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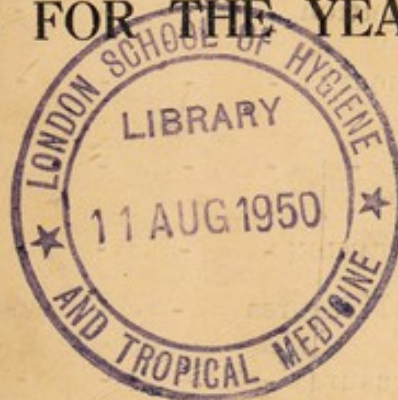


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GAMBIA COLONY.

REPORT ON THE MEDICAL AND HEALTH
SERVICES FOR THE YEAR, 1947.



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REPORT ON THE MEDICAL AND HEALTH SERVICES FOR THE YEAR, 1947.

I. IMPORTANT EVENTS OF THE YEAR.

Treatment Centres. The general picture, described at some length in the 1946 Annual Report, remains largely unchanged. Although a reduced specific allocation of £88,000 from Colonial Development and Welfare Funds was finally approved for new buildings, various obstacles prevented utilisation. Plans for the reconstruction of Victoria Hospital, Bathurst, and for the provision of three Health Centres, at Brikama, (Western Division) Kuntaur (MacCarthy Island Division), and Mansakonko (Central Division) are prepared however, and it is hoped that a commencement will become possible in 1948. Complete reconstruction of the Victoria Hospital has been planned to take place in a series of phases, probably at long intervals, as funds and other circumstances permit. The new design has therefore been influenced partly from this reason, and also from the need to utilise the existing excellent site occupied by a hundred years of growth of primitive accommodation, some of 'permanent' construction, others of a 'temporary' nature, but all now inadequate and poorly related to each other. Serious congestion and the need for improvisation to overcome the increasing accommodation demands are now constant problems.

2. The Victoria Hospital "Master" plans are designed to cater for the indefinite future, and for simultaneous occupation of old and new buildings, until the final reconstruction phase is reached. For this ultimate step, a number of ex-Services' quarters on the Marina near to the Hospital site have been acquired by Government for use as temporary Hospital wards, and already one of these is in use as a combined women and childrens' ward.

3. The first stage of reconstruction, estimated to cost approximately £80,000, will consist of (a) two wards, each of twenty-eight beds, united by a central block providing accommodation for operating and dental suites, X-rays, duty rooms, Hospital Registrar's Offices, staff changing rooms etc, and (b) a service block containing kitchens, laundries, stores etc. of a capacity sufficient to provide for the whole new Hospital when complete. This phase will provide an additional fifty-six beds, and both blocks are so sited as to require a minimum of demolition and alteration of existing buildings. The next reconstruction phase will add similar wards above those built in the first phase. Subsequent phases will take the form of gradual and pre-arranged replacement of the older accommodation.

4. At present some 124 in-patients can be cared for, many under very indifferent conditions. The first phase additions and deductions will result in a total of 172 beds becoming available. Ultimately, in the distant future, the target of 178 beds should be reached. This is not a considerable increase on the bed-state to be provided at the end of the first phase, but the ward conditions will be drastically different. It will be appreciated therefore that the first phase is aimed principally at giving an urgently required increase in accommodation, and later phases at improvement generally.

5. For the three additional Protectorate Health Centres proposed, a balance of some £8,800 should become available. This is grossly inadequate for erection of the type-plan structures prepared and estimated to cost £4,300 each. Improvisation will therefore become essential, even with the financial aid now promised by Native Authority Treasuries. It is anticipated that the Brikama and Kuntaur Centres should be completed in this improvised manner in 1948. The Mansakonko Health Centre, at the projected new Headquarters, Central Division, will have no existing nucleus on which to base improvisation, and would therefore be more costly.

6. *Combined Headquarters.* Following the removal of the Public Utilities Department to the ex-R.A.F. base at Half Die, the Department has been given permission to acquire their old yard and premises as a combined Headquarters for both Medical and Health Services. This is regarded as a major step forward, permitting greatly increased unification and economy of work. The accommodation available will enable all Departmental stores to be centralised under unified supervision for the first time and will provide the Health Service with an adequate suite of offices, including school inspection, vaccination and inoculation clinics, staff lecture room, disinfection unit, with separate accommodation for Sanitary Inspectors, Sanitary Superintendents, and Medical Officer of Health's laboratory etc. Offices and laboratory for the Entomologist and his staff will also be provided.

7. *Staff Prospectus.* For several important reasons it has been necessary in the past few years to effect a drastic reorganisation of staff training methods and service conditions generally. Primarily this was demanded by the considerable increase in staff recruited, and in some cases by the absence or deficiencies of existing training programmes. Later the Rushcliffe Report recommendations influenced and accelerated production of the new medical training programme. Next the Harragin Commission recommendations adopted by Government demanded a welding together of all these innovations. At the same time it was necessary to introduce and encourage higher standards of training in the long-neglected Health Service, aiming at eventual adoption of Royal Sanitary Institute standards. In dealing with recruits of the educational standards available in this Colony the problems encountered were and remain formidable, but it was clearly essential that guides and standards must be laid down if the necessary uniformity and continuity of training were to be secured. A comprehensive prospectus was therefore

prepared embodying teaching curricula for all sections of the services, together with a resumé of the revised conditions of Service. While the curricula in some instances may be regarded as optimistic and the length of training periods in some respects hopeful rather than realistic, confirmation is already available that great improvement on older standards is being produced, and there is justification for the hope that with the higher educational standard of recruits anticipated in the future, the task of teacher and pupil will gradually lessen, and the results further improve. At present a certain latitude in examination standards and extension of training periods are from time to time necessary. Nevertheless a basis has been firmly instituted, and for much help in the production and establishment of the prospectus standards the Department is greatly indebted to the staff of Nursing Sisters and particularly to Miss F. K. Walker, lately Senior Nursing Sister.

8. *Mosquito Control.* In the 1946 Annual Report (paragraph 3) reference was made to the formulation of plans for reclamation of extensive swamp breeding areas in the vicinity of Bathurst. The Entomologist, Mr. Campbell, has now prepared a scheme for the reclamation and drainage, by bund and sluices, of approximately thirty square miles of tidal swamp extending from Bathurst to the Kombo mainland. The initial object of the scheme was the virtual elimination of malaria vectors, chiefly *A. Melas*, from most of the Colony including Bathurst, and the heavily populated areas bordering the same swamps in Kombo districts. If feasible and successful the proposals should not only revolutionise health conditions in the large areas affected, but would simultaneously, by the creation of shorter and improved communications, remove the relative separation of urban and rural interests hitherto created, and encouraged, by circuitous distances. Further, an equally important benefit would be the valuable land which it is anticipated the proposals would make available both for agricultural and building purposes. Government has given a '*prima facie*' blessing to the plans prepared, and it is anticipated they will now be referred for expert technical advice.

9. *Nutrition.* The following precis of the work of the Human Nutrition Research Unit of the Medical Research Council in the Gambia has been kindly supplied by Professor B. S. Platt, C.M.G., who is both head of the Unit, and Professor of Nutrition in the University of London. It continues in a more comprehensive manner, the preliminary account of the Unit's work included in the 1946 Annual Report.

" A central organisation for the co-ordination of investigations
 " into nutritional problems in the Colonial Territories was set up in
 " 1938 on the advice of the Economic Advisory Council's committee on
 " Nutrition in the Colonial Empire. The purpose of this organisation
 " is described in Part I of the report of this Nutrition Committee (Cmd.

“ 6050. H.M.S.O. 1939)—a document which should be familiar to
 “ everyone interested in nutrition in the colonial territories. Towards
 “ the end of the war, Dr. B. S. Platt, the senior member of the staff of
 “ the central organisation, visited the West African territories to dis-
 “ cuss with Governments the possibility of establishing a centre for
 “ nutrition research. In 1946, the Nutrition Sub-Committee of the
 “ Colonial Medical Research Committee, having before it an offer from
 “ His Excellency the Governor of the Gambia, Sir Hilary Blood, of
 “ support and facilities, submitted to the Secretary of State, plans for
 “ a Field Research Station and a Nutrition Field Working Party.
 “ Some preliminary investigations of Gambia foods and dietary surveys
 “ were made by Miss Joyce Griffiths in 1945—1946, and in 1946 Drs.
 “ Berry and Bunting examined briefly the possibilities of including
 “ the nutrition of village people in the middle River area by extending
 “ rice production in the swamp lands, using modern agricultural
 “ machinery. The Nutrition Field Working Party began its work in
 “ January, 1947 in the village of Geneiri in the West Kiang District.
 “ During the first year the state of nutrition was assessed, the preva-
 “ lence of diseases other than those due to malnutrition determined.
 “ the amounts of various foods eaten measured and evaluated in terms
 “ of the most important known nutrients, and quantitative data
 “ obtained on land utilisation, crop yields, and the labour costs of
 “ crops grown by the Geneiri people. Information essential as a
 “ foundation for further work in the village has been obtained on such
 “ matters as food habits and responsibility of individuals in the village
 “ for the organisation of affairs within the community. An excellent
 “ spirit of co-operation exists between the villagers and the staff of the
 “ Working Party.

“ A good start has been made on the second year of the Working
 “ Party’s programme. In 1948, with the help of mechanical equip-
 “ ment, the villagers and the Working Party together expect to produce
 “ at least twice as much staple cereal grain as in 1947; to increase
 “ groundnut production by fifty per cent; to apply improved methods
 “ to the production of rice on a token area, and to raise a variety of
 “ vegetables. In order to enable the villagers to make the extra effort
 “ involved in this increased production, which includes the clearing of
 “ bush from most of the additional area cultivated, arrangements have
 “ been made for improvements in the feeding of the farmers. The
 “ Working Party is also making field trials of groundnut production on
 “ about fifty acres of village land. Careful and detailed records of
 “ all types of operations are being kept so as to ascertain, with the help
 “ of the staff of the Agricultural Economics Research Institute at
 “ Oxford, the costings of a mechanised African village farm. The
 “ agricultural operations are being conducted with the help of the

“ staff of the Department of Agriculture of the Gambia which is making plot trials of crops on land cleared for the purpose in the adjoining village of Masembe. Progress is being made with developing a method of spreading literacy amongst the villagers; other necessary educational measures are being considered. A committee under the chairmanship of the Colonial Secretary advises the staff of the Working Party on the interpretation of its plans in the light of local knowledge and experience.

“ A Nutrition Field Research Station is being established on the sites of the former 55th General Hospital and the Luft Hansa station. Reconditioning of buildings was started at the end of October, 1947. On March 1st, 1948 a ward was opened for the investigation and treatment of patients suffering from the effects of malnutrition. During the remainder of the year laboratory and other buildings will be reconditioned and equipped.

