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NORTHERN NIGERIA

MINISTRY OF HEALTH

RURAL HEALTH REPORT 1964

Including:—

Annual Report of the Sleeping Sickness Service for 1964

Annual Report of the Medical Field Units for 1964

PRINTED BY THE GOVERNMENT PRINTER, KADUNA

1967

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RURAL HEALTH REPORT, 1964, NORTHERN NIGERIA.

Introduction.

The demands of routine work have unfortunately prevented completion of this Report until the writer was relieved of all administrative responsibilities by his successor, Dr. Z.Q. Shaikh, for a few weeks immediately before proceeding on leave in August 1966; one of the signs of haste is the paucity of maps this year.

Although the Report is scheduled to cover the year 1964, it has been felt desirable to include a few comments on developments during 1965 or even 1966, when the matter seemed to be of some importance, or where such comment would round off the information on some outbreak or investigation, as it is not known when the 1965 Report will become available.


There is no entry under para.7 - which should have been a table showing the Establishment as at December 31st, 1964 - because it was not possible to compile an accurately-checked table in the time available. Similarly, shortage of time led to the section on Yaws including "notes on the first 9 months of 1965", because this was substantially the Report submitted to UNICEF and W.H.O. towards the end of 1965 and there was no opportunity to rewrite it.

It is hoped that readers will be indulgent of shortcomings, but it is also hoped that anyone with useful or interesting comments on the material submitted will not hesitate to write to the Principal Health Officer.

DR. K.D.B. THOMSON,
Principal Health Officer,
Rural Health,
Kaduna.

August 1966.





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GENERAL AND ADMINISTRATIVE.

1. Organisation of the Preventive Services Division.

There was no major change during the year; the position was as shown on page 11 of the 1963 Report.

2. Senior Staff - general.

The sudden departure in July of Dr. Lyons, Sleeping Sickness Medical Officer, after 6 months service, and the retirement of Dr. M.P. Hutchinson after 3 years as Sleeping Sickness Consultant, left the Ministry without any full-time doctor for the Sleeping Sickness Service from the end of October - a serious situation which neither the World Health Organisation nor the United Kingdom Technical Assistance Board were able to relieve. Fortunately advice and practical assistance were willingly afforded where appropriate by Dr. H.J.C. Watson, Senior Principal Research Officer at the Nigerian Institute for Trypanosomiasis Research, Kaduna, but the Senior Health Officer was left to advise himself on all routine matters; the careful examination of all incoming sleeping sickness survey and other reports became one of his most important functions. It is hardly surprising therefore that it has not been possible for him to complete compilation of this 1964 Rural Health Report until relieved of all administrative functions by his successor for 3 weeks prior to proceeding on leave in August 1966.

2.2. Omitted from the 1963 Report, two W.H.O. personnel have been advising the Ministry:

Dr. J.G. Guest, Public Health Adviser; arrived 1st April, 1963. He is concerned particularly with the logistics of Native Authority dispensary and maternity and environmental sanitation services.

Mr. V.A. Pinto, Sanitary Engineer; arrived 29th May, 1963. He is concerned particularly with the Igala-Idoma aspect of the Rural Health Development Project - local water-supplies and environmental sanitation.

3. Senior Staff - retirements.

Mr. J. Milton, Senior Tsetse Control Officer, retired on January 4th after 12 years service. His last role as Project Director of the Hadejia River Valley Project was played with distinction.

Dr. G.R.L. Lyons, Sleeping Sickness Medical Officer appointed on December 31st, 1963, resigned to take up a W.H.O. appointment (Malaria) on July 13th.

Dr. M.P. Hutchinson, Sleeping Sickness Consultant seconded under the United Kingdom Technical Assistance Programme on 13th September, 1961, left Nigeria on retirement on October 31st. He had previously spent many years in West Africa on Sleeping Sickness investigation and control, and in Nigeria had served both as a Government Medical Officer and on the staff of the West African Institute for Trypanosomiasis Research (now the Nigerian Institute).

4. Senior Staff joining the Service.

Dr. M.S. Hassan, recruited as a Rural Medical Officer, arrived in February 1964 and was posted to yaws control and Rural Health Development Project duties at No.6 M.F.U., Idah.

Dr. V.P.M.F. van Amelsvoort, also recruited as a Rural Medical Officer, arrived on February 8th and was posted to the Mass Malaria Campaign Birnin Kebbi; (this position involves considerable supervision of rural dispensaries, although technically he comes with Malaria staff generally under the Urban Health Section of the Ministry).

5. Junior Staff - losses.

9 M.F.U. and S.S. Staff were lost to the Service during the year:

1 resigned to undergo nursing training in U.K.

1 resigned to join his Native Authority as a dispensary assistant.

4 resigned for personal reasons.

2 were boarded as unfit.

1 was dismissed.

6. Junior Staff - Recruits.

22 Government-sponsored students qualified from the Medical Auxiliaries Training School in February. 12 were designated Sleeping Sickness Assistants and 10 Medical Field Unit Assistants.

6.2. 1 qualified dispensary assistant trained by a Voluntary Agency was accepted as a sleeping sickness assistant, but later transferred to the Native Authority of his home area.

6.3. 1 very experienced Native Authority Leprosy Superintendent was transferred to the Government Leprosy Service as an Assistant Superintendent, Rural Health (Leprosy). (A transfer to such a high rank is now exceptional).

6.4. 22 Government Trainees were accepted for training as M.F.U./S.S. Assistants at the April 1964 intake.

7.

8. TRAINING.

8.1. Courses completed.

90 students qualified out of 96 who took the Basic Course final examination in January 1964, but 21 of these were Mission students who trained elsewhere than at M.A.T.S. The figures are as follows:

<u>Sponsoring Authority</u>	<u>No. who sat the examination</u>	<u>No. successful</u>
Government	22	22
Native Authorities	51	47
Missions	<u>23</u>	<u>21</u>
	<u>96</u>	<u>90</u>

8.1.2. In addition:

28 Native Authority dispensary assistants were given a Refresher Course lasting 6 months; 24 of these passed the terminal examination.

28 Assistant Leprosy Inspectors qualified from their 6-month training course, including 5 Government trainees who had passed the Basic Course examination early in 1963. (4 additional Native Authority candidates failed to qualify).

19 Native Authority Leprosy Inspectors were given a 1-month Refresher Course.

40 Native Authority Leprosy Attendants were given a 3-month training course - the 14th to be held - and all qualified; about half of these were taught in the vernacular.

8.2. Teaching Staff.

Before the end of the year the Temporary (Lady) Medical Officer who had been engaged full-time at the "Town Dispensary" adjacent to M.A.T.S., examining out-patients and teaching M.A.T.S. students, left Nigeria. A profound improvement in the standard of practical work and knowledge was very obvious in the batch of students trained in this way, but a replacement for her has not been available. However, the W.H.O. Public Health Adviser has not been able to assist the remaining professional staff by giving some lectures. Staff at the end of the year consisted of:

The Acting Principal

1 Medical Officer

5 { Senior Superintendent
Superintendents
Assistant Superintendents

3 M.F.U./S.S. Inspectors

2 Leprosy Inspectors

1 Laboratory Technician

3 M.F.U. Assistants.

(N.B. at any one time during the teaching term there is always a minimum of 160 students - often up to 180 - in two batches of 80 each (first and second year), with frequent additions of Leprosy Inspector, Leprosy Attendant and Refresher Course trainees).

9. MEDICAL FIELD UNITS AND RURAL HEALTH CENTRES.

No.6 Medical Field Unit was separated from the combined Nos.1 and 6 based on Makurdi. and the headquarters established at Idah under the Rural Medical Officer there; he is now in direct control of the Yaws Control Campaign throughout Igala and Idoma Divisions, as well as being in charge of the Rural Health Development Project in this area as counterpart to the W.H.O. Sanitary Engineer. The work of these two Units and of No.4 M.F.U., Keffi is described in the section on Yaws.

9.2. No.3 M.F.U. and the Rural Health Centre Argungu.

A Rural Medical Officer only became available for the first two and the last two months of 1964, and no Health Sister was available. However, before the end of the year an era of more determined efforts at Health Education and general public enlightenment on hygiene was ushered in; a combined "attack" on both sexes was possible with the assistance of the wife of the Rural Medical Officer - also a doctor. The "Health Committee" was reformed in Argungu Town, and it is hoped that its efforts will be less abortive than previously. 12,112 vaccinations against smallpox were performed by M.F.U. and Native Authority Staff in Argungu Emirate during the year, and only 4 cases of smallpox were reported.

9.3. No.5 M.F.U. and Rural Health Centre, Kankiya.

No Rural Medical Officer was available for this Unit throughout the year. The routine functions of a Rural Health Centre were carried out, with special emphasis here on sanitary improvements, as the Unit acts as a Field Training Centre for students from the Kano School of Hygiene, 40 of whom spent 2 months in the area. Construction of well-tops, slaughter-slabs, compost pits, washing-places drains and pit-latrines slabs in the villages around Kankiya were undertaken.

9.4. Rural Health Centre, Ankpa.

This was constructed in 1962 as part of the Rural Health Development Project, and finally commenced functioning in June 1964 when the water-supply was connected up (see para. 11.2)

10. THE TUBERCULOSIS UNIT.

There has been no change in the organisation and policy described in last year's Report. The administration of B.C.G. to the selected population groups was completed in Kano, Katsina and Sokoto Provinces during the year, and only Bornu remains to be completed. Lack of full-time Tuberculosis Medical Officers to supplement the work of the Consultant is delaying any major increase in coverage of the population by B.C.G. vaccination. Mass radiography is at present rendered pointless by the inadequacy of drugs to treat fully all those tuberculosis patients who voluntarily seek treatment, even if out-patient chemotherapeutic treatment is proved in practice to be an effective regime amongst certain groups of people.

10.2. 250 sputum specimens from patients in Plateau and Bauchi Provinces were sent to the W.H.O. - assisted Federal Laboratory in Lagos for culture and sensitivity tests, and by the end of the year results for 134 specimens had been received:

- (a) 76 culture positive; 43 of these strains were resistant to one or more of the 4 commoner anti-tuberculosis drugs.
- (b) 48 culture negative.
- (c) 10 contaminated.

This drug-resistance in 56% of patients whose specimens were successfully cultured is profoundly disturbing, and underlines the need for a laboratory capable of carrying out drug-sensitivity tests in the North - certainly before any major expansion of tuberculosis treatment is embarked upon. (A personal communication from Dr. F.P. Bernard of Ahmadu Bello University, Zaria, in July 1966, suggests that routine drug treatment of the 60-odd cases recently discovered amongst workers there is proving highly successful, so that there may be considerable variation in drug susceptibility amongst M. tuberculosis in different parts of the North).

10.3. Statistics for the Jos Chest Clinic are give below:

Total ward admissions	242
Total patients discharged arrested/quiescent	198
Deaths of in-patients	28
New tuberculosis patients diagnosed	390
Total patients attending tuberculosis out-patient department	5,458.

10.4. Statistics available for the Region as a whole are given below on the next page:

PROVINCE	PERSONS EXAMINED AND/OR VACCINATED	TUBERCULIN TESTED			BCG VACC.
		NO. TESTED	NO. POSITIVE	NO. NEGATIVE	
ILORIN	School Children	4,005	2,241	1,662	1,662
	Infants	-	-	-	895
KABBA	School Children	9,055	4,829	4,104	4,104
	Infant welfare Clinics	-	-	-	423
SOKOTO	School Children	16,293	7,121	7,782	7,782
	Infant Welfare Centres	-	-	-	3,456
	Teachers & Families	529	359	35	35
	Govt. & N.A. Officials	-	-	-	-
KATSINA	School Children	17,253	9,315	7,801	7,848
	Infant Welfare Centres	749	219	274	4,268
	Teachers and families	218	125	33	33
	Govt. & N.A. Officials	-	-	-	-
KANO	School Children	39,749	15,202	23,019	23,019
	Infant Welfare Centres	-	-	-	7,453
	Teachers and families	1,286	700	337	337
	Govt. & N.A. Officials	-	-	-	-
ZARIA	School Children	3,615	1,640	1,975	1,975
BAUCHI	School Children	19,821	10,559	9,844	11,180
	Infant Welfare Centres	-	-	-	8,001
	Teachers and families	529	359	35	35
	Govt. & N.A. Officials	-	-	-	-
PLATEAU	OPD. Contacts & referred Cases, Jos	16,601	7,883	5,846	6,367
	New Born babies in Jos Maternity	-	-	-	1,535
	Infant Welfare Centres	-	-	-	4,193
	School Children	3,453	1,407	1,914	2,027
	T O T A L S	133,156	61,959	64,661	96,628
RHC Ankpa	All ages	20	16	4	4
M.O.H. Kano	" "	N.R.	N.R.	2,947	2,947
M. O. H., Kaduna	" "	N.R.	N.R.	1,984	1,984
	GRAND TOTAL N.REGION	133,176	61,975	69,596	101,563
	CUMULATIVE TOTALS SINCE CAMPAIGN COMMENCED IN 1961.	384,610	153,528	229,472	308,915

11. THE RURAL HEALTH DEVELOPMENT PROJECT.

The origins and progress of this up to the end of 1963 were fully described in the Rural Health Report 1963.

11.2. The Igala-Idoma part of the R.H.D.P.

The Rural Health Centre Ankpa opened in June staffed by a Rural Health Superintendent, an Assistant Urban Health Superintendent, 3 Medical Field Unit Assistants, one Native Authority Dispensary Assistant, and a Native Authority Grade II Midwife; a Community Nurse will be posted as soon as possible. A varying number of Health Assistants were attached to the Centre at different times. The Centre was visited at least once weekly by the Rural Medical Officer and the Health Sister from Idah. The Water supply has now been installed for the Rural Health Centre at Otukpa, and it will be opened when Ministry of Works taking-over formalities have been completed. 6 "Uniport" type round huts were completed as junior staff quarters during the year; there is little accommodation of a reasonable standard for junior staff in this small village, although when water for the villagers begins to flow the position may change. A Town Plan for 2,000 persons was drawn up by the W.H.O. Sanitary Engineer for controlled development at Otukpa.

11.2.2. With regard to Native Authority commitments, Idoma N.A. completed construction of the first Maternity Unit scheduled for the Otukpa area, at Utonkon, and it opened in August with 2 Grade II Midwives to staff it. Its two dispensaries at Ichama and Orukpa were nearly completed; when opened this will complete the Idoma N.A. dispensary commitment. Igala N.A. is much beset by financial difficulties which have prevented any start being made on construction of the 3 Maternity Units and 4 dispensaries scheduled under the Project, although their position with regard to trained staff was excellent.

