and *C. decens* in one, and with dytiscus larvæ in another. Anopheles were found together with cyclops and chironomids in one, with cyclops in one, and with *C. decens*, cyclops and tadpoles in one. *C. decens* were with cyclops in two and with chironomids in one. *C. grahami* were with cyclops in one, *O. irritans* were also with cyclops in one. *C. tigripes* were with *C. fatigans* in one, *Stegomyia luteocephala* were with *C. invidiosus* in one, *S. africana* were with *C. tigripes* in one and *C. invidiosus* were with cyclops in one. These larvæ were found in tamarind, flamboyant, banyan and breadfruit trees and in a species of ficus, also in crab-holes, wells, pots, canoes, cups, calabashes, barrels, catchpits, pools, buckets, tins, broken bottles and tanks.

258. There were 109 collections in October. Sixty-one of these contained *Stegomyia fasciata*, 16 anopheles, nine culiciomyia, nine *Ochlerotatus irritans*, eight *Stegomyia luteocephala*, five *C. decens*, and one *Uranotænia annulata*. *Stegomyia fasciata* were together with *C. decens* in one, and with culiciomyia in one, with anopheles in one, and with psychodid in one. Anopheles were

with tadpoles in one, with *C. decens* in one, and with both *C. decens* and tadpoles in one culicomyia was with dytiscus larvæ in one. *O. irritans* were with *C. decens* in one and with *Stegomyia luteocephala* in one.

The breeding places were pots, crab-holes, bottles, calabashes, pools, surf-boats, wells, gutters, pails, barrels, tins, tanks, drums, saucepans and flamboyant and banyan trees.

259. Only 42 bottles were sent during November. Twenty-nine of these contained *Stegomyia fasciata*, five culicomyia, five *Anopheles costalis*, two *O. irritans* and one *C. decens*. *Stegomyia fasciata* were found with psychodids in one bottle, and *C. decens* were associated with chironomids in another. The receptacles were tins, pots, canoes, pools, wells, demijohns, barrels and catchpits.

260. Thirty-two collections were received in December, *Stegomyia fasciata* were contained in 15, *Culicomyia nebulosa* in eight, *Anopheles costalis* in four and *Ochlerotatus irritans*, *C. decens*, *S. luteocephala*, *C. insignis* and *Uranotænia annulata* each in one, *Stegomyia fasciata* occurred with culicomyia in one and with anopheles in one. Anopheles were found with culicomyia in one, and with psychodids and cyclops also in one. Culicomyia were found living with chironomids in one. *Uranotænia* and *C. insignis* were also together in one bottle. The receptacles were demijohns, tins, pools, catchpits, crab-holes, wells, barrels, buckets and banyan trees.

Tables are given showing the figures under the different months.

261. The first table shows the great preponderance of stegomyia larvæ. The second shows that the larvæ can thrive in association with many others of different genera, and in very varied conditions, in deep wells with anopheles and *C. decens* and other culicines, in pools, in crab-holes, in every imaginable kind of receptacle, in holes in trees, and even in pots of native medicine, along with culicomyia.

TABLE SHOWING IDENTIFICATION OF LARVÆ COLLECTED BY SANITARY INSPECTORS IN LAGOS DURING 1915.

Mosquito.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
<i>Stegomyia fasciata</i> ...	82	81	64	45	59	81	60	36	63	61	29	15	676
<i>Culicomyia nebulosa</i> ...	12	21	12	11	10	26	23	13	17	9	5	8	167
<i>Anopheles costalis</i> ...	6	1	2	2	3	11	10	14	9	16	5	4	83
<i>Ochlerotatus irritans</i> ...	7	2	2	3	...	11	...	14	5	9	2	1	56
<i>Culex decens</i> ...	5	...	...	1	...	1	3	14	8	5	1	1	39
<i>Culex igripes</i> ...	1	...	...	...	...	...	...	...	2	...	...	...	3
<i>Culex duttoni</i> ...	...	2	...	...	...	...	...	...	...	...	...	...	2
<i>Ochlerotatus nigricephalus</i> ...	...	...	...	...	2	...	...	1	1	...	...	...	4
<i>Stegomyia luteocephala</i> ...	...	...	...	...	...	4	3	2	11	8	...	1	19
<i>Stegomyia afriana</i> ...	...	...	...	...	...	1	...	...	1	...	...	...	2
<i>Culex grahami</i> ...	...	...	...	...	...	...	2	1	2	...	...	...	5
<i>Culex fatigans</i> ...	...	...	...	...	...	...	...	2	3	...	...	...	5
<i>Culex insignis</i> ...	...	...	...	...	...	...	...	1	...	...	...	1	2
<i>Uranotænia annulata</i> ...	...	...	...	...	...	...	...	1	1	1	...	1	4
<i>Culex invidiosus</i> ...	...	...	...	...	...	...	...	...	3	...	...	...	3
Total ...	113	107	80	62	74	135	101	99	126	109	42	32	1,080
<i>Stegomyia fasciata</i> per cent.	72.5	75.7	80	72.5	79.7	60	59.4	36.3	50	55.04	69.04	46.8	62.5
<i>Anopheles costalis</i> per cent. ...	5.3	0.9	2.5	3.2	4.05	8.1	9.9	14.1	7.1	14.6	11.9	12.5	7.6