“ The work of the Working Party and at the Research Station at Fajara is linked up with the fundamental research done at the Medical Research Council's Human Nutrition Research Unit in London, and with the teaching and training centred in the Department of Nutrition of the London School of Hygiene and Tropical Medicine. At the request of the Colonial Medical Research Committee space and facilities have been provided at the Research Station for medical research work on subjects other than nutrition, so that it is to be expected that the station at Fajara will, in time, become a research centre for tropical medicine. Whilst both of the projects described are primarily parts of a central organisation developed to serve colonial territories in general, the Gambia will undoubtedly derive much benefit from these activities. The Field Working Party in particular will need to co-operate closely with several government departments and indeed it is already co-ordinating its efforts with those of members of the staffs of the administration, of the medical, agricultural and education departments, and with the local native administration.”

9. (ii) Mrs. Doughty's valuable Nutrition Survey in the Gambia, referred to in the foregoing statement by Professor Platt, remains in the hands of his Unit, and has not yet been published. Nevertheless quotations from her full report were employed by Professor Platt in an address to the Royal Society of Tropical Medicine and Hygiene now available as a reprint from the Transactions of the Society, Vol. 40, No. 4, entitled “ Colonial Nutrition and its problems ”. Pertinent extracts from his address, with explanatory comments added locally have been published in the Gambia. The comparative table included in his address is given in Appendix D to this Report.

Dr. Eddy, Medical Officer of Health who supplied the local commentary to Professor Platt's address may also be quoted usefully:—

“ All the medical symptoms due to lack of these food constituents were noted by Mrs. Doughty, and indeed are noted daily by medical officers working in the Colony and Protectorate. The faults in the diet leading to them can largely be assigned to an over-dependence by most of the population upon a very limited number of food crops—such as rice and coos—and a failure to use milk and other animal foods to any great extent. Improvement can be expected only by production of a much greater variety, as well as greater quantity, of foodstuffs. For instance, the importation of more rice than the country could eat would not remove many of these nutritional defects, though it would supply all the calories or fuel needed.

“ It should be noted that column I of the table (Appendix D), merely states a possible immediate target for a country such as this experiencing difficulty with nutrition, which would produce a substantial increase in health. It must not be taken to represent the best diet possible for all classes of the community.”

9. (iii) In August 1947, the Gambia Nutrition Committee (appointed by Government and engaged in consideration of Gambia problems for many years before the advent of the Human Nutrition Research Unit team) drew attention to continued failure to cope satisfactorily with the observed under-nourishment of Bathurst school children, and to the need for more detailed investigation before an adequate policy could be recommended. In consequence, the Committee, on the advice of Mrs. Doughty of the Human Nutrition Research Unit, who acted as Secretary during her stay in the Gambia, decided to institute a daily supplementary “ snack ” meal containing essential constituents considered to be normally lacking in the children's diet, and to assess the results. In consequence the Medical Officer of Health with the co-operation of the Education Department made a random selection of 450 children from six different schools. All children were carefully examined at the beginning and end of the demonstration by one observer, (Dr. Eddy, who assumed charge of the work). The commonest nutritional defects noted, and thought to be general, were ascribed to lack of the nutritional B2 group, chiefly riboflavin, and of protein. Both were noted to be associated with a hypochromic anaemia. Of the total 450 children employed in the demonstration 225 were given milk and iron and the remainder acted as controls. The dosage given for each child was:

Skimmed milk powder	...	...	...	...	1.35 ozs.
Ferrous Sulphate	...	...	...	...	2 grains
Water added to half a pint.					

The mixture proved popular, and the addition of iron did not appear to detract from acceptability. It was issued under responsible supervision on five schools days per week for a total of 120 days, and as circumstances were later shown to permit, a generous half-pint measure proved possible.

Full assessment of the results involve much labour, and will be quoted more fully in next year's Annual Report. Meantime it can be said that notable improvements in the health of the children were not observed as a result of the demonstration, but many valuable conclusions for future guidance have become available. It is now considered the constituents of the supplementary diet, and the length of the period of administration, were probably inadequate to produce definite results.

10. *Bathurst Surface Drainage.* Progress is being made with this major scheme which includes bunding of a large area from near the Infectious Hospital to Half Die, with sluices interposed at suitable points. Part of the enclosed area is designed to act as a receiving sump for surface water to be later discharged into the river at low tide. It is hoped to have the outfall works in operation in the rainy season of 1949.

11. *Bathurst Conservancy.* Plans have been prepared, and complete installation is anticipated in 1948 and 1949 of a system of "static tank" public latrines similar to those installed in the Accra re-housing schemes. These will replace the existing bucket system which has incurred much public disfavour. The substitution has been made possible by a free grant of £20,000 from Colonial Development and Welfare Act funds. Popular desire would best be satisfied by adoption of a full water-borne conservancy scheme for both public and private use, but this is ruled out meantime both on the score of cost, and inadequate water supply. It is hoped however to encourage the installation of septic or "static" tank units for private use by householders, and gradually eliminate the bucket system altogether. Furthermore, it is the opinion of this Department that the large 'floating' public, who are the chief users of public latrines are not yet fully able to appreciate the care necessary for the successful working of a flush system using pipes, etc., which are readily blocked. A further important value of the "static tank" system is the conservation of latrine products for composting purposes in a country in great need of manure. These products can be cheaply transported to suitable composting sites without nuisance by means of the "Gulley Emptier" type of vehicle which is in process of acquirement.

12. *Aerodromes.* The Half Die Seaplane base remains unused, and Yundum Airfield, now deserted by the B.O.A.C., is little used except by the West African Airways Corporation in its limited schedules. Health work at these airports is therefore now of negligible amount and importance.

13. *Protectorate policy.* With the sub-dispensary system, the Protectorate area is gradually having many of its medical treatment needs satisfied. The system is briefly that each Health Centre or Dispensary has one or more satellite sub-dispensaries which are visited by an officer of the parent unit at approximately weekly intervals. The principle is that in this way permanent and effective health information bureaux will be established in most if not all districts at a minimum cost. The next function of these units in order of priority will be the treatment of epidemic and endemic disease, to which special attention will be paid. Minor ailments of many kinds must also of necessity be catered for in order to maintain the inducement to attend, but they are of secondary importance in the scheme. Subsequently Sanitary Inspector areas will be made co-extensive with medical treatment areas, and thus create the closer liaison essential to progress. In addition to the usual general sanitary measures, the Sanitary Inspector and Dispenser will use the treatment centre disease records as a guide to methodical follow-up measures. Plans are now in preparation to accelerate promotion of these ideas, and to stimulate health interest generally in the Protectorate by the creation of a mobile Health Propaganda Unit, and it is hoped to have this Unit in operation in the 1949 dry season. Concurrently or at later stages the problems of housing now under consideration will be taken a step further.

14. "*Sample*" *Medical Survey.* The Medical Survey to which reference was made in Section 1 paragraph 6 of the 1946 Annual Report successfully completed its task, and has added most important information to the Departmental records. The Report is published separately as a Sessional Paper to be obtained from the usual sources, and only a brief account of the results will be given here.

15. Initially the Sample Survey (now referred to as the "*Ross Medical Survey*") was designed to assess more accurately the incidence of leprosy in the Protectorate about which there were conflicting views. With the resources at the Department's disposal no more than a "*Sample*" Survey could be attempted, and with the advice and support of the Nigerian Government and *BELRA*, Dr. Ross, an experienced Leprosy Medical Officer of the Nigerian Leprosy Service was temporarily seconded to lead a locally-provided team. The choice of leader proved outstandingly fortunate and the full programme, and more, was carried out with praiseworthy enthusiasm and efficiency. Dr. Ross was ably supported by his wife, and by Dr. E. B. Forster, Mr. Jas. Roscoe, S.R.N., (a *BELRA* lay-worker), and a team of Dispensers, Sanitary Inspector, and Laboratory Technician.

16. For reasons of tact demanded of all leprosy investigations, the project was equivocably designated the *Ross Medical Survey*, and in conformity with this purpose the inquiry was originally designed to include such observations as were possible on the incidence of yaws, hookworm, malaria, and sleeping sickness in course of the leprosy assessment, but various modifications were later incorporated to meet the conditions encountered. Not the

least important of these additions is the separate enquiry into child mortality undertaken by Mrs. Ross.

17. Three separate groups of the Protectorate population, each approximately 5,000 in number, in widely distant areas, were chosen for examination. Eventually a total of 17,418 persons, including both sexes and all ages were examined, and few if any persons in the selected groups are considered to have escaped examination.

18. The Department is indebted to Dr. Eddy, Medical Officer of Health, for collation and analysis of the mass of statistics collected, from which the following commentary and statistical summary is abstracted.

(a) LEPROSY.

The annual tax census of the Protectorate of the Gambia for 1945 gives the following figures for population:—

North Bank Division	45,579
South Bank Division	58,317
Kombo North and St. Mary	16,014
MacCarthy Island Division	47,866
Upper River Division	48,331
Total	216,107

The percentage incidences of leprosy in the three areas surveyed, with their standard errors are:—

	Incidence.	Standard error of percentage.
Kombo Area	1.3%	0.16%
M.I.D. Area	2.9%	0.22%
U.R.D. Area	3.2%	0.21%
All Areas	2.5%	0.12%

If the general incidence of leprosy of 2.5% in the sample can be said to be representative of the incidence in the Protectorate as a whole, it may be estimated that there is an approximate total of between 5,000 and 6,000 lepers in the whole population of 216,107, and in the populations of the Divisions concerned there are probably 1,200—1,600 lepers in the MacCarthy Island Division, 1,500—1,900 in Upper River Division and 520—660 in what was the South Bank Division. With a leprosy infectivity rate of 3.3 per 1,000 population over the whole survey and of 5 per 1,000 in the highly infected Upper River area, it may be said that there are probably between 600 and 800 highly infectious lepromatous-lepers in the Protectorate as a whole, and

between 200 and 300 in the Upper River Division. These highly infectious cases, if they are not in some way controlled, will continue to spread the disease, and still further increase its incidence.

(b) TRYPANOSOMIASIS.

19. As might be expected, the incidence of trypanosomiasis varies markedly from village to village; there is an overall incidence of 4.4%, with a variation of incidence from nil in Sare N'Gai to 13% in Fula Bantang both in MacCarthy Island Division, with a standard deviation over the whole survey of 2.6%.