11.2.3. The development of a comprehensive environmental sanitation programme in the Project Area is still in its early stages; sanitary surveys conducted by the W.H.O. Engineer, complementary to that at Ankpa in 1963, were completed at Otukpa and Dekina. In Otukpa district 3,631 compounds holding 31,985 persons were visited. The child mortality rate appeared to be 310 per 1,000. 98.7% of the population had no latrines. In Dekina district 2,979 compounds holding 28,093 persons were visited. The child mortality rate appeared to be 365 per 1,000, and 80.4% of the population were without latrines. The Rural Medical Officer commenced Health Surveys, and was fortunate in having some Benue Sleeping Sickness Staff under an

experienced Inspector available for this work. Extraordinary difficulty was experienced in obtaining faecal specimens for examination, and the one objective index of success or failure of a latrine-construction programme - intestinal helminth rate - is not likely to be satisfactorily available. To quote from the Rural Medical Officer's report "The villagers are on the whole reluctant to bring their stools for microscopies and think that it will be poisoned to kill them in some inexplicable manner." The objective had been to examine stool and urine specimens of all the available inhabitants of every 4th compound (according to the tax register) in the area surveyed, but by the end of the year only 871 specimens had been obtained from 13,444 persons, and these did not of course constitute a random sample, but simply the specimens of those who were prepared to co-operate. (These difficulties were nothing compared to the blank refusal to bring anything at all later encountered at Otukpa). Such difficulties have not been encountered, to the writer's knowledge, in surveys elsewhere in the North. The rarity of S.haematobium infection in the area is interesting, although proper investigation would doubtless provide obvious reasons related to unsuitability of sites for the vector.

11.2.3.2. 10 model latrines were constructed by Health Assistants under the guidance of the W.H.O. Sanitary Engineer and 3 model houses were built on a site in the new Ankpa layout prepared last year by the Engineer. Plans for a mass latrine campaign, with concrete latrine-top slabs made at the Health Centre, are under way; a great deal of preliminary health education - especially during the course of the various surveys - was undertaken, and the people of Ankpa, in particular, with an enthusiastic Health Committee of their own, seem very receptive to such self-help projects; however, the need of funds for the slabs may delay implementation of such a programme.

11.3. Training of Staff.

Community Nurses - 6 qualified at Kaduna during the year, bringing the total to 37 in the Region; 26 were still under training.

Health Inspectors - none have qualified since 1961 - recruitment is poor and those that enter for training tend to leave before it is completed to find more attractive careers elsewhere. 6 students were under training at the end of the year.

Health Assistants - 43 qualified in February, and 85 were under training at the end of the year. Many benefited by special training given to them at Idah by the W.H.O. Sanitary Engineer.

The Health Education Unit at Zaria was opened in October 1964, under the supervision of the Medical Officer of Health, Zaria. Full-time staff consists of a Health Superintendent and a Health Inspector, both of whom have completed overseas post-graduate courses in Health Education. They commenced work with a local environmental health survey. A Health Education Seminar held at Zaria in April was attended by staff of different Ministries and other bodies; it was extremely well organised by the Medical Officer of Health, Zaria, and was most successful.

12. TRYPANOSOMIASIS

12.1. General review.

The Sleeping Sickness Treatment Staff have continued their efforts to locate Sleeping Sickness cases by team surveys, and by surveys carried out by staff attached to fixed treatment centres, as well as treating patients reporting voluntarily to the 71 treatment centres available. Regular examination of all labourers and their families in the mines and timber camps have continued in the endemic areas around the base of the Jos plateau. Registered local labourers, included in this scheme for the first time in 1962, continued to be protected with 6-monthly pentamidine inoculations along with labourers living in the camps.

12.1.2. As predicted last year, the prophylactic pentamidine campaign for Bornu Railway Extension workers has ended. However, labourers on the Bauchi-Numan Trunk Road project are now being examined and protected in the same way.

12.1.3. Whenever possible, resurvey teams have concentrated on village areas known or suspected to be most at risk - these are called "Selected Village Area" ("S.V.A.") resurveys. The degree of risk may be assessed on various factors; villages lying close to a river or river system are obviously the most likely to produce Sleeping Sickness cases in many areas, provided that there is adequate shade and moisture in the dry season for fly survival, and this latter point may be assessed in advance of the S.S. survey teams by Tsetse Control Staff. Where a previous survey has recently been carried out, villages and hamlets which yielded cases at the previous surveys may be selected for re-examination; only if appreciable numbers of cases are again found will the team include adjacent villages, unless possibly there is a local complaint about tsetse fly. (Local complaints of an annoying prevalence of tsetse which turns out to be G.palpalis, or G.tachinoides, rather than G.morsitans, have on a number of occasions now led our staff to an otherwise unsuspected outbreak). In the conduct of this type of survey considerable understanding and initiative is required of the Team Leader, and a number of them have proved very capable in this respect. As remarked in the 1963 Report, "District" incidences are no longer available for comparison with those of previous years, when the technique was to examine complete Districts.

12.1.4. As memory of the massive epidemic of the 1930s becomes dim, and people generally become more sophisticated and independent, so the difficulties of 'rounding-up' large numbers of them in one place for easy examination increase. Unscrupulous or ignorant persons have on occasion used the requirements of the Sleeping Sickness Service as a means of creating local unrest, but more often the difficulties are part of a general spirit of individualism most marked, as expected, in large towns. In an attempt to overcome local resistance in Bida Town and environs, the Niger-Ilorin Unit headquarters moved from Minna to Bida in April; it appears that familiarity has bred confidence in this case, according to the local Officer in-charge.

12.1.5 A summary of returns for the year is given below:-

	Number Examined	Number of Cases			Total Cases	% S.S
		New	Clinical	Relapse		
Mobile Team Resurveys	928,891	756	62	81	899	0.10
Dispensary Resurveys	282,102	236	26	42	304	0.11
Mines etc. Surveys	39,611	11	-	-	11	0.03
Voluntary Disp. Cases	-	359	149	204	712	-
Voluntary Hosp. Cases	-	122	68	77	267	-
TOTAL =	1,250,604	1,484	305	404	2,193	

The total number of cases found was thus the smallest in any year since Sleeping Sickness surveys began in 1930, and about 400 less than in 1963. Three quarters of this reduction on the previous year is accounted for by the smaller numbers of voluntary cases diagnosed at dispensaries and hospitals - 979 compared with 1,269 during 1963 - and the total number of survey cases was maintained by the 219 cases diagnosed in Biu Division, which had never before been surveyed.

12.2.

THERAPY; DIAGNOSIS.

As described in last year's Report, Melarsen is increasingly used for the treatment of Sleeping Sickness in Northern Nigeria; the basis for this trend is shown in the following extract from a report prepared by Dr. M.P.Hutchinson in 1962:-

12.2.2. "During the last ten years, the only major change in therapy has been the introduction of the pentavalent arsenical, Melarsen Sodium, in the treatment of clinical late cases or those who have relapsed following

treatment with standard drugs. In Nigeria, the commonest standard course has used the synergic mixture of antrypol and tryparsamide, followed by tryparsamide alone. The shorter course using pentamidine and tryparsamide was favoured for a time, but with the increasing proportion of relapses, it was felt that this course provided inadequate arsenical to the voluntary cases attending dispensaries and hospitals most of whom already had some degree of C.S.F. involvement. Recently an added factor has been the unexpected poor results in the long term follow-up of early cases originally treated with pentamidine and acting as controls in the Berenil trials.

12.2.2.2. Since the melarsen trials were reported upon in 1956, melarsen has been increasingly employed as dispensary attendants have become trained in its use. To begin with, it was only given to patients relapsing after previous courses containing antrypol and tryparsamide. More recently, some advanced, previously untreated, cases have also been included. The number treated annually with this drug at rural centres has risen from 21 in 1955 to 614 in 1961. In all, 1,963 have been treated for the first time with melarsen. During this period, 61 cases have reported back again as clinical relapses. General experience has usually shown that the majority of relapses after any standard course of treatment occur within the first year. An assessment of the trend has been made annually by expressing the relapses in any one year as a percentage of the new cases treated the previous year. Although this is not a relapse rate, it is a useful index for comparing trends from year to year. This index, which stood at 11.5% for all cases in 1948, rose to 26.3% by the end of 1961. Since the introduction of melarsen, the number treated with this drug in any one year has been small; the consolidated figures for six years, therefore, may more profitably be compared.

<u>All cases</u>	Total new S.S. cases treated in N. Nigeria 1955-60(6 yrs.)	Total S.S. Relapses during 1956-61(6 yrs.)	"Relapse Index"
	<u>24,213</u>	<u>4,559</u>	<u>18.8%</u>
<u>Melarsen</u>	Total treated with melarsen for 1st time. 1955-60(6 yrs.)	Total melarsen relapses during 1956-61(6 yrs.)	"Relapse Index"
	<u>1,349</u>	<u>61</u>	<u>4.5%</u>

12.2.2.3. Allowing for the very many unknown factors, such as cases who died or could not be traced, factors common to both groups, the figures do suggest that the more widespread use of melarsen has been justified, especially when it is remembered that the melarsen group consisted of relapses or clinically advanced cases. Undoubtedly the melarsen index is too low as the long term effect of any late relapses cannot be shown, the majority of cases having been treated within the last three years; nevertheless, the trend appears promising.

12.2.2.4. It must be realized that the treatment of cases relapsing after melarsen provides a particularly difficult therapeutic problem. A small number of such cases with advanced changes in the C.S.F. showed no improvement with up to 5 courses of the trivalent arsenical, melarsen oxide/BAL or Mel B."

12.2.3. There is no difficulty in having Melarsen prescribed by field staff for all cases diagnosed as "relapsed" after previous treatment (including previous treatment with Melarsen itself), and for all cases recorded as "Clinical". Difficulty does arise in its use for "new" gland positive cases which are also in an advanced stage, because only a small minority of them have the C.S.F. examined to confirm the actual stage of the disease, and there is a tendency for staff to overlook symptoms once trypanosomes have been discovered in the gland juice. Many assistants, particularly those working on their own in dispensaries or other treatment posts, tend to treat all gland positive cases with Antrypol and Tryparsamide and only turn to Melarsen if trypanosomes cannot be found.

12.2.4. However, many Survey Team Leaders (especially those with long experience of sleeping sickness in a particular tribe or area), are very good at assessing symptoms due to advanced S.S. in so far as this is at all possible. The fact that only 39 out of 1,629 gland positive cases (1,270 of which were found by survey teams) were diagnosed as "advanced" in 1964, is of course partly due to the impossibility of diagnosing C.N.S. involvement in many cases without performing lumbar puncture, which is only carried out by doctors at present. With regard to "relapse", there is undoubtedly a general tendency to "play safe" and overdiagnose this on the basis of various symptoms occurring in someone who happens to have been treated previously for sleeping sickness; this is proved by the normal C.S.F. often found when a doctor has been able to check such cases by lumbar puncture.

12.2.5. The table on the next page (para.12.2.7) shows comparative figures for relapses and for Melarsen therapy; the diagnostic limitations imposed by the lack of C.S.F. examinations must be borne in mind, but overall it seems that the errors are probably fairly constant. If this is so, then there has at least been no obvious deterioration in the general response to treatment, and the reduction in general "relapse index" between 1953 and 1961 (para.12.2.2.2) attributable to the use of Melarsen, has been maintained. It is also encouraging to note that the "relapse index" after Melarsen does not show any upward trend at present. (Melarsen Sodium is manufactured specially for this Ministry, as it does not appear to be in use elsewhere; the vast majority of our sleeping sickness cases are treated as out-patients at dispensaries, or at local treatment centres which may be set up specifically for treatment of groups of cases found by survey, and admission to hospital for treatment with Mel B, as in some other territories, is only practicable for special cases).

12.2.6. FURTHER NOTE at time of writing - July 1966.

It is pertinent to comment here that close observation of field work, and analysis of some results after C.S.F. examinations early in 1966, suggested the need for Melarsen treatment of all cases not proved to be early (by lumbar puncture) in certain areas. However, on the Biu Plateau results obtained by Dr. Watson of N.I.T.R. suggest that Melarsen in that particular area may be no better, or even less effective, than Antrypol and Tryparsamide, in advanced cases. Variability in response to treatment within the Northern Provinces is further emphasised by the number of serious relapses after all forms of field treatment in patients from the Pitti area who have been followed through with C.S.F. examinations; this could become a very serious problem, as some of these patients brought to Kaduna Hospital for treatment with Mel B had such gross tremor or involuntary movements as to make lumbar puncture and venepuncture exceedingly difficult or impossible. Results of treatment during the last 2 years in Lowland Division of Plateau Province, (where a sharp outbreak has now provided 250 recently infected patients for a comparison of three treatment regimes), have by contrast been very good. These Lowland patients also provided an opportunity for training a few selected Field Staff in the techniques of lumbar puncture and C.S.F. examination.

12.2.7. Statistics for Sleeping Sickness cases reported as "relapses",
and for all cases treated with Melarsen:-

R E L A P S E S				M E L A R S E N					Relapses after Melarsen treatment.	
Year	Total S.S. cases treated	Total relapsed cases treated			Relapsed cases as % of total S.S. cases treated previous year.	S.S. cases treated with Melarsen			No. of relapses after Melarsen expressed as a % of cases treated with Melarsen during the previous year.	No.
		Resurvey	Voluntary	Total		New Clinical	Relapsed	Total		
1957	5,045	188	631	819	-					
1958	4,862	159	647	806	16.0					
1959	4,536	176	589	765	18.7					
1960	3,789	137	604	741	16.3			592	15.7	25
1961	2,878	89	407	496	13.1			684	23.9	41
1962	3,309	128	352	480	16.7			657	19.9	63
1963	2,739	155	329	484	14.6			762	27.8	62
1964	2,304	167	281	448	16.3	39	279	338	28.4	64

12.3.

ADAMAWA PROVINCE.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Bakundi	13,876	50	0.36
Mutum Biyu	5,897	13	0.22
Jalingo	1,782	20	1.12
Gassol	5,342	8	0.15
Muri	3,134	17	0.54
Survey total		108	
Voluntary cases (Numan Hosp.)		<u>3</u>	
Grand Total		<u>111</u>	

12.3.2. Selected village area resurveys were repeated in Muri, Jalingo and Bakundi districts as in 1963, and 80 cases were found compared with 79 in the previous years; the necessity for annual resurveys here obviously continues.