TABLE SHOWING OTHER LARVÆ LIVING TOGETHER WITH STEGOMYIA FASCIATA AND WITH ANOPHELES COSTALIS.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
<i>Stegomyia fasciata</i> and <i>Culicomyia nebulosa</i> ...	2	10	6	6	2	10	5	1	4	1	...	1	48
<i>Stegomyia fasciata</i> and <i>Anopheles costalis</i> ...	2	...	1	1	1	...	1	...	...	1	...	1	8
<i>Stegomyia fasciata</i> and <i>Ochlerotatus irritans</i> ...	3	1	1	...	...	...	...	...	...	...	...	...	5
<i>Stegomyia fasciata</i> and <i>Culex decens</i> ...	1	...	...	...	...	...	...	...	...	1	...	...	2
<i>Stegomyia fasciata</i> and <i>Culex duttoni</i>...	...	1	...	...	...	...	...	...	...	...	...	...	1
<i>Stegomyia fasciata</i> and <i>Culex fatigans</i>...	...	...	...	...	...	...	...	...	1	...	...	...	1
<i>Stegomyia fasciata</i> and <i>Stegomyia luteocephala</i>...	...	...	...	...	...	...	1	...	...	...	...	...	1
<i>Stegomyia fasciata</i> and <i>Stegomyia luteocephala</i> and <i>Psychodids</i>...	...	...	...	...	...	...	...	...	1	...	...	...	1
<i>Stegomyia fasciata</i> and <i>Culex fatigans</i> and <i>Psychodids</i>...	...	...	...	...	...	...	...	1	...	...	...	...	1
<i>Stegomyia fasciata</i> and <i>Culicomyia nebulosa</i> and <i>Chironomids</i>...	...	1	...	...	...	1	...	...	...	...	...	...	2
<i>Stegomyia fasciata</i> and <i>Culex grahami</i> and <i>Chironomids</i>...	...	...	...	...	...	...	...	...	1	...	...	...	1
<i>Stegomyia fasciata</i> and <i>Chironomids</i>...	...	...	1	...	...	1	2	...	...	...	...	...	4
<i>Stegomyia fasciata</i> and <i>Psychodids</i>...	...	...	1	...	...	2	...	1	...	1	1	...	6
<i>Stegomyia fasciata</i> and <i>Cyclops</i>...	...	...	...	...	...	...	...	2	...	...	...	...	2
<i>Anopheles costalis</i> and <i>Culicomyia nebulosa</i>...	...	...	...	...	...	...	1	1	...	...	...	1	3
<i>Anopheles costalis</i> and <i>Ochlerotatus irritans</i>...	...	...	1	1	...	2	...	...	...	...	...	...	4
<i>Anopheles costalis</i> and <i>Ochlerotatus decens</i> ...	1	...	...	...	...	...	...	2	...	1	...	...	4
<i>Anopheles costalis</i> and <i>Ochlerotatus decens</i> and <i>Tadpoles</i>...	...	...	...	...	...	...	...	...	...	1	...	...	1
<i>Anopheles costalis</i> and <i>Ochlerotatus</i> and <i>Cyclops</i>...	...	...	...	...	...	1	...	...	1	...	...	...	2
<i>Anopheles costalis</i> and <i>Cyclops</i>...	...	...	...	...	...	...	...	1	1	...	...	...	2
<i>Anopheles costalis</i> and <i>Cyclops</i> and <i>Chironomids</i>...	...	...	...	...	...	...	...	...	1	...	...	...	1
<i>Anopheles costalis</i> and <i>Cyclops</i> and <i>Psychodids</i>...	...	...	...	...	...	...	...	...	...	...	...	1	1
<i>Anopheles costalis</i> and <i>Tadpoles</i>...	...	...	...	...	...	...	...	...	...	1	...	...	1

262. *Penile sores*.—Six specimens were examined and the *Treponema pallidum* was found in three.

263. *Skin sores*.—Smears from seven sores of doubtful nature were also examined, but all proved negative as regards spirochætes.

264. *Sputum*.—Ten samples of sputum were stained and examined for tubercle bacilli, and the result was positive in three. One smear from the throat was examined for the bacilli of diphtheria, with a negative result.

265. *Tissues*.—A large number of sections were examined.

There were 32 specimens of liver, of which 11 were fatty, seven cirrhotic, four showed abscess formation of amœbic origin, two were tubercular, one syphilitic (gummatous), one with secondary sarcoma and one with secondary carcinoma.

266. Specimens of kidney numbering 24 were examined, and 20 of these showed various stages of nephritis.

267. There were 23 sections of spleen, one of which contained secondary sarcomatous deposits.

268. Specimens of glands to the number of 18 were cut and examined, and three of them showed secondary malignant infection.

269. Fifteen sections of heart muscle were made, and seven sections of stomach were examined.

270. Pieces of lung were forwarded from seven cases; one of these was tubercular and another contained secondary sarcomatous growth.

271. The other tissues consisted of brain (four specimens, one tubercular); intestine, seven specimens (two dysenteric, one tubercular); gall-bladder, four specimens; appendix, three specimens (all showing acute inflammatory signs); pancreas, two specimens; skin, two specimens (one leprotic, the other a neurofibroma); suprarenals, two specimens; tonsils, two; muscle, two; and one each of thymus gland, ulnar nerve, omentum (secondary cancerous invasion), spinal cord, fallopian tubes (pyosalpinx), bone-marrow and uterus (fibroid).

272. In addition to these there were 22 specimens of tumour growth. There were five fibro-sarcomas, three periosteal sarcomas, one giant-celled sarcoma and one small round-celled sarcoma. There were two epitheliomas, one from the penis and the other from the anus. One carcinoma of the liver was received, also one cyst-adenoma of the jaw. The other tumours were non-malignant and included six fibromas, one lipoma and one neurofibroma.

273. Many specimens were added to the Museum, which is now assuming useful proportions. These specimens comprised snakes, plants, tumour growth, aneurisms and other pathological conditions.

274. Eleven smears from urethral discharge were examined for gonococci, with a positive result of four.

275. Twenty specimens of urine were examined.

Quantitative sugar estimations were done in eight, three samples were from cases of blackwater fever, three were from acute nephritis, schistosome ova occurred in two, prostatic threads were noted in one, and three presented no abnormalities.

276. Fifteen vaccines were prepared. Twelve of these were staphylococcal, two were from diplococcus and one from gonorrhœa. The diplococci referred to were isolated from the cases of *Pyosis mansonii*, and it was noticed, while working with the organism, that when mixed with human blood the red cells were markedly de hæmoglobinised.

277. Thirteen Wassermann reactions were performed. The result was positive in nine.

278. Bacteriological analyses were made on samples from various private and public wells in Lagos, Ebute-Metta, Calabar, Port Harcourt, Owerri and Mamfe, and also on samples from the soda-water factories at Ebute-Metta and at the W.A.F.F. headquarters, Lagos.

The results from the soda-water factories were uniformly good and those from the wells uniformly bad.

279. Seven Widal reactions were done.

The result was positive to *Bacillus typhosus* in two, to *Bacillus paratyphosus A.* in one and to *Bacillus paratyphosus B.* in one.