It is of interest to compare the incidence of 2.5% in the Kombo area, 4.2% in the MacCarthy Island area, and 6.0% in the Upper River area, with incidences found in other areas of the country in previous surveys. Lochhead in 1937 surveyed 23 towns of the North Bank of the river between Barra and Kuntaur. He examined 7,151 persons and found an incidence of 2%. There was an incidence of 3.5% around Kaur and Kuntaur, 1% in Baddibu, and 5% in Jokadu and Niami. He noted that incidence appeared to be related to proximity to the river and to swamps. Bowesman in 1939 found an incidence of 4.2% in six towns surveyed in the former North Bank Division, and MacGowan in 1942 working in the same area found an incidence of 1.4% among 3,160 people examined. He also found an incidence of 2.2% in 2,648 people examined in 17 villages in the Bintang—Bwiam area, adjacent to the Kombo area visited by this survey, with incidence in different villages varying from nil to 6.6%. In the Kanfinde—Sintet area to the South of Bintang Creek he found in 3 groups of villages an incidence of 5.5% in 1,489 persons examined.

Probably from 6,000 to 10,000 people in the Protectorate are infected with trypanosomes demonstrable by gland puncture, and it is to be noted that gland puncture alone does not suffice to diagnose all cases. What is more important than the number infected is the fact that practically every village surveyed by this and other surveys contained some persons suffering from the disease.

(c) SCHISTOSOMIASIS.

20. The incidence of 35—36% in the MacCarthy Island and Upper River areas may be compared with the figures obtained during the survey made by Major W. M. Jones and Captain C. C. Thomas, R.A.M.C., in 1945. Urines were collected from boys aged 5—14, and those found to contain red blood-cells after standing were centrifuged and examined. Areas covered were 8 villages in Upper and Lower Saloum on the North Bank of the Central Division, 5 villages around Kuntaur on the North Bank of MacCarthy Island Division, 23 villages in the Upper River Division, in Fulladu East, Sandu, and Wuli, 6 villages in the Kombo, including Brikama and Gunjur, and 8 villages around Bintang Creek on the South Bank in the Western and Central Divisions.

Their findings were as follows:—

	Kombo Area	Bintang Area	Saloum Area	Kuntaur Area	U.R.D. Area,
No. urines examined	126	125	76	57	310
No. urines with <i>S. haematobium</i> ova	3	2	9	14	94
% urines with ova	2%	2%	12%	25%	30%

As in the present survey, there was a considerable range in the incidence in different village surveyed, from 2% in the Kombo up to as much as 64% in fifty-five urines examined at Boro in the Upper River Division.

Jones and Thomas made a search for snails, but comment that although a few *Planorbis* and *Physopsis* spp. were found the high infection-rate of urines was remarkable, when the failure to find snails, and the complete absence of water apart from deep wells, in the dry season, is considered. The virtual absence of infection from the Kombo peninsula, where what appear to be suitable streams and fresh-water swamps for the development of the snail exist, is not fully explained. The distribution of the disease appears to be correlated to the salinity of the water in the River Gambia, and Jones and Thomas make the interesting suggestion that the vectors may be carried down with weed by flood-water from the upper reaches in the wet season, and swept up the mouths of tributaries and creeks by eddies and tidal flow. The increase of salinity of water below Kaur would kill snails carried beyond that point, and act as a barrier to infection in the land surrounding the lower reaches and mouth of the river.

(d) YAWS.

21. Lochhead in 1938 referred to the prevalence of yaws in the area he surveyed on the North Bank of the river, and also remarked upon the relative scarcity of secondary yaws. He made a rough estimate that about 20% of the population appeared to be suffering from some form of yaws. Whatever the aetiology of the conditions observed, an incidence of 13% of disease of the skin, bones, and cellular tissues observed in the present survey is a reflection of the low standard of health of the population surveyed.

(e) GENERAL.

22. Dr. Ross comments:—

“In the three diseases, Trypanosomiasis, Schistosomiasis and Malaria, few symptoms were found of the disease in adults; this was not so in growing children. It was not uncommon to find a child of three or four years with trypanosomiasis or schistosomiasis with an

enlarged spleen and a blood-infection of malaria, or perhaps even a combination of schistosomiasis and trypanosomiasis. This would account for the "aged look" and manner of movement found in the majority of children, the lack of initiative in games, and the absence of exuberant spirits expected in normal healthy children. It also partly accounts for the high death-rate amongst children under ten years of age."

"The high incidence in the body without serious signs and symptoms supports the theory that the body develops a tolerance to the infective organism and resistance rather than an immunity to the actual disease".

23. Comments similar to this and to Dr. Ross's observations about deficiency diseases have been made by every medical officer who has made surveys of disease in the Gambia. All refer to the generally low grade of health, and its inextricable association with poor nutrition, the strain of the "hungry season", and the poor economic state of the people. This survey amply confirms these views, and presents a picture of a heavily parasitized population.

24. That the adult attains a resistance to a multitude of parasites and infections should not be allowed to conceal the fact that he does so at the cost of a heavy toll of infant-life, possibly only partially revealed in this survey, and at a great loss of efficiency to himself. The resistance acquired is not the permanent immunity which is associated with certain diseases, where recovery from the infection is complete; it is an uneasy and lifelong partnership. With diseases like leprosy, yaws, and filariasis, it is a partnership which often disables and mutilates. Less obvious are the effects of malaria, intestinal helminthiasis, and permanent undernutrition, which are shown by the high incidence of marked anaemia, and by the frequently observed incapacity of the Gambian for sustained efficient work. It is commonly accepted by local firms that the Gambian "won't work", and labour forces for the heavy work of loading ships are mainly recruited from tribes outside the territory. With the general picture of ill-health and poverty revealed by this survey, it is just to assume that his inefficiency is due to his physical condition rather than to some conjectured racial incapacity.

25. Other adverse aspects of the health of the community not touched by this survey, are the periodic outbreaks of epidemic disease such as small-pox, and cerebro-spinal fever. These exert their effect rather by a wastage of life than by the more insidious imposition of chronic ill-health, but the disruptive effect of periodic epidemics upon the economy and efficiency of the community should not be disregarded.

26. The main medical problems are control of insect-borne disease, (a formidable undertaking), improved housing and domestic sanitation, and ample food-supply. When this is appreciated it becomes clear that the problem is not medical alone, and indeed, possibly not primarily a medical problem at all, so much depending upon sound agriculture and an improved economy. One may undertake schemes for the eradication of tsetse and its resultant trypanosomiasis, or of the anopheles mosquito, but such schemes will often have a direct effect on agricultural policy and must be firmly co-ordinated with it. Upon the other hand schemes of development undertaken without regard to the medical state of the population will be gravely handicapped, or if the uneasy balance between host and parasite is upset, may prove to be disastrous.

II. ADMINISTRATION.

A. STAFF.

27. In 1947 the title of the head of the Department was altered from Senior Medical Officer to Assistant Director of Medical Services, with effect from the 1st January, 1946, and in the 1948 New Year Honours, Dr. C. W. F. Mackay the present holder was awarded the O.B.E.

28. The following staff changes were recorded:—

Dr. E. B. Forster and Dr. S. G. Gordon, Medical Officers, both assumed duty on 10th January on first appointment. Dr. W. E. Hadden Medical Officer, was on leave from 20th February to 18th September. Dr. Eddy returned from leave on 1st March. Dr. S. H. O. Jones, Medical Officer, proceeded to United Kingdom on study leave on 18th July. Dr. C. W. F. Mackay, Assistant Director of Medical Services, proceeded on leave on 6th November and Dr. Eddy acted in his absence.

29. Mrs. R. E. Campbell (née Wight), Nursing Sister, returned from leave on the 10th January. Miss C. N. Michie, Nursing Sister, assumed duty on 17th March on first appointment. Miss M. M. Wordley, Nursing Sister, was on leave from 15th April to 18th September.

Miss A. M. Rankin, Nursing Sister and Mrs. E. Kennedy (née Dawson) Infant Welfare Sister assumed duty on 2nd and 18th May respectively on first appointment. Miss F. K. Walker, Senior Nursing Sister, proceeded on leave on 18th July prior to retirement, and Mrs. R. E. Campbell assumed the duties of Acting Senior Nursing Sister as from the date of Miss Walker's departure. Miss M. M. Shepherd, Nursing Sister, proceeded on leave on 10th October.

30. Mr. H. Archibald, Sanitary Superintendent, proceeded on leave on 11th January prior to return to Nigeria, on completion of his period of secondment to the Gambia. Mr. C. W. Cottier, Senior Sanitary Superin-

tendent, proceeded on leave on 18th July. Mr. T. MacCarthy, Sanitary Superintendent, assumed duty on 8th August on first appointment.

31. The supply of Nursing Sisters remained satisfactory, and one additional Sanitary Superintendent was recruited leaving one vacancy. More serious is the continued shortage of one Medical Officer.

32. Two Second Grade posts for female nurses were created and filled. The present Laboratory Technician and a Dresser/Dispenser were promoted from Third to new posts created in the Second Grade, and two additional Second Grade posts for Sanitary Inspectors were created of which one was filled.

33. The Gambia Women War Workers medal awarded annually to the best probationer nurse completing training, was won by Nurse E. C. Forbes and the medal and the various certificates gained by other members of the Service were presented to the recipients by the Governor at the annual award ceremony.

B. LEGISLATION.

List of Ordinances Regulations, etc. affecting Public Health during the year 1947.

Serial No.	Date	Short Title.	Provisions.
ORDINANCES.			
REGULATIONS.			
3	15th March, 1947.	The Kombo St. Mary Market Regulations, 1947.	Establishment and control of markets in Kombo St. Mary Division.
5	5th May, 1947	The Town of Bathurst (Building) (Amendment) Regulations, 1947.	Amending regulations 16 & 17 of the principal Regulations.
6	17th July, 1947	Kombo St. Mary (Building) Regulations, 1947.	Regulating the erection of Buildings in Kombo St. Mary Division.
8	21st July, 1947	The Kombo St. Mary (Death & Burial) Regulations, 1947.	Regulation and control of burials and cemeteries in Kombo St Mary Division.
ORDERS.			
11	17th July, 1947	The Public Health Order, 1947.	Addition of Yundum air-field to schedule to Public Health Order, 1935.
12	21st July, 1947	The Public Health (Kombo St. Mary Application) Order, 1947.	Application to Kombo St. Mary of certain sections of the Public Health Order, 1935.
4	18th July, 1947	NOTIFICATIONS.	Addition of Basse Santa Su to second schedule of the Protectorate (Building) Regulations, 1943.

C. FINANCE.

	Estimated.			Actual.			Increase.			Decrease.
	£	s.	d.	£	s.	d.	£	s.	d.	
Revenue ...	4,500	0	0	5,487	6	7	987	6	7	—
Expenditure	67,582	0	0	68,396	7	10	814	7	10	—

MISCELLANEOUS SERVICES.

	Estimated.			Actual.			Increase.	Decrease.		
	£	s.	d.	£	s.	d.	—	£	s.	d.
Contribution to Medical Associations Schools, etc.	309	0	0	155	0	0	—	154	0	0

Colony.