12.3.3. The resurvey of Gassol district produced only 8 cases compared to 16 during the 1962 resurvey; the S.V.A. resurvey of Mutum Biyu produced 15 cases - the same number as found during 1962.

12.3.4. In the Kungana Habe Village Area of Bakundi district (lying on the main Yola-Takum road), where repeated surveys had failed to reduce the high incidence of infection, prophylactic pentamidine was administered during December to 322 villagers - all who were resident in the area at the time, but representing only 70% of the Tax Register population. The inoculation will be repeated in 1965. This represents a limited excursion into the field of prophylaxis, which could not easily or safely be extended in view of the migrant nature of the population in much of the area.

12.4.

BAUCHI PROVINCE.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Team and Dispensary Resurveys	190,726	129	0.07
Mines examination	20,253	1	0.005
Railway Extension Examinations	220	-	
Voluntary cases		<u>77</u>	
Total S.S.Cases		<u>207</u>	

12.4.2. Bauchi Emirate

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S</u>
Ganjuwa	26,090	1	0.003
Jama'a	7,689	13	0.17
Bula	22,524	5	0.02
Duguri	2,403	14	0.58
Zungur	9,561	5	0.05
Bauchi environs	10,978	5	0.04
Bauchi schools	837	-	-
Kirfi	2,764	2	0.07
Darazo June	6,433	11	0.17
" Nov.1964-Jan.'65	869	<u>20</u>	2.3
Total S.S.Cases		<u>76</u>	

The figures for Ganjuwa are for the southern half the district; the northern half was surveyed last year and 22 cases were found, most of them from 5 hamlets on the R. Bunga. Limited "S.V.A." resurveys should now suffice here for some years.

12.4.2.2. Epidemic foci of Sleeping Sickness in Jama'a, Bula, Duguri and Zungur districts, 1960-64 (Sketch-map at page _____).

(i) Routine Sleeping Sickness Resurveys in various districts of Bauchi Emirate in 1960 and 1961 revealed foci of infection at Rimin Zayam, Zaranda, Zungur, Gigyara and Dull (see map). Subsequent developments at these foci have been varied.

(ii) Particular attention has been given to these relatively limited areas since the discovery of these foci; in the case of that at Dull, survey figures have been as follows:-

	1949	1953	1960	1962-63	1964
a.Dull Village only	6/792	?	11/1,086	25/914	0/1,078
b.Dull Village area (including(a)above)	9/3,056	3/4,000	12/4,469	26/2,528	3/5,093

Two of the 3 patients found in 1964 were probably not new infections locally acquired, and the apparent near-extinction of this focus has taken place without assistance from tsetse control measures initiated by this Ministry, although clearing of riverine vegetation for farming is now reported to have reduced tsetse habitat to a 300 yard stretch of stream.

(iii) Tsetse control measures were considered necessary at the other four foci. At Gigyara and Zungur, results have been as follows:-

	<u>1960</u>	<u>1961</u>	<u>1963</u>	<u>1964</u>	
(a) Tukun Kogi	11/95	14/93	4/96	6/97	} Gigyara focus.
(b) Gigyara Village area (including (a) above)	14/2,575	26/2,267	20/2,056	13/2,049	
(c) Zungur Village Area	3/3,039		14/1,891	2/3,634	} Zungur focus.
(d) Ball Village Area	-		14/1,605	1/3,976	
(e) Adjacent part of Bulla District (same focus as (c) above and including (d)).	-		26/5,389	2/10,915	

(iv) It is clear that the Gigyara focus had not been adequately controlled up to 1964 either by repeated surveys, or by tsetse control efforts which began in 1962 in the neighbourhood of Gigyara village with spraying, and 4 miles of clearing. However, subsequent fly and vegetation surveys showed that this focus could not really be separated from a focus of infection discovered up-stream at Zungur in 1963. Tsetse control measures commenced at Zungur in December 1964 by pruning of mango trees along the rivers Maijuju and Zungur; this was carried downstream to the Gigyara area and followed in February 1965 by spraying of the riverine vegetation with D.D.T., including the re-invaded area near Gigyara previously sprayed in 1962. It is hoped that this extension of tsetse control will now succeed in eliminating the persistent focus of sleeping sickness at Gigyara. Cases at Zungur itself declined remarkably even before tsetse control measures were commenced there!

(v) The situation at the Rimin Zayam and Zaranda foci has been as follows:-

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	
(a) Unguwan Balarabe	15/196	5/273	0/266	1/236		} Rimin Zayam.
(b) Polchin Kanawa	3/299	-	4/104	3/445		
(c) Tilai Village area (including (a) & (b) above)	28/3,755	-	20/4,639	7/2,967		
(d) Gansawa	8/158	6/152	-	0/127	0	} Zaranda
(e) Zaranda Habe	6/529	17/528	-	5/419	0	
(f) Zaranda Fulani	2/1,127	1/1,054	-	0/1,157	0	
(g) Zaranda Fulani Village area (incl. (d), (e) & (f) above).	19/6,142	24/6,904	-	5/1,847	0	

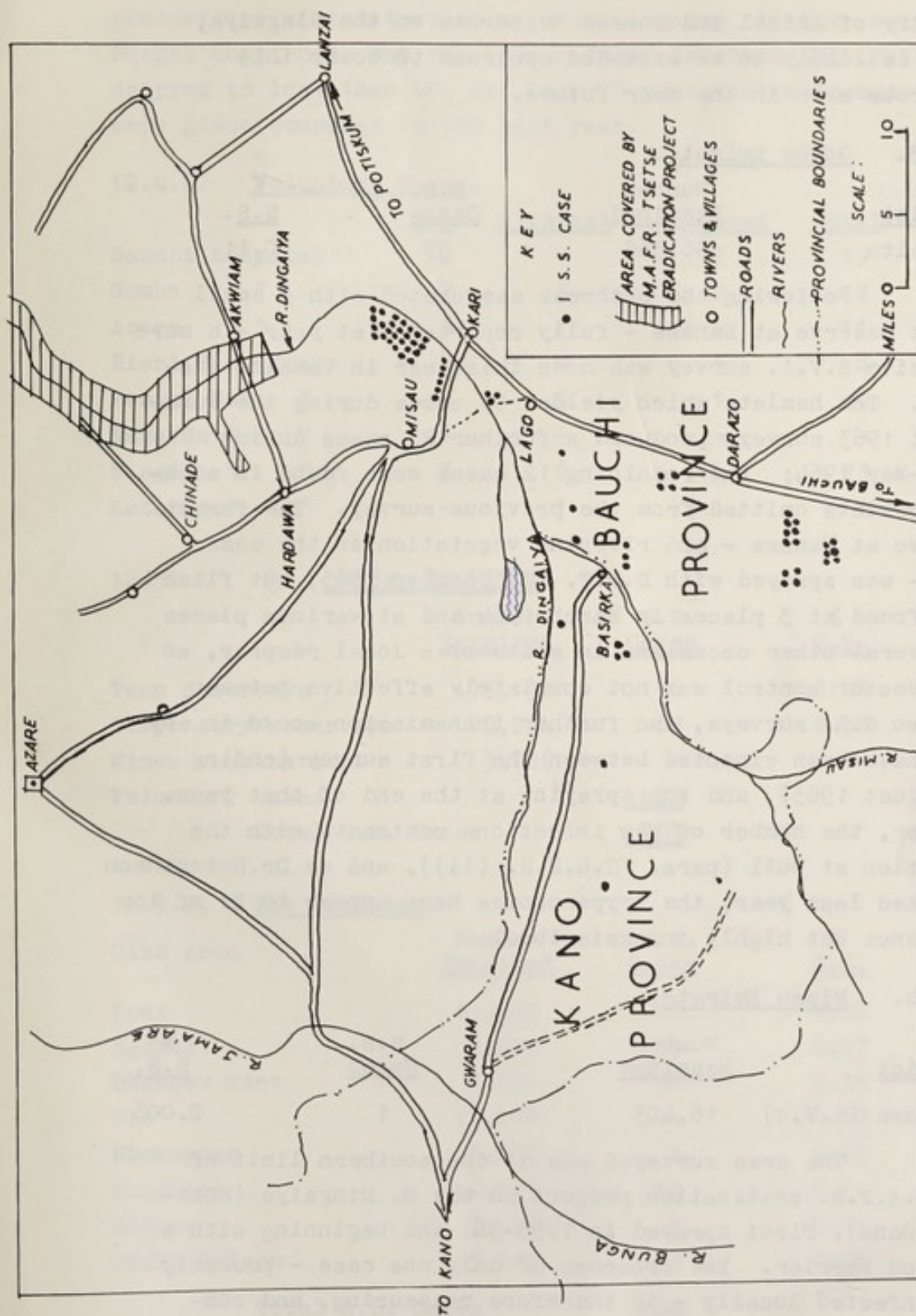
(vi) At Rimin Zayam, control of *G.tachinoides* began early in 1962, by means of spraying with D.D.T. and 18 miles of clearing mainly downstream of Polchi. (Prior to spraying, about 70 *G.tachinoides* could be caught in 1 hour at the Polchi watering-point). However, by the end of 1962, re-invasion had taken place at many points (atches at Polchi watering-point averaging 1 *G.tachinoides* in 2 hours), and spraying of the whole area was repeated in January 1963. Fly were not found again during 1964. It is proposed to repeat the spray of this area if any further S.S. cases are found during the current survey; costs:-

Clearing of 17.8 miles of river bank, £365; spraying with 3,000 lbs of D.D.T., £300 for the insecticide and £131 for labour; yearly reslashing of cleared area £35 - 0 - 0.

(vii) At Zaranda, control of *G.tachinoides* began in December 1961 by spraying with D.D.T. However, fly were found again in 1962 at 4 of the 6 catching points, including the watering-points of Z. Habe and Z. Fulani, where most of the S.S. cases had been diagnosed, and a second spraying in January - March 1963, was extended to include the headwaters of a number of streams to the west, and some on the south east of the area, which had been omitted from the first spraying. Furthermore the whole of the R. Samiya, from which the hamlets of Zaranda Habe and Gansawa draw their water, was cleared from its source to its junction with the main Zaranda river. No peripheral cleared or sprayed barriers were created, but peripheral surveys suggested that re-invasion might not readily occur, (and the failure to detect any further cases of sleeping sickness during 1965 suggests that this focus has now been eliminated).

12.4.2.3. Within a five-mile radius around Bauchi Town tsetse control measures have been applied since 1961 (as reported in that year). This year's "Bauchi Environs" survey covered an area of radius roughly 10 miles around the town, and produced only 5 cases.

12.4.2.4. The 31 cases found in Darazo district represent only part of a focus of infection which extends along the Misau River (called the Dingaiya further downstream), and includes part of Gwaram district of Kano Province as well as Yarima district of Misau Emirate. This is shown in the sketch-map at page . All the Darazo district cases were in males (as were all but 3 of the 28 cases found in early



MAP SHOWING DISTRIBUTION OF SLEEPING SICKNESS CASES
RELATED TO MISAU AND DINGAYA RIVERS SYSTEMS
IN TWO PROVINCES AND THREE EMIRATES.

1964 — EARLY 1965.

MAP No.2.

1965 in Misau Emirate). Infection seems to have a strong association with fishing and farming activities, and there seems little danger of infection in the environs of villages and hamlets. The downstream extent of this focus is fortunately limited by the tsetse eradication project of the Ministry of Animal and Forest Resources on the Dingaiya, which is likely to be extended upstream to cover this dangerous area in the near future.

12.4.3. Gombe Emirate.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Yamaltu	36,368	39	0.11

Following the outbreak associated with a small forest reserve at Kanawa - fully reported last year - a more extensive S.V.A. survey was made this year in Yamaltu district. The hamlets which yielded 59 cases during the June-August 1963 surveys produced a further 27 cases during March-May 1964; the remaining 12 cases were found in adjacent hamlets omitted from the previous survey. The forest reserve at Kanawa - and riverine vegetation in the same area - was sprayed with D.D.T. in December 1963, but flies were found at 3 places in March 1964 and at various places on several other occasions in spite of a local respray, so that vector control was not completely effective between the two S.S. surveys, and further transmission could in any case have been expected between the first survey (ending in August 1963), and the spraying at the end of that year. However, the number of new infections contrasts with the situation at Dull (para. 12.4.2.2. (ii)), and as Dr. Hutchinson remarked last year, the trypanosomes here appear to be of low virulence but highly transmissible.

12.4.4. Misau Emirate.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Hardawa (S.V.A)	16,403	1	0.006

The area surveyed was at the southern limit of the M.A.F.R. eradication project on the R. Dingaiya (Komadugu Gana), first sprayed in 1955-56, and beginning with a cleared barrier. The presence of only one case - probably not infected locally - is therefore reassuring, and complements last years reports for Sokwa, Shira and Udobo districts, also protected by M.A.F.R. Projects.

12.4.5. Mines Examinations.

Mining camps in the Rishi and Pengel area of Lame district continued to be examined every 3 months. 15,831 examinations were carried out during the year, and one S.S. case (in a dependent of a labourer), was diagnosed. 6-monthly pentamidine administration to a small group of mines near Pengel continued, but the labour force involved this year dropped to less than 40, and only 76 pentamidine inoculations were given compared to 150 last year.

12.4.6. Voluntary Cases.

	<u>New</u>	<u>Clinical</u>	<u>Relapsed</u>	<u>Total</u>
Bauchi Hospital	12	-	7	19
Gombe "	7	3	2	12
Azare "	5	2	4	11
Rishi S.S. Disp.	4	-	-	4
Pengel N.A. "	-	5	1	6
Nabardo " "	-	-	-	-
Ningi " "	3	6	14	23
Katagum " "	-	1	1	2

12.5. BENUE PROVINCE.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Team resurveys	175,151	158	0.09
Dispensary resurveys	89,204	68	0.76
Mines examinations	3,728	-	
Voluntary cases		<u>477</u>	
Total S.S. Cases		<u>703</u>	

12.5.2. Tiv Division.

<u>Clan Area</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Kpav	12,490	11	0.08
Ngohol	8,288	39	0.47
Shangev Tiev	8,321	30	0.36
Ute	13,180	4	0.03
Mbakaange	5,838	3	0.05
Mbagbera	10,103	10	0.1
Ningev	3,996	1	0.02
Gboko Prison	3,102	2	0.06
Total S.S. Cases		<u>100</u>	

Disturbed conditions in Ngohol and Shangev Tiev (astride the Gboko-Oturkpo road and including Aliade), prevented the 69 cases diagnosed during the year from completing treatment; it is hoped that they will eventually be traced.