280. Four specimens of *Tœnia saginata* were received, two of *Loa loa* and one of *Dracunculus medinensis*.

281. *The staff.*—Dr. Connal was on duty from 2nd April until the end of the year. Dr. Coghill was on duty from the beginning of the year until the end of August, when he proceeded to Aro to relieve the medical officer there. He proceeded on leave on 25th October. Sergeant Pollitt, R.A.M.C., acted as laboratory attendant from the beginning of the year until 1st June.

No changes occurred in the native staff.

282. *Buildings, etc.*—No new buildings were erected.

The Iju water supply was laid on, early in the year, and has proved a blessing impossible to exaggerate.

283. *Meteorological.*—Barometric readings and records of the solar maximum, grass minimum, dry and wet bulb, and shade maximum and minimum temperatures were kept daily, and measurements of rainfall taken.

284. *Acknowledgments.*—Material was received from practically all the stations in Nigeria, and the following kindly supplied specimens:—Dr. T. B. Adam, Capt. E. L. Anderson, Dr. Ashton, Dr. Beale-Browne, Dr. Guy Beatty, Major Best, Dr. Brierley, Dr. Chartres, Dr. Craig, Dr. Dalziel, Dr. Ellis, Dr. Faderin, Dr. E. M. Franklin, Dr. Foy, Dr. Gibson, Dr. G. M. Gray, Dr. Hanington, Mr. Hubbard, Dr. Hungerford, Dr. Innes, Dr. Kauntze, Dr. Kennedy, Dr. Lobb, Dr. McKay, Dr. Mackey, Dr. Maclaine, Dr. Macpherson, Dr. Manning, Dr. Manson, Dr. Maples, Dr. Martyn-Clark, Dr. J. J. Moore, Dr. Neale, Dr. Norman, Dr. Parkinson, Dr. Pasley, Dr. Paterson, Dr. Peacock, Dr. Pickels, Dr. Pirie, Dr. Pollard, Dr. Quirk, Dr. Sapara, Dr. E. L. Sieger, Dr. J. S. Smith, Dr. Taylor, Dr. Tipper, Dr. F. B. Thompson, Dr. A. H. Wilson.

285. Assistance and advice is also gratefully acknowledged to Lt.-Col. Alcock and Dr. R. T. Leiper, of the London School of Tropical Medicine, and to Dr. Balfour and Dr. Wenyon, of the Wellcome Research Bureau.

286. Mrs. Summers Connal was responsible for the identification of the mosquito-larvæ, of the insects generally, and for most of the dissection and examination of the blood-sucking flies.

287. The privilege of medical supervision over the Yaba Lunatic and Leper Asylums was accorded by the Principal Medical Officer and was exercised throughout the whole year, thus releasing a medical officer for duties elsewhere.

(Signed) A. CONNAL.

(Signed) H. SINCLAIR COGHILL.

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NOTES ON A CASE OF HELMINTHIC INFECTION ASSOCIATED
WITH PARAPLEGIA IN AN EUROPEAN.

NOTES BY DR. RICE.

Friday, 3rd Sept.—Patient complained of “pins and needles” finger tips.

Saturday, 4th Sept.—Patient complained of a “loose feeling” at knees, and accentuated tingling and numbness of fingers. Suspecting poisoning I gave him Pil. Cal. c. Col. at night, and Mag. Sulph. $\frac{1}{2}$ oz. on the morning of

Sunday, 5th Sept.—Patient still complained of looseness of knee-joints and ankles. Bowels opened five times during night, with some vomiting. Some difficulty in walking. Was massaged twice.

Monday, 6th Sept.—Difficulty in walking very marked. I massaged him every four hours. Knee jerks completely absent. Pupils react to light and accommodation. Ate a good lunch, but only had chicken broth for dinner.

Tuesday, 7th Sept.—Seemed a little better and said he had dozed a good deal during the night, but not had a good sleep. Massage and tonic continued. Egg, milk and brandy, $\frac{1}{2}$ oz. every four hours. Difficulty in walking more marked. Can hardly stand.

Wednesday, 8th Sept.—No power in legs at all. No wrist or foot drop. Speech good. Pupils reacting well. Complains of weakness in swallowing, and numbness of the throat and also of the buttocks. Has never complained of pain anywhere at any time. I massaged him once and gave him his tonic, and left at 9.30 a.m. for Ameke. Dr. E. L. Sieger arrived at 11 a.m. and took over the case.

(Sgd.) F. RICE,

M. O., Amoji.

NOTES BY DR. E. L. SIEGER.

On the 8th I left Ameke for Amoji to attend to A. B., relieving Dr. F. Rice, who was proceeding to Port Harcourt. Dr. F. Rice gave me full particulars of the case.

On examination of the patient I found the muscles of the limbs flaccid, the knee reflexes totally absent, and paresis markedly present. The patient was unable to stand or rise without assistance. There was also loss of muscular power and limitation of movement in both arms, and tactile sensation was dulled. The limbs of the right side were more affected than the left. Foot and wrist drop were absent. The patient complained of tingling, numbness and fugitive pains on the left side of the trunk, back of the neck and left side of the face. In the evening, ptosis of the left eye was present, with swelling of the lower lid. As the patient was restless in body and mind, and complained of a succession of sleepless nights, I gave him 20 gr. Pot. Bromid., and he slept well. The temperature and pulse rate were normal.

At 8 a.m. on the 9th I again examined the patient and found all the symptoms aggravated. Paresis gave place to paralysis of the lower limbs; the ptosis was more marked and accompanied by hyperæsthesia of the left side of the face. His speech became slower and his articulation less distinct, and he complained of slight difficulty in swallowing. Taste was not affected.

Viewing with uneasiness the rapid progression of these unfavourable symptoms, I telephoned to Dr. Rice to remain at Ameke and take the patient to Port Harcourt Hospital. I brought the patient into Ameke that afternoon and consulted with Dr. Rice, and we formed the opinion that the case was most probably one of acute ascending paralysis.

Throughout the time I had the patient under my charge I carried out Dr. Rice's treatment, and the patient took plenty of nourishment. Dr. Rice resumed charge of the patient that evening.

(Sgd.) EDWARD L. SIEGER,
M. O., Ameke.

NOTES BY DR. RICE (*continued*).

Friday, 10th Sept.—On re-taking over the case I noticed ptosis of the right eye very marked. The left side of the mouth is drawn down. Difficulty in swallowing and coughing.