	Estimated.			Actual.
	£	s.	d.	
Total Revenue ...	£588,000			£693,773
Total Expenditure ...	608,000			633,272

Percentage expenditure on Medical and Health Services 10.8%

D. MEDICAL SUPPLIES.

34. Various external and internal factors combined to make 1947 a year of difficulty. The rapidly expanding Department, together with store-keeping problems, created many of these, but while Departmental store difficulties are being overcome, and will be simplified when all Departmental stores are unified in the new headquarters, problems arising from the narrowing margin of stocks carried, largely due to the greatly increased treatment demands, and the continuous rise in the cost of drugs and dressings, coupled with erratic and delayed receipt of supplies from United Kingdom, are likely to continue to cause concern. The more essential stocks are in fair supply however, and the creation of a depot in Lagos by the firm of Messrs. May & Baker, Ltd. has been of service.

III. PUBLIC HEALTH.

A.—HOSPITAL AND DISPENSARY STATISTICS.

35. Patients treated in the past three years are compared:—

HOSPITALS.				HEALTH CENTRES & DISPENSARIES.	
Year.	Total admissions.	Outpatient new cases.	Outpatient attendances.	New cases.	Total attendances.
1945	2,371	*	57,918	36,171	†
1946	2,903	*	37,830	52,608	†
1947	3,594	34,284	57,664	53,754	138,145

*Included in gross total of attendances in previous years.

†Not available.

36. Commenting on these statistics, the causes for the fall in the 1946 Hospital outpatient attendances were explained in last year's Annual Report, but although the reasons still operate, the loss has been regained. In the case of minor units the increases observed bear an immediate relation to the number of sub-dispensaries opened. 1947 was a year of stabilisation while new staff remained in training, and it is not anticipated that many new centres can be opened until 1950 when the 1946 recruits should become available. To some extent also the supply situation described in Section D has affected attendances at minor units.

37. The constant and increasing demand for treatment centres in a cosmopolitan area such as the Gambia raises a variety of considerations apart from those of staff, supplies, and costs generally. As explained in paragraph 9, the creation of inexpensive sub-dispensaries, when supported by preventive measures, is the broad policy of the Department, but however satisfactory such an arrangement may be in theory, there must be a limit to the network of units the Department can provide. Unfortunately the boon of a treatment centre cannot be granted solely because of disease incidence. Density of population and other administrative considerations must be taken into account. It is anticipated that as the scheme settles in it can be economically tightened up in various directions, and efficiency increased. Meantime Native Authorities continue to offer the inducement of the necessary buildings in their areas in order to hasten establishment of these centres and it is the Departmental hope that they will display an equally eager co-operation in the advance of hygiene and sanitation which will be the essential *quid pro quo* if the treatment unit is to be established and supplied by the Department.

B.—UNIT DISTRIBUTION.

38. In 1947 many propositions for additional treatment centres were received, but it has been possible only to open new centres at Madina Bafuloto and Sika in the North Bank area of the Western Division. The Dispenser, residing at Bafuloto, services both these units and Kuntaya. Priority has been given to this area because of a heavy Sleeping Sickness incidence reported in the area to the east of the road joining these centres. A new sub-dispensary has also been opened in Saliken, served from Kerewan. This large town (population approximately 8,000) is situated in an unhealthy area. Jawara, at the head of the Mini Minium Bolon near the French border has been closed down as not subserving its function. It had been serviced by Kerewan. In the Central Division a sub-dispensary was opened at Pakali N'ding, chiefly to attend to the needs of large labour forces engaged in trans-Gambian road construction and agricultural projects. Although these activities have now ceased or diminished, the unit, serviced now by Kaiaff will continue until the future of Mansakonko in the same area becomes clearer. Bureng and Dankunku, hitherto serviced by Kaiaff and Kaur respectively, are now attended to by one officer stationed for half his time at each. Kaur

now undertakes care of a new centre opened at N'Jau. In Upper River Division approval has been given to open a sub-dispensary at Bakadaji, to be serviced by Diabugu, but it has not yet been built. The Nutrition Field Working Party have established a Dispensary of its own at Genieri.

39. The changes noted in the preceding paragraph bring up-to-date the Unit Distribution list published in paragraph 18 of the 1946 Annual Report.

40. Sanitary Inspectors are at present posted in the Protectorate as follows, but it is intended to increase their numbers and arrange for redistribution as forecast in paragraph 13 as soon as quarters, etc. can be found.

Brikama	Basse
Bwiam	Diabugu
Georgetown	Kaur
Bansang	Kuntaur
	Jawara.

C.—GENERAL REMARKS.

41. It will be appreciated that the state of the public health as evidenced by patients treated at Government units is far from being a complete picture. The great bulk of sickness is seen by unqualified staff in out-station units, and while the standards of diagnosis and treatment are relatively higher than in most dispensaries in West African territories owing to the staff training system, the diagnostic range is necessarily limited. Recognition of most diseases of epidemic importance seen can however be accepted as tolerably accurate. The cosmopolitan atmosphere of the Gambia imposed by its shape and environment leads to additional pitfalls. An unascertainable number of French subjects, indistinguishable from Gambian, continue to seek treatment in this territory, many of them known to be sufferers from Sleeping Sickness. One estimate puts this type of case at twenty-five per cent of the total treated in certain units. Again native systems of medicine retain some degree of popularity, often observed by the Department as tragic end-results serving to swell the total of hospital deaths.

42. *European Health.* (Average resident, 130 Europeans and 200 Syrians). No important change noted apart from an increase in venereal diseases from eighteen in 1946 to thirty-two this year. In this connection the risk of the conveyance of infection from African nurse to European child was unfortunately demonstrated. Concern was again experienced at the increase in numbers of wives and children residing in the Colony despite the limited medical facilities available.

43. *African Health.* (Population approximately 248,000).

General diseases. Diseases of the digestive system again heads the list of conditions treated, (12,324) followed as usual by diseases of skin and cellular tissue (8,430) and diseases of bones and organs of locomotion (8,040).

It is scarcely possible to comment usefully on such wide groups, the bulk of them recorded in minor units. " Ill-defined " causes (8,303) are on the high level of previous years, and for the same reasons described in 1946. Of these general diseases the most notable variation is the drop to 1,620 cases of rheumatic conditions compared with 8,222 last year when it was surmised that the group concealed many later manifestations of gonorrhoea and yaws. But despite the drop this year, the yaws figure has increased and gonorrhoea has fallen. The solution of the yearly variation remains obscure.

44. *Communicable Diseases.* The incidence of the components of this important group is discussed separately and are contrasted with last year's figures in brackets.

- (i) Malaria 7,000 (5,394). Neither figure can be accepted as more than a token figure in the absence of laboratory confirmation from cases treated at minor units.
- (ii) Sleeping Sickness. 2,225 (2,128). More than 5,500 grams of antrypol and 25,000 grams of tryparsamide were administered during the year. It will be interesting to observe the rise or fall in incidence from treatment of the diseases alone over the period before tsetse control measures are instituted, although results will be complicated by the increasing number of treatment units opened, and the inevitable percentage of ' foreigners ' treated. Special importance is attached to the exhibition of antrypol as a public health measure in reducing fresh infections, and so far no clinical contra-indications for use have been reported.
- (iii) Cerebro-spinal fever ninety-seven cases and fourteen deaths. (166 and 33 deaths). A gratifying year although little credit can be taken.
- (iv) Dysenteries 451 (323). The majority (376) were of the unspecified category, and most were probably of a bacillary nature. Flies are not the serious problem encountered elsewhere.
- (v) Tetanus—thirty-seven cases and ten deaths (17 and 6 deaths).
- (vi) Smallpox—twenty-five cases and fifteen deaths. Another good year. The vaccination and re-vaccination of all the population is the steadily pursued goal, but the beneficial effect of mass vaccination in French territory may now be experienced.
- (vii) Tuberculosis—two hundred and sixty-seven cases and seven deaths (259 and 14 deaths). The bulk are respiratory. While effective prophylaxis may be within sight, present prolonged treatment measures will be almost impossible of acceptance in the Protectorate, whatever the more enlightened urban population may be persuaded to undertake. But so far Sanatoria are beyond the Colony's means, and a solution is still awaited. In Bathurst alone ninety-one cases of respiratory tuberculosis were treated in Hospital, with four

deaths. In addition twenty-six deaths were registered in the town from this cause but a number of them were not confirmed bacteriologically.

- (viii) *Leprosy*. The subject is discussed in connection with the Ross Medical Survey Report (paragraph 14).
- (ix) *Venereal diseases*. Syphilis six hundred and sixty-two, gonorrhoea one thousand eight hundred and ninety-five, and "other venereal diseases" one hundred and eighty-two. (118, 3,617, and 316). The relationship to the fall in the numbers of rheumatic conditions has already been mentioned. The reported increase in syphilis is disturbing, but may partly be accounted for by increasing realisation of the free treatment offered in the Colony, helped by the investigations and exhortations of the Medical Officer of Health in regard to maternal and infantile infections referred to in Appendix C. There has been no recognisable change in social conditions which would account for such an increase. Regarding gonorrhoea the later crippling and other manifestations following sulphonamide-resistance, and delay or neglect in seeking treatment, are of first-class importance, and one fresh and experienced medical observer has rated the problem as amongst the greatest to be overcome. Fresh campaigns are under consideration.
- (x) *Yaws* 5,792 (3,655). The increase is almost certainly due to the increased treatment facilities available, but as with Sleeping Sickness the pendulum should soon swing if effective treatment efforts are being made. The heavy demand for treatment is steadily being met.
- (xi) *Helminths*. Ankylostomes 627 (929), Schistosomiasis 277, (129). Other helminths including ascaris and taenia 5,183 (4,354)—a clear index of the magnitude of the sanitation problem.
- (xii) *Bronchitis* 4,725 (4,165). There is no doubt that a variety of more important conditions are concealed in this total.
- (xiii) *The Pneumonias*. Broncho-pneumonia 179 (100). Lobar pneumonia 249 (207), unspecified 224 (193). Inpatient deaths of twenty-two and twenty-five respectively are recorded in the first two groups. Attention was drawn last year to the often unrecognised importance of the pneumonias as a tropical disease of high mortality.
- (xiv) *Whooping Cough*. There was a recurrence of an epidemic of whooping cough in Bathurst, of which 363 cases were treated at hospital, and thirteen deaths, all under five years of age, were registered from this cause. The overcrowded condition of the town is conducive to the spread of this, with all other respiratory diseases, among small children.