The infection rates in these two kindred areas continued much as usual surveys were previously carried out in 1960 and 1962. Surveys in the remaining areas had not been undertaken for 5 years, and the small number of cases found after this interval was re-assuring.

12.5.3. Wukari Division.

The survey of Takum district, which up to the end of 1963 had covered 26,023 examinations with 38 cases found, produced only 2 more cases out of a further 11,874 persons examined.

12.5.4. Lafia Division.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Lafia	35,194	10	0.03
Obi (part)	16,534	4	0.02

These districts were previously surveyed in 1959, when they produced 6 and 12 cases respectively.

12.5.5. Dispensary resurveys.

<u>Division</u>	<u>Dispensary</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Tiv	Abinsi	3,561	6	0.17
	Igbor	7,327	31	0.42
	Katsina Ala	4,357	3	0.07
	Shangev Ya (Agi)	14,296	6	0.04
Wukari	Bantaje	552	3	0.5
	Donga	3,273	4	0.12
	Ibi	4,300	3	0.07
	Takum	7,979	10	0.13
Idoma	Bagaji	19,827	2	0.01
Nassarawa	Odegin Beki	<u>23,552</u>	<u>-</u>	<u>-</u>
		<u>88,835</u>	<u>68</u>	

12.5.6. Mines Examinations.

3-monthly examinations of labour at the mining camps in Nassarawa Division were carried out. For the second year running, no S.S. case was diagnosed (in 4,784 examinations this year).

12.5.7. Voluntary Cases.

<u>Division</u>	<u>Hospital/dispensary</u>	<u>New</u>	<u>Clin.</u>	<u>Relapse</u>	<u>Total</u>
Tiv	Abinsi	5	6	3	14
	Gboko	33	24	24	81
	Igbor	17	3	2	22
	Katsina Ala	21	5	12	38
	Makurdi Gen. Hosp.	24	7	13	44
	S.U.M., Mbaakon	1	2	1	4
	S.U.M., Mkar Hosp.	13	13	5	31
	Shangev South	36	11	12	59
Wukari	Bantaje	1	2	2	5
	Donga	25	10	10	45
	Ibi	5	2	4	11
	S.U.M. Takum Hosp.	23	-	9	32
	Takum (N.A. disp.)	14	3	3	20
	Wukari Gen. Hosp.	4	7	8	19
Lafia	Awe	2	2	2	6
	Keana	3	-	-	3
	Lafia	11	6	3	20
Nassarawa	Gitata	1	-	-	1
	Odegin Beki	1	-	1	2
Idoma	Bagaji	11	4	5	20

The total number for voluntary cases is 25% less than in 1963, but disturbed conditions in the Province during the year prevent any conclusions being drawn from this. It is interesting to note that for the third year running, however, the proportion of patients diagnosed as "relapses" is almost identical - 24% in 1964 compared to 25% in 1963. The diagnosis of "Clinical" and "relapsed" Sleeping Sickness is based on history and clinical appearance, as lumbar punctures are not performed by field staff, and when the Principal Health Officer, Rural Health or other doctors do carry out C.S.F. examinations of patients so diagnosed, many discrepancies are found. It seems therefore that the error of assessment over a large area is nevertheless a constant, and probably also that the real proportion of relapses in Benue Province has also been roughly constant in recent years.

12.6. BORNU PROVINCE.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Team surveys	68,314	219	0.33

12.6.2. Bedde Emirate.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
(Selected Village areas)	17,844	30	0.16

28 of these cases occurred in Gorgoram village area, compared to 18 in 1962; there was an infection rate of 2.5% in one hamlet. However, in view of the fact that the sources of infection on the R. Jama'ari system will shortly be sprayed out by the M.A.F.R. Tsetse and Trypanosomiasis Unit, as part of their eradication project, a situation otherwise potentially very serious can be regarded complacently.

12.6.3. Bornu Sheikdom.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Fune (Damagun)	14,826	4	0.02

Two cases were found during the first-ever survey of this area in 1956, and 8 in 1961, in relation to the Komadugu Gana system. If the M.A.F.R. tsetse eradication system is successful, no further cases should be infected in this area.

12.6.4. Biu Division.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Kwajaffa	15,627	47	0.3
Babur	9,122	24	0.26
Miringa	889	23	2.6
Sakwa	1,309	14	1.07
Shani	8,697	77	0.86
Total S.S. Cases		<u>185</u>	

12.6.4.2. The figures given above are for the first recorded outbreak of Sleeping Sickness in Biu Division. There are hardly any records of the disease here in the past, and the area has not been kept under surveillance, being remote from the nearest known focus of infection which was, until recently 120 miles away on the Misau - Dingaiya - Komadugu Gana River in N. Bauchi. The isolated focus at Kanawa in Gombe Division discovered last year, however, is only about 60 miles from Biu in a direct line, although no connection between the two infected areas has been traced. There is a fairly direct dry-season road across the Gongola from Kanawa to Biu, along which infected travellers might pass and introduce sleeping

sickness into the area, but in fact the vast majority of cases were found in remote villages and hamlets where conditions of man-fly contact were particularly close. The full extent of the epidemic will be delimited in 1965, but some notes made by Dr. M.P. Hutchinson following his visit in October are extracted below:-

"12.6.4.3. The history of the present outbreak is confusing, but local information at Debrau goes back 5-7 years. It seems possible that some patients from here with enlarged glands may have been suffering from sleeping sickness rather than from glandular tuberculosis, which was thought to have been common in the locality. One biopsy result subsequently checked in the Regional Laboratory, Kaduna, showed only non-specific inflammatory changes, which would fit in with a diagnosis of trypanosomiasis rather than of tuberculous lymphadenopathy.

12.6.4.4. However, even if glandular tuberculosis does exist in the area, it seems certain that there is also a second disease, and that it is the latter which has given Debrau its bad name - so much so that people will not buy produce in any local market if they think it has come from Debrau. Of the 17 people whom the village head could recall as having died over the last 5 years, 10 (7 female, 3 male) had suffered from a chronic condition lasting 1-3 years in which they complained of persistent headache and developed very marked swellings both in the neck and the axillae. The latter remained constantly enlarged until the time of death which, of course, is not usual in a trypanosomal infection. Some of the patients had in addition other signs such as swollen joints, multiple small ulcers, ascites etc., but these were all individual differences.

12.6.4.5. Of the 36 confirmed positive cases of trypanosomiasis diagnosed in July, I examined 33. The remaining 3 had died. Only 1 was in a clinically advanced state and he had already considerably improved, according to the staff. The other 32 patients, although some showed evidence of other ailments and nutritional deficiencies, did not appear clinically advanced. In the majority the cervical lymph nodes had greatly reduced in size since the commencement of treatment according to the R.H.S. who had examined them on the previous occasion. In most, moderately large and typical glands were still palpable; in none could they be said to be atypical for trypanosomiasis at this stage.

12.6.4.6. Of the 20 new cases, 6 had attended voluntarily before the commencement of the new survey; the remaining 14 had been diagnosed during the first week of the survey or on the day of my examination. Most of the new cases came from a chain of small hamlets along one branch of the R. Zur. One interesting case was the Leprosy Inspector from Tishen Alade who had attended as a voluntary patient in August. He had had such gross lymph-adenitis of the cervical, submandibular and axillary groups that the Senior R.H.S., who first examined him, had been unwilling to puncture. However, he had done so and confirmed the presence of trypanosomes. When I saw the patient after he had received 3 A.T.M., nearly all the glands had regressed, much to the astonishment of the R.H.S. and the pleasure of the patient. Certainly the original pattern of distribution and magnitude of the glandular enlargement, as described to me, was not typical of trypanosomiasis, nor particularly, is the extremely rapid subsidence.

12.6.4.7. A second case, a woman who had not yet received any treatment, was seen with very marked cervical lymph nodes, extending also round to the submandibular region. In both axillae she had a bunch of discrete painless large soft glands. She gave a three-year history of the "lumps" with weakness and backache. I confirmed the presence of trypanosomes in the gland juice.

12.6.4.8. Apart from these two cases, 3 others were seen with extremely large and multiple soft lymph nodes. There is therefore the possibility that this may be partly a strain characteristic. It is also possible that the strain may be comparatively avirulent, or at least, not readily neurotropic. This is suggested by one boy who had multiple scars in the neck and tonsillar gland region dating back 3 years to local treatment, and who still had enlarged glands under the scars. The presence of trypanosomes was again confirmed.

12.6.4.9. Examination of blood films from 9 patients who had revealed trypanosomes in gland juice produced tryps. in only three. There was a very obvious lymphocytosis in a further three in whom trypanosomes were not found; in each case glandular enlargement had been marked, and in one case had included a group of glands round the angle of the jaw and lying almost on the ramus of the mandible. ~~XXXXXX~~ Another woman was seen with

massive cervical lymph nodes, not only in the posterior triangle, but also extending down to lie as a mass of discrete glands by the clavicle. On the left side, one gland could be pushed over the clavicle under the loose skin. In spite of repeated punctures, trypanosomes could not be found and her blood films were negative. She is to be re-examined. It would have been interesting to arrange for a biopsy from this case as well as from the other woman mentioned, with nearly similar glands but involving the axilla as well, and in whom trypanosomes were found.

12.6.4.10. The original survey in July showed 9 male to 27 female patients, suggesting a water hole infection. However, it is now clear that these figures are deceptive since far more women than men were examined. In fact, in the first part of the new survey the proportion of M:F has been 1: 2. Of the 20 new cases, there were 12 male and 8 female.

<u>District</u>	<u>Village Area</u>	<u>Census</u>	<u>Exam.</u>	<u>G.P.</u>	<u>S.S.</u>	<u>%</u>
<u>JULY SURVEY 1964</u>						
Kwajafa	Shaffa	5,152	4,323	91	2	
		(27 hamlets examined; cases found in 2 while remaining 25 negative)				
"	Hizshi	1,023	891	24	5	
		(5 hamlets examined; cases found in 3 while remaining 2 negative).				
Babur (Mirnga)	Mandaragarau	884	889	56	23	2.6%
		(8 hamlets examined but only 3 negative; 19 of the cases were from Debrau).				
Sakwa	Kida	740	613	16	6	1.8%
		(all cases were from Gerha).				

OCTOBER SURVEY

Kwajafa	Hizshi	2,331	1,824	53	14	
		(15 hamlets so far examined and cases found in 6).				

12.6.4.11. The fly situation is peculiar around the Biu Plateau. The country is very open and few trees remain. The Plateau descends in a series of steps and at each stage flat topped spurs jut out on either side of flat bottomed valleys. At each step the main waterways have cut a fairly steep channel and in them a dense but narrow strip of vegetation - ideal for G. palpalis - may be found. Some of these pockets may be almost invisible from a distance.

12.6.4.12. The R. Kunar below Shaffa supports G.palpalis both near the C.B.M. School and by the watering point for the village where there are a few gardens. Further down, the R. Kunar passes close to the new Tishan Alade which lies on the main road and there is suitable vegetation for fly at this point. In the dry season, after the fierce grass fires in December the country must look extremely barren and stony and fly distribution must indeed be confined then. However, now in October when the grass is very high, I was surprised to catch fly easily in the open at the crossing of the R. Zur before reaching Debrau. There was only the occasional tree along the river bank at this point. At Debrau itself there is a dense forest patch where the main springs of the R. Kubba arise. Water flows all the year and clearings have been made which are much frequented in the dry season by the Debrau people who come to sit here to enjoy the shade and coolness. These clearings are obviously well used. Banana plantations add to the density of this small patch. The C.B.M. Primary School is only about 200 yards distant (one of the pupil teachers had been found positive; he had been attached to this school for 9 months).

12.6.4.13. The peculiar type of vegetation association seemed confined to the streams draining off the Plateau. Nothing similar was seen when well out on to the riverine plain or across the R. Hawal beyond Garkida. In going to Askira I passed the R. Hehe, the boundary between Sardauna and Bornu, close to Rimalgo on the track from Uba northward. This place had been mentioned by Mr. McLennan in 1962-63 as having reported a considerable increase in fly - G.tachinoides. All this area appeared typical Sudan Savannah, suitable for this species - but not for G.palpalis. Certainly around the Biu Plateau the pockets of G.palpalis seem very favourable (see my touring notes on the fly at the Waka group of schools, just north of Biu), but this fly must be particularly limited in the dry season. Dry season surveys should indicate these points of concentration and it looks as if tsetse control of this species could be comparatively simple. This abnormal population of G.palpalis, beyond or at the limit of this fly's normal zone, would almost certainly seem to provide the vector for the outbreak of trypanosomiasis - just as at Kungana, in Muri Division

of Adamawa, it is this species which appears to control the distribution of the disease and not G.tachinoides which is ubiquitous, especially in the rains."

12.7. ILORIN PROVINCE.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Lanwa (Ilorin Emirate)	4,338	1	0.02
Shonga (Lafiagi N.A.)	6,643	13	0.19

12.7.2. Lanwa district is the area around Jebba South.

12.7.3. 7 of the Shonga cases occurred in people living in Shonga Town. Three patients were described as being very advanced with tremors and weakness, and one died six weeks after the initial pentamidine injection; all three were said to have many trypanosomes in the gland juice. This clinical picture seems to differ from the "mild" type of disease usually described along the Niger, and seen by the writer amongst the 8 cases discovered in 1959 during the course of general morbidity surveys around Bacita, (adjacent to Shonga), and along the Niger near the Kainji Dam site.

12.7.4. There do not appear to have been any proper surveys in Ilorin Province between 1940 and 1963. This was presumably deliberate, and there is nothing to suggest that any great harm accrued, but the resumption of surveys here in 1963 appears to have been timely. (17 cases were found last year during the survey of villages within 10 miles of the Niger in Lafiagi and Fategi, downstreams from the area surveyed this year).

12.8. KABBA PROVINCE.

No surveys were carried out this year.