Left Ameke 6.15 a.m. and arrived Port Harcourt at 12.30 p.m. Patient was in bed in the train all the time and stood the journey well and was handed over to Dr. Neale.

(Sgd.) FRANK RICE,
M. O., Amoji.

NOTES BY DR. NEALE.

Patient arrived in Port Harcourt at 12.30 p.m., Friday, 10th Sept. He was conveyed on stretcher to hospital. On examination I found him unable even to turn over in bed, or raise himself up in any way. He was extremely irritable. The left eye was wide open and staring. Patient was unable to close it. This gave the appearance of slight ptosis of right eye. Both pupils reacted to both light and accommodation. The left angle of the mouth was drawn down. The tongue, when projected from the mouth, was quite straight and even, not inclined to either side. When drinking, liquid tended to dribble from the drawn down left angle of the mouth.

Right arm could not be raised at all, and fingers only moved very slightly and slowly. To the patient the fingers felt numb and heavy. There was a papular rash on the flexor aspect of the forearm. The muscles were flaccid. Sensation was present, but dulled. Left arm could be raised slightly, and there was a little more power in the grip. The feeling of numbness and heaviness was not so marked in this hand. Fingers could only be bent very slightly. A pin point applied to the fingers gave a sensation of intense heat. There were also papules on the flexor aspect of the forearm.

Abdomen and thorax appeared normal as to sensation and general examination. There was dulness over the bladder area, and the patient said he had been unable to pass urine since the previous day. Neither had he had a movement of the bowels for four days. He complained that he felt very uncomfortable inside, but felt he had no power either to pass urine or fæces.

I deferred further examination, proceeded to empty his bladder by catheter, drawing off 26½ ozs. Temperature 98.4, pulse 46.

Condition on examination continued. The uncomfortable feeling passed off after the bladder was emptied. Right leg—muscles flaccid; can draw up leg a little way with great difficulty. Sensation very dulled. Knee jerk absent. Ankle klonus nil. Unable to move toes. Although patient is very ticklish about sole of foot in health, this sensation is now entirely absent.

Left leg is not so paralysed as the right. He can raise his knee slightly against hand pressure on knee. Unable to move toes. Knee and ankle reflexes absent.

There appeared to be no hyperæsthesia anywhere. On testing with a pin, the dulled sensation extended over the whole of the legs and thighs, up to a point from 1 to $1\frac{1}{2}$ inch above Poupart's ligament.

Patient complained of difficulty in swallowing.

He took plenty of light nourishment. Being very restless and irritable I prescribed 5 gr. chloretone at 11.30 p.m. After this he slept quietly till 5 a.m. next day.

11th Sept.—As patient was still unable to pass urine, I again drew it off by catheter— $24\frac{1}{2}$ ozs. Clear, acid, sp. gr. 1017, albumin. Soapy water enema was then given, with only a small result—thin and dark in colour. The following mixture was prescribed:—

Potass. Brom.	...	...	gr.	10	
Do. Iodid	...	...	gr.	2	
Liq. Strych. Hyd.	...	...	m.	5	
Liq. Arsenicalis	...	...	m.	2	
Syr. Aurantii	...	...	dr.	$\frac{1}{2}$	
Aquam. ad	...	...	oz.	1	t.d.s.

Also quinine 5 gr. daily.

Glycerine was also injected per rectum. Later on a large dark motion was passed, with scybala, and a few drops of urine. I made a careful examination of this stool and found the most extraordinary collection of undigested food—concretions of bits of vegetables and seeds matted together with hairy and fibrous material. These I found were from the husks of palm nuts. Microscopic examination of the fæces revealed large numbers of helminthic ova, chiefly ankylostome. Although I could find no adult ankylostomes I was surprised to find ankylostome larvæ.

On questioning the patient as to his eating habits I elicited a history almost identical with a similar case reported by me in last year's annual report—a history of "wolfing" one's food, masticating nothing, swallowing it down without a single chew.

I at once decided that the paralysis in this case must be of toxæmic origin, probably produced by the large helminthic infection. I therefore prescribed as follows:—

Beta-Naphthol gr. 10; every morning on empty stomach for six mornings.

12th Sept.—Beta-Naphthol given at 6 a.m. Slept till nearly 8 a.m. At 8.30 took quaker oats, omelette and tea. At 9.30 he passed $16\frac{1}{2}$ ozs. urine without any trouble. A further motion was passed and examined. There were many ova, some of which I was unable to identify. No trichocephalus ova or worms were found.

Patient is much more cheerful to-day. He can move his right arm slightly. He took all his food throughout the day readily. This is of course minced, or cut up very finely. Chloretone, gr. 8, given shortly after dinner in the evening.

13th Sept.—As patient was feeling the heat very much and was very restless I gave him at 12.30 a.m. the following draught:—

Ammon. Brom.	...	...	gr.	15
Chloral Hydras	...	...	gr.	5
Spt. Ammon. Co.	...	...	m.	40
Tr. Card. Co.	...	...	dr.	$\frac{1}{2}$
Aq. ad	...	...	oz.	2

He slept quietly till nearly breakfast time. Urine clear, acid, sp. gr. 1018, albumin less. Eye (left) not so staring to-day. More power in both arms and legs. Mouth less drawn. Drinks without any dribbling. Hands not so numb. Patient much more cheerful. All symptoms subsiding.

14th Sept.—Patient had a good night's sleep, after above draught at midnight. Mist. Sennæ Co. oz. $1\frac{1}{2}$ given at 7 a.m.

Patient much better. Left eye less prominent. Able to raise right arm easily. More power in both legs. Was lifted into deck chair and put in verandah. Taking all meals well. Urine still contains albumen, but much less in quantity. Bowels moved once during the day. Calomel gr. 4 given 9 p.m.

15th Sept.—Another good night passed. The papular rash on the forearm seems to have come to the surface and causes a lot of itching. Increased power in arms and legs. Albumen less to-day. Mist. Sennæ Co. $1\frac{1}{2}$ ozs. given at 8 a.m. Bowels moved three times. Soft, well digested and good colour. Microscope showed ova very greatly diminished. Some curious large spirilla found on several occasions.

I omitted earlier to mention the blood examination. The only abnormality found was very marked leukæmia.