45. *Mental disease.* Thirty-seven cases were admitted to the Bathurst asylum from all parts of the country and were expertly classified as follows:—

Trypanosomiasis	...	...	...	...	...	...	28
Schizophrenia	...	...	...	...	...	...	3
Mentally defective	...	...	...	...	...	...	1
Delusional insanity	...	...	...	...	...	...	1
Epileptic insanity	...	...	...	...	...	...	1
Senile dementia	...	...	...	...	...	...	1
Syphilis (iv)	...	...	...	...	...	...	1

The figures for Sleeping Sickness may be regarded as startling to many, but they reflect an average percentage of admissions in this Colony. Many phases of mental disturbance are seen from the violent and homicidal to the quiescent and helpless, including schizophrenic, melancholic, and manic depressive types. The recovery rate after two to three courses of antrypol and tryparsamide is very high—ranging from 75 to 85% after which patients rarely require re-admission. The writer has personally observed mental sequelae in two Europeans after treatment with less satisfactory results.

IV.—VITAL STATISTICS.

(Bathurst only).

46. It was again found that the total number of births registered was less than the number of births notified by midwives to the Medical Officer of Health. During the year a careful comparison was kept of registrations and notifications, and parents who failed to register were warned to do so, usually with the required effect. There is a large number of late registrations which adds to the difficulty of obtaining accurate statistics of births, many parents allowing weeks or months to elapse before registering the birth of a child. Legislation is now being introduced to correct this tendency, but careful checking of the Colonial Registrar's returns against births notified to the Medical Officer of Health has led to a computation of 701 live births in Bathurst during the year as opposed to the Registrar's return of 579 live births.

47. A further increasing source of error in the Bathurst vital statistics is the facility with which seriously ill patients can be brought to the hospital by motor-car or ambulance. Midwives and dispensers stationed in the Kombo send a number of serious cases to the hospital, and this tends to inflate the apparent death rate. A correction has therefore been made to 1947 figures by subtracting the numbers of deaths of hospital patients whose residence was outside Bathurst, with the following results:—

		Crude.	Corrected.
Population (1944 Census)	...	21,152	21,152
Births (live)	...	701	701
Total Deaths	...	499	437

	Crude.	Corrected.
Total Still Births	80	75
Deaths under 1 year	97	84
Rate per 1000 population ...	34	34
Death Rate per 1000 population	23	20.7
Infant Mortality rate per 1,000 live births	138	120
Still birth rate per 1000 live births	114	107
Still births per 1000 total births	102	97

COMPARISON WITH PREVIOUS YEARS.

	1945.	1946.	1947. (Crude).	1947 (Corrected).
Population (1944 census) ...	21,152	21,152	21,152	21,152
Births (live)	546	735	701	701
Total Deaths	401	482	499	437
Total Still Births	75	88	80	75
Deaths under 1 year	84	76	97	84
Birth Rate per 1000 population	26	35	34	—
Death Rate per 1000 population	19	23	23	21
Infant Mortality rate per 1000 live births	154	103	138	120
Still Birth rate per 1,000 live births	138	120	114	107
Still Births per 1000 total births	—	—	102	97

48. There has been a reversal of figures of infant deaths and still births as compared with 1946, at the expense of still births. This has probably been due to the fact that attention of midwives and medical officers has been drawn to the tendency, noted in 1946 report, for early infant deaths to be wrongly registered as still-births.

94. An estimation of Bathurst population was made by house counts during the year, and a figure of 14,000 was obtained. It is to be noted that house-counts of a similar nature carried out before the 1944 census gave approximately the same figure which the census showed to be an underestimate. Neither birth-rates nor death-rates appear to indicate a substantial reduction in the population.

50. Appendix C indicates the grounds for belief that maternal syphilis is the most important factor in maintaining the high still-birth rate in Bathurst.

51. In the 1946 annual report it was noted there was an increase in the number of deaths under five years of age as compared with the two previous years. This was attributed to the effect of a measles epidemic during the

year. This year the age-distribution at death is very similar to that occurring last year, viz.—

Age Group.	Total deaths 1946.	Total deaths 1947.
Under 5	205	224
5 — 9	21	25
10 — 14	11	4
15 — 19	7	12
20 — 29	52	43
30 — 39	50	58
40 — 49	43	36
50 — 59	33	35
60 and over	60	62
Total	482	499

It is possible that this increasing number of deaths in the lowest age-group is attributable, partly at least, to an increasing population of children in the town. The population under 5 years at the 1944 (November 14th) Census was 2,028. During the three years 1945—47, 1,972 births have been recorded, and it is probable that more occurred in 1945 than have been recorded as it was found in subsequent years that birth registration had been incomplete. During this period 480 deaths under 5 years of age have been registered. To maintain the balance of population there would have to be a loss of 500 children from this age-group per year. The possibilities of loss are growth of children out of the age-group, and emigration from the town. It is not believed that departure of children from the town is a substantial factor, they are a much more stable part of the population than the middle age-groups. To maintain a loss by growth out of the age-group of 500 children per year one would have to make the highly improbable assumption that the 2,000 population under 5 years at the end of 1944 were so distributed that a larger number (500 for each year) were in the 4—5; 3—4, 2—3, age groups than in the youngest 1—2 and 0—1 groups. Even this impossible assumption makes no allowance for deaths. Unless therefore, there has been a very heavy loss of children from the town by emigration it would appear that the child-population is increasing.

52. An analysis of the Bathurst census figures since 1921 has shown that during the increase of the population from 9,000 to 20,000, there has been a proportionate increase on those described as “ Bathurst born ”, about 50% of the whole population being so described at each Census. It seems probable that the high population recorded in the 1944 Census is now showing its effect by increasing numbers of children who, in the course of time, may be expected to form a yet larger nucleus of permanent indigenous inhabitants in the town, as opposed to the floating seasonal population entering from the Protectorate in search of work.

53. The chief causes of death registered in Bathurst were:—

	All ages.	Under 1 year.	1—4 years.
Whooping cough	13	4	9
Tetanus (not neonatorum)	6	1	1
T.B. Respiratory System	26	0	1
Other forms of T.B.	2	0	0
Malaria	75	14	39
Syphilis	12	2	1
Ascariasis	22	2	15
Malignant growths	10	0	0
Diseases of heart	32	0	0
Bronchitis	14	7	4
Pneumonias:			
Broncho—	54	17	23
Lobar	12	0	0
Unspecified	26	3	2
Diarrhoea and Enteritis:			
(a) Under 2 years	20	9	11
(b) 2 years and over	16	0	10
Nephritis	14	1	3

V. HYGIENE AND SANITATION.

54. Although mosquito control measures were notably improved following the appointment of a whole-time Entomologist, hygiene and sanitation progress was again hindered by executive staff shortages. In particular teaching of junior staff suffered, and the formation of the proposed mobile Health Propaganda Unit was again postponed until European recruitment improves adequately.

A.—PREVENTIVE MEASURES.

55. In addition to the general measures described elsewhere including urban and rural sanitation, and the formation of a Health Propaganda Unit, the following comments on important specific diseases are given.

Mosquito and other insect-borne diseases.

(a) *Malaria*.—The chief mosquito control project described in the Report for 1946 has been carried a stage further. The scheme, which proposes to reclaim some thirty square miles of highly malarious swamps in the vicinity of Bathurst and adjoining the most populous area of the Colony, has been worked out in as great detail as the resources of the Colony permit. Special

attention has been given to the social and economic possibilities of the scheme with the intention that it may form an important part of the framework of the general policy of the Colony's development. It now awaits expert examination by consulting engineers upon whose opinion the decision to proceed with the scheme will depend.

While most of the data obtained both during the entomological survey and in the course of control, have been of obvious practical value in helping to plan a more intensive campaign of mosquito control it was felt that it might yield other important information if subjected to close statistical analysis. Apart from the standard tests of significance which have been applied as a matter of routine to all observations, an investigation was undertaken to the degree of correlation existing between (a) density and malaria morbidity and (b) malaria morbidity and morbidity resulting from other diseases. The result of the analysis was to show that no significant correlation existed between vector density and malaria morbidity in the town of Bathurst nor between parasite rates and vector density. On the other hand a significant correlation exists between malaria morbidity (figures preponderatingly based on clinical observations) and most of the commoner diseases such as diseases of the respiratory tract. The latter result was not unexpected since malaria has long been recognised as a debilitating disease which by lowering resistance predisposes to other diseases. The lack of correlation between parasite rates and vector density was more surprising especially in a town where the trend is towards low endemicity or even epidemicity. This observation coupled with the abrupt rise in malaria morbidity some weeks before vector density showed any change from the very low dry-season rate suggested that (a) the normal autumnal rise in malaria infections (M.T.) was initiated by an earlier wave of relapses and that the local strain or strains of parasites were highly persistent in the human host. Parasite rates were taken at the end of the dry season and showed a heavy saturation of the population (66%—90%) which, considering that vector density had been at a very low figure for over seven months, was in accordance with the expectations based on the statistical analysis.

Experimental culture of foodstuffs in an area of reclaimed mangrove swamp has been continued with the intention of discovering how soon such land may be brought under cultivation after reclamation. Good crops of common garden vegetables are now being harvested from land which has only received some 100 inches of rain fall since it was reclaimed. Casuarinas, oil palms, guavas and other trees are growing well which were planted after one season's rains (about 40 inches).

Work has continued on the improvement of D.D.T. emulsion as a substitute for proprietary larvicides and has now reached a stage when its effectiveness and cost make it possible to substitute it for most other larvicides previously employed.

Research on mosquito breeding places has continued with particular reference to the organic constituents of the water. Correlations have been found between differential plankton counts and breeding frequencies which point to plankton count as an important factor in larval nutrition and hence to suitability for mosquito breeding.

(b) *Yellow Fever*.—No cases recorded. *Aedes* index was *nil* in Bathurst and vicinity throughout the year, and none of the species was detected at Bakau, Fajara or Yundum Airport. Should this situation continue over the 1948 wet season it is proposed to discontinue the policy of immunisation of the African population in Bathurst, a measure instituted chiefly for the protection of the armed forces in wartime. Consideration would then be given to using a less expensive form of yellow fever vaccine, possibly exhibited simultaneously with the dried form of smallpox vaccine, as practised in neighbouring French territory. Special attention would then be paid to the aerodrome and its vicinity, and those areas mostly in the Protectorate, where *Aedes* control is not yet effective. Immunisation of the whole country could be the result, in conjunction with the present smallpox vaccination policy.

(c) *Smallpox*. 8,279 vaccinations were performed, and this number was limited to some extent by vaccine supply difficulties.