12.9. KANO PROVINCE.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Team resurveys	130,291	42	0.03
Dispensary resurveys	7,974	10	0.12
Voluntary cases		<u>30</u>	
Total S.S. Cases		<u>82</u>	

12.9.2. Kano Emirate

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Kiru S.V.A. resurvey	32,937	2	0.006
Kura " "	4,276	23	0.53
Rano " "	37,884	6	0.01
Gwaram, complete dist. survey	55,194	<u>8</u>	0.01
Total S.S. Cases		<u>39</u>	

12.9.2.2. The "Kogin Kano" focus along the river system of that name, about 30 miles south of Kano and astride the main Zaria-Kano road, was first discovered in 1962; in 1963 its full extent was realised - downstream (northwards) into Garun Babba and Kuran, and just across the other side of the main road to Ciromawa and Kwari, all in Kura District which had been excluded from the 1962 survey, (limited to Kiru and Rano). This was described in the Annual Reports of 1962 and (with a map) in 1963. Prophylactic pentamidine was administered to the affected villagers in Kiru and Rano districts in March-April 1963, and was followed by spraying of riverine vegetation with D.D.T. during the period November 1963 - January 1964. A second pentamidine campaign commenced in April 1964, but opposition to it - and especially to the examination and injection of women - was whipped up apparently by unscrupulous persons for some end of their own; (it seemed to be the younger rather than the older men who were responsible). It only proved possible to re-inoculate the population of three villages, totalling 1,798 persons examined and 1,698 inoculated, but it was at least encouraging to find that the only 3 gland-positive S.S. cases found were in persons who had been absent during the 1963 campaign and had not received pentamidine previously. In view of these difficulties, an ordinary S.S. survey was carried out in the remaining villages of the focus in August and September. Of the 22 additional gland positive cases found, only two - absentees from the 1963 campaign - were found in villages where pentamidine had been administered in 1963; the remaining 20 were all in Kura district - 15 in Garun Babba itself and had probably been infected before tsetse control measures had been taken. Up to the end of the year there was no evidence of tsetse in the sprayed area, and it is desirable that it should remain fly-free at least until the effect of the prophylactic pentamidine has worn off,

(to prevent the possible development of cryptic infections), quite apart from the necessity of preventing further transmission in the Garun Babba area where pentamidine has never been given at all. The 1963 pentamidine campaign by itself does appear to have been remarkably successful, but the limitations of the method are well demonstrated by the finding of 5 gland-positive cases a year later amongst persons who were absent during the campaign - in spite of the almost record attendance of 97% of the estimated population (not the inaccurate tax register figure), which was achieved in 1963. The past limitation of the use of pentamidine for prophylaxis in Northern Nigeria to relatively stable, controllable, small or isolated population groups whenever possible, appears to have a sound basis.

12.9.2.3. 5 of the 8 cases found in Gwaram district lived close to the R. Misau-Dingaiya - Komadugu Gana (its successive names) on the opposite bank from cases found in Darazo district of Bauchi Emirate (see para. 12.4.2.4).

12.9.3. Hadejia Emirate

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Auyo	23,453	-	-
Bulangu	32,634	1	0.003
Guri	16,130	-	-
Kiri-Kasama	34,024	2	0.005

In view of the good progress being made with the Hadejia River Valley Tsetse Eradication Project, and the results of this year's full surveys of the above districts, it seems unlikely that such mass surveys will again be required in Hadejia. Selective surveys to act as indicators of possible pockets of tsetse will, however, be needed for many years.

12.9.4. Dispensary/Hospital resurveys.

<u>Dispensary</u>		<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Karamakama	Treatment Centre	5,385	4	0.07
Taura	Treatment Centre	2,589	6	0.23

12.9.5. Voluntary cases

<u>Hospital/Dispensary</u>	<u>New</u>	<u>Clinical</u>	<u>Relapsed</u>	<u>Total</u>
Birnin Kudu Hosp.	-	-	-	-
Hamdullahi disp.	-	-	2	2
Hadejia Hosp.	6	2	3	11
Karamakama treatment Centre	-	-	1	1
Madachi disp.	-	-	4	4
Taura Treatment Centre	3	1	8	12

The small number of cases found by survey in the Hadejia Valley is roughly paralleled by the reduction in new voluntary patients in the area covered by the Eradication Project - which has not yet reached Hadejia.

12.10. KATSINA PROVINCE.

No Team surveys were carried out this year.

Dispensary resurvey

<u>Dispensary</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Bakori	10,193	3	0.03

Voluntary Cases

<u>Dispensary</u>	<u>New</u>	<u>Clinical</u>	<u>Relapsed</u>	<u>Total</u>
Bakori	5	1	1	7

12.11. NIGER PROVINCE.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Team resurveys	66,129	75	0.11
Dispensary resurveys	25,567	13	0.05
Voluntary Cases		<u>90</u>	
Total S.S. Cases		<u>178</u>	

12.11.2. Team resurveys.

<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Jima Doko	16,500	27	0.16
Kutigi	33,409	25	0.07
Lemu	14,720	23	0.15
Zugurma) Kontagora Emirate.	1,500	-	-

The three districts of Bida Emirate surveyed this year all showed a scattered distribution of sleeping sickness, with cases in all 8 village areas of Jima Doka, all 6 village areas of Kutigi, and 7 out of 8 village areas in Lemu district. The technique of selected village area resurvey is thus difficult to apply here. Sleeping sickness in Bida Emirate does appear to be contained at present, but an alteration in the factors concerned in the present equilibrium - especially transmissibility or virulence of the trypanosome strain, and survey attendance rates - could produce a dangerous situation. Here where the tsetse can range more freely than further north, the less intimate nature of man-fly contact may be responsible for the more widespread nature of sleeping sickness at a relatively lower level of endemicity.

The Zugurma survey was carried out in connection with the Mokwa-Kainji Dam road project. At Zugurma itself, where a bridge over the R. Eku has to be constructed, man-fly contact is intimate. The results of the survey are re-assuring, but changing conditions with any influx of population will necessitate occasional spot checks for sleeping sickness.

12.11.3. Dispensary Resurveys.

<u>Dispensary</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Abuja	12,222	2	0.01
Kuta	13,345	11	0.08

12.11.4. Voluntary Cases.

<u>Hospital/dispensary</u>	<u>New</u>	<u>Clinical</u>	<u>Relapsed</u>	<u>Total</u>
Abuja	3	4	1	8
Bida Hospital	13	24	8	45
Doko	4	10	4	18
Kafin Koro	11	-	7	18
Kuta	2	-	6	13
Minna Hospital	1	1	1	3

12.12. PLATEAU PROVINCE.

	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Team resurveys	70,879	94	0.13
Dispensary resurveys	27,533	37	0.13
Mines exam., etc.	6,558	2	0.03
Voluntary cases		<u>110</u>	
Total S.S. cases		<u>243</u>	

12.12.2. Team resurveys.

<u>Division</u>	<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Akwanga	N/Eggon	28,062	11	0.03
Jos	Batchit	1,483	24	1.61
Lowland	Bwol	2,127	21	0.98
"	Dimmuk	17,841	7	0.03
"	Koffyer Kwa	7,158	14	0.19
"	Namu	4,048	5	0.12
Pankshin	Jepal	2,407	12	0.49
"	S. Sura	7,753	-	-

These figures suggest a general increase of sleeping sickness around the base of the Plateau in Lowland and Akwanga Divisions extending up to the limit of fly in the Hawan Kibi (Assob) area of Jos astride the main Jos-Wamba road.

12.12.3. Mines Labour examinations etc.

<u>Mining Camps</u>	Total Labour and families examined	6,206
	Number of Pentamidine inoculations	4,774
	Number of S.S. cases diagnosed	2
<u>M.O.W. Road Labour</u>	Number examined	352
	Number of S.S. cases diagnosed	-

12.13. SARDAUNA PROVINCE.

<u>Native Authority</u>	<u>District</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Gashaka-Mambilla	Gashaka	3,065	3	0.09
United Hills	Ndoro	3,712	2	0.05
	Tigon	4,171	-	-
	Total S.S. cases		<u>5</u>	

All 3 cases in Gashaka District (including one relapsed cases) were found in Jamtari Village Area, described last year as a well-established focus on the Beli-Serti road near the R. Taraba - an extension from the Kungana Habe focus in adjacent Muri Division. This is one of the surprisingly

few areas in N. Nigeria where the presence of a road seems to dictate the pattern of sleeping sickness infection in a very obvious way, as described more generally for Ghana. Dr. Hutchinson pointed out last year that there has been a considerable general increase in the population here, accompanied by a re-grouping of settlements along this relatively recently built road and some Tiv immigration. However, the infection rate at Jamtari has responded well to repeated surveys. Widespread dispersal of the fly in this well-watered area, between the Taraba to the north and 4,000 ft. hills to the south, renders tsetse control impracticable but is presumably responsible for "impersonal" man-fly contact allowing control by repeated survey alone at the present time. Tigon and Ndoro were previously surveyed in 1956 (11 cases) and 1958 (18 cases).

12.14. ZARIA PROVINCE.

	Number <u>Examined</u>	S.S. <u>Cases</u>	% <u>S.S.</u>
Team resurveys	101,973	67	0.06
Dispensary resurveys	95,606	161	0.17
Mines examinations etc.	7,549	6	0.08
Sabon Gida Resettlement Area	1,558	-	-
Voluntary cases		<u>164</u>	
Total S.S. Cases		<u>398</u>	

12.14.2. Team Resurveys.

<u>District</u>	<u>Emirate</u>	Number <u>Examined</u>	S.S. <u>Cases</u>	% <u>S.S.</u>
Kagarko	Zaria	15,344	5	0.03
Kajuru	"	18,675	3	0.02
Kubau	"	49,777	1	0.002
Lere	"	11,450	33	0.29
Ayu	Jema'a	6,727	25	0.37

12.14.3. Kagarko district was previously surveyed in 1958 when 4 cases were found. However, in 1936, 8,500 cases were found amongst 24,000 persons examined - an incidence of 35% - and it is obviously necessary to keep watch on this part of southern Zaria adjacent to Abuja Emirate. Similar remarks apply to Kajuru district, 40 miles south of Kaduna, where the incidence in 1936 was 21%. Kubau district by contrast has never had an incidence greater than 0.3%; it includes part of the "Anchau Corridor" in the N.E. of Zaria Province, and is 15 miles at its nearest point from the "Kogin Kano Focus".

12.14.4. The Pitti Focus: (S.Lere and parts of adjacent districts).

Detailed comments were given in the 1962 and 1963 Reports (para.13.6.6. of the latter). Comparative findings are shown at para. 12.14.4.5. below. The 33 survey cases for 1964 in Lere district were found during the annual re-survey of the Pitti Focus which lasted from November 1964 - January 14th, 1965. A further 10 cases were found during January 1965 (including 4 in adjacent districts), giving a total of 43 for the complete operation, compared with 113 for the 1963-64 survey. There were also 22 voluntary cases at the Warsa treatment Centre, compared to 49 last year. However, from the epidemiological point of view, the fact that only 12 of the survey cases were early (gland-positive) infections suggests that transmission has at last been reduced to a very low level in the main part of the focus covered by tsetse control measures. After close questioning with regard to their movements etc., it was concluded by the Team Leader that several of these 12 patients had probably not acquired their infections within the area of the main focus during the last 12 months.

12.14.4.2. It is difficult to know what contributed most to this result. The careful house-to-house surveys of the first 2 seasons appeared to have little effect on transmission, only reducing the number of new cases found the following year by about half, and tsetse control efforts, judged by (mainly) peripheral re-appearance of fly shortly after spraying, were considered unsatisfactory. A reasonable but unsupported supposition is that the combination of methods was responsible for the eventual success.

12.14.4.3. The diagnosis of 130 cases by the Sleeping Sickness Assistants based on Lere and Gyeshere dispensaries, however, should dispel any feeling of complacency about this area as a whole.

12.14.4.4. A major problem in this area now is the question of treatment - and especially the treatment of relapse. Dr. Hutchinson personally found 44 cases with C.S.F. abnormality indicative of "relapse" during the 1963-64 survey, and a further 29 (out of the total of 43 S.S. cases), were diagnosed as relapses by the Team during this last 1964-65 survey. The problem has already been mentioned under "Therapy", para 12.2.6. ; there appears to be an unusual degree of drug resistance in the trypanosome strain around Pitti.

12.4.4.5.

Piti Focus

<u>Surveys</u>	<u>1961-62</u>		<u>1962-63</u>		<u>1963-64</u>		<u>1964-65</u>	
	<u>Number</u> <u>Examined</u>	<u>%</u> <u>S.S.</u>	<u>Number</u> <u>Examined</u>	<u>%</u> <u>S.S.</u>	<u>Number</u> <u>Examined</u>	<u>%</u> <u>S.S.</u>	<u>Number</u> <u>Examined</u>	<u>%</u> <u>S.S.</u>

Lere District

Piti	2,438	8.2	2,804	3.6	3,232	1.7	2,895	0.8
Gurza	477	3.2	1,204	3.6	1,397	1.3	1,499	0.6
Janji	127	5.5	578	2.4	594	2.5	625	0.8
Jama'ar	-	-	-	-	275	2.8	212	0.5
G. Kurama	-	-	-	-	105	0.9	105	-

Zongon Katab District

Damakasuwa	245	9.8	390	1.3	419	1.6	228	0.9
Talo	193	2.6	430	0.7	441	0.5	374	0.3
Ribam	473	0.6	-	-	-	-	-	-

Kauru District

Parts of Binawa and Majagada	-	-	-	-	873	1.0	129	0.8
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12.14.5. The situation in Jema'a Division, in the high rainfall area of the S.W. foothills of the Jos Plateau, is one of bare containment of an increasing trypanosome challenge. Between January 1964 and August 1965, the sleeping sickness assistant based on Sabon Gida dispensary diagnosed a total of 102 S.S. cases; 42 of these were found in the Fadan Karshi area by dispensary resurvey, with 17 voluntary patients; 18 voluntary patients were treated at Sabon Gida dispensary (Ayu area) in addition to the 25 cases found by team resurvey of Ayu district. This is part of the general upsurge of infection around the Plateau; the 1960 Ayu survey produced only 7 cases, compared to the maximum incidence here of 7.8% in 1943 (189 S.S. cases). The area is unsuitable for tsetse control.