16th Sept.—Symptoms still improving. More movements in fingers. Numbness less. No sign of any return of knee or ankle reflexes. Left eye not so staring. Lid comes down a little more over the eyeball. Mouth straighter. Able to raise both arms over the head. Albumen still present in urine. Sp. gr. 1020. Rash and irritation disappearing from arms. Calomel gr. 2 given.

17th Sept.—Further steady improvement noted. Patient was able to turn over in bed without assistance for the first time. Still some albumen in urine. Bowels moved once. Opened a small chigger abscess at side of toe nail, fourth, left foot. Patient has been very careless in his mode of living in his station. Walks about his bush house in bare feet, consequently has had, he says, dozens of chiggers removed from his feet by his boys.

18th Sept.—Patient had another very good night, a half of the bromide draught having been given at midnight. Bowels open once. Albumen still in urine. Increased power and field of movement. Can nearly hold a cup in his two hands in order to drink from. Is able to turn over on either side in bed without assistance. There are certain ova in the fæces closely resembling those of *ascaris lumbricoides*, which I am unable to identify.

19th Sept.—Instead of Beta-Naphthol I gave Santonin gr. 5, Calomel gr. 3, at 6 a.m.. Also I substituted the following mixture for what he has been taking thrice daily:—

Syr. Ferri Iodidi ...	...	...	dr. $\frac{1}{2}$
Liq. Strychnin. Hyd. ...	...	...	m. 5
Liq. Arsenicalis ...	...	...	m. 2
Aq. ad ...	...	...	oz. 1 t.d.s.

Patient feeling much better. Sat up on edge of bed by himself. Gave his lower bowel a wash out with soapy water enema. Mouth practically quite straight to-day. No sign of return of absent reflexes.

Medical Board held yesterday found patient to be suffering from "Paralysis of toxæmic origin, with albuminuria."

INVESTIGATIONS BY DR. E. E. MAPLES AT CALABAR.

An investigation was held into the various positions in which the appendix is found in natives, by observation on dead bodies brought in for post-mortem dissection. Classifying according to the hour positions, the following results were obtained:—

(a) In quarter past hour position	...	...	...	33·3 per cent.
(b) In hour position	...	...	...	9·53 „
(c) In 25 minutes past hour position	...	...	...	9·53 „
(d) In half past hour position	...	...	...	9·53 „
(e) In quarter to hour position	...	...	...	9·53 „
(f) In five past hour position	...	...	...	4·76 „
(g) In ten past hour position	...	...	...	4·76 „
(h) In twenty-five minutes to hour position	...	...	...	4·76 „
(i) In coiled up directly behind cæcum	...	...	...	4·3 „
				100·0 „

In 42·9 per cent. the appendix had at least one coiling as it lay in its position; this is inclusive of the 14·3 per cent. of cases in (i) above where the appendix lay coiled up directly behind the cæcum.

In 9 per cent. of cases there were signs of old inflammation by way of adhesions, etc., surrounding or involving the appendix.

HEPATIC ABSCESS.

An investigation was held on six dead bodies to see if it was possible to perform an operation for exposing the liver by way of the chest wall without opening the pleural cavity, an operation which has been recommended by various writers, especially Rickman Godlee. In no case, after removal of portions of the tenth and eleventh ribs, was it found possible to strip the pleura off the right thoracic wall and the upper surface of the diaphragm, without tearing the pleura which is particularly thin in this situation. I therefore conclude that if a liver abscess is to be opened by way of the chest wall and diaphragm, the pleural cavity must of necessity be opened.

In my experience I have so far never failed in succeeding in opening and draining hepatic abscess through the abdominal wall, and I believe it is always possible to open, and with the aid of the Fowler position to satisfactorily drain, any liver abscess through the abdominal parietes.

VARIETIES OF MOSQUITO IN CALABAR.

In 1915 Mr. A. D. A. Macgregor, the Station Magistrate, very kindly undertook an investigation into the varieties of mosquito present in Calabar. The larvæ were kept and hatched out, and the following species were identified:—

- Stegomyia fasciata.*
- „ *thomsoni.*
- „ *periskelata.*
- Myzomyia funesta*, var. *Umbrosa.*
- Culex fatigans.*
- Pyretophorus costalis.*
- Myzorhynchus paludis.*
- Myssorhynchus maculatus.*
- Chrysoconops euscopennatus.*
- Toxorhynchites brevipalpis.*
- Tæniorrhynchus.*

The absence of anopheles is a remarkable feature.

At the Native hospital an unusual and rare case of sarcoma, arising from the scapula, was operated on. The patient refused to have an inter-

scapulo-thoracic amputation of the upper limb performed, but after ligation of the sub-scapular artery, the whole of the scapula and half of the clavicle and the upper end of the humerus were removed, together with the contents of the axilla. The latter procedure was found necessary, as it was discovered during the operation that the axillary glands were secondarily infected with sarcomatous growth, a condition very rare with sarcoma, although common enough in epithelioma. The patient died after operation from shock.

Several cases have been treated which form a distinct group not infrequent among natives, both men and women; I refer to those in which there is a chronic fibrosis with ulceration and stricture of the rectum in men, and of the vagina, external genitals, and the rectum in women. These cases might be thought to be of specific origin, but in my opinion they are not; the ulceration certainly improves under salvarsan and other specific treatment, but does not clear up. Nor do I think they are malignant in origin. I have come to the conclusion that they properly correspond to the *Esthiomene* of French writers, a condition which is ignored so far as I know by English observers, with the exception of Herman (in his "Diseases of Women").

Another uncommon case occurred in which, during the performance of a hysterectomy for fibroid, it was found necessary to remove both ovaries and fallopian tubes, on account of cysts in the former organs and pyosalpinxes in the latter. Although a certain amount of pus escaped into the pelvis the patient made an uninterrupted recovery.

A rather unusual feature of the hernia cases operated in 1915 has been the comparative frequency with which hernias *par glissement* were met with, and in which usually the bladder and sometimes the cæcum and appendix were encountered. Among 29 cases of radical cure for hernia performed, seven (*i.e.*, 24.1 per cent.) proved to be such gliding hernias.

One case of septic mastoiditis was treated in which a complete Stacke's operation was performed, and subsequently the internal lateral sinus was opened and drained for septic phlebitis; the patient subsequently died of pyæmia.

Remarkable results were obtained from the treatment of bad cases of syphilis in natives with salvarsan or one of its substitutes. In all 17 injections were performed with most gratifying immediate results.