(d) *Trypanosomiasis*. Anti-tsetse measures still await expert advice and aid consequent on Dr. Nash's appreciation and recommendations submitted in 1945, but while expert assistance will no doubt be forthcoming in due course from the work of the West African Research unit, or from the International body now functioning, it would now seem that independent local initiative and effort will first be demanded in view of the delay in receiving the promised external aid. Meantime human curative treatment continues on a gradually expanding scale (vide paragraph 44 (ii)). It is to be noted that Gambia policy still hopes to give priority to tsetse-reclamation however, in an area where *Glossina palpalis* is estimated to constitute 80—90% of the vector agent, and the remainder probably *Glossina morsitans* only. The *Glossina palpalis* habitat is co-extensive with the boundaries of the river and its subsidiary creeks and swamps, and thus the infested areas expand and contract in the rainy and dry seasons. Attack therefore in the dry season would seem to offer a special opportunity of success with reduced effort. It is hoped that after suitable demonstration, Native Authorities may be induced to undertake the reclamation measures required with a minimum of central supervision. This policy unfortunately conflicts with that of our French neighbours who from the size and nature of their vast territories have been forced to adopt human prophylaxis and curative measures as their means of attack.

(e) *Plague*. No cases reported, nor was any outbreak from French territory notified. The rat-population in Bathurst and Protectorate villages is high. In Bathurst very many were caught by the Health Service and an

unknown number killed by poison. These measures have little effect in reducing the rat-population in the town; warehouses used for storing food and groundnuts are dilapidated and rat-infested, and most of the buildings in the town are of poor construction and provide excellent harbourage. Substantial improvement cannot be expected until warehouses are rebuilt and made rat-proof, and building standards in the town generally are raised. The building problem is closely associated with that of overcrowding, a problem which is incapable of solution until adequate building land for expansion of the town can be found. Not until then can any policy of slum-clearance be undertaken.

If ever infection is introduced into the town, Bathurst in its present condition would be practically defenceless and open to a devastating epidemic.

B.—GENERAL MEASURES.

56. The effort to encourage the greater use of the bore-hole type of latrine in the Protectorate was severely curtailed by inability to obtain an adequate supply of auger-drills, the cost of which from normal sources of supply has now risen to over £70 per unit apart from current scarcity of the equipment. Inquiries are in progress with a view to obtaining alternative and cheaper types.

57. In Bathurst a start has been made to replace existing public latrines using the bucket system by a network of 'static' tank latrines. The subject is referred to in paragraph 11. The same system will it is hoped be installed at Kuntaur wharftown for the 1948—49 groundnut season, and at Bakau and Serekunda in the Colony area in 1949. Expense and constructional difficulties hinder wide-spread adoption.

58. In these and other Sanitary problems much is expected of the Health Propaganda Unit which is in process of organisation, and may be ready to operate in 1949.

59. Swamp reclamation in the vicinity of Bathurst by deposition of the town's refuse and night-soil continues. When a "gully-emptier" required in connection with the 'static' tank latrine system becomes available, it may become possible to utilise nightsoil more advantageously.

C.—SCHOOL HYGIENE.

60. In Bathurst, in addition to the examination of 450 school children in connection with the milk feeding demonstration, 225 scholars were examined on first entry into the schools. Again it was found that the chief defects in the Bathurst school child are malaria and malnutrition. The children ranged in age from 5 years to 17 years; the vast majority being between 5 years and 10 years. The gross spleen rate for all 225 children was 59

26%. Those whose ages were accurately recorded were 157 in number, and the gross spleen rate of these was 22%. There is a significant fall in spleen rate after the age of 7—8 years, and as usual in an endemic area a negligible spleen rate after the age of 10 years.

Spleen rate over 10 years,	$\frac{0}{26} = 0\%$.	}
Spleen rate under 10 years,	$\frac{35}{331} = 27\%$.	
Spleen rate 8 and 9 years,	$\frac{3}{26} = 11.5\%$.	
Spleen rate 5—7 years,	$\frac{32}{105} = 30\%$.	

61. School spleen rates in the past have occasionally been given which cover all school ages, and the inclusion of children over ten years of age has led to a lower figure. Figures from year to year cannot be regarded as comparable for the measurement of malarial endemicity unless there is some indication of ages of children examined.

62. Fifty-two out of the 225 children had an angular stomatitis, presumably due to hyporiboflavinosis, and 13% were described as clinically anaemic. Almost all the young children show mild signs of rickets; usually they have 'knock-knees', often to so marked a degree that their feet are splayed wide apart when they stand with the knees closely approximated. This probably is due rather to a calcium deficiency in the diet than to a lack of Vitamin D, as it would be presumed that exposure to sunlight should provide a sufficiency of this vitamin in a sunny country. Against such a presumption should be put in the fact that many of the schools are dark and gloomy, the children come from dark ill-lit homes and often they wear more than a sufficiency of clothes, with that apparently universal hall-mark of a rise in social status—the solar topee.

63. Teeth upon the whole are remarkable good. Occasionally a complete dental breakdown is seen which usually appears to be due to a total neglect of oral hygiene. An exception must be made regarding children with some European ancestry, as it is noticeable that these lighter-skinned children are much more subject to dental caries than the dark-skinned African. There may be dietary differences which account for this but it appears to be unlikely, as a large proportion of the school-going class of African take a European type of diet similar to that taken by the children of mixed ancestry.

64. Though the dental condition of children is, for the most part, good, there is an urgent need for conservative dentistry. One or two carious teeth in an otherwise sound mouth are often seen, and skilled dentistry might then check a process which may eventually lead to loss of a number of teeth. There are at present negligible facilities for this necessary work.

65. The other chief defects noted are respiratory infections—chiefly coryza—which spread rapidly through the schools. The use of a pocket handkerchief is practically unknown, and during the examination of an infected school there is chorus of hearty sniffs, and a large number of faces besmeared with nasal mucus. As many of the schools have the old-style long communal desks, the rapid spread of nasal infections is not surprising.

66. Two new buildings at the Convent School and Methodist girls school are satisfactory, and set a good standard, but the older buildings still resemble the old style board-school, with dark gloomy rooms containing more than one class.

67. In the Protectorate 347 children were examined by the Medical Officer, Bansang, at schools at Georgetown, Fula Bantang, Basse, Kumbul, and Kristikunda. These schools accommodate both boarders and day scholars, and one school at Kristikunda at the extreme eastern end of the country, is of particular interest as the majority of the children are boarders from Bathurst. Of eighty-seven boys examined in this school only three are recorded as suffering from cheilosis though twelve suffered from 'crackle skin' and six had ulcers of the leg. These Bathurst children compared favourably in general health and nutritional standards with local children at an adjacent school under the same management.

68. Much attention has been paid to diets in boarding schools during the past few years, and it is satisfactory to record that in most schools boarders show a better nutritional state than day-scholars and there has been an improvement in nutritional standards as compared with previous years. School managers have difficulty however in reaching recommended diet-scales in the hungry season, and there is considerable undernutrition in these Protectorate schools.

69. The nutritional state of each school examined was assessed by the Medical Officer as follows:—

School.	Number examined.	Subnormal nutrition.	Percentage Subnormal.
Armitage School Georgetown (Govt.)	114	54	47%
Fula Bantang (R.C.M.)	33	5	15%
Basse Mansajang (boys) (R.C.M.)	64	21	33%
Basse Convent (girls) (R.C.M.)	19	3	16%
Kumbul (C.M.S.)	11	0	0%
Kristi Kunda St. John's (local boys) (C.M.S.)	19	6	32%
Transfiguration (Bathurst boys)	87	17	19%

As in Bathurst schools, a number of the children show signs of rickets—either bow legs or knock knees.

70. Buildings in Protectorate schools were, on the whole, found to be satisfactory though often of a simple nature; some schools dormitory space was inadequate, and there is insufficient provision for washing and bathing. Latrines, in most schools, are deep pit-latrines, and concrete slab tops are being encouraged. Refuse disposal is faulty in some schools, no incinerator being provided to burn refuse.

D. LABOUR AND HOUSING CONDITIONS.

71. Labour conditions, including references to health, are published in the Annual Report of the Labour Department, and are therefore omitted here.

72. Housing conditions show no significant departure from those of previous years. The subject was discussed at some length in the 1946 Annual Report, where also reference was made to the report of a Special Committee set up at that time to consider the problems.

E. FOOD IN RELATION TO HEALTH AND DISEASE.

73. Paragraph 9 of this report describes the current situation. There have been no unusual features in the supply and availability of foodstuffs.

F. PORT HEALTH WORK AND ADMINISTRATION.

74. *Bathurst*

Number of ships boarded	167
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75. No evidence of plague infection was detected.

76. 504 aircraft including seaplanes passed through air ports and were sprayed with insecticide at arrival and take-off.

77. There were no notable changes at the seaport, and no noteworthy diseases detected.

78. With the departure of the B.O.A.C. and B.S.A.A., traffic at the airport has decreased very greatly, and is now principally used as a staging post by the West African Airways Corporation.

G. MATERNAL AND CHILD WELFARE.

79. (a) Antenatal and Child Welfare Clinics.

These are increasingly popular, but it was not possible to open new centres in 1947. It is hoped in future years to give a helpful analysis of the gross totals now shown.

Year.	Number of Centres.	Total Attendances.
1945	6	20,341
1946	7	21,755
1947	7	24,186

Approximately 11,603 dried-milk issues were made in Bathurst and vicinity to nursing mothers and infants.

80. (b) Maternity Hospital, Bathurst.

(Total Hospital statistics are included in Appendix A.)

Total admissions	324	315	359
Confinements	202	172	234
Ante and post-natal affections	26	30	120
Abortions	18	11	19

81. (c) District Government midwives supervised the following additional confinements:—

	1945.	1946.	1947.
Bathurst	168	229	226
Bakau, Sukuta and Brikama	175	209	143
Basse	50	40	51

C. W. F. MACKAY,

Assistant Director of Medical Services.

APPENDIX B.

WORK OF LABORATORY SERVICE.

Staff. The staff consisted of one trained Laboratory Technician assisted by Dresser/Dispensers in training. During the absence of Mr. J. V. Coker, the Laboratory Technician, for three months on Medical Survey, the work was continued by Dispenser Daniel who had previous experience of this work.

INSTRUCTIONAL COURSES FOR DRESSER-DISPENSERS IN
LABORATORY WORK.

This as reported last year continues to prove satisfactory. Of the three Dresser-Dispensers in training two were successful and one failed at the examination set in December 1947.

During the period of training of one year, each trainee, in addition to weekly lectures, receives practical demonstrations in the laboratory. The modest museum-library instituted continue to expand usefully.