12.14.6. Dispensary resurveys.

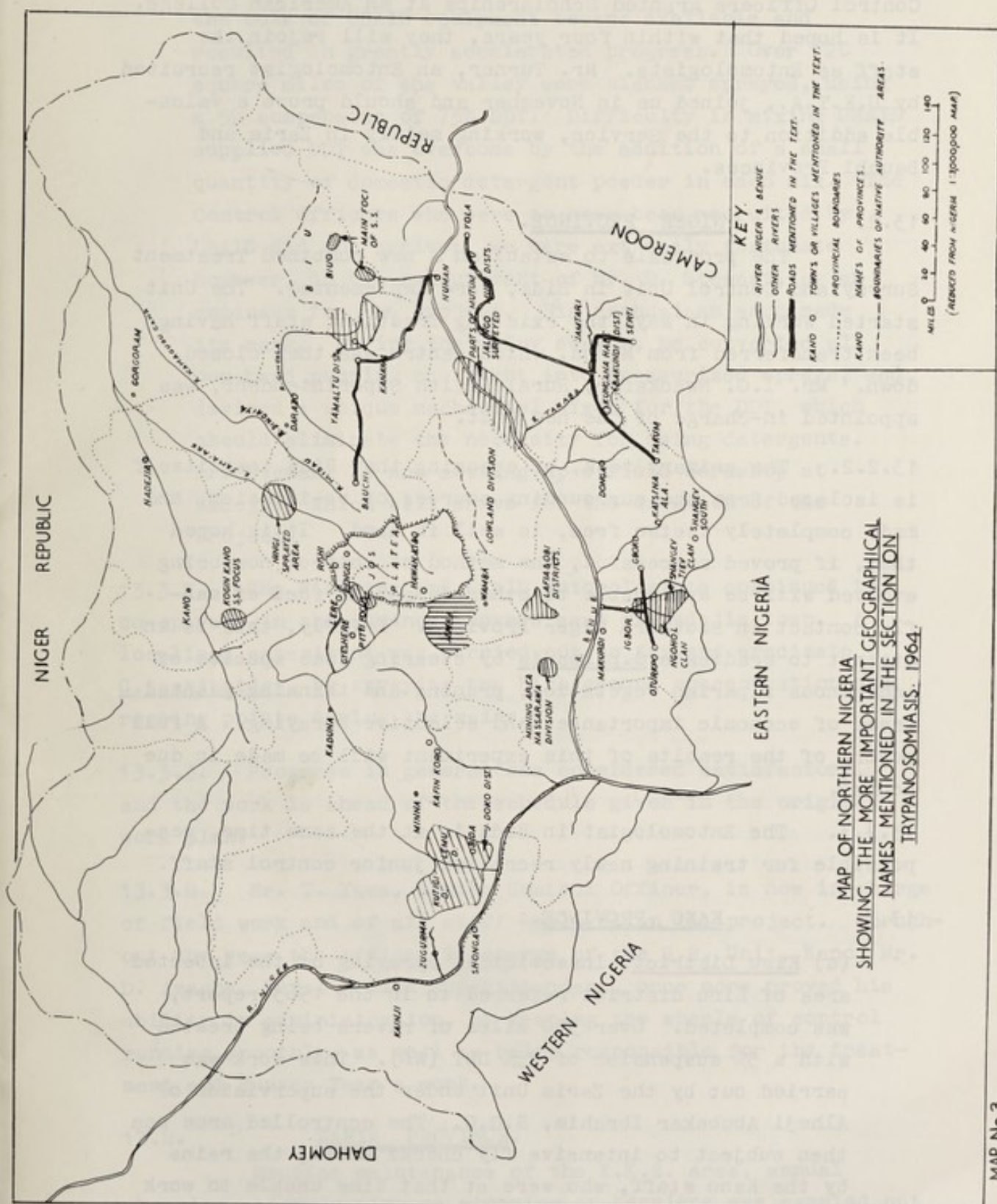
<u>District</u>	<u>Dispensary</u>	<u>Number Examined</u>	<u>S.S. Cases</u>	<u>% S.S.</u>
Kauru	Gyeshere	17,781	39	0.22
Lere	Lere	11,846	21	0.18
	Warsa (Pitti)	546	2	0.37
	Zonkwa Fulani T.C.	129	-	-
Jema'a	Abu	11,640	4	0.25
	Fadan Wate	5,967	16	0.27
	Kafanchan Hosp.	15,918	12	0.07
	Old Jema'a	19,891	24	0.12
	Sabon Giad	23,263	43	0.18

12.14.7. Mines examinations etc.

<u>Mines Camps</u>	Examinations of labour and families	6,775
	No. of S.S. cases diagnosed	4
	No. pentamidine injections	4,264
<u>M.O.W. Road Labour</u>	No. of examinations	559
	No. of S.S. cases	-
Timber extraction labourers	No. of examinations	215
	No. of S.S. cases	2

12.14.8. Voluntary cases.

<u>Emirate</u>	<u>Centre</u>	<u>New</u>	<u>Clinical</u>	<u>Relapse</u>	<u>Total</u>
Zaria	Gyeshere disp.	29	4	5	38
"	Lere "	7	16	9	32
"	Takalafiya "	-	-	-	-
"	Warsa Treatment Centre	9	2	11	22
"	Zaria disp.	-	-	4	4
"	Zonkwa Fulani T.C.	-	-	-	-
Jema'a	Abu Mines Centre	-	-	-	-
"	Fadan Wate disp.	11	3	7	21
	Kafanchan Hosp.	3	3	18	24



(By Mr. J.O. Steiner, Principal Control Officer)

The Staff position during the year began fairly satisfactorily, but was weakened by the loss of two Assistant Control Officers granted Scholarships at an American College. It is hoped that within four years, they will rejoin the staff as Entomologists. Mr. Turner, an Entomologist recruited by U.K.T.A., joined us in November and should prove a valuable addition to the Service, working mainly in Zaria and Bauchi Provinces.

13.2.

NIGER PROVINCE.

The proposals to establish a new combined Treatment Survey and Control Unit in Bida, were implemented. The Unit started working in May, the existing Treatment staff having been transferred from Minna, which centre was then closed down. Mr. I.O. Nwaokafor, Rural Health Superintendent, was appointed in-charge of the new Unit.

13.2.2. The primary task, of ensuring that Bida town itself is isolated from the surrounding sources of re-invasion, and made completely tsetse free, is well in hand. It is hoped that, if proved successful, the method of control now being evolved will be applicable to other dangerous foci of man-fly contact in Southern Niger Province. Briefly, this is an attempt to eradicate G.palpalis by clearing some species of indigenous riparian vegetation, pruning and thinning planted trees of economic importance, and selective spraying. A full report of the results of this experiment will be made in due course.

13.2.3. The Entomologist in Bida is at the same time, responsible for training newly recruited junior control staff.

13.3.

KANO PROVINCE.

(a) Kiru District: Insecticidal spraying of the infected area of Kiru district referred to in the 1963 report, was completed. Over 350 miles of rivers being treated with a 5% suspension of 75% DDT (WP). This work was carried out by the Zaria Unit under the supervision of Alhaji Abubakar Ibrahim, S.C.O. The controlled area was then subject to intensive fly checks during the rains by the Kano staff, who were at that time unable to work in the Hadejia Valley. These checks showed that G.tachinoides had survived in one stretch of river in the control area. This District being of such vital significance as a reservoir of infection, it has been decided to respray the whole control area in 1965.

(b) Hadejia River Valley Project: Fly checks were carried out systematically during the rains, until the valley became completely flooded and prevented their continuing. No fly were recorded in the areas controlled to date. During the 1963/64 Spraying season, the bulk of USAID equipment became available and resulted in greatly accelerated progress. Over 120 square miles of the valley were blanket sprayed, using a 5% suspension of 75% DDT. Difficulty in mixing USAID supplied DDT was overcome by the addition of a small quantity of domestic detergent powder in each mix. The Control Officers who were to have been recruited by USAID did not arrive; we were extremely fortunate however, in the recruitment of Mr. D. Stewart, as an engineer for the Project. His enthusiasm soon made its mark. During the rainy season, he converted all our hand pumping equipment into pressurized sprays, and devised a unique mechanical mixer for the DDT, which should eliminate the necessity for using detergents. Mr. Stewart is now setting up a field workshop at Hadejia, which will serve for the duration of the Project.

13.3.2. The Ministry and USAID Entomologists continued to co-operate in the advance surveys east of Hadejia town. A localised experiment was carried out to try and eradicate G.tachinoides, by spraying the high ground concentration and resting points during the rains.

13.3.3. Progress in general was considered satisfactory, and the work is ahead of the schedule given in the original work plan.

13.3.4. Mr. T. Yuwa, Senior Control Officer, is now in-charge of field work and of all staff employed on the project. Throughout the year the officer in-charge of the S.S. Unit, Kano, Mr. D. Amagha, Rural Health Superintendent, once more proved his ability in administration, by keeping the wheels of control running smoothly, as well as being responsible for the treatment and Survey Team's work.

13.4. ZARIA PROVINCE.

Routine maintenance of the K.K.Z. area, annual checking and ~~reslashing~~ or stumping of barriers was carried out where necessary. There is good indication that the barriers will soon be able to be left untended, regeneration now having been reduced appreciably.

13.4.2. Once again fly re-invaded the headwaters of the R. Jare and of the R. Kamanda. It is now firmly believed that in each case the fly are being carried in mechanically, and we have now accepted annual respraying of selected stretches of both these rivers, as a routine measure.

13.4.3. Routine maintenance of Kaduna Capital Territory clearings as carried out with funds supplied by the administrator.

13.4.4. At Pitti in southern Lere, the insecticidal control area was once again re-invaded. The area was re-sprayed for the third year, over 180 miles of river being treated with a 2% suspension of Arkotine. However, it has become obvious that control cannot be successfully maintained over this small district, centred in a large endemic area. Movement of people and cattle will re-introduce fly each year. It is now proposed to prepare a large scale eradication scheme to cover the entire headwaters of the R. Kaduna south of the Kogin Kuri. This will eventually include the areas of infection in Ayu District, and in Bachit district of Plateau Province referred to elsewhere in this report. Over 160 cases of S.S. have been discovered in this larger area during the year.

13.5. BENUE PROVINCE.

Disturbed conditions through the year, restricted control work in the Province. Routine fly checks of controlled areas were made where possible, and plans prepared for future reclamation work in Tiv. Surveys carried out by Benue teams at the new Rural Health Centres at Ankpa and Otukpa in Igala-Idoma showed no sleeping sickness in the area. It must be emphasized however, that the high population of G.tachinoides in this area, presents a potentially dangerous situation here, should trypanosomiasis ever be introduced from the nearby endemic areas of Benue Province.

13.6. BAUCHI PROVINCE.

In Ningi chiefdom a project to eradicate G.tachinoides and G.morsitans from a large endemic area of Sleeping Sickness, was planned in collaboration with the Ministry of Animal and Forestry Resources. A total of 383 miles of river were treated with a 5% suspension of DDT of 5% (WP). This area was then further protected by siting Dieldrin barriers at what were considered the strategic points likely to invite re-invasion. These barriers will be annually resprayed towards the end of each dry-season. The Project

consumed 10,170 lbs of DDT 75% (WP) and 230 gallons of 20% Dieldrin Emulsion concentrate applied as a 4% Solution. Total cost in labour £1,064.

13.6.2. Maintenance of clearings in the Bauchi town's fly free zone were carried out, an annual routine.

13.6.3. A focus of infection in Darazo District will have to be the subject of full investigations before plans can be made for control. These will be carried out as soon as staff can be made available.

13.6.4. In Yamaltu District the forest reserve at Kanawa was invaded after our apparent success reported in 1963. The reserve has been resprayed (early 1965). DDT (WP) having apparently failed in our first attempt, for the second a 2½% solution of 20% Dieldrin was employed. Should this again prove unsuccessful against re-invasion, a recommendation will be made to cut the reserve, which provides one of the most intimate points of man-fly control known to us.

13.6.5. In Bula and Zungur Districts, work began at the end of December on a scheme which will be described in the 1965 Annual Report. It is planned to eradicate G.tachinoides by a combination of River and Barrier spraying, together with severe pruning of riparian mangoes.

13.6.6. In August, our attention was dramatically focussed on Biu Emirate in Bornu Province where one of our Bauchi teams reported increasing numbers of cases being found in Debrau District. Extra teams were rapidly moved into the area, and surveys are now being extended throughout the Emirate, under the capable direction of M. Musa Halilu, the Senior Superintendent of Rural Health. By the end of the year 200 cases had been diagnosed, and more were expected.

With our staff committed to an already heavy programme, it appeared unlikely that control measures could be undertaken in the near future. However, the Ministry of Animal and Forestry Resources Tse-tse and Trypanosimiasis Unit, who were about to move into this area, kindly offered to spray out the focii of immediate infection for us. Plans are now being made to this effect, meanwhile surveys continue.

14. Y A W S.

(This section includes notes on the first 9 months 1965)

14.1. Initial Treatment Surveys.

There have been no initial treatment surveys since 1962.

14.2. Resurveys.

Approximately 940,323 people were examined during 1964; 567 infectious and 25,681 active cases were recorded.

14.2.2. Many of these infectious cases were found during "Special resurveys" - described in para.15.5.5 of the 1963 Report - covering limited areas where such cases had been found 3 months previously, and it is therefore no longer relevant to consider the overall percentage figures for cases found during resurveys.

14.2.3. The total number of infectious cases found during 1964 is less than half of that for 1963, but this fact is misleading without more detailed analysis. Excluding Igala and Idoma, the reduction in the number of cases found was from 981 to 306, and it can be stated that the general position was very satisfactory, with yaws apparently on the verge of extinction in most areas.

14.2.4. However, there was an increase from 59 to 124 cases in Igala Division, and in Idoma the figures for 1963 and 1964 were 151 and 125 respectively. Considering the first half of 1965, there were 94 infectious cases found in Igala Division and 173 in Idoma, and the final figures for these two areas are almost certain to show a marked increase over 1964. These comparisons are set out in Table 2.

14.2.5. This increase in the number of survey cases found in the Igala-Idoma area is undoubtedly due to greatly increased personal investigation and control of field work by the Rural Medical Officer, Idah, resulting in a concentration of closely-supervised effort where it is most needed. Sketch-maps and other detailed information are now provided by the M.F.U. Staff in respect of infectious cases, and it is becoming possible to understand the situation. Certainly there is no doubt about the diagnosis in most of these cases, as there often is in respect of cases reported by dispensary assistants but not confirmed by Medical Field Unit Staff.

14.2.6. The great reduction in infectious cases reported from dispensaries in this area (see para.14.3.2) can probably be ascribed to this more purposeful activity of the teams in places where infectious cases occur; more patients may be treated in their villages before they have made up their minds to seek treatment voluntarily, and there may also have been an improvement in the diagnostic standards of dispensary assistants.

14.2.7. Minor foci of infection persist in Konton Karifi and adjacent districts of Nassarawa Division. The number of cases (survey and dispensary) is small - 22 in the first and 19 in the second quarter of 1965 - but it is curious that here, alone of areas which had initial yaws incidences of less than 4%, such cases do keep occurring. All these dispensary cases are checked by M.F.U. Staff; epidemiological information has not so far suggested acquisition of infection outside the area, nor are most of the cases in hamlets on the Niger or Benue which could have been infected by people passing along these rivers from infected areas further south. Whether these small scattered foci could constitute a serious threat if untreated is more than I can prognosticate; however, all infectious cases here are being actively followed up by special resurveys at present.