ANNUAL REPORT FOR THE YEAR 1915.

By W. RALSTON, B.Sc. (LOND.), F.I.C., Government Chemist, Nigeria.

Since I returned from leave on the 2nd April, 1915, the following work has been done.

2. The samples received may be classified as shown in the following table.

Kind.	Department Submitting.	No.	Total.
Gin	Customs	25	144
	Police	9	
Rum	Customs	14	
	Customs	14	
Whisky and Brandy	Customs	2	
Perfumery and drugs	Customs	23	
Provisions	Customs	17	
Matches	Customs	40	
Water	Railway	1	
	Medical Department	6	
	Medical Research	11	
	Public works	6	
	Sanitary	1	
Chemico-legal (4 visits to court)	Police (Gold Coast and Nigeria)	18		25
	Medical	7	
	Political	6	
Miscellaneous	Political	2	31
	Sierra Leone Government	10	
	Railway	1	
			13
			213

3. *Customs Work.*—The 135 samples include 24 from Lagos, 17 from Sapele, 31 from Warri and Burutu, 4 from Forcados, 5 from Opobo, 24 from Benin, 14 from Calabar and 16 from Onitsha. These were examined in the usual routine way. All were found free from injurious or prohibited ingredients. The spirits from the Police department were examined for strength in alcohol and any adulterant, but although 4 at least would have been condemned in England as adulterated by dilution with water I believe there is no minimum legal limit of strength fixed for Nigeria.

4. *Water Analysis.*—Six samples were analysed for Public Works Department from boreholes at Burutu. Twelve samples of Iju water were analysed in connection with some experiments undertaken at the Medical Research Institute, and for the Municipal Sanitary Officer. During the rainy season the Iju water was very peaty coloured and the analyses showed high organic matter (due to vegetation), but as the dry season set in the quality of the water improved. I believe the coloration is chiefly due to the water from a tributary flowing into the Iju, and so if this could be cut out, especially from the time the rains commence (when the Iju alone might be sufficient to supply all demands), there would be much less variation in the quality of the supply.

Seven other samples were submitted by Medical Officers at Lagos, Abeokuta, Ibadan, Agbor, Owerri, Mamfe and by the Railway Department at Ijoko.

5. *Chemico-legal Work*.—Nine samples of those from the Police Department came from the Gold Coast Colony in connection with cases of suspected food poisoning. There were two cases, seven specimens being examined for one of them. The chief specimen was of the nature of a ju-ju mixture of beads, cowri shells, charcoal, salt, sand, hair, fibre and leaf in a basis of shea-butter fat. The other was a post-mortem case, the specimens being stomach contents and a piece of bark. In both cases the specimens were brought by a police messenger from Accra and were returned to him under the supervision of the Police Department at Lagos. Two poisoned arrows from Okwoga showed the poisoning symptoms due to strophanthin. Some native charms were examined from Ekiti. Four specimens were examined for blood-stains and two mixtures called "Herbal Remedies" were analysed for a test case in court. The other samples were connected with the ordinary post-mortem examinations. Four attendances as a Crown Witness at the Law Courts in Lagos were made.

6. *Miscellaneous Works* includes the analysis of two clay rocks from Obu-lu and an analysis of 12 kinds of native foodstuff used for the prison dietary at Sierra Leone. The results obtained can be applied to Nigeria and other parts of the West Coast, so it might be considered useful to publish a short summary of my report for general information. The results are shown in the table below, and a few brief explanatory remarks are added.

PERCENTAGES.

Foodstuffs.	Refuse and dirt.	Dry Solids.	Water.	Ash.	Fibre.	Proteids.	Carb-hydrates.	Oil.	Calories per lb.
Rice	·67	84·12	15·88	·45	·10	7·31	75·83	·43	1532
Yam (ordinary)	16·5	33·38	66·62	·64	·41	2·02	30·24	·07	597
Cocoa-Yam	113·0	39·49	60·51	1·05	·57	2·44	35·30	·12	702
Sweet Potatoes	15·4	43·9	56·1	·54	1·0	1·94	39·99	·43	799
Foofoo (wet)	—	33·12	66·88	·28	1·23	·69	30·80	·12	600
" (dry)	—	92·93	7·07	·77	3·44	1·93	86·44	·35	1685
Palm Oil	·02	—	·58	—	—	—	—	99·42	4017
Split Peas... ..	—	87·57	12·43	2·35	1·26	24·62	57·47	1·87	1592
Oyo (fresh, green)	88·2	15·88	84·12	1·77	1·18	3·63	8·44	·86	276
" (dried)	—	93·53	6·47	10·4	6·95	21·38	49·73	5·07	1625
Ockro (dried)	—	75·44	24·56	5·68	7·11	11·41	49·74	1·5	1303
Native Peppers—									
(a) Small pod red and green mixed (fresh)	—	24·57	75·43	1·29	6·88	3·77	9·11	3·52	510
Small pod red and green mixed (dried)	—	93·25	6·75	4·89	26·10	14·32	34·57	13·37	1905
(b) Large pod red (dried)	—	93·9	6·1	5·75	25·93	17·61	31·06	13·55	1905
(c) Large pod green (dried)	—	91·85	8·15	5·35	26·30	20·69	30·41	9·1	1776
Large pod green (fresh)	—	13·48	86·52	·78	3·86	3·04	4·47	1·33	261

The yams and potatoes were cooked, mashed and dried till the weights before and after cooking were identical, and the percentages therefore may refer both to the raw material as to the cooked foodstuff. The refuse shown represents matter not eaten, while the two columns for "Dry Solids" and "Water" represents 100 parts of edible foodstuff, the percentages of the dry constituents being detailed in the other columns. The sum of these constituents in each case equals the total dry solids. The cocoa-yam specimen was much decayed, but normally the refuse will probably be about the same as for other yams and potatoes (15—16 per cent.).

The "calories per lb" column gives a scale for comparing the food-values of the different foodstuffs, carbohydrates (with fibre) and proteids being each equivalent to 1,820 calories per lb., and the oil to 4,040 calories per lb. A former analysis of ordinary potatoes gave these a value of 438 *calories per lb.*, so that with this result and those found for rice and split peas agreeing with published tables, the results shown in the table may be compared directly with those for other well-known foodstuffs.