General. The scope of the laboratory was described at length in the 1946 Annual Report, and the following summary indicates the volume of work performed in 1947:—

Parasitology	...	...	...	...	...	...	5,650
Serology	...	...	...	...	...	...	909
Blood and Hb. Examinations	...	...	...	...	...	...	3,336
Bacteriology	...	...	...	...	...	...	1,059
Miscellaneous	...	...	...	...	...	...	147
Autopsies	...	...	...	...	...	...	51
Total	...	...	...	...	...	...	11,152

As part of the controlled milk demonstration referred to at paragraph 9 (ii) the haemoglobin of 395 school children was examined by the Sahli method with the following results:—

Haemoglobin 85% and above	...	...	...	...	...	13
Below 85%	...	...	...	...	...	143
Below 65%	...	...	...	...	...	293

In an inquiry into the causes of stillbirths and infantile mortality, routine examination of 427 placentae revealed sixty-six smears containing sub-tertian parasites, and the technician observed that many showed heavy infestation. Frank "crescent" forms were never seen. Many additional Khan tests were also performed as a result of the examination of the blood of

pregnant women in connection with stillbirth rates. The result are described in Appendix "C". Regarding parasitology, subtertian malaria parasites were exclusively found, although there is suspicion that other forms must occur locally. Trypanosomes are of course a frequent finding in the selected cases, sometimes in conjunction with filaria. Of intestinal parasites, ascaris is most frequently seen, but hookworm is very common, and schistosomes are numerous in the urine of patients from certain areas.

In the fifty-one autopsies performed the commonest causes of death were broncho-pneumonia (11) subtertian malaria (10) and lobar pneumonia (5). Tuberculosis was reported three times only.

APPENDIX C.

NOTES ON STILL-BIRTHS IN BATHURST.

In the report on the Medical and Health Services for 1945, it was noted that it was hoped to make an investigation into the cause of still-births during 1947. So far this investigation has taken the two main lines of examination of placental smears of births attended by Government midwives for malaria parasites, and examination of the Khan reaction of mothers attending the antenatal clinics, and the Maternity Hospital for delivery.

Placental Smears.

In Bathurst, 316 placental smears were examined of which 55 showed malaria parasites, and 271 were negative. In villages in the Kombo, 164 smears were made; 133 were negative and 31 were positive. The relation of malaria parasites in smears to live and still-births is shown in the following tables.

TABLE I.

	Total smears.	Total negative.	Total positive.	Percentage positive.
Bathurst				
All cases	316	271	55	17.4%
Live births	284	236	48	17%
Still births	32	25	7	22%

TABLE II.

Kombo villages.	Total smears.	Total negative.	Total positive.	Percentage positive
All cases	164	133	31	19%
Live births	152	125	27	17.8%
Still births	12	8	4	33.3%

Though in both these sets of figures a higher proportion of positive smears occurs in still births than in live births, the numbers are too small to be statistically significant. Malaria may have some effect upon the still-birth rate, but in Bathurst it is evidently negligible, and in the Kombo more figures are required to assess its real importance.

It is worthy of note that in four cases in the Kombo, where the midwife recorded the new born child was feeble and asphyxiated, the placental smear showed a heavy infection with parasites. In Bathurst, two children died shortly after birth in which the placental smear was positive. One case of interest is that of a child born in the Maternity Home whose blood was found to contain subtertian parasites only four days after birth. This must have been due to a maternal infection, as it is well within the incubation period of the disease.

Kahn Reaction.

The examination of the Kahn reaction in pregnant women has proved to be of great interest. Unfortunately, until recently, it has not been possible to perform Kahn tests as a routine on all ante-natal patients, though it is hoped that in the future this may be done. With limited laboratory facilities there has not unnaturally been a clinical selection of cases which has been Kahn-tested, and the statistics given below reveal very clearly that, consciously or unconsciously, medical staff have concentrated on patients with a bad obstetric history.

The records kept of ante-natal patients at the clinics give a history of previous pregnancies, survival of children, still-births, and abortions of multiparous women. These records give a gloomy picture of the accidents of pregnancy and of child-health in the town generally. They are summarised in Table III.

TABLE III.

Obstetric histories of 245 multiparous ante-natal patients.

	Total No. of women.	Previous Preg- nancies.	Live Births.	Children living.	Children dead.	Total Still births.	Total Abor- tions.
Kahn +	38	119	90	46	44	13	16
Kahn -	56	145	121	64	57	11	13
Not tested	151	414	383	301	82	17	14
All cases	245	678	594	411	183	41	43

TABLE IV.

	Total previous pregnan- cies.	Total still births.	% Still births.	Total still births & abortions.	% Still births & abortions.
Kahn positive	119	13	10.9%	29	24.5%
Kahn negative	145	11	7.6%	24	16.5%
All women	678	41	6.1%	84	12.4%

(Some of the women had more than one still birth or abortion. The actual number who suffered from these disasters is shown in Table V.)

TABLE V.

Numbers and percentages of parous women who have had still-births and abortions.

	Total women.	No. who have had still-births.	%	No. who have had both still-births and abortions.	%
Kahn positive	38	9	23.5%	20	53%
Kahn negative	56	7	12.5%	15	28%
Not tested	151	16	10.6%	27	18%
All cases	245	32	13%	62	25%

(Table IV expresses certain of the figures in table III as proportions.)

Of the proportions shown in Tables IV and V it can be said that in neither case do those relating to Kahn-negative cases differ significantly from proportions in the whole population, but that the 53% of Kahn-positive women who have had both still births and abortions, and the 24.5% of pregnancies in Kahn-positive women, are significantly higher than those shown by the whole population.

Not all the women now Kahn-positive will have been positive throughout their obstetric histories, some will have become infected after the births of children. The real experience of Kahn-positive women is therefore probably worse than is indicated here.

Though the experience of the Kahn-tested cases, both positive and negative, is so much worse than that of the general total population that there is a probability of selection, a considerable number of the tests have in fact been on unselected cases, increasingly so towards the end of the year, and the proportion of 45% Kahn-positive of all these tested women is alarming. Primipara who were tested, with no history of abortions, are free of all taint of selection, and are less likely to be infected than multipara. Of twenty-two of this class tested, seven were Kahn-positive. Of ninety-six women tested as a routine at the antenatal clinic, thirty-eight were positive, a proportion of 30.5%. It is to be noted that only exceptionally has a test been made because of overt signs of clinical syphilis, such selection as there has been has been done almost entirely by choosing women with histories of still-births and abortions. These indications of a high incidence of positive Kahn-reaction, and a relation of this to still-births and abortions, lead to a strong suspicion that maternal syphilis is a most important factor in the lamentably high still-birth rate in Bathurst.

LIVE AND STILL BIRTHS OCCURRING IN THE MATERNITY HOME, BATHURST, OR IN CLINIC PATIENTS DELIVERED OUTSIDE.

The case-histories of thirty-two still births occurring in the Maternity Home have been examined. Of these thirteen of the mothers were subjected to Kahn-tests.

Total cases	...	...	...	...	...	...	...	32
Kahn positive	...	...	...	...	...	...	...	8
Kahn negative	...	...	...	...	...	...	...	5
Not tested	...	...	...	...	...	...	...	19

Less than half the cases were tested, but even so a quarter of the still-births were Kahn positive.

Histories of Kahn positive still-births.

- 1 breech delivery. Foetal heart heard during labour.
- 1 Ante partum haemorrhage.
- 6 Normal vertex-presentations with uncomplicated labour.

In none was the foetal heart heard during labour, and the foetus on delivery was macerated. The foetus therefore died *in utero*, and it is fair to presume that the cause was maternal syphilis. One additional still-birth of a macerated foetus, with absent heart-sounds, occurred in an antenatal clinic patient at her house.

Histories of Kahn-Negative still-births.

- 1 was born before admission to hospital. The mother was admitted with a retained placenta, and this may have been an infant-death and not a still birth.
- 2 were breech deliveries with death attributable to delay in labour and malpresentation. The foetal heart was heard in one and not recorded in the other.
- 1 was a premature baby, foetal heart not heard, mother suffered from marked albuminuria.
- 1 was a macerated foetus, foetal heart not heard, cause of intrauterine death unknown.

History of still births not Kahn tested.

- 2 Breech deliveries, foetal heart not heard, of which 1 was a macerated foetus.
- 2 Forceps deliveries, one admitted from outside Bathurst after 3 days labour.
- 1 Shoulder presentation. Admitted from outside Bathurst.
- 1 Twin pregnancy of which 1 died survived.
- 1 Anencephalic monster.
- 2 Placenta preavia.
- 4 Vertex presentations, of which 3 were primipara, foetal heart was heard in all labours. Cause of death probably prolonged labour.

- 6 Vertex presentations without complications of labour, with the delivery of a macerated foetus and absent foetal heart-sounds during labour. Death was intrauterine and can be attributed to maternal disease. Five were multiparous and one primiparous.

These histories may be summarised as follows:—

Of 9 Kahn-positive still-births 7 were intrauterine deaths = 78%

Of 5 Kahn-negative still-births 2 were intrauterine deaths = 40%

Of 19 non-tested still-births 6 were intrauterine deaths = 31%

Of 33 Total still-births 15 were intrauterine deaths = 46%.

From this small total it is not possible to make firm deductions but they clearly show that nearly half the still births are due not to the accidents of midwifery, but to intrauterine death of the foetus before labour. This in most cases is due to maternal disease, and one of the generally acknowledged principal causes of such an event is maternal syphilis. In this group less than half the mothers were tested, but even so more than one quarter (9/33) were shown to be Kahn positive.

In addition to these still births, a record is here given of a number of births occurring in women who have attended the ante-natal clinic or maternity home:—

Normal Pregnancy	15	18	309	342
Still Births	9	5	25	39
Early infant deaths	3	1	19	23
Total	27	24	353	404
Still births % total of group	33	21	7.1	9.7
Early infant deaths % of group	11.5	4.2	5.4	5.7

These figures are small, but it may be said that the figures of 33% and 11.5% of still births and early infant deaths are significantly greater than the 9.7% and 5.7% of the whole population, whereas the corresponding figures for the Kahn-negative mothers are not. Again it is seen that nearly one quarter of the still births were from Kahn-positive mothers, though less than one tenth of the whole 342 mothers were tested. The early infant-deaths shown occurred within a few days of birth, before the midwife had ceased to attend the mother.

CONCLUSION.

A high proportion of still births in Bathurst are recorded as still-birth of a macerated foetus. This note suggests that the predominant factor causing these deaths is maternal syphilis. Kahn-reactions are now being performed as a routine on all women attending the ante-natal clinic, and when more statistics are available, it should be possible to make an estimate of the actual numbers of still births caused in a year by this disease. It is likely that it will be shown that a number of infant deaths also result from maternal infection.

In addition to Kahn tests, a routine examination is also being made for gonorrhea. Of the small number so far examined, more than half have been shown to be infected.