14.2.8. In the 1963 Report (para.13.3.5), the discovery of an untouched pocket of yaws in the hills in Kumbo village area, Donga Division, was reported. This pocket now appears to have been eradicated following 3 special resurveys, during the first of which (March 1964) Total Mass Treatment was applied.

Date	No. of persons examined	% of Pop. examined	Infectious Yaws cases found	%
June 1963	2,617	89.6	30	1.15
March 1964	2,875	98.4	27	0.9
July 1964	2,872	98.3	4	0.1
Nov. 1964	2,776	95	Nil	-

It appears that only 87 contacts of the 30 cases were treated in June 1963, so that the finding of a further 27 cases 9 months later is hardly surprising; the total mass treatment then given appears to have been justified by results.

14.3. Dispensary Returns.

14.3.1. There was a further drop in the number of infectious cases reported from dispensaries during 1964 - 875 compared with 1,356 in 1963. During the first 9 months of 1965 this fell dramatically to only 299 cases. Excluding Igala and Idoma, the figures were:

<u>1963</u>	<u>1964</u>	<u>1st 9 months 1965.</u>
923	530	167

This sudden fall corroborates the remarkable drop in the number of survey cases found in 1965, and strengthens the supposition that, elsewhere than in Igala and Idoma, yaws is now nearing extinction in Northern Nigeria.

14.3.2. In Igala and Idoma, there has also been a fall in the dispensary cases:-

<u>1963</u>	<u>1964</u>	<u>1st 9 months 1965.</u>
643	594	132

The dramatic drop in 1965 coincide with an increase in cases picked up by the survey teams, as described in paras.14.2.4 - 14.2.6.

14.3.3. Dispensaries in Muri and Chamba Divisions have now been registered as yaws treatment Centres, following instruction courses by the staff of No.2 M.F.U., Jalingo.

14.4. General Remarks.

14.4.1. There is little doubt that well organised special resurveys will be required for some time to come in Igala and Idoma. The writer has personally confirmed in the field that some parents in Idoma Division believe it is better for infectious yaws lesion to run their course rather than to have their children treated. This belief has been recorded in a number of other places, and static treatment centres for treatment of voluntary cases can play little part in yaws eradication in such circumstances.

14.4.2. Infection in several instances seems almost certainly to have been contracted over the border in the Eastern Region, and "Border resurveys", with Teams working along both sides simultaneously, have been arranged through the good offices of the W.H.O. Yaws Adviser. At a later stage, such border co-operation will probably be absolutely essential if yaws eradication is to be achieved, although at the present time I doubt whether we would be justified in claiming that most of our infections here are derived from outside the Region.

TABLE I

		1961	1962	1963	1964
Total for all Teams	Persons examined	2,432,555	1,754,696	1,502,770	940,323
	All active	27,200	17,273	15,409	5,657
	Infectious	4,847	2,016	1,191	567
	Contacts	119,750	43,476	27,336	18,780
	Treatments given	277,355	165,236	42,772	25,681
Resurvey Teams	Persons examined	2,300,280	1,650,173	1,502,770	940,323
	All active	26,003 (1.1%)	16,545 (1.0%)	15,409 (1.0%)	5,657 (0.6%)
	Infectious	4,342 (0.19%)	1,700 (0.1%)	1,191 (0.08%)	567 (0.006%)
	Contacts	119,750	43,476	27,336	18,780
	Treatments given	145,753	61,236	42,772	25,681
I.T.S.	Persons examined	132,275	104,523	-	-
	All active	1,197	728	-	-
	Infectious	505	316	-	-
	Treatments given	131,602	104,000	-	-
Treatment Centres	All active	-	3,616	3,422	2,390
	Infectious	<u>2,739</u>	<u>1,430</u>	<u>1,356</u>	<u>875</u>
	Contacts	-	1,558	2,292	2,315
	Treatments given	-	5,174	5,714	6,011
Grand Totals	All active	-	20,889	18,831	8,047
	Infectious	7,586	3,446	2,547	1,442
	Contacts	-	44,934	29,628	21,095
	Treatments given	-	170,410	48,486	31,692

TABLE II

Infectious Yaws cases, 1963 - June 30th 1965; breakdown to show the prevalence of cases in Igala and Idoma and the striking fall in cases reported elsewhere.

		1963	1964	1st half year 1965	3rd quarter 1965
Infectious cases found by resurvey Teams:-	Igala	59	124	94	86
	Idoma	151	125	173	32
	Total Igala-Idoma	210	249	267	118
	All other areas	981	306	80	38
	Total all areas	1,191	555	347	156
Infectious cases reported from dis- pensaries	Igala	49	80	8	12
	Idoma	384	265	57	55
	Total Igala-Idoma	433	345	65	67
	All other areas	923	530	85	82
	Total all areas	1,356	875	150	149
Total infec- tious (resurvey + dispensary) cases.	Igala	108	204	102	98
	Idoma	535	390	230	87
	Total Igala-Idoma	643	594	332	185
	All other areas	1,904	836	165	120
	Total all areas	2,547	1,430	497	305

14.5. Smallpox vaccination.

A total of 673,582 vaccinations were carried out by the Yaws Teams during 1964, and 628,051 during the first 9 months of 1965.

In the majority of instances there was a take rate of about 80% in those with no previous vaccination or smallpox and about 20% in those with evidence of previous vaccination or smallpox. These figures are regarded as satisfactory, and variations from these figures have been promptly queried. In one instance a remarkably low take rate in those previously vaccinated was explained by the M.F.U. Assistant in-charge as due to vaccinations having been conducted by the N.A. Health Staff a few months previously. He drew the probably correct inference that these N.A. vaccinations, (using the same type of wet lymph as Government Staff use) were thereby proved to have been effective.

14.6. Leprosy.

A total of 1,516 leprosy patients in 1964, and 2,144 in the first 9 months of 1965, were referred to the nearest leprosy clinic for treatment.

14.7. B.C.G. Vaccination.

14.7.1. During 1964 a number of Medical Field Unit Staff working in the Yaws Campaign were given instruction in Heaf testing and BCG vaccination by the Tuberculosis Consultant at Jos.

14.7.2. In the Keffi area (where yaws has been extinct for several years), a trial introduction of Heaf testing and B.C.G. vaccination along with yaws surveillance, leprosy case-finding and smallpox vaccination, was made. In this particular area the local people did not seem to be very happy about having the Heaf test and smallpox vaccination together, followed a few days later by B.C.G., and here and elsewhere caution will obviously have to be exercised in combining smallpox and tuberculosis preventive measures, although it is hoped that with adequate propaganda it will prove generally acceptable.

14.7.3. The total figures for Heaf testing and B.C.G. vaccinations by Yaws Teams are given below:

	No. Heaf tested	No. given B.C.G. Vaccination
1964	5,002	1,825
Jan.-Oct.1965	1,784	920

It is now felt that any marked expansion of B.C.G. vaccination will require the full-time supervision of a Tuberculosis Medical Officer.

Routine larviciding, as described in the 1963 Report, continued at Abuja and Lokoja. Results at Abuja were considered satisfactory, and fly-density figures for comparison are given below; the figures represent fly-boy-hours at the same catching-stations:

	<u>Project area</u>				<u>Abuja Township</u>			
	1955	1960	1963	1964	1955	1960	1963	1964
June	3.29	0.18	0.05	0.27	3.06	0.03	0.04	0
July	8.28	0.13	0.06	0.06	19.29	0.02	0.02	0
August	15.96	0.67	0.62	0.15	12.95	0.13	0.34	0.31
September	16.75	1.60	0.59	1.27	27.00	0.61	0.43	0.10
October	8.53	2.44	0.43	0.62	10.73	2.63	0.36	0.39
November	2.89	1.0	0.21	0.09	3.11	1.51	0.29	0.09
December	1.19	0.56	0.10	0.06	0.10	0.35	0.08	0.04

15.1.2. Mr. J.B. Davies, (former Simulium Entomologist with this Ministry and at present on a W.H.O. Consultancy to assess the Abuja Project), has kindly pointed out (personal communication July 1966) that the average number of catchers was doubled in 1962, which could (he estimates) result in an apparent reduction in density by a factor of up to 3 at the low densities pertaining, compared to results given for the period before 1962. (If there is only one fly about, increasing the number of catchers will obviously reduce the fly-boy-hour figure, whereas at high densities any reduction will be minimal). Allowing for this, the reduction in fly density achieved is still significant compared to the 1955 pre-control figures, and fairly satisfactory by the standard of fly control expected of the scheme.

15.1.3. A total of 449 gallons of "Arkotine" was used to treat a measured 14,148 cusecs. of water, giving a mean concentration of D.D.T. during the 30 minute applications of 1.01 parts per million - double the average concentration aimed at (0.5 p.p.m.) based on the average flow May-July 1959. However, as explained last year, standard dosages are used in this Project - not to be varied according to the flow - to establish the practicability of control schemes designed by professional staff being maintained by technical staff without supervision.

15.2. The Hawal River Valley. As forecast in last year's report, two Peace Corps personnel temporarily attached to the Church of the Brethren Mission, Garkida, made a further attempt to eradicate simulium during the dry season early in 1964. Their own fly-check along the rivers Hawal and Zur lasting five weeks from June 1964 failed to yield any adult flies, and it seemed that their efforts were nearly successful. (However, in February 1965 breeding was again found $1\frac{1}{2}$ and 8 miles downstream of Garkida bridge, so that eradication was not achieved; it now seems that Simulium breeding in the area is more widespread than originally believed).

15.3. Kaduna. Fly rounds at the established catching stations have not revealed any significant change in the situation calling for a resumption of control measures (which were not very effective anyway). It is curious however, that onchocerciasis surveys of "Kaduna Villages" - some of them no nearer the River than recently built Government housing estates - still produce high infection rates, although there is little evidence of infection amongst Government staff. Since the effective range for infection with onchocerciasis is over 5 miles from breeding sites in other parts of the North, the apparent failure of Simulium to infect or even to bite Senior Staff in Kaduna, little of which is more than 4 miles from breeding sites in the river, is interesting. (The writer has little doubt that senior staff in Kaduna bitten by Simulium would soon complain about it).

1964	5,720	1,835
Jan.-Oct. 1965	1,780	370

E P I D E M I C D I S E A S E S :

16. CEREBRO-SPINAL MENINGITIS.

1964 was not an 'epidemic year'. Only 2,027 cases of meningitis were recorded - the smallest number since 1958; 244 deaths were notified, a mortality rate of 12%. As usual, the apparent mortality rate during the early part of the epidemic season (July-December 1963) was higher than that during the latter part of the season (January-June 1964). April was the month of peak incidence, compared with March in 1962 and 1963. Comparative statistics are given below:

<u>Year</u>	<u>Cases</u>	<u>Peak month</u>	<u>Deaths</u>	<u>Mortality rate</u>
1959	2,610		257	9.8%
1960	36,285	April	2,448	7.5%
1961	13,476	April	1,146	8.5%
1962	23,693	March	1,810	7.6%
1963	3,067	March	409	13.3%
1964	2,027	April	244	12%

16.2. Sokoto Province again provided the largest number of cases (455) but the attack rate per 100,000 population, (based on the 1953 census), was no greater than that in Bauchi and Plateau, and less than that in Katsina and Zaria Provinces. Generally speaking, the 1963 prevalence rates were maintained during 1964 except in Adamawa/Sardauna and in Sokoto Provinces, where they fell sharply.

16.3. Comparative Provincial figures for 1963 and 1964 are given below; although the 1953 Census figures are out of date, they suffice for comparison, assuming an approximately proportional population increase in the various Provinces:

Province	No. of cases		Attack rate per 100,000 population		Increase or decrease
	1963	1964	1963	1964	
Adamawa/Sardauna	161	40	13.7	3.6	-
Bauchi	196	245	13.8	17.3	+
Benue	49	30	3.4	2.3	-
Bornu	126	97	7.9	6.1	-
Ilorin	8	5	1.5	0.9	-
Kabba	35	14	5.2	2.1	-
Kano	234	284	8.4	8.3	-
Katsina	364	365	25.1	24.6	-
Niger	30	37	4.2	5.2	+
Plateau	82	152	10.9	17.0	+
Sokoto	1,600	455	59.6	17.0	-
Zaria	139	172	17.3	21.3	+
Kaduna	11	131			
		<u>2,027</u>			

16.4. During the last inter-epidemic period, 1955 - 1958, each yearly total for the Region was under 1,000 cases; allowing for the increase in population at risk, and the probability of a greater notification-rate, (resulting from the increase in dispensary posts and better communications etc.), 1964 probably represents a near-return to an inter-epidemic level of meningitis cases. Many of these are probably not meningococcal at all, as discussed in the 1963 Report.

Region	No. of cases - Annual totals for			Population in 1964
	1957	1958	1959	
Aden	151	48	141	140
Bahari	128	243	113	110
Banda	40	30	24	24
Barni	158	97	108	108
Borja	8	5	7	7
Kabir	33	14	24	24
Kano	231	204	211	211
Katsina	361	303	273	273
Kiger	30	27	13	13
Plateau	83	158	103	103
Sokoto	1,000	453	393	393
Zaria	139	133	173	173
Zaria	41	111	111	111
Total	2,711	1,511	1,511	1,511

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VOLUNTARY CASES TREATED AT DISPENSARIES.

Province	S.S. Dispensaries			N.A. Dispensaries			Total of all S.S. Cases			Total S.S. Cases during 1963
	New	Clinical	Relapse	New	Clinical	Relapse	New	Clinical	Relapse	Total 1964
Adamawa	9	-	-	-	-	-	9	-	-	9
Bauchi	4	5	1	3	7	15	7	12	16	35
Benue	-	-	-	187	78	87	187	78	87	352
Bornu	-	-	-	-	-	-	-	-	-	-
Ilorin	-	-	-	-	-	-	-	-	-	-
Kabba	-	-	-	-	-	-	-	-	-	-
Kaduna C.T.	2	-	-	-	-	-	2	-	-	2
Kano	4	1	8	-	-	6	4	1	14	19
Katsina	-	-	-	5	1	1	5	1	1	7
Niger	4	10	4	16	4	14	20	14	18	52
Plateau	-	-	-	59	14	23	59	14	23	96
Sardauna	-	-	-	-	-	-	-	-	-	-
Sokoto	-	-	-	-	-	-	-	-	-	-
Zaria	9	2	11	57	27	34	66	29	45	140
TOTAL	32	18	24	327	131	180	359	149	204	712
										918

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VOLUNTARY CASES TREATED AT HOSPITALS.