A series of experiments was made to extract the "essential oil" from limes, the yield obtained being about .2 per cent. and samples were prepared to be sent to the Imperial Institute, London, for valuation. An investigation was also begun to ascertain the yield of alcohol that might be expected from the carbohydrates in yam. An estimation of the *starch* proved that this practically was the only carbohydrate present.

Referring to my earlier work on food values as stated above, a comparison between the carbohydrates reveals the fact that yams contain about $1\frac{1}{2}$ times as much starch as potatoes do. The potato has been a profitable source for alcohol, so it is to be presumed that the yam under similar conditions should be even more profitable. Theoretically, 1 chemical ton (2,000 lbs.) of yam would yield 600 lbs. starch, equivalent to 666 lbs. glucose, or 340 lbs. alcohol.

This 340 lbs. *absolute* alcohol would yield 42.5 gallons of 98 per cent. alcohol, suitable for most commercial purposes. Assuming manufacturers sold this at 3/- a gallon, and bought the 2,000 lbs. yam at £2, there would be a balance of over £4 to meet the costs of production and yield a profit. So far my best result has been a yield of glucose equivalent to 26.1 per cent. of the yam, equivalent to 13.3 per cent. as alcohol, instead of a theoretical yield of $16\frac{2}{3}$ per cent., but as the investigation is not complete it would be premature to say more.

7. *General Remarks.*—The bulk of the work as usual was the examination of samples for the Customs Department, which submitted 135 out of 213 samples, and the war has had some influence in reducing the number.

Certain laboratory operations of a more or less mechanical routine kind are done by the two native assistants, who likewise assist in the office routine clerical work of preparing vouchers, etc.

W. RALSTON,

Government Chemist.

19th April, 1916.

CHEMICAL LABORATORY,
YABA.

REPORT OF DENTAL WORK DONE IN NIGERIA IN THE YEAR 1915.

WARRI, S. NIGERIA,

April 20th 1916.

SIR,

I have the honour to forward you my report of the dental work done in the Colony from January 1st, 1915, to April 11th, 1915. This completes the account of work done in my previous tour.

LOKOJA—JANUARY 1ST TO 7TH, 1915.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
7	Fillings 6	4	Fillings 4
	Extractions nil.		Extractions 5
	Replacing crown, scalings, dressings, and other minor operations ... 13		Temporary fillings, dressings, and other minor opera- tions 7

EXTRAORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
4	Artificial dentures, crowns and repairs thereto. Fees paid, £7 1s. 6d.	Nil	Nil.

ONITSHA.—JANUARY 9TH TO JANUARY 23RD, 1915.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives	Nature of work.
6	Fillings 7 Extractions nil. Replacing crowns, dressings and other minor operations 8	8	Fillings 4 Extractions 9 Scalings, dressings, and other minor operations 3

EXTRAORDINARY OPERATIONS.—*Nil.*

WARRI AND FORCADOS.—JANUARY 27TH TO MARCH 4TH, 1915.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
10	Fillings 11 Extractions... .. nil. Scalings, dressings, replacing crowns and other minor operations 13	9	Fillings 5 Extractions 12 Scalings, dressings, and other minor operations 5

EXTRAORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
1	Partial artificial denture. Fees paid, £6 6s. 0d.	2	Partial artificial dentures. Fees paid £3 9s.

CALABAR.—MARCH 8TH TO MARCH 19TH, 1915.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
7	Fillings 6 Extractions nil. Scalings, dressings and other minor operations 4	21	Fillings 10 Extractions 37 Scalings, dressings and other minor operations... 3

EXTRAORDINARY OPERATIONS.—*Nil.*

LAGOS.—MARCH 28TH TO APRIL 11TH, 1915.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
24	Fillings 16	6	Fillings 1
	Extractions 1		Extractions 7
	Scalings, dressings and other minor operations 11		Scaling 1

EXTRAORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
2	Repairs to dentures. Fees paid, £1 11s. 6d.	nil.	nil.

TOTAL ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
54	Fillings 46	48	Fillings 24
	Extractions 1		Extractions 70
	Scalings, dressings, replacing crowns, pivots and other minor operations... .. 49		Scalings, dressings, replacing crowns, pivots and other minor operations 19

TOTAL EXTRAORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
7	Artificial dentures and repairs thereto. Fees paid, £14 19s. 0d.	2	Artificial dentures (partial). Fees paid, £3 9s. 0d.

I have, etc.,

(Sd.) H. F. HARDIE.

The Honourable,
Principal Medical Officer,
Lagos.

ANNUAL SANITARY REPORT ON PRISONS FOR 1915.

PRISONS.	Average number 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.
Abeokuta	114.5	71.0	11.5	605.7	5.5	220	120	9.8	26.1
Badagry	38.7	25.8	23.0	440.9	5.8	93	43	13.2	103.3
Epe	48.0	94.0	47.0	200.0	3.4	93	17	1.6	Nil.
Ibadan	167.0	19.7	24.3	178.9	2.2	Nil.	Nil.	Nil.	275.4
Lagos	286.8	48.9	25.8	476.3	6.2	1,608	249	—	27.8
Ondo	31.7	10.9	50.3	346.1	1.0	Nil.	Nil.	Nil.	Nil.
Agbor	96.9	50.0	18.4	545.8	3.9	208	33	6.3	41.2
Asaba	47.6	52.5	Nil.	842.6	2.1	147	34	4.6	189.0
Awka	170.7	29.2	26.6	340.0	5.1	567	479	21.9	216.7
Benin City	95.3	42.7	15.5	289.7	3.2	383	94	18.7	83.6
Forcados	79.7	111.2	7.3	265.7	4.3	3,136	174	8.0	200.7
Ifon	27.0	74.0	17.6	523.2	1.7	Nil.	Nil.	Nil.	Nil.
Kwale	117.7	38.9	20.9	256.5	1.7	546	150	6.8	101.9
Okwoga	56.6	36.8	17.0	137.8	1.4	232	87	9.7	212.0
Onitsha	145.2	63.6	27.6	483.6	6.3	499	239	13.8	227.2
Sapele	138.0	73.4	11.5	539.1	7.6	600	147	15.5	130.4
Ubiaja	83.8	32.3	19.3	324.8	10.3	269	135	10.4	95.4
Udi	116.1	13.0	—	1,652.0	0.2	493	211	8.2	310.0
Warri	179.0	16.7	11.9	171.9	1.5	719	419	14.8	89.3
Afikpo	154.0	33.9	17.0	239.4	10.1	471	192	10.3	155.8
Okigwi	145.8	55.9	4.1	665.3	10.4	310	166	12.1	150.8
Ogoja	80.7	55.4	13.1	402.6	5.5	195	88	4.1	148.7
Obudu	351.0	186.2	17.5	1,894.6	13.7	84	30	11.3	341.8
Abakaliki	41.7	73.2	26.0	833.9	10.8	237	46	9.7	95.8
Calabar	326.4	36.8	20.1	525.4	9.2	709	368	11.4	42.8
Opobo	142.7	25.7	27.2	630.0	12.8	273	85	11.3	113.1
Degema	111.3	71.8	26.2	580.5	10.2	286	41	6.3	89.8
Brass	71.7	34.5	12.7	347.2	3.3	109	33	13.5	83.6
Owerri	116.1	76.8	21.4	893.4	6.2	329	81	10.3	180.8
Ekot	133.0	16.3	—	227.2	1.4	Nil.	Nil.	—	120.3
Ikot-Ekpene	333.3	63.8	15.0	453.3	5.0	883	416	8.8	57.0
Bonny	45.7	48.6	36.0	1,381.9	27.7	193	59	3.6	87.5
Port Harcourt	610.9	81.1	8.0	435.1	4.8	1,833	1,106	19.2	229.1