The history of maternity work in Bathurst is largely one of a combat against infection. In early days a very heavy reduction was made in infant-mortality in the Government midwifery service from 300—500 infant deaths per 1000 births, to its present level of about 120, chiefly by eliminating sepsis, in particular neo-natal tetanus. Not much improvement has ever been noted in reduction of the still-birth rate, and it is beginning to be clear that however high the technical standard of the conduct of labours by midwives becomes, not much reduction can be expected until the problem of syphilis is tackled.

T. P. EDDY,

Medical Officer of Health.

FOOTNOTE. Up to July 1948, 336 unselected women attending clinics have been Kahn tested, and of these 70 were Khan positive, a proportion of 21 per cent. 243 women were from Bathurst and 93 from Kombo villages. There was no significant difference of incidence in the groups—20 per cent and 22.5 per cent respectively.



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APPENDIX A.

Local list No.	No. in International List (1938)		Europeans.			Africans				Total all Cases.
			Inpatients	I.P. Deaths	Out-patients	Inpatients	I.P. Deaths	Out-patients	Dis-pensaries.	
		GROUP I.								
1	1	Typhoid fever	—	—	—	—	—	—	—	—
2	2	Paratyphoid fevers	—	—	—	—	—	—	—	—
3	3	Plague	—	—	—	—	—	—	—	—
4	4	Cholera	—	—	—	—	—	—	—	—
5	6	Cerebro Spinal meningitis	—	—	—	39	14	14	44	97
6	9	Whooping cough	—	—	1	25	5	337	—	363
7	10	Diphtheria	—	—	—	1	1	—	—	1
8	12	Tetanus (not neonatorum)	—	—	—	13	10	15	9	37
9	13	Tuberculosis of the Respiratory System	1	—	—	42	7	98	76	217
10	14—22	Other forms of Tuberculosis	—	—	—	4	2	46	—	50
11	23	Leprosy	—	—	—	2	1	71	134	207
12	27	Dysentery (a) Bacillary	1	—	—	8	—	—	38	47
		(b) Amoebic	3	—	3	14	—	—	8	28
		(c) Other or unspecified forms	1	—	—	13	3	51	311	376
13	28	Malaria (a) Benign tertian	—	—	—	—	—	—	—	—
		(b) Quartan	—	—	—	—	—	—	—	—
		(c) Subtertian	35	—	36	292	10	1,179	—	1,542
		(d) Unspecified	2	—	18	154	11	3,195	2,089	5,458
		(e) Blackwater fever	—	—	—	—	—	—	—	—
14	29	Trypanosomiasis	—	—	—	51	2	387	1,787	2,225
15		Venereal Diseases—								
	30	(a) Syphilis including locomotor ataxia & G.P. I	1	—	12	91	5	235	323	662
	25	(b) Gonorrhea and gonococcal infections	4	—	13	127	—	448	1,303	1,895
	44a	(c) Other venereal diseases	1	—	1	33	—	147	—	182
16	31	Relapsing fever	—	—	—	—	—	—	—	—
17	32	Yaws	—	—	—	44	—	1,082	4,664	5,790
18	33	Influenza	—	—	2	—	—	52	109	163
19	34	Smallpox	—	—	—	18	—	2	5	25
20	35	Measles	—	—	1	—	—	11	35	47
21	38	Varicella	—	—	—	2	—	12	—	14



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APPENDIX A.—Contd.

Local list No.	No. in International List (1938)		Europeans.			Africans.					Total all Cases.	
			Inpatients	I.P.	Deaths	Out-patients	Inpatients	I.P.	Deaths	Out-patients		Dis-pensaries.
22	38	Rabies	—	—	—	—	—	—	—	—	—	—
23	38	Yellow fever	—	—	—	—	—	—	—	—	—	—
24	39	Typhus	—	—	—	—	—	—	—	—	—	—
25	40	Ankylostomiasis	—	—	—	2	63	—	—	418	144	627
26	42	Ascariasis	1	—	—	1	69	—	—	3,263	1,742	5,076
27	42	Schistosomiasis	—	—	—	—	10	1	—	123	144	277
28	42	Filariasis	—	—	—	—	8	—	—	28	—	36
29	42	Tapeworm	—	—	—	3	8	—	—	33	63	107
30	42	Other helminthic diseases	—	—	—	1	21	3	—	200	6	228
31	43	Mycoses	—	—	—	—	—	—	—	—	—	—
		(a) Tinea and ringworm	1	—	—	17	5	—	—	127	—	150
		(b) Other mycoses	—	—	—	—	—	—	—	2	—	2
32	5, 7, 8, 10, 11, 24, 26, 32, 36, 37, 41, 44.	Other infective or parasitic diseases ...	—	—	—	2	4	1	—	5	—	11
GROUP II.												
Cancer and other Tumours—												
33	45—55	(a) Malignant	—	—	—	—	17	5	—	4	—	21
34	56	(b) Non-malignant	—	—	—	6	24	—	—	58	—	88
35	57	(c) Unspecified	1	1	—	—	—	—	—	5	49	55
GROUP III.												
36	58—60	Rheumatic conditions	2	—	—	11	28	—	—	1,579	—	1,620
37	61	Diabetes mellitus	—	—	—	—	—	—	—	—	—	—
38	63	Goitre	—	—	—	—	3	—	—	194	—	197
39	66	Other general diseases	—	—	—	1	2	—	—	5	—	8
		Vitamin deficiency diseases	—	—	—	—	—	—	—	—	—	—
40	71	Hypovitaminosis A	—	—	—	—	—	—	—	—	—	—
41	68	do. B ¹	1	—	—	3	4	—	—	37	—	45
42	69 & 71	do. B	—	—	—	—	5	1	—	31	—	36
43	67	do. C	—	—	—	—	1	—	—	8	—	9



[illegible]



APPENDIX A.—Contd.

Local list No.	No. in International List (1938)		Europeans.			Africans				Total all Cases.
			Inpatients	I.P. Deaths	Out-patients	Inpatients	I.P. Deaths	Out-patients	Dis-pensaries.	
62	104, 105, 110—114	Other respiratory diseases (including tuberculosis)		—	13	38		698	298	1,049
		GROUP IX.								
63	117	Ulcers of stomach and duodenum ...	—	—	—	1	—	—	—	1
64	119	Diarrhoea and Enteritis	—	—	—	18	2	215	1,200	1,433
65	120	(a) Under 2 years	6	—	21	43	9	1,248	936	2,254
66	121	(b) 2 years and over	2	—	1	16	2	20	—	39
67	122	Appendicitis	—	—	—	338	5	431	140	909
68	124	Hernia and intestinal obstruction ...	—	—	—	18	5	31	—	49
69	125—7	Cirrhosis of the liver	3	—	5	24	1	27	24	83
70	115,—16, 118, 123, 127—9	Other diseases of the liver and biliary passages	18	—	72	124	9	3,823	8,287	12,324
		Other diseases of the digestive system								
		GROUP X.								
71	130—2	Nephritis	—	—	—	35	6	53	—	88
72	133—9	Other non-venereal diseases of the genito-urinary system	3	—	18	316	4	1,076	167	1,580
		GROUP XI.								
73	—	Deliveries	6	—	1	230	—	7	—	244
74	140—2	Abortions	—	—	—	43	—	85	176	304
75	143	Haemorrhage of pregnancy	—	—	—	14	1	—	—	14
76	144 & 148	Toxaemias of pregnancy and puerperium	—	—	—	13	1	3	—	16
77	147	Infection during childbirth and puerperium	—	—	—	11	2	1	—	12
78	145—6 & 9	Other conditions of pregnancy and the puerperium	1	—	—	132	2	74	—	207
		GROUP XII.								
79	155	Ulcers	1	—	11	71	—	879	3,049	4,011
80	153	Elephantiasis	—	—	—	33	—	118	72	223
81	151—153	Other diseases of the skin and cellular tissues	17	—	90	295	4	2,827	5,201	8,430



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APPENDIX A.—Contd.

Local list No.	No. in International List (1938)		Europeans.			Africans				Total all Cases.
			Inpatients	I.P. Deaths	Out-patients	Inpatients	I.P. Deaths	Out-patients	Dis-pensaries.	
		GROUP XIII.								
82	154—6	Diseases of the bones and organs of locomotion	1	—	5	72	—	1,137	6,825	8,040
		GROUP XIV.								
83	157	Congenital malformations	—	—	1	7	6	3	—	11
		GROUP XV.								
		Diseases of early infancy—								
84	158	(a) Congenital debility	—	—	—	6	2	—	—	6
85	159	(b) Premature births (excluding still births)	—	—	—	21	9	—	—	21
86	160	(c) Injury at birth	—	—	—	1	1	—	—	1
87	161	(d) Tetanus neonatorum	—	—	—	—	—	—	—	—
88	161	(e) Other diseases peculiar to early infancy	—	—	—	7	5	244	—	251
		GROUP XVI.								
89		Senility	—	—	—	2	—	7	—	9
		GROUP XVII.								
		External causes—								
90	163—4	(a) Suicide	—	—	—	—	—	—	—	—
91	165—8	(b) Homicide	—	—	—	—	—	—	—	—
92	169—98	(c) Other causes	11	—	74	303	12	2,347	2,463	5,198
		GROUP XVIII.								
93	199—200	Ill-defined causes	1	—	—	6	2	82	8,214	8,303
		Total of all diseases treated	146	1	556	4,031	246	35,591	54,220	94,544
		Total examinations inoculations etc.	—	—	82	—	—	130	—	212



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APPENDIX D.
NUTRIENT CONTENTS OF DIETARIES.

	Value recommended as an immediate objective for populations of Colonial territories.	Nutrients available per head per day.						
		Nyasaland survey, 1938-1939.						
		U. K. 1944.	Barbados 1944.	Gambia villages 1945.	Hill village	Foothill village	Lakehore village	Urban area
		i	ii	iii	iv	v	vi	vii	viii
Calories	2,500	2,923	2,413	2,028	1,805	2,049	1,739	1,655
Protein (grammes)	60	87	45	56	50	59	26	54
Fat (grammes)	—	117	63	25	15	16	9	11
Carbohydrate (grammes)	—	381	416	396	357	400	387	334
Alcohol (mg)	—	—	—	—	2.5	8.6	1.4	0.8
Calcium (mg)	800	1,037	254	219	280	476	1,065	702
Iron	20	16	12	26	25	34	21	24
Vitamin A (i.u.)	5,000 (as B carotene)	3,773	5,215	3,536	7,757	10,220	6,020	6,914
Vitamin Bi (mg) (aneurin, thiamine)	1.5	2.0	0.8	1.8	0.8	1.2	0.7	0.8
Riboflavin (mg)	1.8	2.1	0.8	0.5	0.5	0.7	0.5	0.6
Nicotinic acid (mg)	12	19.7	7.0	14.5	9.0	11.5	9.6	7.0
Vitamin C (ascorbic acid) (mg)	30	123	69	28	86	98	120	73