Province	Government Hospitals			Mission Hospitals			Total for all Hospitals			Total for 1963
	New	Clinical	Relapse	New	Clinical	Relapse	New	Clinical	Relapse	Total 1964
Adamawa	-	-	-	-	3	-	-	3	-	3
Bauchi	24	5	13	-	-	-	24	5	13	42
Benue	28	15	20	34	15	13	62	30	33	125
Bornu	-	-	-	-	-	-	-	-	-	-
Ilorin	-	-	-	-	-	-	-	-	-	-
Kabba	-	-	-	-	-	-	-	-	-	-
Kaduna C.T.	-	-	-	-	-	-	-	-	-	-
Kano	6	2	3	-	-	-	6	2	3	11
Katsina	-	-	-	-	-	-	-	-	-	-
Niger	14	25	9	-	-	-	14	25	9	48
Plateau	-	-	-	13	-	1	13	-	1	14
Sardauna	-	-	-	-	-	-	-	-	-	-
Sokoto	-	-	-	-	-	-	-	-	-	-
Zaria	3	3	18	-	-	-	3	3	18	24
T O T A L	75	50	63	47	18	14	122	68	77	267
										351

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APPENDIX C.

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DISPENSARY AND TEAM RESURVEYS.

Province	Team Resurveys				Dispensary and Hospital Resurveys			
	Number Examined	S.S. Cases			Number Examined	S.S. Cases		Total S.S.
		New	Clinical	Relapse		New	Clinical	
Adamawa	29,816	66	17	25	-	-	-	-
Bauchi	164,701	105	2	10	26,025	5	2	5
Benue	175,151	134	16	8	89,204	56	5	7
Bornu	69,172	218	1	-	-	-	-	-
Ilorin	10,981	9	5	-	-	-	-	-
Kabba	-	-	-	-	-	-	-	-
Kaduna C.T.	-	-	-	-	-	-	-	-
Kano	236,532	38	3	1	7,974	4	2	4
Katsina	-	-	-	-	10,193	2	-	1
Niger	66,129	63	7	5	25,567	11	1	1
Plateau	70,879	78	8	8	27,533	33	-	4
Sardauna	10,948	3	-	2	-	-	-	-
Sokoto	-	-	-	-	-	-	-	-
Zaria	94,512	42	3	22	95,606	125	16	20
TOTAL	920,891	756	62	81	282,102	236	26	42
								304

MINISTRY OF HEALTH, NORTHERN NIGERIA

Sleeping Sickness Service, Annual Report
1st January - 31st December 1964EXAMINATION AND PENTAMIDINIZATION OF ALL MINES, RAILWAY
EXTENSION, M.O.W. ROAD AND TIMBER
EXTRACTION LABOURERS AND FAMILIES.

Province	Mines Labour and Families			Railway Extension Labour & Families			M.O.W. and Road Labour			Timber Extraction Labour.		Total Labour & Families Examined	Total No. with S.S.	Total Penta- midine given
	Number Examined	No. with S.S.	No. Pent. given	Number Examined	No. with S.S.	No. Pent. given	Number Examined	No. with S.S.	Number Examined	No. with S.S.				
Adamawa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bauchi	20,253	1	76	220	-	174	-	-	-	-	-	20,473	1	250
Benue	3,728	-	-	-	-	-	-	-	-	-	-	3,728	-	-
Bornu	-	-	-	578	2	578	-	-	-	-	-	578	2	578
Ilorin	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabba	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaduna C.T.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kano	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Katsina	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niger	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plateau	6,206	2	4,774	-	-	-	725	-	-	-	-	725	-	-
Sardauna	-	-	-	-	-	-	352	-	-	-	-	6,558	2	4,774
Sokoto	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zaria	6,775	4	4,132	-	-	-	559	-	-	215	2	7,649	6	4,132
T O T A L	36,962	7	8,982	798	2	752	1,636	-	215	2	39,611	11	9,734	

No. Pentamidine injections given:

1. Resettlement Area (Sabon Gida) 1,330
2. Villages in Kogin Kano focus 1,698
3. Kungana Habe (Adamawa Prov.) 322

GRAND TOTAL OF PROPHY-
LACTIC PENTAMIDINE
INJECTIONS = 13,074.

MINISTRY OF HEALTH, NORTHERN NIGERIA

Sleeping Sickness Service, Annual Report
1st January - 31st December 1964

PROVINCIAL DISTRIBUTION OF ALL CASES OF SLEEPING SICKNESS

Province	Team Resurveys	Disp. Resurveys	Mines, M.O.W., Timber Ext. Railway Ext. Surveys	S.S. Disps.	N.A. Disps.	Mines Disps.	G'ment Hosps.	Mission Hosps.	Total S.S. Cases	% of Total Figure
Adamawa	108	-	-	9	-	-	-	3	120	5.5
Bauchi	117	12	1	10	25	-	42	-	207	9.5
Benue	158	68	-	-	352	-	63	62	703	32.0
Bornu	219	-	2	-	-	-	-	-	221	10.1
Ilorin	14	-	-	-	-	-	-	-	14	0.6
Kabba	-	-	-	-	-	-	-	-	-	-
Kaduna C.T.	-	-	-	2	-	-	-	-	2	0.1
Kano	42	10	-	13	6	-	11	-	82	3.7
Katsina	-	3	-	-	7	-	-	-	10	0.5
Niger	75	13	-	18	34	-	48	-	188	8.6
Plateau	94	37	2	-	96	-	-	14	243	11.1
Sardauna	5	-	-	-	-	-	-	-	5	0.2
Sokoto	-	-	-	-	-	-	-	-	-	-
Zaria	67	161	6	22	118	-	24	-	398	18.1
TOTAL	899	304	11	74	638	-	188	79	2,193	100.0

MINISTRY OF HEALTH, NORTHERN NIGERIASleeping Sickness Service, Annual Report
1st January - 31st December 1964SUMMARY OF S.S. CASES FOUND AT RESURVEYS, 1964

App. F.

Type of Resurvey	Number Examined	New	Clinical	Relapse	Total S.S.	% S.S.
Team Resurveys	928,891	756	62	81	899	0.1
Dispensary & Hospital	282,102	236	26	42	304	0.11
Mines, M.O.W. Timber Ext.	39,611	11	-	-	11	0.02
T O T A L	1,250,604	1,003	88	123	1,214	0.10

SUMMARY OF VOLUNTARY S.S. CASES TREATED AT
HOSPITALS AND DISPENSARIES 1964

Cases attending at:	New	Clinical	Relapse	Total
Dispensaries	359	149	204	712
Hospitals	122	68	77	267
T O T A L	481	217	281	979

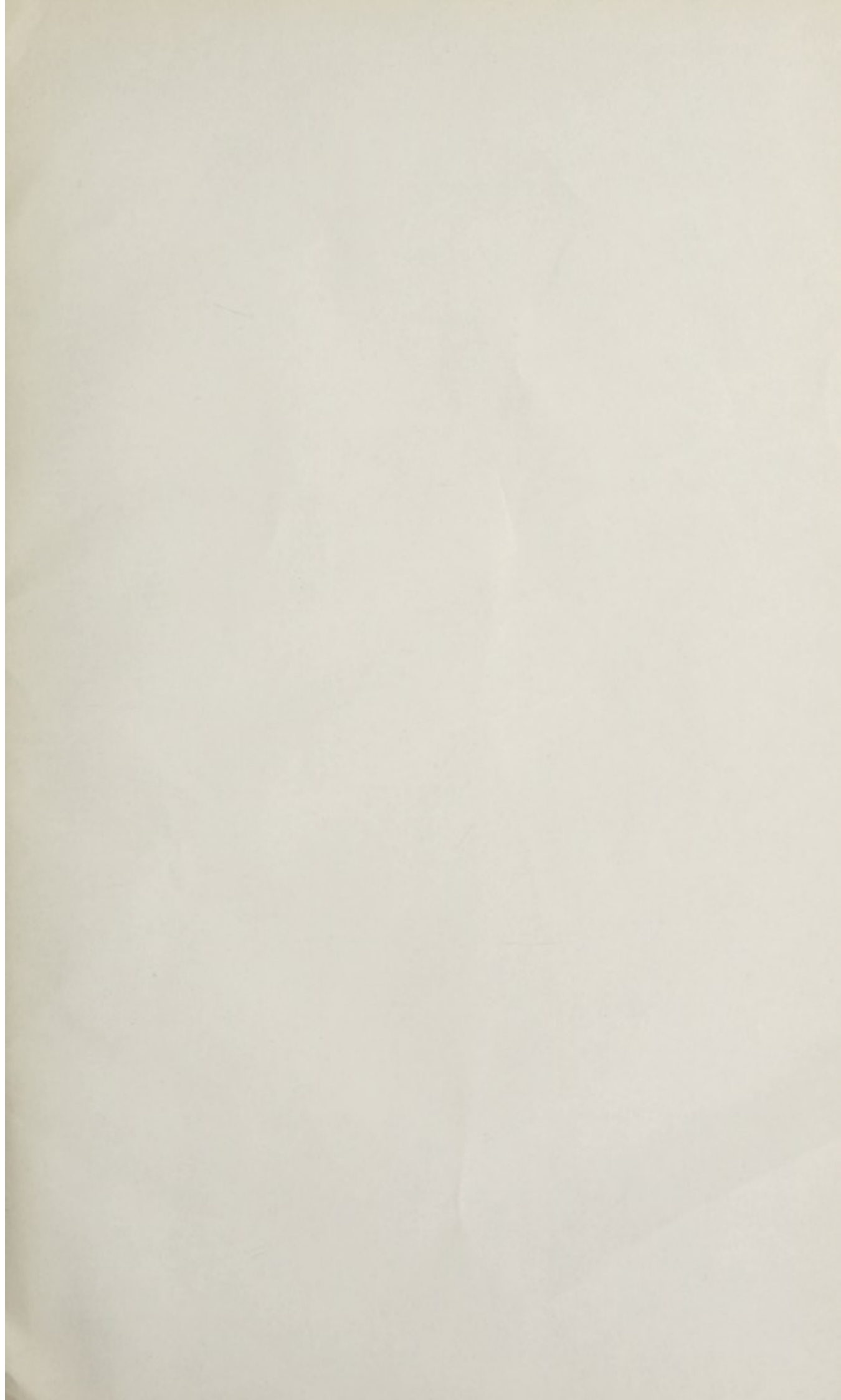


APPENDIX G.

YEARLY RECORD OF ALL CASES OF SLEEPING SICKNESS TREATED IN NORTHERN NIGERIA FROM 1946 TO 1964
RESURVEY AND VOLUNTARY SLEEPING SICKNESS CASES

Year	TEAM RESURVEY			DISPENSARY RESURVEY			MINES, TIMBER EXT. MOW & RLY. EXT. RESURVEY			TOTAL OF ALL RESURVEY CASES			VOLUNTARY S.S. CASES			GRAND TOTALS OF ALL CASES
	No. Examined	No. of S.S. Cases Discov-ered	Inf. Rate %	No. Examined	No. of S.S. Cases Discov-ered	Inf. Rate %	No. Examined	No. of S.S. Cases Discov-ered	Inf. Rate %	No. Examined	No. of S.S. Cases Discov-ered	Inf. Rate %	Att. Disp.	Att. Hosp.	Total Vol. Cases	
1946	354,206	3,481	0.98	115,578	1,080	0.93	35,446	227	0.64	505,230	4,788	0.94	8,153	3,220	11,373	16,161
1947	627,088	2,609	0.41	86,007	791	0.91	35,422	140	0.39	748,517	3,540	0.47	7,934	2,521	10,455	13,995
1948	570,976	3,860	0.67	264,525	1,828	0.69	12,725	36	0.28	848,226	5,724	0.67	5,506	2,345	7,851	13,575
Jan. 1949 - March 50	596,059	1,645	0.27	386,236	1,823	0.47	3,907	9	0.23	986,202	3,477	0.35	5,792	2,022	7,814	11,291
1950 - 51	536,543	1,899	0.35	264,479	1,067	0.40	20,571	109	0.52	821,593	3,075	0.37	2,839	1,187	4,026	7,101
1951 - 52	689,747	1,548	0.22	310,019	1,109	0.35	18,552	65	0.35	1,018,318	2,722	0.26	3,307	1,191	4,498	7,220
1952 - 53	628,607	1,140	0.18	402,761	925	0.23	12,843	26	0.20	1,044,211	2,091	0.20	2,712	1,257	3,969	6,060
1953 - 54	587,541	1,475	0.25	829,668	1,767	0.21	36,251	91	0.25	1,453,460	3,333	0.23	2,402	878	3,280	6,613
1954 - 55	959,238	2,240	0.23	657,533	1,241	0.18	56,451	150	0.26	1,673,312	3,631	0.21	2,179	1,114	3,293	6,924
1.4.55 - 31.12.55	794,077	1,960	0.24	224,775	450	0.20	53,772	102	0.19	1,072,624	2,512	0.23	1,544	841	2,385	4,897
1956	1,319,510	1,798	0.13	431,683	880	0.23	82,169	144	0.17	1,833,362	2,822	0.15	2,207	882	3,089	5,911
1957	1,135,764	1,660	0.14	463,367	885	0.19	89,124	112	0.12	1,688,255	2,657	0.15	1,701	687	2,388	5,045
1958	1,274,833	1,630	0.12	395,934	779	0.19	46,946	47	0.10	1,717,713	2,456	0.14	1,660	746	2,406	4,862
1959	1,127,912	1,643	0.14	361,911	727	0.20	38,069	43	0.11	1,527,892	2,413	0.15	1,543	580	2,123	4,536
1960	1,203,365	1,263	0.10	367,265	510	0.13	58,881	45	0.07	1,629,511	1,818	0.11	1,420	551	1,971	3,789
1961	1,397,201	744	0.05	291,228	408	0.14	43,783	22	0.05	1,732,212	1,174	0.06	1,111	593	1,704	2,878
1962	1,201,720	1,534	0.12	326,101	466	0.13	42,296	9	0.02	1,570,117	2,009	0.13	938	362	1,300	3,309
1963	1,240,252	1,062	0.08	326,417	381	0.11	50,233	27	0.05	1,616,902	1,470	0.09	918	351	1,269	2,739
1964	928,891	899	0.1	282,102	304	0.11	39,611	11	0.02	1,250,604	1,214	0.10	712	267	979	2,193





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