RETURNS OF INFECTIOUS DISEASES AND INTESTINAL PARASITES.

YEAR.	NEMATODES.																													
	Port-bertl.	Cerebro-spinal fever.	Chicken-pox.	Diphtheria.	Dysentery.	Enteric fever.	Erysipelas.	Gonorrhoea.	Influenza.	Leprosy.	Malaria.	Blackwater fever.	Measles.	Rubella.	Pneumonia.	Rabies.	Relapsing fever.	Rheumatic fever.	Septicæmia.	Trypanosomiasis.	Small-pox.	Syphilis, Primary.	Syphilis, Secondary.	Syphilis, Inherited.	Tetanus.	Tuberculous.	Whooping Cough.	Yaws.	Yellow fever.	Others.
1915	43	1	1,110	3	1,236	1	1	1,659	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	248	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	22	32	167	99	104	...	...

YEAR.	CISTODA.										NEMATODES.									
	Proteozoa.	Trematoda (Flukes).	Others.	Tenia Solium.	Tenia Saginata.	Others.	Ascaris.	Trichocephalus Dispar.	Dracunculus.	Filariasis.	Strongylus.	Anchyllostomiasis.	Oxyuris.	Schistosomum.	Others.	Myiasis.	Others.			
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	...	106	...	...	1,973	3	640	63	2	212	1	...	...	17	57
1912	...	3	...	117	...	...	2,673	6	625	95	2	405	36	...	...	10	17
1911	103	...	...	3,349	...	484	18	...	404	1	20	...	...	63			

RETURN OF ANTI-MOSQUITO WORK, 1915.

	Houses inspected, 1915.	Number of houses with Larvæ, 1915.	Rainfall, 1915.	Rainfall, 1914.	Mosquito Index, 1915.	Mosquito Index, 1914.
Lagos and Ebute-Metta	620,196	19,251	90.4	68.9	3.1	3.3
Aro	10,647	123	42.5	42.1	1.1	2.0
Epe	13,320	517	91.5	77.5	3.8	2.9
Badagry	3,998	182	54.4	79.2	4.5	2.0
Ibadan I.	22,434	978	55.2	249.2	1.3	2.8
Ibadan II.	23,044	2,532	55.2	249.2	10.9	12.7
Oshogbo	4,833	336	3.0	84.1	6.9	13.5
Warri	43,279	123	138.6	61.2	0.28	0.5
Forcados	54,845	137	283.4	249.2	0.24	0.1
Sapele	11,856	133	105.5	65.4	1.12	0.5
Benin-City	10,951	609	50.2	84.1	5.56	2.1
Agbor	6,064	28	86.6	61.2	0.46	0.6
Onitsha	26,668	44	81.3	49.5	0.16	0.1
Asaba	22,986	112	60.3	43.6	0.48	0.2
Siluko	6,788	186	...	...	2.74	3.0
Awka	8,868	366	...	...	0.41	10.8
Koko	2,498	43	...	...	1.72	1.2
Okwoga	6,294	60	68.0	58.6	0.95	0.5
Udi	10,175	57	61.7	62.0	0.56	0.5
Calabar	98,252	403	136.6	122.5	0.41	0.3
Opobo	10,928	37	154.8	137.1	0.33	0.4
Bonny	8,947	610	176.1	163.7	0.68	7.8
Degema	21,128	103	77.2	63.1	0.48	0.1
Brass	9,807	54	82.0	130.8	0.55	0.6
Owerri	17,159	132	110.9	82.9	0.76	2.6
Abakaliki	4,109	...	95.4	45.8	...	...
Afkpo	2,700	271	38.9	62.0	10.0	12.8
Eket	7,043	447	...	...	6.3	4.5
Ikot-Ekpene	1,342	26	96.9	69.3	1.9	2.7
Obudu	2,262	2	83.0	63.6	0.088	0.5
Ogoja	2,891	84	...	...	2.8	1.3
Port Harcourt	14,668	327	71.5	...	2.2	1.2

SPLEEN RETURNS FOR THE YEAR 1915.

DISTRICT.	Number of children examined.	Percentage with enlarged spleen.
Lagos and Ebute-Metta	510	42.9
Aro... ..	335	8.3
Badagry	662	48.3
Epe... ..	52	67.3
Ibadan	1,089	52.1
Agbor	570	35.9
Awka	405	34.8
Benin City... ..	954	32.7
Forcados	1,837	40.5
Ifon	120	32.5
Okwoga	189	63.4
Onitsha	2,653	62.9
Sapele	166	45.7
Udi... ..	289	24.2
Warri	304	50.9
Ogoja	57	15.7
Abakaliki	54	51.8
Calabar	38	42.1
Opobo	781	79.8
Dagama	48	43.7
Brass	2,837	68.1
Owerri	362	48.6
Eket	53	28.3
Ikot-Ekpene	164	28.6
Bonny	251	48.2
Port Harcourt	473	22.6